Jan. 28, 1936. E. S. ROSCOE 2,028,848

PERFORATOR

Filed Aug. 25, 1933

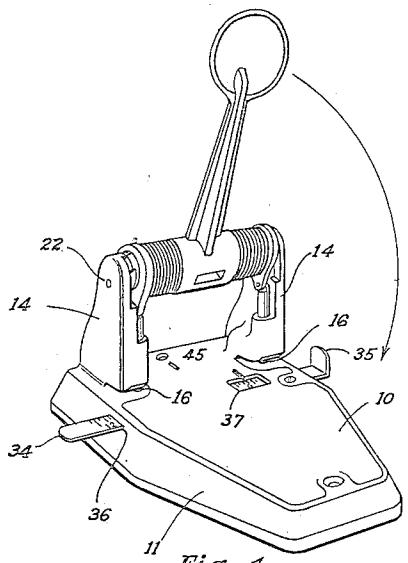


Fig. 1

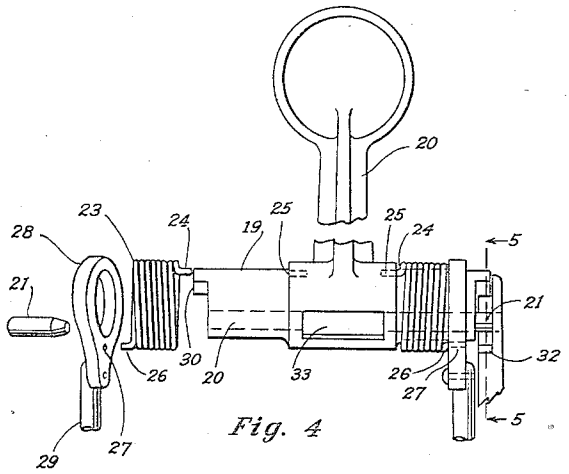


Fig. 4

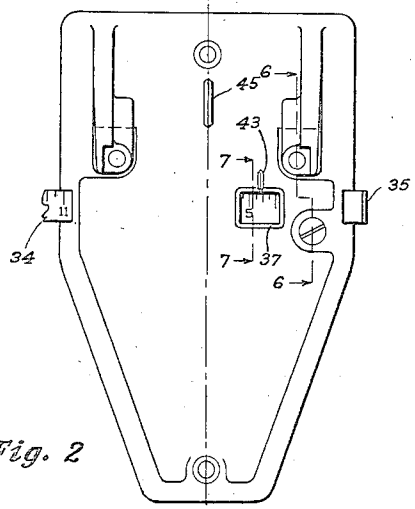


Fig. 2

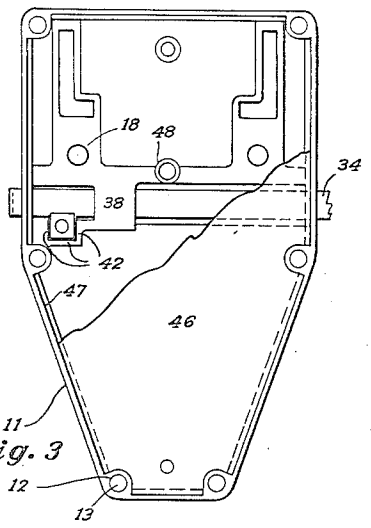


Fig. 3

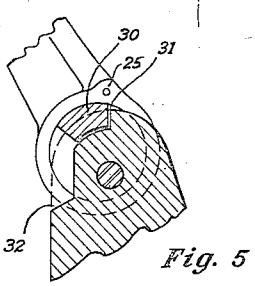


Fig. 5

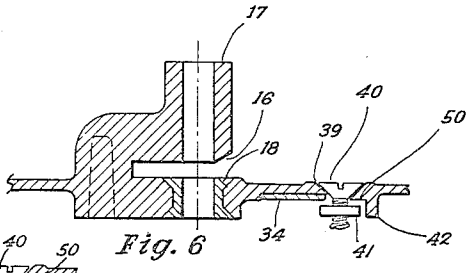


Fig. 6

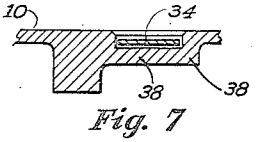


Fig. 7

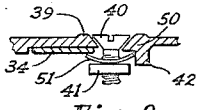


Fig. 8

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PERFORATOR

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Application August 25, 1933, Serial No. 686,787

12 Claims. (Cl. 164—91)

This invention relates to perforators or punches employed to perforate or punch holes in correspondence papers and the like, so that they can be bound into a suitable file.

