

April 13, 1948.

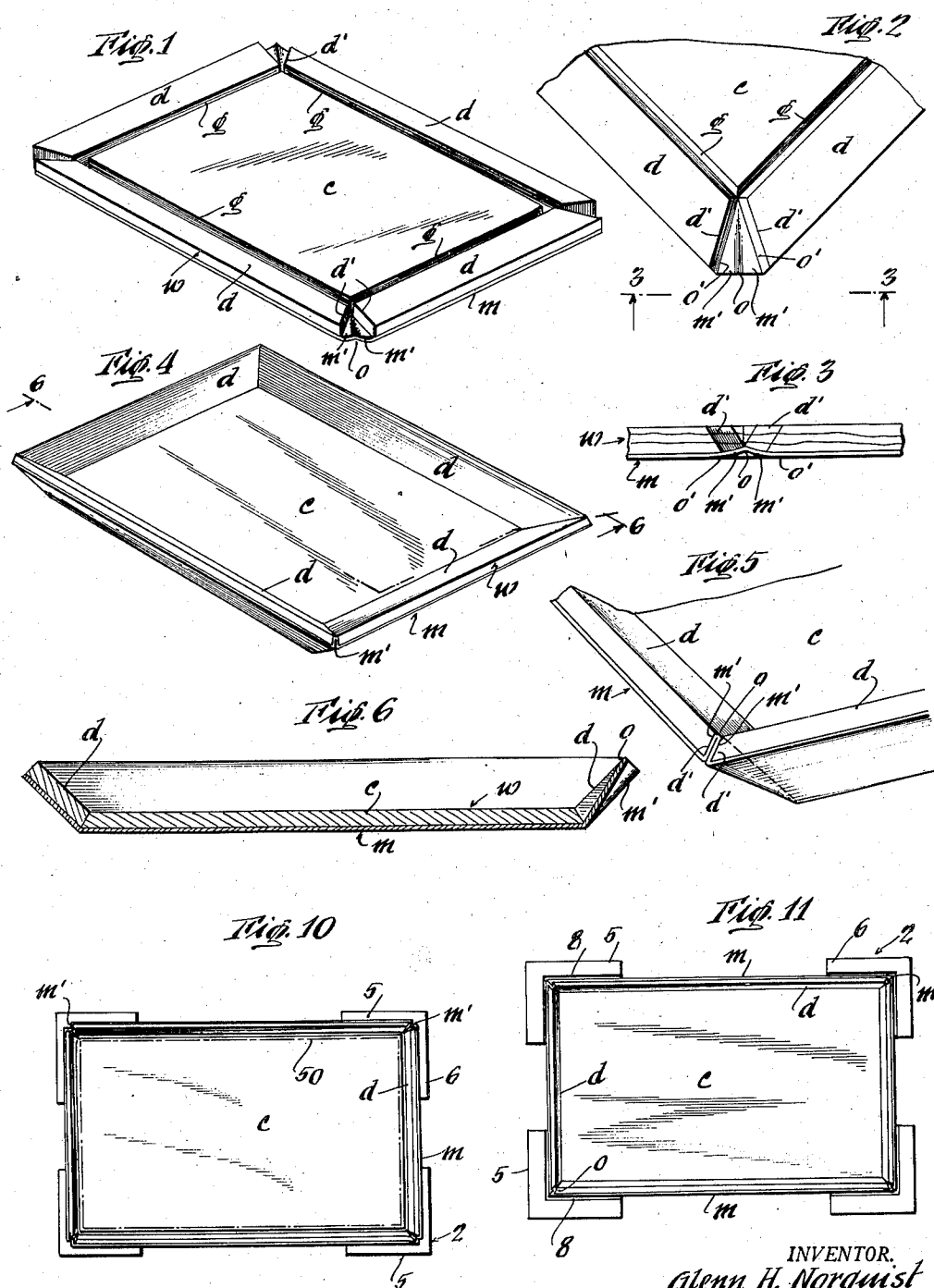
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2,439,397

