

June 8, 1926.

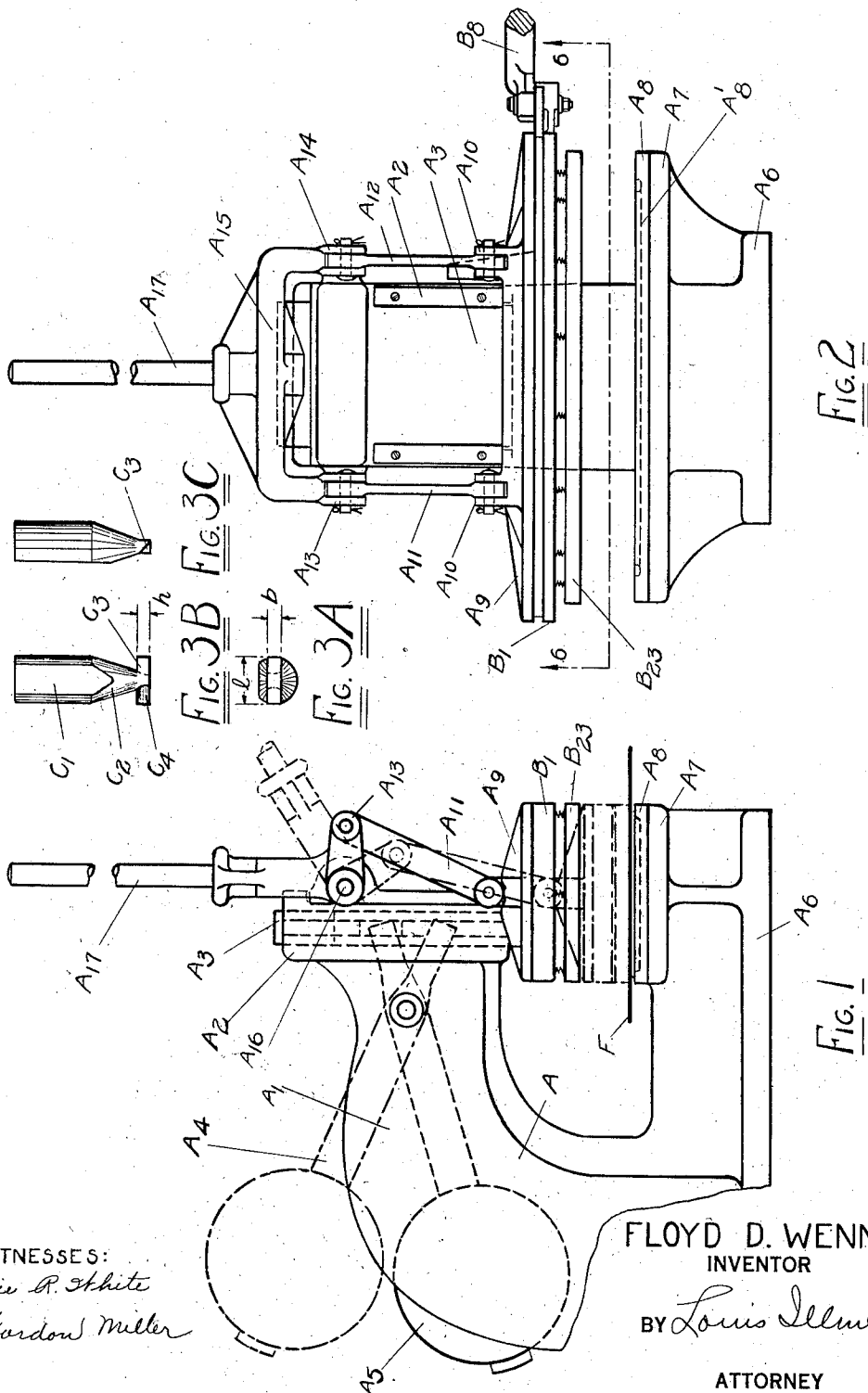
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1,587,690

