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UNITED STATES DISTRICT COURT FOR THE DISTRICT OF IDAHO

TB HOLDING COMPANY LLC, a Colorado limited liability company Plaintiff, v. J&S SIDING, an Idaho liability company Defendant	Case No.: **COMPLAINT FOR DAMAGES AND EQUITABLE RELIEF:** **Count 1) Infringement of US Patent 9,283,604;** **Count 2) Infringement of US Patent 9,732, 529;** **Count 3) Infringement of US Design Patent D602,612** **JURY TRIAL DEMANDED**

Plaintiff, TB Holding Company LLC, a limited liability company organized and existing under the laws of Colorado, complains and alleges against Defendant J&S Siding, a limited

liability company duly organized and existing under the laws of the State of Idaho, having its principal place of business located at 9673 S. Ammon Road, Idaho Falls, Idaho 83406, as follows:

JURISDICTION AND VENUE

1. This is an action arising under the patent laws of the United States, 35 U.S.C. § 1 et seq. Accordingly, this Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

2. This Court has personal jurisdiction over J&S Siding because it is organized under the laws of Idaho and has its principal place of business in Idaho.

3. Under 28 U.S.C. § 1400(b), venue is proper in this judicial district at least because J&S Siding is organized under the laws of Idaho and has a place of business in this judicial district.

Parties

4. Plaintiff TB Holding Company LLC (TB Holding), a limited liability company organized and existing under the laws of Colorado has a principal place of business at 3543 South County Road 5, Loveland, Colorado 80537. Plaintiff manufactures, distributes, and sells elongated metal simulated log siding panel in the state of Colorado.

5. Defendant J&S Siding is a limited liability company duly organized and existing under the laws of the State of Idaho, having its principal place of business located at 9673 S. Ammon Road, Idaho Falls, Idaho 83406. J&S Siding manufactures, distributes, and sells elongated metal simulated log siding panel in the present Judicial District.

Count 1

Infringement of US Patent 9,283, 604 against Defendant

6. Ted Baum Jr. is the sole inventor of the invention claimed in US Patent 9,283,604 ('604 Patent) entitled "*Metal Simulated Log Siding Panel with Hew Lines and Method of Making and Using Same*" issued March 15, 2016. A copy of the patent is attached as Exhibit A.

7. Ted Baum Jr. at the time of issuance of the '604 Patent on May 15, 2016, owned all right, title, and interest in and to the '604 Patent.

8. Ted Baum Jr. maintained ownership of all right, title, and interest in and to the '604 Patent until he assigned all right, title, and interest in and to the '604 Patent to Plaintiff TB Holding.

9. A copy of the assignment to TB Holding was executed on June 28, 2018, by Ted Baum Jr. and recorded at the United States Patent Office on June 29, 2018, under reel 046243 frame 0010. A copy of the assignment is attached hereto as Exhibit B.

10. TB Holding owns all right, title and interest in and to the '604 Patent.

11. The '604 Patent is valid and subsisting.

12. The '604 Patent has been in full force and effect since issuance.

13. On around 2009 Defendant, J & S Siding, purchased a series of components from Plaintiff TB Holding for connection to a conventional seamless siding machine.

14. Plaintiff installed the components on the conventional seamless siding machine, hereinafter "first conventional siding machine," to provide Defendant with a first attachment device and a first apparatus in around 2009.

15. Claims 1-13 of the '604 Patent read on the first attachment.

16. Claims 14-25 of the '604 Patent read on the first apparatus.

17. In around 2015 Defendant instructed a person, hereinafter Person A, to build pirated copies of the components provided to it by Plaintiff. Defendant installed the components on a second conventional siding machine.

18. The pirated copies of the components provided Defendant with a pirated second attachment and the installation of the components provided Defendant with a second pirated apparatus. Defendant uses the second pirated attachment and second pirated apparatus to manufacture elongated metal simulated log siding panels and sell said siding in Idaho.

19. In the alternative to paragraphs 17 and 18, if the Defendant installed the components on the first conventional siding machine than the pirated copies of the components provided Defendant with a pirated second attachment as claimed in Claims 1-13. Defendant uses the second pirated attachment to manufacture elongated metal simulated log siding panels and sells said siding in Idaho.

20. In the alternative to paragraphs 17, 18 and 19, Defendant uses a second pirated attachment and second pirated apparatus. Defendant uses the second pirated attachment and second pirated apparatus to manufacture elongated metal simulated log siding panels and sells said siding in Idaho.

21. For the nonlimiting reasons set forth below Claim 1 of the ‘604 Patent reads on the second pirated attachment.

22. For the nonlimiting reasons set forth below Claim 14 of the ‘604 Patent reads on the second pirated apparatus.

23. The construction and installation of the pirated components to provide the second pirated attachment, and second pirated apparatus was without the permission of Plaintiff.

24. In the alternative to paragraph 23 the construction and use of the second pirated attachment and second pirated apparatus was and is without the permission of Plaintiff.

25. The below interlineated photographs in paragraph 31 show an exemplar attachment device for producing an elongated metal simulated log siding; it further shows an exemplar

apparatus for producing elongated metal simulated log siding having the shown attachment device connected thereto. The exemplar is hereinafter referred to as the "Representative Exemplar."

26. Claim 1 is a representative claim for an attachment device protected by the '604 Patent.

27. Claim 1 of the '604 Patent recites the below elements; the letters have been added to cross-reference the claim features to the corresponding features in the Representative Exemplar and to cross-reference the features in the claim to supporting exemplary description of such features in the body of the '604 Patent.

28. Claim 1 of the '604 Patent recites:

A) a log forming attachment for connection to a conventional seamless siding forming machine to create an elongated metal simulated log siding panel from a different panel configuration created by and delivered from the conventional siding forming machine, comprising:

B) a plurality of circular disks located to contact one side of the panel configuration delivered from the siding forming machine;

C) a plurality of circular elastomeric rollers located to contact the other side of the panel configuration at a location opposite from the circular disks; and wherein:

D) each circular disk is associated with an elastomeric roller;

E) each disk and associated elastomeric roller are positioned to receive between them the panel configuration delivered from the siding forming machine;

F) each disk and associated elastomeric roller having a relative separation between them which causes the delivered panel configuration to be compressed into the elastomeric roller by the disk as the delivered panel configuration moves between the associated disks and rollers;

G) the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk; and

H) each induced permanent bend simulates a hew line in the simulated log siding panel.

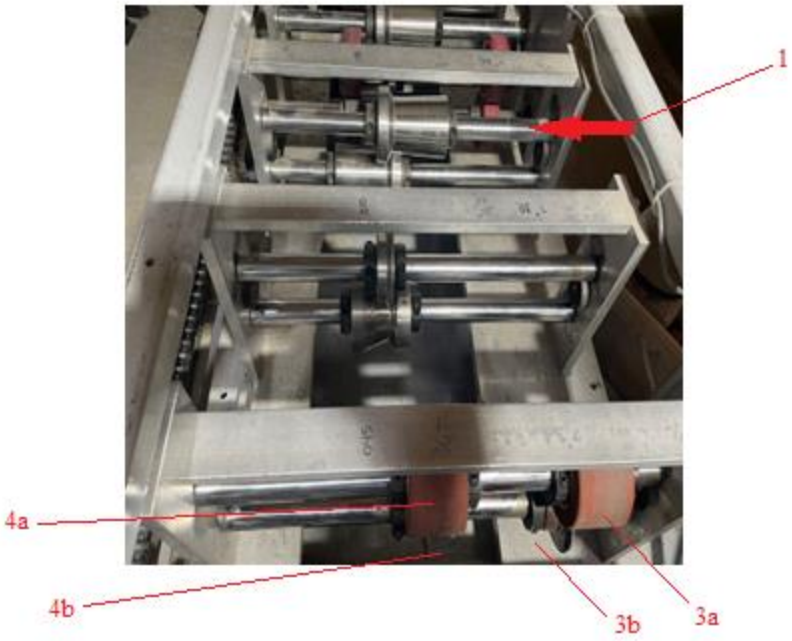
29. Support and exemplary description for Claim 1A's recitation can be found at 7:22-29, 43-66; 8:13-27 of the '604 Patent, Exhibit A.

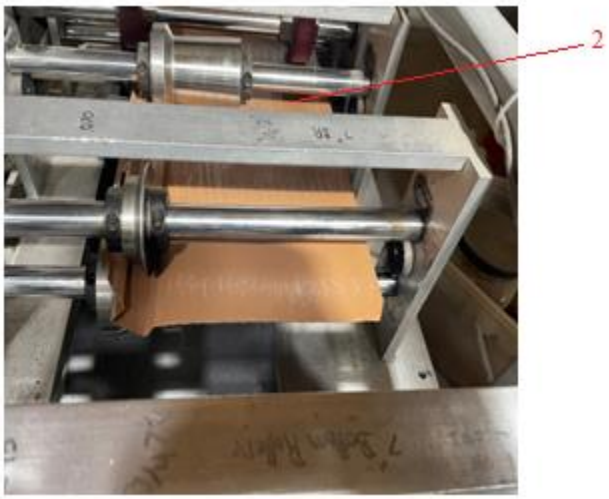
30. The above citations in part recite;

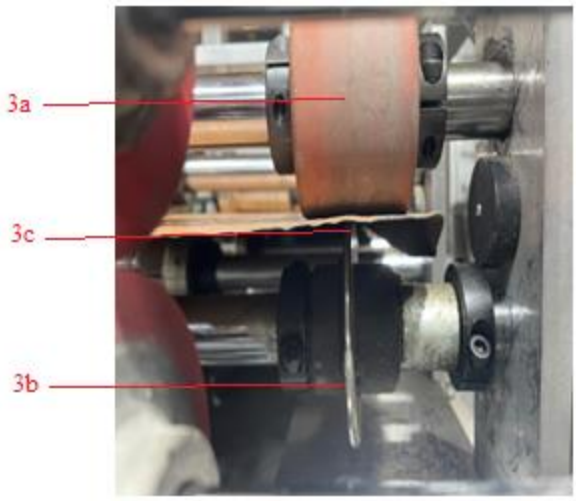
The seamless siding forming machine 36 is conventional except for certain modifications described below. A log forming attachment 40**,** shown in FIGS. **18-23,** is attached to a rear end of the siding forming machine **36.** The log forming attachment **40** and the below-described modifications to the siding forming machine **36** transform a partial seamless siding panel configuration **72** (FIG. **13)** into the simulated log siding panel **20** (FIG. **2).** See 7:22-29,

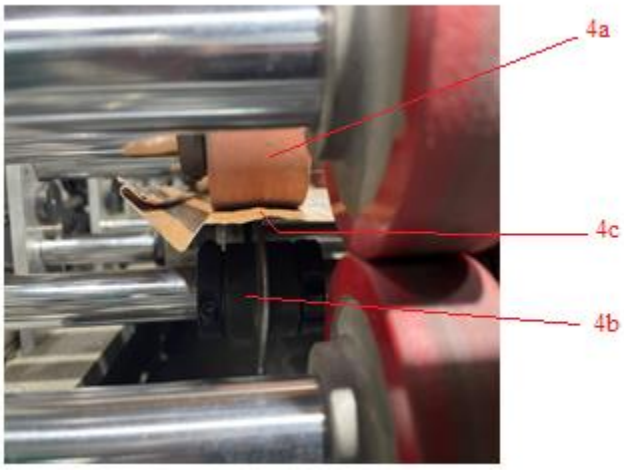
The next series of metal forming stations of the machine **36** includes conventional roller dies **62, 63** and **68** shown in FIG. **9** which produce the bends in the metal strip **44** which define the attachment edge **22,** the offset wall portion **24,** and an intermediate portion **65** which will become the curved portion **23** of the simulated log siding panel **20** (FIG. **2).** As shown in FIG. **11,** the first bends created by the die **62** (FIG. 9) extend the offset wall portion **24** a slight angle relative to the attachment edge **22** and the intermediate portion **65.** As shown in FIG. **12,** the next bends created by the die **63** (FIG. **9)** create a greater angle of the offset wall portion **24** relative to the attachment edge **22** and the intermediate portion **65.** See 8:13-19.

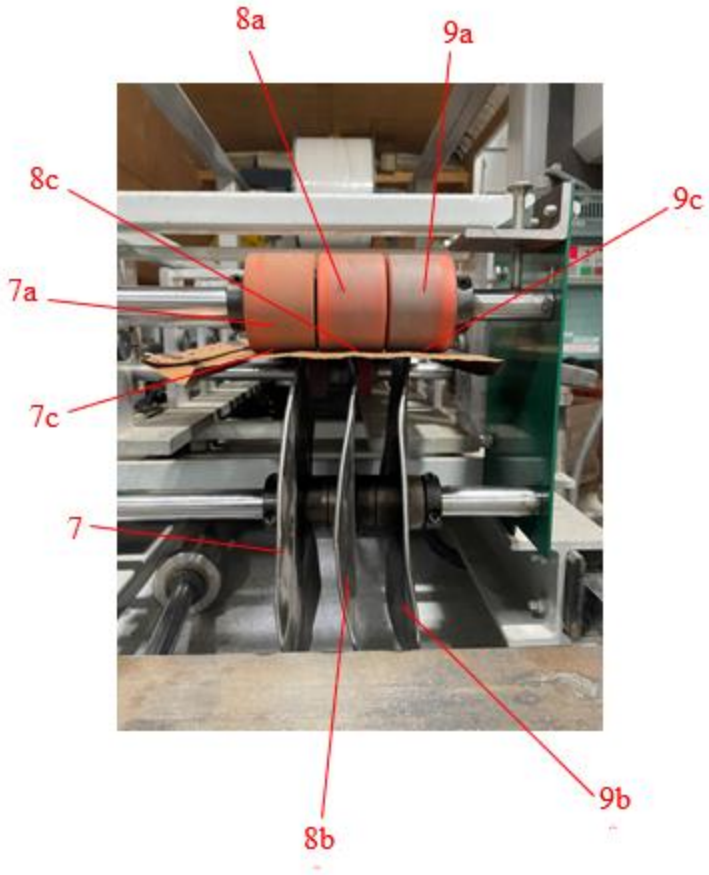
31. The Representative Exemplar is shown in the below interlineated photographs:

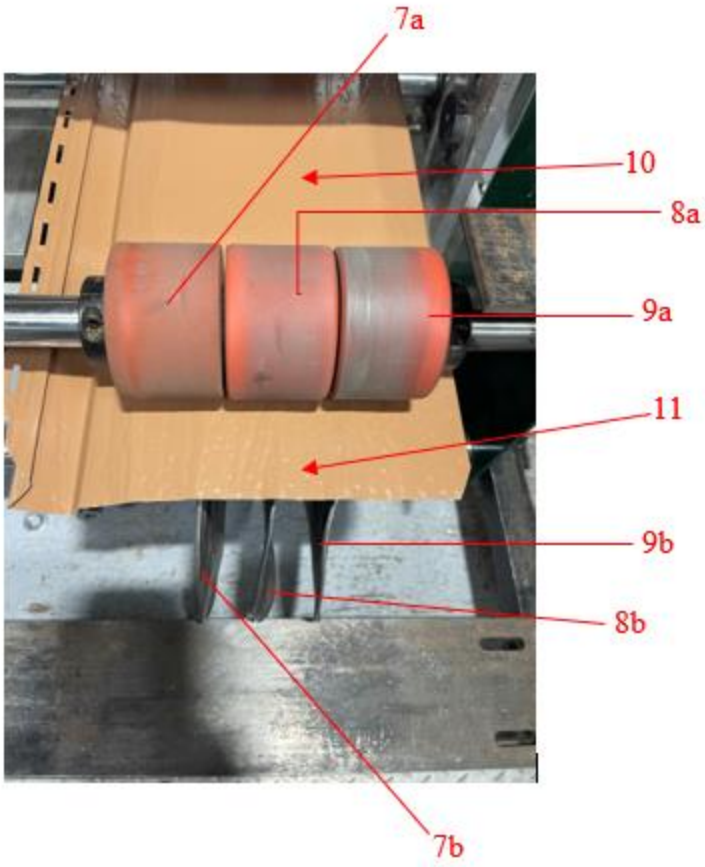

1
4a
4b
3b
3a


2


3a
3c
3b


4a
4c
4b


8a
9a
8c
9c
7a
7c
7
9b
8b



32. In the Representative Exemplar the machine at and upstream of reference 1 shows a conventional seamless siding forming machine. The siding machine has rollers of the type referenced in the specification at 8:13-19.

33. References 3a, 3b, 4a, 4b, 7a, 7b, 8a, 8b, 9a, ,9b show a log forming attachment for connection to the conventional seamless siding forming machine shown at reference 1. A portion of the attachment 7a, 7b, 8a, 8b, 9a, 9b is down stream of attachment portion 3a, 3b, 4a, 4b.

34. The attachment is for connection to the seamless siding machine because the attachment is adapted to connect to a frame through the attachment's axles; the frame connects the attachment to the conventional machine 1.

35. The second pirated attachment is like that shown and includes at least a plurality of the disks and rollers from the group of rollers and disks at 3a, 3b, 4a, 4b, 7a, 7b, 8a, 8b, 9a, ,9b . The plurality of disks and rollers is for connection to the seamless siding machine because like the Representative Exemplar, the second pirated attachment is adapted to connect to a frame through the attachment's axles; the frame connects the attachment to a conventional machine like the machine at reference 1. A difference exists in the disks shown and those of the second pirated attachment. The disks have different contours at their perimeter and may have different diameters.

36. Claim 1A's recitation of a log forming attachment for connection to a conventional seamless siding forming machine reads on the Representative Exemplar attachment for connection to the machine shown at 1 as described above with reference to numbers 1, 3a, 3b, 4a, 4b, 7a, 7b, 8a, 8b, 9a, 9b.

37. Claim 1A's recitation of a log forming attachment for connection to a conventional seamless siding forming machine reads on the second pirated attachment for connection to the machine shown at 1 as described above with reference to numbers 1, 3a, 3b, 4a, 4b, 7a, 7b, 8a, 8b, 9a, and 9b.

38. The attachment of the Representative Exemplar shown in the photos in combination with the panel shown at position 2 and 11 show a log forming attachment for connection to a conventional siding machine to create an elongated metal simulated log siding panel shown at position 11 from a different panel configuration shown at position 2. The panel at position 2 created by and delivered from the conventional siding forming machine at 1.

39. The second pirated attachment also is a log forming attachment to create an elongated metal simulated log siding panel like that shown at position 11 from a different panel

configuration like that shown at position 2. The panel at position 2 created by and delivered from a conventional siding forming machine like that shown at 1. The difference between panel 11 and the panel like 11 is the contour of hew lines in the panel like panel 11, possibly the amount of the plurality of hew lines in the panel, possibly the wood grain, and possibly the width of the panel, and; the difference in the panel like panel 2 possibly being grain lines and width of the panel; and the difference in the attachment being the contour of the disks, possibly the diameter of the disks and possibly the number of disks and corresponding rollers,.

40. On information and belief, the second pirated attachment has two rollers and associated disks at positions like the position of rollers and disks at 3a,3b; 4a, 4b.

41. Claim 1A's recitation of a log forming attachment to create an elongated metal simulated log siding panel from a different panel configuration created by and delivered from the conventional siding forming machine reads on the Representative Exemplar shown in the photos with reference to the panel shown at positions 2 and 11. The panel at position 2 created and delivered by the machine at 1.

42. Claim 1A's recitation of a log forming attachment to create an elongated metal simulated log siding panel from a different panel configuration created by and delivered from the conventional siding forming machine also reads on the second pirated attachment as described above to create an elongated metal simulated log, as described above with reference to the siding panel like that shown at position 11 from a different panel configuration like that described above with reference to the panel at position 2; the panel like the panel at position 2 created by and delivered from the conventional siding forming machine like that shown at reference 1.

43. The Representative Exemplar shows the attachment includes a plurality of circular disks 3b, 4b, 7b, 8b, 9b. The disks contact one side of the panel shown above just upstream of positions

3c, 4c 7c, 8c, 9c. The panel at positions just upstream of positions 3c, 4c, 7c, 8c, 9c is delivered from the panel at position 2. The panel at position 2 created and delivered by the conventional machine at 1.

44. The second pirated attachment also includes a plurality of circular disks like at least a plurality of the disks shown in the photos at 3b, 4b, 7b, 8b and 9b. The disks of the second pirated attachment differ from the Representative Exemplar in the contours of their edge at their perimeter and perhaps their diameter. They contact one side of the panel configuration in a manner like the panel shown just upstream of positions 3c, 4c, and/or 7c, 8c, 9c. The panel because the attachment may have less disks may have less points of contact than the panel just upstream of 3c, 4c, 7c, 8c, 9c.

45. Further, with respect to the second pirated attachment, a panel like the panel at position 2 is delivered to reside in a combination of positions selected from positions like the panel shown just upstream of positions 3c, 4c, 7c, 8c, 9c from the conventional siding machine like the siding forming machine at item 1. The panel like panel 2 as described above is created by a conventional machine like the machine at 1.

46. Item B of Claim 1 which recites a plurality of circular disks located to contact one side of the panel configuration delivered from the siding forming machine reads on the Representative Exemplar as described above with reference to numbers 1, 2, 3b, 3c; 4b, 4c; 7b, 7c; 8b, 8c; 9b, 9c.

47. Item B of Claim 1 also reads on the second pirated attachment as described above with reference to numbers 1, 2, 3b, 3c; 4b, 4c; 7b, 7c; 8b, 8c; 9b, 9c.

48. The Representative Exemplar shows the attachment includes a plurality of circular elastomeric rollers 3a, 4a, 7a, 8a, 9a located to contact the other side of the panel configuration

in a manner like the panel shown just upstream of positions 3c, 4c, 7c, 8c, 9c at a location opposite from the circular disks 3b, 4b, 7b, 8b, 9b.

49. The second pirated attachment includes a plurality of circular elastomeric rollers like at least a plurality of those shown at 3a, 4a, 7a, 8a, 9a located to contact the other side of the panel configuration like positions selected form the panel positions shown just upstream of positions 3c, 4c, 7c, 8c, 9c and at a location opposite from the plurality circular disks as described above with reference to disks 3b, 4b, 5b, 7b, 8b an 9b.

50. Item C of Claim 1 which recites a plurality of circular elastomeric rollers located to contact the other side of the panel configuration at a location opposite from the circular disks reads on the Representative Exemplar as described above with reference to numbers 3a, 4a, 7a, 8a, 9a; 3b, 4b, 7b, 8b, 9b; and 3c, 4c, 7c, 8c, 9c.

51. Item C of Claim 1 also reads on the second pirated attachment as described above with reference to numbers 3a, 4a, 7a, 8a, 9a; 3b, 4b, 7b, 8b, 9b; and 3c, 4c, 7c, 8c, 9c.

52. The Representative Exemplar shows each circular disk 3b, 4b, 7b, 8b, 9b is associated with an elastomeric roller 3a, 4a, 7a, 8a, 9a.

53. The second pirated attachment includes the plurality of circular disks wherein each circular disk selected from disks in the photos is associated with an elastomeric roller like the rollers shown in the photos. The difference in the disks, number of disks and associated rollers from the photos as described above.

54. Item D of Claim 1 which recites each circular disk is associated with an elastomeric roller reads on the Representative Exemplar for the reasons explained above with respect to the correlation of rollers and disks.

55. Item D of Claim 1 also reads on the second pirated attachment as described above for the reasons explained above with respect to the correlation of rollers and disks.

56. The Representative Exemplar shows each disk 3b, 4b, 7b, 8b, 9b and associated elastomeric roller 3a, 4a, 7a, 8a, positioned to receive between them the panel configuration delivered from position 2 and delivered from the siding forming machine 1. The panel at position 2 is received as shown just upstream of positions 3c, 4c, 7c, 8c, 9c.

57. The second pirated attachment like the attachment in the photos has each of its disks associated with one of its rollers to receive a panel at positions selected from a combination of positions from the positions just upstream of 3c, 4c, 7c, 8c, 9c; said panel delivered from a position like position 2. Because the attachment may have less disks and associated rollers the number of points of contact may be less than in the photos.

58. Item E of Claim 1 which recites each disk and associated elastomeric roller are positioned to receive between them the panel configuration delivered from the siding forming machine reads on the Representative Exemplar described above with reference to numbers 3a, 4a, 7a, 8a, 9a; 3b, 4b, 7b, 8b, 9b; and 3c, 4c, 7c, 8c, 9c.

59. Item E of Claim 1 also reads on the second pirated attachment as described above with reference to numbers 3a, 4a, 7a, 8a, 9a; 3b, 4b, 7b, 8b, 9b; and 3c, 4c, 7c, 8c, 9c.

60. Respecting the Representative Exemplar, each disk and associated elastomeric roller of the Representative Exemplar has a relative separation between them which causes the delivered panel configuration shown just upstream of positions 3c, 4c, 7c, 8c, 9c to be compressed into the elastomeric roller by the disk as the delivered panel configuration at positions 2 and 10 moves between the associated disks and rollers.

61. Each disk and roller of the second pirated attachment has a relative separation between them which causes the delivered panel configuration like that shown at any combination of the positions just upstream of 3c, 4c, 7c, 8c, 9c to be compressed into the elastomeric roller by the disk as the delivered panel, like the panel at positions 2 and 10, moves between the associated disks and rollers. The difference between panel 2 and the panel like panel 2 as described above. The difference between panel 10 and the panel like panel 10 being possibly in the amount of the and contour of the hew lines and gain lines and width.

62. Item F of Claim 1 which recites each disk and associated elastomeric roller having a relative separation between them which causes the delivered panel configuration to be compressed into the elastomeric roller by the disk as the delivered panel configuration moves between the associated disks and rollers reads on the Representative Exemplar as described above with reference to the relative separation of the disks and associated rollers compressing the delivered panel.

63. Item F of Claim 1 which recites each disk and associated elastomeric roller having a relative separation between them which causes the delivered panel configuration to be compressed into the elastomeric roller by the disk as the delivered panel configuration moves between the associated disks and rollers also reads on the second pirated attachment as described above with reference to the relative separation of the disks and associated rollers compressing the delivered panel.

64. The Representative Exemplar shows the compression of the panel configuration into the elastomeric roller 3a, 4a, at positions just upstream of positions 3c and 4c; the panel moved downstream from position 2; it further shows the compression of the panel moved downstream from position 10 into the elastomeric roller 7a, 8a, 9a at positions just upstream 7c, 8c, 9c, the

compression induces a permanent bend in the panel configuration defined by the circular disk. The disks being disks in the photos; the bends from disks 3b, 4b shown at 3c, 4c, 10 and 11 and the bends from disks 7b, 8b, 9b shown at 7c, 8c, 9c and 11.

65. The second pirated attachment creates compression of the panel configuration into a combination of a plurality of rollers selected from rollers 3a, 4a, 7a, 8a, 9a. The combination of rollers including at least some rollers at positions like 3a, 4a; the panel at positions just upstream of a combination of positions including at least some positions like positions just upstream of 3c and 4c; the panel moved downstream from a position like position 2.

66. Further regarding the pirated attachment, the compression of the panel in a combination of rollers including at least some rollers at 7a, 8a, 9a at a plurality of positions at least some just like the positions upstream of positions like 7c, 8c, 9c; the panel moved downstream from a position like position 10.

67. Regarding the pirated attachment, the compression into elastomeric rollers induces a permanent bend in the panel configuration defined by the circular disks. The disks being disks like the disks described above with respect to the pirated attachment. The bends from the combination of disks at least some disks positioned like disks 3b, 4b; the panel at positions including at least some like positions just upstream of 3c, 4c, 10 and 11; and the bends from the combination of disks at least some disks positioned like some of disks at 7b, 8b, 9b, the bends in the panel at positions including some positions like some of those just upstream of 7c, 8c, 9c and 11.

68. Element G of Claim 1 which recites the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular

disk reads on the Representative Exemplar as described above with reference to the compression of the panel into the rollers by the disks to produce a permanent bend in the panel.

69. Element G of Claim 1 also reads on the second pirated attachment as described above with reference to the compression of the panel into the rollers by the disks of the second pirated attachment to produce permanent bends in the panel.

70. Each induced permanent bend created from the compression of the panel in the rollers by the disks of the Representative Attachment simulates a hew line in the simulated log siding panel as shown at panel position 11.

71. Each induced permanent bend created from the compression of the panel in the rollers by the disks of the second pirated attachment simulates a hew line in the simulated log siding panel like the panel shown at 11; the difference being the contours of the hew lines and possibly the wood grain lines and possibly the amount of the plurality of hew lines and possibly the width of the panel.

72. Element H of Claim 1 which recites each induced permanent bend simulates a hew line in the simulated log siding panel reads on the Representative Exemplar as described above with reference to the bends simulating hew lines in the simulated log.

73. Element H of Claim 1 which recites each induced permanent bend simulates a hew line in the simulated log siding panel reads on the second pirated attachment as described above with reference to the bends simulating hew lines in the simulated log.

74. Claim 14 of the ‘604 Patent recites the below elements; the letters have been added to cross-reference the claim features to the corresponding features in the Representative Exemplar.

75. Claim 14 of the ‘604 Patent recites:

A) apparatus for creating an elongated metal simulated log siding panel from a continuous strip of metal, comprising:

B) a seamless siding forming machine which creates a panel configuration from the strip of metal, the panel configuration being different from the simulated log siding panel;

C) a plurality of circular disks connected to the machine and located to contact one side of the panel configuration;

D) a plurality of circular elastomeric rollers connected to the machine and located to contact the other side of the panel configuration at a location opposite from the circular disks; and wherein:

E) each circular disk is associated with an elastomeric roller; each disk and associated elastomeric roller are positioned to receive between them the panel configuration;

F) each disk and associated elastomeric roller having a relative separation between them which compresses the panel configuration into the elastomeric roller by the disk as the panel configuration moves between the associated disks and rollers;

G) the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk; and

H) each induced permanent bend simulates a hew line in the simulated log siding panel.

