April 28, 1925. 1,536,038

W. K. BISHOP

METHOD OF UNITING COMPLEMENTARY FRAME MEMBERS

Filed Aug. 8, 1924 3 Sheets-Sheet 1

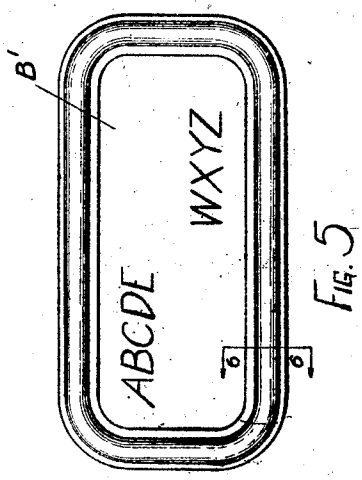


FIG. 5

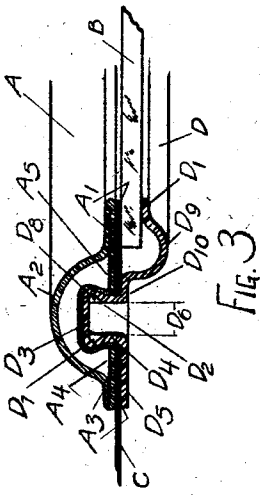


FIG. 3

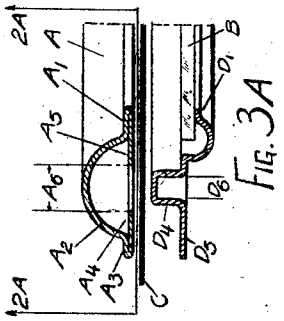


FIG. 3A

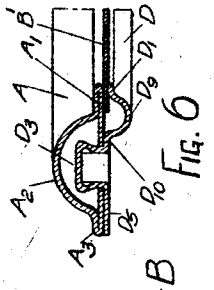


FIG. 6

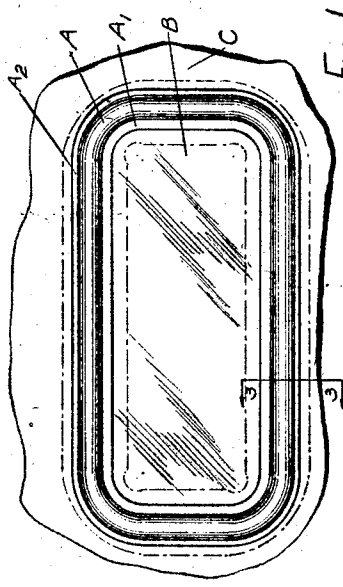


FIG. 1

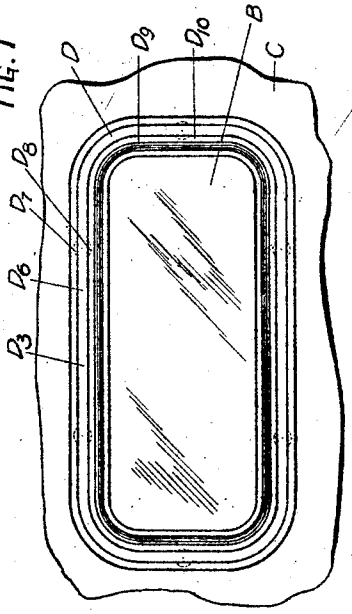


FIG. 2

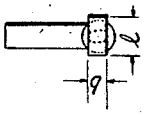


FIG. 4B

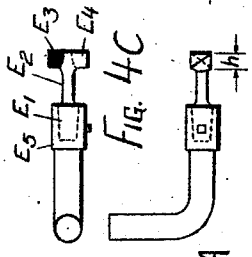


FIG. 4C

FIG. 4A

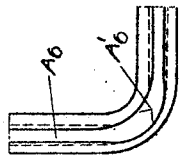


FIG. 2A

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METHOD OF UNITING COMPLEMENTARY FRAME MEMBERS

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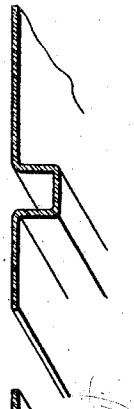