The main feature of the invention relates to a perforator which is relatively inexpensive to manufacture, easy to assemble, sturdy in construction and which is reliable in operation.

Another feature of the invention resides in the spring arrangement for restoring the punch operating lever and the related punches to their normal position at the top point in their stroke.

A further feature of the invention resides in a novel gauge arrangement which is readily legible, is easily adjusted and which serves to indicate the position on the sheet or sheets where the perforations will be made by the perforator.

These and other features of the invention will appear from the detailed description and the claims when taken with the drawing in which Fig. 1 is a perspective view of a perforator of the present invention; Fig. 2 is a top plan view of the perforator with the operating lever and its eccentric shaft together with the restoring springs and punches removed therefrom; Fig. 3 is a bottom view of the perforator with a portion of the bottom pan broken away; Fig. 4 is a front view of the movable parts of the perforator including the operating lever and its eccentric shaft in which view the right hand restoring spring, the eccentric shaft and the punch are shown in their normal position, whereas, the corresponding parts at the lefthand end of the eccentric shaft are shown in exploded relation; Fig. 5 is a detailed sectional view taken on the sectional line 5—5 of Fig. 4; Fig. 6 is a detailed sectional view taken on the section line 6—6 of Fig. 2; Fig. 7 is a detailed sectional view taken on the line 7—7 of Fig. 2, and Fig. 8 is a cross sectional view, similar to that illustrated in Fig. 6, illustrating a modified arrangement for locking the gauge in its adjusted position.

In the drawing, 10 designates a base preferably of cast metal, such as zinc die casting. As best shown in Fig. 3, the base has a downwardly extending chamfered border flange 11 which is provided at its corners with bosses 12 to receive feet of rubber or other suitable material (not shown). The upper face of the base at its rear corners has cast integral therewith perforated uprights 14 in which the moving parts of the perforator are mounted. At the junction of the upright 14 with the base 10, there are provided chamfered kerfs 16 to receive the margin of the paper or papers to be perforated. Each upright 14 as shown in Fig. 6 is cast with a vertical punch guide opening 17 while the base proper has cast therein, hardened steel bushings 18 having openings therein in vertical alinement with the punch guide openings.

The movable parts of the perforator include an eccentric shaft 19 having a handle 20' either cast integral therewith or secured thereto by pins or other suitable fastening means. The shaft 19 in each end has a longitudinal bore 20 eccentrically positioned with respect to the main axis thereof, into each of which bores a pin 21 of such size as to make a driving fit therewith is driven. Each pin 21 is journaled in a horizontal opening 22 in one of the uprights 14 which openings are in horizontal alinement so that the eccentric shaft rotates on these pins. A torsion spring 23 surrounding each end of the eccentric shaft 19 has one end 24 bent as indicated to engage an opening 25 in the shoulder formed by the head of the handle 20', and has its other end 26 bent to engage an opening 27 in an eccentric strap 28. Each strap is rotatable on an end of the eccentric shaft 19, as illustrated at the righthand portion of Fig. 4 and has pivotally mounted thereon a hardened steel punch 29 the lower end of which extends into one of the guides 17. Each end of the eccentric shaft 19 is cut away to form a stop 30 protruding from the end of the shaft which stop cooperates with the shoulders 31 and 32 formed in each upright 14 to limit respectively the upward and downward strokes of this shaft and its handle 20'. It has been mentioned that the pins 21 make a driving fit with their respective bores 20 and it should be noted that these bores communicate with an enlarged opening 33 in the lower side of the shaft so that the pins can be driven through the bores into this opening whence they will drop through, when it is desired to remove the eccentric shaft from the uprights 14.

