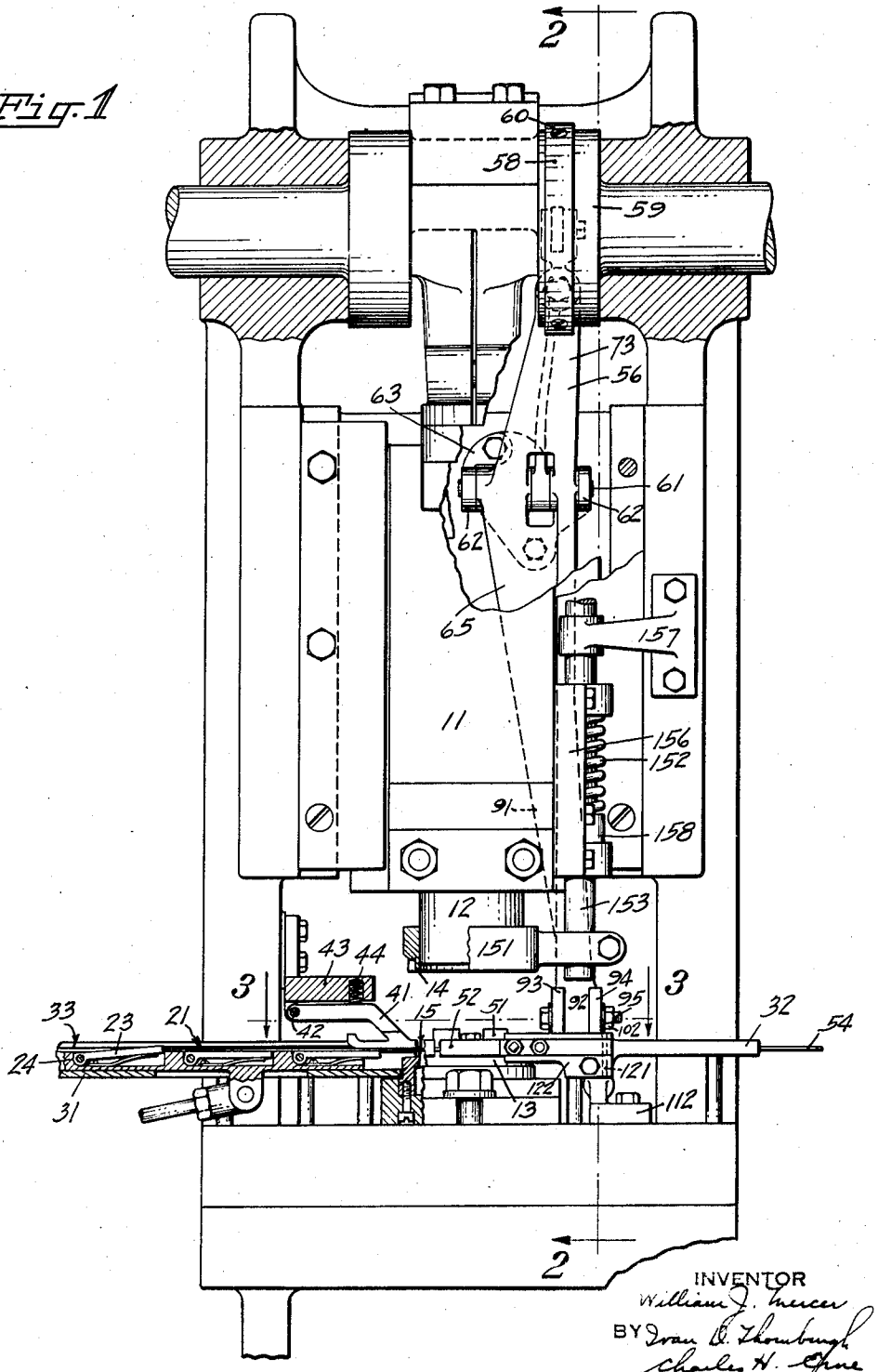
Dec. 7, 1937. W. J. MERCER 2,101,083

PRESS GAUGE

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