FIG. 12

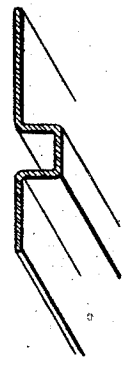


FIG. 13

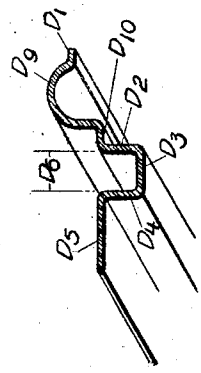


FIG. 14

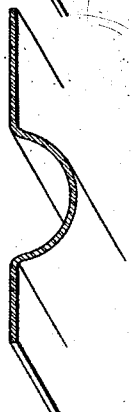


FIG. 8

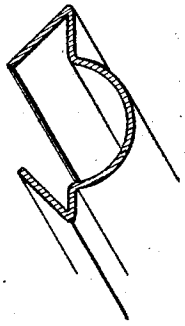


FIG. 10

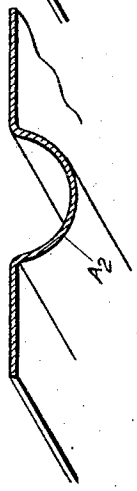


FIG. 7

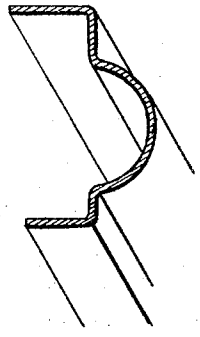


FIG. 9

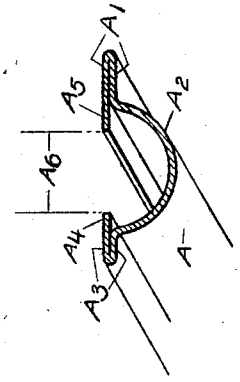


FIG. 11

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METHOD OF UNITING COMPLEMENTARY FRAME MEMBERS

Filed Aug. 8, 1924 3 Sheets-Sheet 3

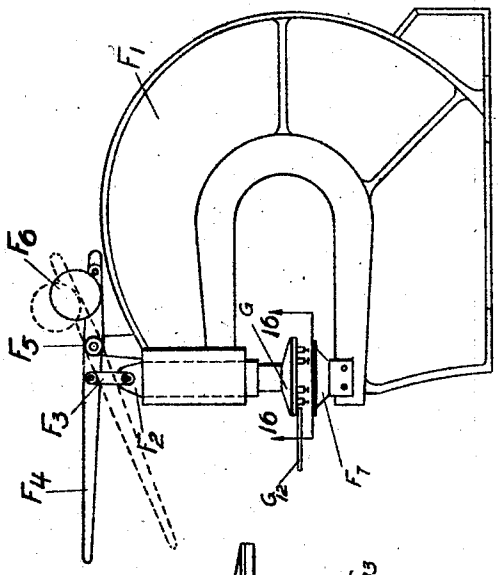


FIG. 15

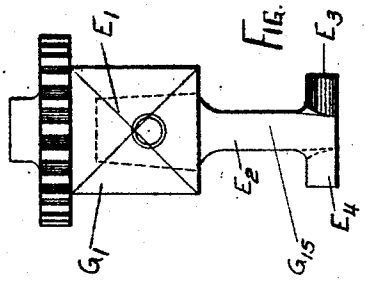


FIG. 18.

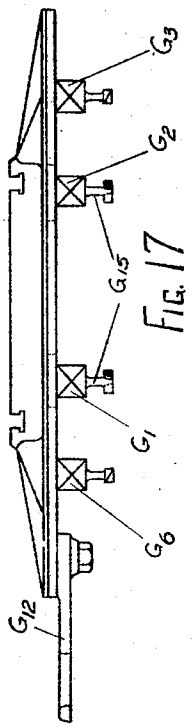


FIG. 17

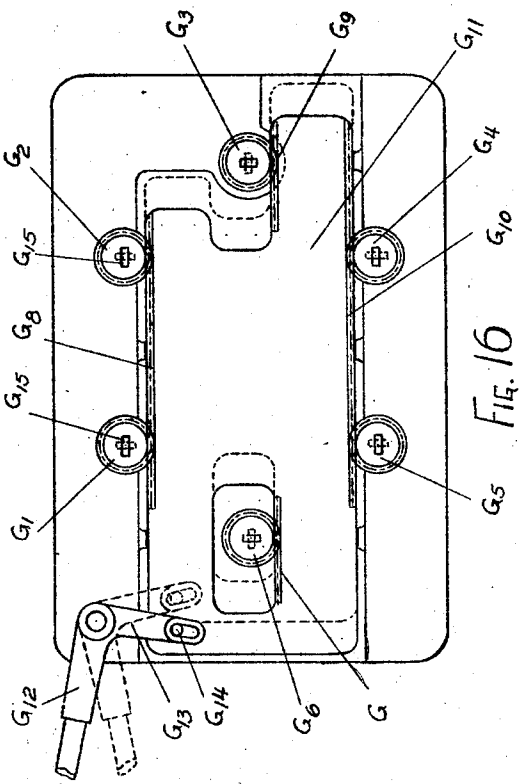


FIG. 16

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Patented Apr. 28, 1925. 1,536,038

UNITED STATES PATENT OFFICE.