METHOD AND MACHINE FOR ASSEMBLING AND UNITING FRAME MEMBERS

Filed March 18, 1925

4 Sheets-Sheet 1



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METHOD AND MACHINE FOR ASSEMBLING AND UNITING FRAME MEMBERS

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4 Sheets-Sheet 3

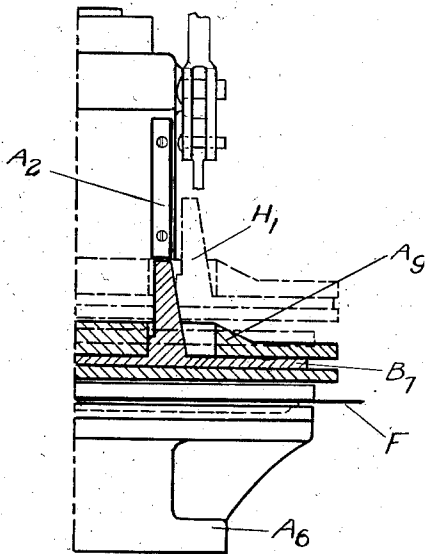


FIG. 9

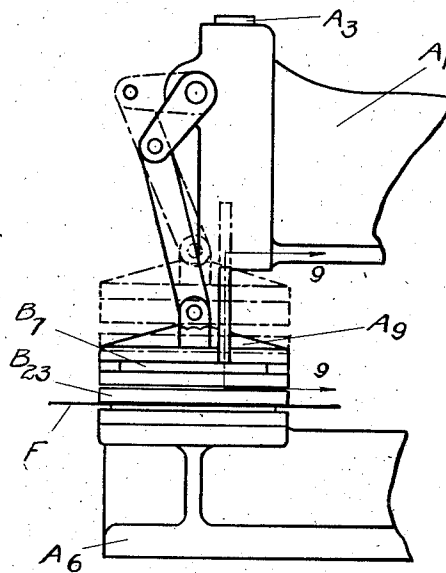


FIG. 8

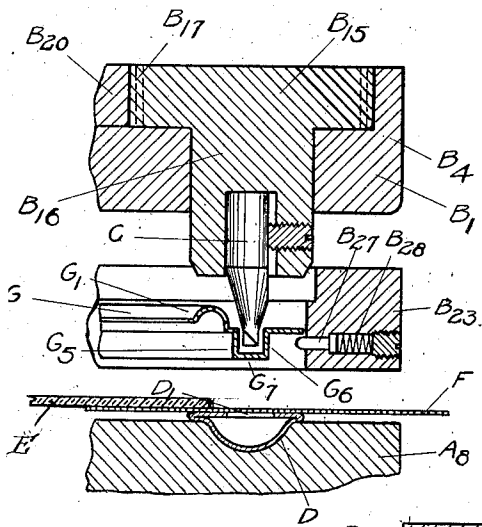


FIG. 10

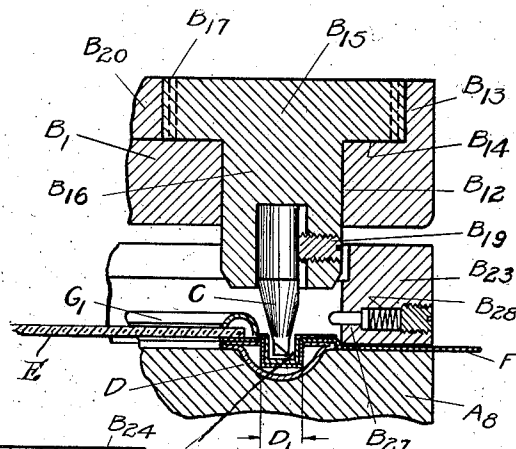
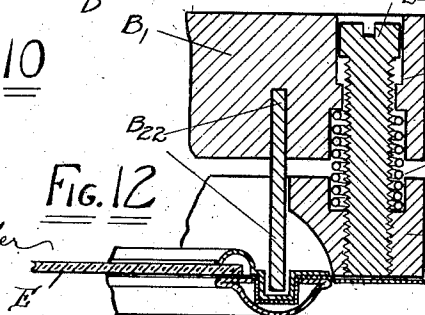


FIG. 11

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FIG. 12



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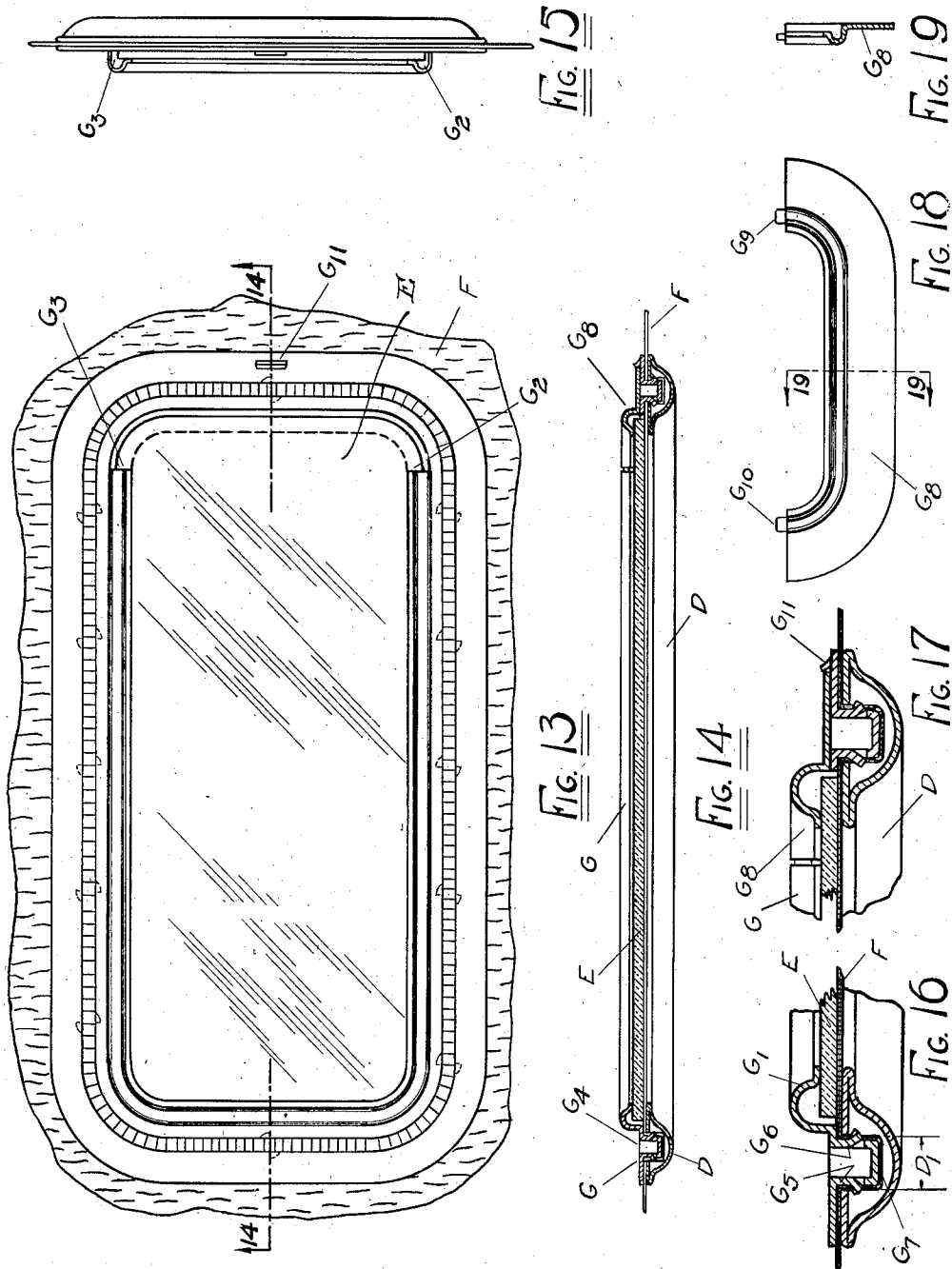
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METHOD AND MACHINE FOR ASSEMBLING AND UNITING FRAME MEMBERS

Filed March 18, 1925

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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METHOD AND MACHINE FOR ASSEMBLING AND UNITING FRAME MEMBERS.

