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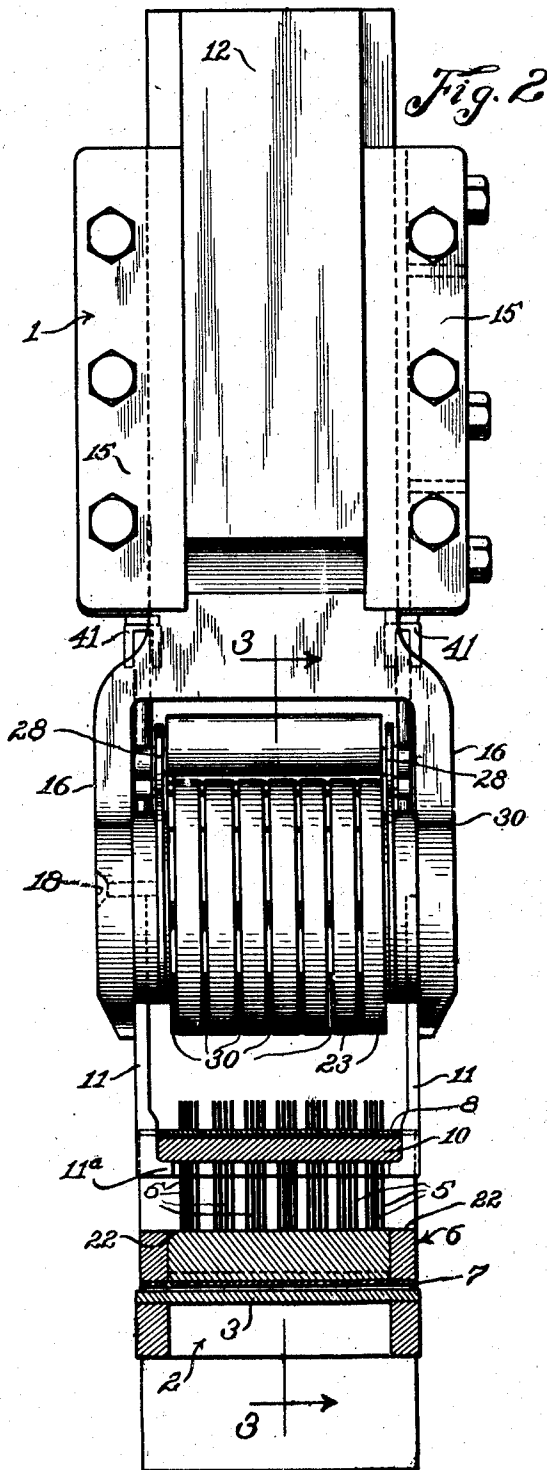
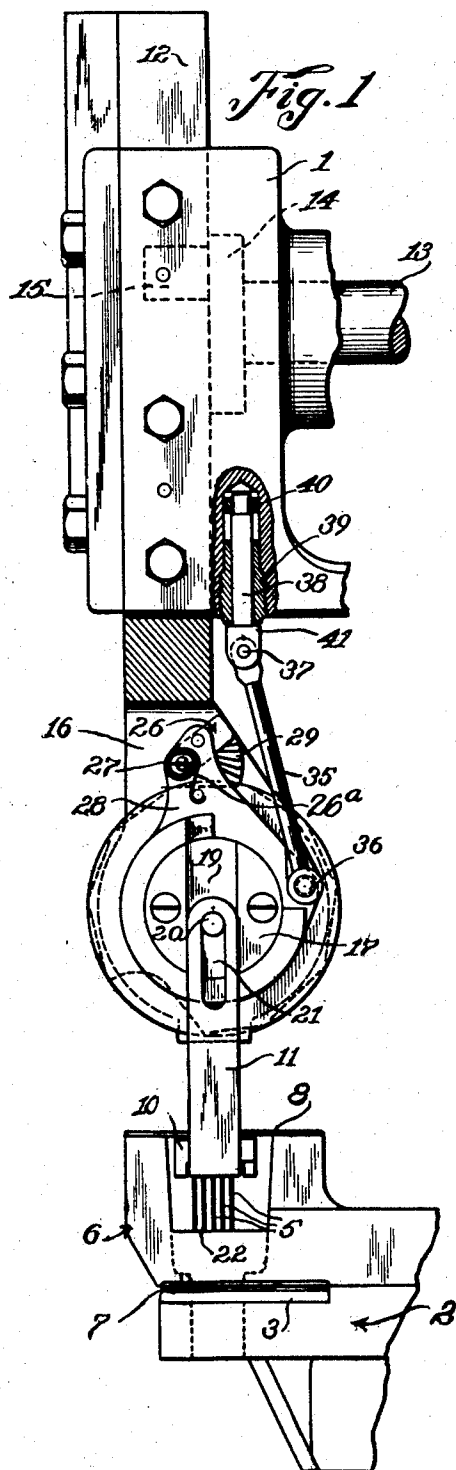
E. G. RIX

