Dec. 19, 1967 D. J. YOUSSI ET AL 3,358,355

SIDING PANEL AND METHOD OF MAKING SAME

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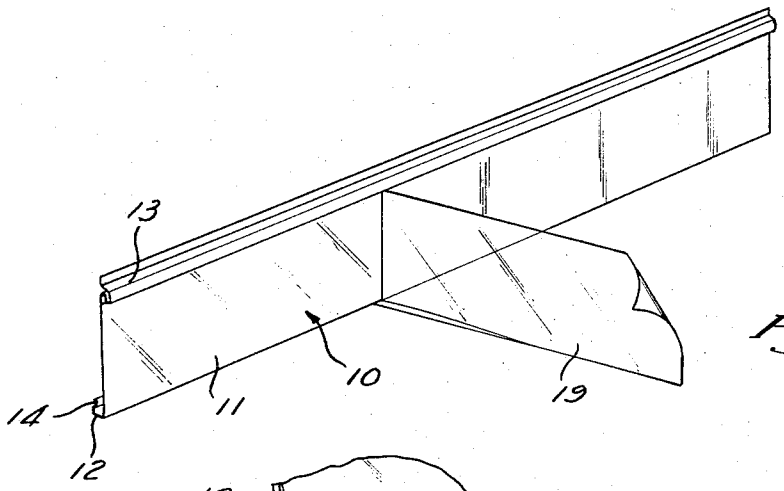

Fig. 1

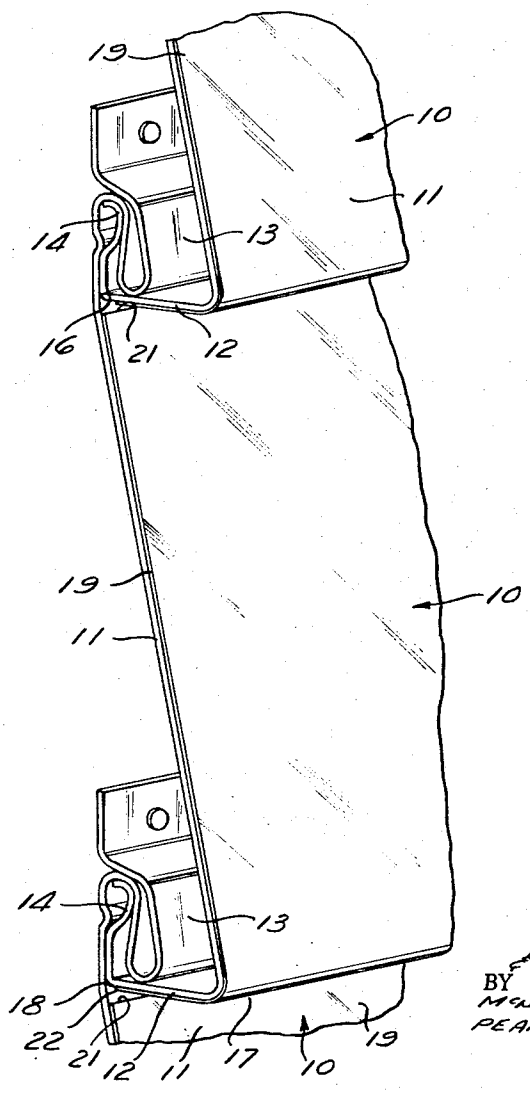

Fig. 2

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Filed June 2, 1966 4 Sheets-Sheet 2