Application filed March 18, 1925. Serial No. 16,532.

My invention generically relates to novel machine and method for assembling and uniting complementary frame members serving as a moulding for a center medium, said process being performed in connection with a suitable press equipt with operable frame uniting means and with a reciprocating ram provided with gripping means adapted to convey one of the frame members toward the other for the assembly purposes; with these outstanding features as a basis, a series of relevant steps are set forth which finally bring about an improved method for uniting said frames around the edge of the center medium. When employed for installing curtain windows, my machine not only mounts complementary grommet-like frame members upon the opposite faces of the curtain or other carrying material, but is further capable of uniting said frames and binding the inner border of the curtain about the marginal edge of the center medium to make a weather proof joint therewith.

In the specific embodiment herein disclosed, my machine is shown as equipt with a plurality of separate interconnected crimping tools which are adapted to be introduced as a unit into a suitably shaped hollow grooved expansible male sheet metal frame member subsequent to its assembly into a nestled co-acting female frame member, and by the operation of said tools, simultaneously indenting or crimping said male member into interlocking engagement with the female member at a plurality of spaced points disposed longitudinally of said members. The use of my improved machine serves to eliminate the need for individually indenting crimp cleats between said male and female frame members or for otherwise separately drawing up a number of spaced screws, staples, prongs or other fastening devices when used for uniting complementary frame members.

Said machine is particularly adapted to interlock two-part window sash frame members, such as are commonly employed to bind a sight pane into an automobile curtain, side panels or the like which may be fashioned from leather, fabrics, fibre board or similar carrying material. As applied to vehicle curtain lights and especially back curtain sights, a set of complementary frame members are preferably disposed on

opposite sides of the pane or other center medium while the inner border of the curtain opening is interposed therebetween for binding purposes, and when these superimposed frame members are suitably united by means of my assembly machine, they form a neat and effective tie or weather-proof binder between the pane and its surrounding curtain fabric or other external carrying material.

The primary object of this invention is to provide for a simple and effective machine and method capable of facilitating the rapid and economical installation of curtain window assemblies to thus fully meet present day production needs in the automotive industry. To accomplish this end, I preferably use a conventional press but equip its traveling ram with frame uniting means which in the present instance comprise a plurality of crimping tools each rotatably mounted on interconnected spindles, and by imparting an oscillatory movement to said tools, I simultaneously indent a series of spaced crimp cleats between the assembled male and female frame members and thereby minimize the time and cost of mounting curtain light frames when assembled on a productive scale. It is pointed out that the present invention is directed toward suitable mechanism designed to attain this end and does not lay claim to the indicated interlocking process per se.

Embodied herein are also other features of structure and method steps which insure the desired rapid and proper binding of the frame and its pane into the curtain, all of which will be set forth in detail hereinafter.

Reference is had to the accompanying four sheets of drawings which illustrate a specific embodiment of my invention; like characters of reference indicate like parts throughout the several views, and in which drawings:

Fig. 1 represents an elevational side view of my multi-spindled cleating press provided with a ram equipt with my improved devices and adapted to simultaneously form a series of spaced crimp cleats in one operation for the purpose of uniting a set of complementary frame members.

Fig. 2 is an elevational front view of Fig. 1.

Figs. 3^a, 3^b and 3^c, respectively show a

bottom, side and end view of a crimping tool for forcibly expanding and uniting the nested frame members and bind a curtain fabric therebetween.

Fig. 4 shows an elevational view of the assembled tool carrier which attaches to the bottom of the traveling ram of my machine and this is taken in partial section along the line 4—4 of Fig. 5.

Fig. 5 represents a top view of said assembled tool carrier except that the retaining plate of the tool carrier is removed to better illustrate the manner in which the plural crimping tools may be interconnected by rack and gear means.

Fig. 6 shows a bottom view of Fig. 3 as seen from line 6—6 of Fig. 2; while Fig. 7 is an elevational cross-sectional view of the assembled tool carrier as taken along the line 7—7 of Fig. 4.

Fig. 8 is a fragmental elevation side view illustrating a constructive detail of a locking device used in connection with the press shown in Fig. 1.

Fig. 9 represents an elevational front view in partial section as taken along line 9—9 of Fig. 8.

Fig. 10 shows an enlarged vertical detail of the assembled tool carrier in its uppermost or raised ram position taken in partial section along line 10—10 of Fig. 6, while the inserted male frame member is shown suspended thereon preparatory to cleating same into the female member, which latter member is shown as seated upon the lower die block ready to receive said male member the curtain fabric and the pane being initially interposed therebetween.

Fig. 11 is a view similar to Fig. 10 except that the ram and its carrier parts have been lowered to bring the male frame member down upon the pane and said curtain fabric into its nestled position relative to the female frame which applies just prior to performing the cleating operation.

Fig. 12 details the screw means serving to resiliently hold the pressure pad to the tool carrier parts, as taken along the line 12—12 of Fig. 6.

Fig. 13 represents an elevational rear view of the removed assembled male and female sheet metal frame members together with a pane therebetween interlocked with the curtain fabric; the detachable keeper piece for the frame has not yet been placed in position and this figure shows the finished curtain light product as it appears subsequent to uniting the frames by means of the machine shown in Fig. 1.