Fig. 1



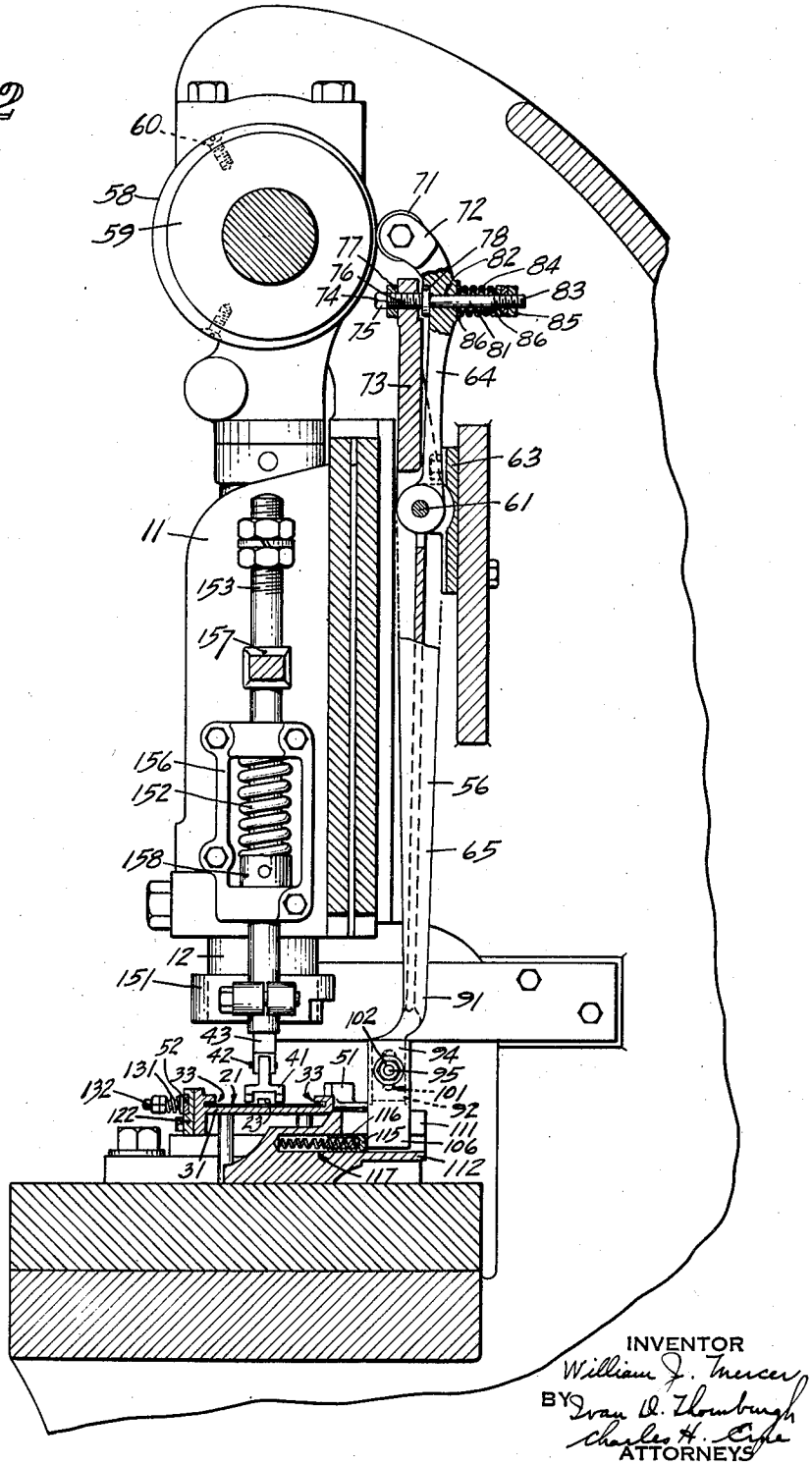
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Fig. 2



