March 25, 1941. A. J. SCHWISOW 2,235,948

PERFORATING, SCORING, AND PUNCHING ATTACHMENT FOR PRINTING PRESSES

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Fig. 1.

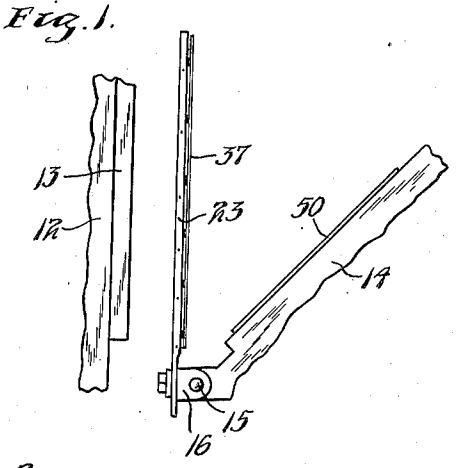


Fig. 2.

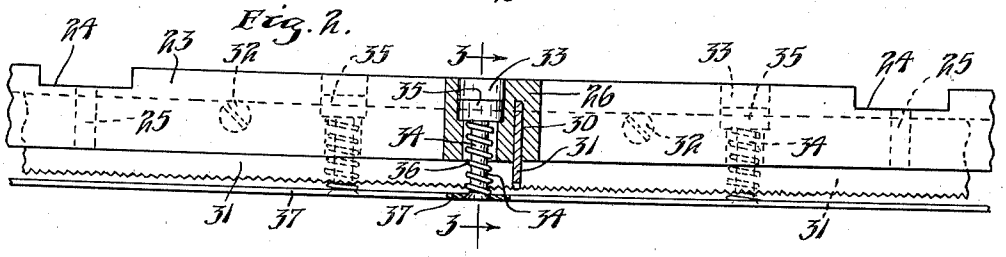


Fig. 3.

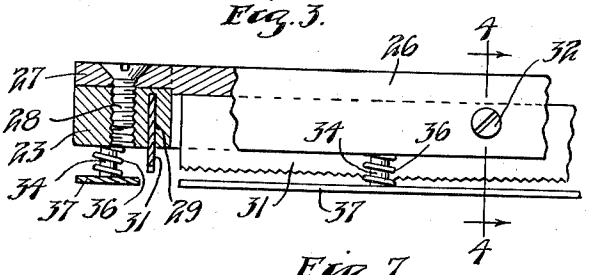


Fig. 4.

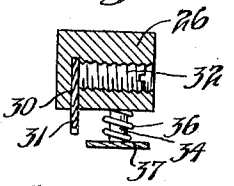


Fig. 7.

Fig. 5.

Fig. 8.

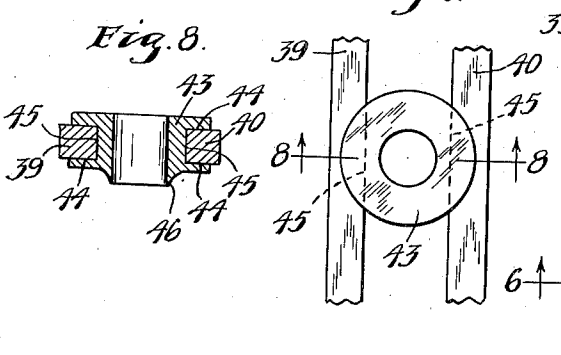
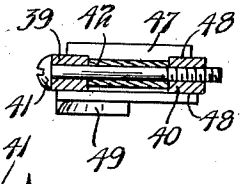


Fig. 6.



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Fig. 10.

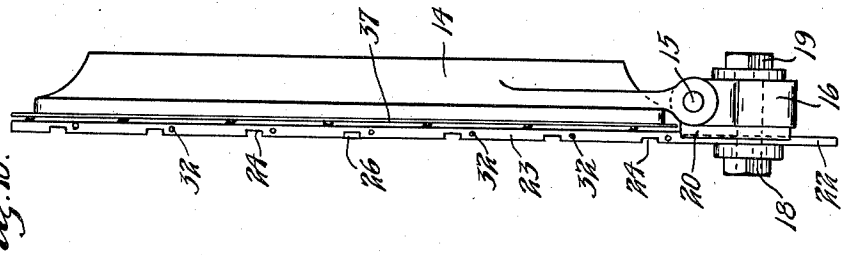


Fig. 9.