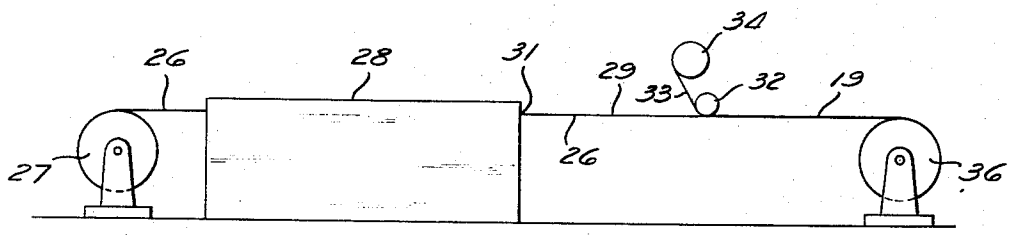

Fig. 3

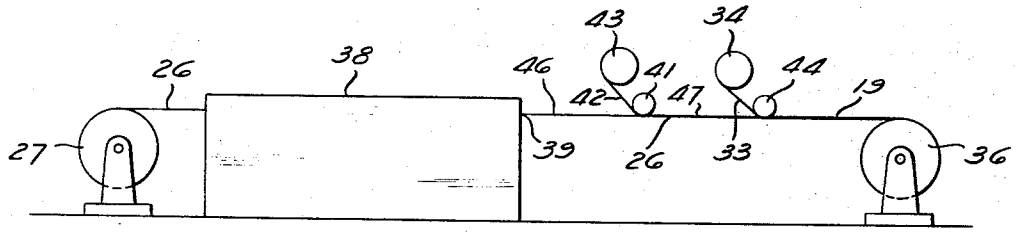

Fig. 4

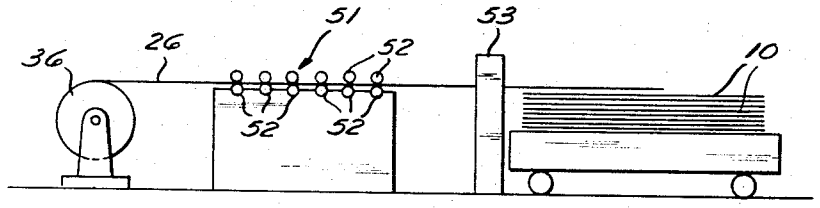

Fig. 5

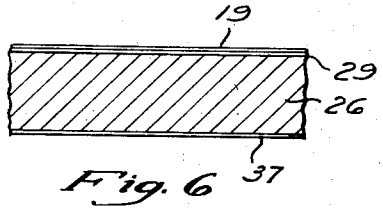

Fig. 6

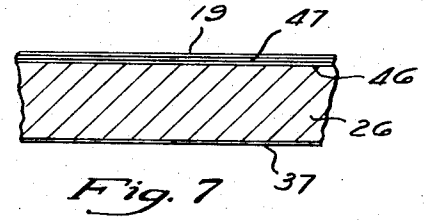

Fig. 7

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SIDING PANEL AND METHOD OF MAKING SAME

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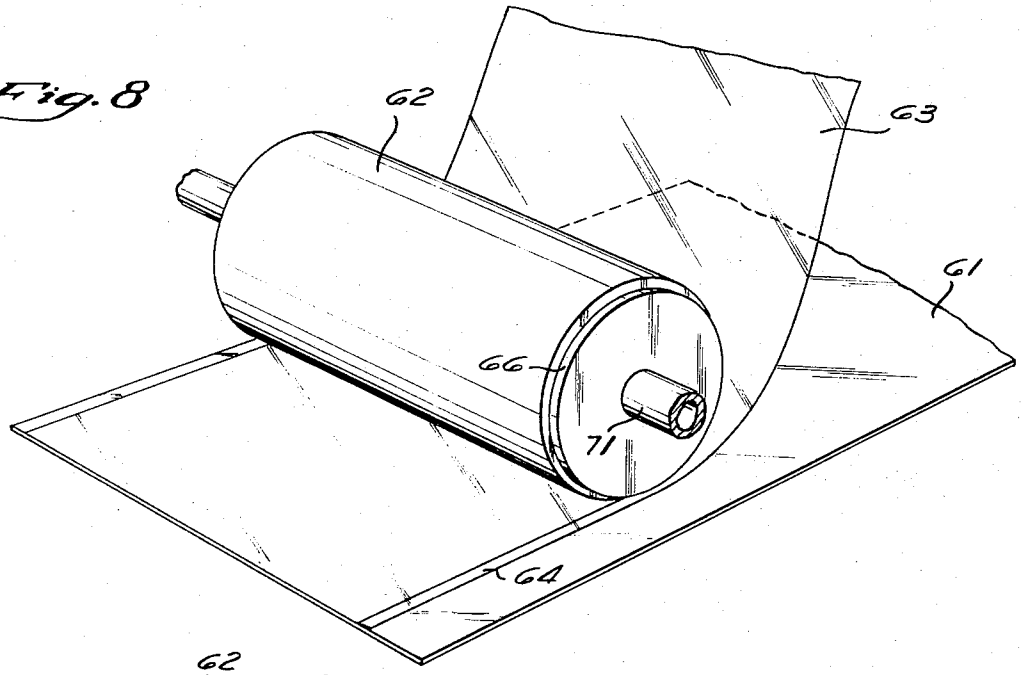
Fig. 8



