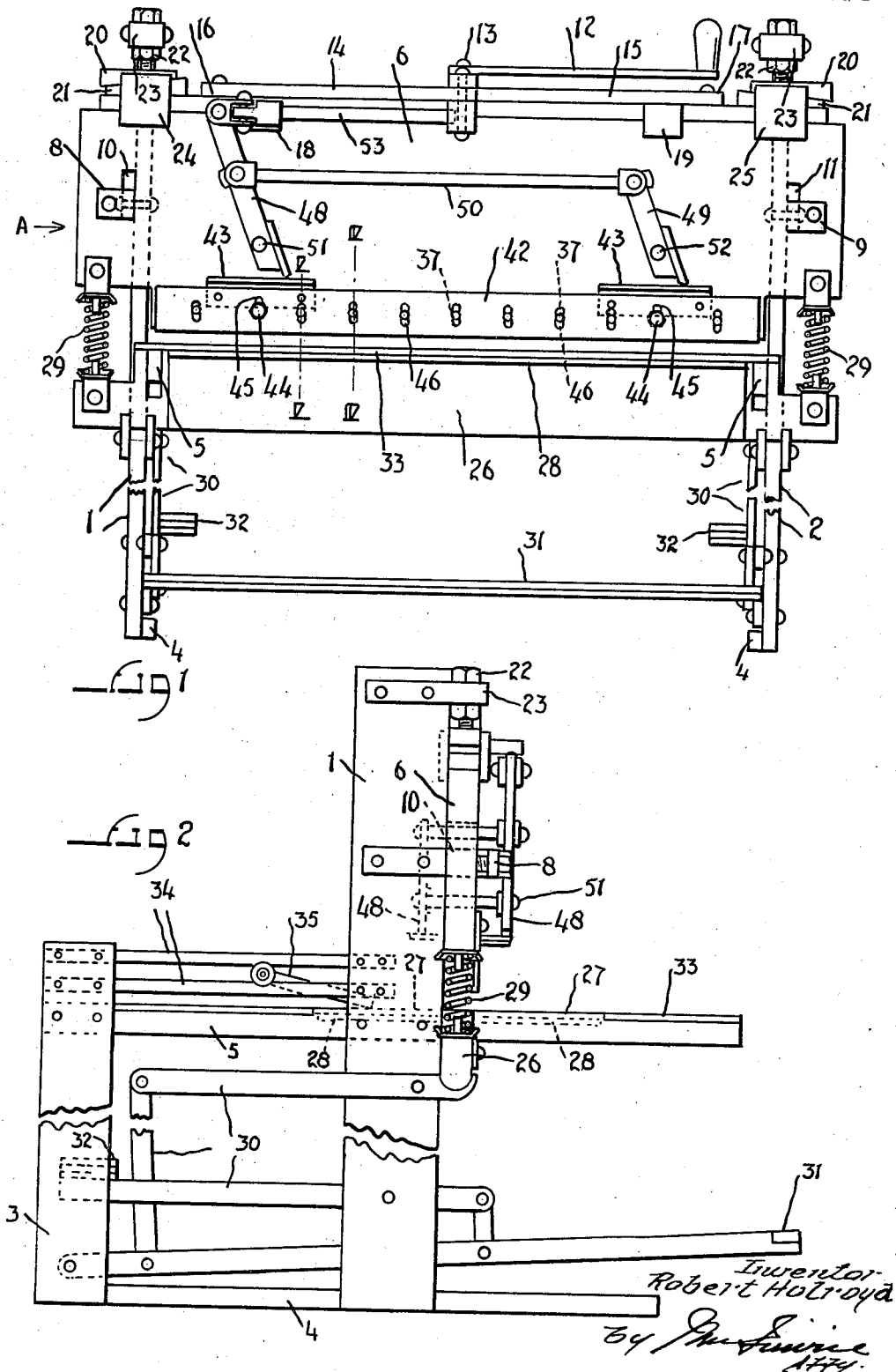


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Aug. 15, 1939.