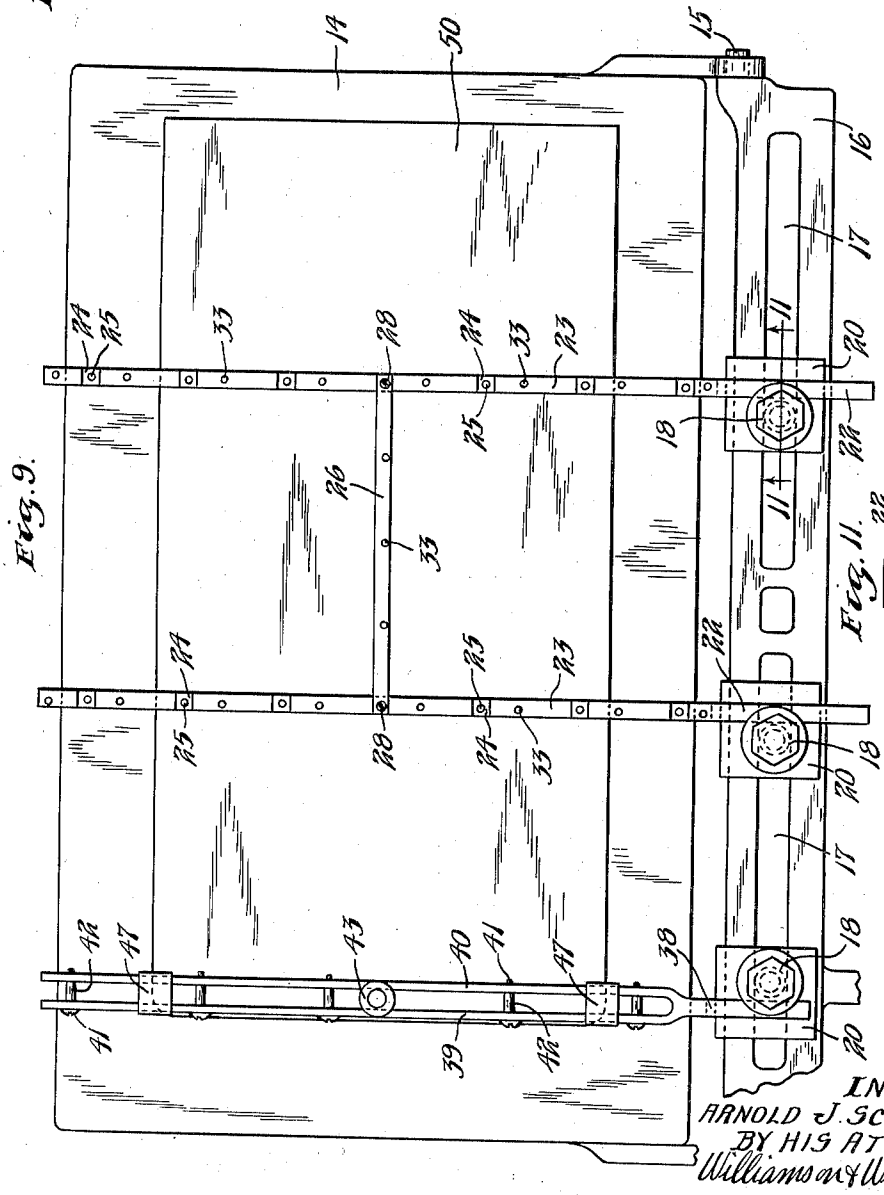
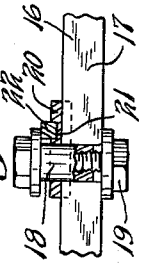


Fig. 11.



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PERFORATING, SCORING, AND PUNCHING ATTACHMENT FOR PRINTING PRESSES

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Application August 26, 1939, Serial No. 292,077

3 Claims. (Cl. 164—98)

This invention relates to printing machines and more particularly to apparatus for perforating, cutting and creasing paper on the well-known oscillating platen type of press.