In a perforator of this type, it is necessary to provide a gauge such as 34 having an upstanding end 35 which serves to locate the paper or papers so that the perforations therein may be positioned in the perforator in a predetermined relation with respect to one edge of the sheets. This gauge, which is formed of sheet metal and which is suitably marked with graduations and suitable legends, such as numbers, passes through openings 36 in the side flanges of the base. The base is provided with a window 37 which has an index 43 formed at an intermediate point on one edge thereof so that the gauge markings can be seen at both sides of the index. Beneath this window, there is cast directly beneath the window,

a bridge 38 of substantially the same area as that of the window (see Figs. 2 and 3) which bridge serves to support the gauge even when the gauge is withdrawn from an opening in one of the side flanges of the base. Since the perforator is used to perforate various sizes of sheets, it is necessary to have this gauge adjustable and for this purpose the base is provided with a countersunk opening 39 adjacent the edge of the gauge, which opening has mounted therein the head of a screw 40. This screw is provided with a nut 41, the upper surface of which, as shown in Fig. 6, frictionally engages a portion of the lower surface of the gauge and a portion of the lower surface of the base to hold the gauge in the desired adjusted position. As indicated in Figs. 3 and 6, the base is cast with shoulders 42 which engage three sides of the nut 41 to prevent it from turning whenever the screw 40 is being adjusted.

An optional arrangement of the gauge locking mechanism as disclosed in Fig. 8 includes a spring washer 51 placed above the nut 41 in contact with the bottom of the gauge 34 at one edge and with the face of casting 50 at the other edge. In this arrangement the tightening of the screw 40 applies spring pressure to the gauge 34 thereby effecting any desired friction against gauge movement as well as positively locking it if the screw is turned tightly enough.

The base is also provided with a raised lug or projection 45 spaced between the uprights 14 to serve as an indicator useful in positioning a sheet or sheets with respect to the punches in proper relation to any predetermined point along the margin of the sheet or sheets.

On the underside of the base there is provided a pan or bottom cover which not only functions to receive the punched out parts of the paper, but also serves to give a finished appearance to the bottom of the perforator. This pan is shaped to engage the bosses 12 and to rest on a ridge 47 formed in the border flanges 11, in which position the pan is held on the base by a screw (not shown) engaging the threaded boss 48 cast into the base.

In assembling the perforator, the eccentric shaft 19 has mounted thereon, the torsion springs 23 with the end 24 of each spring inserted into the opening 25. Thereafter, the eccentric straps 28 are placed on the free ends of the eccentric shaft 19 so that the ends 26 of the torsion springs engage the openings 27 in these straps. Then, the punches 29 carried on the eccentric straps are inserted in the vertical guides 17 and the eccentric shaft with parts thus assembled thereon, is positioned so that its bores 20 are in alinement with the openings 22 in the uprights 14. Thereafter, the pins 21 are driven through the openings 22 into the bores 20 until the free end of each pin is substantially flush with the side face of its related upright 14. The gauge 34 is assembled in the base by inserting its straight end through the openings in the side flanges 11 having the graduations visible through the window 37, in which position it is clamped by the adjusting screw 40 and its nut 41.

In disassembling the operating parts of the perforator, the pins 21 are driven through the bores 20 until they drop through the opening 33. Thereafter, the several parts assembled on the eccentric shaft may easily be removed in the reverse order to that followed in assembling these parts.

It will be noted that the upward and downward stroke of the eccentric shaft 19 and its handle 20' are definitely limited by the shoulders 31 and 32 on the uprights 14. Furthermore, by supporting the punches on the eccentric straps which are rotatable on the ends of the eccentric shaft 19, the maximum leverage is available when the load (that is the work done in perforating the papers) is greatest since the eccentric straps approach their dead center positions at the top of the stroke. Furthermore, by using the torsion springs according to the arrangement herein disclosed, these springs tend to effect a quick return of the shaft 19 and its handle to its uppermost position. This results from the fact that the torsion springs exert an efficient lifting action on the eccentric shaft, even when it approaches its dead center position, a condition limiting the characteristic of compression springs which push directly on the punches or the eccentric straps.

It will be understood that the present disclosure is given by way of example since there can be numerous variations and modifications thereof within the scope of the following claims without departing from the spirit of the invention.

What I claim is:

1. In a device of the class described in combination, a pair of spaced supports, a shaft eccentrically mounted in said supports, a reciprocating part actuated by said shaft, a torsion spring having one end actuated by the rotation of said shaft and having its other end moving with said reciprocating part.