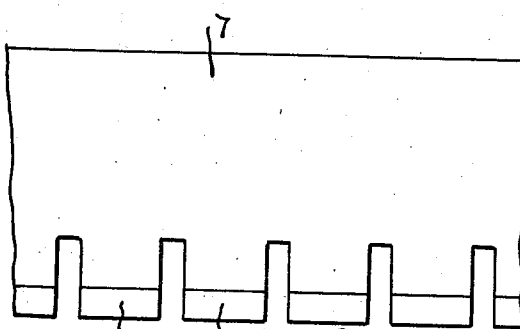
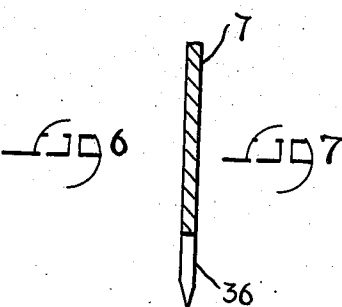
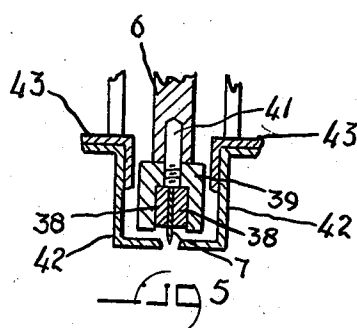
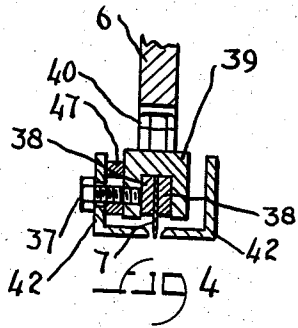
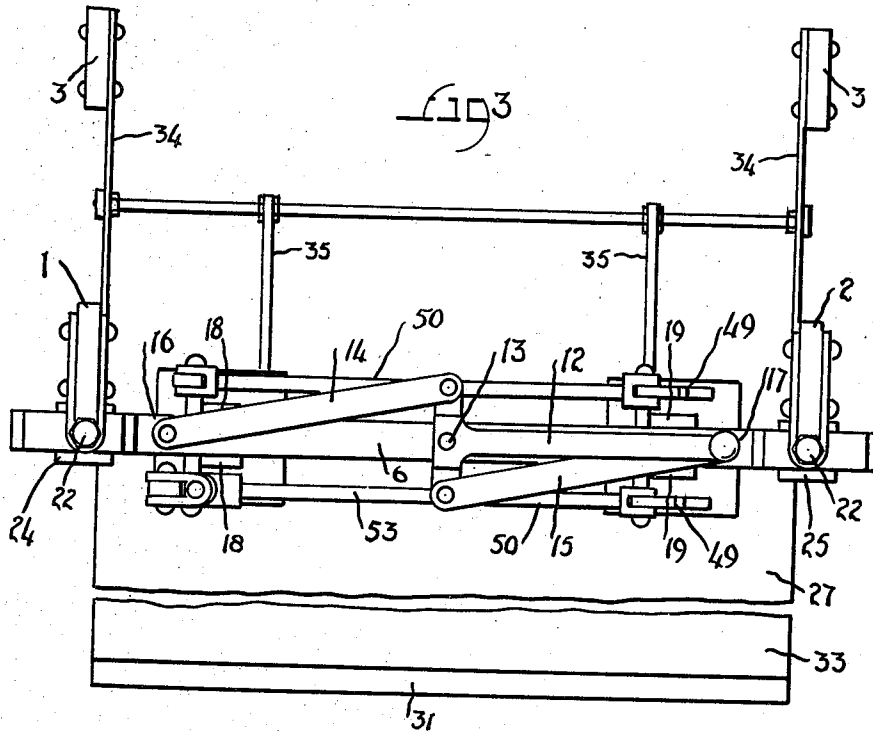
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2,169,799

PERFORATING MACHINE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PERFORATING MACHINE

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In Great Britain January 26, 1938

5 Claims. (Cl. 164—86)

This invention relates to perforating machines such as are used for effecting simultaneous perforation of a plurality of sheets of paper or the like.

Machines of this kind are in use comprising a plurality of perforating pins. These are generally open to the disadvantage that considerable expense is incurred in replacing the perforating parts which cannot be sharpened satisfactorily for their purpose and, further, that generally substantial force is required to operate them. Printing machines have also been used in which the perforating means comprises a rule formed with relatively short tapered teeth, but these latter machines have generally been handicapped by the paper sticking to the teeth of the perforating rule if used for the simultaneous perforation of a plurality of sheets of paper.