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METHOD OF UNITING COMPLEMENTARY FRAME MEMBERS.

Application filed August 8, 1924. Serial No. 730,842.

To all whom it may concern:

Be it known that I, WILLIAM K. BISHOP, a citizen of the United States, and a resident of Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Methods of Uniting Complementary Frame Members of which the following is a specification.

My present invention relates to novel constructive means for forcibly indenting crimping cleats particularly as applied to interlocking two-part curtain light frames, mirror frames, trays or name-plate mouldings and the like, but my improvements also find a wider application in various associations other than those designated. The object of my invention is to provide a simple and economical method for interlocking suitable complementary or coacting frame members or like parts without resorting to separate fastening devices or prongs of any kind, the underlying fastening features being similar in certain aspects to those disclosed in my co-pending application Serial Number 668,530 filed October 15, 1923.

In its broader aspects my invention contemplates the uniting of any set of co-acting frame members such as might serve as a moulding for a center medium or as a binding strip for the border of a fabric or like flexible materials. My frame is furthermore adapted to economically mount a center medium into a hole cut into a curtain fabric or the like; and in such instances, my set of complementary frame members are preferably disposed on opposite sides of a flat medium while the marginal edges of the fabric opening are interposed therebetween for binding purposes; upon interlocking the frame members as indicated, they constitute a neat and effective tie between the center medium and its surrounding curtain fabric.

As applied to a two-part curtain light frame, the desired end is preferably accomplished by the use of an endless outer frame member having a cross-sectionally bowed or dished-shaped portion provided with a set of overhung lugs that project inward from the respectively longitudinal edges of said dished contour to form an undercut annular slot therebetween, which recess constitutes the female part of my frame.

The separate backing or inner frame member is preferably made of sheet-metal and this is formed into a substantially rectangular grooved male part that initially projects freely into but snugly nestles within said slot or female part of the outer frame member. When these two frame parts are firmly pressed together, the inner wall surfaces defining said channel-like groove in the rearward side of the male part of the backing frame will be exposed to view. This is taken advantage of in fastening the male and female parts together by means of a novel crimp or indented cleat means shaped up integrally with the parallel side walls of said rectangular male part. The cleat is formed by forcibly expanding or otherwise indenting these relatively thin side walls outwardly so as to grip in under the respective overhung lug of the slotted female part. It is preferred to utilize a plurality of such suitably spaced cleats to interlock the inner frame member with the outer frame member after they have been properly assembled in place.

My improved method of fastening serves not only to eliminate the need for separate screws, prongs or the like, but effects a substantial saving in the manufacturing cost of any complementary frame parts to which this invention may be applied. The frame members are furthermore entirely free from projecting parts of any kind and when interlocked in place, they present a neatly finished appearance on either side of the interlocked frames.

Embodied herein are also a novel method for forming up the described two-part frames and also a disclosure of the particular type of tool required for expanding my crimp cleats therein.

Furthermore, means are shown whereby a plurality of said indented cleats may be formed simultaneously with a view of minimizing the cost of interlocking the frames when assembled on a productive scale.

In addition, other features of structure and organization are disclosed which facilitate the manufacture and application of said type of interlocked two part frames, all of which will be set forth in detail hereinafter.

Reference is had to the accompanying three sheets of drawings, which illustrate an example of the preferred embodiment of my invention; like characters of reference indi-

cating like parts in the several views, and in which drawings:

Fig. 1 is an elevational front view of the outer or female member of a two-part curtain light frame showing a curtain and a pane mounted therein.

Fig. 2 is a rear view of Fig. 1 showing the inner or grooved male member of the curtain light frame shown in Fig. 1.

Fig. 2^a represents a partial view of the outer frame member as taken along the part line 2^a—2^a of Fig. 3^a showing a detail of the female or groove element of same.

Fig. 3 is an enlarged cross-sectional view of an assembled curtain light frame as taken along 3—3 of Fig. 1.

Fig. 3^a is a view similar to Fig. 3, but indicating the relative position of the various curtain light elements prior to pressing the frame members together.