76. The structure in the above photos show an apparatus for creating an elongated metal simulated log siding panel from a continuous strip of metal.

77. The second pirated apparatus is an apparatus for creating an elongated metal simulated log siding panel from a continuous strip of metal.

78. Item A of Claim 14 which recites apparatus for creating an elongated metal simulated log siding panel from a continuous strip of metal reads on the apparatus shown in the photos and described above with respect to Claim 1.

79. Item A of Claim 14 reads on the second pirated apparatus as described above with respect to Claim 1.

80. The Representative Exemplar shows a seamless siding forming machine at and upstream of 1 which creates a panel configuration from the strip of metal at position 2, the panel configuration being different from the simulated log siding panel at position 11 in terms of the contour of hew lines and wood grain.

81. The second pirated apparatus has a seamless siding forming machine like machine 1 which like the machine at 1 creates a panel configuration from a strip of metal, the panel configuration being like the panel at position 2, the panel different forming the simulated log siding panel like the panel at 11; the panel like 11 differing from panel 11 in terms of the contour of the hew lines and possibly the wood grain lines and possibly the number of the plurality of hew lines and possibly the width of the panel; the difference between panel 2 and the panel like panel 2 comprising possibly the wood grain lines and panel width.

82. Item B of Claim 14 recites a seamless siding forming machine which creates a panel configuration from the strip of metal, the panel configuration being different from the simulated log siding panel reads on the Representative Exemplar for the reasons stated above with regards to the machine at and upstream of 1 and the panel at position 2 and 11.

83. Item B of Claim 14 recites a seamless siding forming machine which creates a panel configuration from the strip of metal, the panel configuration being different from the simulated

log siding panel also reads on the second pirated apparatus for the reasons stated above with regards to the machine like the machine at 1 and panels like the panels at 2 and 11.

84. The Representative Exemplar includes a plurality of circular disks 3b, 4b, 7b, 8b, 9b connected to the machine and located to contact one side of the panel configuration just upstream of the panel at 3c, 4c, 7c, 8c, 9c.

85. The second pirated apparatus has a plurality of circular disks from disks like the disks 3b, 4b, 7b, 8b, 9b, except for the contours of the disks at the perimeter, and possibly the diameter of the disks and number of disks, connected to the machine like machine 1 located to contact one side of the panel configuration like the configuration just upstream of the panel at 3c, 4c, 7c, 8c, 9c; except because there may be less disks associated with the pirated attachment the points of contact may be fewer than the panel just upstream of 3c, 4c, 7c, 8c, 9c.

86. Item C of Claim 14 which recites plurality of circular disks connected to the machine and located to contact one side of the panel configuration reads on the Representative Exemplar described above as having the plurality of disks 3b, 4b, 7b, 8b, 9b to contact the panel configuration just upstream of the panel at3c, 4c, 7c, 8c, 9c.

87. Item C of Claim 14 also reads on the second pirated apparatus described above as having the plurality of disks like disks 3b, 4b, 7b, 8b, 9b as described above to contact the panel configuration as described above just upstream of the of the panel like the panel at 3c, 4c, 7c, 8c, 9c; again because there may be less disks associated with the pirated attachment, the points of contact may be fewer than the panel just upstream of 3c, 4c, 7c, 8c, 9c. Also, the contours of the disks at their perimeter may be different from the disks shown in the photos; and the diameter of the disks may differ and the amount of disks may differ.

88. The Representative Exemplar shows a plurality of circular elastomeric rollers 3a, 4a, 7a, 8a, 9a; connected to the machine 1 and located to contact the other side of the panel configuration opposite from the circular disks 3b, 4b, 7b, 8b, 9b; the configuration opposite the disks just upstream of the panel it at 3c, 4c, 7c, 8c, 9c.

89. The second pirated apparatus has a plurality of circular elastomeric rollers selected from a group of rollers like rollers 3a, 4a, 7a, 8a, 9a; connected to the machine like the machine at 1; the rollers of the second pirated apparatus located to contact the other side of the like panel configuration opposite from the plurality of disks selected from the group of disks, as described above, like disks 3b, 4b, 7b, 8b, 9b; the panel configuration opposite the disks just upstream of the panel like the panel at 3c, 4c, 7c, 8c, 9c; again except because there may be less disks associated with the pirated attachment, the points of contact may be fewer than the panel just upstream of 3c, 4c, 7c, 8c, 9c.

90. Item D of Claim 14 which recites a plurality of circular elastomeric rollers connected to the machine and located to contact the other side of the panel configuration at a location opposite from the circular disks reads on the Representative Exemplar discussed above as having elastomeric rollers located on the panel configuration opposite disks.

91. Item D of Claim 14 which recites a plurality of circular elastomeric rollers connected to the machine and located to contact the other side of the panel configuration at a location opposite from the circular disks also reads on the second pirated apparatus discussed above as having a plurality of circular elastomeric rollers from a group of rollers like rollers 3a, 4a, 7a, 8a, 9a located at the other side of the panel configuration like the panel just upstream of 3c, 4c, 7c, 8c, 9c; again except because there may be less disks associated with the pirated attachment the points of contact may be fewer than the panel just upstream of 3c, 4c, 7c, 8c, 9c.

92. The Representative Exemplar shows each circular disk 3b, 4b, 7b, 8b, 9b is associated with an elastomeric roller 3a, 4a, 7a, 8a, 9a; each disk and associated elastomeric roller are positioned to receive between them the panel configuration from the position at 2; in more detail the panel at 2 moves downstream to a position just upstream of 3c, 4c to reside between rollers and disks 3a, 3b; 4a, 4b; the panel continues to move downstream to a position just upstream of the panel at 7c, 8c, 9c.

93. The second pirated apparatus has each of its plurality of circular disks as described above from the group of disks like disks 3b, 4b, 7b, 8b, 9b associated with a plurality of elastomeric rollers from the group of rollers like rollers 3a, 4a, 7a, 8a, 9a; each disk and associated elastomeric roller are positioned to receive between them the panel configuration moved from a position like the configuration at 2; in more detail the panel like that at 2 moves downstream to a position just upstream of positions like positions 3c, 4c 7c, 8c, except because there may be less disks associated with, the pirated attachment the points of contact may be fewer than the panel just upstream of 3c, 4c, 7c, 8c, 9c.

94. Item E of Claim 14 which recites each circular disk is associated with an elastomeric roller; each disk and associated elastomeric roller are positioned to receive between them the panel configuration reads on the Representative Exemplar discussed above as having each circular disk 3b, 4b, 7b, 8b, 9b is associated with an elastomeric roller 3a, 4a, 7a, 8a, 9a; positioned to receive between them the panel configuration from position 2.

95. Item E of Claim 14 which recites each circular disk is associated with an elastomeric roller; each disk and associated elastomeric roller are positioned to receive between them the panel configuration also reads on the second pirated apparatus described above as having each

circular disk associated with an elastomeric roller; positioned to receive between them the panel configuration from a position like position 2.

96. The Representative Exemplar shows each disk and associated elastomeric roller having a relative separation between them which compresses the panel configuration just upstream of panel positions 3c, 4c, 7c, 8c. 9c into the elastomeric roller by the disk as the panel configuration positioned at positions 2 and 10 moves between the associated disks and rollers;

97. The second pirated apparatus' disks and rollers have a relative separation between them which causes the delivered panel configuration like that shown at positions just upstream of 3c, 4c, 7c, 8c, 9c to be compressed into the elastomeric roller by the disk as the delivered panel, like the panel at positions 2 and 10, moves between the associated disks and rollers; except because there may be less disks associated with the pirated attachment the points of contact may be fewer than the panel just upstream of 3c, 4c, 7c, 8c, 9c. The difference between the panel like panel 10 and panel 10 being the contour of the hew lines and possibly the amount of hew lines and possibly the wood grain lines and width of the panel.

98. Item F of Claim 14 which recites each disk and associated elastomeric roller having a relative separation between them which compresses the panel configuration into the elastomeric roller by the disk as the panel configuration moves between the associated disks and rollers reads on the Representative Exemplar as described above as having the panel compressed between the rollers and disks.

99. Item F Claim 14 which recites each disk and associated elastomeric roller having a relative separation between them which compresses the panel configuration into the elastomeric roller by the disk as the panel configuration moves between the associated disks and rollers reads on

the second pirated apparatus as described above as having the panel compressed between the rollers and disks.

100. The Representative Exemplar shows the compression of the panel configuration into the elastomeric roller 3a, 4a, at positions just upstream of positions 3c and 4c; the panel moved downstream from position 2; it further shows the compression of the panel moved downstream from position 10 into the elastomeric roller 7a, 8a, 9a at positions just upstream of 7c, 8c, 9c induces a permanent bend in the panel configuration defined by the circular disk. The disks being disks in the photos; the bends from disks 3b, 4b shown at 3c, 4c, 10 and 11 and the bends from disks 7b, 8b, 9b shown at 7c, 8c, 9c and 11.

101. The second pirated attachment creates compression of the panel configuration into a plurality of elastomeric rollers selected from a group of rollers like rollers 3a, 4a, 7a, 8a, 9a at positions just upstream of positions like positions 3c 4c; 7c, 8c, 9c; the panel moved downstream from a position like position 2 to a position like position 10 and 11; the compression forms the permanent bends from the plurality of disks from the group of disks, as described above, like disks 3b, 3c, 7b, 8b, 9b. Notably because there may be less disks associated with the pirated attachment the points of contact may be fewer than in the panel just upstream of 3c, 4c, 7c, 8c, 9c. Also, the contours of the bends differ in the panel associated with the second pirated apparatus and the number of bends may differ.

102. Item G of Claim 14 which recites the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk reads on the Representative Exemplar described above as having the rollers and disks forming a permanent bend in the panel.

103. Item G of Claim 14 which recites the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk reads on the second pirated apparatus described above as having the rollers and disks forming a permanent bend in the panel.

104. With respect to the Representative Exemplar, each induced permanent bend created from the compression of the panel in the rollers by the disks simulates a hew line in the simulated log siding panel as shown at 11.

105. With respect to the second pirated attachment, each induced permanent bend created from the compression of the panel in the rollers by the disks of the second pirated attachment as described above simulates a hew line in the simulated log siding panel like the panel shown at 11; the difference between the panel at 11 and the panel like panel 11 comprising the contours of the hew lines, possibly the amount of hew lines and possibly the wood grain lines as shown at panel position 11 and the width of the panel.

106. Item H of Claim 14 which recites each induced permanent bend simulates a hew line in the simulated log siding panel reads on the Representative Exemplar as described above as having the permanent bend simulating the hew lines.

107. Item H of Claim 14 which recites each induced permanent bend simulates a hew line in the simulated log siding panel reads on the second pirated attachment as described above as having the permanent bend simulating the hew lines.

108. Defendant's second pirated attachment, for the at least the following reasons literally infringes the '604 Patent: Defendant's use of the second pirated attachment, the structure of the second pirated attachment, and because Claim 1 reads on the second pirated attachment for the reasons stated above.

109. In the alternative to the above literal infringement allegation, if the second attachment does not literally infringe the '604 Patent than it infringes the '604 Patent under the doctrine of equivalents because any element recited in Claim 1 not present literally in the second pirated attachment is present under the doctrine of equivalents.

110. Defendant's second pirated apparatus, for the reasons stated with respect to the use of the second pirated apparatus by Defendant, the structure of the second pirated apparatus, and how Claim 14 reads on the second pirated apparatus, literally infringes the '604 Patent.

111. In the alternative to the above literal infringement allegation, if the second pirated apparatus does not literally infringe the '604, then it infringes the '604 under the doctrine of equivalents because any element recited in Claim 14 not present literally in the second pirated attachment is present under the doctrine of equivalents.

112. In around 2018 Plaintiff sent Defendant a letter advising Defendant of the '604 application and provided Defendant with a copy of the application as published.

113. Defendant's infringement, at least since 2018, has been willful and continues to be willful in that in 2018, Plaintiff sent Defendant a letter advising it of the '604 Patent, enclosing the '604 Patent, and charging Defendant with infringement thereof.

114. Defendant's infringement of the '604 Patent interferes with Plaintiff's ability to exclusively control the manufacture, use, offer for sale and sale of the attachment and apparatus and, unless temporarily and permanently enjoined enjoyed, will irreparably harm Plaintiff.

115. Defendant's willful infringement has further damaged Plaintiff in that Plaintiff has and continues to lose sale revenue and license revenue and has sustained other damages in an amount to be proven at trial.

116. Based on the information alleged in this claim, Plaintiff is informed and believes, and thereon alleges, that this is an exceptional case, which warrants an award of attorneys' fees to pursuant to 35 U.S.C. § 285. Further the case warrants treble damages under 35 U.S.C.§284.

Count 2

Infringement of US Patent 9,732, 529 against Defendant

117. Ted Baum Jr. is the sole inventor of the invention claimed in US Patent 9,732, 529 ('529 Patent) entitled "*Simulated Log Siding Panel with Hew Lines*" issued August 15, 2017. A copy of the patent is attached as Exhibit C.

118. Ted Baum Jr. at the time of issuance of the '529 Patent on August 15, 2017, owned all right, title, and interest in and to the '529 Patent.

119. Ted Baum Jr. maintained ownership of all right, title, and interest in and to the '529 Patent until he assigned all right, title and interest in and to the '529 Patent to Plaintiff TB Holding.

120. A copy of the assignment to TB Holding was executed on June 28, 2018, by Ted Baum Jr. and recorded at the United States Patent Office on June 29, 2018, under reel 04623/0010 frame 0010. A copy of the assignment is attached hereto as Exhibit B.

121. TB Holding owns all right, title, and interest to the '529 Patent.

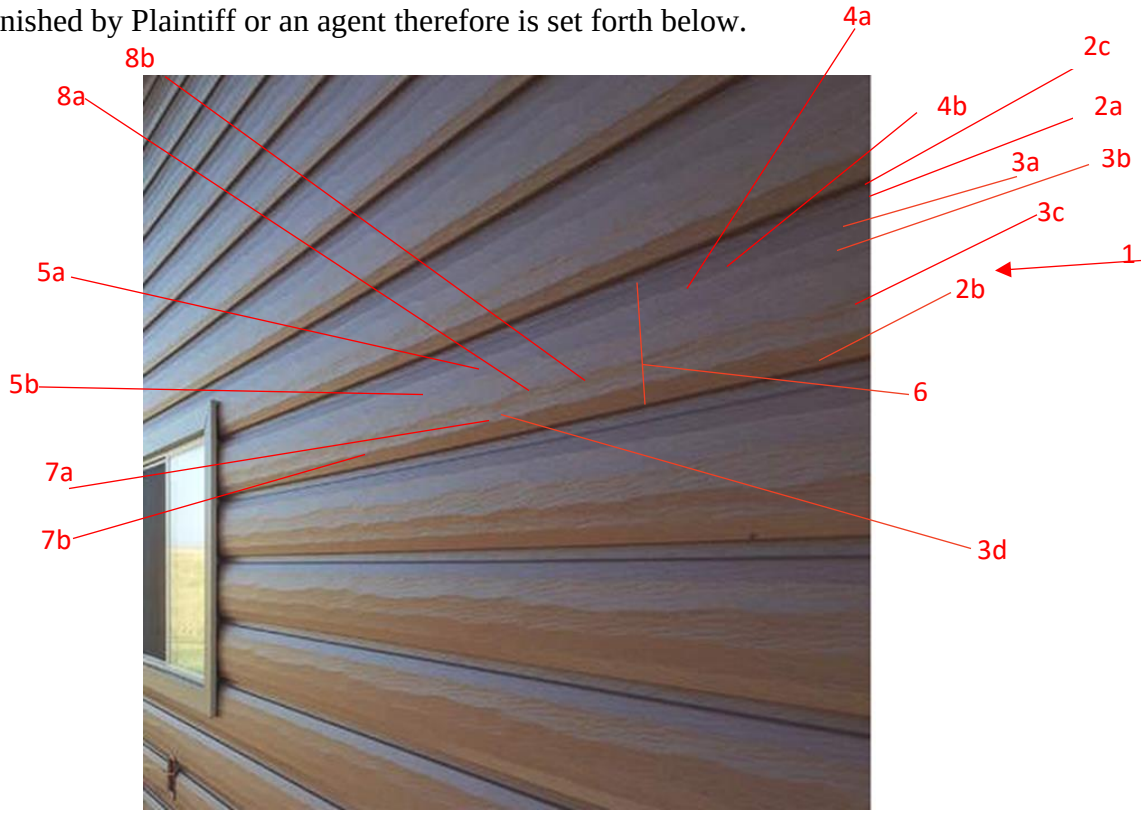
122. The '529 Patent is valid and subsisting.

123. The '529 Patent has been in full force and effect since issuance.

124. Defendant manufactures and sells in Idaho elongated metal simulated log siding panels, hereinafter Defendant Panels, without the permission of Plaintiff or an agent therefor.

125. Defendant manufactures Defendant Panels not from any attachment or apparatus provided by Plaintiff or agents therefor.

126. An example of Defendant Panels manufactured from an attachment and apparatus not furnished by Plaintiff or an agent therefore is set forth below.



127. On information and belief Defendant manufactures the above Defendant Panel from a pirated attachment and a pirated apparatus. The Above Defendant Panel was advertised though Google at https://www.google.com/search?q=j%26+s+siding+idaho&rlz=1C1CHBF_enUS907US907&oq=j%26+s+siding+idaho&aqs=chrome..69i57j0i22i30.7827j0j7&sourceid=chrome&ie=UTF8 on June 03, 2022.

128. Claim 1 of the '529 Patent is representative of the elongated metal simulated log siding panel covered by the '529 Patent.

129. Claim 1 of the ‘529 Patent recites the below elements; the letters have been added to cross-reference the claims with the example of the above Defendant Panel.

A) an elongated metal simulated log siding panel, comprising:

B) an intermediate portion of the panel that extends longitudinally along the length of the panel and simulates a natural construction log having hew lines;

C) a plurality of longitudinally extending and transversely spaced permanent bends in the intermediate portion which simulate the hew lines of the natural construction log; wherein:

D) the transverse position of the hew line-simulating bends varies relative to margins of the intermediate portion along the length of the panel;

E) the transverse position of the hew line-simulating bends varies relative to one another along the length of the intermediate portion of the panel; and further comprising:

F) offset wall portions extending rearwardly from opposite margins of the intermediate portion to project the intermediate portion forward and give relief to the intermediate portion.

130. Claim 1 of the ‘529 Patent, for the nonlimiting reasons set forth below, reads on Defendant Panel as exemplified above.

131. The Defendant Panel shows an elongated metal simulated log siding panel 1. The panel has an intermediate portion shown at 6 of panel 1 that extends longitudinally along the length of the panel and simulates a natural construction log having hew lines 3a, 3b, 3c, and 3d.

132. It further includes a plurality of longitudinally extending and transversely spaced permanent bends which are shown at least at hew lines 3a, 3b, 3c, 3d.

133. The intermediate portion 6 has simulated hew lines 3a, 3b, 3c, 3d, of the natural construction log. The transverse position of the hew line-simulating bends as shown at 4a, 4b, 5a, 5b 7a, 7b, and 8a, 8b varies relative to margins 2a, 2b of the intermediate portion 6 along the length of the panel.

134. The transverse position of the hew line-simulating bends at 4a, 5a, 7a, 8a varies relative to one another along the length of the intermediate portion of the panel.

135. The panel further has offset wall portions extending rearwardly from opposite margins of the intermediate portion to project the intermediate portion forward and give relief to the intermediate portion. The offset wall portions are hidden behind the margins at 2a, 2b. The walls based on their position give relief to intermediate portion 6.

136. Claim 1A which recites an elongated metal simulated log siding panel reads on item 1 as described and shown above.

137. Claim 1B which recites an intermediate portion of the panel that extends longitudinally along the length of the panel and simulates a natural construction log having hew lines reads on the above panel 1 having hew lines 3a, 3b, 3c, 3d.

138. Claim 1C recites a plurality of longitudinally extending and transversely spaced permanent bends in the intermediate portion which simulate the hew lines of the natural construction log reads on the portion of the panel 1 at 3a, 3b, 3c, 3d which shows the bends.

139. Claim 1D which recites the transverse position of the hew line-simulating bends varies relative to margins of the intermediate portion along the length of the panel reads on Defendant Panel 1 which shows the transverse portion 4a, 4b; 5a, 5b, 7a, 7b, 8a, 8b of the hew lines 3a, 3b, 3c, 3d varying relative to the margins 2a, 2b.

140. Claim 1E which recites the transverse position of the hew line-simulating bends varies relative to one another along the length of the intermediate portion of the panel reads on Defendant Panel 1 which shows the hew line-simulating bends at 3a, 3b, 3c , 3d varying relative to one another at 4a, 5a,7a, 8a.

141. Claim 1F which recites offset wall portions extending rearwardly from opposite margins of the intermediate portion to project the intermediate portion forward and give relief to the intermediate portion reads on Defendant Panel 1 for the reasons explained with reference to the panels hidden walls beyond the margin lines.

142. Defendant's Defendant Panel, for the reasons stated with respect to the structure of the Defendant Panel and how Claim 1 reads on the Defendant Panel, literally infringes the '529 Patent.

143. In the alternative to the above literal infringement allegation, if the Defendant Panel does not literally infringe the '529 Patent than it infringes the '529 Patent under the doctrine of equivalents because any element recited in Claim 1 not present literally in the Defendant Panel is present under the doctrine of equivalents.

144. Defendant's infringement at least since 2018 has been willful and continues to be willful in that in 2018, Plaintiff sent Defendant a letter advising it of the '529 Patent, enclosing the '529 Patent, and charging Defendant with infringement thereof.

145. Defendant's infringement of the '529 Patent interferes with Plaintiff's ability to exclusively control the manufacture, use, offer for sale, and sale of the Defendant Panel and, unless temporarily and permanently enjoined enjoyed, will irreparably harm Plaintiff.

146. Plaintiff's willful infringement has further damaged Plaintiff in that Plaintiff has and continues to lose sale revenue and license revenue and has sustained other damages in an amount to be proven at trial.

147. Based on the information alleged in this claim, Plaintiff is informed and believes, and thereon alleges, that this is an exceptional case, which warrants an award of attorneys' fees to pursuant to 35 U.S.C. § 285. Further the case warrants treble damages pursuant to Section 9 U.S.C.§284.

Count 3

Infringement of US Design Patent D602,612 against Defendant

148. Ted Baum Jr. is the sole inventor of the invention claimed in US Design Patent D602, 612 ('D602 Patent) entitled "Metal Simulated Log Siding Panel" issued Oct 20, 2009. A copy of the patent is attached as Exhibit D.

149. Ted Baum Jr. at the time of issuance of the "D602 Patent on October 20, 2009, owned all right, title, and interest in and to the 'D602 Patent.

150. Ted Baum Jr. maintained ownership of all right, title, and interest in and to the 'D602 Patent until he assigned all right, title and interest in and to the 'D602 Patent to Plaintiff TB Holding.

151. A copy of the assignment to TB Holding was executed on June 28, 2018, by Ted Baum Jr. and recorded at the United States Patent Office on June 29, 2018, under reel 04623/0010 frame 0010. A copy of the assignment is attached hereto as Exhibit B.

152. TB Holding owns all right, title, and interest in and to the 'D602 Patent.

153. The 'D602 Patent is valid and subsisting.

154. The 'D602 Patent has been in full force and effect since issuance.

155. As stated above in Count 2, Defendant manufactures and sells in Idaho, Defendant Panels, without the permission of Plaintiff or an agent therefor.

156. Defendant manufactures Defendant Panels not from any attachment or apparatus provided by Plaintiff or agents therefor.

157. An example of Defendant Panel manufactured from an attachment and apparatus not furnished by Plaintiff or an agent therefore is set above with respect to Count 2.

158. The subject matter of 'D602 Patent is covered by a single claim which reads: "Claim: The ornamental design for a metal simulated log siding panel, as shown and described.

159. The 'D602 Patent shows the claimed ornamental design for the metal simulated log siding panel with seven figures.

160. The seven figures reference the panel as follows:

FIG. 1 is a perspective view of a metal simulated log siding panel showing my new design, which is broken to indicate nonspecific length;

FIG. 2 is a front elevational view thereof;

FIG. 3 is a rear elevational view thereof;

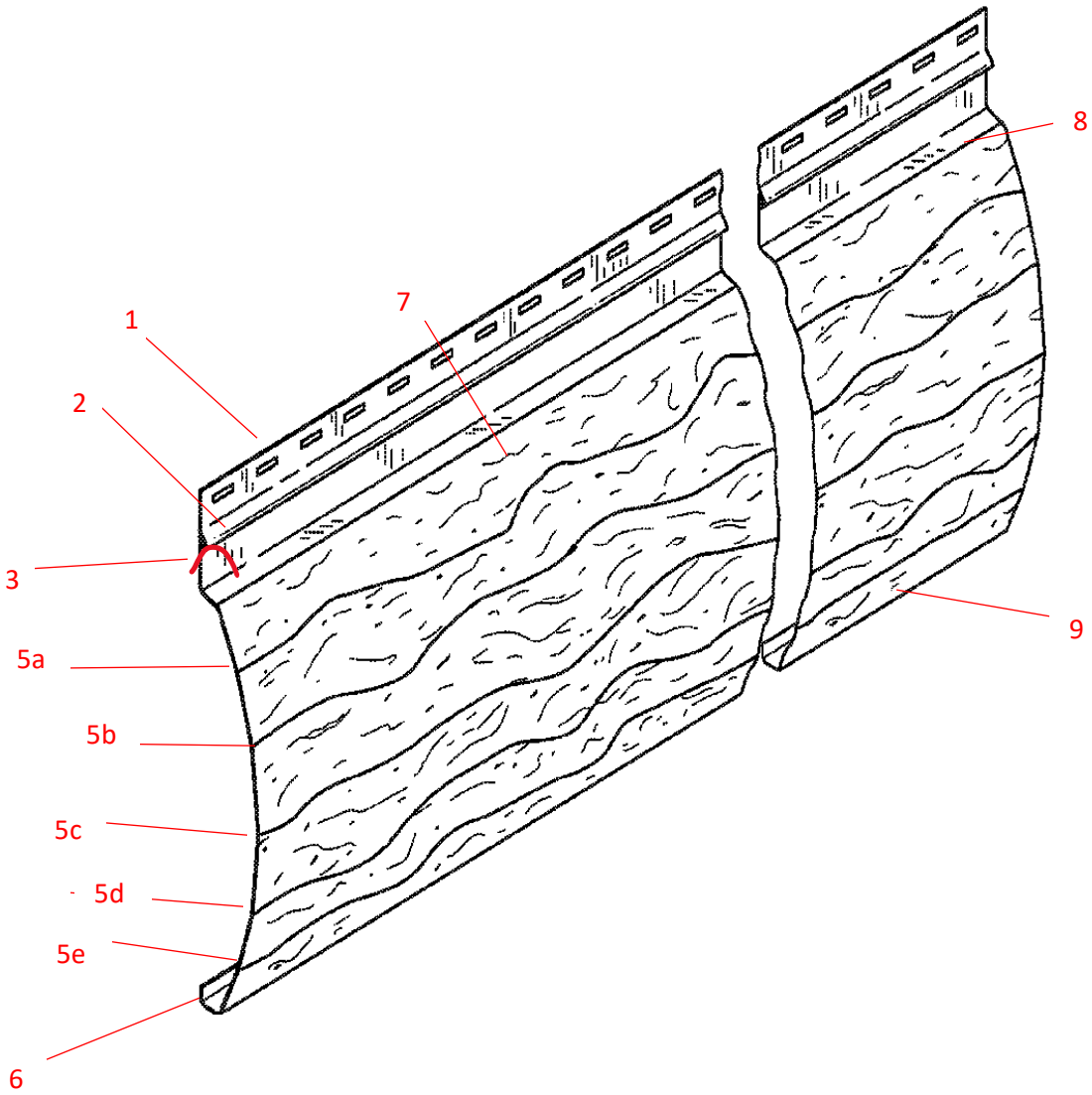
FIG. 4 is a left side elevational view thereof;

FIG. 5 is a right-side elevational view thereof;

FIG. 6 is a top plan view thereof; and,

FIG. 7 is a bottom plan view thereof.

161. The isometric view of the panel of the 'D602 Patent is shown below interlineated with numbers to provide an element by element analysis of the claimed design versus the prior art and the accused panel.



162. Item 1 of Claim 1 of the ‘D602 Patent is found in the prior art as exemplified by item 35 in the ‘529 Patent, Count 2.

163. Item 2 of Claim 1 of the ‘D602 Patent is found in the prior art as exemplified by item 28 of the ‘529 Patent, Count 2.

164. Item 6 of Claim 1 of the ‘D602 Patent is in the prior art as exemplified by 25 and 32 in of the ‘529 Patent, Count 2.

165. Item 7 of Claim 1 of the ‘D602 Patent is found in the prior art as exemplified by the wood grain shown in figure 17 of the ‘529 Patent, Count 2.

166. Items 8 and 9, bends, are found in the prior art as exemplified in the '529 Patent at figure 13, Count 2.

167. The angled chink at item 3 of Claim 1 of the 'D209 Patent is not found in the prior art.

168. Items 5a-5e, "hew lines", of Claim 1 of the 'D602 Patent are not found in the prior art in any amount or contour.

169. The curvature of the panel of claim 1 is not found in the prior art.

170. Item 1, 2, and 6 of Claim 1 of the 'D602 Patent is found in the Defendant Panel and are hidden in the photo of Defendant Panel, Count 2.

171. Items 7, grain lines of the 'D602 Patent are found in the Defendant Panel 1, Count 2.

172. Items 8 and 9, bends, of the 'D602 Patent are found in the Defendant Panel items 2a, 2b, Count 2.

173. Item 3, the chink of Claim 1 of the 'D602 Patent is found in the Defendant Panel at 2c, Count 2.

174. Items 5a-5e of Claim 1 of the 'D602 Patent "hew lines" are found with different contours and one less hew line at 3a-3d in the Defendant Panel, Count 2.

