Jan. 6, 1931. F. DITCHFIELD 1,787,816

PUNCHING DIE

Filed April 18, 1928 6 Sheets-Sheet 1

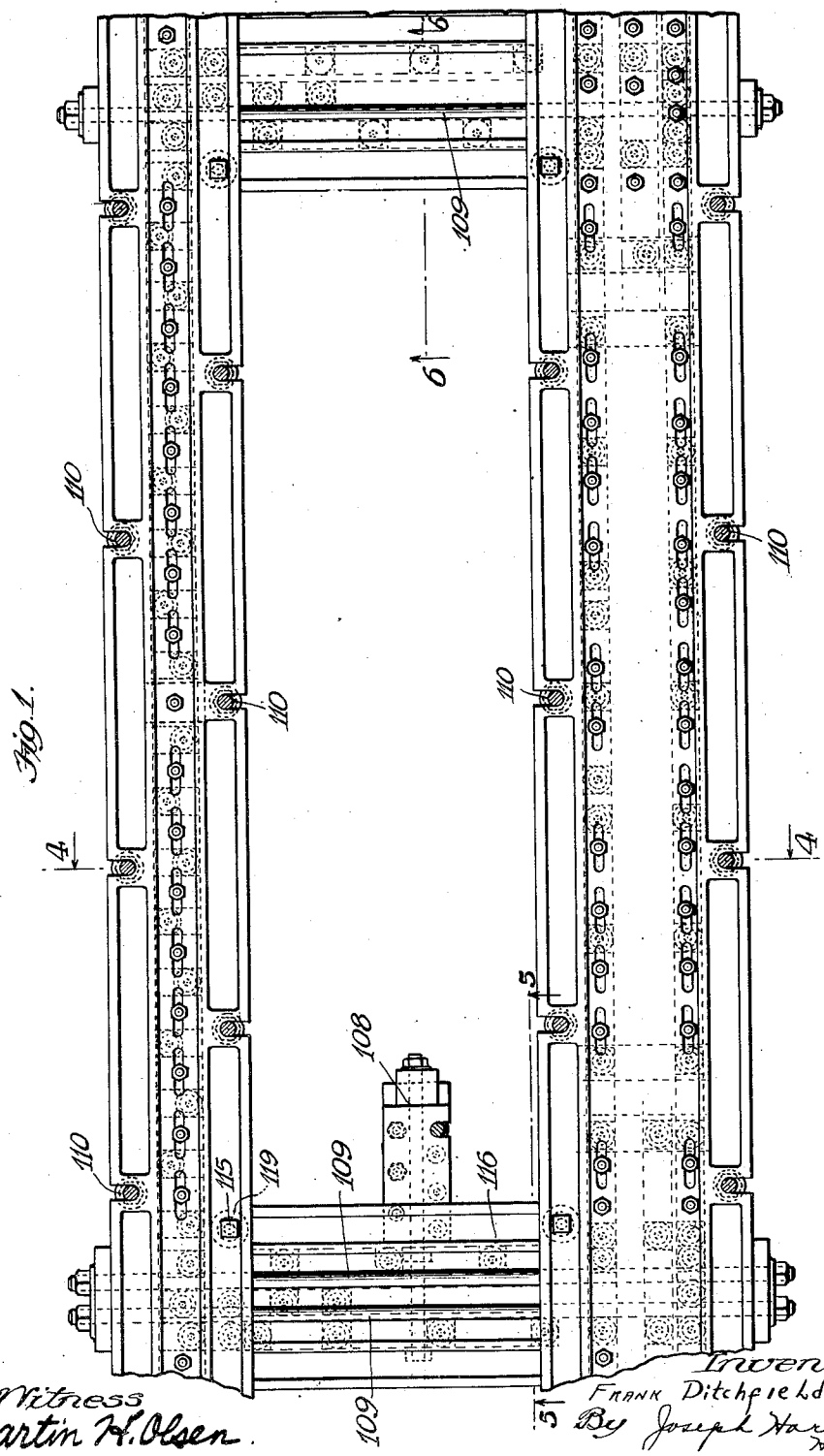


Fig. 1.