Fig. 4^a represents a crimping tool suitable for forming my interlocking cleat in the side walls of the offset male part of the inner frame member.

Figs. 4^b and 4^c represent bottom and side views, respectively, of the tool shown in Fig. 4^a.

Fig. 5 shows my expanded crimp cleats applied to an endless two-part molding member of a name-plate or like parts, which member is similar to the curtain light frame shown in Fig. 1, except that the transparent pane is now replaced by a name-plate or similar center medium.

Fig. 6 is an enlarged cross-sectional view of an assembled name-plate molding as taken along 6—6 of Fig. 5.

Figs. 7 to 11 inclusive show partial cross-sectional views illustrating the steps required in forming up the outer or female member of my two-part frame.

Figs. 12 to 14 inclusive show partial cross-sectional views illustrating the steps required in forming up the inner or male member of my two-part frame.

Fig. 15 shows an elevational outline of a hand-operated multiple spindle machine adapted to simultaneously form a series of spaced crimp cleats in one operation.

Fig. 16 illustrates a tool block adapted to be attached to the ram of said machine as seen from below from the plane 16—16 in Fig. 15.

Fig. 17 represents an elevational side view of the tool block shown in Fig. 16 and further illustrates the manner in which a plurality of rack and gear actuated crimping tools may be simultaneously actuated.

Fig. 18 shows some further details of the crimping tool used in connection with the machine outlined in Fig. 15.

Referring first to Fig. 1, the letter A represents the sheet metal outer frame member in its entirety particularly as applied to a curtain light structure and B is the transparent pane or other medium mounted therein. The frame A is also provided with an internal flange A_1 adapted to bear against the marginal portion of one side of the pane B. Formed integral with said flange A_1, is a cross-sectionally dished or bowed offset A_2, the outermost longitudinal edge of which terminates in an outwardly disposed foot flange A_3 as is best shown in Fig. 3. This foot flange A_3 is further provided with an inturned annular lug A_4 that overhangs and follows along the outer longitudinal edge of the dished offset A_2.

The opposite or innermost longitudinal edge of the endless dished offset A_2 is likewise provided with a complementary inturned annular lug A_5, which is shown as an extension of the internal flange A_1 and spaced from the lug A_4 to form the slot or female part therebetween, designated as A_6. This slot is disposed about the pane and preferably follows the frame contour. The described elements A_3, A_4 and A_5 substantially lie in a common plane with the face of the internal flange A_1; and this plane defines the parting face of the two part frame members as is clearly indicated in Fig. 3^a.

In assembling the two-part frame members as applied to curtain lights, the supporting fabric C is intended to initially lie along said aligned parting face. The pane B may then be mounted against the internal flange A_1 of the outer frame and cushioned by means of the interposed fabric C as shown in Fig. 3. The opposite face of the marginal edge of the pane B is held in place by a peculiarly shaped internal flange D_1 formed integral with the inner or backing frame and this second member of the two-part frame is designated as a whole by the letter D.

An endless bead-like element D_9 is provided for said flange D_1 for the purpose of augmenting its resiliency with respect to the opposite internal flange A_1 as well as to the pane B mounted therebetween. The outermost longitudinal edge of said bead-like element D_9 is sharply bent up into a plane substantially parallel to that of the internal flange D_1, that is to say, the face of the pane B but disposed in an offset relation thereto, so as to constitute the narrow endless intermediate flange D_{10} as shown in Fig. 3.

The outermost edge of said intermediate flange D_{10} is then sharply bent into an annular side wall D_2 which is disposed substantially normal to the plane of the short face D_1 and loosely encircles the pane B. The transverse wall D_2 is made of sufficient length to project considerably beyond the thickness of the pane B, whereupon the sheet metal of the backing frame is again bent outwardly and away from the internal flange D_1 to form a bottom wall D_3. The

face dimension of this bottom wall is determined by the width of the receiving slot in the female member as will appear hereinafter. The sheet metal is further bent back to form another annular side wall D_4 which is substantially parallel with the side wall D_2. The inner frame member is finally flared outward and away from the wall D_4 to form the circumscribing flange D_5. In the case of Fig. 3, this last named flange is disposed so as to align and become flush with the exterior face of the pane B.

The transverse side walls D_2 and D_4 together with the integral bottom wall D_3 enclose an annular channel-like groove of substantially uniform width formed in the inner frame D, which groove designated as D_6, is preferably but not necessarily disposed around the entire contour of the pane B. The exterior faces of the spaced side walls D_2 and D_4 register with and are intended to initially enter freely into the undercut slot A_6 of the outer frame member A. The concentric side walls D_2 and D_4 together with the bottom wall D_3 constitute the male part of the inner frame member D.