1,982,453

PERFORATING MACHINE

Filed Jan. 19, 1934

2 Sheets-Sheet 1



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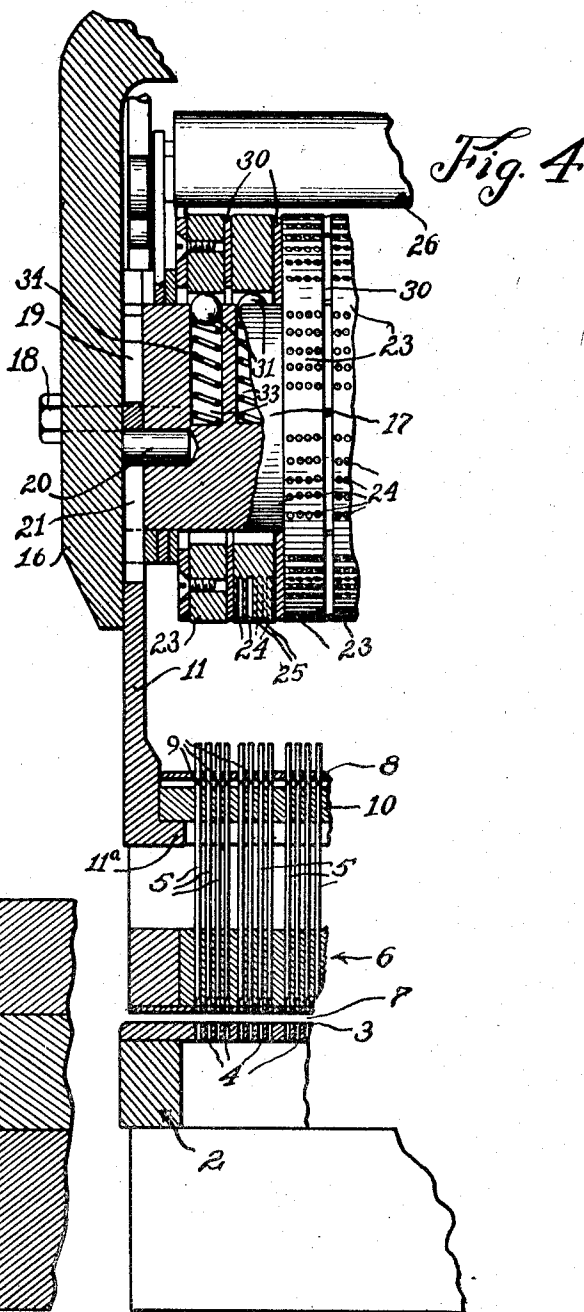
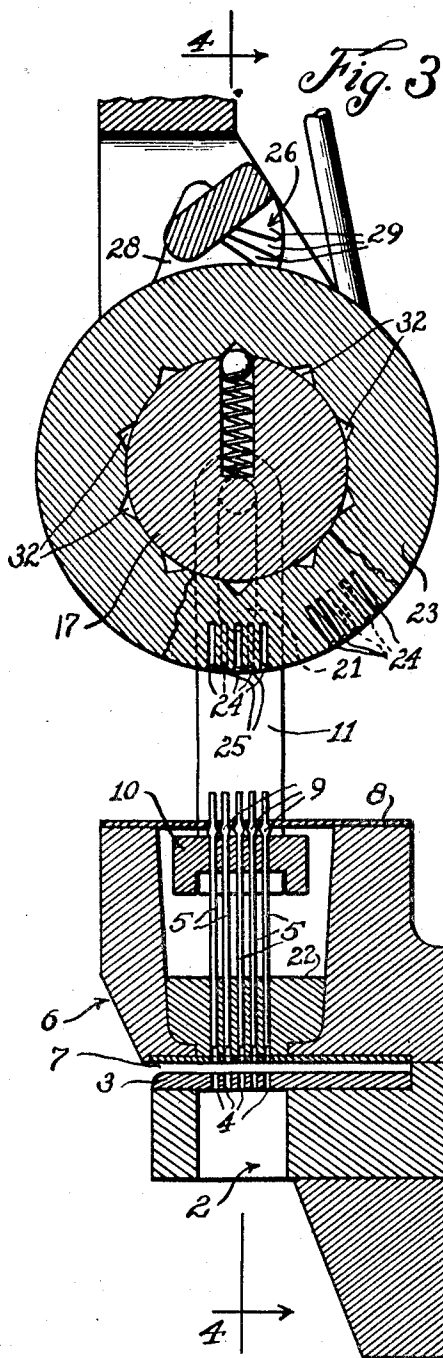
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