Numerous devices have been heretofore devised particularly for perforating single sheets of paper at the time these sheets are printed. In general, they customarily include a rocker bar carrying gripper arms and having yieldably mounted perforating blades on the gripper arms. Some types of apparatus have been supplied with stripper mechanism for pulling the paper away from the perforating blades, but the stripper mechanism has not always functioned as efficiently as desired. Other apparatus has been used for punching holes in the paper such as are used for pages to be inserted in loose-leaf binders, but their proper position relative to the printing on the page is often difficult to secure.

It is a general object of my invention to provide a printing press structure wherein sheets being printed can be simultaneously perforated, cut or creased in a highly efficient manner, and wherein the perforating or creasing mechanism is adjustable to meet various types of perforating requirements and wherein the paper is effectively gripped and subsequently stripped from the perforator or cutter so that the printing is not blurred or otherwise rendered unsatisfactory.

Another object of the invention is the provision of improved punching mechanism which is extremely flexible in adjustment so that it can be positioned relative to an adjustable perforating or cutting blade.

A further object of the invention is the provision of a corner cutting die which is flexibly mounted for wide ranges of adjustable positioning so that it can be accurately set relative to the area to be printed and also relative to lines to be perforated or cut.

Still a further object of the invention is the provision of a rocker bar which adjustably supports rods carrying perforating, line cutting or creasing devices as well as hole punching and corner cutting dies which are all independently adjustable to secure the greatest flexibility of operation of such devices during the actual printing step.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the views, and, in which:

Fig. 1 is a diagrammatic fragmentary side elevation of a printing press showing the general relationship of my invention to the platen and the type bed;

Fig. 2 is an enlarged fragmentary detail in side elevation of a rod constructed in accordance with my invention and supporting a perforating blade and a stripper element;

Fig. 3 is a transverse section taken approximately on the line 3—3 of Fig. 2;

Fig. 4 is a section taken approximately on the line 4—4 of Fig. 3;

Fig. 5 is an enlarged fragmentary detail in plan view of a pair of rods supporting a corner cutting die;

Fig. 6 is a section taken approximately on the line 6—6 of Fig. 5;

Fig. 7 is an enlarged fragmentary plan of a pair of rods supporting a hole punching die;

Fig. 8 is a section taken on the line 8—8 of Fig. 7;

Fig. 9 is a front elevation of a press platen with a form of my invention mounted in conjunction therewith;

Fig. 10 is an end elevation of the structure shown in Fig. 9; and

Fig. 11 is an enlarged section taken on the line 11—11 of Fig. 9.

In the following detailed description where I mention a perforating blade it is understood that this term is to include an elongated cutting blade or shear mechanism or a creasing blade. Where a cutting die or dies are mentioned this is understood to mean a hole punching die or a corner cutting die. Furthermore, the term rod is intended to include any of those rods or arms which are connected to the rocker bar adjacent the base of the platen and which may function as gripper fingers, supports for the perforating straight line cutting and creasing devices as well as those pairs of rods used to adjustably support the hole punching dies and corner cutting dies.

In Fig. 1 there is shown the usual support 12 for a chase 13 within which is mounted a bed of type not shown. A portion of the platen 14 is shown hingedly supported at 15 and it is adapted to swing upwardly to a vertical position and thence move horizontally to the type bed. The details of this mechanism are conventional. Associated with the platen 14 is a rocker bar 16 which extends across the press adjacent the base of the platen and is customarily adapted to carry the usual gripper fingers which press the sheets of paper firmly against the platen during the printing operation. The rocker bar 16 moves forwardly with the platen 14 as the platen is pressed against

the type bed with the paper contacting the type faces.