175. The curvature of the panel of claim 1 is found in the Defendant Panel 1, count 2.

176. Given the elements of Claim 1 of the 'D602 Patent which are found in the Defendant Panel, the sameness of the elements' combination as found in the Defendant Panel, the uniqueness of some of the elements present in the Defendant Panel and the 'D602 Patent; the same combination of unique elements between the Defendant Panel and the 'D602 Patent, and or the totality of the sameness of the 'D602 Patent claimed design with the design of the Defendant Panel; in the eye of an ordinary observer, giving such attention as a purchaser usually

gives, the two designs are substantially the same because the resemblance is such as to deceive such an observer, inducing purchase of one supposing it to be the other.

177. Defendant's Defendant Panel, for the reasons stated with respect to the description of the Defendant Panel and how Claim 1 of the 'D602 Patent reads on the Defendant Panel; the Defendant Panel literally infringes the 'D602 Patent.

178. In the alternative to the above literal infringement allegation, if the Defendant Panel does not literally infringe the 'D602 Patent than it infringes the '602 Patent under the doctrine of equivalents because any element of the design not present literally in the Defendant Panel is present under the doctrine of equivalents.

179. Defendant's infringement at least since 2009 has been willful and continues to be willful in that in 2009 some of the components provided to Defendant were marked with the design patent number and a statement advising the panel produced by the components were protected by the 'D602 Patent.

180. Plaintiff sent Defendant a letter in 2018 advising it of the '529 Patent, enclosing the '529 Patent, and charging Defendant with infringement thereof.

181. Defendant's infringement of the 'D602 Patent interferes with Plaintiff's ability to exclusively control the manufacture, use, offer for sale, and sale of the panels having the claimed design and, unless temporarily and permanently enjoined enjoyed, will irreparably harm Plaintiff.

182. Plaintiff's willful infringement has further damaged Plaintiff in that Plaintiff has and continues to lose sale revenue and license revenue and has sustained other damages in an amount to be proven at trial 35 U.S.C. § 289.

183. On information and belief Defendant has made significant profits which should be paid to Plaintiff pursuant to statute.

184. Based on the information alleged in this claim, Plaintiff is informed and believes, and thereon alleges, that this is an exceptional case, which warrants an award of attorneys' fees to pursuant to statute 35 U.S.C. § 285. Further the case warrants treble damages under 35 U.S.C.§284.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for judgment against Defendant as follows:

A. That Defendant has infringed each of the '604, '529, and 'D602 Patents, and unless enjoined, will continue to infringe each of these patents;

B. That Defendant has willfully infringed each of the '604, '529, and 'D602 Patents;

C. That Defendant pay Plaintiff damages adequate to compensate for Defendant's infringement of the each of the '604 '529, and 'D602 Patents and not less than a reasonable royalty, together with interest and costs under 35 U.S.C. § 284;

D. That Defendant Pay to Plaintiff all of its profits made selling panels that infringe the 'D602 Patent pursuant to 35 U.S.C. § 289;

E. That Defendant be ordered to pay prejudgment and post judgment interest on the damages assessed;

F. That Defendant pay Plaintiff enhanced treble damages pursuant to 35 U.S.C. § 284;

G. That Defendant be enjoined from infringing each of the '604, '529, and 'D602 Patents, or if its infringement is not enjoined, that Defendant be ordered to pay ongoing royalties to Plaintiff for any post- judgment infringement of any of the '604, '529, and 'D602 Patents;

H. That this is an exceptional case under 35 U.S.C. § 285, and that Defendant pay Plaintiff's attorneys' fees and costs in this action; and

I. That Plaintiff be awarded such other and further relief as this Court deems just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiff hereby demands a trial by jury on all issues triable to a jury.

McFarland Ritter PLLC

/s/Ryan T. McFarland
Ryan T. McFarland, ISB No. 7347
Attorneys for Plaintiff

EXHIBIT A

EXHIBIT B

US009283604B2

(12) **United States Patent**
Baum, Jr.

(10) **Patent No.: US 9,283,604 B2**
(45) **Date of Patent: Mar. 15, 2016**

(54) **METAL SIMULATED LOG SIDING PANEL WITH HEW LINES AND METHOD OF MAKING AND USING SAME**

(76) Inventor: **Ted Baum, Jr.**, Loveland, CO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 2129 days.

(21) Appl. No.: **12/329,336**

(22) Filed: **Dec. 5, 2008**

(65) **Prior Publication Data**

US 2010/0139080 A1 Jun. 10, 2010

(51) **Int. Cl.**
B21D 5/08 (2006.01)
E04F 13/12 (2006.01)

(52) **U.S. Cl.**
CPC ***B21D 5/08*** (2013.01); ***E04F 13/123*** (2013.01); *Y10T 29/49* (2015.01); *Y10T 29/5116* (2015.01)

(58) **Field of Classification Search**
CPC B21D 5/08; E04F 13/123; Y10T 29/5116; Y10T 29/49
USPC ..... 72/176, 177, 179, 180, 181, 251, 252.5, 72/379.6, 382, 385, 182, 226, 178; 29/34 R, 592
See application file for complete search history.

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Design patent application of the inventor herein, U.S. Appl. No. 29/329,008, filed Dec. 5, 2008.

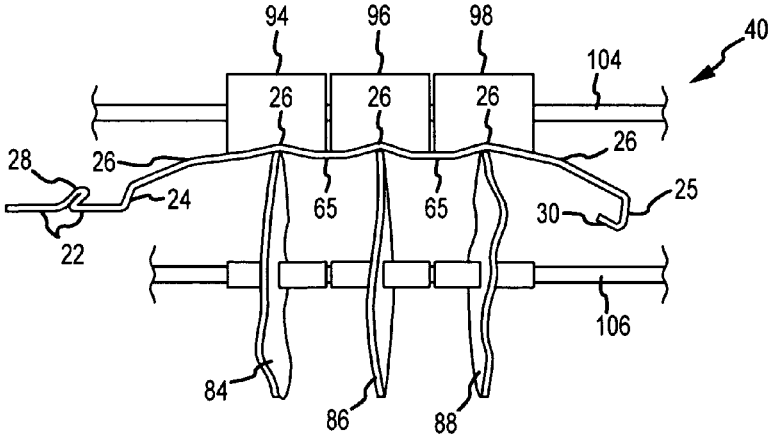
* cited by examiner

Primary Examiner — Teresa M Ekiert
(74) *Attorney, Agent, or Firm* — John R. Ley

(57) **ABSTRACT**

An elongated metal simulated log siding panel has a curved portion that simulates the curvature of a natural construction log. A plurality of longitudinally extending and randomly transversely spaced permanent bends in the curved portion simulate hew lines of a natural construction log, thereby creating a more natural appearance. Rotating disks compress the metal into an elastomeric roller to create the hew line-simulating bends.

25 Claims, 11 Drawing Sheets



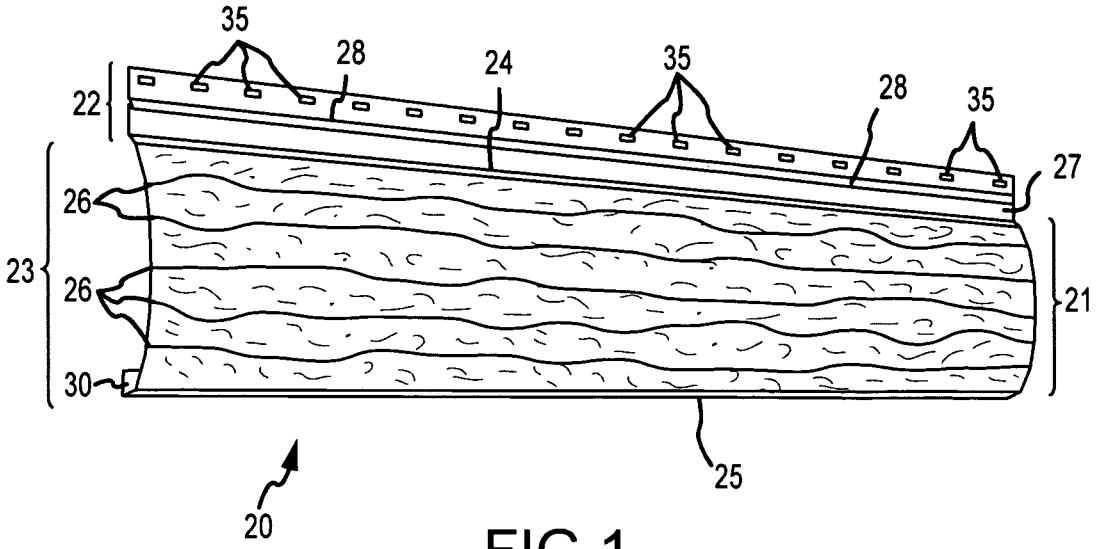

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FIG.1

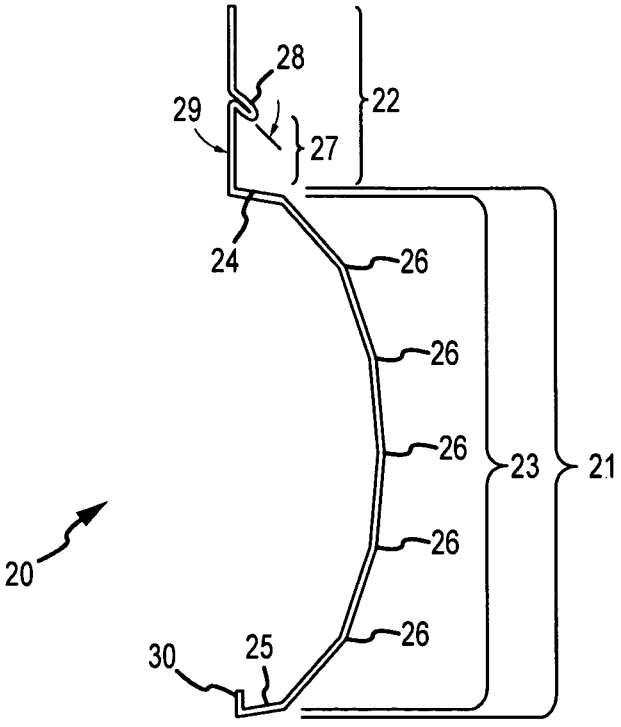
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FIG.2

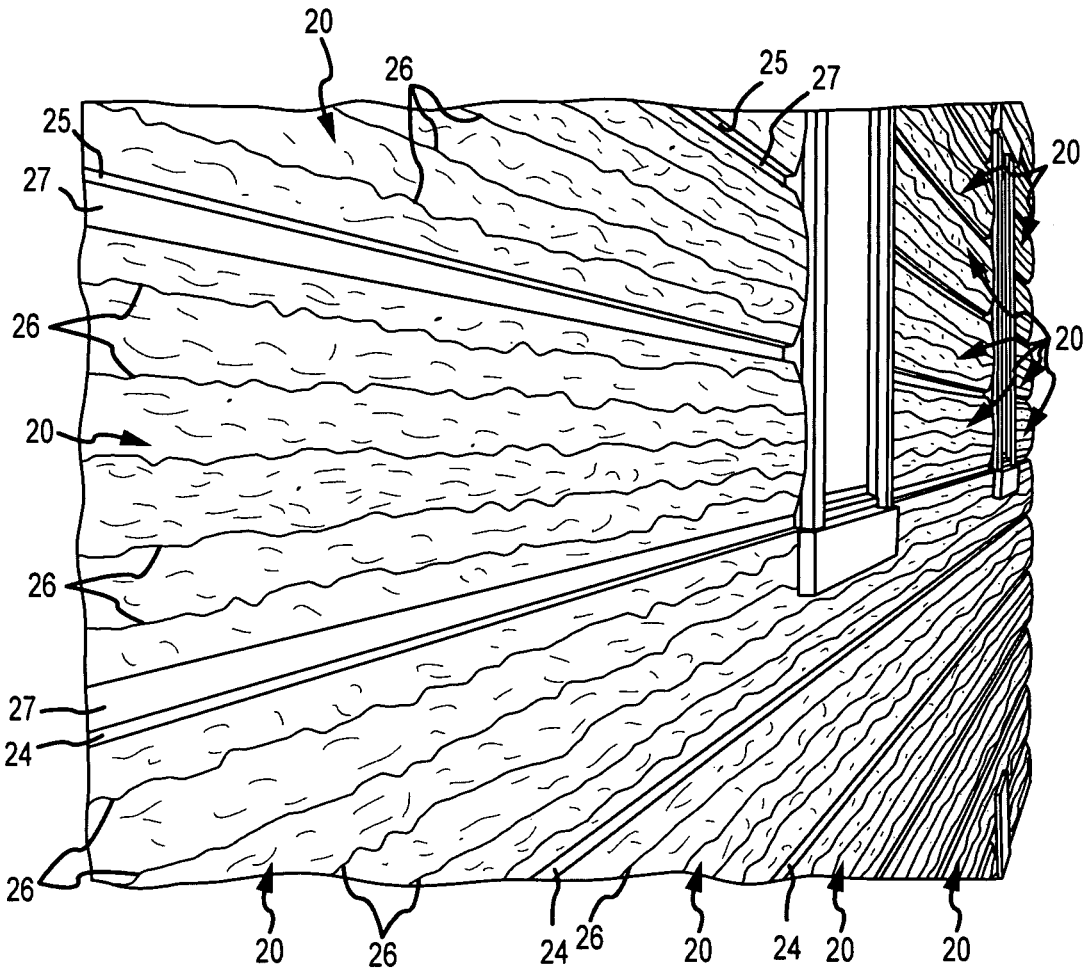

FIG.3

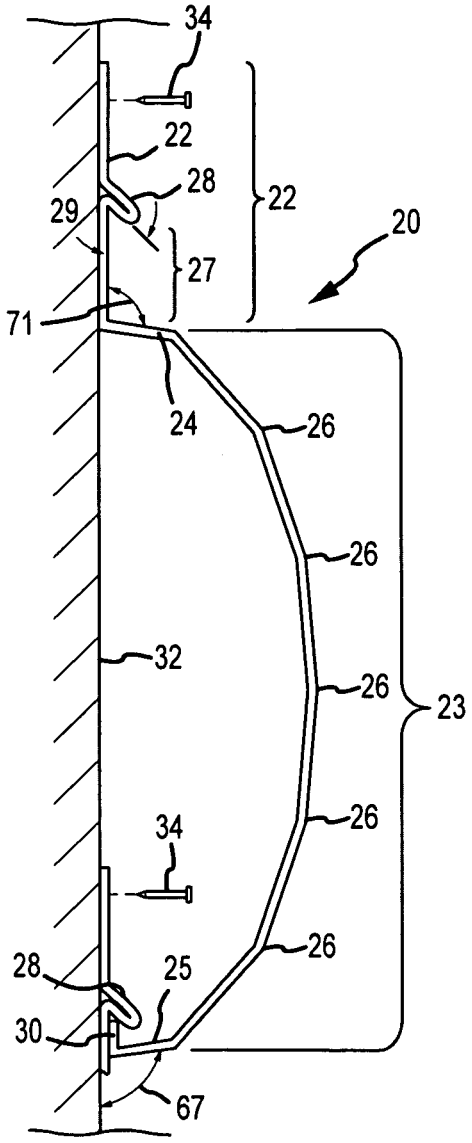
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FIG.4

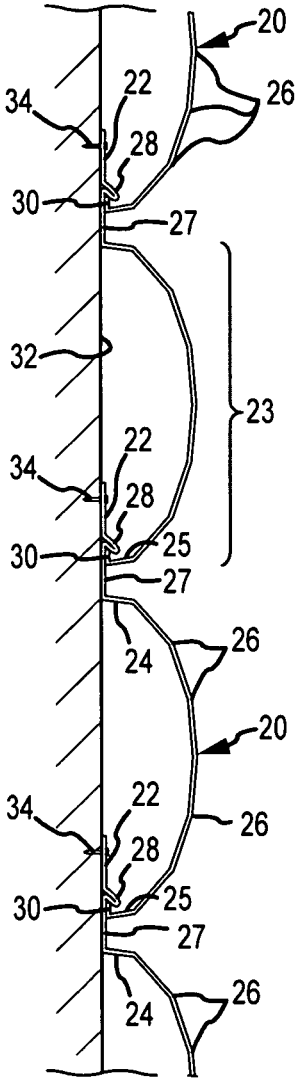
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FIG.5