Fig. 14 shows a sectional view of the complementary frame parts assembled about a curtain fabric as taken along line 14—14 of Fig. 13, except that the keeper piece has now been snapped in place behind the gap edge of the pane.

Fig. 15 is an end view of Fig. 13 as seen from the open or keeper end of the assembled frame.

Fig. 16 represents an enlarged sectional view similar to the left hand detail shown in Fig. 14, while Fig. 17 shows a similar enlargement of the right hand sectional detail of Fig. 14.

Fig. 18 is a plan view of the frame keeper piece while Fig. 19 shows a cross-section of same as taken along line 19—19 of Fig. 18.

Referring first to Fig. 1, this represents a suitable hand-operated upright press of the conventional C frame type which in its entirety is designated by the letter A. The frame proper A₁ may be provided with a relatively short vertical guide way A₂ in which is slidably mounted a traveling head or ram A₃ adapted to overrun the lower transverse face of said guide. The ram may further be equipt with a suitably disposed balance lever A₄ carrying the counterweight A₅. The lower leg of said frame has a foot flange A₆ and this may be fashioned into the relatively long platin A₇ disposed transversely to the vertical plane of the frame proper. Said platin is suitably spaced with respect to said lower transverse face of the guide A₂ to constitute a frame gap therebetween. Superimposed upon the top face of said platin is a cover plate or die block A₈ equipt with shallow endless groove or recess A₈' adapted to receive and seat the female member of the two part sheet metal curtain light frame. It is pointed out that said die block A₈ serves essentially in the capacity of an abutment adapted to oppose the thrust which the ram action is intended to exert upon the complementary frame assembly, and as used in the claims, the term "block abutment means" is not intended to be specifically directed toward the structural features shown in the drawings but broadly comprises any similar or equivalent element that might serve the indicated purposes.

Attached to the lower or bottom face of the ram A₃ is a transversely disposed retaining plate A₉ which is adapted to travel with said ram. This retaining plate may be equipt with complementary clevises such as A₁₀, each provided with pins adapted to engage the respective links A₁₁ and A₁₂. The upper free end of said links pivotally engage the spaced lever arms A₁₃ and A₁₄ respectively, and these arms are tied together by the lever yoke A₁₅ and turn about the fulcrum shaft A₁₆. Said yoke is provided with a manipulating handle A₁₇, and it will be apparent that when said handle is moved from its vertical or normal position (shown in full lines) into its oblique position (shown by dotted lines in Fig. 1) that this will correspondingly shift the sliding ram A₃ and its retaining plate A₉ from their outmost position with respect to the block into the

lower or inmost position which is also shown by dotted lines in Fig. 1.

The bottom face of the retaining plate A_1 is equipt with an attached tool carrier. As is best shown in Figs. 4 to 7, said carrier comprises a spindle holder B_1 which may be provided with a relatively thin center plate B_2 and integral offset side flanges B_3 and B_4 therefor, disposed to form an open ended channel-like slide slot B_5 which runs lengthwise of said spindle holder. Said flanges may be attached to the retaining plate A_1 by means of screws such as B_6 as shown in Fig. 7. Freely mounted within said slot B_5 is a rack slide or reciprocating element B_7 and this may be actuated by means of the shifter lever B_8 . As indicated, this lever may be of the bell crank type fulcrumed on an extended portion of one of the side flanges and adapted to be raised and lowered therewith.

One leg of said lever is equipt with a shifting handle B_9 while its other leg is provided with a projecting pin B_{10} adapted to engage a suitable slot B_{11} by means of which the slide or element B_7 may be shifted laterally between its full and its dotted positions indicated in Fig. 5.

As is best illustrated by Figs. 6, 10 and 11, the spindle holder B_1 is further equipt with a series of spaced holes such as B_{12} , B_{12}' etc. disposed adjacent to the margin of said plate and preferably drilled through their respective side flanges B_3 and B_4 . The uppermost portion of said holes may be counterbored as at B_{13} , B_{13}' etc. to provide for the respective shoulders B_{14} , B_{14}' etc. Mounted within each such plate hole is a forming or crimping tool spindle B_{15} equipt with a shank B_{16} having an enlarged actuating gear segment B_{17} , which latter member may be fitted into any one of said counterbores and supported by its shoulder such as B_{14} . The shank B_{16} may be recessed into a socket for receiving the crimping tool C and this may be locked in place by the set screw B_{18} .

The preferred type of crimping tool is shown in detail by Figs. 3^a, 3^b and 3^c. The tool proper has a flattened shank portion C_1 adapted to fit into the respective recessed spindle shank B_{16} . This tool is further provided with a reduced neck portion C_2 while its free end is equipt with a head element comprising oppositely disposed beveled toes C_3 and C_4 respectively. As shown in Fig. 3^a, the overall length "l" of the oblong head is made greater than its width dimension "b," while the height "h" is made relatively short for reasons that will appear hereinafter.

As will be understood, the spindles B_{15} together with their inserted tools are intended to oscillate freely within their respective mountings. In order to simultane-

ously operate all the spindles, the slide or reciprocating element B_7 is preferably equipt with a series of inset rack segments such as B_{20} , which are adjustably secured to the edges of said slide so as to properly engage the respective spindle gear segments such as B_{17} , and simultaneously impart a rotary movement to the aligned tool heads whenever the lever B_8 is shifted within the prescribed limits of travel. If desired, any number of additional tool-spindles may be similarly mounted and as will be apparent from Fig. 5, certain of these spindles may be located adjacent to the transverse ends of the spindle holding means B_1 by suitably slotting the rack slide at B_{21} as indicated. The spindle disposition is preferably such that the elongated head of the respective crimping tools C will align in such fashion that they may readily enter the mouth of an endless expansible groove part formed in the male member of the curtain light frame.