The rocker bar 16 is provided with a pair of elongated openings 17 and in these openings are positioned a plurality of headed sleeves 18. These sleeves extend into the apertures of the rocker bar 16 and are threadedly connected with bolts 19 extending into the apertures from the opposite side of said rocker bar. The elements 18 and 19 removably and slidably secure clamp elements 20 to the rocker bar as clearly shown in Figs. 9 and 11. Each of the clamps 20 has a groove 21 formed therein as shown in the section in Fig. 11, and, as shown in Fig. 9, the central and right-hand clamps 20 removably receive the lower ends 22 of pairs of identical upstanding rods 23 which are longitudinally adjustable in the grooves of said clamps. The rods 23 are provided with a plurality of rectangular cut-outs 24, each of which has a threaded aperture 25 which extends entirely through the rods 23. A cross rod 26 has undercut ends 27 which are adapted to fit into oppositely disposed cut-outs 24 in the two parallel rods 23 and said rod 26 is secured thereto by means of suitable studs 28. It will be seen that the cross rod 26 can be moved to different vertical positions spanning the parallel rods 23. It is also contemplated that a plurality of cross rods 26 of different lengths can be provided in which case the clamps securing the lower ends of rods 23 to the rocker bar 16 can be shifted to vary the spacing between the said vertical rods 23 according to the widths desired, and a cross rod of appropriate width can be inserted between said vertical rods in the same manner as the rods 26.

The pair of rods 23 and rod 26 are provided with longitudinal channels 29 and 30 to receive perforating blades 31 therein. It will be seen from the sections in Figs. 3 and 4 that the perforating blades 31 closely fit the channels 29 and 30 and they are rigidly but removably secured therein by means of threaded studs 32, such as shown in the cross bar 26 in Fig. 4. Furthermore, the perforating blades 31 are preferably longitudinally slidable in the rods 23 and 26 so that they can be set to various positions in accordance with the particular job. It is, of course, obvious that the perforating teeth are positioned along the exposed edge of each of the perforating blades 31 as best shown in Fig. 2.

The rods 23 and 26 are provided with a plurality of apertures 33 which are enlarged at one end. In these apertures are slidably mounted pins 34 having enlarged heads 35, said heads lying in the enlarged portions of the apertures 33. On each of the pins 34 is a helical spring 36 and the lower ends of said pins as viewed in Fig. 2 carry an elongated flexible strip of metal 37 with the lower ends of the springs bearing against said strip 37 and normally forcing it away from each of the rods 23 and 26. It should be further noted in Figs. 1, 3 and 4 that the strips 37 which function as combined grippers and strippers are urged outwardly by the springs 36 from the rods 23 and 26 a distance greater than the outward extent of the toothed edges of the perforating blades 31.

It should be understood that the parallel rods 23 can be shifted from one side to the other side of sleeves 18 and bolts 19 merely by swinging the clamps 20 about said sleeves so that the range of adjustability of the rods 23 along the rocker bar 16 is increased.

The rods for supporting the cutting dies are illustrated in Figs. 5 through 8 and at the left-hand side of Fig. 9. This rod unit comprises a lower rectangular end 38 which is preferably of the same shape and size of the lower ends 32 of the previously described rods 23. The rod base 38 extends upwardly and is bifurcated to provide a pair of parallel elements 39 and 40 which are somewhat flexible. At spaced intervals along the rod-like elements 39 and 40 are pairs of axially aligned openings extending through the rod elements, the apertures in the rod element 39 being smooth walled and slightly larger than the opposite apertures in the rod element 40 which are threaded. Bolts 41 extend through these pairs of apertures and each bolt carries a spacer sleeve 42 which is slidable on the bolt. Thus the rods can be drawn together by the bolts 41 to a certain minimum determined by the lengths of the sleeves 42.

As shown in Figs. 7 and 8 a hole cutting die 43 is positioned between said rod elements 39 and 40. The die 43 has a pair of guide flanges 44 formed thereon, and the bottom of the channels formed by said guides 44 are flattened along the dotted lines 45 in Fig. 7 to provide sliding surfaces which contact opposite side faces of the rod elements 39 and 40. The die 43 is provided with a circular cutting edge 46 which is adapted to cut through the paper being printed.