It will be observed that said male member is kept spaced from the bead-like element D_9 by means of the connecting intermediate flange D_{10}, which flange preferably aligns with the plane of the circumscribing flange D_5. Said flange D_{10} is adapted to bear against the inner overhung lug A_5 and it thus serves as a stop face against the outer frame member A when the assembled two-part frame is interlocked by means of my indented crimp cleats in the manner presently to be described.

Prior to assembling, the respective two-part frame members when applied to a curtain light, assume the relations indicated in Fig. 3ª. The pane B is centered in the inner frame member D while the fabric C lies between the inner and outer frame flanges as indicated. The members A and D are then sprung tightly together causing the fabric C to take a circuitous path about the nested male and female frame parts as is best shown in Fig. 3.

While in this strained or sprung relation, the described male and female flange parts are locked together in a novel manner. For this purpose, a crimping tool such as is shown in its various views by Figs. 4ª, 4ᵇ and 4ᵉ may be used. The tool proper has a tapered shank E_1 which snugly fits into a handle socket part E_5. The shank E_1 is further provided with a reduced neck portion E_2 and the free end of which is equipt with a head element having oppositely disposed beveled toes E_3 and E_4, respectively. As shown in Fig. 4ᵇ, the overall length "l" of the oblong head is somewhat greater than its width dimensions "b." The height "h," on the other hand, is made somewhat shorter than the distance between the assembled bottom wall D_3 of the male part and the overhung lugs A_4 or A_5 which define the slot in the female part.

The width "b" of the tool head is intended to fit within the groove dimension D_6. Hence when this tool is firmly pressed against the bottom wall D_3 of the exposed groove, the partial turning of the shank will wedge the beveled toes E_3 and E_4 against the respective side walls D_2 and D_4 and thus cause the sheet metal therein to be indented and simultaneously shape up the opposite crimp or indented cleat means D_7 and D_8 in the manner indicated in Fig. 3. Said projections expanded in the side walls D_2 and D_4 serve to interlock the outer frame A with the inner frame B after the parts have been properly assembled in place. When the head length "l" of my crimp tool is made a little longer than the groove width D_6, the described partial turning of the tool handle will serve to expand said indented cleats without necessarily cutting through the side walls D_2 and D_4. On the other hand, if it is preferred to work with a relatively long head length "l," this may then be made to cut through said walls and form up triangular ear-like projecting spurs, which become interlocked with the respective overhung lugs A_4 and A_5 of the female part. The term indented cleat is used herein in its generic sense and is intended to cover either or both of these alternative methods of forming the cleat as well as all other types of cleat that may be formed up by any kind of crimping tool adapted to be inserted into the exposed groove D_6.

It will further be observed that the expanded cleats D_7 and D_8 project outwardly from their respective side walls in such fashion that their overall width is now greater than the slot width A_6 and that they are thereby made to engage the respective overhung lugs A_4 and A_5 and become positively interlocked therewith. It will be apparent that the male part need not interlock with both of the lugs A_4 and A_5 since the two-part frames may readily be fastened together by engagement with but one or the other of such lugs.

While my expanded cleat method of interlocking any two nested sheet metal members has been specifically described in connection with an endless curtain light frame, it is pointed out that this novel type of fastening is also applicable to many other purposes in the art to which it relates. As an instance of such wider application, Fig. 5 shows the indented crimp cleat used in connection with a molding or endless two-part frame member for a name plate, license plate or the like center media. The frame elements are substantially identical with those previously

described in connection with Fig. 3, except that the curtain fabric and the pane is now omitted. In its stead, a name plate, tray plate or other center medium designated as B′ may be substituted; and if so desired, this may be provided with suitable script or lettering as shown and fabricated out of a material entirely different from that used for the molding.