APPARATUS AND METHOD FOR FLANGING METAL CLAD FIBROUS BASE PANELS

Filed Nov. 1, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

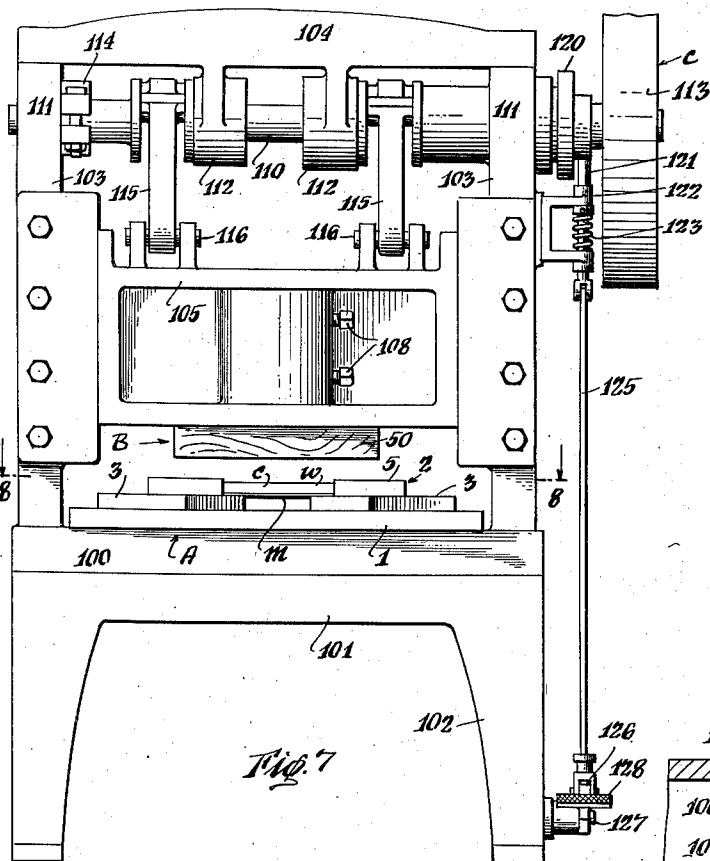


Fig. 7

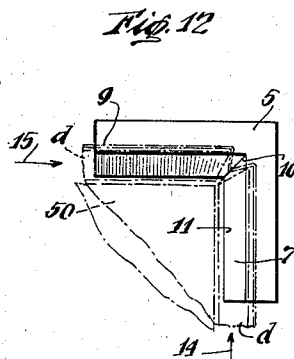


Fig. 12

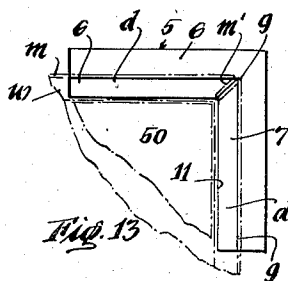


Fig. 13

Fig. 8

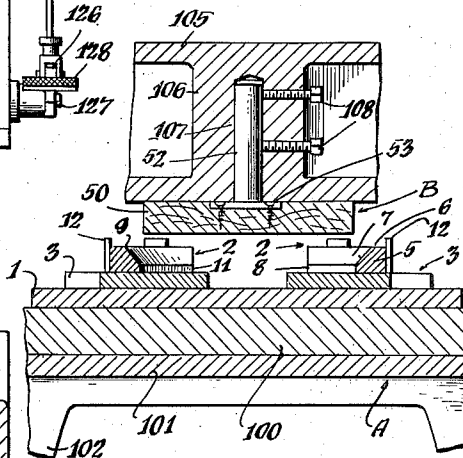
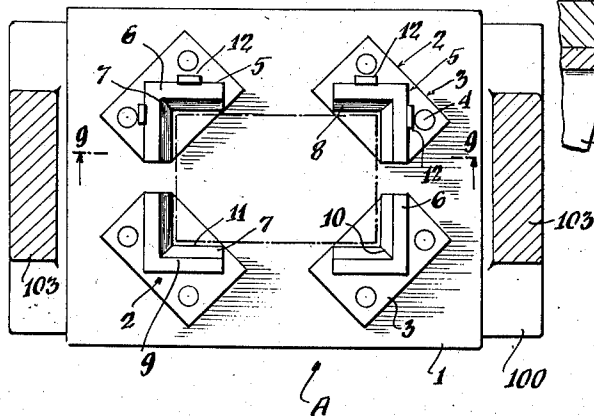


Fig. 9

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APPARATUS AND METHOD FOR FLANGING
METAL-CLAD FIBROUS BASE PANELS

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15 Claims. (Cl. 153—23)

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This invention relates to metal forming, and more particularly to an improved method and mechanism for flanging and ribbing metal clad panels.

Metal clad panels, comprising a base sheet formed of wood, plywood, fiberboard or other base material having a metal sheet secured to one side thereof, possess qualities which make them highly adapted and useful for fabrication into table tops, shelving, cabinets, counters, packing cases, and like products. In the fabrication of such products from metal clad panels, it is often necessary to form flanges on such panels which extend along two or more sides thereof.

Preparatory to the flanging operation, it is customary to cut grooves in the base sheet and notch out the corner of the panel so as to permit the flanges to be formed by bending the metal sheet along a line coincident with the grooves formed in the base sheet. Heretofore the corner notch has been cut completely through both the base sheet and the metal sheet so that when the flanges are formed the free ends thereof will meet substantially in abutment. The adjacent ends of the metal flanges must then be welded or soldered together. Such a corner construction is relatively weak since the ends of the flanges are held together solely by the strength of the weld or solder seam.

In accordance with this invention, the metal clad panel is prepared for the flanging operation by forming a V-notch in the corner of the base sheet only, leaving the exposed corner metal uncut and unweakened. A crimp is then formed in the uncut and unweakened corner section of the metal sheet, the crimp being characterized by fold defining lines in the corner metal along which the metal corner section will fold during the flanging operation to provide a plural ply reinforcing rib at each corner of the flanged panel. The plural ply reinforcing rib is so formed that the same will be wedged between the adjacent ends of the adjacent flange sections of the base sheet, forming a strong and sturdy corner construction. The plural ply metal reinforcing rib may be seam-welded so that it will maintain its preformed shape and further enhance the corner strength of the flanged panel.

This invention more particularly relates to a method and mechanism for flanging metal clad panels and to the formation of inturned plural ply metal reinforcing ribs at the corners thereof during and substantially simultaneously with the flanging operation. The mechanical devices which preform these operations are preferably attached to a mechanically operated press of a type commonly used in metal working. These devices include a bed plate which is suitably attached to and supported by the fixed bed block

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of the press. The bed plate supports corner dies arranged and spaced to receive the metal clad panel to be flanged therebetween. A pressure block is fixed to the upper reciprocating member of the press and is shaped and arranged to telescope into the area between the spaced corner dies therebelow and to exert pressure on the center or facing section of the panel as the panel is telescoped into the space between the corner dies. The corner dies are provided with shaping surfaces which shape the flanges of the panel to the desired contour as the panel is driven by the pressure block into the space between the corner dies. The corner dies are further shaped and formed so that the crimped corner sections of the metal sheet will fold along the fold-forming lines therein provided so that each metal corner section will be shaped into a reinforcing rib defined by connected rib-forming elements extending substantially in parallelism and projecting inwardly between the adjacent ends of the flange sections of the base sheet. The corner ribs take shape as the metal clad panel is pressed into the space between the corner die members. The ribs are completely formed and the flanges shaped to the desired contour when the upper pressure block has completed its downward travel into the space between the corner die members.