In Figs. 5 and 6 the rods 39 and 40 are shown supporting a substantially rectangular cutting die block 47 which is provided with guide flanges 48 generally similar to the flanges 44 on the die block 43. On the under face of the die block 47 is a round corner cutting blade 49. This die is adapted to slide between the rod elements 39 and 40, and said die as well as the die 43 can be rigidly clamped between said round elements by tightening the bolts 41 connecting said rod elements. It is, of course, understood that the lengths of the sleeves 42 are slightly less than the minimum distance required between the rod elements 39 and 40 to tightly clamp said die blocks.

The face of the platen carries a tympan which is adapted to underlie the sheet 50 being printed which receives the teeth of the perforating blade and the edges of the cutting die after they have penetrated the paper. This tympan is of the customary type ordinarily used in printing machinery.

As shown in Fig. 9 the apparatus can be adjustably set to any desired position for different sized sheets of paper and can be utilized in its simplest form merely with the two vertical rods 23 as a gripper mechanism where no cutting or perforating is done. The vertical rods 23 can be supplied with perforating blades to form lines of vertical perforations and the cross rod 26 can be attached with a perforating blade therein to provide cross perforations. Obviously the bar 26 can be used for cross perforating while the rods 23 can be utilized merely as gripper rods without perforating blades as desired.

At the same time with any of these desired arrangements of the rods carrying the perforating blades, it is possible to punch holes in the sheet being printed and simultaneously to use the corner cutting die 47 for rounding the corners of a sheet. Each of the bars 23 can be moved along the rocker bar 16 independently of the other, and the cutting die carrying bars 39 and 40 can be moved laterally on the rocker bar 16 while the cutting dies 43 and 47 can be vertically adjusted independently of each other so that an extremely flexible variation of operations can be produced.

The vertical adjustability, particularly of the vertical rods **23** is of importance. It may frequently be necessary to position the horizontal rod **26** at a point which would not coincide with the location of a pair of the notches or cut-outs **24**. In this case, the rods **23** can be moved up or down relative to their rocker bar clamps to the exact position desired.

The perforating blades **31**, as stated above, are rigidly held by the vertical rods **23** and the cross rod **26**, these blades being longitudinally slidable in the slots **29** and **30** in said rods but at the same time so retained therein that there is no possibility of said blades becoming bent. The combined gripper and stripper elements **37** provide highly effective mechanism which will exert even pressures on the paper as the platen comes into contact with the type firmly securing the paper while the impression is being made and as the platen leaves the type said flexible and resiliently mounted elements **37** will smoothly and evenly retain the paper on the platen while the perforating blades **31** are being removed.

While I have shown perforating blades substantially coextensive with the lengths of the rods **23** and **26**, it is contemplated that shorter blade sections can be used. They can be spaced to produce a gap in the line of perforations, and where desired, a strip of knife-like blade can be inserted with or without toothed perforating blade sections.

The structure is extremely compact and in no way interferes with the actual printing operation and the actual device can be made much lighter in construction than it appears to be in the drawings since its size was exaggerated with respect to the fact of the platen to more effectively illustrate the structural features thereof.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

1. In a printing press having a type bed, a movable platen, and a rocker bar, a rod secured to said rocker bar and extending across the face of said platen, said rod being forked and including a pair of substantially parallel spaced elements, cutting dies having oppositely disposed guides slidably contacting said spaced elements to support said dies between them, and means for connecting said spaced elements, said connecting means being adjustable to vary the spacing between said elements whereby said dies are releasably secured against sliding movement between said rods.

2. In a printing press having a type bed, a movable platen and a rocker bar, a pair of rods connected to said rocker bar and lying substantially normal thereto, the connection between said rods and said rocker bar permitting longitudinal movement of said rods normal to said bar, perforating blades mounted on said rods and longitudinally movable thereon, a third rod connected to said rocker bar and movable longitudinally in a direction substantially normal to said rocker bar, and punching and corner cutting dies longitudinally movable on said last mentioned rod.

3. In a printing press having a type bed and movable platen, a rocker bar, a clamp member longitudinally slidable on said rocker bar, and a gripper rod connected to said clamp member and extending substantially normally to said rocker bar, said rod being longitudinally slidable in said clamp member, said clamp member including a plate and a headed bolt, and said rod being shiftable from one side of said bolt to the other, and said plate being of such size that said rod will be clamped between the plate and headed bolt on either side of said bolt.

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