1,982,453

## PERFORATING MACHINE

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Application January 19, 1934, Serial No. 707,239

8 Claims. (Cl. 101—19)

This invention relates to a perforating machine and more particularly to an automatic change perforating machine for perforating sheets of paper and the like with predetermined indicia.

One of the objects of my invention is to provide an automatic change perforating machine in which improved means are provided for advancing the numbering wheels or rings during the upstroke of the head and after the punches have cleared the openings in the rings.

A further object is to provide such a construction in which the operation will be simple and reliable and will involve the use of a relatively small number of comparatively simple parts.

A further object is to provide such a construction which will enable rapid operation of the machine.

Further objects and advantages of the invention will appear from the description and claims.

In the drawings:

Figure 1 is a side elevation of the punch and die portion of a machine incorporating one embodiment of an invention;

Fig. 2 is a front elevation of the mechanism shown in Fig. 1;

Fig. 3 is a vertical section taken on a line corresponding to line 3—3 of Fig. 2; and

Fig. 4 is a vertical section on a line substantially corresponding to line 4—4 of Fig. 3.

Referring to the drawings in detail, the embodiment illustrated comprises a head 1 which forms a part of the frame of a perforating machine and is arranged to support a part of the operating mechanism, a die-shoe 2 positioned under the head 1, and a die member 3 supported on the die-shoe 2 and provided with a plurality of holes 4 to receive cooperating punches 5, preferably in groups as illustrated and supported in alignment with the holes 4 by means of a punch holder 6 into which they extend and through which they move in performing a punching operation. The punch holder 6 forms a guide for the punches and is secured to the die-shoe 2 in a manner to provide a slot 7 between it and the die plate 3 to receive the material to be punched.

The upper ends of the punches 5 are supported in position by means of a perforated plate 8 through which they extend. The punches 5 are normally held in raised position as illustrated in Fig. 2 and are maintained in this raised position by means of enlarged portions 9 on the punches. These enlarged portions normally rest on a lifter plate 10, which lifter plate is supported on the intumed ends 11<sup>a</sup> of upwardly extending

lifter hook members 11. The hook members 11 are supported on a suitable punch operating member located above the punches and which will be described later.

The punch member is so constructed that when it is moved downwardly by suitable mechanism, the lifter hooks 11 and the lifter plate 10 supported thereby will be lowered and the punch operating member will cause predetermined punches to punch the desired indicia.

The punch operating mechanism comprises a vertically slidable member 12 supported in suitable ways in the head 1. This punch operating member is preferably reciprocated by means of a rotatable shaft 13 having a disc 14 thereon on which a roller 15 is eccentrically mounted which extends into a transverse slot in the slide member whereby the slide member will be reciprocated by a rotation of the shaft 13. The slide member 12 is provided with downwardly extending spaced arms 16 and a cylindrical shaft or arbor 17 of comparatively large diameter is fixed therebetween by means of screws 18.