It will be further observed that the relatively long spindle shank B_{16} projects considerably below the bottom face of either side flange B_3 and B_4 . Intermediate certain of the respective spindles and extending a little below the extremities of said crimping tools, a series of inserted upright bridge strips B_{22} depend from the spindle holder B_1 . The spaced strips are intended to freely enter and align with the mouth of said expansible groove part of the male frame member and tightly thrust said groove into close engagement with its co-acting female frame member prior to interlocking the frame members together. The bridge strips B_{22} being slightly longer than the extremities of the tools C , serve to protect said tools against any direct thrust which the manipulating handle might otherwise exert thereon.

Referring further to the spindle holder B_1 , this is equipt with a flat pressure pad B_{23} , the opening through which is preferably but not necessarily disposed to encircle the downward projecting portions of the various spindle shanks B_{16} , and this opening is made sufficiently large to encompass the perimeter of the complementary nested frames and abut the block A_1 so as to snugly hold down the interposed fabric surrounding said perimeter and prevent wrinkling thereof, as shown. The bottom face of the pressure pad is mounted to fall somewhat below the plane of the distributed crimping tool extremities while the upper face of said pad B_{23} is purposely kept spaced from the lower face of said spindle holder. The pressure pad is designed to be resiliently hung with respect to holder B_1 by means of a series of adjustable screws such as B_{24} shown in Fig. 12, which screws are threaded in registering holes suitably disposed in

the pad B₂₃. The enlarged head of said screws may be supported upon a counter-sunk shoulder B₂₅ formed in the spindle holder as shown, while the lower portion of the screw holes may be recessed to receive the spiral springs such as B₂₆ which thrust against the pressure pad and serve to yieldingly hold same in an adjusted spaced relation with respect to the holder B₁.

As a further refinement in design, attention is directed to the shouldered tit snap means B₂₇ of which several may be mounted in the side or end walls of the pressure pad. These tits slightly project into the hollow space formed in said pad B₂₃ and may be snapped back out their normal position by compressing the thrust springs B₂₆. As is best shown in Fig. 10, the purpose of these tits is to hold up the male frame member in its suspended position prior to performing the indicated cleating operation, said tits serving in the capacity of gripping means for manipulating one of said frame members and releasably conveying same with the ram movements. As shown in Fig. 11, this suspended frame is automatically disengaged from said tits as soon as the pressure pad is allowed to abut the block A₃ since the pad is thereby forced to move closer to the holder B₁.

Taking up now the purpose of my machine as more specifically applied to the cleating of curtain light products, this will be made clear by further reference to the structural details pertaining to the sheet metal frame members that are to be united about the edge of a pane or other suitable center medium. As disclosed by Figs. 13 to 19, the letter D represents in its entirety an endless outer frame member, while E is the transparent sight pane mounted therein. The frame D may be provided with a cross-sectionally dished shaped offset having complementary inturned marginal flanges forming an annular undercut receiving slot D₁ therebetween which is preferably disposed around the contour of said pane to constitute the female part of said frame.

In the present window assembly the curtain fabric F is intended to lie along the parting face of outer frame D as defined by said inturned flanges. The pane E is centrally disposed and spans the innermost of the inturned flanges and is preferably cushioned by the interposed fabric F in the manner indicated in Fig. 10. The opposite marginal face of the pane E may be gripped by a specially shaped inner or backing frame and this male member of the two-part frame is designated as a whole by the letter G.

This inner sheet metal frame comprises a head-like pane engaging flange G₁ which need not however be made endless as are the remaining parts of this member; said

flange is preferably but not necessarily cut away along one of the frame sides and terminates in the respective socket parts G₂ and G₃, thus forming a gap therebetween. The inner frame G is further provided with a relatively narrow grooved male part G₄ comprising side walls G₅ and G₆ which are disposed substantially normal to the face of the pane and tied together by the integral transverse wall G₇ serving to close the bottom of said groove. The proper overall face dimension of this bottom wall is determined by width of the female part or receiving slot D₁ of the outer frame, the intent being that said trough shaped grooved male part shall register with and be adapted to enter any desired shape that may be given to the slotted female part.

When completely assembled upon the curtain fabric, the two co-acting frame members applied to a curtain window installation are finally brought into the relation indicated in Fig. 14. Prior to interlocking said members D and G, they are firmly sprung together thus interlacing and making the curtain fabric take a circuitous path about the nested male and female part in the manner illustrated by Fig. 16.

While in this strained or sprung relation, the male and female frame members may be interlocked by means of the described crimping tool. The width "b" of the tool toes is made somewhat smaller than the spacing between the side walls G₅ and G₆ of the grooved male member while the length "l" of said tool is made somewhat larger, to the end that when a partial turn is given to the shank C₁ of the inserted tool subsequent to the assembling of the members D and G, this will cause said toes to simultaneously indent or forcibly expand the side walls; if preferred, the use of a greater toe pitch "l" will serve to cut through said side walls and thus form up projecting ear-like spurs which interlock with the undercut edges of the described female frame member D. Either alternative indentation of said male part of the frame G may be resorted to and it will be seen that its overall width is now greater than that of the female slot D₁ so as to positively interlock said frame together. It will be apparent that this cleating operation also securely binds the interposed curtain fabric to the assembled frame and the use of a plurality of spaced cleats for uniting the frame members insures against pulling the curtain border out of its binding.

Subsequent to interlocking the assembled frame members about the pane as described, the pane may thereupon still be conveniently slid out from between the spaced innermost flanges of the frame members through said gap in the pane engaging flange G₁. As detailed in Figs. 18 and 19, a keeper piece G₈ may be employed to span said gap and hold

the pane in place and this piece may be equipped with short projecting tongues G_9 and G_{10} , adapted to telescope into the respective sockets G_2 and G_3 . After being so entered, the flange portion of the keeper may be snapped behind the lock clip G_{11} as indicated.