In performing the flanging operation, the metal clad panel is first prepared by providing grooves or cuts in the base sheet thereof which define the flanging sections and the center or facing section of the panel. The corner or corners of the base sheet are notched out in the proper manner to form inclined ends on the flange sections of the base sheet, and the exposed corners of the metal sheet is crimped to provide the proper fold forming lines therein. The metal clad panel which has thus been grooved, notched and crimped, is placed upon the corner die members so that only the flanges thereof rest upon the die members, with the base sheet facing upwardly. The flanges and corner ribs are fully formed by the forming surfaces of the corner die members when the panel is driven into the space between the die blocks by a single downward stroke of the pressure block which may be manually or power-operated.

By associating this improved flanging and ribbing mechanism with a power-operated mechanical press, metal clad panels may be flanged and ribbed at high production speeds by a single press operator. The corner die members are preferably made of tool steel, are relatively simple in design, and can be easily made by a toolmaker. The pressure block is preferably made of wood and is provided with suitable means for firm attachment thereof to the reciprocating member of a press. The die mem-

bers are preferably removably attached to the bed plate so as to permit variable spacing of the corner die members in accordance with the shape and size of the flanged panel to be formed. The forming surfaces of the die block are accurately shaped and contoured in conformity with the desired contour of the flanges to be formed. This novel mechanism not only operates to accurately form the panel flanges and inturned corner ribs, but further operates to firmly press the ends of the flange sections of the base sheet firmly against the formed corner ribs projected therebetween, so that the flanged panel is completely and fully formed in a neat and attractive manner in a single operation.

An object of this invention is to provide an improved mechanism for flanging metal clad panels with precision and accuracy with a minimum of labor and at low cost.

Another object of this invention is to provide an improved automatic mechanism adapted to operate upon metal clad panels and form one or more flanges and substantially simultaneously form one or more inturned corner reinforcing ribs therein.

A further object of this invention is to provide an improved mechanism for forming flanges and inturned corner ribs in metal clad panels which is strong and sturdy in construction, simple and foolproof in operation, and which is adapted to form said flanges and ribs accurately and at high production speeds.

A further object of this invention is to provide an improved high speed method for flanging and corner-ribbing metal clad panels.

Other objects and advantages of this invention will become apparent as the disclosure proceeds.

Although the characteristic features of this invention will be particularly pointed out in the claims appended hereto, the invention itself, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part hereof, in which

Fig. 1 is a perspective view of the metal clad panel as it appears when prepared for flanging and ribbing, the panel having grooves and corner notches formed in the base sheet, and crimp forming fold lines formed in the corner sections of the metal which is attached to the base sheet;

Fig. 2 is an enlarged fragmentary top plan view of a corner portion of the prepared metal clad panel shown in Fig. 1;

Fig. 3 is an enlarged fragmentary edge view of the prepared metal clad panel as the same appears when viewed along line 3-3 of Fig. 2;

Fig. 4 is a perspective view of the metal clad panel as it appears when flanged and ribbed;

Fig. 5 is an enlarged fragmentary perspective view of a corner portion of the flanged panel showing particularly the construction of the corner rib formed from the crimped corner section of the unbroken metal liner sheet;

Fig. 6 is a transverse cross-sectional view of the flanged panel as it appears when viewed along line 6-6 of Fig. 4;

Fig. 7 is a diagrammatic front elevational view of a mechanically operated press having the improved flanging and ribbing attachments associated therewith;

Fig. 8 is a transverse cross-sectional view of the press as it appears when viewed along line

8-8 of Fig. 7, this view showing particularly the corner forming die blocks supported upon the fixed bed block of the press;

Fig. 9 is a fragmentary cross-sectional view of a portion of the press and associated flanging and ribbing attachments as the same appear when in inoperative position, and viewed along the vertical plane indicated by the arrows 9-9 of Fig. 8;

Fig. 10 is a plan view of the corner forming die block showing a prepared metal clad panel positioned thereon and ready for flanging and ribbing;

Fig. 11 is a top plan view of the corner forming die block showing the metal clad panel telescoped to the full extent into the space between the corner die blocks and thereby flanged and ribbed;

Fig. 12 is an enlarged fragmentary top plan view of one of the corner forming die blocks, this view also showing in dotted lines a corner portion of the metal clad panel as it appears at an intermediate stage of flanging and ribbing, a fragmentary portion of the reciprocating pressure block also being shown in dotted lines seated upon the main section of the panel being flanged and ribbed; and

Fig. 13 is an enlarged top plan view of the corner die block, this view also showing the panel in dotted lines as it appears when fully flanged and ribbed, a fragmentary portion of the pressure block also being shown in dotted lines and seated upon the main section of the panel operated upon.

Similar reference characters refer to similar parts throughout the several views of the drawings and specification.