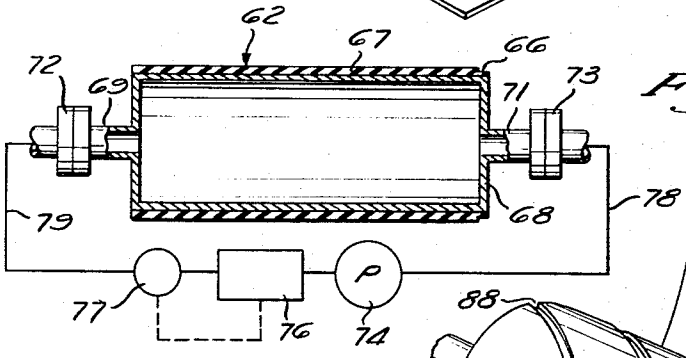


Fig. 9

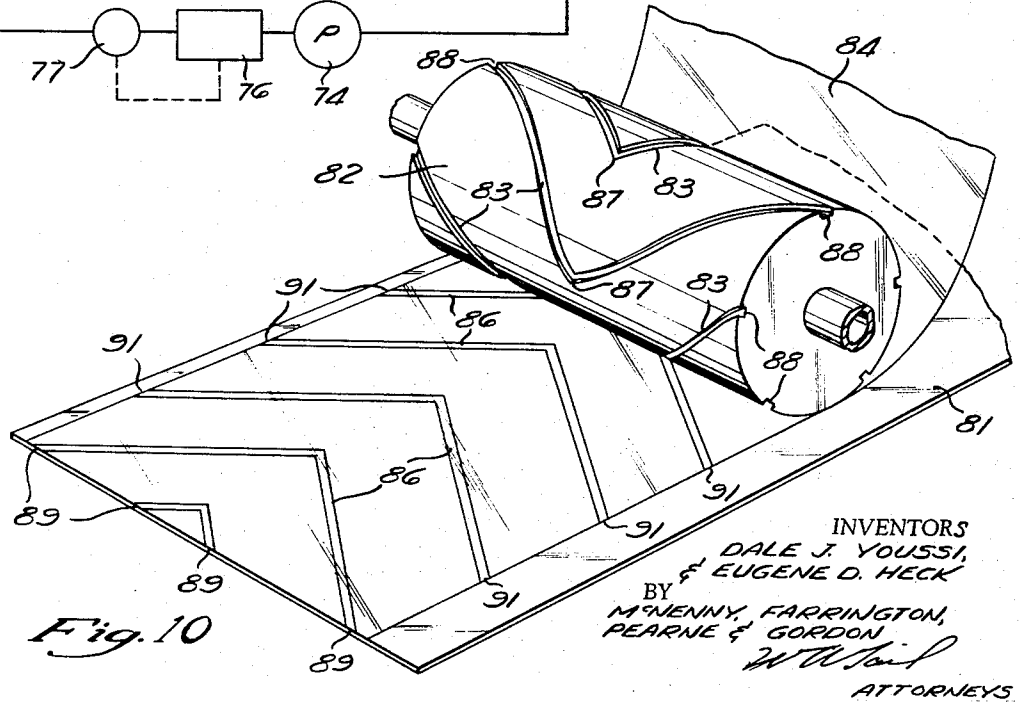


Fig. 10

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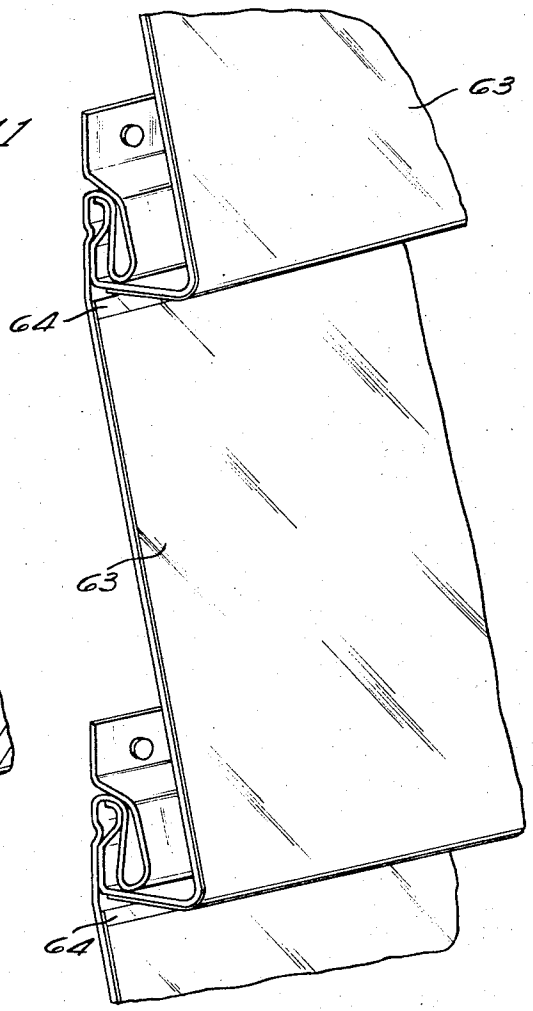
Fig. 11