Having described the principal structural features of my machine and also the characteristics of the product upon which it is intended to operate, the function of my machine as applied to installing a curtain window assembly may be traced as follows:

Assuming the manipulating handle A_{17} to stand in its full-lined or raised outmost position shown in Fig. 1, and that the tool carrier is equipped with the described appurtenances, then the press is ready to receive the complementary frames in the fashion indicated in Fig. 10. That is to say, as a first step in my method of installing a curtain window, the outer frame or female member D is seated in the recess of the die block A_8 while the inner frame or male member G is lodged into the pressure pad B_{23} and detachably suspended therein over the various snap tits B_{27} in alinement with the seated frame D as shown.

As a second step, the curtain F together with the pane E is introduced between said separated frame members and these inserted parts are mounted upon the seated complementary frame parts preferably in superimposed relation as shown in Fig. 10.

As a third step the lever A_{17} is pulled down into its lower position as shown in dotted lines by Fig. 1, and this will cause the carrier and its suspended male member G to be lowered into the assembled relation shown by Fig. 11. The fabric thereby becomes interwoven between the nestled male part G_4 and its co-acting undercut female slot D_{11} , and by further pulling down on said lever, any augmented thrust on the ram will cause the bridge strips to snugly press and hold the two frame members in close engagement preparatory to cleating the frames into interlocking relation. It will be apparent that the pad B_{23} will at the same time have been pressed up-closer toward the spindle holder B_1 and that the pressure pad is made to thrust down upon the fabric around the entire perimeter of said nestled frames.

While held in this strained relation, the shifter lever B_8 is drawn laterally into the dotted position shown in Fig. 5, which in turn simultaneously partially rotates the various tool toes and this serves to indent or crimp spaced interlocking cleats between the male and female parts of the co-acting frame D and G and this feature constitutes the fourth step in my method.

The lever B_8 is now again placed into its normal or full-lined position which then permits the unhampered withdrawal of the tool

carrier and its associated parts from the up-turned mouth of the grooved male frame part G_4 . Thereupon the manipulating lever A_{17} may be raised into its normal or vertical position which then completes the cleating operation as performed by my machine and allows the curtain together with its installed frame and pane to be removed as a unit from the abutment block.

In certain cases especially when a sight pane is to be installed into the conventional fabric curtain, it is preferred to introduce such fabric between the complementary frame members in an uncut condition as regards the sight opening, although it may be expedient to cut cross slits in said pane spanning curtain portion for the purpose of augmenting its take up and facilitating the described interlaced binding of the inner fabric border into the frame members, all without drawing inwardly or wrinkling that portion of the fabric lying outside of the frame perimeter. After otherwise completing the frame assembly in the press, the curtain fabric when left to span the pane, may thereupon be trimmed to make the curtain opening conform to the inner contour of the frame and thus remove obstruction to the normal transparency of the pane, and when resorted to, such trimming operation constitutes a final supplementary step in my method of installing curtain lights.

It will be apparent that the removable keeper piece G_8 may now be inserted in place, but this feature does not constitute any essential step in the described installation method since said keeper is primarily provided for pane renewal purposes. In the event that the use of my machine should be confined to mounting and uniting moulding-like complementary frames about the edge of a center medium, it will be understood that the necessary installation steps will be substantially similar to those heretofore set forth except in so far as the omission of the inserted curtain element may modify or simplify the described operations.

Supplemental means are also provided to facilitate the proper operation of the machine, and to this end a lock device may be used such as is shown in Figs. 8 and 9. This lock feature comprises an upwardly projecting stanchion H_1 , the lower end of which is set into or otherwise secured to the rack slide B_7 and adapted to move therewith through a suitable clearance hole cut in the retaining plate A_9 . One edge of the stanchion is disposed to move alongside the upright face of the ram guide housing as shown in Fig. 10 by dotted lines and in such fashion that said stanchion is made to cooperate with an L shaped obstruction.

While the manipulating handle A_{17} is raised or lowered as described, the free end of said stanchion is obliged to ride alongside

said housing face and thus serves as a stop device to prevent inadvertently moving the shifter lever B_2 out of its full-lined position shown in Fig. 5. This stop device maintains the desired initial alignment on part of the various oblong crimping tool heads so as to prevent any oblique turning thereof until the assembled male and female frame members have been firmly pressed together and are ready for the described crimping operation. As soon however as the carrier tool appliances have been properly entered into the frame groove G_1 as indicated in Fig. 11, the free extremity of the stanchion will then have been sufficiently lowered to pass under the bottom transverse edge of said guide housing and thereafter allow the shifter lever B_2 to move the rack slide B_1 into its cross-sectional position indicated in Fig. 9. In the meantime, the heads of the crimping tools C will have been turned crosswise of the grooved side walls G_2 and G_3 so as to indent a crimp cleat between the assembled frame members D and G . While in said oblique position, the respective tool heads may not be raised without tearing out the frame parts and it is the further function of my interlocking device to prevent damage on this account. As long therefore as said stanchion rides under the bottom housing wall, the shifter lever B_2 is operative, but the manipulating handle A_{17} cannot be raised until the shifter lever is brought back into its normal position in which the tool heads align with said frame groove and are properly turned to be unobstructedly removable therefrom.

My machine is likewise applicable to uniting frames each provided with a series of co-acting male and female parts instead of using only one continuous groove as has been specifically disclosed herein. Furthermore, it is not essential that the curtain be fashioned from fabric and like flexible materials since the method and devices herein set forth may readily be used to bind a pane into a curtain made of fibre board or other stiff carrying materials, but in that event it is expedient to initially cut the curtain opening sufficiently large to freely encompass and clear the nestled male and female frame parts and which are then merely clamped between the outermost flanges of the complementary frames. It will also be understood that various changes in the details of my machine may be resorted to such as making same power driven instead of hand operated and the like, and that while the described species of frame uniting means represents what is now considered a preferred embodiment of my machine the result attained might be duplicated by substantially equivalent methods nor is it intended that the present invention is to be limited to uniting complementary frames of the type having

the precise form characteristics or fastening means disclosed herein all without departing from the spirit and scope of my invention, heretofore described and more particularly set forth in the appended claims.