The metal clad panel as prepared for flanging and ribbing is illustrated more particularly in Figs. 1 and 2. The prepared panel to be operated is formed essentially from a base sheet *w* of such material as wood, plywood, or fiberboard having a metal sheet *m* firmly bonded thereto. The prepared panel is provided with grooves *g* cut into the base sheet *w*, which meet or intersect at points adjacent the corners of the panel so as to divide the panel into a main or center section *c* and flanged sections *d*. Each corner of the base sheet has a V-shaped cut-out so formed so as to provide the flanged sections *d* thereof with mitered ends *d'*, leaving exposed a corner section *m'* of the metal facing sheet. Each metal corner section *m'* is crimped so as to provide a raised ridge or folding line *o* extending midway between the ends *d'* of the flanged section *d* of the base sheet. Fold lines *o'* are also formed in each corner section of the metal sheet, the folding lines *o'* extending parallel with and directly adjacent to the respective free ends *d'* of the flanged section *d* of the base sheet. Thus it will be observed that the crimp formed in the corner section is characterized by converging fold forming lines *o* and *o'* which divide the exposed corner section *m'* of the metal sheet into two similar triangular segments, which may be collapsed together in substantially parallel extending relationship as shown in Fig. 5 by the mechanism more particularly hereafter described to provide an inwardly extending plural ply rib which substantially reinforces the corner construction of the finished flanged panel.

The mechanisms and attachments for flanging and corner ribbing the prepared metal clad panel illustrated in Fig. 1 and above described, may be generally described as comprising a forming and shaping assembly *A* which cooperates with a pres-

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sure applying assembly B which may be associated with a suitable mechanical press C, as shown in Figs. 7, 8 and 9, to support the forming and shaping assembly A and to reciprocate the pressure applying assembly B in a manner under the control of the operator. The forming and shaping assembly A, as illustrated in Figs. 8 to 13, inclusive, comprises a heavy base plate 1, which may rest upon the bed plate 100 of the press C. The bed plate 100 of the press may rest upon a table framework 101 supported upon staunch legs 102 resting on the factory floor. The press comprises mechanisms positioned above the base plate 1 for reciprocating the pressure applying assembly B, which is comprised essentially of a pressure block 50 positioned above and cooperating with the flange forming and rib forming mechanisms associated with and supported by the base plate 1.

The base plate 1 supports on the upper surface thereof one or more corner forming die blocks indicated generally by the numeral 2. It will be appreciated that a die block of the proper construction is provided for each corner of the flanged panel to be formed. The die blocks are so spaced and positioned as to permit the panel to be flanged and ribbed to be telescoped within the space defined by said spaced die blocks. Four similar die blocks are illustrated in the drawings as attached to the base plate 1, each spaced and positioned to operate upon a prepared rectangular shaped panel to form four flanges extending around the edges of the panel. It will be appreciated, however, that mechanisms constructed in accordance with this invention are adapted to form one or any desired number of panel flanges of any desired shape by providing the base plate 1 with the proper number of forming blocks 2 spaced and arranged in a proper manner to perform the desired flanging operation. It will, therefore, be understood that while a set of four die blocks 2 are illustrated in the accompanying drawings arranged to flange all four sides of a rectangular shaped panel, it will be appreciated that when the die blocks are shaped, arranged and spaced in accordance with the principles of this invention, any selected flanging operation can be performed.

As shown more particularly in Figs. 8 and 9, each die block 2 comprises a supporting block 3, which is attached to the upper surface of the base plate 1 as by metal screws or bolts 4. Resting upon and firmly secured to the supporting block 3 is a die member 5 preferably formed of hardened tool steel, which may be secured to the supporting block 2 in a firm manner as by threaded bolt or welding, or if desired may be integrally formed with the supporting block 2. Each die member 5 is shaped to form the corner of the flanged panel and is generally angular in shape to present a pair of laterally extending leg or wing sections. It will be appreciated that the angle defined by the leg sections of the die member is such as to accurately conform to the shape of the corner to be formed in the flanged panel. Each die member 5 presents a relatively flat top face 6 and an inner forming face 7 which closely conforms to the angularity of the flange to be formed. The forming face 7 of each of the die members 5 are shown in the drawings as inclined at an angle of approximately 45° to form flanged panels whose flanges *d* are inclined approximately 45° to the plane of the center section *c* thereof. It will be appreciated, however, that flanged panels may be formed in which the

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flanges thereof extend at any desired degree of inclination to the main section of the panel by giving the forming face 7 a corresponding inclination. The lower edge 11 of the inclined forming face 7 of each die member terminates in a substantially vertical riser face 8. The inclined forming face 7 meets the flat top face 6 of the die member along a relatively sharp but non-cutting bending edge 9. The forming faces 7 presented by the angular extending wing sections of each die member meet in an inclined corner line 10, which may be relatively sharp or rounded, depending upon the sharpness or roundness of the corner desired in the flanged panel to be formed.

It will be noted that a die block 2 having a corner forming die member 5 is provided for each corner presented by the flanged panel to be formed. As shown more particularly in Figs. 10 to 12, inclusive, the die members 5 are so spaced and formed that the riser surfaces 8 thereof closely conform to the bend lines *g*, or otherwise stated, to the edges of the center section *c* of the flanged panel to be formed. The flat prepared panel when placed upon the set of die members 5 will initially rest upon the flat top surfaces 6 of the die members as shown in Fig. 10. Suitable guide stops 12, which may project upwardly from the top faces 5 of the die members, may be provided to effect placement and registration of the prepared panel when placed by the operator on the die members. It will be noted that the flat prepared panel when properly registered in position upon the die members will have only the flanged sections *d* thereof in contact with the flat surfaces 6 of the die members with the center section thereof *c* unsupported and extending over the area whose outline is defined by the edges 11 of the die members.