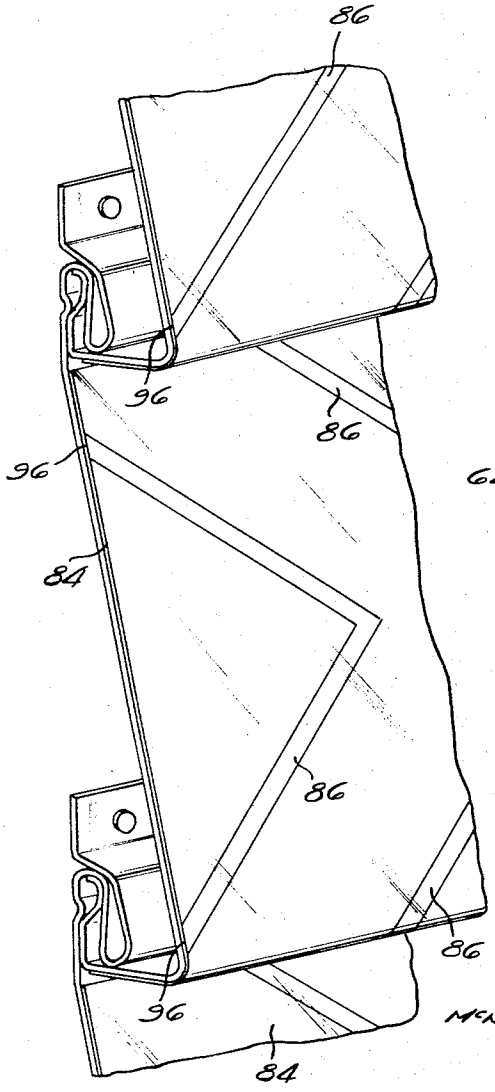


Fig. 12

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3,358,355

SIDING PANEL AND METHOD OF MAKING SAME

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Filed June 2, 1966, Ser. No. 562,029
26 Claims. (Cl. 29—424)

This is a continuation-in-part of our copending application, Ser. No. 526,591, filed Feb. 10, 1966, now abandoned. This invention relates generally to siding and more particularly to a novel and improved prefinished siding having a strippable protective coating thereon and to a method of manufacturing such siding.

An improved prefinished siding panel, incoporating this invention, is provided with a strippable protective coating which protects the exterior finish of the panel against damage and soiling during the packaging, shipment, and installation of the panel. The protective coating is arranged to permit its easy removal after the panel is installed and the danger of damage or soiling of the exterior finish is past.

The method of manufacture, incorporating this invention, provides for the application of the protective coating before the completion of the panel manufacturing operations to protect the finish while such operations are being performed.

Preferably the protective coating is applied to the exterior finish immediately after the exterior finish is applied so that a maximum protection is provided. In one illustrated embodiment of this invention a film of polyethylene is strippably bonded to the exterior finish with heat already required for the application of the exterior finish. Therefore, the cost of providing the protective coating is minimized. In another embodiment, a heated roll is used to bond the strippable coating and portions of the coating are left unbonded so that a loose gripping portion is provided to facilitate stripping.

It is an important object of this invention to provide a novel and improved prefinished siding panel having a strippable protective coating to protect such finish and to provide a novel and improved method of manufacturing such panels.

It is another important object of this invention to provide a novel and improved prefinished siding adapted to be overlapped with similar adjacent panels during the installation thereof wherein a strippable protective coating covers a substantial portion of the exposed finish to protect such finish against damage or soiling during the panel installation.

It is another important object of this invention to provide a novel and improved prefinished siding panel including a strippable protective coating applied to only those portions of the exterior finish which are exposed when such panels are installed in an overlapping relationship with adjacent similar panels, so that such protective coating can be removed to expose the surface of the exterior finish after installation of the panels.

It is still another object of this invention to provide a novel and improved siding panel, according to the preceding objects, wherein the bond between the base material of the panel and the exterior finish is substantially stronger than the bond between the exterior finish and the protective coating.

It is still another object of this invention to provide a novel and improved siding panel, according to any of the preceding objects, wherein the protective coating is a polyethylene film heat bonded to the exterior finish.

It is still another object of this invention to provide a novel and improved siding panel, according to any of the preceding objects, wherein a loose portion is provided in the protective coating to facilitate its removal.

It is still another object of this invention to provide a novel and improved method of manufacturing siding panels wherein an exterior finish is covered by a protective strippable coating applied thereto prior to the packaging of the panels.

It is another object of this invention to provide a method of manufacturing panels, according to the last preceding objects, wherein the exterior finish and protective coating are applied to the base material of the panels prior to a forming operation so that the exterior finish is protected by the coating during such forming operation.

It is another object of this invention to provide a method, according to the last preceding object, wherein the exterior finish and protective coating are applied to a strip of base material before such strip is coiled so that the exterior finish is protected against photographing while the strip is coiled.

It is still another object of this invention to provide a method, according to preceding objects, wherein the protective coating is heat bonded to the exterior finish.