Jan. 6, 1931. F. DITCHFIELD 1,787,816

PUNCHING DIE

Filed April 18, 1928 6 Sheets-Sheet 2

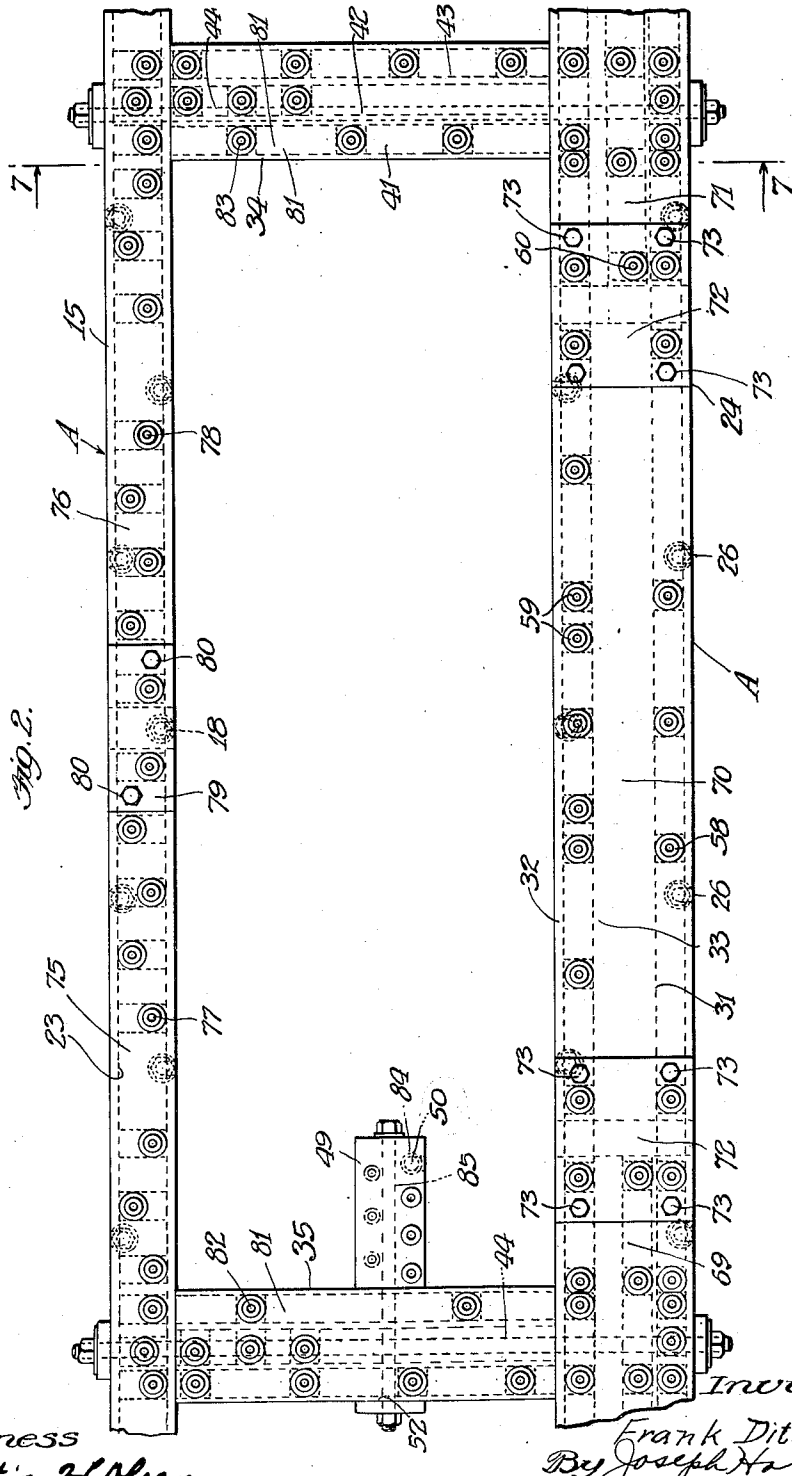


Fig. 2.

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PUNCHING DIE

Filed April 18, 1928 6 Sheets-Sheet 3

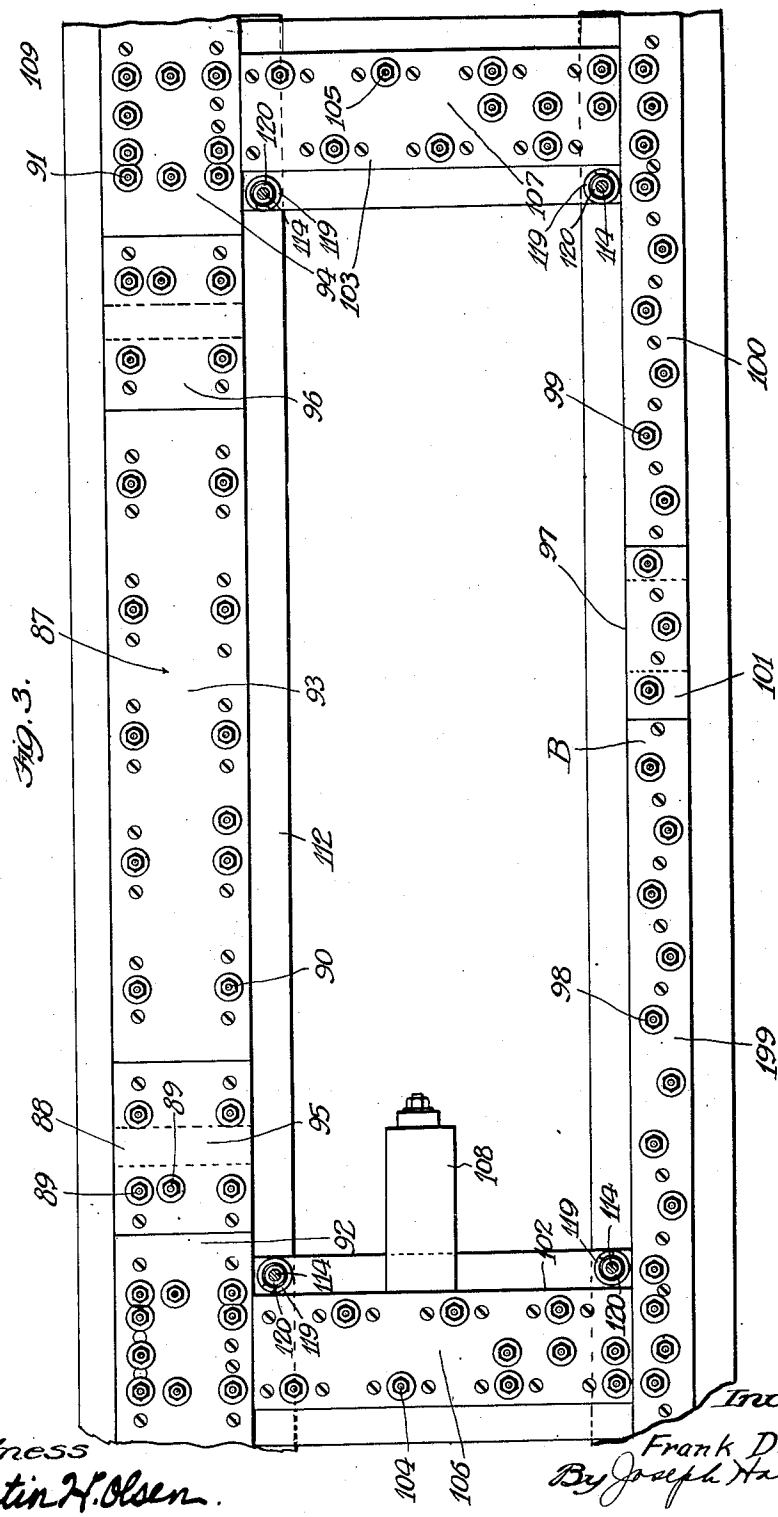


Fig. 3.