Claims:—

1. In a machine for uniting complementary frame members serving to bind a medium therebetween of which frame one member is provided with a female part or parts while the other is provided with a hollow expansible male part or parts respectively adapted to nestle within the female part or parts, said machine being equipt with a block abutment means and with a tool carrier comprising a plurality of spindles and simultaneous actuating means therefor, means for moving said carrier toward and away from said abutment, and a crimping tool for each of said spindles, said tool being adapted to enter an expansible frame part and by the turning thereof serving to indent or expand said frame members into interlocking relation.
2. In a machine for uniting complementary frame members serving to bind a medium therebetween of which frame one member is provided with a female part or parts while the other is provided with a hollow expansible male part or parts respectively adapted to nestle within the female part or parts, said machine being equipt with a block abutment means and with a reciprocating tool carrier provided with a plurality of spindles, means for moving said carrier toward and away from said abutment and snugly clamp said frame members together, and a crimping tool for each of said spindles adapted to enter the interior of an expansible frame part or parts and by the manipulation thereof serving to forcibly crimp or indent said frame members into interlocking relation.
3. In a machine for uniting complementary frame members serving to bind a medium therebetween of which frame one member is provided with a female part or parts while the other is provided with a hollow expansible male part or parts respectively adapted to nestle within the female part or parts, said machine being equipt with a block abutment means adapted to seat one of the frame members and with a tool carrier provided with a plurality of spindles, means for suspending the complementary frame member from said carrier, means for bringing the suspended frame member into assembled relation with the seated frame member, and a crimping tool for each of said spindles, said tools being adapted to enter said expansible male part and by the actuation thereof serving to crimp or indent said frame members into interlocking relation.
4. In a machine for uniting complementary frame members serving to bind a me-

dium therebetween of which frame one member is provided with a female part or parts while the other is provided with a hollow expansible male part or parts respectively adapted to nestle within the female part or parts, said machine being equipt with a block abutment means, a ram and a retaining plate disposed transversely of one end of the ram, a manipulating lever adapted to move said ram to and fro with respect to said abutment, a tool carrier comprising a spindle holder and a slide adapted to travel with the retaining plate, a plurality of spindles mounted in said holder adapted to be actuated by said slide, a shift lever adapted to move said slide lengthwise with respect to said retaining plate, and a crimping tool for each of said spindles, said tool being adapted to enter an expansible male part and by the operation thereof serving to indent or expand said frame members into interlocking relation.

5. In a machine for uniting complementary frame members serving to bind a medium therebetween of which frame one member is provided with a female part or parts while the other is provided with a hollow expansible male part or parts respectively adapted to nestle within the female part or parts, said machine being equipt with a block abutment means adapted to seat one of the frame members and with a tool carrier comprising a spindle holder means provided with a plurality of actuatable spindles, a crimping tool for each of said spindles, said tool being equipt with a head portion projecting from said spindle and adapted to enter said expansible male part, a bridge strip or strips disposed intermediate certain of said spindles to project beyond the extremities of said tool heads, and means for reciprocating said carrier to and from said abutment, said strips on the inward stroke of the carrier serving to thrust the assembled frame members tightly together prior to actuating said spindle for cleating purposes.

6. In a machine for uniting complementary frame members serving to bind a medium therebetween of which frame one member is provided with a female part or parts while the other is provided with a registering, hollow expansible male part or parts respectively adapted to nestle within the female part or parts, said machine being equipt with a block abutment means adapted to seat one of said members and with a tool carrier comprising a spindle holding means and a reciprocating element, a plurality of spaced spindles mounted in said holder and adapted to be actuated by said element, a crimping tool for each of said spindles, a pressure pad adapted to encompass the perimeter of said seated frame and resiliently hung from said carrier in spaced relation, means for reciprocating the carrier and asso-

ciated parts with respect to said abutment, said pressure pad being forced toward said carrier subsequent to engagement with the abutment and prior to actuating said spindles for cleating purposes.

7. In a machine for uniting complementary frame members serving to bind a medium therebetween, said machine being equipt with an abutment means and a ram provided with operable frame uniting means, a manipulating lever serving to move said ram toward or from said abutment, a shifter lever adapted to actuate said uniting means and effect a fastening together of said frame members when the ram has been moved into its extreme inward position relative to the abutment, and means interlocking the manipulating lever with the shifter lever.

8. In a machine for uniting complementary co-acting frame members serving to bind a medium therebetween, said machine being equipt with an abutment means and a ram provided with operable frame uniting means, a manipulating lever adapted to move said ram and associated parts to and from said block, a stanchion, a shifter lever in operative connection with said stanchion and adapted to actuate said uniting means, and an L-shaped obstruction element adapted to co-operate with the stanchion for interlocking the manipulating lever with the shifter lever, the free end of said stanchion being arranged to move alongside one leg edge of said obstruction element between the limits of the ram travel and to move along the other transversely disposed leg edge subsequent to bringing the ram into one of its extreme positions, whereupon the shifter lever may be unobstructedly actuated.

9. In a machine for uniting a pair of complementary frame members adapted to encompass the marginal edge of a center medium and serving to bind same into a curtain opening, said machine comprising abutment means seating one of said frame members and further comprising a reciprocating ram adapted to move toward said abutment, which ram on its extreme inward stroke imposes a thrust upon the other of said frame members when placed in assembled relation upon said seated frame element, a curtain material and a center medium having been previously interposed therebetween, and means associated with the ram for expanding or indenting one of said clamped frame members into the other frame element and interlock the interposed curtain material about the marginal edge of the center medium.