A vertical groove 19 is provided in each end of the arbor 17, and the upwardly extending lifter hooks 11, which latter normally support the punches 5 in raised position, extend into these grooves 19 and are slidable therein, and, when the slide 12 is in raised position, as in the drawings, they are supported in these grooves on pins 20 extending into slots 21 in the hook members. Therefore, when the slide 12 is moved downwardly the hooks 11 and the lifter plate 10 supported thereby also move downwardly until they rest on the oppositely disposed surfaces 22 of the punch holder 6, thereby allowing the groups of punches 5 to be forced downwardly by punch operating discs or rings 23 which are mounted for rotation on the arbor 17.

Each ring 23 is in alignment with a corresponding group of punches and each is provided with holes 24 into which predetermined non-perforating punches may extend during the punching operation. As a matter of convenience in illustration, these holes 24 are not shown in Fig. 2 but the rings including the holes are shown in detail in Figs. 3 and 4. Each ring is also provided with depressions 25 for engaging predetermined punches of its corresponding group for perforating the desired indicia. In the embodiment shown, the periphery of each disc 23 is divided into ten sections and in each section a group of holes and depressions is located, each section, therefore, providing either a hole or a depression for each punch in a cooperating group. By

this arrangement the discs may be intermittently and consecutively rotated to bring predetermined sections of the discs into alignment, whereby consecutive indicia may be perforated by consecutive operation of the punch member.

A comb-like pawl 26 is pivoted at 27 on carrier plates 28 which latter are pivotally mounted for oscillation on the shaft 17. The pawl 26 is provided with comb-like teeth 29 which are arranged to engage successively the teeth of ratchet members 30 one of which is secured to each disc 23. The pawl is held in yieldable engagement with one or more of the ratchets by means of a spring 26<sup>a</sup>. The ratchet teeth 29 are of varying lengths corresponding to the order in which it is desired to rotate the discs.

Each ring is resiliently maintained against rotation by means of a ball 31 engaging in a corresponding notch 32 in its corresponding disc. These balls 31 are supported in holes 33 in the shaft 17 and are maintained in engagement with the notches by means of springs 34. It will be apparent that by oscillating arms 28 and the pawl 26 located thereon, the ring 23 may be intermittently and consecutively moved to present the consecutive faces of the discs to the groups of plungers.

In order to oscillate the pawl 26 in synchronism with the punching operation, links 35 are pivoted to each of the oppositely disposed carrier plates 28 at 36. The links 35 are also pivoted at 37 to slidable rods 38 which are mounted in bushings 39 secured in the head 1. The upper end of each rod 38 is provided with a head 40 and the lower end with a shoulder 41. The head 40 and shoulder 41 are, relative to the bushing 39, spaced in a manner to provide lost motion between the rod 38 and the bushing 39. The operation of the device is as follows: When the punch operating mechanism, including the rings 23, is moved downwardly the links 35 and rods 38 will move therewith until the head 40 on the rod 38 engages the top of the bushing 39. During the remainder of the downward movement the link 35 will cause arms 28 and pawl 26 thereon to be rotated anti-clockwise to a position behind succeeding ratchet teeth on the ratchets 30. When the punch member is again raised the shoulder 41 will engage the bushing 39 and the pawl 26 will thereby be moved to the position shown in Fig. 1 whereby one or more of the punch operating rings 23 which may be engaged by the pawl 26, will be rotated to present succeeding faces to the punches.

The lost motion between the rod 38 and the bushing 39 provides for operating the pawl 26 to move the rings 23 only during the upper portion of the upward stroke of the punch operating members thereby allowing the non-perforating punches 5 to be completely withdrawn from the holes 24 in the rings and the perforating punches to be completely removed from the depressions 25 before the pawl 26 effects a movement of the rings 23.