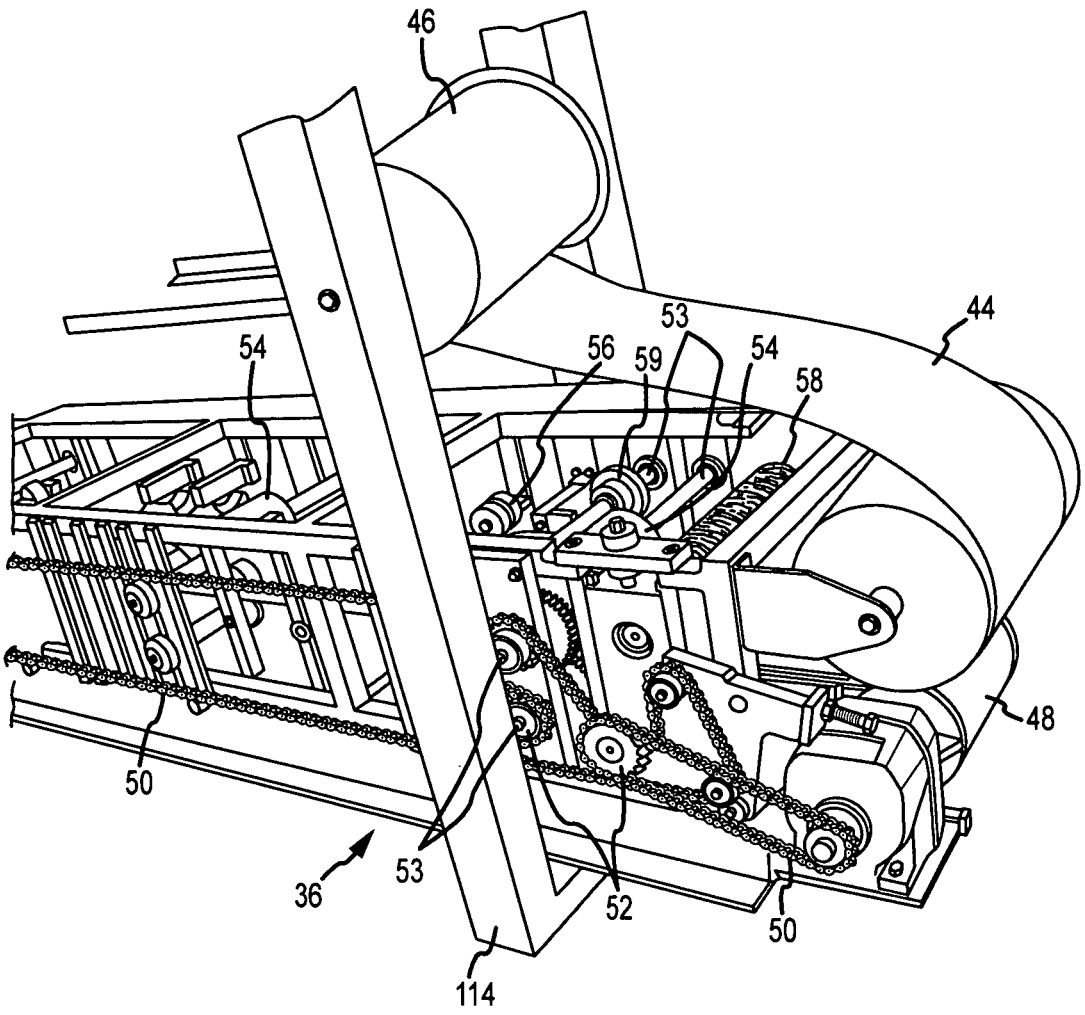

FIG.6
PRIOR ART

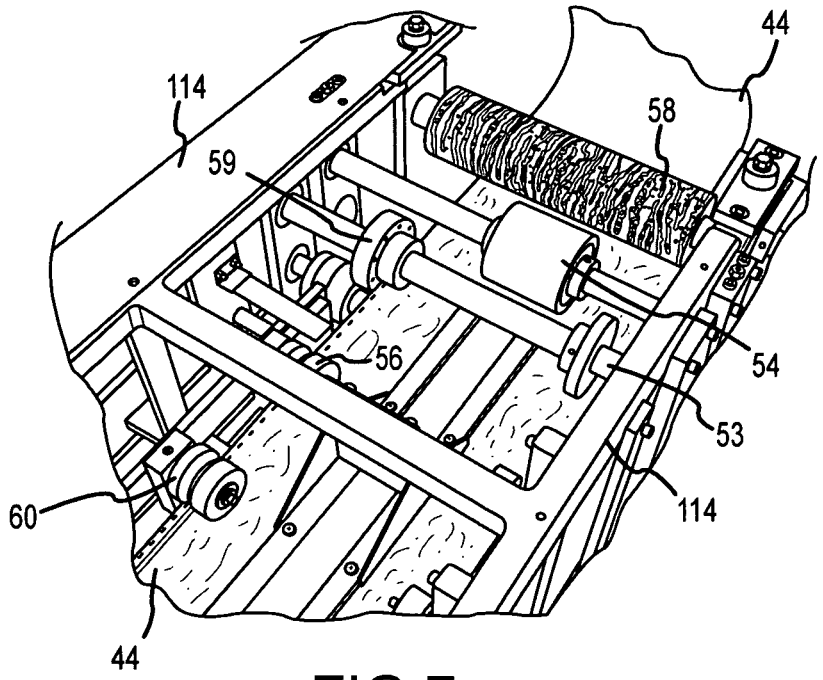

FIG.7
PRIOR ART

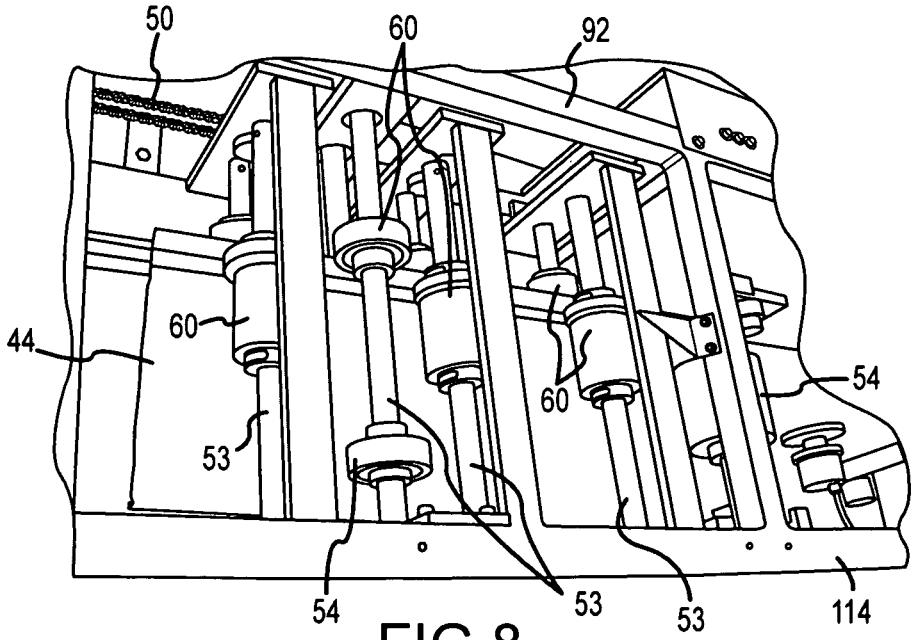

FIG.8
PRIOR ART

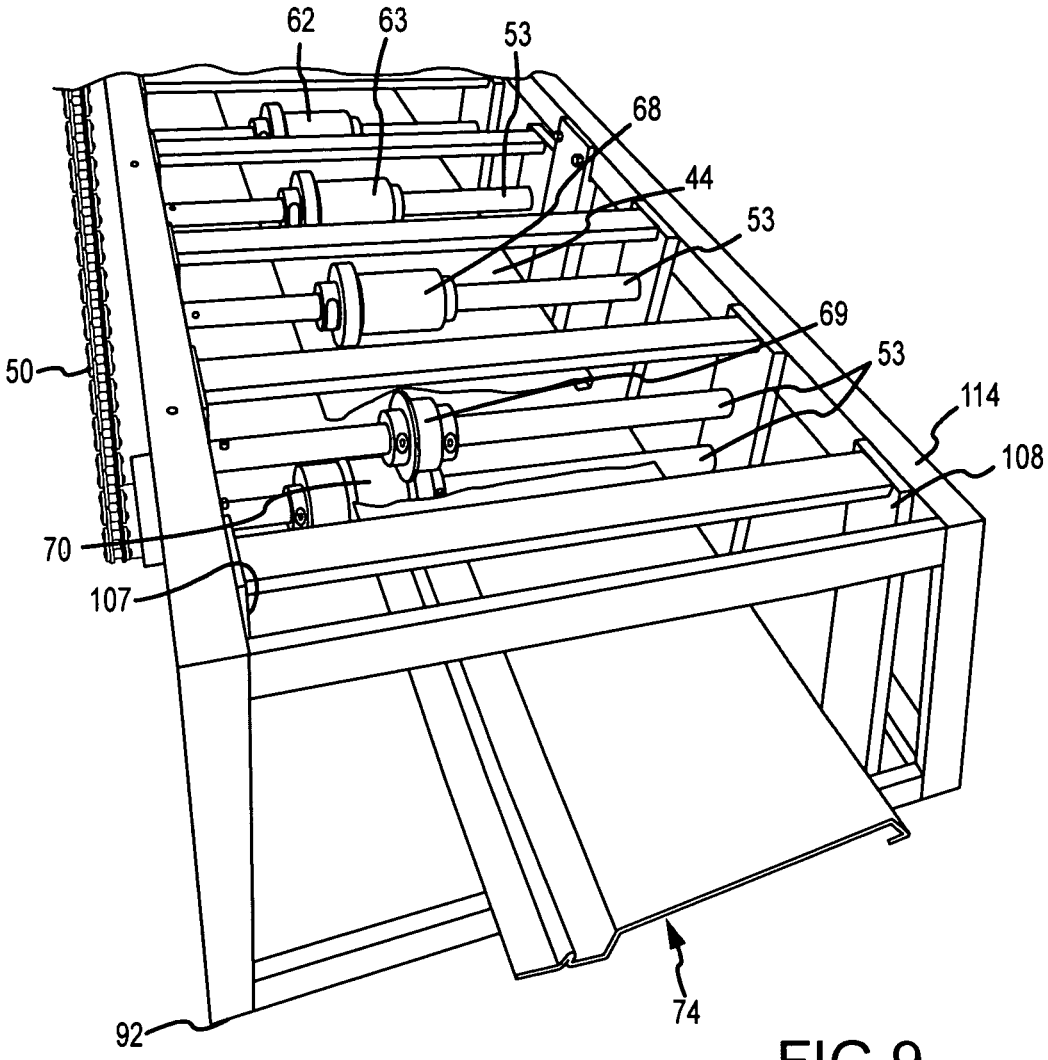

FIG.9

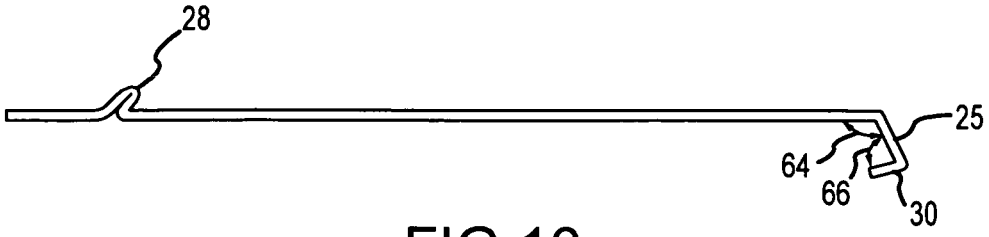

FIG.10

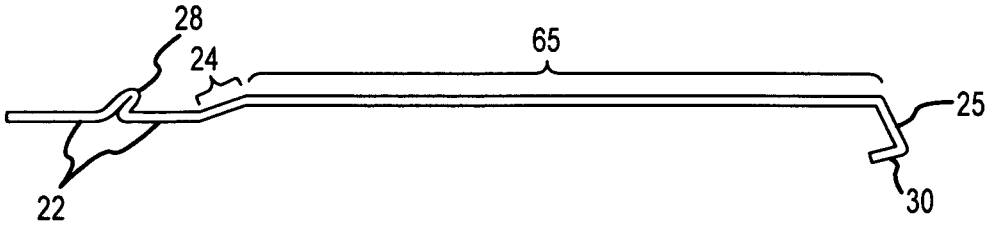

FIG.11

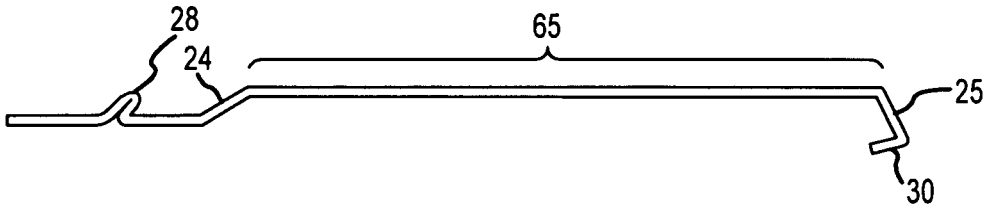

FIG.12

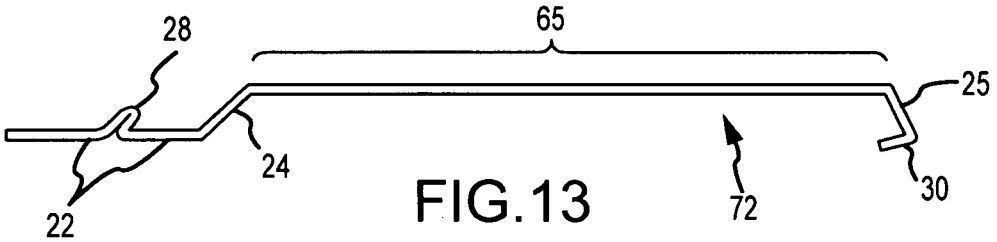

FIG.13

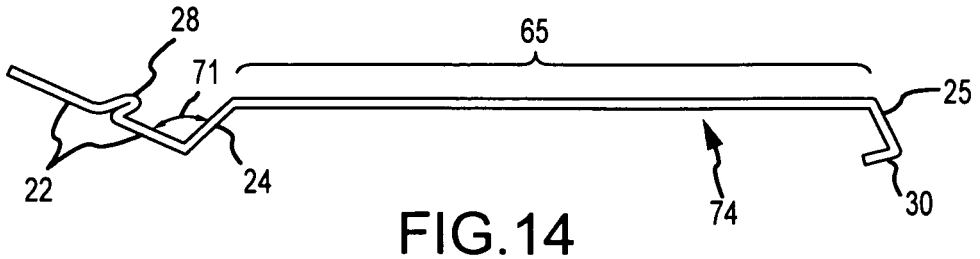

FIG.14

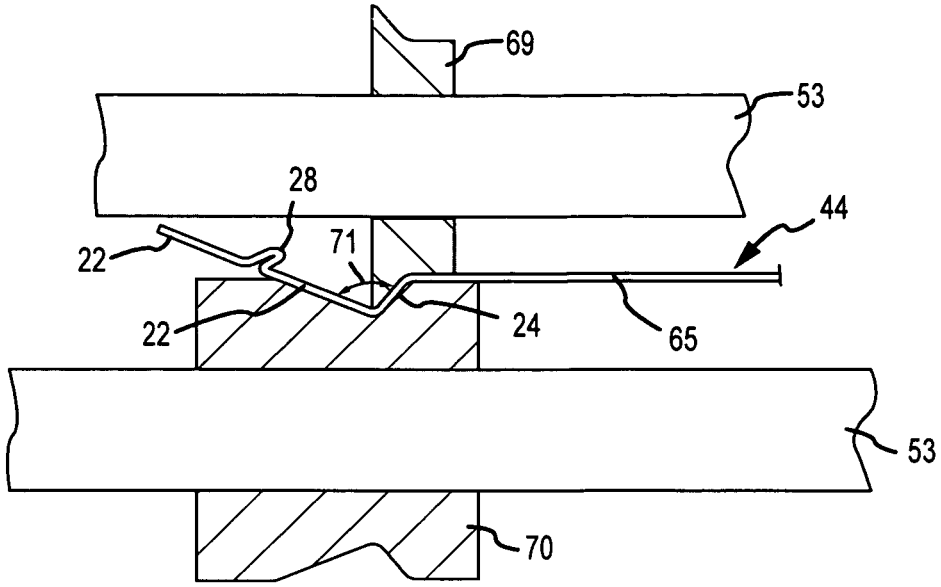

FIG.15

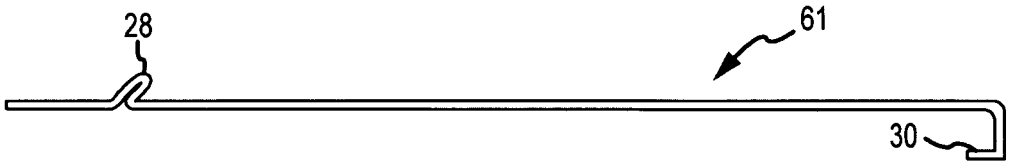

FIG.16
PRIOR ART

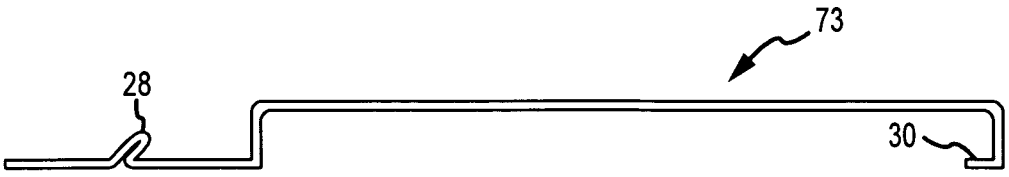

FIG.17
PRIOR ART

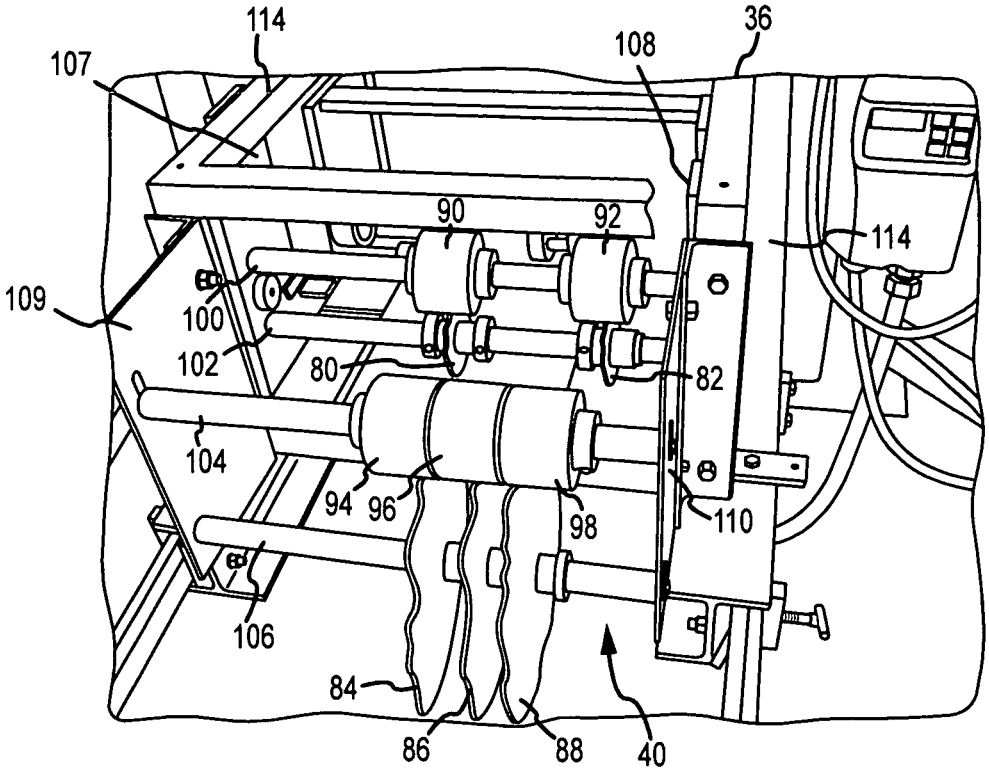
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FIG.18

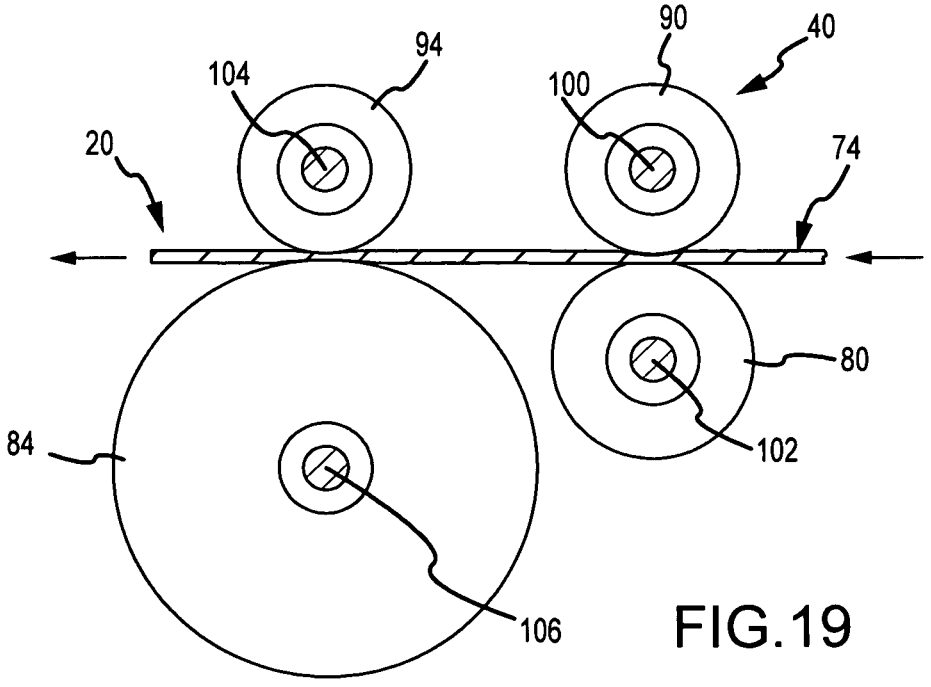
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FIG.19

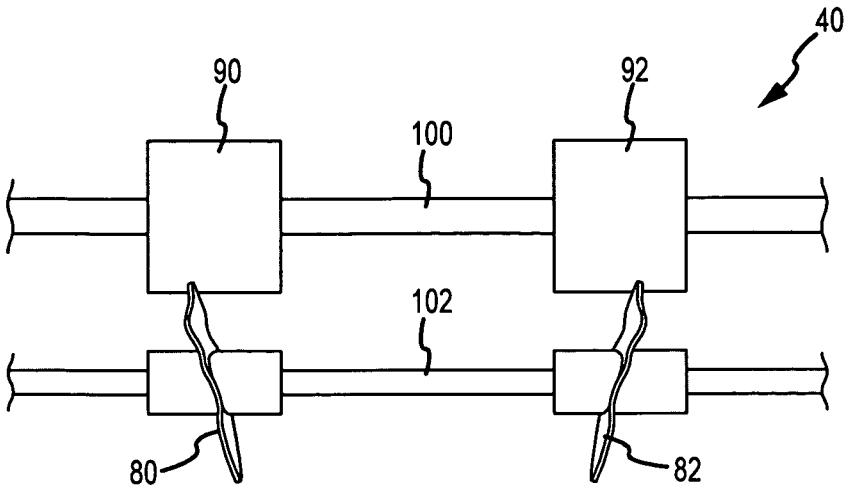

FIG.20

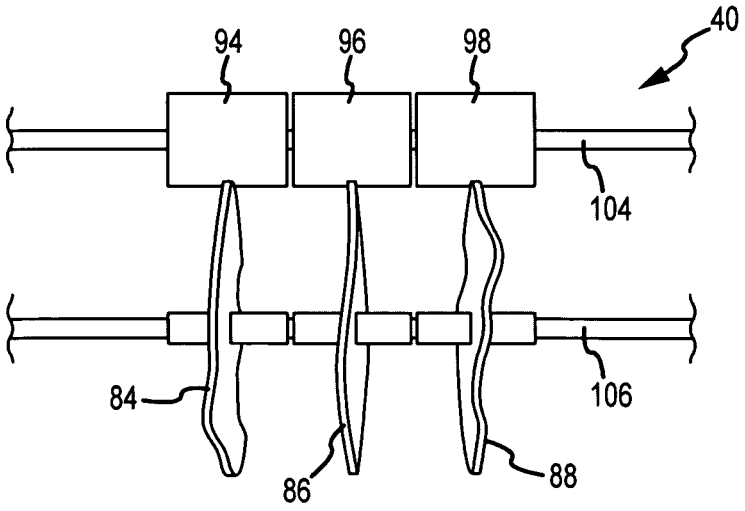

FIG.21

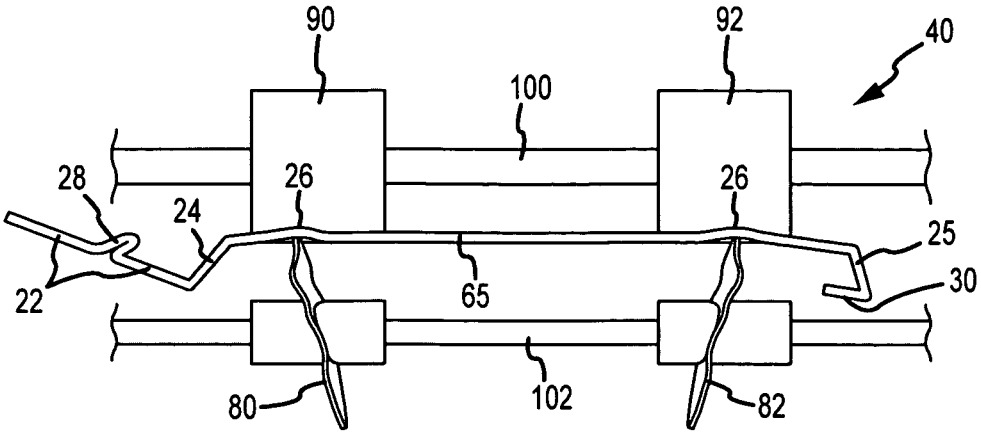
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FIG.22

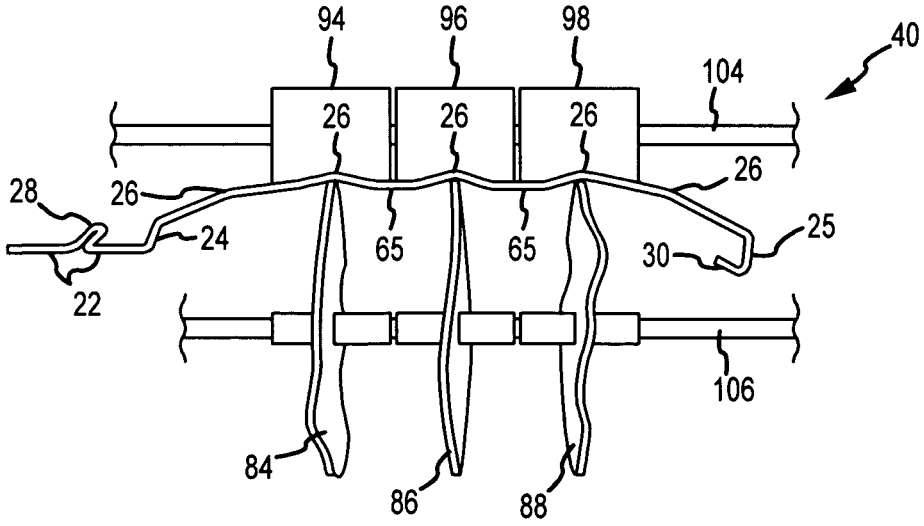
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FIG.23

METAL SIMULATED LOG SIDING PANEL WITH HEW LINES AND METHOD OF MAKING AND USING SAME

This invention relates to metal siding used on the exterior of residential and other buildings. More particularly, this invention relates to a new and improved metal simulated log siding panel having bends formed in the metal panel to simulate hew lines, thereby creating a more realistic appearance which simulates actual wooden construction logs. Further still, this invention relates to a new and improved method and apparatus for making metal simulated log siding panels having hew line-simulating bends.

BACKGROUND OF THE INVENTION

Both natural and artificial siding have been added to the exterior surfaces of buildings for many years, either as an original exterior for the building or on top of an existing exterior. One siding panel is attached to the exterior of the building, and another similarly-shaped panel is attached adjacent to the earlier panel. This process continues until the entire exterior of the building is covered by the attached siding panels. Adding siding panels on top of an existing exterior is an attractive and cost-effective alternative to repairing or replacing the existing exterior of the building. Changing the siding may also have the desirable effect of changing the exterior appearance and character of the building.

The typical forms of natural siding panels are flat wooden boards or strips of tree trunks which exhibit the exterior curvature of construction logs. The typical forms of artificial siding panels are metal or vinyl panels which have been formed into the shape of natural siding panels. Metal siding panels are usually made from aluminum or steel. Metal siding panels are painted and/or embossed to more closely simulate the appearance of natural siding. Vinyl panels are usually painted or formed from colored synthetic plastic material. The advantage of artificial siding is that it is usually more maintenance-free than natural siding. Natural siding requires continual painting, conditioning and other types of care. In addition, artificial siding is usually less expensive than natural siding.

It is possible to form metal siding panels into a variety of geometric configurations which simulate natural siding panels. For example, metal panels have been formed into shiplap, board and batten, reverse board and batten, clapboard, colonial, vertical and horizontal double four, vertical and horizontal double five, and colonial Dutch configurations. A continuous siding forming machine is used to make these different metal siding panel configurations. A strip of flat sheet metal is moved through roller dies of the siding forming machine, and the roller dies sequentially shape and form the metal strip into the desired siding panel configuration.

Another configuration of metal siding is simulated log siding. Attaching simulated log siding panels to the exterior of a building converts the appearance of the building from a more conventional structure into the appearance of a log cabin or other log building. Use of simulated log siding has the potential of creating a noticeable change in the exterior appearance and character of a building. However, simulated log siding has only achieved moderate consumer acceptance, principally because the simulation of natural construction logs is not sufficiently realistic. A building having previous forms of simulated log siding is easily recognized as having artificial log siding.

The typical metal simulated log siding exhibits a uniform cylindrical shape which is intended to represent the convex curvature of a construction log. The uniform cylindrical shape is not an accurate or realistic simulation, because natural logs have various anomalies in shape, changes in curvature and other natural variations in appearance, all of which are unlike the smooth cylindrical shape of known previous metal simulated log siding panels. The uniformity and repetition of the smooth cylindrical shapes immediately reveals the artificial nature of previously known simulated log siding.

Attempts to counter the uniformity of smooth cylindrical simulated log siding have included embossing a wood grain-like texture on the exterior of the metal simulated log siding. However, the embossed wood grain-like texture cannot be observed from a distance, and has no effect on diminishing or moderating the continuous and repeated cylindrical monotony of known metal simulated log siding panels.

Other attempts to invoke a more realistic appearance in metal simulated log siding panels include coloring the space between the cylindrical convex portions to replicate the appearance of chinking. Chinking is used between natural construction logs to seal the spaces between the natural logs and shut out the exterior environment. The coloring which represents chinking may be directly adhered to the metal simulated log panel, or a separate chink-colored strip may be added once the metal simulated log siding panels have been installed on the building. While the attempt to replicate the appearance of chinking contributes a modest enhancement toward a more realistic appearance, the cylindrical similarity of the simulated log panels and the monotony of the repetitious identical cylindrical shapes creates the predominate overall appearance which is easily recognized as artificial.

SUMMARY OF THE INVENTION

The present invention significantly improves the level of realism of sheet metal simulated log siding, by creating the effect of hew lines on an exterior curved portion of the panel. Hew lines on a natural construction log are longitudinal edges and lines that result from using a draw knife to cut away bark from a tree trunk that is finished into a construction log. Because the bark is removed manually with uneven movements of the draw knife, the hew lines on natural construction logs are somewhat random in position and in separation from one another.

The present invention creates permanent bends to replicate hew lines in the curved portion of each metal simulated log siding panel. The hew line-simulating bends are random in position and separation along the length of the curved portion of the simulated log siding panel. The hew line-simulating bends also break up and disturb any perceived uniformity in appearance of the curved portion of the simulated log siding panel. When multiple simulated log siding panels of the present invention are attached to the exterior of a building, the random nature of the simulated hew lines and the lack of uniformity in the curved portions of the panels avoids the typical repetitious similarity of previously-known metal simulated log siding, thereby contributing a significant enhancement in the appearance and realism of metal simulated log siding panels. These considerations are involved in different aspects of the present invention.

One aspect of the invention involves a method of forming an elongated strip of metal into a simulated log siding panel which includes a curved portion that simulates curvature of a natural construction log. The method includes forming a plurality of longitudinally extending and transversely spaced

permanent bends in the curved portion which simulate hew lines of a natural construction log.

Another aspect of the invention involves an elongated sheet metal simulated log siding panel. The simulated log siding panel comprises a curved portion that simulates the curvature of a natural construction log, and a plurality of longitudinally extending and transversely spaced permanent bends in the curved portion which simulate hew lines of a natural construction log.

Other or subsidiary aspects of the invention involve varying the transverse position of the hew line-simulating bends relative to margins of the curved portion along the length of the panel, varying the transverse position of the hew line-simulating bends relative to one another along the length of the panel, creating the curved portion of the simulated log siding panel by the hew line-simulating bends, forming offset wall portions on opposite margins of the curved portion to project the curved portion outward and provide visual relief for the curved portion, extending the hew line simulating bends substantially continuously along the length of the curved portion and the panel, and continuously forming the hew line-simulating bends in a continuous strip of sheet metal as the panel was formed, among other things.

A further aspect of the invention involves a log forming attachment for connection to a conventional seamless siding forming machine to create an elongated metal simulated log siding panel from a different panel configuration created by and delivered from the conventional siding forming machine. The log forming attachment comprises a plurality of circular disks located to contact one side of the panel configuration delivered from the siding forming machine, and a plurality of circular elastomeric rollers located to contact the other side of the panel configuration at a location opposite from the circular disks. Each circular disk is associated with an elastomeric roller. Each disk and associated elastomeric roller are positioned to receive between them the panel configuration delivered from the siding forming machine. Each disk and associated elastomeric roller have a relative separation between them which causes the panel configuration to be compressed into the elastomeric roller by the disk as the delivered panel configuration moves between the disks and associated elastomeric rollers. The compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk. Each induced permanent bend simulates a hew line in the simulated log siding panel.

Other or subsidiary aspects of the log forming attachment include a laterally deformed outer circular edge of each disk, deforming the outer circular edge of each of the disks in a different and random manner, using at least one circular disk which has a different diameter than at least one other circular disk, using one group of disks which have the same diameter and using another group of disks which have a different diameter, connecting at least one circular disk in a non-orthogonal relationship to a shaft about which the disk rotates, and inducing permanent hew line-simulating bends in the panel configuration which are sufficient to create curvature of the curved portion.

Other aspects of the invention, and a more complete appreciation of the present invention, as well as the manner in which the present invention achieves the above and other improvements, can be obtained by reference to the following detailed description of a presently preferred embodiment taken in connection with the accompanying drawings, which are briefly summarized below, and by reference to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a metal simulated log siding panel which incorporates the present invention.

FIG. **2** is an end elevation view of the simulated log panel shown in FIG. **1**.

FIG. **3** is a perspective view of an exterior portion of a building to which there have been attached a plurality of the simulated log siding panels of the type shown in FIGS. **1** and **2**.

FIG. **4** is a view similar to FIG. **2**, showing connection of the simulated log siding panel shown in FIG. **1** to the exterior surface of the building shown in FIG. **3**.

FIG. **5** is a view similar to FIG. **4**, showing connection of a plurality of simulated log siding panels of the type shown in FIGS. **1**, **2** and **4** to the exterior surface of the building shown in FIG. **3**.

FIG. **6** is a generalized perspective view of a prior art seamless siding forming machine and a coil of metal used to create seamless metal siding panels.

FIG. **7** is a partial perspective view of a front portion of the prior art seamless siding forming machine shown in FIG. **6**, illustrating components including a wood grain embossing roller.

FIG. **8** is partial perspective view of a middle portion of the prior art seamless siding forming machine shown in FIGS. **6** and **7**, illustrating a plurality of metal forming roller dies.

FIG. **9** is a partial perspective view of a modified end portion of the prior art seamless siding forming machine shown in FIGS. **6**, **7** and **8**, illustrating metal forming roller dies and a partially completed seamless siding panel emerging from the machine.

FIGS. **10-14** are end elevation views showing configurations of bent sheet metal existing at different metal forming stations of the siding forming machine shown in FIGS. **6-9**.

FIG. **15** is a vertical cross-sectional view of a metal forming roller die used in the siding forming machine shown in FIG. **9**.

FIG. **16** is an end view of a prior art shiplap siding panel.

FIG. **17** is an end view of a prior art reverse board and batten siding panel.

FIG. **18** is an perspective view of a log forming attachment, which incorporates the present invention, connected to the end of the prior art seamless siding forming machine shown in FIGS. **6-9**, by which to transform the siding panel configuration shown in FIG. **14** into the simulated log siding panel shown in FIGS. **1-5**.

FIG. **19** is a side elevation view of associated disks and elastomeric rollers of the log forming attachment shown in FIG. **18**.

FIG. **20** is an end elevation view of some of the associated disks and elastomeric rollers of the log forming attachment shown in FIGS. **18** and **19**.

FIG. **21** is an end elevation view of the other ones of the associated disks and elastomeric rollers of the log forming attachment shown in FIGS. **18** and **19**.

FIG. **22** is an end elevation view of a portion of the log forming attachment shown in FIG. **20**, showing initial transformation of the configuration shown in FIG. **14** into the simulated log siding panel shown in FIGS. **1-5**.

FIG. **23** is an end elevation view of a portion of the log forming attachment shown in FIG. **21**, showing final transformation of the configuration shown in FIGS. **14** and **22** into the simulated log siding panel shown in FIGS. **1-5**.

DETAILED DESCRIPTION

A metal simulated log siding panel **20** which incorporates the present invention is shown in FIGS. **1** and **2**. The simu-

lated log panel **20** is formed from a sheet or strip of relatively thin gauge sheet metal, such as aluminum or steel, which has been bent into a convex shape **21** and into an attachment edge **22**. The attachment edge **22** is used to connect the simulated log panel **20** to an exterior wall or surface of a building. The convex shape **21** is formed by an outer curved portion **23** and offset wall portions **24** and **25**. The curved portion **23** replicates or simulates a natural log used in the construction of a building. The offset wall portions **24** and **25** project the curved portion **23** outward and provide relief to visually accentuate the curved portion **23**, when the panel **20** is attached to the exterior of the building (FIG. **3**).

Bends **26** are formed in the curved portion **23** to simulate hew lines that typically exist on natural construction logs. The hew line-simulating bends **26** are formed as permanent deformations in the curved portion **23**. The hew line-simulating bends **26** also create the curvature of the curved portion **23** of the panel **20**, while simultaneously preventing the curved portion **23** from assuming a uniform cylindrical shape. The hew line-simulating bends **26** extend continuously, or substantially continuously, along the entire length of the curved portion **23** of the simulated log panel **20**. The hew line-simulating bends **26** are not straight, not uniformly spaced transversely from the margins of the curved portion **23**, and not uniformly spaced transversely with respect to one another. Instead, each hew line-simulating bend **26** varies in transverse position on the curved portion **23** between the margins at those locations where the offset wall portions **24** and **25** intersect the curved portion **23**. The hew line-simulating bends **26** also vary in transverse spacing relative to adjacent hew line-simulating bends **26**.

The hew line-simulating bends **26** contribute substantially to the more authentic appearance of the simulated log siding panel **20**. The unevenness and random-appearing nature of the hew line-simulating bends **26** replicate the random look of actual hew lines formed on natural construction logs which result from using a draw knife to strip natural bark from a tree trunk that becomes the construction log. The hew line-simulating bends **26** simulate the marks, edges or corners created by using the draw knife. The slight discontinuities or breaks in the curvature of the curved portion **23** created by the random hew line-simulating bends **26** also make the overall shape of the curved portion **23** comparable to the somewhat irregular shape of an actual construction log.

The more authentic and realistic appearance of the simulated log siding panels **20** becomes more apparent when multiple panels **20** are attached to the exterior of the building, as shown in FIG. **3**. As is apparent from FIG. **3**, the continuous and random transverse position of the hew line-simulating bends **26** creates a strong overall resemblance to a natural construction log, particularly when multiple panels **20** cover the broad expanse of a building exterior.

The impression is also enhanced by the offset wall portions **24** and **25**. Due to the forward projection of the curved portion **23** because of the offsetting wall portions **24** and **25**, the curved portion **23** appears relieved on the exterior of the building, thereby contributing to the recognition of and focus on the curved portion **23** as simulating a construction log. Furthermore, the relief created by the offset wall portions **24** and **25** provides a space **27** (FIGS. **1** and **2**) on the attachment edge **22** where a strip, coloring, or some other material may be located to replicate actual chinking between natural construction logs. Replicating chinking also contributes to the more authentic appearance.

The exemplary panels **20** shown have five hew line-simulating bends **26** extending along the length of the curved portion **23** of each panel **20**, as best shown in FIG. **2**. Five hew line-simulating bends **26** appear appropriate and consistent when the distance separating the margins between opposite edges of the curved portion **23** is approximately 8-10 inches. For panels **20** which replicate larger logs, represented by a greater distance between the margins of the curved portion **23**, a greater number of hew line-simulating bends **26** is more appropriate. Conversely, a lesser number of hew line-simulating bends **26** should be used on panels **20** which replicate smaller-width construction logs. The number of hew line-simulating bends **26** should achieve an appealing, authentic and realistic appearance.

Each panel **20** also includes a flange retainer **28** which extends outward from a middle location on the attachment edge **22**. The flange retainer **28** is separated from the offset wall portion **24** by the space **27**, as shown in FIG. **2**. The flange retainer **28** extends at an acute angle **29** (FIG. **4**) from the attachment edge **22** and projects toward the convex shape **21**. A lip **30** extends inward from a rear edge of the offset wall portion **25**, on the opposite side of the convex shape **21** from the attachment edge **22**. The lip **30** extends toward the attachment edge **22** and into an interior concave area behind the convex shape **21**.

The retainer flange **28** and the lip **30** are used to connect the simulated log siding panels **20** to one another and to an exterior wall **32** of a building structure, as shown in FIGS. **4** and **5**. The lip **30** of one panel **20** is inserted under a retainer flange **28** of a lower, immediately adjacent panel **20** which has been previously connected to the exterior wall **32**. The upper attachment edge **22** of the panel **20** is thereafter attached to the exterior wall **32** with fasteners, such as screws or nails **34** which extend through attachment holes **35** (FIG. **1**) formed in an outer marginal area of the attachment edge **22**. The acute angle **29** of the retainer flange **28** of the lower adjacent panel **20** firmly retains the lip **30** of the upper adjacent panel **20** at the intersection of the retainer flange **28** and the attachment edge **22**, without the need for separate fasteners. The next, immediately-adjacent panel **20** is connected in the same manner, until multiple levels or tiers of panels **20** have been attached and connected to each other in the same way to cover the exterior wall **32** of the building (FIG. **3**).