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Fig. 4

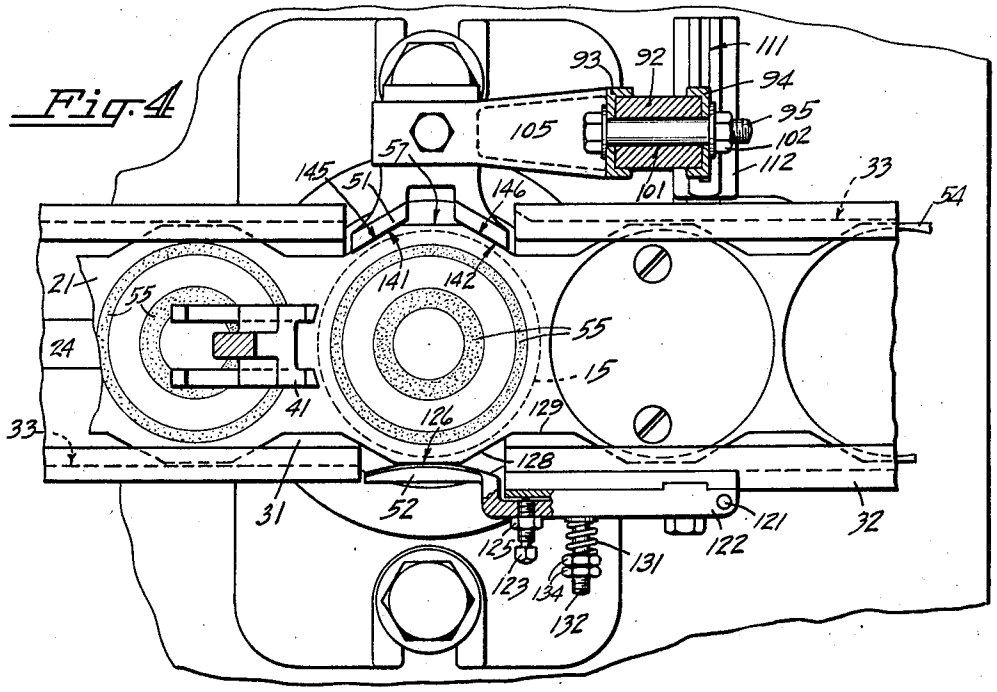
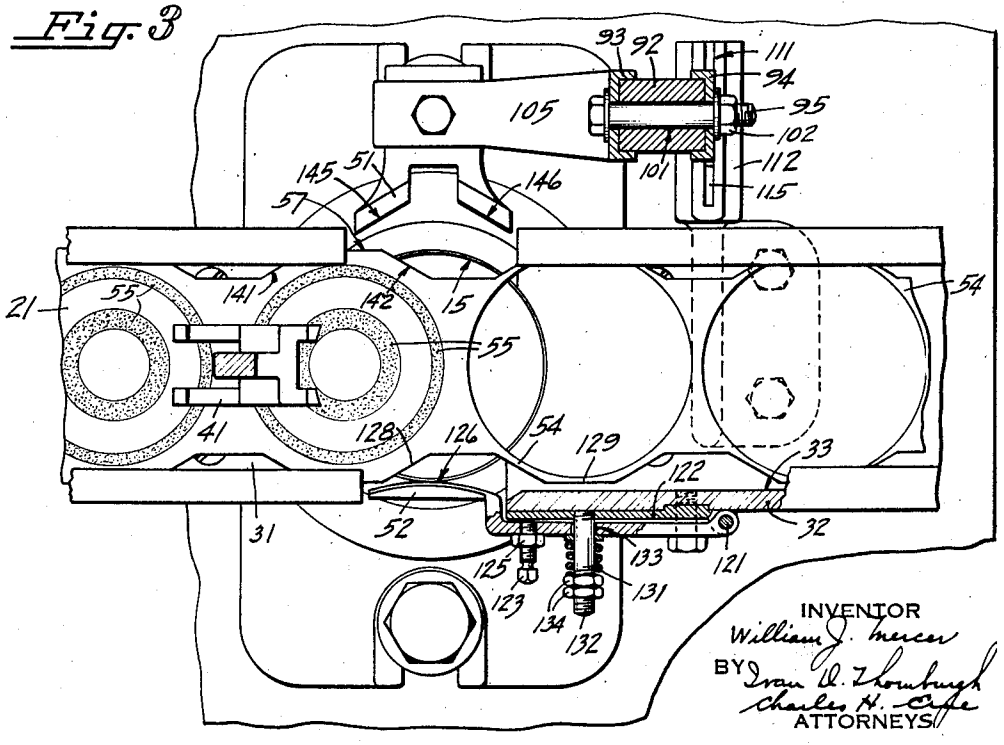


Fig. 3



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UNITED STATES PATENT OFFICE

2,101,083

PRESS GAUGE

William J. Mercer, Berkeley, Calif., assignor to American Can Company, New York, N. Y., a corporation of New Jersey

Application February 25, 1936, Serial No. 65,728

7 Claims. (Cl. 164—59)

The present invention relates to presses which operate on strips of sheet material such as tin plate and the like and has particular reference to the gauging of the strip or work by utilizing a recurring edge configuration, or pattern, of the strip, such strips being well known in can manufacture as scroll strips and being extensively used for automatic strip feed presses which blank, cut or form can ends, can parts or the like.