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PUNCHING DIE

Filed April 18, 1928 6 Sheets-Sheet 4

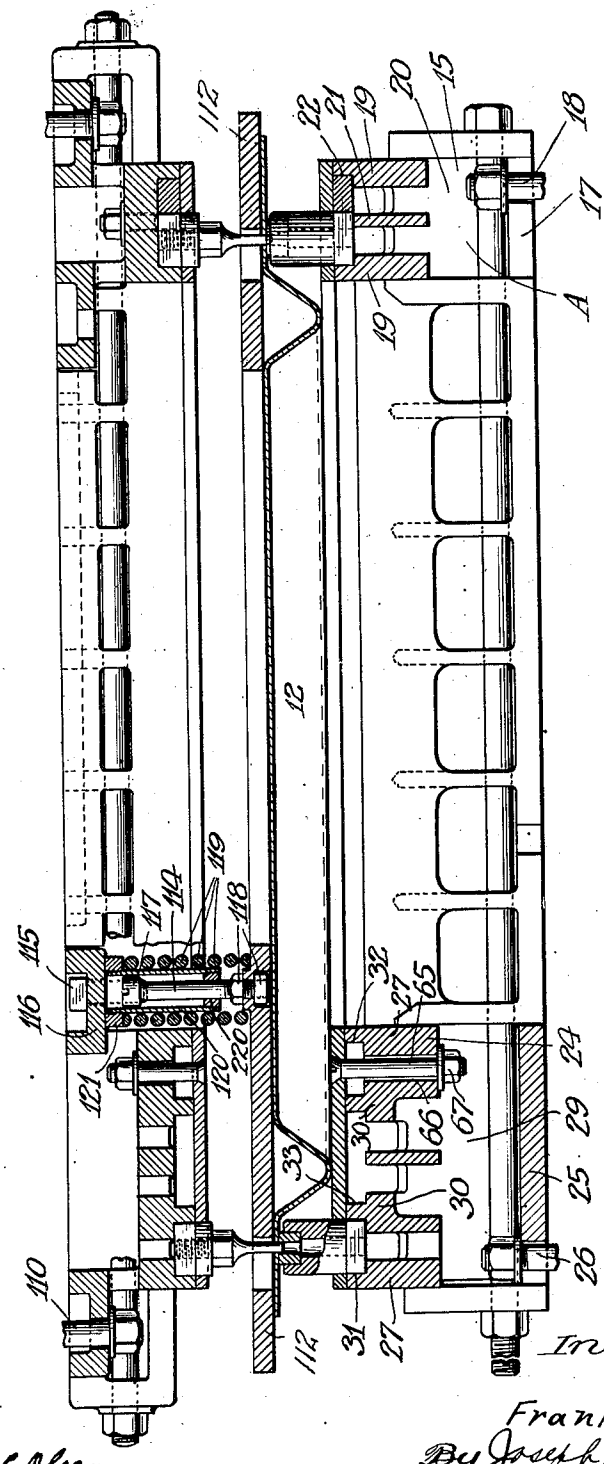


Fig. 4.

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Jan. 6, 1931. F. DITCHFIELD 1,787,816

PUNCHING DIE

Filed April 18, 1928 6 Sheets-Sheet 5

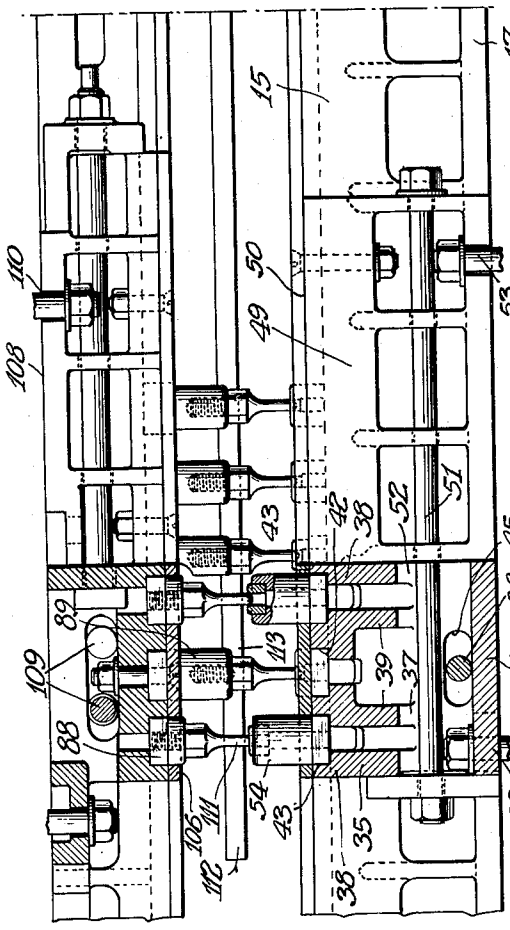


Fig. 5.