To retain the lip **30** of the panel **20** at the lowermost level or tier on the exterior wall **32**, a bottom attachment (not shown), which is similar to the attachment edge **22** with the flange retainer **28**, is connected at the bottom of the exterior wall **32**. Such a bottom attachment provides a flange retainer **28** to retain the lip **30** of the lowermost panel **20** connected to the exterior wall **32**. As is apparent from FIGS. **4** and **5**, the exposed area **27** of the attachment edge **22** presents an area upon which simulated chinking can be added.

When the simulated log panel is installed on the exterior wall, as shown in FIGS. **4** and **5**, the dimension between the lip **30** and the flange retainer **28** of the lower log siding panel **20** and the position of the top attachment edge **22** of the upper log siding panel **20** is maintained at a constant dimension, so that the overall extent of curvature of the curved portion **23** of each of the log siding panels **20** is essentially the same when installed on the exterior wall of the building.

Each simulated log panel **20** is preferably seamless, meaning that it extends the entire length of the exterior wall **32** as shown in FIG. **3**. A seamless panel **20** does not adjoin or connect to a horizontally adjacent similar panel **20**. The seamless nature of each panel **20** also contributes to a realistic look, because natural log construction typically utilizes construction logs which extend the full length between typical breakpoints in the exterior walls, such as at corners, doors and windows. In the same way, seamless simulated log siding

panels **20** extend between breakpoints in the exterior walls to further duplicate natural log construction techniques (FIG. **3**).

Exemplary dimensions of the simulated log siding panel **20** which provide enhanced authenticity and appearance are as follows, all with reference to FIG. **4**. The maximum point of curvature or separation of the curved portion **23** from the exterior wall **32** is about 1⅛ inches. The offset wall portions **24** and **25** are about 7/16 inches in width, meaning that the curved portion **23** is offset from the attachment edge **22** and the exterior wall **32** by slightly less than that same dimension. The area **27** between the adjacent offset wall portions **24** and **25** (FIG. **5**) at which to attach simulated chinking is approximately ⅝ inches in width, once the two panels have been connected together (FIG. **5**). These exemplary dimensions create enhanced visual effects for a panel **20** which has a width of its curved portion **23** between the marginal junctions with the flat offset wall portions **24** and **25** of approximately 8-10 inches.

The simulated log siding panel **20** is formed using a seamless siding metal forming machine **36**, shown in FIGS. **6-9**. The seamless siding forming machine **36** is conventional except for certain modifications described below. A log forming attachment **40**, shown in FIGS. **18-23**, is attached to a rear end of the siding forming machine **36**. The log forming attachment **40** and the below-described modifications to the siding forming machine **36** transform a partial seamless siding panel configuration **72** (FIG. **13**) into the simulated log siding panel **20** (FIG. **2**).

The seamless siding forming machine **36** operates on a continuous strip **44** of metal which is unwound from a coil or spool **46**. A motor **48** is connected to move a chain **50** and thereby rotate sprockets **52** to which the chain **50** is connected. The sprockets **52** are connected to shafts **53**, and rollers **54** are connected to the shafts **53** along the length of the machine **36**. The rollers **54** pull the metal strip **44** through the machine **36**. Roller dies **56**, **59**, **60**, **62**, **63**, **68**, **69** and **70** (FIGS. **6-9** and **15**) are located at a series of metal forming stations located along the length of the machine **36**. The roller dies interact with the moving metal strip **44** to form the bends and configurations shown in FIGS. **10-14** as the metal strip **44** progresses through the machine **36**.

A first metal forming station of the seamless siding forming machine **36**, shown in FIG. **7**, is a conventional embossing roller **58**. The embossing roller **58** creates a surface pattern or texture in the metal strip **44** which simulates the grain or texture characteristics of natural wood. The simulated grain and texture characteristics are permanently formed in the metal strip **44** and the finished simulated log siding panel **20**.

The next metal forming station of the machine **36** includes a conventional hole-punching die **59** which produces the attachment or nail holes **35** (FIG. **1**) in the attachment edge **22** of the panel **20**. Conventional roller dies **60**, shown in FIGS. **7** and **8**, next bend the flange retainer **28** (FIG. **2**) along one transverse edge of the metal strip **24** which will become the attachment edge **22**, as shown in FIG. **10**. Other conventional roller dies (not shown) produce the bends which form the offset wall portion **25** and the lip **30** on the opposite transverse edge of the metal strip **44**. A conventional seamless siding forming machine which has not been modified in accordance with the present invention could convert the configuration shown in FIG. **10** into a conventional shiplap siding panel **61** shown in FIG. **16**, by employing a subsequent metal forming station (not shown) to bend the offset wall portion **25** perpendicularly with respect to the center of the metal strip **44** and to bend the lip **30** perpendicularly with respect to the offset wall portion **25**.

The metal forming roller dies bend the offset wall portion **25** until it extends at an obtuse angle **64** relative to the center of the metal strip **44**, as shown in FIG. **10**. The lip **30** is bent to extend at an acute angle **66** relative to the offset wall portion **25**. Bending the lip **30** at the acute angle **66** facilitates connecting the lip **30** to the flange retainer **28** (FIGS. **4** and **5**), to hold the simulated log siding panel **20** in a firmly retained position on the exterior wall **32**. The acute angle **66** also extends the offset wall portion **25** at an obtuse angle **67** (FIG. **4**) relative to the exterior surface **32** of the building when the panel **20** as it attached to an adjacent panel **20**. The angle **66** (FIG. **10**) is the complement of angle **67** (FIG. **4**).

The next series of metal forming stations of the machine **36** includes conventional roller dies **62**, **63** and **68** shown in FIG. **9** which produce the bends in the metal strip **44** which define the attachment edge **22**, the offset wall portion **24**, and an intermediate portion **65** which will become the curved portion **23** of the simulated log siding panel **20** (FIG. **2**). As shown in FIG. **11**, the first bends created by the die **62** (FIG. **9**) extend the offset wall portion **24** a slight angle relative to the attachment edge **22** and the intermediate portion **65**. As shown in FIG. **12**, the next bends created by the die **63** (FIG. **9**) create a greater angle of the offset wall portion **24** relative to the attachment edge **22** and the intermediate portion **65**. The last bends created by the die **68** further angle the offset wall portion **24** relative to the intermediate portion **65** and relative to the attachment edge **22**, as shown in FIG. **13**.

The bends in the metal strip **44** illustrated in FIG. **13** establish the final angles of the offset wall portions **24** and **25** relative to the intermediate portion **65**. The final angle of the offset wall portion **24** relative to the intermediate portion **65** is approximately the same as the final angle of the offset wall portion **25** relative to the intermediate portion **65**. The attachment edge **22** extends generally parallel to the intermediate portion **65**.

The configuration shown in FIG. **13** is a partial reverse board and batten siding panel configuration **72**. A conventional seamless siding forming machine which has not been modified as described herein could convert the partial reverse board and batten configuration **72** into a conventional complete reverse board and batten siding panel **73** shown in FIG. **17**, by employing another metal forming station (not shown) to bend the offset wall portion **24** to extend perpendicularly from the attachment edge **22** and the intermediate portion **65** and to bend the offset wall portion **25** to extend perpendicularly to the intermediate portion **65** and to bend the lip **32** extend perpendicularly to the offset wall portion **25**.

The simulated log siding panel **20** is formed from the partial reverse board and batten configuration **72** (FIG. **13**) into the configuration **74** shown in FIG. **14** by two complementary metal forming roller dies **69** and **70** shown in FIGS. **9** and **15**. The metal forming roller dies **69** and **70** are used as the last set of metal forming dies in the seamless siding machine **36**. The dies **69** and **70** establish a final obtuse angle **71** of the attachment edge **22** relative to the offset wall portion **24**, by bending the metal into the configuration **74** shown in FIG. **14**. The angle **71** (FIG. **14**) extends the offset wall portion **24** forward from the exterior surface **32** (FIGS. **4** and **5**) when the simulated log siding panel **20** is connected to the building. The angle **71** is approximately the same as the obtuse angle **67** that the offset wall portion **25** extends from the exterior surface **32** (FIG. **4**). The similar angles **67** and **71** create symmetry and uniformity in visual relief of the curved portion **23**.

The configuration **74** of the panel shown in FIGS. **9** and **14** is delivered to the log forming attachment **40**, where it is transformed by the log forming attachment **40** into the simu-

lated log siding panel **20**. The transformation of the panel configuration **74** into the simulated log siding panel **20** is achieved by creating the hew line-simulating bends **26** in the intermediate portion **65** (FIG. **14**).

The log forming attachment **40** is connected at the end of the seamless siding forming machine **36**. As shown in FIGS. **18-23**, the log forming attachment **40** is formed by rotatable disks **80**, **82**, **84**, **86** and **88**, which interact with associated rotatable elastomeric rollers **90**, **92**, **94**, **96** and **98**, respectively. The disks **80**, **82**, **84**, **86** and **88** and the elastomeric rollers **90**, **92**, **94**, **96** and **98** are not rotated by the chain **50** from the motor **48** of the seamless siding machine **36** (FIGS. **6** and **9**). Instead, the disks and elastomeric rollers are rotated by the movement of the bent metal strip **44** as it is propelled from the seamless siding machine **36** and moved between the associated disks and elastomeric rollers **80** and **90**, **82** and **92**, **84** and **94**, **86** and **96**, and **88** and **98**, as shown in FIG. **19**.

The log forming attachment **40** includes four idler shafts **100**,**102**,**104** and **106**. The idler shafts **100** and **102** are connected to support brackets **107** and **108** (FIG. **9**) which would normally be used to support the roller dies at the end of the siding forming machine **36**. The idler shafts **104** and **106** extend between attachment plates **109** and **110**, which are connected on respectively opposite sides of a frame **114** of the seamless siding forming machine **36**, as shown in FIGS. **9** and **18**.

The two smaller diameter disks **80** and **82** are attached to and rotate around the shaft **102**. The two elastomeric rollers **90** and **92** are attached to and rotate around the shaft **100**. The elastomeric rollers **90** and **92** interact and rotate with the respectively associated disks **80** and **82**. The position of the disks **82** and **84** on the shaft **102** aligns an outer circular periphery of those disks with an outer cylindrical surface of the elastomeric rollers **90** and **92** retained on the shaft **100**. The three larger diameter disks **84**, **86** and **88** are attached to and rotate around the shaft **106**. The three elastomeric rollers **94**, **96** and **98** are attached to and rotate around the shaft **104**. The elastomeric rollers **94**, **96** and **98** interact and rotate with the respectively associated disks **84**, **86** and **88**. The position of the disks **84**, **86** and **88** on the shaft **106** aligns an outer circular periphery of those disks with an outer cylindrical surface of the elastomeric rollers **94**, **96** and **98** retained on the shaft **104**.

The space between the shafts **100** and **102** is adjustable, and that space determines the spacing between the associated disks and elastomeric rollers **80** and **90**, and **82** and **92**. Similarly, the space between the shafts **104** and **106** is also adjustable, and that space determines the spacing between the associated disks and elastomeric rollers **84** and **94**, **86** and **96**, and **88** and **98**. This spacing determines the extent of deformation of the intermediate portion **65** (FIGS. **14**, **22** and **23**) when the hew line-simulating bends **26** are created.

The periphery of the disks **80**, **82**, **84**, **86** and **86** have each been deformed transversely relative to a plane that would otherwise be occupied by those disks if their outer peripheral edges were not deformed, as shown in FIGS. **18** and **20-23**. The extent and pattern of tranverse deformation of the outer periphery of each of the disks is random and different from that of the other disks. As a result of this deformation, the exterior periphery of the disks **80**, **82**, **84**, **86** and **88** does not track in a path which is orthogonal to the axis of the shafts **102** and **106** or parallel to the direction of movement of the bent metal strip **44** through the machine **36**, as the disks rotate. Instead, the path followed by the outer periphery of the disks moves from side to side as the disks rotate, at the location where the disk peripheries adjoin the elastomeric rollers. Furthermore, as is shown in FIG. **20**, each complete disk **80** and **82** may be oriented in a non-orthogonal relationship to the axis of the shaft **102**. This non-orthogonal relationship further accentuates the transverse side to side movement of the periphery of the disks **80** and **82**. The deformed outer periphery of the disks and the non-orthogonal positioning of the disks on the shafts causes the exterior periphery of the disks to move laterally, side-to-side in different and random paths, none of which are parallel to the movement of the bent metal strip **44**.

When the bent metal configuration **74** moves between the disks **80**, **82**, **84**, **86** and **88** and the elastomeric rollers **90**, **92**, **94**, **96** and **98**, as shown in FIG. **19**, the circular exterior peripheral edge of the disks slightly compresses the intermediate portion **65** of the configuration **74** (FIGS. **9**, **14**, **22** and **23**) into the elastomeric rollers and forms the hew line-simulating bends **26**, as shown in FIGS. **22** and **23**. The compression of the elastomeric rollers **90**, **92**, **94**, **96** and **98** by the peripheries of the disks **80**, **82**, **84**, **86** and **88** force the intermediate portion **65** into the elastomeric rollers and creates the hew line-simulating bends **26**. The amount of compression and bending of the intermediate portion **65** shown in FIGS. **22** and **23** is more than the amount of actual permanent deformation exhibited by the hew line-simulating bends **26** (FIG. **2**), because the metal tends to spring back slightly after it has been bent by the disks and elastomeric rollers.

The hew line-simulating bends **26** created by the disks and elastomeric rollers also have the effect of transforming the flat intermediate portion **65** (FIG. **14**) into the curved portion **23** of the simulated log siding panel **20** (FIG. **2**). The hew line-simulating bends **26** create curvature in the curved portion **23**. The curvature of the portion **23** is irregular along its length because of the random transverse spacing and position of the bends **26**, thereby better simulating the uneven exterior appearance of a natural construction log.

Because of the amount and random characteristic of the lateral distortion of the outer peripheral edges of each of the disks **80**, **82**, **84**, **86** and **88** is different, and because the disks may be connected in a non-orthogonal orientation for rotation on the shafts **80** and **84**, the rotation of the disks against the elastomeric rollers causes the hew line-simulating bends **26** to move transversely relative to one another and relative to the margins of the intermediate portion **65** along the length of the panel. Further nonuniformity results because of the difference in relative diameters of the disks **80** and **82**, compared to disks **84**, **86** and **88**. Because the smaller diameter disks **80** and **82** rotate more rapidly compared to the rotation of the larger diameter disks **84**, **86** and **88**, the pattern of hew line-simulating bends **26** induced by the more rapidly rotating smaller diameter disks **80** and **82** repeats more frequently than the repetition of the pattern created by the slower rotating larger diameter disks **84**, **86** and **88**. Therefore, the entire pattern of hew line-simulating bends **26** exhibits substantial nonuniformity, non-repetitiveness and randomness in transverse position, relative to one another and to the margins of the curved portion **23** of the simulated log panel **20**, as well as randomness, nonuniformity and non-repetition of the hew line patterns created, resulting in an appearance which more realistically and authentically simulates the appearance of a natural construction log.

The elastomeric rollers **90**, **92**, **94**, **96** and **98** exhibit hardness of approximately fifty (50) durometers. Elastomeric rollers having this hardness have proved satisfactory in making well-defined hew line-simulating bends **26** in simulated log siding panels **20** formed from 26 to 30 gauge steel or 0.027 to 0.032 inch thick aluminum. Thicker or thinner metal may require the use of elastomeric rollers having a greater or lesser durometer hardness. Of course, because the disks and asso-

ciated elastomeric rollers have continuous rolling contact with the metal strip as it advances through the siding forming machine **36**, the hew line-simulating bends **26** extend continuously along the length of the simulated log siding panel **20**.

The capability to create the hew line-simulating bends **26** offers substantial improvements in the realism and appearance of simulated log siding panels. The random nature of the hew line-simulating bends **26** contributes to the realism by replicating the random nature of hew lines in natural construction logs. The hew line-simulating bends **26** also change the curvature of the curved portion **23** in a somewhat irregular or uneven manner, thereby simulating the uneven nature of natural construction logs and simultaneously avoiding the unrealistic appearance of the repeating pattern of cylindrical prior art simulated log panels.

The log forming attachment **40** is used in conjunction with a conventional seamless siding forming machine **36** to transform partial conventional siding patterns, such the partial reverse board and batten configuration **72** (FIG. **13**) or the partial shiplap configuration (FIG. **10**), into the simulated log siding panel **20**. The same conventional seamless siding machine can be used to create other patterns and configurations of seamless siding, by removal of the log forming attachment **40** and other modifications described above and installing the conventional metal forming parts that were removed. Such changes are easily accomplished and doing so avoids the need for a separate seamless siding forming machine dedicated only to forming simulated log simulated log siding panels.

Many other improvements and advantages will become apparent upon gaining a complete appreciation of the scope, significance and ramifications of the present invention. Preferred embodiments of the invention and many of its improvements have been described with a degree of particularity. The detail of the description is of preferred examples of implementing the invention. The detail of the description is not necessarily intended to limit the scope of the invention. The scope of the invention is defined by the following claims.

The invention claimed is:

1. A log forming attachment for connection to a conventional seamless siding forming machine to create an elongated metal simulated log siding panel from a different panel configuration created by and delivered from the conventional siding forming machine, comprising:

a plurality of circular disks located to contact one side of the panel configuration delivered from the siding forming machine;

a plurality of circular elastomeric rollers located to contact the other side of the panel configuration at a location opposite from the circular disks; and wherein:

each circular disk is associated with an elastomeric roller;

each disk and associated elastomeric roller are positioned to receive between them the panel configuration delivered from the siding forming machine;

each disk and associated elastomeric roller having a relative separation between them which causes the delivered panel configuration to be compressed into the elastomeric roller by the disk as the delivered panel configuration moves between the associated disks and rollers;

the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk; and

each induced permanent bend simulates a hew line in the simulated log siding panel.

2. A log forming attachment as defined in claim **1**, wherein:

each disk has an outer circular edge which has been deformed laterally from a plane of the disk.

3. A log forming attachment as defined in claim **1**, wherein:

the deformation of the outer circular edge of each of the plurality of disks is different.

4. A log forming attachment as defined in claim **2**, wherein:

at least one of the circular disks has a different diameter than at least one of the other circular disks.

5. A log forming attachment as defined in claim **2**, wherein:

the plurality of circular disks are divided into two groups, each of the groups includes at least one circular disk; and

the circular disks of each group have the same diameter; and

the circular disks of different groups have different diameters.

6. A log forming attachment as defined in claim **2**, further comprising:

a shaft to which each circular disk is connected and about which each circular disk rotates; and wherein:

at least one circular disk is connected to the shaft in a non-orthogonal relationship.

7. A log forming attachment as defined in claim **1**, wherein the simulated log siding panel has a curved portion that simulates curvature of a natural construction log, and wherein:

the permanent bends induced in the panel configuration are sufficient to create curvature of the curved portion.

8. A log forming attachment as defined in claim **1**, wherein the simulated log siding panel has a curved portion that simulates curvature of a natural construction log, the curved portion extending transversely between margins, the margins extending longitudinally along the panel, and wherein:

the transverse position of the hew line-simulating bends varies relative to the margins of the curved portion along the length of the panel.

9. A log forming attachment as defined in claim **8**, wherein:

the transverse position of the hew line-simulating bends varies relative to one another along the length of the panel.

10. A log forming attachment as defined in claim **9**, wherein:

the hew line-simulating bends create curvature of the curved portion.

11. A log forming attachment as defined in claim **10**, wherein:

the curved portion is formed in a portion of the panel configuration which projects forward and provides visual relief from adjacent portions of the panel configuration.

12. A log forming attachment as defined in claim **9**, wherein:

the panel configuration includes an edge portion which extends from the curved portion a sufficient distance to establish an area upon which to receive simulated chinking.

13. A log forming attachment as defined in claim **8**, wherein:

the hew line-simulating bends extend substantially continuously along the length of the panel.

14. Apparatus for creating an elongated metal simulated log siding panel from a continuous strip of metal, comprising:

a seamless siding forming machine which creates a panel configuration from the strip of metal, the panel configuration being different from the simulated log siding panel;

a plurality of circular disks connected to the machine and located to contact one side of the panel configuration;

a plurality of circular elastomeric rollers connected to the machine and located to contact the other side of the panel configuration at a location opposite from the circular disks; and wherein:

each circular disk is associated with an elastomeric roller;

each disk and associated elastomeric roller are positioned to receive between them the panel configuration;

each disk and associated elastomeric roller having a relative separation between them which compresses the panel configuration into the elastomeric roller by the disk as the panel configuration moves between the associated disks and rollers;

the compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk; and

each induced permanent bend simulates a hew line in the simulated log siding panel.

15. Apparatus as defined in claim **14**, wherein:

each disk has an outer circular edge which has been deformed laterally from a plane of the disk.

16. Apparatus as defined in claim **15**, wherein:

the deformation of the outer circular edge of each of the plurality of disks is different.

17. Apparatus as defined in claim **15**, wherein:

at least one of the circular disks has a different diameter than at least one of the other circular disks.

18. Apparatus as defined in claim **15**, wherein:

the plurality of circular disks are divided into two groups, each of the groups includes at least one circular disk;

the circular disks of each group have the same diameter; and

the circular disks of different groups have different diameters.

19. Apparatus as defined in claim **15**, further comprising:

a shaft to which each circular disk is connected and about which each circular disk rotates; and wherein:

at least one circular disk is connected to the shaft in a non-orthogonal relationship.

20. Apparatus as defined in claim **14**, wherein the simulated log siding panel has a curved portion that simulates curvature of a natural construction log, and wherein:

the permanent bends induced in the panel configuration create curvature of the curved portion.

21. Apparatus as defined in claim **14**, wherein the simulated log siding panel has a curved portion that simulates curvature of a natural construction log, the curved portion extending transversely between margins, the margins extending longitudinally along the panel, and wherein:

the transverse position of the hew line-simulating bends varies relative to the margins of the curved portion along the length of the panel.

22. Apparatus as defined in claim **21**, wherein:

the transverse position of the hew line-simulating bends varies relative to one another along the length of the panel.

23. Apparatus as defined in claim **22**, wherein:

the hew line-simulating bends create the curvature of the curved portion.

24. Apparatus as defined in claim **23**, wherein:

the curved portion is formed in a portion of the panel configuration which projects forward and provides visual relief from adjacent portions of the panel configuration.

25. Apparatus as defined in claim **14**, wherein:

the seamless siding forming machine continuously advances the panel configuration; and

the plurality of disks and elastomeric rollers continuously form the hew line-simulating bends in the advancing panel configuration.

* * * * *

EXHIBIT B

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT5031804

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
TED BAUM JR.	06/28/2018

RECEIVING PARTY DATA

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PROPERTY NUMBERS Total: 3

Property Type	Number
Patent Number:	9283604
Patent Number:	9732529
Patent Number:	D602612

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Total Attachments: 3
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source=Assignment#page2.tif
source=Assignment#page3.tif

ASSIGNMENT OF PATENT RIGHTS

THIS ASSIGNMENT is between and among Ted Baum, Jr., 3543 South County Road 5, Loveland, Colorado 80537 USA ("Assignor") and TB Holding Company, LLC, 3543 South County Road 5, Loveland, Colorado 80537 USA ("Assignee").

WHEREAS, Assignor owns all right, title, and interest in and to the following Patents and Patent Applications (the "Patent Rights"), as follows:

1. United States Patent Serial No.: D602,612, issued on October 20, 2009;

2. United States Patent Serial No.: 9,283,604, issued on March 15, 2016;

3. United States Patent Serial No.: 9,732,529, issued on August 17, 2017; and

WHEREAS, Assignor desires to assign all right, title and interest in and to the Patent Rights to Assignee to the extent he has any such rights worldwide; and

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, each of the undersigned hereby agree as follows:

1. Assignor warrants that:

a. he has the authority to assign all right, title, and interest in and to the Patent Rights;

b. he has conveyed no right, title, or interest in the Patent Rights to any party other than the Assignee;

c. at the time of signing of this Assignment, he neither knows nor has reason to know of any outstanding right, title, or interest in the Patent Rights inconsistent with a full assignment of rights to the Assignee.

2. Assignor, for good and valuable consideration, hereby sells, grants, transfers, authorizes application for, agrees to support, and assigns to Assignee the entire right, title, and interest in and to the Patent Rights, including, but not limited to:

a. all such worldwide rights to make, use, offer-for-sale and sell the Patent Rights;

b. the above-identified patents and patent applications and to any division, substitution, continuation, or continuation-in-part, of such application, all patents which may be granted thereon, and all reissues, and extensions thereof;

c. the right to file applications for United States or foreign patents based upon the Patent Rights, and to make a claim for any priority to which such applications are entitled, and to any division, substitution, continuation, or continuation-in-part, of such

applications, all patents which may be granted thereon, and all reissues and extensions thereof;

d. all related rights involving the Patent Rights in any country such as utility-model registrations, inventor's certificates, and the like, and all rights, titles, and interests involving the Patent Rights under any foreign government;

3. Assignor acknowledges that pursuant to the sale, grant, transfer, and assignment to the Assignee of the entire right, title, and interest in and to the Patent Rights, as provided in the above paragraphs, this assignment shall be complete as to all rights owned. As such, Assignor consents to a waiver of any and all access rights to any applications for United States or foreign patents relating to the Patent Rights, and including but not limited to the above-identified application, and to any division, substitution, continuation, or continuation-in-part, of such applications, all related access rights involving the Patent Rights in any country such as utility-model registrations, inventor's certificates and the like, and all access rights, titles, and interests involving the Patent Rights under any foreign government, to the extent permissible.

4. Assignor further covenants and agrees that he will sign all lawful papers and consents, as well as aid the Assignee in petitioning waiver of access of Assignor to the United States or foreign patent offices of any and all applications for United States or foreign patents relating to the Patent Rights, as provided above.

5. Assignor grants the firm of CR MILES, P.C. or other designated agent, the power to insert on this Assignment any further identification which may be necessary or desirable in order to comply with the rules of the Patent Cooperation Treaty or the United States Patent Office or any foreign patent office for recordation of this document, including, but not limited to, inserting the application number, the execution date, or the filing date of the above-identified United States Patent Application based upon the Patent Rights.

6. This assignment shall be binding on all parties, their heirs, executors, administrators, successors, or assigns, and may be recorded in the United States Patent and Trademark Office or elsewhere. In the event any provision of this Agreement is found to be unenforceable or to be unreasonable in scope, such provision shall be modified only to the extent necessary to make it enforceable, and as so modified, this Agreement shall remain in full force and effect.

SIGNATURES ON THE FOLLOWING PAGE:

Ted Baum SR.
Ted Baum, Jr.

Date: 6-28-18

UNITED STATES OF AMERICA)
STATE OF Colorado)
COUNTY OF Larimer)

SUBSCRIBED AND AFFIRMED OR SWORN to before me in the County of Larimer, State of Colorado, United States of America, by Ted Baum, Jr., this 28th day of June, 2018. WITNESS my hand and official seal pursuant to the authority vested in me as a Notary Public by the State of Colorado.

Pamela Troyan
Notary Public
My Commission Expires: 09-17-19

PAMELA TROYAN
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20074035189
MY COMMISSION EXPIRES SEPTEMBER 17, 2019

EXHIBIT C

EXHIBIT C

US009732529B2

(12) **United States Patent**
Baum, Jr.

(10) **Patent No.: US 9,732,529 B2**
(45) **Date of Patent: *Aug. 15, 2017**

(54) **SIMULATED LOG SIDING PANEL WITH HEW LINES**

(71) Applicant: **Ted Baum, Jr.**, Loveland, CO (US)

(72) Inventor: **Ted Baum, Jr.**, Loveland, CO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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E04F 13/08	(2006.01)
B21D 5/08	(2006.01)

(52) **U.S. Cl.**

CPC ***E04F 13/0871*** (2013.01); ***B21D 5/08*** (2013.01); ***E04F 13/123*** (2013.01); *Y10T 29/49* (2015.01); *Y10T 29/5116* (2015.01)

(58) **Field of Classification Search**

CPC E04C 2/08
USPC 52/233, 313, 554
See application file for complete search history.

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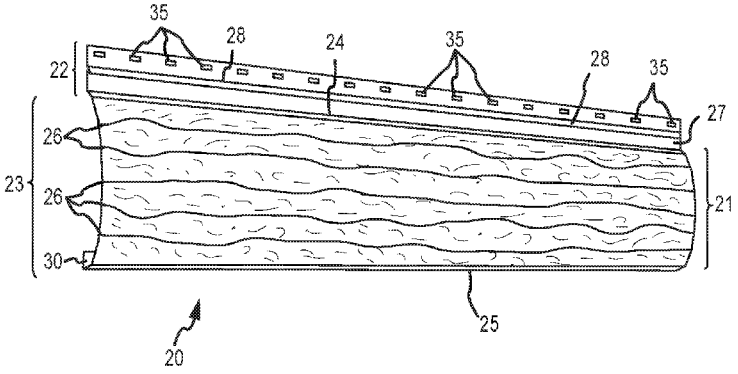
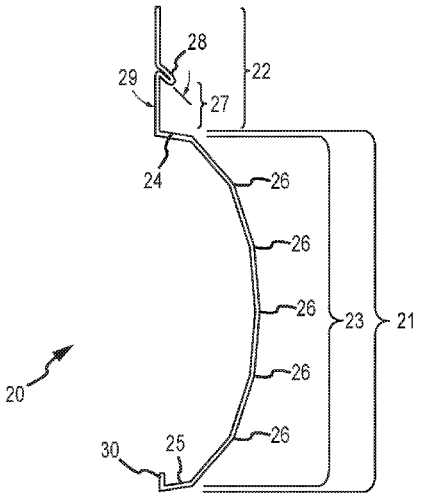
(57) **ABSTRACT**

An elongated metal simulated log siding panel has a curved portion that simulates the curvature of a natural construction log. A plurality of longitudinally extending and randomly transversely spaced permanent bends in the curved portion simulate hew lines of a natural construction log, thereby creating a more natural appearance. Rotating disks compress the metal into an elastomeric roller to create the hew line-simulating bends.