Sheets from which the scroll strips are cut are often lithographed and extreme accuracy is required both in printing the lithographed matter on the sheets and in subsequently shearing the strips from the sheets. Such accurate shearing is done preferably on a press similar to that disclosed in the M. L. Heald Patent 1,846,330 which utilizes an accurately sheared scroll edge in gauging a sheet before each shearing operation. It is to a specific type of gauging of strips, prior to cutting or forming can ends or the like, and which gauging action also utilizes the accurately sheared scroll edge that the present invention is particularly directed.

An object of the present invention is the provision of a centralizing device for use in a press which functions to engage and accurately locate an edge part of the scroll strip and bring it into a particular gauging relation to the dies of the press prior to the press operation.

Another object of the invention is the provision of a gauging means for accurately locating a lithograph or other design on the strip with respect to the die members of a press, the design bearing a definite relation to the scroll edge which cooperates with the gauge.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a front elevation of a punch press embodying the present invention from which parts have been broken away to gain clarity in illustration;

Fig. 2 is a transverse vertical section of the same taken substantially along the line 2—2 in Fig. 1; and

Figs. 3 and 4 are fragmentary plan sections taken substantially along the line 3—3 of Fig. 1 and showing arrangements of the same parts at feeding and gauging stages, respectively.

For the purpose of illustrating the present invention, there is disclosed a portion of a punch press of familiar construction in which a slide 11 is vertically reciprocated by the usual power means, the slide carrying with it a punch or die member 12. A cooperating stationary die member 13 is secured to the frame of the press, the movable and fixed dies being provided with cutting edges 14, 15 properly aligned for blanking, punching, cutting or shearing of a strip 21 placed or fed between them.

The strip 21 is advanced by any well-known method, such as that indicated, wherein yielding feed fingers 23 in a reciprocating bar 24 advance the strip successively in step fashion between the die members, the waste or skeleton being ejected by any one of the many suitable methods used in punch press work. During advancement, the strip is supported by a feed table 31 and a discharge table 32 disposed on the two sides of the stationary die member 13 and secured to the press frame, the strip being freely guided laterally in ways 33 formed in the table.

A pressure sled or foot 41 is arranged above the feed table 31 (see Fig. 1) and bears downwardly in frictional contact with the strip 21 to keep the strip flat and restrain it from backward movement on the return stroke of the bar 24. The foot 41 is pivoted at 42 in a bracket 43 bolted to the press frame, a spring 44 mounted in the bracket and bearing downwardly on the foot provides the proper pressure against the strip.

The gauging device of the present invention operates upon the scroll edge of the strip toward the end of a forward movement or step advance of the strip, and before the reciprocating die member 12 comes into contact with the strip. Thus final and accurate centering or positioning of the strip is effected before the blanking, shearing or punching operation is started.

The gauging device comprises a movable gauge block 51 and an opposing pressure arm 52 which work together with other associated mechanism. It is by the direct action of one or both of these block and arm members in cooperation with the edge or edges of the strip 21 that the final and accurate gauging and positioning of the strip is effected.

The gauge block 51 is in retracted position while the strip 21 is being fed across the stationary die 13 from left to right as viewed in Fig. 3. Circular portions constituting the work have just been removed from the strip to the right of the die leaving extremely small areas of scrap 54 and a new uncut area to be stamped is being moved into cutting position.

Portions 55 of the strip are designed to be a part of the area to be removed from within the scroll edges and are lithographed portions as indicated by the stippled areas in the drawings. This showing of a design as being lithographed on the strip being gauged is done to illustrate a condition of strip which requires very accurate gauging. Such lithographing is located very accurately or in just the right place on the strip when it is printed and the same continued accuracy in the gauging of the strip and subsequent work on the lithographed portions of the strip in the press is possible when the strip is first gauged in accordance with the instant invention. Accuracy in stamping in many cases has heretofore been impaired by variables during operation such as wear and tear in parts, "nicking" or indenting of strips by feed fingers, and other causes which result in "short positioning" or "overthrow" of the sheet or strip. Longitudinal correction for "short positioning" or "overthrow" and also lateral correction is one of the features of the gauging or centralizing device of the present invention which will now be described in detail.

The gauge block 51 is mounted near the lower extremity of a composite lever 56 and is moved toward and away from an adjacent scrolled edge 57 of the strip 21 by means of a cam 58 working through the lever. The cam fits on a web 59 of the press crankshaft and is fastened thereto by screws 60.