It is still another object of this invention to provide a method according to the last preceding object wherein the base material and exterior finish are heated during the application of the exterior finish and at least part of the heat for bonding the protective coating is provided by the hot strip.

It is still another object of this invention to provide a novel and improved method of manufacturing siding panels wherein a strippable polyethylene film is heat bond to the exterior finish.

It is still another object of this invention to provide a novel and improved method of manufacture according to the last preceding object in which film is provided with a loose, unbonded portion.

Further objects and advantages will appear from the following description and drawings wherein:

FIGURE 1 is a perspective view of a siding panel incorporating the present invention with the protective coating partially stripped therefrom;

FIGURE 2 is an enlarged fragmentary perspective view illustrating the structure of the panel of FIGURE 1 and the installation thereof;

FIGURE 3 is a schematic illustration of one preferred method of applying a paint type exterior finish and protective coating to a strip of metal used to form siding panels;

FIGURE 4 is a schematic illustration of one preferred method of applying a film type exterior finish and protective coating;

FIGURE 5 is a schematic illustration of the forming and shearing operations for completing the manufacture of panels coated as illustrated in FIGURE 3 or FIGURE 4;

FIGURE 6 is an enlarged fragmentary cross section of the final product when the external finish is a paint type coating covered by a protective coating;

FIGURE 7 is an enlarged fragmentary view similar to FIGURE 6 but showing the product when the exterior finish is a film material bonded to the base metal by a heat activated adhesive;

FIGURE 8 is a fragmentary perspective view illustrating one method and apparatus for bonding the protective film with a longitudinal edge portion which is loose to provide a section which is easily gripped;

FIGURE 9 is a cross section of the roller shown in FIGURE 8 and a schematic illustration of the system for heating the roller;

FIGURE 10 is a fragmentary perspective view of another method and apparatus for bonding the protective coating;

FIGURE 11 is a fragmentary perspective view similar to FIGURE 2 of a finished panel formed by the method and apparatus of FIGURE 8; and

FIGURE 12 is a view similar to FIGURE 11 illustrating a finished panel formed by the method and apparatus of FIGURE 10.

FIGURES 1 and 2 illustrate one typical form of metal siding panel **10** provided with a central exposed face **11** and an exposed shadow leg **12**. Edge portions **13** and **14** are shaped to interlock with associated edge portions of similar panels when the panels are installed, as illustrated in FIGURE 2. The particular form of interlock at the edge portions **13** and **14** is similar to the structure illustrated in the United States Letters Patent to Sugar et al., No. 3,159,943, and is not critical to the present invention. It should be understood that the present invention can be incorporated in other types of panels and that this illustration of a particular siding panel configuration is not intended to limit our invention to such panel structure.

The panel **10** is prefinished to provide an exterior finish at least along the face portion **11** and shadow leg **12** so that after installation of the panel the entire exposed surface thereof is provided with an exterior or exposed finish applied during the manufacture of the panels. The exterior or exposed finish is normally very thin and has not been illustrated in FIGURES 1 and 2 because of the scale of these drawings. However, the exterior finish should extend at least from the point **16** on the face portion **11** (as illustrated in FIGURE 2) around the corner **17** to the point **18** at the rearward edge of the shadow leg **12**.

When the exterior finish is a paint type coating it is normally applied over a primer coating. Also, it is customary to apply a suitable corrosion resistant coating to the rearward or back surface. Since the rearward coating provides no aesthetic function it may be different than the exterior finish coating. When the exterior finish is a film mtaerial, such as Tedlar, it is customary to bond the film at least along the exposed surfaces of the panel with a suitable adhesive. This is discussed in more detail below.

A strippable protective coating **19** is applied to the exterior finish at least along a substantial portion of the exposed part of the panel. In the illustrated embodiment of this invention the protective coating **19** of polyethylene film is heat bonded to the exterior finish and extends from an upper edge **21** adjacent to the interlocking portion of the panel, around the corner **17**, and along the shadow leg **12** to an edge **22**. The protective coating is removable, after the panels are installed, by merely gripping an edge and stripping the coating **19** away from the panel substantially as illustrated in FIGURE 1. In the preferred embodiment of this invention the protective coating **19** does not extend into the interlocking zone between adjacent panels, so it can be easily removed as a single piece.

Although the illustrated embodiment of this invention provides a polyethylene film heat bonded to the exterior finish, it should be understood that other types of coatings and coating materials may be utilized so long as they provide sufficient protection and are strippable, preferably in one piece. Also, the protective coating can be applied or secured to the exterior finish by any suitable method so long as sufficient adherence is provided to retain the coating in place, and so long as it permits easy stripping without damage to the exterior finish. For example, electrostatic bonding and strippable adhesives may be used in some instances. Similarly, a non-adhesive material which clings to the finish can sometimes be used. The bond between the base material and the exterior finish is substantially stronger than the bond between the exterior finish and protective coating. Also, the tensile strength of the protective coating, when compared to its bond, is sufficiently great to permit removal of the protective coating as a single sheet.