7 Claims, 11 Drawing Sheets





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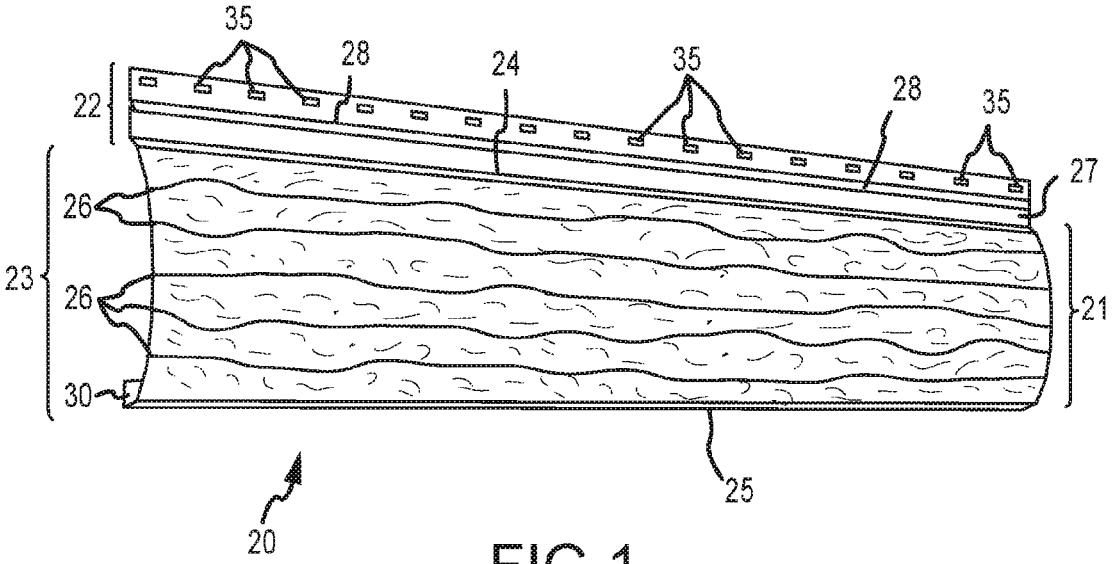
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FIG.1

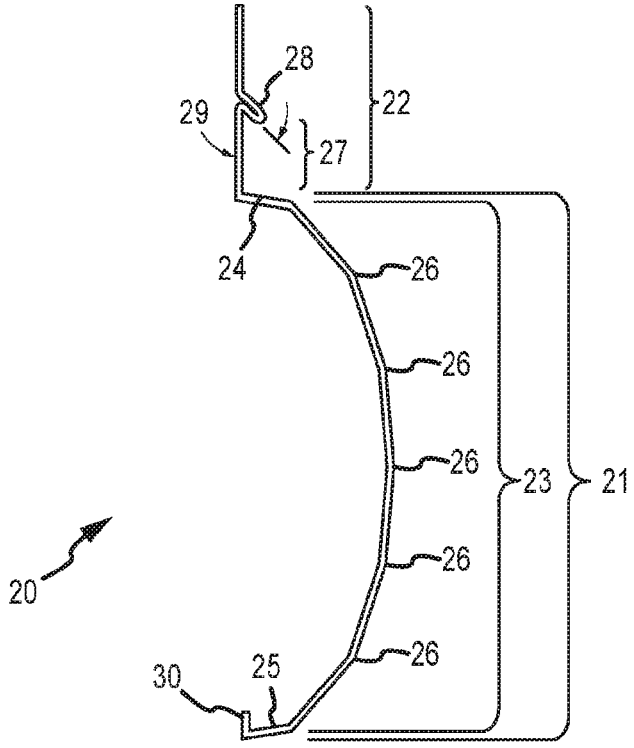
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FIG.2

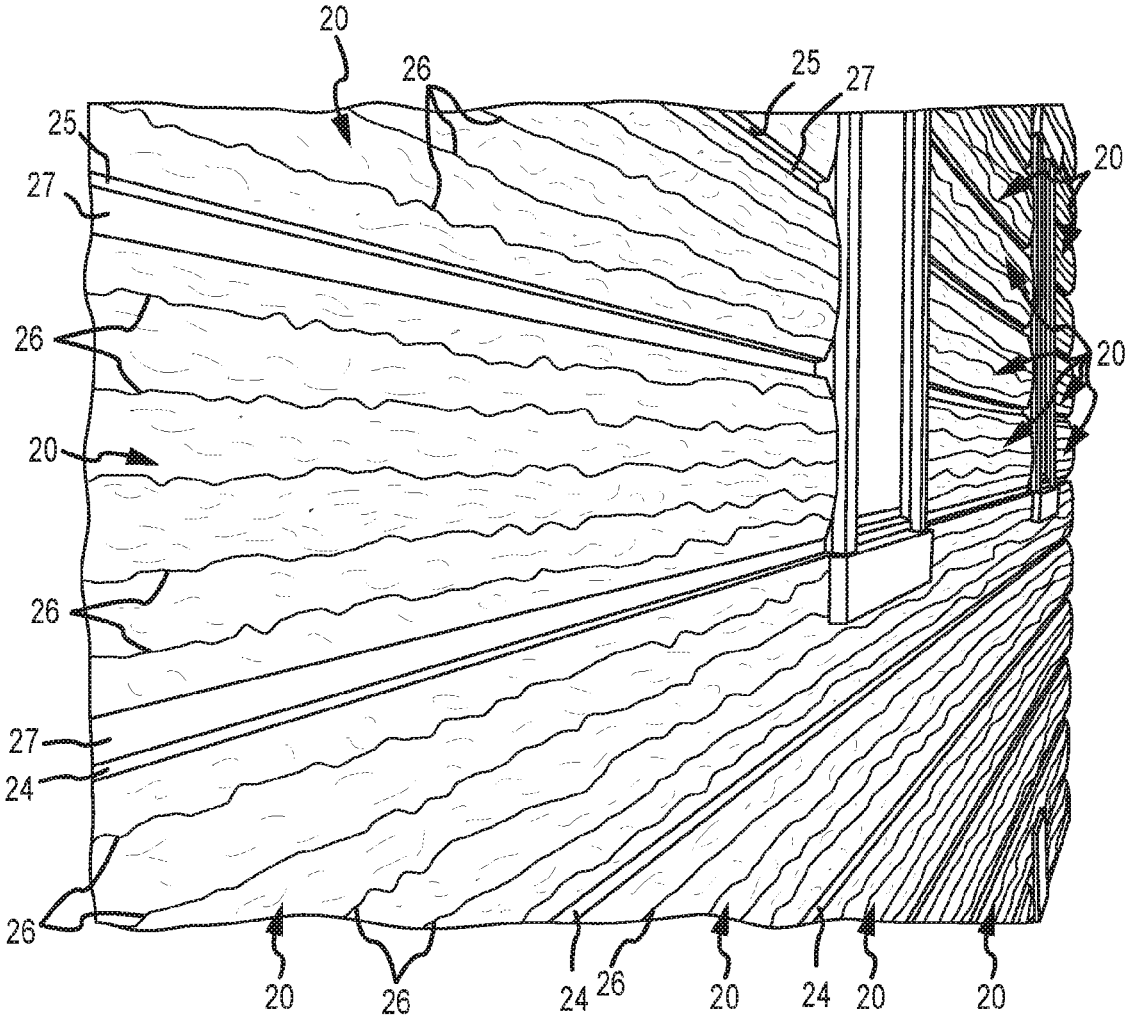

FIG.3

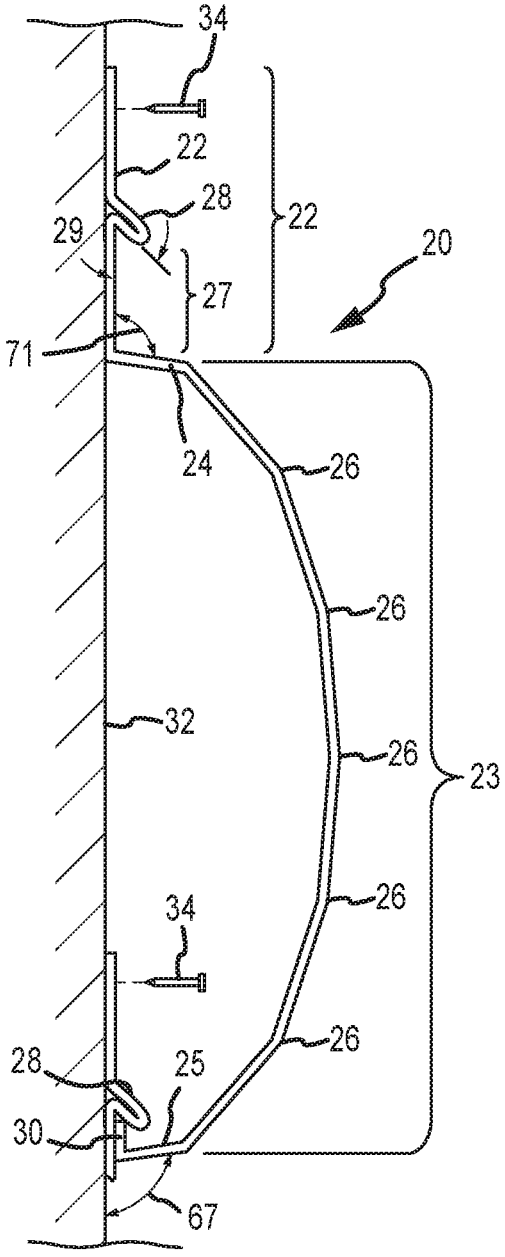
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FIG.4

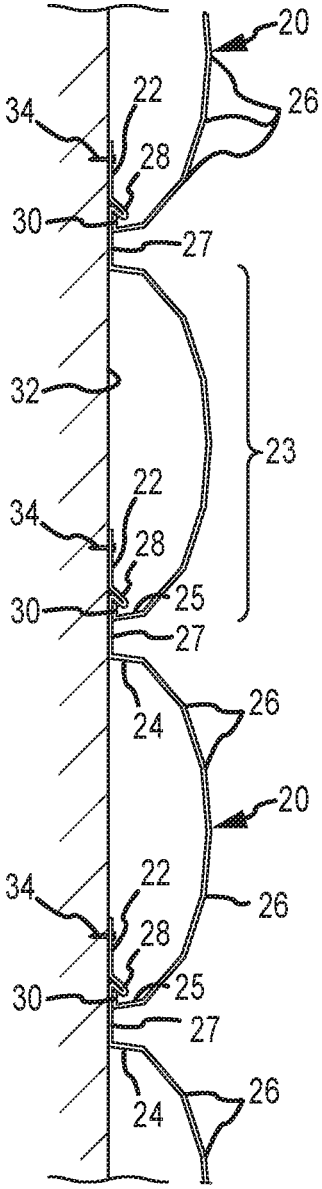
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FIG.5

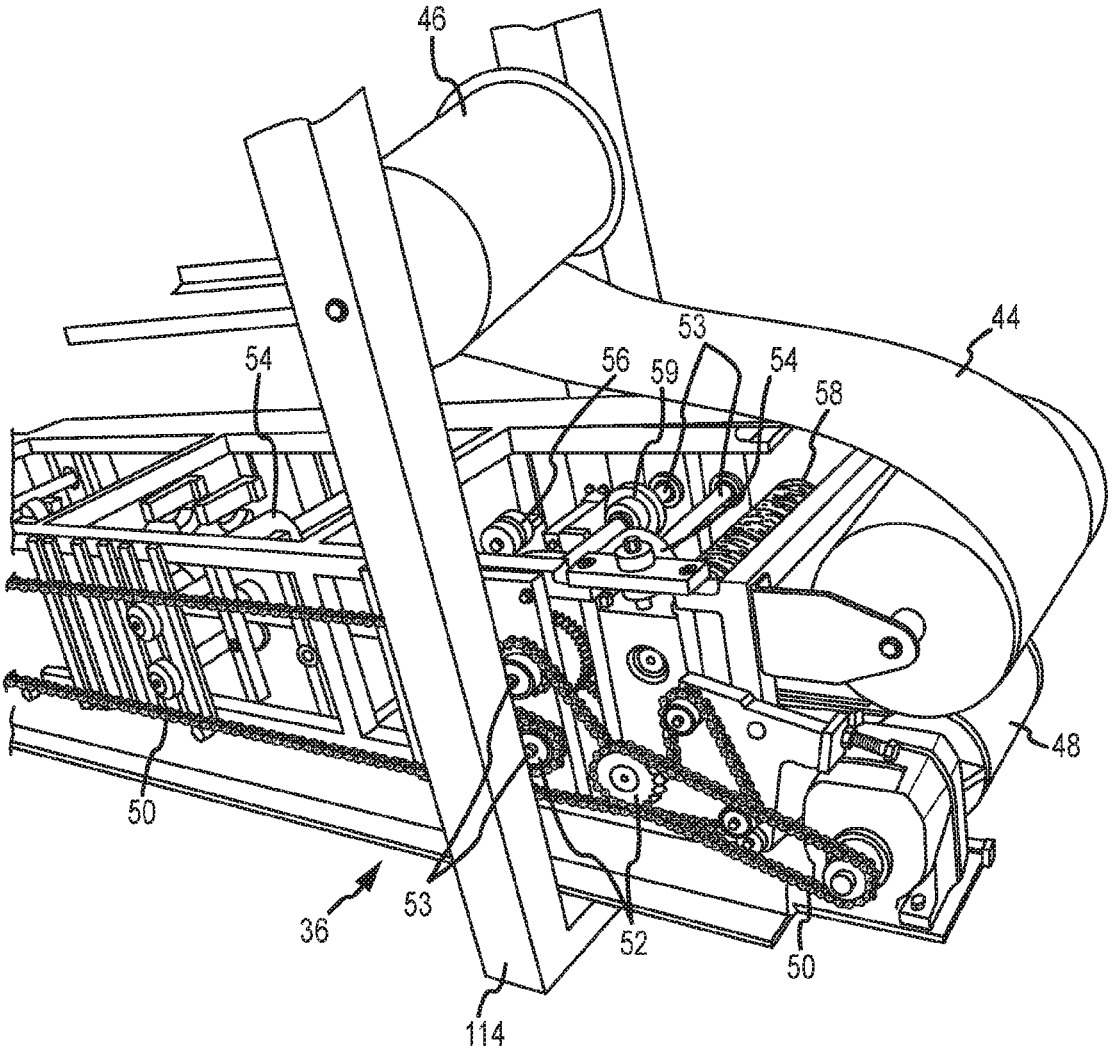


FIG.6
PRIOR ART

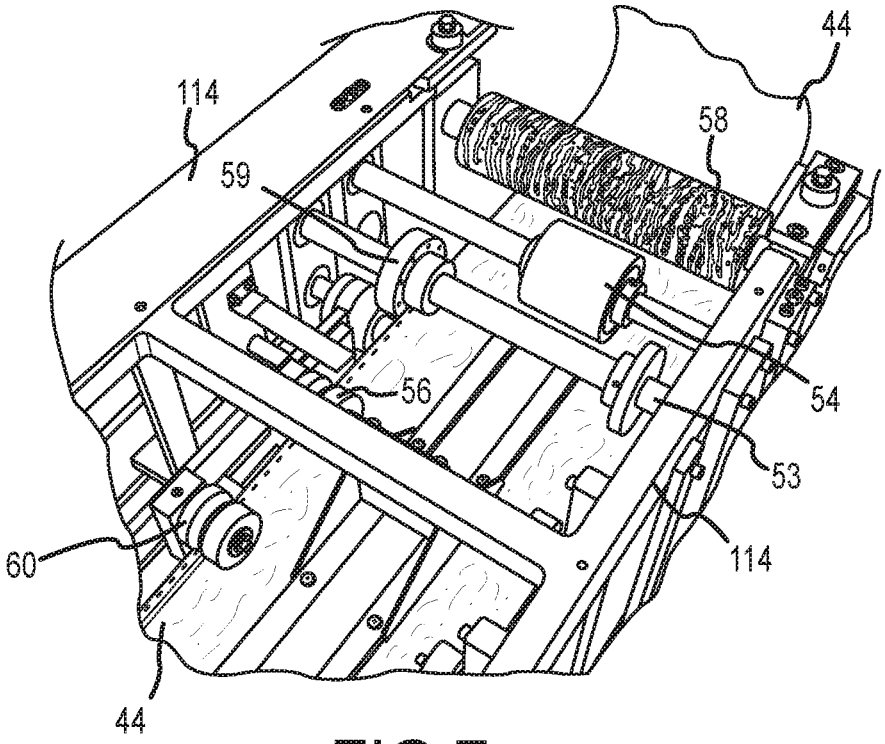


FIG.7
PRIOR ART

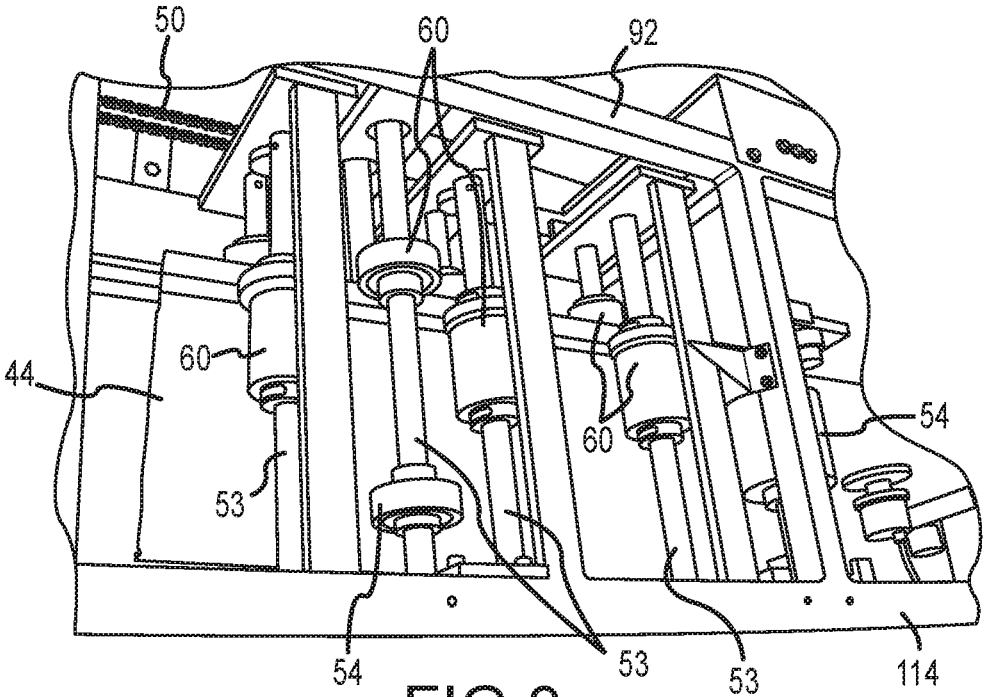
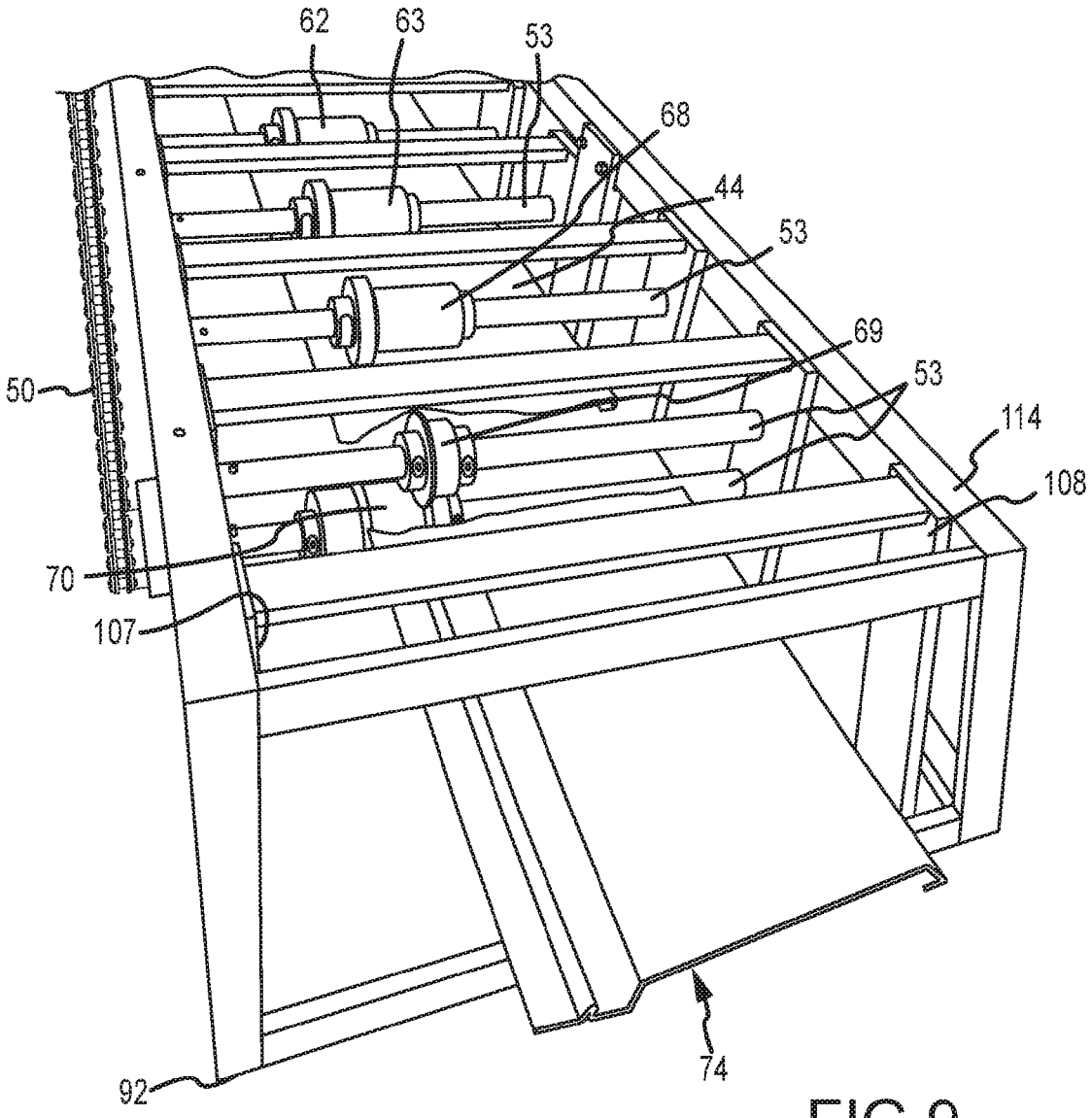


FIG.8
PRIOR ART



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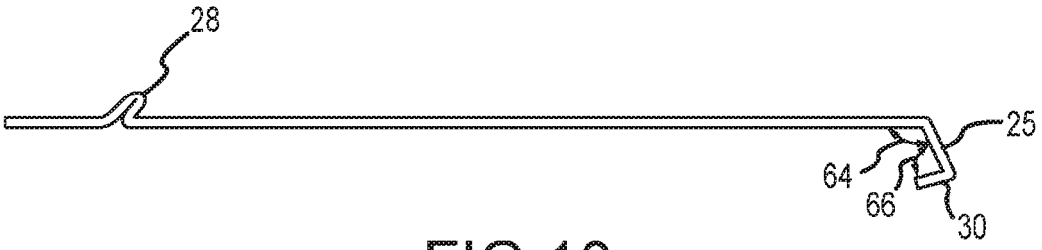


FIG.10

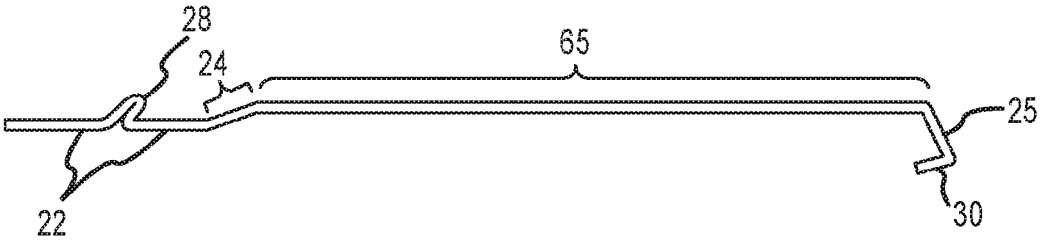


FIG.11

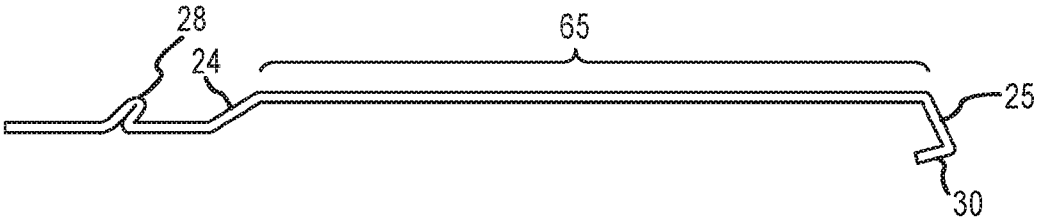
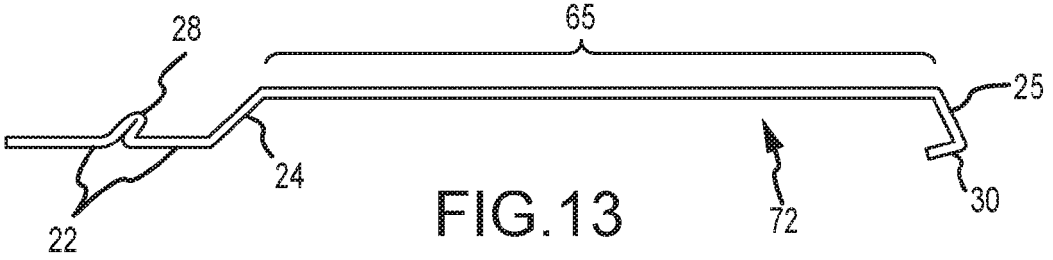


FIG.12



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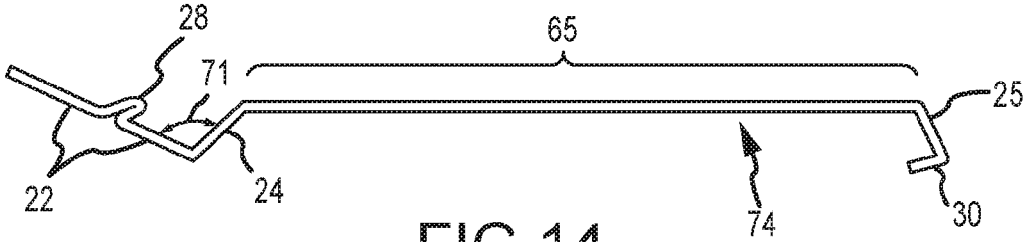