The object of the present invention is to minimize the above disadvantages.

According to the invention, therefore, I provide a perforating machine comprising a bed whereon the paper to be perforated may be carried, a perforating rule or rules the teeth of which are relatively long and finely tapered so as not to split the paper, spring or like means whereby the bed and the rule are normally held apart to permit ready insertion of the paper, e. g. the maximum number of sheets adapted to be perforated by said teeth, and means whereby prior to the perforating action the bed and the rule are brought into closer relationship with the paper therebetween, whereafter perforation is carried out.

For example, the means whereby the bed and rule are brought into closer relationship as previously mentioned may comprise complementary wedges or equivalent members whereby initial adjustment of the perforating rule or rules towards the bed of the machine may be effected independently of the means whereby the bed and the rule are forced relatively together to effect the perforation.

As a further feature of the invention, means is provided, operable in part by the means whereby prior to the perforating action the bed and the rule are brought into closer relationship, for freeing the paper from the rule after perforation.

Such means may conveniently comprise ejector members (e. g., angle irons or equivalent) mounted so as to be slidable in a plane substantially parallel with that in which the perforating rule moves. For example, the perforating rule itself may be carried in a substantially channel section housing between gripping blocks which, by

means of clamping screws or equivalent, are pressed together against the upper part of the rule, and the ejector members may be provided with slotted holes and mounted by bolts or equivalent passing therethrough, so that said ejector members are movable in a plane substantially parallel with that in which the perforating rule moves.

In order that the ejector members may be depressed so as to free the paper from the rule after perforation, they may be provided with bearing plates or equivalent adapted to be depressed by a lever system operable by a part of the means for bringing the bed and the rule into closer relationship prior to the perforating action.

Preferably, said lever system is pivotally mounted upon a machine member which carries the perforating rule, the arrangement being such that the pivotal movement of the lever system is so super-imposed upon the movement of the machine member aforesaid that the ejector members are depressed below the cutting edge of the rule in order to free the paper after perforation when the said machine member is moved away from the bedplate by the reaction of means in which energy is stored by the means for bringing the bed and the rule into closer relationship prior to the perforating action.

In order that the invention and its mode of operation may be more clearly understood, a preferred embodiment will now be described, by way of example, with reference to the accompanying drawings in which:

Fig. 1 is a side elevation of a perforating machine according to the invention.

Fig. 2 is an end elevation of the machine shown in Fig. 1, looking in the direction of the arrow A.

Fig. 3 is a plan view of the machine shown in Fig. 1.

Fig. 4 is a section on the line IV—IV, Fig. 1.

Fig. 5 is a section on the line V—V, Fig. 1.

Fig. 6 is a sectional view of the perforating blade.

Fig. 7 is a side elevation of part of the perforating blade.

Referring to Figs. 1, 2 and 3, the frame of the machine comprises stanchions 1 and 2, and stay bars 3, 4 and 5. A top plate 6 adapted to carry a perforating rule 7 in a manner to be described hereafter, is mounted so as to be slidable in a vertical plane on the stanchions 1 and 2 by means of brackets 8 and 9 bolted to the stanchions 1 and 2 and passing through slots 10 and 11 in the top plate 6.

The movement of the top plate 6 is caused by a hand operated double bell crank lever 12 pivoted at 13 on the top plate 6. Actuating arms 14 and 15 are provided with cross-heads 16 and 17 sliding in guides 18 and 19 fixed to the top plate 6. Spacing means comprising complementary wedges 20 and 21, the upper pair 20 of which are held and adjusted by set screws 22 in straps 23 are retained by the guide plates 24 and 25 on the top plate 6.

A bottom plate 26 carries an adjustable bed-plate 27 of soft sheet brass mounted by means of a bracket 28. Said bottom plate 26 is connected to the top plate 6 by helical springs 29 and is movable in the vertical plane by means of a lever system 30 operated by a pedal 31 and provided with balance weights 32.

A table 33 is carried by the stay bars 5 and slides 34 connected to the stay bars 3 and the stanchions 1 and 2 are provided for the mounting of adjustable feeders 35.