The composite lever 56 (see Figs. 1 and 2) is secured to a pin 61 which is mounted to pivot in bearings 62 of a bracket 63 which is secured to the press frame. The composite lever is made up of a cam roll lever 64 and a gauge lever 65. A roller 71 is rotatably mounted in a fork 72 formed in the lever 64, and is normally held against the cam 58 by spring pressure in a manner to be described in detail later.

The cam roll lever 64 (Fig. 2) is normally held in an adjusted position relative to a short upper arm 73 of the gauge lever 65 by an adjustment device broadly designated by the numeral 74. The adjustment device comprises a shouldered and threaded screw 75, one threaded end 76 being screwed into the upper end of the short lever arm 73 and being held in its adjusted position by a lock nut 77.

In this adjusted position a shoulder 78 of the screw 75 engages the roll lever 64 holding it spaced from the short lever arm 73. A stem 81 of the screw passes through a hole 82 formed in the roll lever and terminates in another threaded end 83, a spring 84 being located intermediate the lever 64 and lock nuts 85 which are located on the threaded end 83. Washers 86 are placed at the ends of the spring 84 to prevent twisting of the spring during adjustment of the nuts 85.

The gauge block 51 is adjusted laterally with respect to the strip 21 and the die 13 by means of the adjustment screw 75 just described. Further separation of the two levers adjacent the screw withdraws or retracts the gauge block away from the stationary die edge 14, and less separation of the levers positions the block closer to the die edge. An exact desired lateral setting of the block relative to the die may be obtained in this manner.

A long lower arm 91 of the gauge lever 65 terminates at its lower end in a block 92. Channelled side plates 93, 94 are mounted on opposite sides of the block and are held in an adjusted position thereon by a bolt 95, which extends through holes formed in the side plates and through an elongated slot 101 formed in the block, and a nut 102 threaded on the bolt. This adjustment of the side plates relative to the arm 91 is limited by the length of slot 101.

The plate 93 is formed with a horizontal arm 105 and the gauge block 51 is secured to its under side. The plate 94 is extended downwardly as a flat, unchannelled section 106 which forms the lowermost extremity of the composite lever 56. This section projects into a slot 111 (Figs. 2 and 3 of a return spring bracket 112 which is secured by bolts to the bolster plate of the press. The slot 111 is made relatively deep and its side walls serve as guides and prevent twisting and side-play of the arm 91 or the gauge block 51 during the gauging operation.

The forward edge of the plate section 106 engages a spring barrel 115 of a spring 116, both being mounted in a bore 117 of the bracket 112. This construction maintains pressure against the lower end of the composite lever 56 and tends to move it counterclockwise, as viewed in Fig. 2, on the pin 61 so that the cam roll 71 is held yieldingly against the cam 58 as previously mentioned.

Spring 84 of the adjustment device 74 exerts a pressure at all times greater than that exerted by spring 116, but any excessive abnormal pressure on the composite lever which tends to further rotate the lever counterclockwise is taken up by compression of the spring 84. This feature, therefore, prevents undue straining of the relatively light composite lever.

The pressure arm 52 is pivotally mounted on a pin 121 (Figs. 3 and 4) which is held in a bracket 122 secured to the discharge table 32. The block is adjusted laterally with respect to the strip and die edges by means of a stop-screw 123 which threadedly engages and projects through the arm 52 and is held in adjusted position by a lock nut 125. In such adjusted position the innermost portion of the block, which is a curved surface 126, is positioned close to the die edge 15.

When a side 128 of a scrolled edge 129 of the advancing strip 21 engages the curved surface 126, the block may be yieldingly pushed back and away from the die edge 15 or the strip may be laterally moved as its scrolled edge rides on to the curved surface. The yielding of the block is made possible by a spring 131 which is mounted on a stud 132 having two threaded ends, one of which extends through a hole 133 formed in the arm 52 and this end is screwed into the bracket 122. The other end of the stud accommodates adjustable lock nuts 134 by means of which the desired compression is put on the spring 131 so that it exerts the correct pressure on the block.

As the feed bar 24 reaches the end of its forward stroke and as the strip 21 is thus advanced to an approximate cutting position between the die members, the gauge block 51 is moved inward from the position shown in Fig. 3 to that shown in Fig. 4. Simultaneously, the yielding pressure of the arm 52 becomes effective on the edge 129 of the strip. This insures proper seating of a pair of sloping edges 141, 142 of the strip against cooperating sloping surfaces 145, 146 of the gauge block 51, the surfaces being formed substantially as counterparts of the pair of sloping edges.