FIG.14

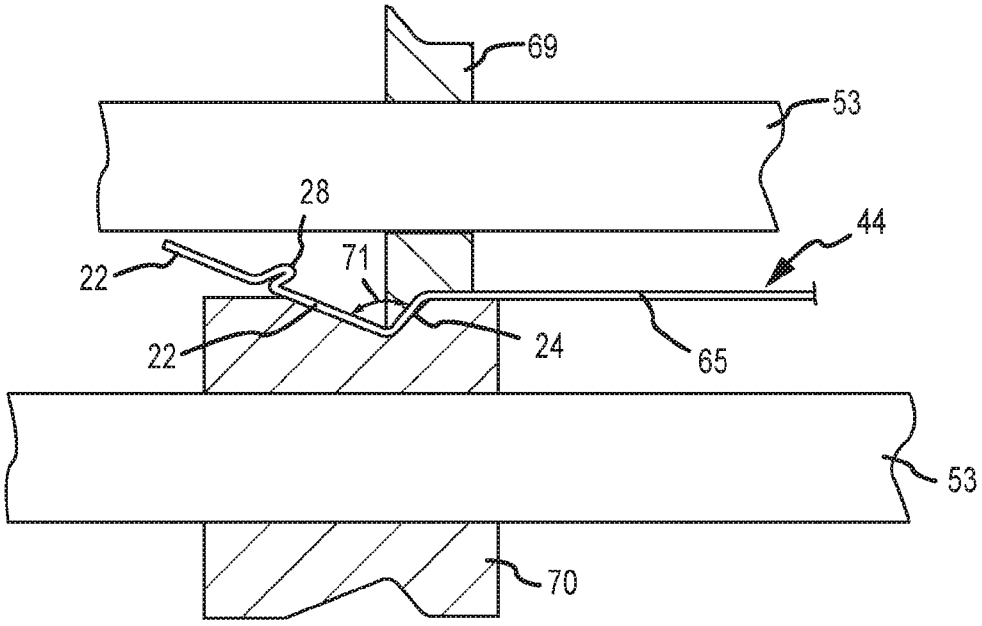

FIG.15

FIG.16
PRIOR ART

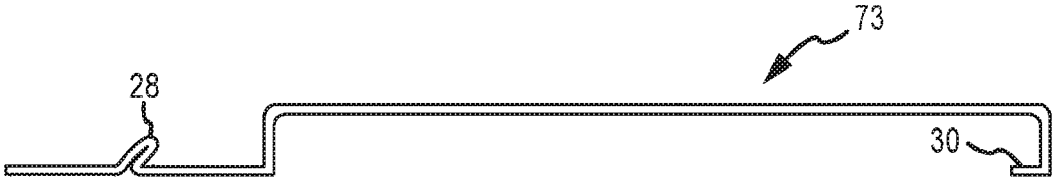

FIG.17
PRIOR ART

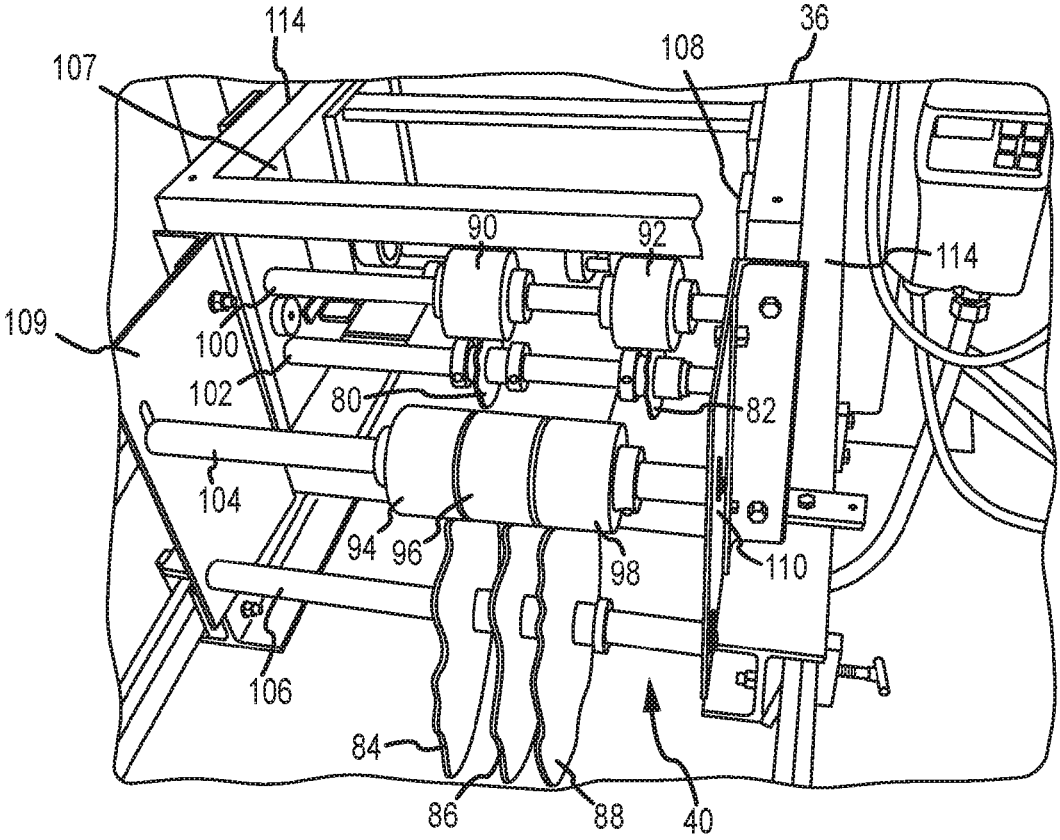
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FIG.18

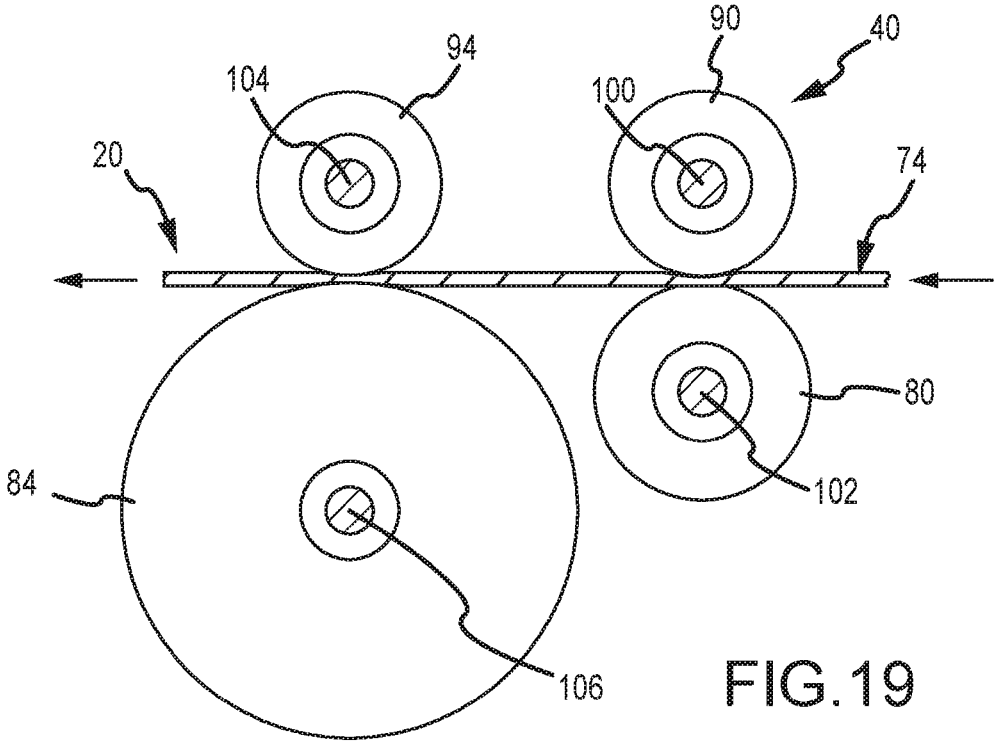
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FIG.19

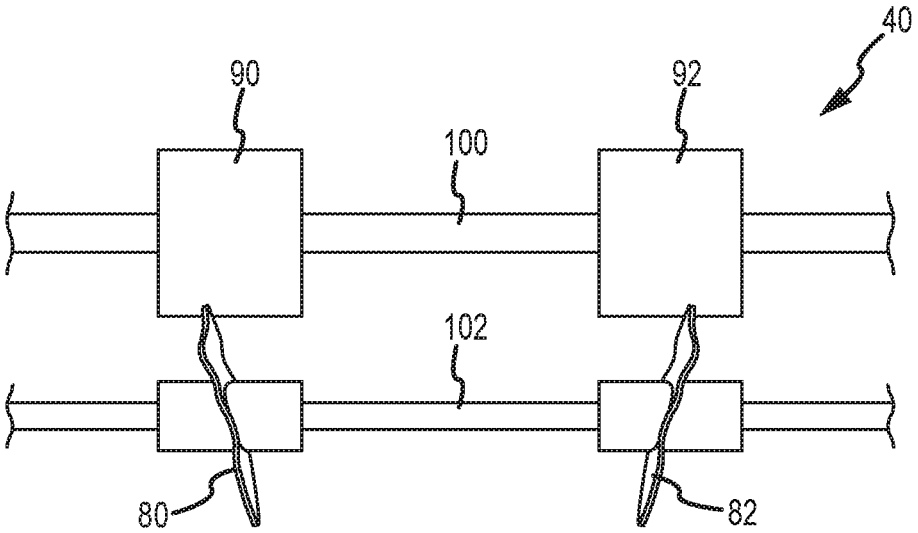

FIG.20

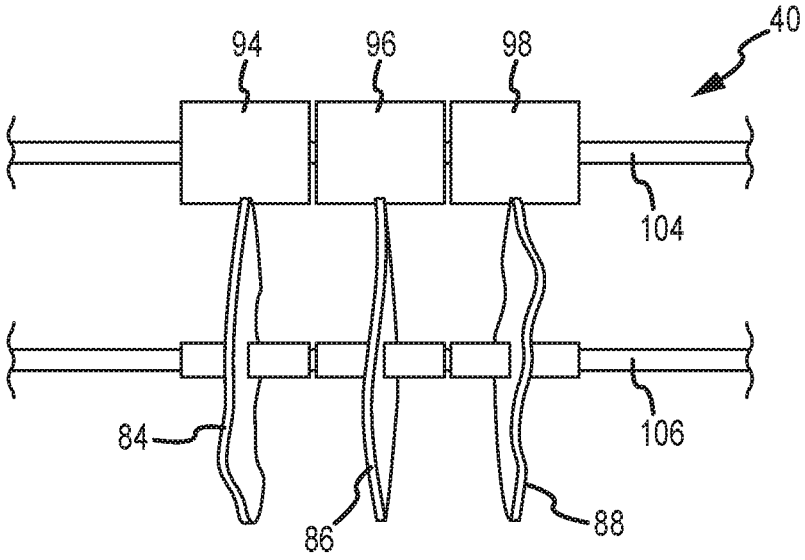

FIG.21

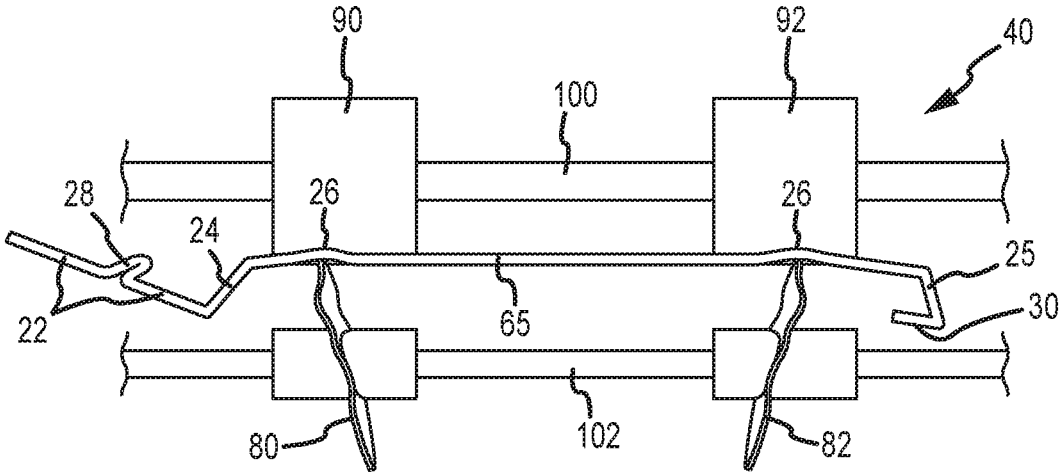
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FIG.22

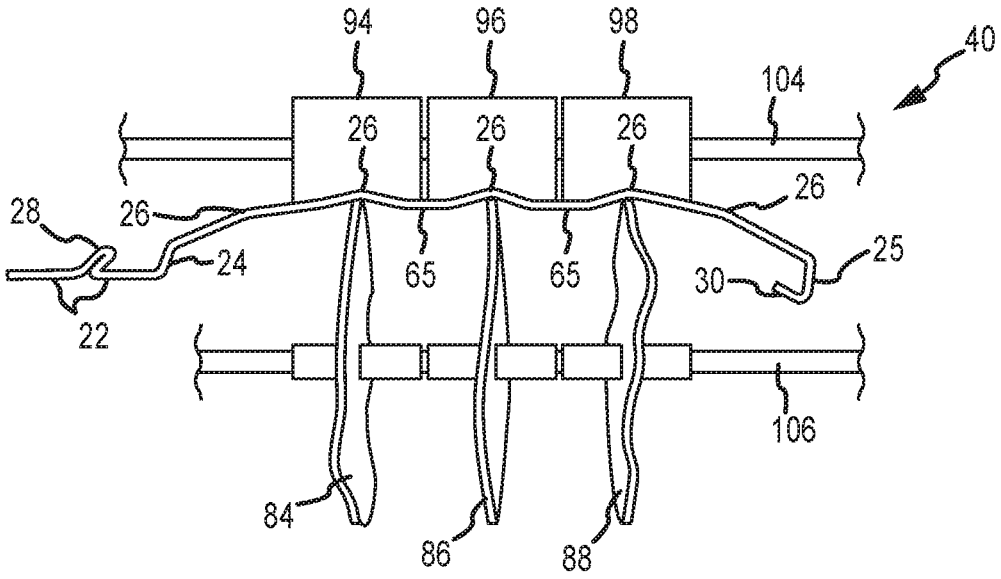
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FIG.23

SIMULATED LOG SIDING PANEL WITH HEW LINES

CROSS REFERENCE TO RELATED APPLICATION

This is a division and continuation of U.S. application Ser. No. 12/329,336, filed Dec. 5, 2008 by the inventor hereof. The subject matter of prior U.S. application Ser. No. 12/329,336 is incorporated fully herein by this reference.

FIELD OF THE INVENTION

This invention relates to metal siding used on the exterior of residential and other buildings. More particularly, this invention relates to a new and improved metal simulated log siding panel having bends formed in the metal panel to simulate hew lines, thereby creating a more realistic appearance which simulates actual wooden construction logs. Further still, this invention relates to a new and improved method and apparatus for making metal simulated log siding panels having hew line-simulating bends.

BACKGROUND OF THE INVENTION

Both natural and artificial siding have been added to the exterior surfaces of buildings for many years, either as an original exterior for the building or on top of an existing exterior. One siding panel is attached to the exterior of the building, and another similarly-shaped panel is attached adjacent to the earlier panel. This process continues until the entire exterior of the building is covered by the attached siding panels. Adding siding panels on top of an existing exterior is an attractive and cost-effective alternative to repairing or replacing the existing exterior of the building. Changing the siding may also have the desirable effect of changing the exterior appearance and character of the building.

The typical forms of natural siding panels are flat wooden boards or strips of tree trunks which exhibit the exterior curvature of construction logs. The typical forms of artificial siding panels are metal or vinyl panels which have been formed into the shape of natural siding panels. Metal siding panels are usually made from aluminum or steel. Metal siding panels are painted and/or em bossed to more closely simulate the appearance of natural siding. Vinyl panels are usually painted or formed from colored synthetic plastic material. The advantage of artificial siding is that it is usually more maintenance-free than natural siding. Natural siding requires continual painting, conditioning and other types of care. In addition, artificial siding is usually less expensive than natural siding.

It is possible to form metal siding panels into a variety of geometric configurations which simulate natural siding panels. For example, metal panels have been formed into shiplap, board and batten, reverse board and batten, clapboard, colonial, vertical and horizontal double four, vertical and horizontal double five, and colonial Dutch configurations. A continuous siding forming machine is used to make these different metal siding panel configurations. A strip of flat sheet metal is moved through roller dies of the siding forming machine, and the roller dies sequentially shape and form the metal strip into the desired siding panel configuration.

Another configuration of metal siding is simulated log siding. Attaching simulated log siding panels to the exterior of a building converts the appearance of the building from

a more conventional structure into the appearance of a log cabin or other log building. Use of simulated log siding has the potential of creating a noticeable change in the exterior appearance and character of a building. However, simulated log siding has only achieved moderate consumer acceptance, principally because the simulation of natural construction logs is not sufficiently realistic. A building having previous forms of simulated log siding is easily recognized as having artificial log siding.

The typical metal simulated log siding exhibits a uniform cylindrical shape which is intended to represent the convex curvature of a construction log. The uniform cylindrical shape is not an accurate or realistic simulation, because natural logs have various anomalies in shape, changes in curvature and other natural variations in appearance, all of which are unlike the smooth cylindrical shape of known previous metal simulated log siding panels. The uniformity and repetition of the smooth cylindrical shapes immediately reveals the artificial nature of previously known simulated log siding.

Attempts to counter the uniformity of smooth cylindrical simulated log siding have included embossing a wood grain-like texture on the exterior of the metal simulated log siding. However, the embossed wood grain-like texture cannot be observed from a distance, and has no effect on diminishing or moderating the continuous and repeated cylindrical monotony of known metal simulated log siding panels.

Other attempts to invoke a more realistic appearance in metal simulated log siding panels include coloring the space between the cylindrical convex portions to replicate the appearance of chinking. Chinking is used between natural construction logs to seal the spaces between the natural logs and shut out the exterior environment. The coloring which represents chinking may be directly adhered to the metal simulated log panel, or a separate chink-colored strip may be added once the metal simulated log siding panels have been installed on the building. While the attempt to replicate the appearance of chinking contributes a modest enhancement toward a more realistic appearance, the cylindrical similarity of the simulated log panels and the monotony of the repetitious identical cylindrical shapes creates the predominate overall appearance which is easily recognized as artificial.

SUMMARY OF THE INVENTION

The present invention significantly improves the level of realism of sheet metal simulated log siding, by creating the effect of hew lines on an exterior curved or intermediate portion of the panel. Hew lines on a natural construction log are longitudinal edges and lines that result from using a draw knife to cut away bark from a tree trunk that is finished into a construction log. Because the bark is removed manually with uneven movements of the draw knife, the hew lines on natural construction logs are somewhat random in position and in separation from one another.

The present invention creates permanent bends to replicate hew lines in the curved or intermediate portion of each metal simulated log siding panel. The hew line-simulating bends are random in position and separation along the length of the curved portion of the simulated log siding panel. The hew line-simulating bends also break up and disturb any perceived uniformity in appearance of the curved portion of the simulated log siding panel. When multiple simulated log siding panels of the present invention are attached to the exterior of a building, the random nature of the simulated hew lines and the lack of uniformity in the curved portions

of the panels avoids the typical repetitious similarity of previously-known metal simulated log siding, thereby contributing a significant enhancement in the appearance and realism of metal simulated log siding panels. These considerations are involved in different aspects of the present invention.

One aspect of the invention involves a method of forming an elongated strip of metal into a simulated log siding panel which includes a curved portion that simulates curvature of a natural construction log. The method includes forming a plurality of longitudinally extending and transversely spaced permanent bends in the curved portion which simulate hew lines of a natural construction log.

Another aspect of the invention involves an elongated sheet metal simulated log siding panel. The simulated log siding panel comprises a curved portion that simulates the curvature of a natural construction log, and a plurality of longitudinally extending and transversely spaced permanent bends in the curved portion which simulate hew lines of a natural construction log.

Other or subsidiary aspects of the invention involve varying the transverse position of the hew line-simulating bends relative to margins of the curved portion along the length of the panel, varying the transverse position of the hew line-simulating bends relative to one another along the length of the panel, creating the curved portion of the simulated log siding panel by the hew line-simulating bends, forming offset wall portions on opposite margins of the curved portion to project the curved portion outward and provide visual relief for the curved portion, extending the hew line simulating bends substantially continuously along the length of the curved portion and the panel, and continuously forming the hew line-simulating bends in a continuous strip of sheet metal as the panel is formed, among other things.

A further aspect of the invention involves a log forming attachment for connection to a conventional seamless siding forming machine to create an elongated metal simulated log siding panel from a different panel configuration created by and delivered from the conventional siding forming machine. The log forming attachment comprises a plurality of circular disks located to contact one side of the panel configuration delivered from the siding forming machine, and a plurality of circular elastomeric rollers located to contact the other side of the panel configuration at a location opposite from the circular disks. Each circular disk is associated with an elastomeric roller. Each disk and associated elastomeric roller are positioned to receive between them the panel configuration delivered from the siding forming machine. Each disk and associated elastomeric roller have a relative separation between them which causes the panel configuration to be compressed into the elastomeric roller by the disk as the delivered panel configuration moves between the disks and associated elastomeric rollers. The compression of the panel configuration into the elastomeric roller induces a permanent bend in the panel configuration defined by the circular disk. Each induced permanent bend simulates a hew line in the simulated log siding panel.

Other or subsidiary aspects of the log forming attachment include a laterally deformed outer circular edge of each disk, deforming the outer circular edge of each of the disks in a different and random manner, using at least one circular disk which has a different diameter than at least one other circular disk, using one group of disks which have the same diameter and using another group of disks which have a different diameter, connecting at least one circular disk in a non-orthogonal relationship to a shaft about which the disk rotates, and inducing permanent hew line-simulating bends in the panel configuration which are sufficient to create curvature of the curved portion.

Other aspects of the invention, and a more complete appreciation of the present invention, as well as the manner in which the present invention achieves the above and other improvements, can be obtained by reference to the following detailed description of a presently preferred embodiment taken in connection with the accompanying drawings, which are briefly summarized below, and by reference to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a metal simulated log siding panel which incorporates the present invention.

FIG. **2** is an end elevation view of the simulated log panel shown in FIG. **1**.

FIG. **3** is a perspective view of an exterior portion of a building to which there have been attached a plurality of the simulated log siding panels of the type shown in FIGS. **1** and **2**.

FIG. **4** is a view similar to FIG. **2**, showing connection of the simulated log siding panel shown in FIG. **1** to the exterior surface of the building shown in FIG. **3**.

FIG. **5** is a view similar to FIG. **4**, showing connection of a plurality of simulated log siding panels of the type shown in FIGS. **1**, **2** and **4** to the exterior surface of the building shown in FIG. **3**.

FIG. **6** is a generalized perspective view of a prior art seamless siding forming machine and a coil of metal used to create seamless metal siding panels.

FIG. **7** is a partial perspective view of a front portion of the prior art seamless siding forming machine shown in FIG. **6**, illustrating components including a wood grain embossing roller.

FIG. **8** is partial perspective view of a middle portion of the prior art seamless siding forming machine shown in FIGS. **6** and **7**, illustrating a plurality of metal forming roller dies.

FIG. **9** is a partial perspective view of a modified end portion of the prior art seamless siding forming machine shown in FIGS. **6**, **7** and **8**, illustrating metal forming roller dies and a partially completed seamless siding panel emerging from the machine.

FIGS. **10-14** are end elevation views showing configurations of bent sheet metal existing at different metal forming stations of the siding forming machine shown in FIGS. **6-9**.

FIG. **15** is a vertical cross-sectional view of a metal forming roller die used in the siding forming machine shown in FIG. **9**.

FIG. **16** is an end view of a prior art shiplap siding panel.

FIG. **17** is an end view of a prior art reverse board and batten siding panel.

FIG. **18** is an perspective view of a log forming attachment, which incorporates the present invention, connected to the end of the prior art seamless siding forming machine shown in FIGS. **6-9**, by which to transform the siding panel configuration shown in FIG. **14** into the simulated log siding panel shown in FIGS. **1-5**.

FIG. **19** is a side elevation view of associated disks and elastomeric rollers of the log forming attachment shown in FIG. **18**.

FIG. **20** is an end elevation view of some of the associated disks and elastomeric rollers of the log forming attachment shown in FIGS. **18** and **19**.

FIG. **21** is an end elevation view of the other ones of the associated disks and elastomeric rollers of the log forming attachment shown in FIGS. **18** and **19**.

FIG. **22** is an end elevation view of a portion of the log forming attachment shown in FIG. **20**, showing initial transformation of the configuration shown in FIG. **14** into the simulated log siding panel shown in FIGS. **1-5**.

FIG. **23** is an end elevation view of a portion of the log forming attachment shown in FIG. **21**, showing final transformation of the configuration shown in FIGS. **14** and **22** into the simulated log siding panel shown in FIGS. **1-5**.

DETAILED DESCRIPTION

A metal simulated log siding panel **20** which incorporates the present invention is shown in FIGS. **1** and **2**. The simulated log panel **20** is formed from a sheet or strip of relatively thin gauge sheet metal, such as aluminum or steel, which has been bent into a convex shape **21** and into an attachment edge **22**. The attachment edge **22** is used to connect the simulated log panel **20** to an exterior wall or surface of a building. The convex shape **21** is formed by an outer curved portion **23** and offset wall portions **24** and **25**. The curved portion **23** replicates or simulates a natural log used in the construction of a building. The offset wall portions **24** and **25** project the curved portion **23** outward and provide relief to visually accentuate the curved portion **23**, when the panel **20** is attached to the exterior of the building (FIG. **3**).

Bends **26** are formed in the curved portion **23** to simulate hew lines that typically exist on natural construction logs. The hew line-simulating bends **26** are formed as permanent deformations in the curved portion **23**. The hew line-simulating bends **26** also create the curvature of the curved portion **23** of the panel **20**, while simultaneously preventing the curved portion **23** from assuming a uniform cylindrical shape. The hew line-simulating bends **26** extend continuously, or substantially continuously, along the entire length of the curved portion **23** of the simulated log panel **20**. The hew line-simulating bends **26** are not straight, not uniformly spaced transversely from the margins of the curved portion **23**, and not uniformly spaced transversely with respect to one another. Instead, each hew line-simulating bend **26** varies in transverse position on the curved portion **23** between the margins at those locations where the offset wall portions **24** and **25** intersect the curved portion **23**. The hew line-simulating bends **26** also vary in transverse spacing relative to adjacent hew line-simulating bends **26**.

The hew line-simulating bends **26** contribute substantially to the more authentic appearance of the simulated log siding panel **20**. The unevenness and random-appearing nature of the hew line-simulating bends **26** replicate the random look of actual hew lines formed on natural construction logs which result from using a draw knife to strip natural bark from a tree trunk that becomes the construction log. The hew line-simulating bends **26** simulate the marks, edges or corners created by using the draw knife. The slight discontinuities or breaks in the curvature of the curved portion **23** created by the random hew line-simulating bends **26** also make the overall shape of the curved portion **23** comparable to the somewhat irregular shape of an actual construction log.

The more authentic and realistic appearance of the simulated log siding panels **20** becomes more apparent when multiple panels **20** are attached to the exterior of the building, as shown in FIG. **3**. As is apparent from FIG. **3**, the continuous and random transverse position of the hew line-simulating bends **26** creates a strong overall resemblance to a natural construction log, particularly when multiple panels **20** cover the broad expanse of a building exterior.

The impression is also enhanced by the offset wall portions **24** and **25**. Due to the forward projection of the curved portion **23** because of the offsetting wall portions **24** and **25**, the curved portion **23** appears relieved on the exterior of the building, thereby contributing to the recognition of and focus on the curved portion **23** as simulating a construction log. Furthermore, the relief created by the offset wall portions **24** and **25** provides a space **27** (FIGS. **1** and **2**) on the attachment edge **22** where a strip, coloring, or some other material may be located to replicate actual chinking between natural construction logs. Replicating chinking also contributes to the more authentic appearance.

The exemplary panels **20** shown have five hew line-simulating bends **26** extending along the length of the curved portion **23** of each panel **20**, as best shown in FIG. **2**. Five hew line-simulating bends **26** appear appropriate and consistent when the distance separating the margins between opposite edges of the curved portion **23** is approximately 8-10 inches. For panels **20** which replicate larger logs, represented by a greater distance between the margins of the curved portion **23**, a greater number of hew line-simulating bends **26** is more appropriate. Conversely, a lesser number of hew line-simulating bends **26** should be used on panels **20** which replicate smaller-width construction logs. The number of hew line-simulating bends **26** should achieve an appealing, authentic and realistic appearance.

Each panel **20** also includes a flange retainer **28** which extends outward from a middle location on the attachment edge **22**. The flange retainer **28** is separated from the offset wall portion **24** by the space **27**, as shown in FIG. **2**. The flange retainer **28** extends at an acute angle **29** (FIG. **4**) from the attachment edge **22** and projects toward the convex shape **21**. A lip **30** extends inward from a rear edge of the offset wall portion **25**, on the opposite side of the convex shape **21** from the attachment edge **22**. The lip **30** extends toward the attachment edge **22** and into an interior concave area behind the convex shape **21**.

The retainer flange **28** and the lip **30** are used to connect the simulated log siding panels **20** to one another and to an exterior wall **32** of a building structure, as shown in FIGS. **4** and **5**. The lip **30** of one panel **20** is inserted under a retainer flange **28** of a lower, immediately adjacent panel **20** which has been previously connected to the exterior wall **32**. The upper attachment edge **22** of the panel **20** is thereafter attached to the exterior wall **32** with fasteners, such as screws or nails **34** which extend through attachment holes **35** (FIG. **1**) formed in an outer marginal area of the attachment edge **22**. The acute angle **29** of the retainer flange **28** of the lower adjacent panel **20** firmly retains the lip **30** of the upper adjacent panel **20** at the intersection of the retainer flange **28** and the attachment edge **22**, without the need for separate fasteners. The next, immediately-adjacent panel **20** is connected in the same manner, until multiple levels or tiers of panels **20** have been attached and connected to each other in the same way to cover the exterior wall **32** of the building (FIG. **3**).

To retain the lip **30** of the panel **20** at the lowermost level or tier on the exterior wall **32**, a bottom attachment (not shown), which is similar to the attachment edge **22** with the flange retainer **28**, is connected at the bottom of the exterior wall **32**. Such a bottom attachment provides a flange retainer **28** to retain the lip **30** of the lowermost panel **20** connected to the exterior wall **32**. As is apparent from FIGS. **4** and **5**,

the exposed area **27** of the attachment edge **22** presents an area upon which simulated chinking can be added.

When the simulated log panel is installed on the exterior wall, as shown in FIGS. **4** and **5**, the dimension between the lip **30** and the flange retainer **28** of the lower log siding panel **20** and the position of the top attachment edge **22** of the upper log siding panel **20** is maintained at a constant dimension, so that the overall extent of curvature of the curved portion **23** of each of the log siding panels **20** is essentially the same when installed on the exterior wall of the building.

Each simulated log panel **20** is preferably seamless, meaning that it extends the entire length of the exterior wall **32** as shown in FIG. **3**. A seamless panel **20** does not adjoin or connect to a horizontally adjacent similar panel **20**. The seamless nature of each panel **20** also contributes to a realistic look, because natural log construction typically utilizes construction logs which extend the full length between typical breakpoints in the exterior walls, such as at corners, doors and windows. In the same way, seamless simulated log siding panels **20** extend between breakpoints in the exterior walls to further duplicate natural log construction techniques (FIG. **3**).

Exemplary dimensions of the simulated log siding panel **20** which provide enhanced authenticity and appearance are as follows, all with reference to FIG. **4**. The maximum point of curvature or separation of the curved portion **23** from the exterior wall **32** is about 1⅛ inches. The offset wall portions **24** and **25** are about 7/16 inches in width, meaning that the curved portion **23** is offset from the attachment edge **22** and the exterior wall **32** by slightly less than that same dimension. The area **27** between the adjacent offset wall portions **24** and **25** (FIG. **5**) at which to attach simulated chinking is approximately ⅝ inches in width, once the two panels have been connected together (FIG. **5**). These exemplary dimensions create enhanced visual effects for a panel **20** which has a width of its curved portion **23** between the marginal junctions with the flat offset wall portions **24** and **25** of approximately 8-10 inches.