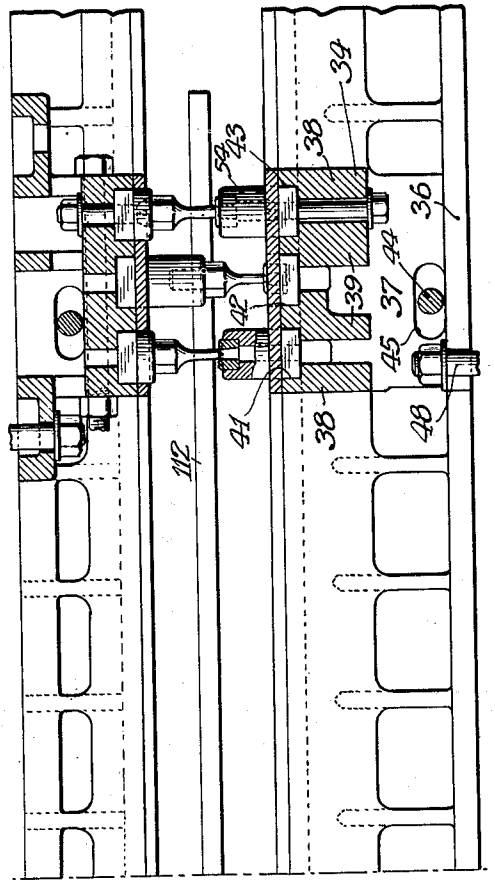


Fig. 6.

Witness
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Jan. 6, 1931. F. DITCHFIELD 1,787,816

PUNCHING DIE

Filed April 18, 1928 6 Sheets-Sheet 6

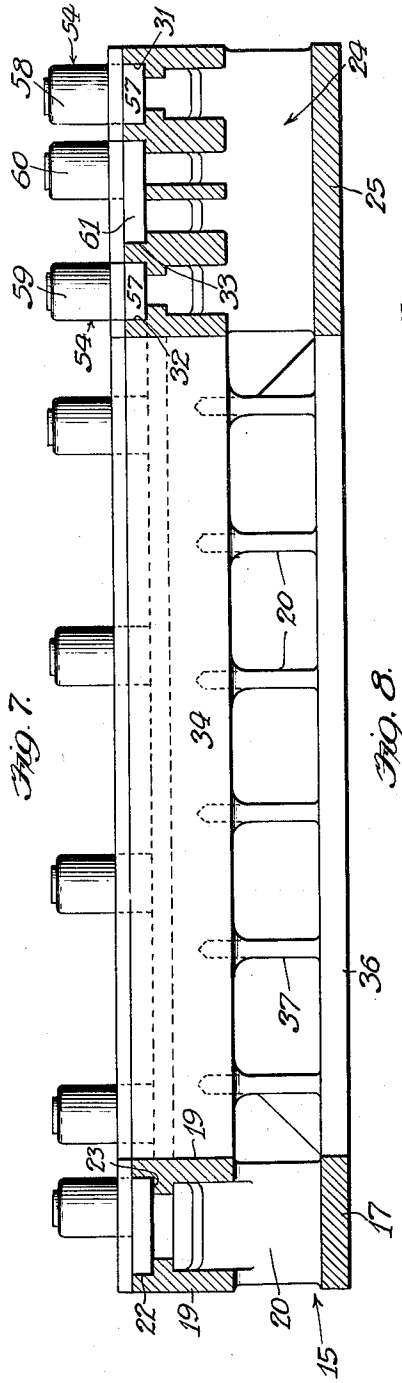


Fig. 7.

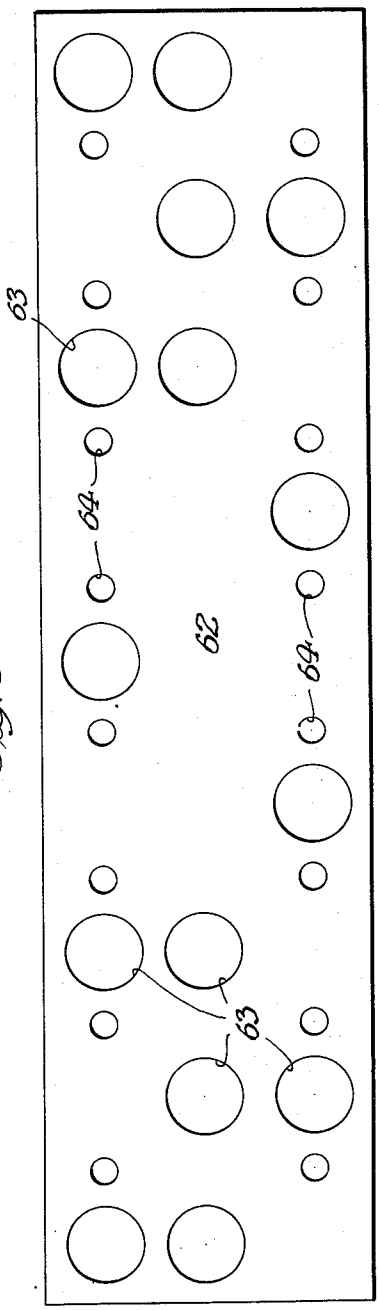


Fig. 8.

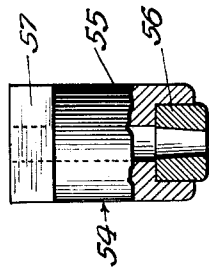


Fig. 11.

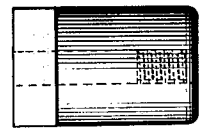


Fig. 10.

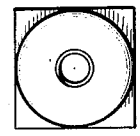


Fig. 9.

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Patented Jan. 6, 1931 1,787,816

UNITED STATES PATENT OFFICE

FRANK DITCHFIELD, OF CLEVELAND, OHIO, ASSIGNOR TO THE YOUNGSTOWN STEEL DOOR CO., OF CLEVELAND, OHIO, A CORPORATION OF OHIO

PUNCHING DIE

Application filed April 18, 1928. Serial No. 271,075.

This invention relates to punching dies.

In the manufacture of steel car doors of the type shown in Allen S. Barrows' patent, Number 1,342,400, dated June 1, 1920, it frequently happens that the doors will be practically identical throughout, except that they may vary a small amount in length or width to meet slight variations in door-frame constructions of railway cars. Doors of the character disclosed in the Barrows' patent, referred to, are corrugated, and heretofore there has been a very high die cost in providing suitable dies for efficiently punching the corrugated sheets from which the door is assembled, due to the necessity for accommodating the corrugations in the sheets, and because of the further necessity for taking care of the variations in the size of said sheets.