FIGURES 3 through 5 disclose methods of manufacturing siding panels incorporating the broader aspects of the present invention. Referring now to FIGURE 3, strip metal stock **26** is supplied from a coil **27** to a coating machine **28**. The strip **26** entering the coating machine **28** may be provided with a suitable primer coating and back coating as desired. The coating machine **28** is arranged to apply an exterior finish **29** to at least one surface of the strip **26**. As the strip **26** passes through the machine **28** a paint-like finish **29** is applied and dried with heat so that the strip emerging from the coating machine **28** at **31** is heated and provided with an exterior finish **29** at least along those portions of the strip which will ultimately be the exposed surfaces of the face portion **11** and shadow leg **12**.

After emerging at **31** from the coating machine the strip **26** passes under a roller **32** which presses polyethylene film **33** from a supply roll **34** against the exterior finish **29** to heat bond the film to the exterior finish **29**. The width of the film **33** is arranged so that it covers only the section of the strip **26** which will ultimately be the exposed surfaces and the edges which ultimately form the interlock are free of the coating **19**.

The apparatus is arranged so that the strip **26** passing under the roller **32** is at the correct temperature to produce the desired bond between the film **33** and finish **29**. In some instances it may be necessary to provide cooling to reduce the strip temperature before it passes under the roll. In the illustrated apparatus the strip **26** having the exterior finish **29** and protective coating **19** thereon is then coiled at **36** for storage. Generally, the strip **26** on the coil **36** will already have a back coating **37**, as illustrated in FIGURE 6. The presence of the protective coating prevents photographing on the exterior finish **29** and eliminates the need of separator papers, or the like, in the coil to prevent such action. With this arrangement the surface of the exterior finish **29** is protected immediately after it is applied to the strip, so maximum protection is afforded.

FIGURE 4 illustrates a variation of the method of applying the exterior finish and protective coating. In this method the strip **26** is supplied from the coil **27** to a machine **38** which applies a heat activated adhesive coating **46** along at least those portions of the strip surface to be covered by an exterior finish. The strip **26** emerging at **39** from the coating machine **38** is at an elevated temperature and is passed under a roll **41** which presses an exterior finish film material **42**, such as Tedlar or the like, against the adhesive to form a permanent bond between the exterior finish and the strip. The film **42** is supplied from a roll **43**. After the strip **26** passes under the roll **41** in this embodiment the strip is carried past a second roller **44** which presses the protective coating film **33** against the still heated strip and heat bonds the film **33** to the exterior finish. Here again, the film **33** may be supplied from a roller **34**.

Referring now to FIGURE 7, the strip **26** formed by the apparatus of FIGURE 4 has an adhesive coating **46**, applied by the coating apparatus **38**, bonding an exterior finish coating **47** to the strip material **26**. The protective coating **19** overlies the exterior finish **47**. The rearward surface is also provided with a corrosion resistant coating **37**. After passing the roll **44** the strip **26** is coiled at **36** for storage in the same manner as in FIGURE 3.

Either of the types of coils **36** from the apparatus of FIGURES 3 or 4 are then supplied to the apparatus of FIGURE 5. The coated strip **26** passes from the coil **36** through a forming machine schematically represented at **51**. This machine bends the strip **26** progressively as it passes through forming rolls **52** until the strip is provided with the desired cross section, for example the cross section illustrated in FIGURE 2. The strip then passes through a shear **53** arranged to automatically cut the strip to panel length completing the manufacture of

the panels **10**. The panels **10** are then packaged without separators for shipment and installation.

The bond or adhesion between the protective coating **19** and the exterior finish is sufficiently strong so that the protective coating is not torn or loosened to any substantial degree as it passes through the forming machine **51** even though the coating covers a portion of the strip bent to form the corner **17**.

It should be understood that the illustrated method of applying the coating **19** is particularly advantageous since the heat for bonding the coating to the exterior finish is already present in the strip when it leaves the machine for applying the exterior finish. However, other coating procedures may be utilized as mentioned above. It should also be understood that the manufacturing apparatus may be arranged so that the coated strip is supplied to the forming machine directly without intermediate coiling.

In the illustrated method of manufacture and installation the coating **19** performs four distinct functions. It prevents photographing on the exterior finish during the coiling at **36**, it prevents polishing or damage to the exterior finish during the forming operations in the forming machine **51**, it prevents damage to the exterior finish when a plurality of panels are packaged together without separators and it prevents damage or soiling of the exterior finish during the installation of the panels.