2. In a perforator, a base having a pair of spaced supports, an eccentric shaft journaled in said supports, said shaft being provided with a lever to rotate the same, an eccentric strap mounted on each end of said shaft, a punch supported on each eccentric strap, and a torsion spring for at least one end of said shaft, said spring having one end anchored to said shaft and the other end anchored to said eccentric strap.

3. In a device of the class described in combination, a pair of spaced supports, a shaft eccentrically mounted in said supports, an eccentric strap having a reciprocating part attached thereto, said strap being actuated by said shaft, and a torsion spring actuated by the rotation of said shaft and having its other end anchored to the eccentric strap.

4. In a perforator, a base having a pair of spaced supports and at least one punch guide, a shaft eccentrically journaled in said supports, said shaft being provided with an operating lever, an eccentric strap mounted on at least one end of said shaft, a reciprocating member attached to said eccentric strap to slide in said guide, and at least one torsion spring having one end movable with said shaft and having its other end movable with said eccentric strap.

5. In a device of the class described in combination, a pair of spaced uprights, a shaft eccentrically mounted in said uprights, a strap rotatable on said shaft, a reciprocating element suspended from said strap, and a torsion spring encircling said shaft, said spring having one end movable with said shaft and having its other end movable with said strap.

6. In a perforator, a base having a pair of spaced supports, a rotatable shaft eccentrically mounted on said supports, at least one reciprocating member actuated by said eccentric shaft, and a torsion spring encircling said shaft, said spring having one end actuated in accordance with the movement of said shaft and having its other end engaging said reciprocating member.

7. In a device of the class described in combination, a pair of spaced uprights, a shaft eccen-

trically mounted in said uprights, a handle attached to said shaft, a strap rotatably mounted on said shaft at each end thereof, a reciprocating element suspended from each strap, and a torsion spring at each end of said shaft, each spring encircling an end portion of said shaft and having one end movable with said shaft and having its other end movable with an adjacent strap.

8. In a perforator, a base having a pair of spaced uprights and a pair of punch guides, an eccentric shaft journaled in said uprights, said shaft being provided with a handle, an eccentric strap mounted on each end of said shaft, a punch supported on each eccentric strap and extending into a related punch guide, and a torsion spring for each end of said shaft, each spring having one end anchored to said shaft and at its other end anchored to an eccentric strap.

9. In a perforator, a base having a pair of spaced uprights and provided with spaced punch guides, an eccentric shaft journaled in said uprights, said shaft being provided with a handle, an eccentric strap mounted on each end of said shaft, a punch pivotally supported on each eccentric strap and extending into a related punch guide, and a torsion spring encircling each end of said shaft, each spring having one end engaging a point on said shaft and its other end engaging a point on said eccentric strap.

10. In a perforator, a base having a pair of spaced uprights and provided with punch guides spaced from said base, bushings secured in said base in vertical alinement with said punch guides and forming dies for punches, an eccentric shaft journaled in said uprights, said shaft being provided with a handle, an eccentric strap mounted on each end of said shaft, a punch pivotally supported on each eccentric strap and extending into a related punch guide, and a torsion spring encircling each end of said shaft and having one end anchored in a hole in said handle, and the other end anchored in a hole in a related eccentric strap.

11. In a device of the class described in combination, a pair of spaced uprights, each upright having a guide, a shaft eccentrically mounted in said uprights, said shaft being provided with a lever and a pair of spaced shoulders at an intermediate portion thereof, and a strap rotatably mounted on said shaft at each end thereof adjacent one of said uprights, a punch element suspended from each strap and extending into a related guide, and a torsion spring encircling each end of said shaft and having one end anchored in an opening in said shoulder and having its other end anchored in an opening in a related strap.

12. In a perforator, a base provided with spaced uprights having openings in horizontal alignment, a shaft provided with a lateral opening and having longitudinal bores eccentrically positioned in alinement with respect to its main axis which bores communicate with said opening, pins freely rotatable in said openings and making a driving fit with the walls of said bores, punches operated by said shaft, and dies with which said punches cooperate.

EDWIN S. ROSCOE.