When downward pressure is exerted on the center section *c* of the prepared flat panel, as by the pressure block 50, the center section *c* of the panel is telescoped downwardly into the area or space defined by the forming faces 7 of the die members. As such downward pressure is exerted, the flanged portions of the metal sheet will bend along a line coincident with the groove lines *g* formed in the base sheet, which bending is accentuated by the bending edges 9 of the die members 5. The metal faces of the flanged sections being formed will follow and conform to the forming surfaces 7 of the die members during continuance of the downward pressure exerted on the center section *c* of the panel. When the outside face of the center section *c* of the panel being formed has reached the terminus edge 11 of the forming faces 7, the metal faces of the flanged sections *d* of the panel will be shaped in true conformity with the forming faces 7.

During shaping of the flanges, it will be noted that the metal corner sections *m'* are forced to collapse along the bend defining lines *o* and *o'*. Since the inclined corner 10 of the forming faces 7 prevent the metal corner sections from expanding or blowing outwardly, the metal corner section is forced to fold inwardly to provide an returned rib formation. Such inward folding of the metal corner section is positively assured by the pre-crimping of the corner section which presents the medial raised ridge or medial fold line *o*. Since a die member 5 is positioned at each corner of the flanged panel to be formed, the panel being operated upon cannot crawl or shift out of place, and since the space defined between the forming surfaces 7 of the die members is gradually contracted in area as the center

section *c* is driven downwardly by the pressure block 50, the excess metal represented by the crimped corner sections *m'* are forced to fold inwardly, in the manner illustrated in Fig. 12. The forming faces 7 of the die members transmit the downward pressure force in a direction extending towards the inclined corner 10 of the forming faces, the direction of the force being indicated by the arrows 14 and 15, as illustrated in Fig. 12. When the outside face of the center section *c* of the panel being flanged has been driven to extend in a plane defined by the lower edges 11 of the forming surfaces 7, the crimped metal corner section will have been collapsed and folded into an inwardly extending rib, as illustrated in Figs. 5 and 13.

The pressure applying assembly B, as shown more particularly in Figs. 7 and 9, comprises a pressure block 50 which is preferably formed of wood, and has an area which closely conforms to the center section *c* of the flanged panel to be formed. The pressure block 50 may be reciprocated by any desired mechanical means, such as the mechanical press, illustrated in Fig. 7.

The mechanical press shown in Fig. 7 comprises a pair of spaced upright standards 103, which rest upon the base block 100 of the press, the standards being connected at their upper ends by a yoke frame 104. A slide frame 105 is arranged to reciprocate between the standards 103. As shown in Figs. 7 and 9, the slide frame 105 has a collar 106 formed therewith, having an interior socket 107 which receives a stud 52 attached to the pressure block 50 as by screws 53. Suitable set screws 108 or other devices may be provided to retain the stud 52 in the socket 107. The pressure block 50 may seat against the lower face of the slide frame 105 so as to transmit the downward force exerted by the slide frame 105 directly against the pressure block 50.

The slide frame may be reciprocated by any desired mechanism. As shown in Fig. 7 for purposes of illustration, power means for reciprocating the slide block 105 may comprise a crank shaft 110 journaled in bearings 111, associated with the supporting standards 103, and a pair of center bearings 112 supported from the yoke frame 104. One end of the crank shaft 110 may be provided with a balancing flywheel pulley 113 around which a drive belt may extend, and the other end provided with a friction brake 114. A pair of pitmen 115 are attached at one end thereof to the crank shaft 110 and at the other end thereof to the slide frame 105 by means of hinge pins 116.

It is important that the reciprocating movement of the pressure block 50 be under the immediate control of the operator. A clutch 120 operatively connects the continuously rotating drive wheel 113 to the crank shaft 110. The clutch 120 is engaged by a control bolt 121 supported by a bracket 122 attached to the adjacent supporting standard 103 of the press. The end of the control bolt 121 is normally held in engagement with the clutch 120 by means of a compression spring 123. When the control bolt 121 is in engagement with the clutch 120, the crank shaft 110 does not rotate, and when the control bolt 121 is withdrawn from engagement with the clutch 120, the crank shaft 110 will make one complete revolution and reciprocate in slide frame 105 one complete stroke. The friction brake 114 is adjusted to prevent further rotation of the crank shaft 110 when disengaged by the clutch 120 from the drive wheel 113. The lower

end of the control bolt 121 is connected to a control rod 125 connected to a foot lever 126, one end of which is pivotally mounted as by a pin 127 to the adjacent leg of the press. A foot pad 128 is attached to the other end of the foot lever 126 and is conveniently arranged so that the foot lever 126 may be depressed by the foot of the operator to withdraw the control bolt 121 from engagement with the clutch 120.

To perform the flanging and ribbing operation, the operator places the preformed panel, as shown in Fig. 1, upon the die blocks 2 with the metal face of the flanged sections *d* of the panel resting upon the flat top surfaces 5 of the die members, and with the panel properly registered by means of the abutment elements 12 projecting upwardly from the die blocks. The operator then steps on the foot pad 128 of the foot lever 126, thereby withdrawing the control bolt 121 from engagement with the clutch 120. The drive wheel 113 then will rotate the cam shaft 110 one complete revolution, the operator removing his foot from the foot pad 128 so that the control bolt 121 will manipulate the clutch 120 so as to disengage the drive wheel 113 from the cam shaft 110 when the cam shaft 110 has made one complete revolution. It will be noted that the friction brake 114 also serves to immediately halt rotation when the clutch 120 disengages the cam shaft 110 from the drive wheel 113.