In one successful commercial run, the following specifications applied. An aluminum siding strip of .0225 inch thickness was coated with an adhesive formulated as follows:

	Parts by volume
DuPont adhesive component 6803	1
DuPont adhesive component 6870	10
DuPont adhesive component 6872	2
Toluol	3¾

The adhesive coated siding was run through a 90-foot oven maintained at a temperature of about 400° F. at a line speed of 185 feet per minute. Approximately four or five feet from the outfeed end of the oven, a Tedlar film of .001 inch thickness was applied by pressure roll to the adhesive. As used herein, Tedlar refers to film sold under that name by DuPont to aluminum siding manufacturers for exterior siding applications, and is stated by them to be a polyvinylfluoride material.

Slightly beyond the Tedlar applying step and at a point approximately six feet from the outfeed end of the oven, the strip temperature was measured and found to be about 385° F. to 390° F. At this point a polyethylene film of a thickness of .001 inch was applied by means of a pressure roll. The aluminum siding strip with its Tedlar exterior finish and applied polyethylene film was wound in a take-up roll in accordance with conventional manufacturing procedures. In the above process, Tedlar of a thickness of .0015 inch has been applied, and aluminum of a thickness of .018 inch has been used. Polyethylene of .002 inch has also been employed, and line speeds have varied from 170 to 200 feet per minute.

Two embodiments of another aspect of this invention are illustrated in FIGURES 8 through 12. In both of these embodiments the protective coating or film is provided with a loose portion so that it may be easily gripped to initiate stripping after the panels are installed.

Referring now to FIGURES 8, 9 and 11, the prefinished strip **61** is carried past a heated pressure roll **62** which presses a sheet of polyethylene **63** against the finished surface of the strip **61**. To heat bond the protective sheet **63** to the finished surface of the strip **61** the pressure roll **62** in this embodiment is heated and is proportioned so that a longitudinal lip **64** of the sheet **63** is not pressed against the surface of the strip **61**. Consequently this lip **64** is loose or unbonded to provide a portion throughout the length of each panel which may be gripped by the installer to initiate the stripping. Preferably, the lip **64** is about ⅛ of an inch wide and is located at the edge of the protective film or coating on the face of the finished panel, as illustrated in FIGURE 11. In this embodiment the pressure roll is formed with an end relief **66** adjacent to one end to provide the non-bonding of the lip **64**. The depth of this relief is greatly exaggerated in the drawing.

Referring to FIGURE 9, preferably the pressure roll **62** is provided with a silicone rubber sleeve **67** approximately 3/16 of an inch thick and formed with the relief **66** adjacent to one end thereof. The sleeve **67** is mounted on a hollow, metallic roller **68** provided with hollow support shafts **69** and **71** at opposite ends. The support shaft **69** and **71** are journaled in suitable bearings and are connected through swivel couplings **72** and **73**, respectively, to a piping system schematically illustrated and including a pump **74**, a heater **76** and a thermostat **77** connected to control the heater **76**. The pump operates to pump oil from the coupling **73** through a line **78** to the heater **76**, past the thermostat **77** and through a line **79** to the coupling **72**. The oil then passes through the metallic roller **68** back to the coupling **73**.

The heated oil passing through the roller heats the surface of the rubber sleeve **67** to the temperature required to insure a proper heat bonding of the polyethylene film **63** on the finished strip **61**. The thermostat **77** automatically controls the temperature of the oil and in turn the temperature of the roller. This system may be used in conjunction with the heated strip to supply additional heat to the film or may be used in some instances with unheated strip. The silicone rubber is desirable since it provides a release from the polyethylene film so that the film does not tend to wrap around the roll. After the protective coating is applied the strip is passed through the forming rolls and a shear as illustrated in FIGURE 5 to form sliding panels as illustrated in FIGURE 11.

Another embodiment is illustrated in FIGURES 10 and 12, in this instance the prefinished strip **81** is passed under a pressure roll **82** formed with a plurality of symmetrically arranged V-shaped grooves **83**. These grooves prevent pressure from being applied to V-shaped sections of the polyethylene film **84** so that V-shaped sections **86** are unbonded providing a loose section for gripping to strip away the protective film.

Preferably, the grooves **83** are arranged so that their apexes **87** overlap or extend into the zone of the next adjacent groove as illustrated. With such an arrangement the apex **87** of one groove is located between a line connecting the extremities **88** of the next adjacent groove and the apex of such next adjacent groove. This arrangement insures there is an unbonded section at the end of the strip regardless of where the shearing occurs as well as along spaced points at the edges of the protective coating **84**. In fact, in some instances there are four unbonded portions **89** at the end of the strip but never less than two. Also, there are relatively closely spaced unbonded portions **91** spaced along the length of the resulting panels at each edge of the protective coating.