An object of this invention is to provide a die arrangement of the character which will permit of the punching of the sheets, and accommodate variations in size and of the corrugations therein, without necessitating the provision of a new set of dies in each instance, or any great labor in resetting the dies for the different sizes of sheets punched, and in order to take care of the corrugation situation in the panels.

Another object of this invention is to provide a die arrangement of the character referred to, wherein a rectangular frame is provided, which is utilized in carrying the punching dies and is adjustable so as to assume the required positions in accommodating the punching dies to different sizes of sheets and the variation in the number of corrugations therein.

Still another object of the invention is to provide an arrangement whereby the punches carried by the frame members are held in predetermined fashion by means of a plurality of templets, each of which accommodates a plurality of members, whereby the said punching members may be relatively shifted with respect to the carrying frame and to each other in groups and secured in their adjusted positions in such manner that the groups of punches are aligned, so that it is unnecessary to individually align the male and female punches, the alignment of one pair of co-operating male and female punches serving to align the set of groups of punches.

A still further object of the invention is to provide templets of the character referred to, which are interchangeable to permit locating the punches in different desired positions, in each instance the templets used for both the male and female dies being prepared simultaneously to absolutely assure registration of the male and female die members when the same are secured upon the frame members in the desired situations.

Still another object of the invention is to provide templets of the character indicated, each of which controls the positioning of the group of punching dies, and wherein, when the templets are adjusted so as to space the same apart to accommodate the punches to larger sized sheets, the adjacent ends of the templets are connected together by bridging members which determine the positioning between the templets and hence serve in positioning the groups of punches of both the male and female series in relatively aligned positions.

Other and further objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming part of this specification, Figure 1 is a top plan view of the die arrangement, showing the relative positions of the frame members and groups of the die punches. Figure 2 is a top plan view of the female die frame, showing the manner in which the frame members and die members are adjustable to take care of variations in size and corrugated formation of the sheets to be punched. Figure 3 is a bottom plan view, similar to Figure 2, and showing the carrying frame for the male die punches. Figure 4 is a transverse, vertical, sectional view of the invention, corresponding substantially to the line 4—4 of Figure 1. Figure 5 is a longitudinal, vertical, sectional view of the invention, corresponding substantially to the line 5—5 of Figure 1. Figure 6 is a longitudinal, vertical, sectional view of the invention, corresponding substantially to the line 6—6 of Figure 1. Figure 7 is a transverse, vertical, sectional view

of the female die-carrying frame, corresponding substantially to the line 7—7 of Figure 2. Figure 8 is an enlarged, detailed plan view of one of the templets used in connection with the invention. Figure 9 is an end view of one of the male die punch stems used in connection with the invention. Figure 10 is a side elevational view of said die punch stem. And Figure 11 is a side elevational view of one of the female die punch stems.

As shown in the drawings, the frame for carrying the female series of die punches is indicated generally by the reference character A. Said frame includes a longitudinally extending side member 15, having a bottom wall 17 adapted to be secured to the bed (not shown) of a suitable press by means of a series of securing bolts indicated at 18. The member 15 is further provided with side walls 19—19 which are secured to the bottom wall 17 by a series of transversely extending diaphragms or webs 20, and formed integrally with the webs 20, and extending longitudinally midway between the side walls 19 is an upstanding flange 21. The side walls 19—19, at their inner upper surfaces, are rabbeted, as indicated at 22, for the reception of the female die stems in a manner hereinafter more fully described, the rabbeted portions providing a channel or groove 23 which extends continuously throughout the length of the frame member 15. The frame A is provided at the opposite side with a frame member 24 quite similar in construction to the frame member 15, except that the frame member 24 is made wider to accommodate two rows of die stems so as to accommodate a corrugation therebetween and permit the punching of the sheet on opposite sides of the corrugation. As best shown in Figures 2, 4 and 7, the frame member 24 has a bottom wall 25, adapted to be secured to the bed of the press by means of a series of bolts indicated at 26. Side walls 27 are provided, which are integrally formed with transversely extended webs 29, and with each of the side walls 27 is associated a longitudinally extending web 30, the webs 30 forming with the side walls 27 continuously extending, longitudinally disposed grooves or slots 31 and 32, for the reception of the stems of die-punching members, and the webs 30—30 co-operate to provide a centrally disposed, longitudinally extended groove 33 for the reception of die-punching members. The frame A is further provided with end members 34 and 35. The end member 34 comprises the bottom wall 36, diaphragms 37, side walls 38, and intermediate webs 39, corresponding generally to the structure described in connection with the member 24, the formation, as best shown in Figure 5, providing three longitudinally extending grooves 41, 42 and 43, for the reception of die-punching members. The end member 34 is of a length corresponding to the width of the sheet operated upon, and fits between the end portions of the frame members 15 and 24, being secured in position by means of a retainer bolt 44, which extends through the members 15 and 24, and through slots 45 in the diaphragms 37 of the end member 34, whereby transverse movement of the member 34 longitudinally with reference to the members 15 and 24 is permitted when desired. The bolts 48 are utilized for securing the bottom wall of the member 34 to the bed of the press in either its extended or contracted position. The member 35 at the opposite end of the frame is identically similar to the member 34, and the same reference characters will be utilized to identify like parts of both constructions. Associated with the member 35 is a relatively short, longitudinally extending, frame member 49. This member is provided with a longitudinally extending groove 50, substantially in the same manner as the other frame members, for the reception of punching members. The member 49 is laterally adjustable transversely with respect to the members 15 and 24 through the provision of a retainer bolt 51, mounted to slide in a slot 52 formed in the member 35, there being a bolt 53 for securing the member 49 in its proper position upon the bed of the press.