During the initial 180° rotation of the cam shaft 110, the pistons 115 attached thereto moves the slide frame 105 of the press downwardly, and the pressure block 50 moves downwardly to exert downward pressure on the center section *c* of the panel, driving the panel downwardly into the space defined by the forming surfaces 7 of the die members. The flanges of the panel take the shape of the forming surfaces 7 of the die members and the crimped metal corner section is simultaneously folded inwardly to form a reinforcing rib as the center section *c* of the panel is driven downwardly by the pressure block 50. When the lower surface of the center section of the panel reaches the break line 11 of the die members, the flanging and ribbing of the panel is completed, and the mitered ends *d'* of the flanged sections *d* of the base sheet have been pressed firmly against the metal rib wedged therebetween. It is preferable to cut off the outer end of the corner metal *m'* of the panel to be formed, as indicated in Figs. 1 and 2, so that when the rib formation is completed, as shown in Fig. 5, no part of the metal corner rib will project above the top edge of the formed flanges. The outer end of the corner metal may be cut off along a straight line or such other shaped line, as will not leave any corner metal projecting from the top edge of the flanged panel.

As the cam shaft 110 continues its complete revolution the slide frame 105 thereof is raised, which raises the pressure block 50 and relieves the pressure on the center section *c* of the panel. The flanged and ribbed panels will then spring upwardly from its seated position within the space defined by the die members, and the finished flanged and ribbed panel can then be removed and another prepared panel placed in position over the die blocks. The entire flanging and ribbing operation can be performed on a prepared panel by means of the machine and attachments above described in a matter of a few seconds.

By the use of the method and mechanisms above described, prepared metal clad panels can

be flanged and ribbed with precision and accuracy at high production speed by relatively untrained operators. Several hundred panels may be flanged and ribbed per hour by a single operator without reliance upon skilled craftsmanship to insure neat and accurate workmanship. It will be appreciated that polygonal metal clad panels presenting any desired number of corners may be flanged and ribbed by the employment of a die block for each corner to be ribbed, properly spaced to receive the flanged panel therebetween. Flanges can be formed of any desired depth or inclination by providing die members having forming surfaces 7 of a corresponding depth and shape.

While certain novel features of the invention have been disclosed herein, and are pointed out in the claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A machine for flanging and ribbing metal clad panels of the type which comprises a base sheet bonded to a metal sheet, a corner of the base sheet being notched to define the ends of the flanges to be formed with the exposed corner metal having preformed fold defining lines therein, said machine including a die block having a pair of angularly extending wing sections, said wing sections presenting downwardly inclined flange forming faces meeting in a corner shaped to conform to the contour of the adjacent flanges and corner of the completed flanged panel to be formed, said wing sections presenting a substantially vertical riser face extending downwardly from the lower edge of each of said flange forming faces, and pressure means including a pressure block having its marginal edges confined within the main center section of the panel operative to drive said panel flanges into shaping contact with the forming faces of said die block whereby said die block operates to shape said flanges and bend the corner metal inwardly to form a corner reinforcing rib wedged between the adjacent ends of the formed panel flanges.

2. A machine for flanging and ribbing metal clad panels of the type which comprises a base sheet bonded to a metal sheet, each corner of the base sheet being notched to define the ends of the flanges to be formed with the exposed corner metal having preformed fold defining lines therein, said machine including a plurality of die blocks arranged in spaced relation at the respective corners of the flanged panels to be formed, each of said die blocks having a pair of angularly extending wing sections presenting downwardly inclined flange forming faces meeting in an unbroken corner shaped to conform to the contour of the adjacent flanges and corner of the completed flanged panel to be formed, each of said wing sections presenting a substantially vertical riser face extending downwardly from the lower edge of each of said flange forming faces, a pressure block adapted to seat on the center section of the panel, said pressure block having the marginal edges thereof wholly confined within the marginal edges of said center section and out of contact with the inside faces of the panel corner during the forming operation, and pressure applying means for driving said panel into the space defined by the forming faces of said die blocks whereby said die blocks operate to shape said flanges and bend the exposed corner metal inwardly to form corner reinforcing ribs wedged

between the adjacent ends of the formed panel flanges.

3. The method of making a flanged metal clad panel formed from a base sheet and a flexible metal sheet having a main center section, flange forming sections and a triangular shaped segment removed from a corner of the base sheet to define the adjacent ends of the flanged sections thereof, the unbroken exposed corner of the metal sheet being crimped, the steps which include forcing the panel into a forming die to shape the flanges thereof and fold the crimped corner metal into a ribbed formation extending inwardly between the adjacent ends of the flanged sections of the base sheet, said flange forming and rib forming operation being accomplished by applying pressure to the inside face of the center section of the panel and without the application of pressure to the inside faces of the flange sections thereof.

4. The method of making a flanged metal clad panel formed from a base sheet and a flexible metal sheet having a main center section, flange forming sections and triangular shaped segments removed from the corners of the base sheet to define the adjacent ends of the flanged sections thereof, the unbroken exposed corners of the metal sheet being crimped, the steps which include forcing the panel into forming dies to form the flanges and fold the crimped corner metal into ribber formations extending inwardly between the adjacent ends of the flanged sections of the base sheet, said flange forming and rib forming operation being accomplished by applying pressure to the inside face of the center section of the panel only, and without the application of contact pressure to the inside faces of the flange sections or to the outside face of the main center section of the panel during the forming operation.