After the strip with protective coating applied, as illustrated in FIGURE 10, is passed through the forming rolls and shear, as illustrated in FIGURE 5, a panel is produced as illustrated in FIGURE 12. Each panel has at least two unbonded portions **96** at its ends.

Although preferred embodiments of this invention are illustrated, it is to be understood that various modifications and rearrangements of parts may be resorted to without departing from the scope of the invention as defined in the following claims.

We claim:

1. A method of manufacturing siding panels having an iregular cross section with an exposed portion and an edge adapted to be overlapped by part of a similar panel comprising applying an exterior finish to a flat strip of sheet material at least along the section thereof which becomes the exposed portion, bonding a protective strippable coating to said exterior finish over at least a sub-

stantial part of said section, and thereafter forming said cross section by bending said strip, said protective coating being thereafter strippable after similar panels are overlapped to expose said exterior finish without marring its surface.

2. A method as set forth in claim 1 wherein at least one bend is made in the portion of said strip covered by said protective coating without breaking said protective coating and without substantially loosening the protective coating from said exterior finish.

3. A method as set forth in claim 2 wherein said forming is produced by passing said strip through a series of forming rolls and said protective coating prevents contact between portions of said exterior finish and said rolls thereby preventing damage to such portions of said exterior finish.

4. A method as set forth in claim 1 wherein said strip is coiled after the application of said protective coating and before forming said cross section, said protective coating preventing photographing of the protected part of said exterior finish while said strip is coiled.

5. A method as set forth in claim 1 wherein said strip is cut into panel lengths and a plurality of said panels having said protective coating thereon are packaged together for shipment without separators, said protective coating preventing damage to protected parts of said exterior finish while such panels are packaged together.

6. A method according to claim 1 wherein said edge is free of said protective coating so that said protective coating is strippable after the siding is installed with said edge covered by an adjacent similar panel.

7. A method as set forth in claim 6 wherein said forming of said cross section produced an interlock along each side of said exposed portion, each interlock being adapted to mate with one interlock of an adjacent similar panel, and said interlocks being free of said protective coating.

8. A method as set forth in claim 1 wherein said protective coating is film material bonded to said exterior finish.

9. A method as set forth in claim 8 wherein said film is applied with a portion of said film unbonded at least at spaced locations along a longitudinal edge thereof.

10. A method as set forth in claim 8 wherein said film is applied with a portion unbonded at each end of said panel.

11. A method as set forth in claim 8 wherein said film is applied so that at least one longitudinal edge of said film is unbonded.

12. A method as set forth in claim 8 wherein said exterior finish is a film material bonded to said strip with a substantially stronger bond than the bond between said exterior finish and said protective coating.

13. A method as set forth in claim 1 wherein said protective coating is bonded to said exterior finish with heat.

14. A method as set forth in claim 13 wherein said strip is heated before the protective coating is applied and supplies said heat for bonding.

15. A method as set forth in claim 14 wherein said heating of said strip occurs during the application of said exterior finish.

16. A method as set forth in claim 15 wherein said protective coating is polyethylene.

17. A method as set forth in claim 13 wherein a heated roll is used to bond said protective coating to said exterior finish.

18. A siding panel comprising a base material having an irregular cross section with an exposed portion and an edge adapted to be overlapped by a similar panel, an exterior finish covering at least said exposed portion, and a strippable protective coating on said exterior finish covering at least a substantial part of said exposed portion, said edge being free of said protective coating.

19. A siding panel as set forth in claim 18 wherein said panel is provided with interlocks along opposite sides of said exposed portion, each interlock being adapted to mate with one interlock of an adjacent similar panel, and said interlocks being free of said protective coating.

20. A siding panel as set forth in claim 19 wherein said central portion includes a planar face and a shadow leg joined at a corner, and said protective coating extends around said corner.

21. A siding panel as set forth in claim 20 wherein said exterior finish is bonded to said base material with a stronger bond than the bond between said protective coating and said exterior finish, and the tensile strength of said protective coating is sufficiently high when compared to its bond with said exterior finish to permit stripping of said protective coating in one piece.

22. A siding panel as set forth in claim 21 wherein said protective coating is provided with loose unbonded portions at least along part of one longitudinal edge.

23. A siding panel as set forth in claim 22 wherein said loose unbonded portion extends the length of said longitudinal edge and is on the face portion of said panel.

24. A siding panel as set forth in claim 21 wherein said protective coating is provided with a plurality of spaced V-shaped unbonded portions wherein the apex of each V portion extends into the next adjacent V portion.

25. A siding panel as set forth in claim 21 wherein said protective coating is polyethylene.

26. A siding panel as set forth in claim 25 wherein said polyethylene is heat bonded to said exterior finish.

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THOMAS H. EAGER, *Primary Examiner.*