The simulated log siding panel **20** is formed using a seamless siding metal forming machine **36**, shown in FIGS. **6-9**. The seamless siding forming machine **36** is conventional except for certain modifications described below. A log forming attachment **40**, shown in FIGS. **18-23**, is attached to a rear end of the siding forming machine **36**. The log forming attachment **40** and the below-described modifications to the siding forming machine **36** transform a partial seamless siding panel configuration **72** (FIG. **13**) into the simulated log siding panel **20** (FIG. **2**).

The seamless siding forming machine **36** operates on a continuous strip **44** of metal which is unwound from a coil or spool **46**. A motor **48** is connected to move a chain **50** and thereby rotate sprockets **52** to which the chain **50** is connected. The sprockets **52** are connected to shafts **53**, and rollers **54** are connected to the shafts **53** along the length of the machine **36**. The rollers **54** pull the metal strip **44** through the machine **36**. Roller dies **56**, **59**, **60**, **62**, **63**, **68**, **69** and **70** (FIGS. **6-9** and **15**) are located at a series of metal forming stations located along the length of the machine **36**. The roller dies interact with the moving metal strip **44** to form the bends and configurations shown in FIGS. **10-14** as the metal strip **44** progresses through the machine **36**.

A first metal forming station of the seamless siding forming machine **36**, shown in FIG. **7**, is a conventional embossing roller **58**. The embossing roller **58** creates a surface pattern or texture in the metal strip **44** which simulates the grain or texture characteristics of natural wood. The simulated grain and texture characteristics are permanently formed in the metal strip **44** and the finished simulated log siding panel **20**.

The next metal forming station of the machine **36** includes a conventional hole-punching die **59** which produces the attachment or nail holes **35** (FIG. **1**) in the attachment edge **22** of the panel **20**. Conventional roller dies **60**, shown in FIGS. **7** and **8**, next bend the flange retainer **28** (FIG. **2**) along one transverse edge of the metal strip **24** which will become the attachment edge **22**, as shown in FIG. **10**. Other conventional roller dies (not shown) produce the bends which form the offset wall portion **25** and the lip **30** on the opposite transverse edge of the metal strip **44**. A conventional seamless siding forming machine which has not been modified in accordance with the present invention could convert the configuration shown in FIG. **10** into a conventional shiplap siding panel **61** shown in FIG. **16**, by employing a subsequent metal forming station (not shown) to bend the offset wall portion **25** perpendicularly with respect to the center of the metal strip **44** and to bend the lip **30** perpendicularly with respect to the offset wall portion **25**.

The metal forming roller dies bend the offset wall portion **25** until it extends at an obtuse angle **64** relative to the center of the metal strip **44**, as shown in FIG. **10**. The lip **30** is bent to extend at an acute angle **66** relative to the offset wall portion **25**. Bending the lip **30** at the acute angle **66** facilitates connecting the lip **30** to the flange retainer **28** (FIGS. **4** and **5**), to hold the simulated log siding panel **20** in a firmly retained position on the exterior wall **32**. The acute angle **66** also extends the offset wall portion **25** at an obtuse angle **67** (FIG. **4**) relative to the exterior surface **32** of the building when the panel **20** as it attached to an adjacent panel **20**. The angle **66** (FIG. **10**) is the complement of angle **67** (FIG. **4**).

The next series of metal forming stations of the machine **36** includes conventional roller dies **62**, **63** and **68** shown in FIG. **9** which produce the bends in the metal strip **44** which define the attachment edge **22**, the offset wall portion **24**, and an intermediate portion **65** which will become the curved portion **23** of the simulated log siding panel **20** (FIG. **2**). As shown in FIG. **11**, the first bends created by the die **62** (FIG. **9**) extend the offset wall portion **24** a slight angle relative to the attachment edge **22** and the intermediate portion **65**. As shown in FIG. **12**, the next bends created by the die **63** (FIG. **9**) create a greater angle of the offset wall portion **24** relative to the attachment edge **22** and the intermediate portion **65**. The last bends created by the die **68** further angle the offset wall portion **24** relative to the intermediate portion **65** and relative to the attachment edge **22**, as shown in FIG. **13**.

The bends in the metal strip **44** illustrated in FIG. **13** establish the final angles of the offset wall portions **24** and **25** relative to the intermediate portion **65**. The final angle of the offset wall portion **24** relative to the intermediate portion **65** is approximately the same as the final angle of the offset wall portion **25** relative to the intermediate portion **65**. The attachment edge **22** extends generally parallel to the intermediate portion **65**.

The configuration shown in FIG. **13** is a partial reverse board and batten siding panel configuration **72**. A conventional seamless siding forming machine which has not been modified as described herein could convert the partial reverse board and batten configuration **72** into a conventional complete reverse board and batten siding panel **73** shown in FIG. **17**, by employing another metal forming station (not shown) to bend the offset wall portion **24** to extend perpendicularly from the attachment edge **22** and the intermediate portion **65** and to bend the offset wall portion

25 to extend perpendicularly to the intermediate portion 65 and to bend the lip 32 extend perpendicularly to the offset wall portion 25.

The simulated log siding panel 20 is formed from the partial reverse board and batten configuration 72 (FIG. 13) into the configuration 74 shown in FIG. 14 by two complementary metal forming roller dies 69 and 70 shown in FIGS. 9 and 15. The metal forming roller dies 69 and 70 are used as the last set of metal forming dies in the seamless siding machine 36. The dies 69 and 70 establish a final obtuse angle 71 of the attachment edge 22 relative to the offset wall portion 24, by bending the metal into the configuration 74 shown in FIG. 14. The angle 71 (FIG. 14) extends the offset wall portion 24 forward from the exterior surface 32 (FIGS. 4 and 5) when the simulated log siding panel 20 is connected to the building. The angle 71 is approximately the same as the obtuse angle 67 that the offset wall portion 25 extends from the exterior surface 32 (FIG. 4). The similar angles 67 and 71 create symmetry and uniformity in visual relief of the curved portion 23.

The configuration 74 of the panel shown in FIGS. 9 and 14 is delivered to the log forming attachment 40, where it is transformed by the log forming attachment 40 into the simulated log siding panel 20. The transformation of the panel configuration 74 into the simulated log siding panel 20 is achieved by creating the hew line-simulating bends 26 in the intermediate portion 65 (FIG. 14).

The log forming attachment 40 is connected at the end of the seamless siding forming machine 36. As shown in FIGS. 18-23, the log forming attachment 40 is formed by rotatable disks 80, 82, 84, 86 and 88, which interact with associated rotatable elastomeric rollers 90, 92, 94, 96 and 98, respectively. The disks 80, 82, 84, 86 and 88 and the elastomeric rollers 90, 92, 94, 96 and 98 are not rotated by the chain 50 from the motor 48 of the seamless siding machine 36 (FIGS. 6 and 9). Instead, the disks and elastomeric rollers are rotated by the movement of the bent metal strip 44 as it is propelled from the seamless siding machine 36 and moved between the associated disks and elastomeric rollers 80 and 90, 82 and 92, 84 and 94, 86 and 96, and 88 and 98, as shown in FIG. 19.

The log forming attachment 40 includes four idler shafts 100, 102, 104 and 106. The idler shafts 100 and 102 are connected to support brackets 107 and 108 (FIG. 9) which would normally be used to support the roller dies at the end of the siding forming machine 36. The idler shafts 104 and 106 extend between attachment plates 109 and 110, which are connected on respectively opposite sides of a frame 114 of the seamless siding forming machine 36, as shown in FIGS. 9 and 18.

The two smaller diameter disks 80 and 82 are attached to and rotate around the shaft 102. The two elastomeric rollers 90 and 92 are attached to and rotate around the shaft 100. The elastomeric rollers 90 and 92 interact and rotate with the respectively associated disks 80 and 82. The position of the disks 82 and 84 on the shaft 102 aligns an outer circular periphery of those disks with an outer cylindrical surface of the elastomeric rollers 90 and 92 retained on the shaft 100. The three larger diameter disks 84, 86 and 88 are attached to and rotate around the shaft 106. The three elastomeric rollers 94, 96 and 98 are attached to and rotate around the shaft 104. The elastomeric rollers 94, 96 and 98 interact and rotate with the respectively associated disks 84, 86 and 88. The position of the disks 84, 86 and 88 on the shaft 106 aligns an outer circular periphery of those disks with an outer cylindrical surface of the elastomeric rollers 94, 96 and 98 retained on the shaft 104.

The space between the shafts 100 and 102 is adjustable, and that space determines the spacing between the associated disks and elastomeric rollers 80 and 90, and 82 and 92. Similarly, the space between the shafts 104 and 106 is also adjustable, and that space determines the spacing between the associated disks and elastomeric rollers 84 and 94, 86 and 96, and 88 and 98. T his spacing determines the extent of deformation of the intermediate portion 65 (FIGS. 14, 22 and 23) when the hew line-simulating bends 26 are created.

The periphery of the disks 80, 82, 84, 86 and 86 have each been deformed transversely relative to a plane that would otherwise be occupied by those disks if their outer peripheral edges were not deformed, as shown in FIGS. 18 and 20-23. The extent and pattern of tranverse deformation of the outer periphery of each of the disks is random and different from that of the other disks. As a result of this deformation, the exterior periphery of the disks 80, 82, 84, 86 and 88 does not track in a path which is orthogonal to the axis of the shafts 102 and 106 or parallel to the direction of movement of the bent metal strip 44 through the machine 36, as the disks rotate. Instead, the path followed by the outer periphery of the disks moves from side to side as the disks rotate, at the location where the disk peripheries adjoin the elastomeric rollers. Furthermore, as is shown in FIG. 20, each complete disk 80 and 82 may be oriented in a non-orthogonal relationship to the axis of the shaft 102. This non-orthogonal relationship further accentuates the transverse side to side movement of the periphery of the disks 80 and 82. The deformed outer periphery of the disks and the non-orthogonal positioning of the disks on the shafts causes the exterior periphery of the disks to move laterally, side-to-side in different and random paths, none of which are parallel to the movement of the bent metal strip 44.

When the bent metal configuration 74 moves between the disks 80, 82, 84, 86 and 88 and the elastomeric rollers 90, 92, 94, 96 and 98, as shown in FIG. 19, the circular exterior peripheral edge of the disks slightly compresses the intermediate portion 65 of the configuration 74 (FIGS. 9, 14, 22 and 23) into the elastomeric rollers and forms the hew line-simulating bends 26, as shown in FIGS. 22 and 23. The compression of the elastomeric rollers 90, 92, 94, 96 and 98 by the peripheries of the disks 80, 82, 84, 86 and 88 force the intermediate portion 65 into the elastomeric rollers and creates the hew line-simulating bends 26. The amount of compression and bending of the intermediate portion 65 shown in FIGS. 22 and 23 is more than the amount of actual permanent deformation exhibited by the hew line-simulating bends 26 (FIG. 2), because the metal tends to spring back slightly after it has been bent by the disks and elastomeric rollers.

The hew line-simulating bends 26 created by the disks and elastomeric rollers also have the effect of transforming the flat intermediate portion 65 (FIG. 14) into the curved portion 23 of the simulated log siding panel 20 (FIG. 2). The hew line-simulating bends 26 create curvature in the curved portion 23. The curvature of the portion 23 is irregular along its length because of the random transverse spacing and position of the bends 26, thereby better simulating the uneven exterior appearance of a natural construction log.

Because of the amount and random characteristic of the lateral distortion of the outer peripheral edges of each of the disks 80, 82, 84, 86 and 88 is different, and because the disks may be connected in a non-orthogonal orientation for rotation on the shafts 80 and 84, the rotation of the disks against the elastomeric rollers causes the hew line-simulating bends 26 to move transversely relative to one another and relative to the margins of the intermediate portion 65 along the

length of the panel. Further nonuniformity results because of the difference in relative diameters of the disks **80** and **82**, compared to disks **84**, **86** and **88**. Because the smaller diameter disks **80** and **82** rotate more rapidly compared to the rotation of the larger diameter disks **84**, **86** and **88**, the pattern of hew line-simulating bends **26** induced by the more rapidly rotating smaller diameter disks **80** and **82** repeats more frequently than the repetition of the pattern created by the slower rotating larger diameter disks **84**, **86** and **88**. Therefore, the entire pattern of hew line-simulating bends **26** exhibits substantial nonuniformity, non-repetitiveness and randomness in transverse position, relative to one another and to the margins of the curved portion **23** of the simulated log panel **20**, as well as randomness, nonuniformity and non-repetition of the hew line patterns created, resulting in an appearance which more realistically and authentically simulates the appearance of a natural construction log.

The elastomeric rollers **90**, **92**, **94**, **96** and **98** exhibit hardness of approximately fifty (50) durometers. Elastomeric rollers having this hardness have proved satisfactory in making well-defined hew line-simulating bends **26** in simulated log siding panels **20** formed from 26 to 30 gauge steel or 0.027 to 0.032 inch thick aluminum. Thicker or thinner metal may require the use of elastomeric rollers having a greater or lesser durometer hardness. Of course, because the disks and associated elastomeric rollers have continuous rolling contact with the metal strip as it advances through the siding forming machine **36**, the hew line-simulating bends **26** extend continuously along the length of the simulated log siding panel **20**.

The capability to create the hew line-simulating bends **26** offers substantial improvements in the realism and appearance of simulated log siding panels. The random nature of the hew line-simulating bends **26** contributes to the realism by replicating the random nature of hew lines in natural construction logs. The hew line-simulating bends **26** also change the curvature of the curved portion **23** in a somewhat irregular or uneven manner, thereby simulating the uneven nature of natural construction logs and simultaneously avoiding the unrealistic appearance of the repeating pattern of cylindrical prior art simulated log panels.

The log forming attachment **40** is used in conjunction with a conventional seamless siding forming machine **36** to transform partial conventional siding patterns, such the partial reverse board and batten configuration **72** (FIG. **13**) or the partial shiplap configuration (FIG. **10**), into the simulated log siding panel **20**. The same conventional seamless siding machine can be used to create other patterns and configurations of seamless siding, by removal of the log forming attachment **40** and other modifications described above and installing the conventional metal forming parts that were removed. Such changes are easily accomplished and doing so avoids the need for a separate seamless siding forming machine dedicated only to forming simulated log simulated log siding panels.

Many other improvements and advantages will become apparent upon gaining a complete appreciation of the scope, significance and ramifications of the present invention. Preferred embodiments of the invention and many of its improvements have been described with a degree of particularity. The detail of the description is of preferred examples of implementing the invention. The detail of the description is not necessarily intended to limit the scope of the invention. The scope of the invention is defined by the following claims.

The invention claimed is:

1. An elongated metal simulated log siding panel, comprising:

an intermediate portion of the panel that extends longitudinally along the length of the panel and simulates a natural construction log having hew lines; and

a plurality of longitudinally extending and transversely spaced permanent bends in the intermediate portion which simulate the hew lines of the natural construction log; wherein:

the transverse position of the hew line-simulating bends varies relative to margins of the intermediate portion along the length of the panel; and

the transverse position of the hew line-simulating bends varies relative to one another along the length of the intermediate portion of the panel; and further comprising:

offset wall portions extending rearwardly from opposite margins of the intermediate portion to project the intermediate portion forward and give relief to the intermediate portion.

2. An elongated metal simulated log siding panel as defined in claim **1**, wherein:

the hew line-simulating bends extend substantially continuously along the length of the intermediate portion of the panel.

3. An elongated metal simulated log siding panel as defined in claim **1**, wherein:

the intermediate portion of the panel is curved transversely forward relative to the length of the intermediate portion.

4. An elongated metal simulated log siding panel as defined in claim **3**, wherein:

the transverse forward curvature of the intermediate portion is created by the hew line-simulating bends.

5. An elongated metal simulated log siding panel as defined in claim **1**, further comprising:

an edge portion extending outward from one offset wall portion a sufficient distance to establish an area upon which simulated chinking can be added.

6. An elongated metal simulated log siding panel as defined in claim **1**, wherein:

the panel is constituted from a strip of metal.

7. An elongated metal simulated log siding panel as defined in claim **1**, wherein:

the panel is constituted from a continuous strip of metal.

* * * * *

EXHIBIT D

EXHIBIT A

US00D602612S

(12) United States Design Patent

Baum, Jr.

(10) Patent No.: US D602,612 S
(45) Date of Patent: ** Oct. 20, 2009

(54) **METAL SIMULATED LOG SIDING PANEL**

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(**) Term: **14 Years**

(21) Appl. No.: **29/329,008**

(22) Filed: **Dec. 5, 2008**

(51) **LOC (9) Cl.** **25-01**
(52) **U.S. Cl.** **D25/141**
(58) **Field of Classification Search** D25/139, D25/141–144; 52/518–520, 544–555, 557; 72/130, 177–178, 181
See application file for complete search history.

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(57) **CLAIM**

The ornamental design for an metal simulated log siding panel, as shown and described.

DESCRIPTION

FIG. **1** is a perspective view of an metal simulated log siding panel showing my new design, which is broken to indicate nonspecific length;

FIG. **2** is a front elevational view thereof;

FIG. **3** is a rear elevational view thereof;

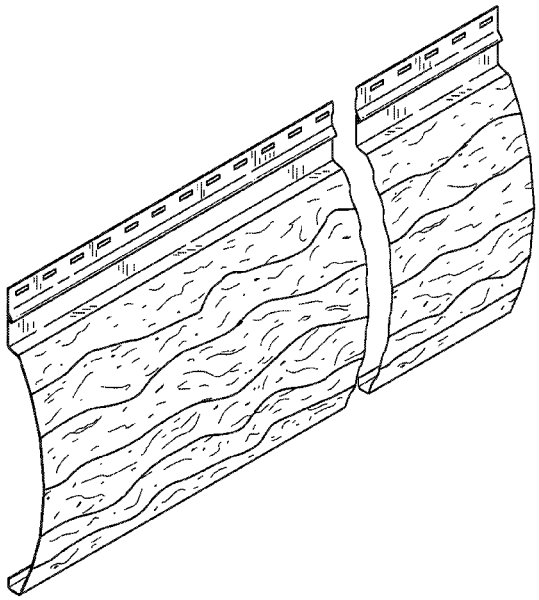
FIG. **4** is a left side elevational view thereof;

FIG. **5** is a right side elevational view thereof;

FIG. **6** is a top plan view thereof; and,

FIG. **7** is a bottom plan view thereof.

1 Claim, 5 Drawing Sheets



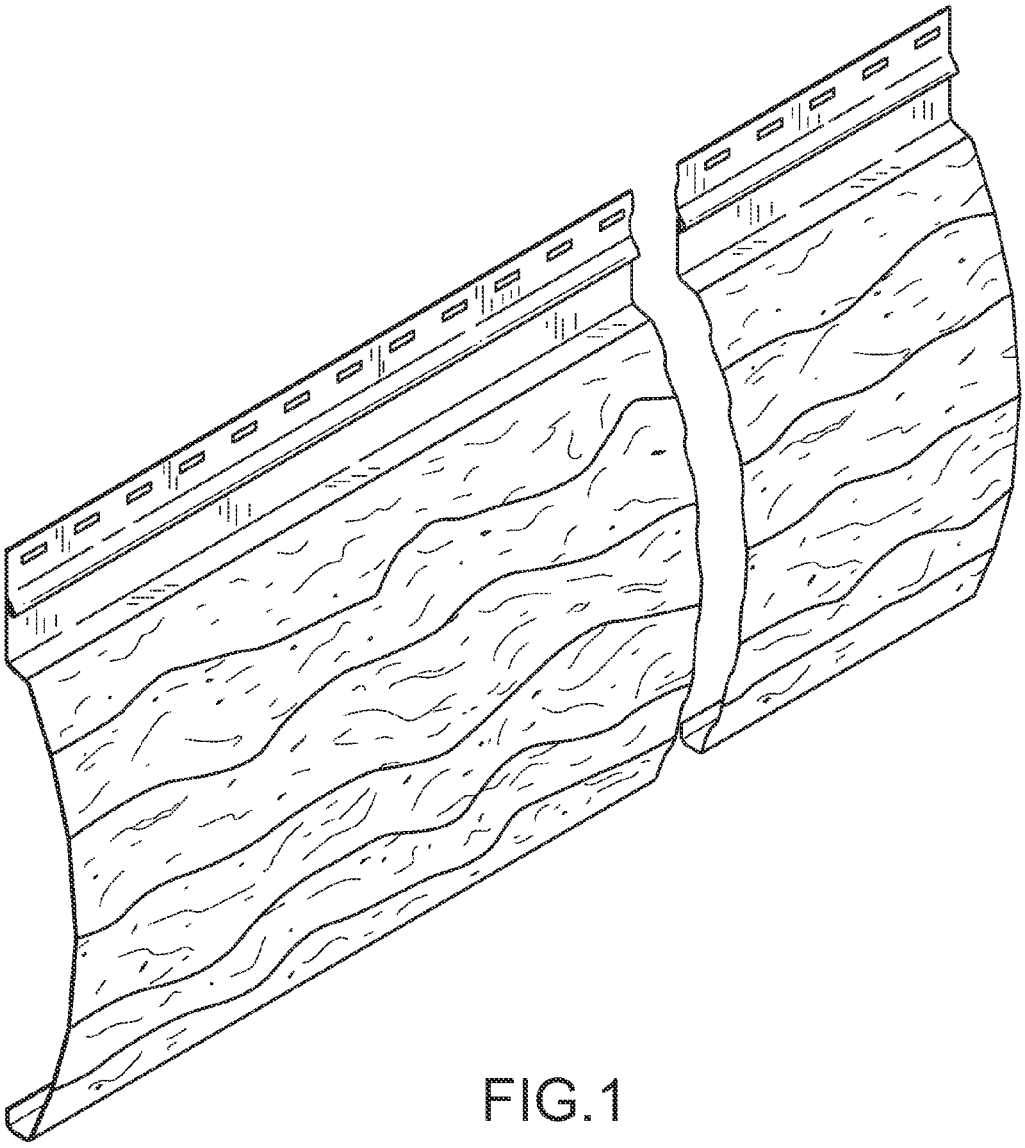


FIG.1

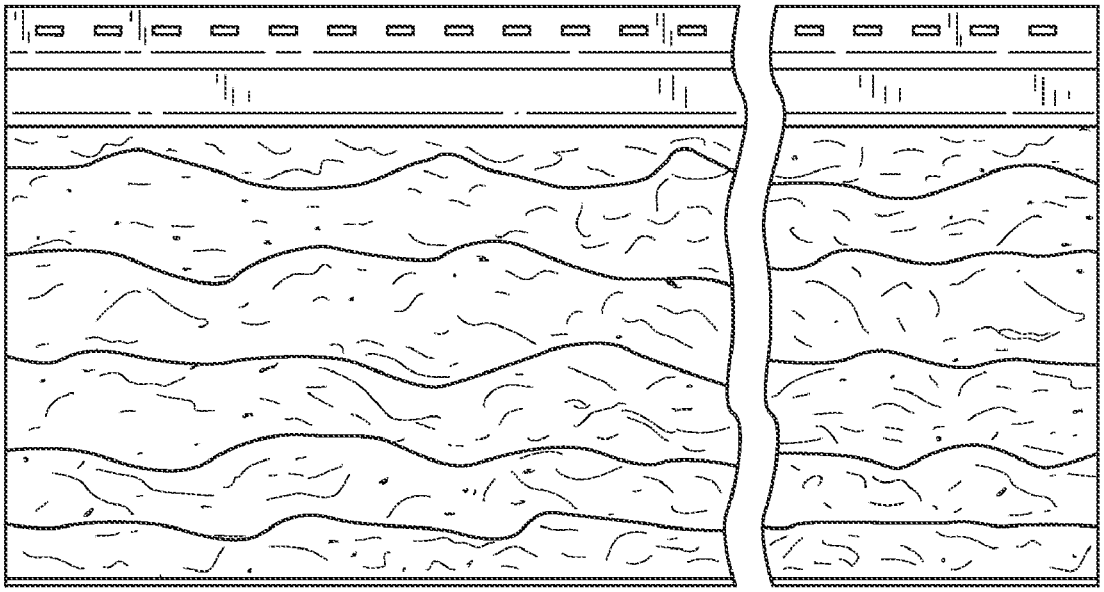


FIG.2

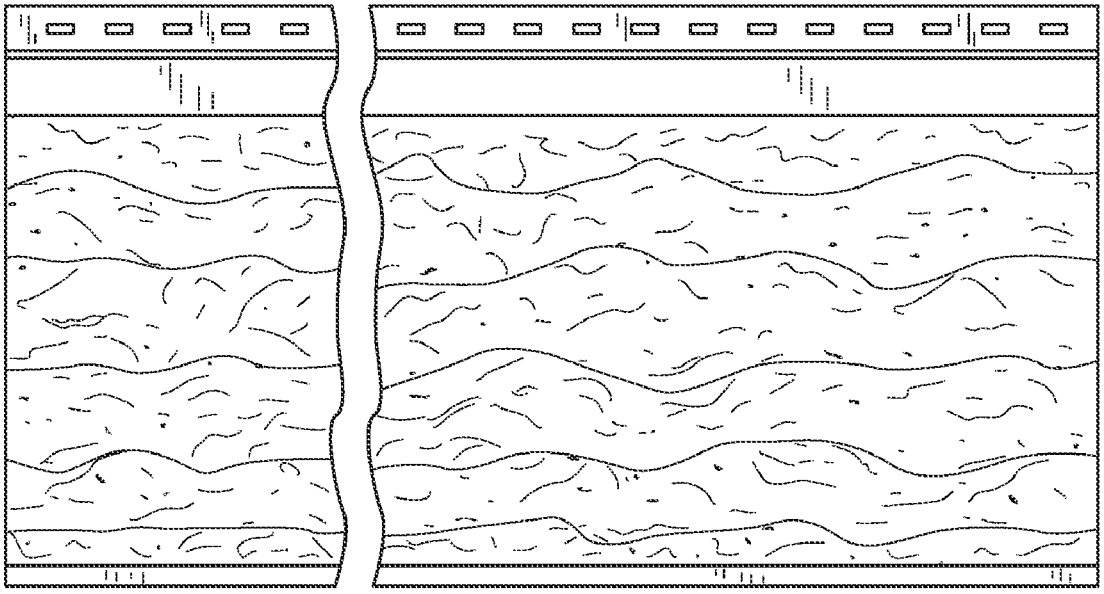


FIG.3

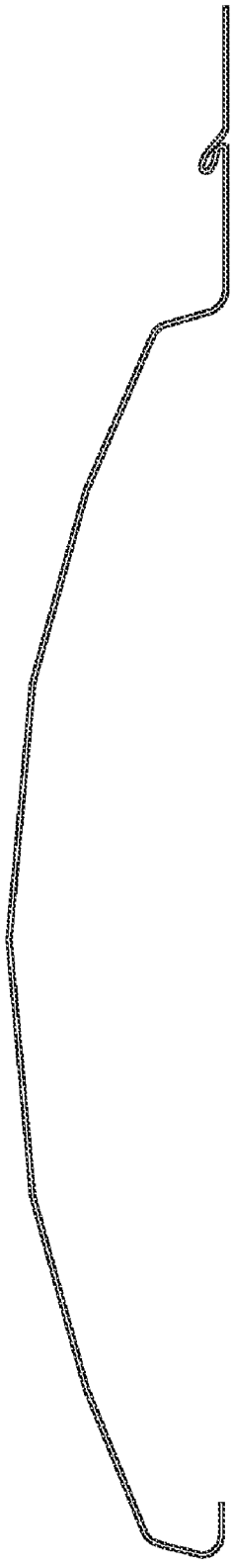


FIG.4

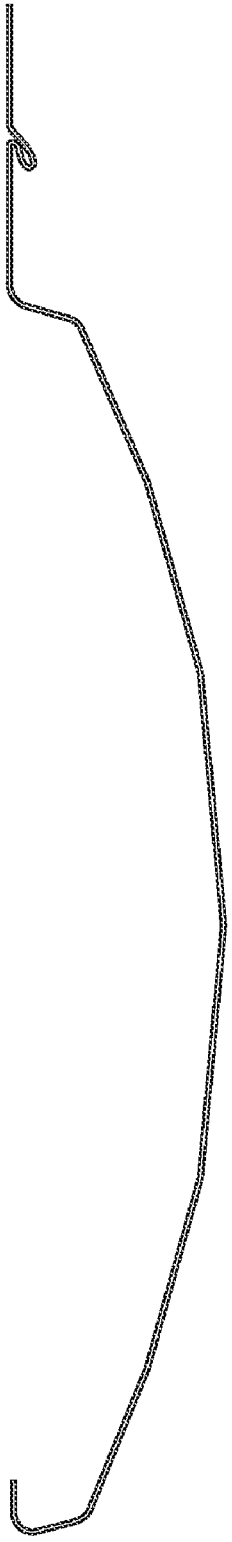


FIG.5

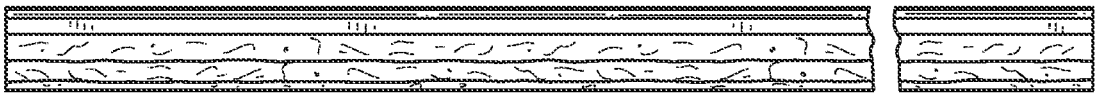


FIG.6

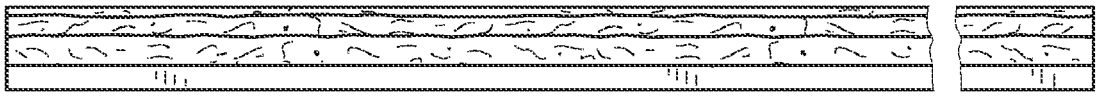


FIG.7