If the approximate positioning of the strip by the feed bar has left the strip "short positioned," that is not quite fully advanced, the surface 145 of the gauge makes its first contact with the strip on the strip's sloping edge 141, and as the

strip is pushed "home" to fully seated position in the gauge block 51 by the yielding pressure of the arm 52, the strip is moved forward or longitudinally into fully gauged position. In doing this the edge 141 slides over the gauge surface 145 until the edge 142 stops on the gauge surface 146. In this fully gauged position the parts are disposed as shown in Fig. 4. In addition to the longitudinal positioning just described, the lateral movement of the gauge simultaneously has positioned the strip laterally so that the lithographed area 55 is accurately centralized over the die edge 15.

A strip which has been "overthrown" or is too far advanced in the approximate positioning by the feed bar is returned backward or longitudinally to its accurately gauged position. For this backward movement the surface 146 makes the first contact with the edge 142 and this sliding engagement pushes the strip back or toward the left as viewed in Figs. 3 and 4, until it is centralized in the fully gauged position shown in Fig. 4.

After the strip is thus accurately centralized, a punch stripper ring 151 (Figs. 1 and 2) which moves down with the die 12, engages the upper surface of the strip 21 and holds it flat under pressure supplied by a spring 152 while the dies 12, 13 perform the cutting operation. The stripper is of familiar construction in punch press design and comprises a rod 153 to which the ring is attached, a bracket 156 secured to the slide, and a stationary bracket 157 secured to the press frame. The rod extends through bearings in both brackets, the spring 152 being housed in bracket 156 and applying downward pressure to a collar 158 pinned to the rod.

After the press operation is completed and while the slide is rising, the gauge block 51 returns to its retracted position and the arm 52 resumes its normal inward position as shown in Fig. 3. When all the inner portions constituting the work have been removed from a strip, the remaining skeleton is still bound outwardly or laterally by intact scroll edges and is a scrap area representing a minimum of wastage for the strip.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine adapted to remove an inner portion of a strip having a scroll edge which embodies adjacent recesses, the combination of die means for severing a portion from the strip which lies between adjacent recesses, and means operating on the sides of two adjacent recesses prior to said severing operation for gauging the strip relative to said die means.

2. In a machine adapted to remove a lithographed portion of a strip having a scroll edge which embodies adjacent projections, the combination of die means for severing from the strip a lithographed portion which is located adjacent a said projection, and gauge means operating on opposed edges of a said projection prior to a severing operation of said die means for gauging the strip relative to the die means to insure accurate removal of said lithographed portion.

3. In a machine adapted to remove inner portions of a strip having recurring scroll pattern edges, the combination of means for successively advancing said strip between removal operations, and gauging means adapted to operate on opposite edges of recurring patterns consisting of projections of said scroll edge to accurately position said strip before each removal operation.

4. In a machine adapted to remove inner portions from a strip having scroll edges, the combination of die means for severing the desired portions of the strip, means for successively advancing said strip between severing operations, and movable gauging means located adjacent the path of advance of said strip and opposite to the place of the die operation and adapted to operate upon a said scroll edge and at substantially right angles to the path of travel of the strip to gauge it for each severing operation.

5. In a machine adapted to operate on a strip having scroll edges, the combination of means for successively advancing said strip between operations, gauging means located adjacent the path of advance of said strip and movable into engagement with a said scroll edge and at substantially right angles to said path and at the termination of said strip advance for positioning the strip for a said operation, and a cooperating yielding pressure means also located adjacent the path of advance of said strip but opposed to said gauging means for engaging the opposite edge of said strip to insure adequate gauging contact for said gauging means.

6. In a machine adapted to remove inner portions from a strip having recurring scroll pattern edges, the combination of means for successively advancing said strip between removal operations, gauging means located adjacent the path of advance of said strip and movable at substantially right angles to said path and into engagement with a said strip edge, said gauging means including a portion shaped substantially as a counterpart of a section of the recurring scroll pattern on the strip edge and utilizing said section to gauge said strip for each removal operation.

7. In a punch press adapted to stamp portions from a strip of stock having a recurring scroll pattern edge, the combination of means for stamping portions from said strip, means for advancing said strip between stamping operations, means for guiding said strip during said advancement, said advancing and guiding means cooperating to initially position said strip relative to said stamping means, a gauge located alongside of the path of advance of said strip, and a face on said gauge shaped substantially as a counterpart of a recurring portion of the said scroll pattern on the edge of said strip, and adapted to engage and cooperate with the same to finally and accurately position said strip relative to said stamping means prior to each stamping operation.

WILLIAM J. MERCER.