Referring now more specifically to some further constructive details of my two-part curtain light frame and the novel method for forming these members, it will be observed that the internal flange A_1 of the outer frame member A is formed of double metal thickness by bending the sheet metal back upon itself to constitute the endless inner overhung lug A_5, and that the foot flange A_3 is formed in a like manner to constitute the endless outer overhung lug A_4. The forming operations required to produce the outer frame member of this kind are disclosed in the partial cross-sectional views shown in Figs. 7 to 11 inclusive. The first step consists of a drawing operation forming the endless cross-sectionally bowed or dished-like offset A_2 in a blank of sheet metal (see Fig. 7). As is indicated by Fig. 8, the center of this dished blank is then pierced and the outer edges thereof trimmed to a suitable width and initially given the annular contour as outlined by dotted and dashed lines in Fig. 1, thus leaving a marginal brim portion around both longitudinal edges of said endless offset. The next step consists in bending up the respective inner and outer brim portions intermediate their respective width dimensions in the manner shown in Fig. 9. These brim portions are then further crimped and inturned so as to assume the angular relation indicated by Fig. 10. As a final operation, the said brims are still further inturned and pressed down so as to align and bear snugly against the respective adjacent faces of the outwardly disposed wall of the foot flange A_3 and that of the inwardly disposed inner flange A_1 in the manner shown in Fig. 11. The successive steps indicated by Figs. 9 to 11 inclusive, together really constitute but a single crimping operation and hereafter will so be designated. It will be seen that the inturned trimmed edges of said brim portions are made to overlap the two longitudinal edges of said dished offset to form an undercut slot therebetween in the manner previously described in connection with Figs. 1 to 6.

In order to facilitate said bending operation around the corners of the outer frame member A, it is preferred to cut back the corners of the pierced center of the blank by shaping same in the manner indicated in Fig. 1 by dotted and dashed lines. This in turn increases the width of the endless slot A_6 at such points where said gap turns the corners and this feature is further shown in Fig. 2^a as taken along 2^a—2^a of Fig. 3^a where the augmented corner slots are designated as A'_6.

Referring now to the method of forming up of the inner frame D, this is disclosed in the various views Figs. 12 to 14 inclusive. The first operation consists in drawing up the substantially rectangular male offset out of a blank of ductile sheet metal as shown by Fig. 12. This blank is next pierced and trimmed to a suitable width as indicated by Fig. 13, and is given an endless shape that generally follows the contour of the complementary outer frame A. As a final operation, the endless raised bead-like element D_9 is drawn into this inner frame, leaving an inwardly disposed internal flange portion D_1, which is adapted to bear against either the pane B or the center medium B′. It will be obvious that the designated order of described operations may be modified without effecting any material change in the resulting product. As was previously pointed out, the element D_9 is intended to be suitably spaced from the male part D_2—D_3—D_4 to form the short intermediate flange D_{10} which lies in substantial alignment with the circumscribing flange D_5 as shown in Fig. 14.

A further important object of the present invention is to provide suitable means whereby the described two-part curtain light frame and the like members may be assembled and interlocked with the rapidity and at the minimum of expense such as is required to fully meet present productive needs. To this end, I provide for a hand operated multiple spindle machine such as is illustrated in Figs. 15 to 18 inclusive, which simultaneously operates a series of spaced crimping tools and allows of quickly and economically forming the described crimp cleats for interlocking any two-part frame members.

Referring now to Fig. 15, the conventional press frame F_1 is provided with a suitable sliding ram F_2 having a link F_3 that engages the lever F_4 which is fulcrumed at any convenient point such as F_5. The part F_6 represents a counterweight adapted to balance the reciprocating ram F_2. Mounted within the gap of the frame and attached to the lower end of the sliding ram, is a tool block designated as a whole by G. The bottom of the frame gap is further provided with a die fixture or platin F_7 adapted to receive the dished outer member A of an assembled frame such as shown and described in connection with Fig. 3. When the assembled frame members are placed in this position, the annular groove D_6 of the backing frame D will be exposed to view and made to face the multiple tools carried by the block G. As shown in detail by Figs. 16 and 17, the tool

block comprises a series of parallelly mounted tool spindle sockets such as G_1, G_2 etc., the axes of which align with and are distributed about the contour of said groove D_6. Each such spindle is equipt with a rotatably mounted gear, that mesh with suitably disposed rack sections such as G_8, G_9 etc., which sections are mounted upon the common slide block G_{11}. A second hand operated lever G_{12} having a bell crank part G_{13}, is equipt to engage the pin G_{14} which is adapted to move the slide block G_{11} within the respective limits indicated by full and dotted lines in Fig. 16.

As shown in Fig. 18, each of said sockets such as G_1 is provided with a tapped shank crimped tool similar to that designated as G_{15} and this tool is substantially identical to that previously described in connection with Figs. 4^a and 4^c inclusive. When the lever G_{12} is placed in its full lined position, all of the toe elements of the respective crimping tools are intended to align lengthwise with the contour of the exposed slot D_6 so as to allow said toes to drop freely into the endless slot D_6 when the upper lever F_4 is pulled down into its lower or dotted position. This operation will also serve to initially press the two-part frame members snugly together, whereupon the lower lever G_{12} is pulled sidewise into its dotted position, causing all the crimping tools to rotate about their respective socket axes and thus simultaneously produce a plurality of the described expanded crimp cleats. When the lower lever is brought back into its full-lined position and the upper lever is again raised, the completely interlocked frame members may thereupon be removed from the platin F_7.