Referring to Figs. 6 and 7, the perforating rule 7 is formed with a plurality of teeth 36, which are relatively long and finely tapered as compared with the usual previously known machines so as not to split the paper and, as will be seen in Figs. 4 and 5, it is mounted by clamping screws 37 between gripping blocks 38 contained in a channel section housing 39, which is fixed to the top plate 6 by bolts 40 and dowel pins 41.

As shown in Figs. 1, 4 and 5, angle section ejector members 42 carry wearing plates 43 and are mounted on the top plate 6 by bolts 44 which pass into the channel section housing 39 but only so far as will not interfere with the effect of the gripping blocks 38, through slotted holes 45 in said ejector members 42 so that the latter may be movable in the vertical plane. Additional slotted holes 46 are provided in the ejector members 42 through which pass the clamping screws 37, the latter being spaced from the channel section housing 39 by packing pieces 47.

Referring to Fig. 1, lever 48 and 49 abutting on the wearing plates 43, one pair on each side of the top plate 6, connected by tie rods 50 are pivoted at 51 and 52 respectively and operable by levers 53 controlled by the double bell crank lever 12, the arrangement being such that as the double bell crank lever 12 is forced away from the operator the levers 48 and 49 are caused to depress the wearing plates 43 and with them the ejector members 42.

In operation, the double bell crank lever 12 is manually forced away from the operator to cause the wedges 20 and 21 to slide relative to each other, thus allowing the springs 29 to raise the top plate. The paper to be perforated is placed upon the brass plate 27, its position being adjusted by the feeders 35. The double bell crank lever 12 is now drawn towards the operator forcing the wedges 20 and 21 together and depressing the top plate 6 against the action of the springs 29. Foot pressure is applied to the pedal 31 thus raising the bottom plate 26 and with it the paper against the perforating rule 7 and effecting perforation.

The foot pressure is then released and the toggle lever 12 again forced away from the operator thus raising the top plate 6 and depressing the ejector members 42 by means of the levers 48

and 49 and freeing the paper from the perforating rule 7.

I claim:

1. A perforating machine comprising in combination a bed whereon the paper to be perforated may be carried, a perforating rule the teeth of which are relatively long and finely tapered, mounting means therefor, resilient means whereby the bed and the rule are normally held apart to permit ready insertion of the paper, complementary wedge means and control means therefor whereby initial adjustment of the perforating rule towards the bed of the machine may be effected prior to perforation and independently operable means whereby the bed and the rule are forced relatively together to effect perforation.

2. A perforating machine comprising in combination a bed whereon the paper to be perforated may be carried, a perforating rule having teeth, mounting means therefor, means whereby the bed and the rule are normally held apart to permit ready insertion of the paper, adjustable spacing means for normally holding the rule and bed in predetermined spaced relation and manually operable means, whereby prior to the perforating action said spacing means are adjusted to cause the rule to be brought into closer relationship with the paper therebetween, independent means for forcing the bed relatively to and toward the rule to effect perforation, and ejector means, operable by said spacing means for freeing the paper from the rule after perforation.

3. A perforating machine comprising in combination a bed whereon the paper to be perforated may be carried, a perforating rule or rules the teeth whereof are relatively long and finely tapered mounted in a substantially channel section housing between gripping blocks by clamping screws, resilient means whereby the bed and the rule are normally held apart to permit ready insertion of the paper, complementary wedge means and control means therefor whereby initial adjustment of the perforating rule towards the bed of the machine may be effected prior to perforation, independently operable means for forcing the bed and the rule relatively together to secure perforation and ejector members mounted so as to be slidable in a plane substantially parallel with that in which the perforating rule moves and operated so as to free the paper from the rule after perforation, by said wedge control means when it is being employed to move the perforating rule away from the bed of the machine after perforation.

4. A perforating machine, as claimed in claim 1, in which the wedge control means comprises a double bell crank lever pivoted upon the mounting means for the perforating rule operable so as to force the complementary wedges together and thereby to depress the perforating rule against the action of the resilient means for holding the bed and the rule normally apart.

5. A perforating machine, as claimed in claim 2, in which the ejector means comprises a lever system, and means whereby the movement of the spacing means and said lever system are super-imposed so as to free the paper from the rule when the latter is retracted from the bed.

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