Each of the frame members is adapted to adjustably accommodate a plurality of female die stems 54, and the manner in which the die stems are secured in position so as to be adjustable in groups when the frame members are adjusted, forms an important feature of my invention. As shown in Figure 11, the die stem may consist of a cylindrical body portion 55 having a socket in its free end for the reception of the die proper indicated at 56. The opposite end of the die stem is provided with a square head 57, adapted to be slidably disposed in the grooves provided therefor in the various frame members. Considering the frame member 24 as an example, a plurality of the die stems 54 are arranged in an outer row 58, Fig. 7, and in an inner row 59, the square heads 57 of the die stems forming the row 58 fitting into the groove 31 of the member 24, while the square heads 57 of the die stems of the row 59 fit into the groove 32 of the member 24. A central row 60 of die stems has heads 61 mounted in the groove 33 of the member 24. It will be noted that the individual die stem members of the row 60 have heads different from the heads 57 of the die members 54, but are alike in all other respects. The head 61 of each of the die members or the row 60 is offset in such manner that the die stem itself is offset with respect to the center of the groove 33, and it will be understood that the cylindrical portions of the various die stems may be varied in position with reference to either

the heads 57 or 61, to permit adjustment in position of the die stem members laterally with reference to the grooves in which they slide.

The relative position of the individual die stems 54 and 60 longitudinally with respect to the frame member 24, is controlled by means of a series of templets which separate the die stem members into groups along the length of the member 24. One of the templets utilized is shown in detail in Figure 8 and indicated by the reference character 62. Said templet is in the form of an elongated flat plate of a width corresponding to the width of the frame member 24, and is provided with a series of rows of circular apertures, indicated at 63, each of which is adapted to accommodate the cylindrical portion of one of the die stems 54 or 60, the positioning of the circular aperture 63 in the templet 62 determining the relative positions of the die stems 54 and 60 longitudinally with reference to the frame member 24. When the templet is in position, the heads 57 and 61 of the die stem members can not pass through the templet, and when the templet is secured in position, the heads of the die stems are rigidly maintained in the grooves of the member 24. The templet is provided with a plurality of apertures 64, adapted for the reception of a plurality of bolts 65 having their heads countersunk in the templet, and extending through longitudinally extending slots, indicated at 66 and being secured in suitable position by means of a nut 67 on the lower end of the bolt. By this arrangement, the templet 62 can be shifted longitudinally of the frame 24 by loosening the nut 67 to permit travel of the bolt 65 in the slot 66 provided therefor. Movement of the templet 62 in a longitudinal direction carries the punching stems along the grooves of the frame member 24, so that the entire group of templet stems associated with the templet are shifted to a new position while maintaining their relative disposition with reference to each other. As best shown in Figure 2 of the drawings, three templets of the same character as 62, and indicated at 69, 70 and 71, are provided for use in connection with the frame member 24, providing three groups of die stem members, each of the templets being longitudinally movable with reference to the frame member and with respect to each other as explained in connection with the templet 62, that is, by loosening the bolt corresponding to the bolt 65, say of the templets 69 and 71. These templets, together with the groups of the die stems controlled thereby, may be separated the desired distance from the remaining templet 70, and the separated ends of the templets 69 and 71 and of the templet 70 are connected by means of suitable bridge strips 72, which are connected to the templets 69 and 70 and 70 and 71 by means of bolts 73, the apertures for the bolts being spaced apart a predetermined distance to determine the gap between the ends of the templets 69, 70 and 71.

An identically similar arrangement of die stems and templets is provided for the frame member 15, except that the templets for this frame member preferably will be narrower to correspond to the smaller width of the member 15, and said templets will also preferably be longer so that only two of the same are required for the entire length of the member 15, these templets being indicated by the reference characters 75 and 76. When the templets 75 and 76 are extended, carrying the groups 77 and 78 of the die stems therewith, the same are connected together by means of a bridge strip 79 held in position by bolts 80, the bridge strip serving to maintain the ends of the templets 75 and 76 in proper adjusted position.

The end members 34 and 35 are provided with arrangements substantially identically similar to the frame member 24, that is, each of the members 34 and 35 has a templet 81 which controls the position of the punches; however, the groups of punches 82 and 83 of the end members 34 and 35 preferably are not made adjustable with reference to the related frame members, but move in unison with the frame members when the latter are adjusted. The frame member 49 also carries a group of punches, indicated by the reference character 84, held in position by templet 85.

With the arrangement described, it will be apparent that the die members may be adjusted in groups along the frame members 15 and 24, and these adjustments may be made when desired, without varying the position of the end members 34 and 35; however, when the sheet to be punched is of greater length than ordinary, the two end members 34 and 35 may be shifted transversely away from each other longitudinally with reference to the members 15 and 24 by loosening the retaining bolts, and when said members have been shifted the retaining bolts may be again secured in position. This action shifts the groups of punches 82 and 83 outwardly, so that the greater length of the sheet may be accommodated. When the sheet is of greater width, it is preferred to substitute end members corresponding to 34 and 35, of greater length than those shown, to take care of the additional width of the sheet.

The frame B for carrying the male punching elements is practically identical with the construction of the frame A, except for such differences as are necessary to connect the same to the plunger of the press. As best shown in Figures 1 and 3, the frame B has a side member 87, corresponding to the side member 24, and provided with grooves 88 corresponding to the grooves 31, 32 and 33 of the member 24, and has groups of die punch stems 89, 90 and 91, corresponding to similar

groups carried by the frame A, which groups are held in position by templets 92, 93 and 94, connected together by bridge strips 95 and 96, corresponding to the bridge strips 72 of the frame member 24 of the frame A. The frame member 97 of the frame B corresponds to the member 15 of the frame A and is provided with an arrangement of die groups 98 and 99, templets 199 and 100, and a bridge strip 101, corresponding to similar templets and bridge strips of the frame member A.