While the preferred embodiment of my crimp cleat means has been set forth in detail, it is to be understood that this novel device is subject to a rather wide latitude in its application; as an instance, it will be apparent that instead of utilizing a single endless female and nestled male parts of my illustrated frame, substantially the same results may be obtained by means of a series of shorter registering parts male and female suitably disposed about the contour of the outer frame, and this modification of interlocked fastening means although not specifically illustrated, is nevertheless intended to come within the scope of my invention. Furthermore, the pitch allowed between the crimp cleats is to a large extent optional, and for certain purposes it may be expedient to so closely space these cleats as to virtually constitute one continuous cleat throughout the length of the interlocked joint. It will also be apparent that the male part of my frame need not necessarily be formed in the described rectangular fashion, and that various other changes in the details of my disclosures may be resorted to without departing from the spirit and scope of my invention, heretofore described, and more particularly set forth in the appended claims.

Claims.

1. The method of uniting a set of co-acting endless frame members adapted to encompass an opening therethrough, of which frame one member is provided with a female part while the other member is provided with a registering male part adapted for crimping or indenting into the female part when the parts are assembled, said method consists in crimping or indenting the male part into the female part subsequent to the assembly thereof.

2. The method of interlocking a set of co-acting hoop-like frame members having a central opening therethrough, of which frame one member is provided with a female part while the other member is provided with an expansible projecting male part adapted to register with said female part when the frame members are assembled, said method consists in crimping or indenting the male part into interlocking engagement with the female part subsequent to the assembly thereof.

3. The method of uniting a set of co-acting frame members serving to bind a medium therebetween, of which frame one member is provided with a female part disposed outside the perimeter of said medium while the other member is provided with an expansible male part initially shaped to nestle within said female part when the said two parts are assembled, said method consists in crimping or indenting said male part into interlocking engagement with the female part subsequent to the assembly thereof.

4. The method of uniting a set of co-acting frame members serving to bind a medium therebetween, of which frame one member is provided with a plurality of female parts disposed outside the perimeter of said medium while the other member is provided with registering expansible male parts initially shaped to nestle within their respective female parts when assembled, said method consists in crimping or indenting the male parts into their respective female parts subsequent to the assembly thereof for the purpose of interlocking said frame members about said medium.

5. The method of uniting a set of co-acting endless frame members serving to encompass a center medium and bind same therebetween, of which frame one member is provided with a female part while the other members is provided with an expansible male part adapted to initially nestle within the female part when the parts are assembled, said method consists in crimping or indenting said male part into the fe-

male part subsequent to the assembly thereof.

6. The method of uniting a set of co-acting frame members serving to bind a fabric therebetween, of which frame one member is provided with a female part and the other member is provided with a registering expansible male part, said method consists in crimping or indenting the male part into interlocking engagement with the female part for the purpose of binding the interposed fabric to said frame.

7. The method of uniting a set of co-acting frame members disposed on opposite sides of a medium and serving to bind an interposed fabric thereto, of which frame one member is provided with a female part while the other member is provided with an expansible male part initially shaped to enter said female part when the members are assembled, said method consists in crimping or indenting the male part into interlocking engagement with the female part subsequent to the assembly thereof.

8. The method of uniting a set of co-acting frame members serving to bind a medium therebetween, of which frame one member is provided with a slotted female part circumscribing the marginal contour of said medium while the other member is provided with an expansible grooved channel-like male part initially shaped to unobstructedly enter said female part, said method consists in crimping or indenting the male part into interlocking engagement with the female part subsequent to the entrance of said co-acting parts.

9. The method of uniting a set of co-acting endless frame members serving to bind a medium therebetween, of which frame one member is provided with an undercut slotted female part disposed outside of the perimeter of said medium while the other member is provided with cross-sectionally channel shaped male part having an expansible side wall extending across the parting surface between said members and adapted to register with an edge portion of said female part, said method consists in crimping or indenting the side wall of said male part into interlocking relation with the adjacent portion of the female part subsequent to the entrance of said male part into said registering female part.