5. The method of making a flanged metal clad panel formed from a base sheet and a flexible metal sheet having grooves cut in the base sheet to define the main section and flange sections thereof and having a triangular shaped segment removed from the corner of the base sheet to define the adjacent ends of the flanged sections thereof, the metal sheet having converging crimp-forming fold lines in the exposed corner of the metal sheet said method including forcing the panel flanges and corner into shaping contact with a forming die whereby the forming faces of the die will shape the flanges of the panel and cause the crimped metal corner to collapse and form an in-turned reinforcing rib wedged between the adjacent ends of the flange sections of the base sheet, said flange forming and rib forming operation being accomplished by applying pressure to the side face of the center section of the panel only, and without the application of contact pressure to the inside faces of the flange sections thereof.

6. The method of making a flanged metal clad panel formed from a base sheet and a flexible metal sheet having grooves cut in the base sheet to define the main section and flange sections thereof and having triangular shaped segments removed from the corners of the base sheet to define the adjacent ends of the flanged sections thereof, the metal sheet having converging crimp-forming fold lines in the exposed corners of the metal sheet said method including forcing said panel into a restricted area defined by the forming faces of spaced dies positioned at the corners of the flanged panel to be formed, whereby the forming faces of said dies will shape the flanges

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of the panel and cause each of said crimped metal corners to collapse and form an inturned reinforcing rib wedged between the adjacent ends of the flange sections of the base sheet; said flange forming and rib forming operation being accomplished by applying pressure to the inside face of the center section of the panel only, and without the application of contact pressure to the inside faces of the flange sections or to the outside face of said center section during the forming operation.

7. A machine for flanging and ribbing metal clad panels of the type which comprises a fibrous base sheet having a metal surfacing sheet bonded thereto, the base sheet having grooves cut therein forming a main section and flange forming sections, a corner of the base sheet being notched to define the ends of the flanges to be formed with the exposed corner metal having preformed fold defining lines therein, said machine including in combination, a die-block presenting a downwardly inclined flange shaping face and an intermediate corner shaping face presenting together a substantially continuous and unbroken shaping surface, said die-block also presenting a substantially vertical riser face extending below said shaping surface, and pressure means for exerting pressure against the main section of the panel to force the panel into the confines of said die-block and substantially simultaneously force the metal corner section and the metal faces of the flange sections into forming contact with the shaping surface of said die-block whereby the metal corner section is formed into an inwardly extending plural ply rib wedged between the adjacent ends of the flange sections of the base sheet.

8. A machine for flanging and ribbing metal clad panels of a type which comprises a fibrous base sheet having a metal surfacing sheet bonded thereto, the base sheet having grooves cut therein forming a main section and flange forming sections, a corner of the base sheet being notched to define the ends of the flanges to be formed with the exposed corner metal having preformed fold defining lines therein, said machine including in combination, a die-block having downwardly inclined flange shaping faces, a corner shaping face and substantially vertical riser faces extending downwardly from the lower edge of said flange shaping faces and corner shaping face, and pressure means including a pressure block for exerting downward pressure against the main section of the panel to force the panel into the confines of said die-block and substantially simultaneously force the metal corner section and the metal faces of the flange sections into forming contact with the shaping surface of said die-block whereby the metal corner section is formed into an inwardly extending plural-ply rib wedged between adjacent ends of the flange sections of the base sheet, said pressure block having its peripheral edges substantially out of contact with the inside faces of said flange sections during the shaping operation.

9. A machine for flanging and ribbing metal clad panels of a type which comprises a composition base sheet having a metal surfacing sheet bonded thereto, the base sheet having grooves cut therein forming a main center section and flange forming sections, the corners of the base sheet being notched to define the ends of the flanges to be formed with exposed metal corners having preformed fold defining lines therein, said machine including in combination, a plurality of die-blocks arranged in space relationship to re-

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ceive the panel therebetween, said die-blocks having downwardly inclined shaping faces for shaping the metal corner sections into inwardly extending ribs and for shaping the flanges to extend at a predetermined angle to the center section of the panel, said die-blocks each presenting substantially vertical riser faces extending downwardly from the lower edge of the inclined shaping faces with the area defined by said riser faces being sufficient to receive and contain the main center section of the panel, and pressure means for applying pressure to the center section of the panel to force the panel into the space defined by the shaping faces of said die-blocks and substantially simultaneously force the metal corner sections and the metal faces of the flange sections into forming contact with the shaping faces of said die-blocks whereby the metal corner sections are forced inwardly to form inwardly extending plural-ply corner ribs wedged between adjacent ends of the flange sections of the base sheet during shaping of said flange sections.

10. A machine for flanging and ribbing metal clad panels of the type which comprises a composition base sheet having a metal surfacing sheet bonded thereto, the base sheet having grooves cut therein defining a main section and flange forming sections, the corners of the base sheet being notched to define the end of the flanges to be formed with the exposed metal corners having preformed fold defining lines therein, said machine including in combination, a plurality of corner and flange shaping die-blocks arranged in fixed space relation, said die-blocks having downwardly inclined shaping faces which together define the outer contour and shape of the corner sections and flange sections of the panel to be formed, said die-blocks defining a cavity space below the lower edge of the shaping faces of sufficient area to receive the center section of the panel to be formed, and pressure means for forcing said panel into the space defined by the shaping faces of said die-block whereby said metal corners are formed into inwardly extending plural-ply ribs wedged between the adjacent ends of the formed flange sections of the base sheet.