The two end members 102 and 103 of the frame B have die groups 104 and 105, and templets 106 and 107, corresponding to the die groups 82 and 83 and the templets 81 of the end members 34 and 35 of the frame A. The end member 103 of the frame B is provided with a die-carrying extension 108, corresponding to the extension 49 upon the frame member 35. The end members 102 and 103 are adjustable longitudinally with reference to the side members 87 and 97, by loosening the bolts 109 and shifting the end members toward and away from each other. Suitable retaining bolts 110 are provided for securing the frame B to the plunger of the press. The various groups of die stems carried by the frame members of the frame B are threaded for the reception of the punches proper, indicated at 111. The various frame members of the frame B are provided with means for resiliently supporting a stripper 112. The stripper 112 is provided with slots 113, through which the punches proper, indicated at 111, project, the stripper being carried by the frame members 87 and 97, the slots 113 permitting the punch members to move relatively to the stripper when the end members of the frame are adjusted.

The stripper 112 is supported, at a plurality of places, from the frame B by the following means, only one of which is deemed necessary of detailed description: To the underside of the web 116 of the frame member is secured a plate 121, as by means of bolts 115. Each plate 121 has a threaded opening to which is attached a corresponding threaded sleeve 120. The latter is interiorly threaded at the bottom to receive a guide washer 220, in which is vertically slidable the shank of a bolt 114, the head 117 thereof being preferably rounded and slidably guided within said sleeve. The bolt 114 carries two nuts 118 secured on opposite sides of the stripper 112, so as to provide a firm connection with the bolt. An expansion spring 119 encircles the sleeve 120 and is normally operative to force the stripper down to its lowermost position, at the same time permitting the stripper to yield or approach the frame B when the latter comes down in the punch press. In this manner, the stripper clamps the panel sheet in advance of the male punches passing through the sheet, as will be understood.

Referring to the relatively short extensions 49 and 108, heretofore described, the purpose of these is to punch the holes in those panels to which the usual hasp is attached, and said extensions are made adjustable in order to accommodate different locations of the hasp relative to its panel.

In operation, when it is desired to punch a door sheet of the character referred to, the sheet is placed in position with the end corrugations between the rows of punches carried by the end members of the two frames, while the longitudinal edge portion of the sheet, having no corrugation, is placed in line with members 15 and 97 of the frames A and B. The opposite longitudinal edge of the sheet having a corrugation, is so disposed that the corrugation in said edge is accommodated between the two rows of punches 58 and 59, while beyond the corrugation the row 60 projects to a point level with the die stems of the rows 58 and 59. With the frames A and B in the positions shown in Figure 1—that is, when the end members of the two frames are extended, the groups of die stems of both frames A and B are also extended, due to the fact that the templets have been longitudinally moved to accommodate the larger sheet, and the templets secured in position by the bridging strips. When it is desired to accommodate a sheet of less length than the one referred to, the bridging strips are removed from the templets, and the templets moved longitudinally toward each other until in abutment, after which they are secured in position. By the movement of the templets, the punch members are shifted in groups to their new position without relative displacement with reference to each other, and this is true of both the male and female groups of dies, so that when the shift has taken place, as permitted by the movement of the templets, the dies are in alignment. The end members of both frames are then moved inwardly and secured in position, bringing about proper registration of the male and female die punch members of the two frames. As before stated, the stripping mechanism is carried by the stationary side members of the frame B, but are slotted so that the relative movements between the end members and side members may take place without affecting the operation of the stripper. Should it become desirable to accommodate a series of sheets of greater width than the ordinary sheet, the side members of both frames may be shifted apart, and end members of the desired greater length substituted for those shown. In this way, no disturbance of the groups of die punch members is caused, and with the longer end members for the frames the mechanism will operate as above pointed out. Of course, when the frames are widened transversely, it is necessary to substitute for the stripper plate shown, one in which the

slots for the punch elements proper will be correctly placed.

With the above described arrangement, it will be appreciated that the frames as provided are readily adjustable, and that the die punches are so disposed as to be capable of accommodating the corrugated formation of the sheets operated upon, and when it becomes necessary to adjust the die punches they may be quickly adjusted by shifting the same in groups through the use of the templets, such movements being permitted by the peculiar formation of the frame members, and when the groups of die punches are shifted the templets may be connected by the bridging strips which cause the templets to assume the desired new positions; further, the shifting of the frame members which takes place, is governed by the connections between the end members and the side members, so that accurate realignment of the die groups carried by the end members may be effected, and also considerable latitude for adjustment of these end members with respect to each other is provided for. Of course, any number of combinations of die punches, referring to their relative positions in the group, may be effected by providing suitable templets, and great accuracy and saving in labor are effected by providing templets for the male and female members which have been bored simultaneously. Due to this latter expedient, when one die punch of a group of female die punches is aligned with one of a group of the male die punches, all of the remaining punches of the group or groups will be in alignment, overcoming any possibility of variation and faulty registration of the die members and dispensing with the time and labor necessary in individually setting and aligning the die members utilized in a machine.

While I have herein shown and described what I consider the preferred manner of carrying out the invention, the same is merely illustrative, and I contemplate all changes and modifications which come within the scope of the claims appended hereto.

I claim:

1. In a construction of the character described, the combination with a substantially rectangular, multiple-part frame, adjustable to accommodate substantially rectangular metallic sheets of different sizes; of a plurality of punching die members carried by each of the parts of said frame; and means for adjusting said die members in groups to position the same to operate upon different sheets, said means being in the form of templets which maintain the individual die members comprising each group, in predetermined relative position during adjustment of the die members in the respective frame parts.

2. In a construction of the character described, the combination with a substantially rectangular, multiple-part frame, some of the parts of which are adjustable with reference to other parts thereof, said frame being adapted to accommodate corrugated metallic sheets of different sizes; of a plurality of punch and die members co-operating with and directly supported by the various parts of said frame and arranged to accommodate the corrugations in said sheets; and means for adjusting said members to accommodate the different sizes of sheets, said means co-operating with said members to position the same in groups, said means being in the form of templets adjustable simultaneously with the respective groups with respect to the frame and having means for securing said members in various adjusted positions.