10. The method of uniting a set of endless co-acting frame members serving to bind a medium therebetween, of which frame one member is provided with a female part while the other member is provided with a hollow expansible male part registering with and entered into said female part, said method consists in introducing forming tool means into said male part and by the operation thereof, indenting or crimping the male part into interlocking engagement with the female part subsequent to the assembly thereof.

11. The method of uniting a set of co-acting frame members serving to bind a medium therebetween, of which frame one member is provided with a female part disposed around the margin of said medium while the other member is provided with an expansible cross-sectionally grooved projecting male part entered into said female part, said method consists in introducing multiple oscillatory crimping tool means into the mouth of said grooved male part and by the operation thereof, indenting or crimping said assembled male part into interlocking engagement with the female part at a plurality of spaced points along said grooved male part.

12. The method of uniting a set of co-acting endless frame members having an opening therethrough, of which frame one member is provided with a slotted female part encompassing said opening while the other member is provided with an expansible grooved male part registering with and entered into said female part, said method consists in introducing a plurality of crimping or indenting tool means into the mouth of said assembled male member and by the operation thereof, simultaneously indenting or crimping said male part into interlocking engagement with the female part at a plurality of spaced points along said grooved male part.

13. The method of forming complementary endless sheet-metal moulding or frame-like members respectively comprising a female part and a nested male part therefor, which method as applied to said male part consists in the following steps, viz: firstly, drawing the sheet metal to form an endless groove therein having a set of substantially parallel side walls normally disposed to the face of said blank; secondly, trimming the blank to form a circumscribing flange for said groove and piercing the blank to partially remove the center from said endless male member; thirdly, drawing an endless interior bead-like element spaced from said groove to constitute an intermediate flange therebetween; and lastly, assembling the male part within said female part and indenting crimp cleats in one or both of said side walls whereby to interlock the male part into the female part subsequent to the assembly thereof.

14. The method of forming complementary endless sheet-metal moulding or frame-like members respectively comprising a female part and a nested male part therefor, which method as applied to the female part consists of the following steps, viz: firstly, drawing an endless cross-sectionally dished-like offset in the sheet metal blank; secondly, trimming the blank by piercing the

center of the endless female part while leaving a marginal brim around both longitudinal edges of said offset; thirdly, a crimping step serving to bend over and inturn said brim portions intermediate to their respective width dimensions whereby to overlap the two longitudinal edges of said offset and form an undercut slot between the respective trimmed edges of said inturned brims, and lastly, assembling the male part into the female part and indenting crimp cleats therebetween subsequent to the assembly thereof.

15. The method of forming complementary endless sheet-metal moulding or frame-like members respectively comprising a female part and a channel grooved male part therefor adapted to be nested within said female part, which method as applied to the female part consists of the following steps, viz: firstly, drawing an endless cross-sectionally dished-like offset in the blank; secondly, trimming the blank by piercing the center while leaving a marginal brim portion around both longitudinal edges of said offset; and thirdly, a crimping step serving to bend over and inturn both the innermost and the outermost brim portions whereby to overlap the longitudinal edges of said offset and form an undercut slot between the trimmed edges of said inturned brim; and as applied to the male part, said method consists of the following steps, viz: firstly, drawing an endless groove in a second sheet-metal blank adapted to enter said undercut slot of the female member; secondly, trimming said blank by piercing the center while leaving a marginal brim portion around both the longitudinal edges of said groove; and finally, indenting an interlocking crimp cleat between the assembled male and female parts subsequent to the assembly thereof.

16. The method of uniting a set of coacting members of which one member is provided with a slotted female part while the other member is provided with a hollow expansible male part having complementary side walls adapted to register with the respective longitudinal edges defining said slot, said method consists in introducing into the interior of said male part, a pivotally mounted forming tool comprising a shank equipt with oppositely disposed toe elements, and by the rotary movement thereof, simultaneously indenting or expanding both of the side walls subsequent to the assembly of said male and female parts.

17. The method of uniting a set of coacting members of which one member is provided with a slotted female part while the other is provided with a hollow expansible male part having complementary side walls adapted to register with the respective longitudinal edges defining said slot, said method consists in introducing into the interior of said male part, a plurality of interconnected pivotally mounted forming tools, each comprising a shank equipt with oppositely disposed toe elements, and by the oscillatory operation thereof simultaneously forming spaced crimp cleats between the said male and female parts subsequent to the assembly thereof.

In testimony whereof, I have herewith set my hand this 4th day of August, 1924.

WILLIAM K. BISHOP.

Witnesses:
JAMES F. GRAY,
D. N. ABBOTT.