11. A machine for flanging and ribbing metal clad panels of a type which comprises a composition base sheet having a metal surfacing sheet bonded thereto, the base sheet having grooves cut therein defining a main section and flange forming sections, the corners of the base sheet being notched to define the ends of the flanges to be formed with the exposed metal corners having preformed fold defining lines therein, said machine including in combination, a relatively stationary base plate, a plurality of corner and flange shaping die-blocks fixed to said base plate in spaced relation, said die-blocks having downwardly inclined shaping faces and substantially vertical riser faces extending from the lower edge of said shaping faces to said base plate, said shaping faces together defining the outer contour and shape of the corner sections and flange sections of the panel to be formed, and pressure means for forcing said panel into the space defined by the shaping faces of said die-blocks whereby said metal corners are formed into inwardly extending plural-ply ribs wedged between the adjacent ends of the adjacent flange sections of the base sheet, said pressure means including a pressure block having its periphery confined within the margins of the center section of the panel and normally out of contact with the inside

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faces of the flange sections during the flanging operation.

12. A machine for flanging and ribbing metal clad panels of a type which comprises a composition base sheet having a metal surfacing sheet bonded thereto, the base sheet having grooves cut therein defining a main section and flange forming sections, the corners of the base sheet being notched to define the ends of the flanges to be formed with the exposed metal corners having preformed fold defining lines therein, said machine including in combination, a relatively stationary base plate, a plurality of corner and flange shaping die blocks fixed to said base plate in spaced relation, said die-blocks having downwardly inclined shaping faces and substantially vertical riser faces extending from the lower edge of said shaping faces to said base plate, said shaping faces together defining the outer contour and shape of the corner sections and flange sections of the panel to be formed, and pressure means including a pressure block for applying pressure to the main center section of said panel operative to force the panel into the space defined by the shaping faces of said die-blocks whereby said metal corners are formed into inwardly extending plural-ply ribs wedged between the adjacent ends of the formed flange sections of the base sheet, said pressure block having its periphery confined within the margins of said center section of the panel and normally out of contact with the inside faces of the flange sections during the flanging operation, the riser faces of said die-blocks defining a cavity sufficient in size to receive the main section of the panel to be formed.

13. A machine for flanging and ribbing metal clad panels of a type which comprises a base sheet bonded to a metal sheet, the base sheet having grooves cut therein forming a main center section and flange forming sections, the corners of the base sheet being notched to define the ends of the flanges to be formed with the exposed metal corners having preformed fold defining lines therein, said machine including a plurality of die-blocks arranged in spaced relation at the respective corners of the flanged panel to be formed, each of said die-blocks having a corner section and angularly extending wing sections, said corner section and wing sections having a downwardly inclined corner forming face and a downwardly inclined flange forming face shaped to conform to the contour of the panel corner and panel flanges to be formed, each of said die-blocks also presenting substantially vertical riser faces extending downwardly from the lower edge of said flange forming faces, said die-blocks being so positioned and arranged that the forming faces thereof together define the contour of the panel flanges to be formed and the vertical faces thereof define the contour of the main center section to be formed, a pressure block adapted to seat on the center section of the panel and out of contact with the inside faces of the flange sections thereof, and pressure applying means for manipulating said pressure block to drive said panel into the space defined by the forming faces of said die-blocks whereby said forming faces of said die-blocks operate to shape the flanges of the panel and shape said metal corner sections into inwardly extending plural ply ribs wedged between the adjacent ends of the flange sections of the base sheet.

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14. A machine for flanging and ribbing metal clad panels of the type which comprises a base sheet bonded to a metal sheet, the base sheet having grooves cut therein forming a main center section and flange forming sections, the corners of the base sheet being notched to define the ends of the flanges to be formed with the exposed metal corners having preformed fold defining lines therein, said machine including, a plurality of die-blocks arranged in spaced relation at the respective corners of the flanged panel to be formed, each of said die-blocks having a pair of angular extending wing sections presenting a corner forming face and flange forming faces shaped to conform to the contour of the panel corners and adjacent flanges to be formed, said die-blocks being so positioned and arranged that the forming faces thereof together define the contour of all of the panel corners and flanges to be formed, a pressure block adapted to seat on the center section of the panel and out of contact with the inside faces of the panel corners during the forming operation, and means for applying pressure to said pressure block to drive said panel into the space defined by the forming faces of said die-blocks whereby said die-blocks operate to shape the panel flanges and bend the excess metal at the corners of the panel inwardly to form inwardly extending plural ply ribs wedged between the adjacent ends of the adjacent flange sections of the base sheet.

15. A machine for flanging and ribbing metal clad panels of the type which comprises a base sheet bonded to a metal sheet, the base sheet having grooves cut therein forming a main center section and flange forming sections, the corner of the base sheet being notched to define the ends of the flanges to be formed with the exposed corner metal having preformed fold defining lines therein, said machine including a die-block having angular extending wing sections presenting a corner forming face and adjacent flange forming faces shaped to conform to the contour of the panel corner and adjacent flanges to be formed, a pressure block adapted to seat on the center section of the panel and out of contact with the inside faces of the panel corners during the forming operation, and means for applying pressure to said pressure block to drive said panel into shaping contact with the forming faces of said die-block whereby said die-block operates to shape the panel flanges and bend the excess metal at the corner of the panel inwardly to form a corner reinforcing rib wedged between the adjacent ends of the flange sections of the base sheet.

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