10. In a machine for uniting a pair of complementary frame members adapted to bind a sight pane into a curtain opening, said machine comprising abutment means

seating one of said frame members and further comprising a reciprocating ram equipt with means for detachably gripping the other of said members and conveying same therewith, means for moving the ram together with said gripped frame member toward its complementary member for the purpose of assembling the respective frame members upon opposite sides of an interposed curtain and a pane, and means carried by the ram for expanding or indenting one of said clamped frame members into interlocking relation to the other frame member about both the curtain and the interposed pane.

11. In a machine for uniting a pair of complementary frame members adapted to bind a sight pane into a curtain opening, said machine comprising abutment means seating one of said frame members and also a ram equipt with gripping means adapted to detachably convey the other of said members with the ram, a pressure pad for the ram adapted to encompass both of the frame members, means for moving said ram and its associated parts toward said abutment and bring the respective frame members into assembled relation upon opposite sides of an interposed curtain, said pad serving to impose a thrust upon the exterior curtain portion which surrounds the perimeter of said assembled frame members and clamp same with respect to said abutment, and means for crimp cleating the frame members together while said curtain portion is subjected to pad thrust.

12. In a machine for uniting a pair of complementary endless frame members adapted to bind the margin of a sight pane into a curtain opening, said machine comprising abutment means seating one of said frame members and a ram equipt with means for detachably conveying the other frame member therewith, means moving the ram together with said other frame member toward said seated member for the purpose of assembling the respective frame members upon opposite sides of an interposed laminated center medium comprising a pane centered in the frame and a curtain material extending beyond the pane margin, and means carried by the ram for uniting the complementary frame members in assembled relation about opposite faces of said laminated medium.

13. In a machine for uniting a pair of complementary frame members adapted to bind a sight pane into a curtain opening, said machine comprising abutment means seating one of said frame members and a ram equipt with means for detachably conveying the other frame member therewith, means for moving the ram together with said other frame member toward said seated member to superimpose the conveyed

frame member thereon but prior to which movement a curtain and a pane is interposed between said frame members, and actuatable uniting means associated with the ram adapted to fasten said assembled frames together and securely join the margin of the pane to the curtain.

14. The method of assembling a pair of complementary moulding-like frame members about a center medium, said method being performed by a machine equipt with operable frame uniting means, an abutment means, movable means adapted to co-operate with said abutment and provided with gripping devices serving to detachably convey one of the frame members therewith, said method consisting in the following steps, viz: firstly, suspending said one frame member from said movable means and seating its complementary frame member upon the abutment; secondly, inserting the center medium between the separated frame members; thirdly, conveying the suspended frame member into assembled position with respect to said seated frame member; and lastly, actuating the uniting means to secure said frame members to bind the edge of said center medium.

15. The method of installing a pair of frame members adapted to grip a center medium therebetween and bind a center medium into a carrying material, said method being performed by a machine equipt with operable frame uniting means, abutment means, and movable means adapted to co-operate with said abutment and having gripping devices serving to detachably convey one of the frame members therewith, said method consisting in the following steps, viz: firstly, suspending said one frame member from said movable means and seating its complementary frame member upon the abutment; secondly, inserting a carrying material and a center medium between said frame members, the medium being placed in a substantially centered relation to said seated frame member; thirdly, conveying the suspended frame member into assembled position with respect to said seated frame member and thereupon imposing a clamping thrust between said frame members and upon their interposed material and medium; and lastly, actuating the uniting means to secure said frame members together and bind the material about the margin of the medium.

16. The method of installing a pair of endless frame members adapted to encompass and grip a center medium therebetween and mount said medium into a carrying material, said method being performed by a machine equipt with operable frame uniting means, abutment means, and co-operating means relatively movable with respect to the abutment and having gripping devices serv-

ing to detachably convey one of the frame members therewith, said method consisting in the following steps, viz: firstly, suspending said one frame member from the afore-
5 said movable means and seating its complementary frame member upon the abutment; secondly, inserting a carrying material and a center medium between said frame members, both of said inserted elements being
10 adapted to span the opening in said seated frame member; thirdly, conveying the suspended frame member into assembled position with respect to said seated frame member; fourthly, actuating the uniting means
15 to secure said frame members together and bind the material about the margin of the medium; and lastly, trimming away that material portion which spans the frame opening to remove material obstruction
20 from the medium.

17. The method of assembling a center medium into a carrying material, which assembly comprises a pair of frame members adapted to circumscribe a center medium
25 and bind said medium into a carrying material by the use of an abutment means, another means relatively movable with respect to said abutment for the purpose of cooperation, and operable frame uniting devices
30 carried by one of the aforesaid means; said method consisting in the following steps, viz: firstly, introducing one of the frame

members between said movable means and the abutment; secondly, placing the carrying material and the center medium upon
35 said one frame member; thirdly, superimposing thereon the other of said frame members in assembled relation through the medium of said movable means; and lastly, actuating the uniting devices to secure said
40 frame members in place.

18. The method of assembling a center medium into a pair of frame members adapted to bind the edge of said medium and grip same therebetween by the use of an
45 abutment means, another cooperating means relatively movable with respect to said abutment adapted to convey one of the frame members therewith, and operable frame uniting devices carried by one of the afore-
50 said means; said method consisting in the following steps, viz: firstly, introducing one of the frame members between said movable means and the abutment; secondly, placing the center medium upon said one frame
55 member; thirdly, conveying the other of said frame members into superimposed relation through the medium of said movable means; and lastly, actuating the uniting devices to secure said assembled frame mem-
60 bers in place.

In testimony whereof, I have herewith set my hand this 17 day of March, 1925.

FLOYD D. WENN.