3. In a construction of the character described, the combination with a substantially rectangular, multiple-part frame, some of the parts of which are adjustable with reference to other parts thereof, said frame being adapted to accommodate corrugated metallic sheets of different sizes; of a plurality of punch and die members co-operating with the various parts of said frame and arranged to accommodate the corrugations in said sheets; means for adjusting said members to accommodate the different sizes of sheets, said means co-operating with said members to arrange the same in groups, said means being in the form of templets adjustable with respect to the frame and having means for securing said members in various adjusted positions; and means bridging the gap between the templets when the same are separated for determining the amount of separation thereof.

4. In a construction of the character described, the combination with a plurality of frames, one of which is adapted to co-operate with a plurality of female die punches, and the other of which is adapted to co-operate with a plurality of male die punch members; of a plurality of templets for separating the male die punch members into groups on the male die punch frame, and a plurality of templets for separating the female die punch members into groups on the other frame, the templets of corresponding groups being alike to insure substantially absolute accuracy, the templets for the male die punch members being shiftable with reference to each other, and the templets co-operating with the female die punch members being likewise shiftable, whereby the male and female die punch members may be aligned by groups, each group of punch members being movable on the corresponding frame simultaneously with the corresponding group templet.

5. In a construction of the character described, the combination with a substantially

rectangular frame, corresponding substantially in size to a metallic sheet to be operated upon; of die members co-operating with said frame and adapted to punch said sheet along all edges thereof; means in the form of a plurality of templets for controlling the position of said die members, said templets separating said die members into groups, said templets and groups of die members controlled thereby being adjustable as groups with reference to said frame; and means for securing the templets to the frame in adjusted position.

6. In a construction of the character described, the combination with a frame element; of a plurality of punching die members longitudinally movable along said frame element; a plurality of templets for segregating the die members into groups, each of said templets being adjustable with its group of die members along said frame element; and means for connecting the adjacent ends of the templets when they are spaced from each other, and bridging the gap between the ends of said templets.

7. In a construction of the character described, the combination with a substantially rectangular frame adapted to accommodate a corrugated sheet; of punch die members co-operating with and adjusted on said frame and arranged to accommodate the corrugations of said sheet; means for segregating said die members into groups to maintain the individual die members of each group in position against relative displacement, said groups being adjustable as groups with respect to said frame; and devices for securing said means on the frame in adjusted position.

8. In a construction of the character described, the combination with a frame member; of a plurality of die punch members co-operating with said frame member and being movable with reference thereto; a plurality of templets for positioning the die members to accommodate a corrugation in the material to be punched, said templets, together with the die members controlled thereby, being adjustable toward and from each other with reference to the frame member; and means bridging the gaps between the templets when the same are adjusted away from each other.

9. In a construction of the character described, the combination with an elongated frame member provided with a plurality of longitudinally disposed slots arranged substantially in parallelism; of a plurality of die members mounted in said slots and shiftable longitudinally along the same; and a plurality of templets disposed along said frame member for positioning the die members in predetermined fashion, said templets being shiftable along said frame member to adjust the die members relatively thereto, without relative displacement of the individual die members comprising each group.

10. In a construction of the character described, the combination with an elongated frame member provided with a longitudinally extending slot; of a plurality of die members disposed in said slot and longitudinally movable with reference thereto; and a templet having means for securing said die members in predetermined relation with reference to said frame, said templet being shiftable along said frame and carrying the die members controlled thereby, to different positions as a group, without relative displacement between the individual die members.

11. In a construction of the character described, the combination with a frame member provided with a slot; of a plurality of die members having headed portions fitted in said slot and movable along the same, each die member being provided with a stem portion projecting from the frame member; a templet having openings for the reception of the stem portions of said die members and bearing upon the heads thereof to maintain the die members in position in said slot; and means for securing said templet to said frame member.

12. In a construction of the character described, the combination with a frame member provided with a slot; of a plurality of die members having headed portions fitted in said slot and movable along the same, each die member being provided with a stem portion projecting from the frame member; a templet having openings for the reception of the stem portions of said die members and bearing upon the heads thereof to maintain the die members in position in said slot; and means for securing said templet to said frame member, said means serving to permit longitudinal movement of said templet with reference to said frame member.

13. In a construction of this character described, the combination with a frame, certain parts of which are movable with reference to each other; of die punches carried by the various members of said frame; and a yieldably mounted stripping plate through which said punches project, said stripping plate being provided with means to permit the adjustment of the movable parts of said frame and the punches carried thereby.

14. In a construction of the character described, the combination with opposed frames, each provided with grooves for the reception of male and female die members, respectively; of a plurality of male die members disposed in the groove of one of said frames and adjustable therein; a plurality of female die members disposed in the groove of the opposed frame and adjustable therein; templets cooperable with like groups of male and female die members, respectively,

each corresponding pair of templets determining the position of opposed groups of die members, whereby corresponding groups of male and female die members may be alined by adjusting the corresponding templets; and means for securing the templets to the respective frames when in adjusted position.

15. In a construction of the character described, the combination with opposed supporting frames, each provided with means for securing male punch and female die members, respectively, thereto; of a series of groups of male punch members mounted on one of said frames and adapted to be secured thereto in adjusted position; a series of groups of female die members mounted on the other of said frames and adapted to be secured thereto in adjusted positions; a plurality of templets engageable and cooperable with corresponding like groups of male punch and female die members, respectively, each opposed and corresponding pair of templets determining the position of opposed cooperable groups of said members whereby corresponding cooperable groups of the male and female members may be alined by adjusting their corresponding templets; and means for securing the templets to the respective frames when in adjusted position.

In witness that I claim the foregoing I have hereunto subscribed my name this 29th day of March, 1928.

FRANK DITCHFIELD.