The structure may be varied from the specific embodiment herein illustrated without departing from the spirit of the invention, and it is desired therefor, that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. An automatically advanced number punching apparatus comprising a frame, a plurality of

independently operable punches, a reciprocable head, a plurality of punch-operating rings rotatably mounted on said head and having perforations to receive the ends of non-operated punches during a punch-actuating movement of the head, and means for advancing said rings during the withdrawal movement of the head and after the rings have been withdrawn sufficiently to clear the ends of the punches.

2. An automatically advanced number punching apparatus comprising a frame, a plurality of independently operable punches, a reciprocable head, a plurality of punch-operating rings rotatably mounted on said head and having perforations to receive the ends of non-operated punches during a punch-actuating movement of the head, and means for advancing said rings during the withdrawal movement of the head and after the rings have been withdrawn sufficiently to clear the ends of the punches, said advancing means comprising a pawl member for advancing the rings and an oscillatable pawl carrier mounted on said head.

3. An automatically advanced number punching apparatus comprising a frame, a plurality of independently operable punches, a reciprocable head, a plurality of punch-operating rings rotatably mounted on said head and having perforations to receive the ends of non-operated punches during a punch-actuating movement of the head, means for advancing said rings during the withdrawal movement of the head and after the rings have been withdrawn sufficiently to clear the ends of the punches, said advancing means comprising a pawl member for advancing the rings and an oscillatable pawl carrier mounted on said head, and a lost motion mechanism for operating said pawl carrier.

4. In a perforating machine, a frame, a group of punches, a reciprocating punch-operating head, a rotatable member on said head and having groups of openings therein to receive non-perforating punches, said rotatable member serving to operate the remainder of the group of punches, and lost motion means between said frame and said rotatable member and arranged to move said member during reciprocation and after withdrawal from said non-perforating punches to present a succeeding group of perforations.

5. In a perforating machine of the character described, a frame, a group of punches, a reciprocating punch-operating head, a rotatable member on said head and having groups of openings therein to receive non-perforating punches and serving to operate the remainder of the group of punches, a ratchet and pawl mechanism for rotating said rotatable member, and lost motion mechanism between said pawl and said frame, said lost motion mechanism comprising means connected with said pawl and having a portion extending adjacent said frame, and means on said frame and cooperating with said portion to operatively move said pawl during reciprocation and only after withdrawal from said non-perforating punches.

6. In a perforating machine, a frame, a group of punches, a reciprocating punch-operating head, a rotatable member on said head and having groups of openings therein to receive non-perforating punches, said rotatable member serving to operate the remainder of the group of punches, and lost motion means between said frame and said rotatable member and arranged to move said member during reciprocation and

after withdrawal from said non-perforating punches to present a succeeding group of perforations, said lost motion means comprising a ratchet on said rotatable member, a movable pawl supporting member, a pawl on said last mentioned member and in operable relation with said ratchet, an arm on said pawl supporting member and extending adjacent said frame, and means on said frame for operating said arm and providing a lost motion between said frame and said pawl.

7. In a perforating machine, a frame, a group of punches, a reciprocating punch-operating head, a rotatable member on said head and having groups of openings therein to receive non-perforating punches, said rotatable member serving to operate the remainder of the group of punches, and lost motion means between said frame and said rotatable member and arranged to move said member during reciprocation and after withdrawal from said non-perforating punches to present a succeeding group of per-

forations, said lost motion means comprising a ratchet on said rotatable member, an oscillatable member, a pawl on said oscillatable member and in operable relation with said ratchet, a member mounted for limited movement on said frame, and a link connecting said oscillatable member and said limited movement member.

8. An indicia perforating machine of the character described comprising a frame, a reciprocating head, a plurality of rotatable discs on said head and having a plurality of groups of holes and depressions around the periphery thereof, a group of punches in alignment with each disc, oscillating pawl means for advancing said discs to consecutively position groups of depressions and holes in alignment with said punches and a lost motion connection between said pawl means and said frame to intermittently rotate said discs during the latter portion of the upward movement of said head.

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| 25 | 100 |
| 30 | 105 |
| 35 | 110 |
| 40 | 115 |
| 45 | 120 |
| 50 | 125 |
| 55 | 130 |
| 60 | 135 |
| 65 | 140 |
| 70 | 145 |
| 75 | 150 |