May 15, 1956 A. F. BROOK 2,745,492

PUNCH FOR PERFORATING SHEETS TO RECEIVE THE RINGS OF MECHANICAL BINDINGS

Filed Sept. 16, 1953 2 Sheets-Sheet 1

Fig. 1.

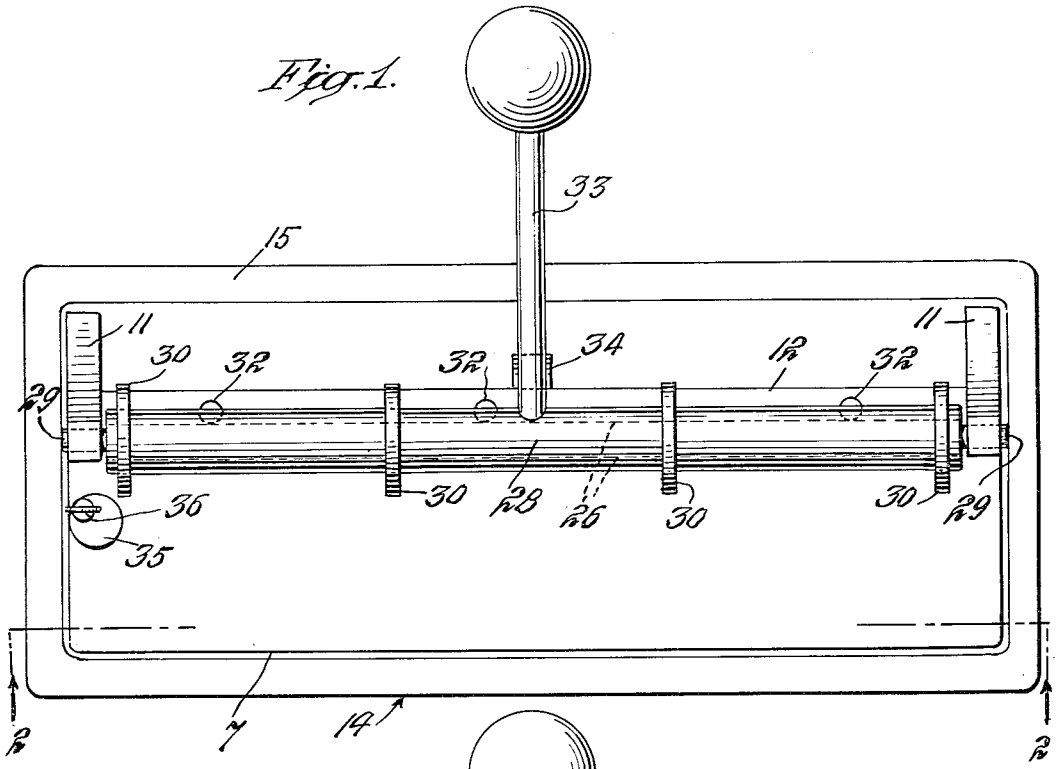
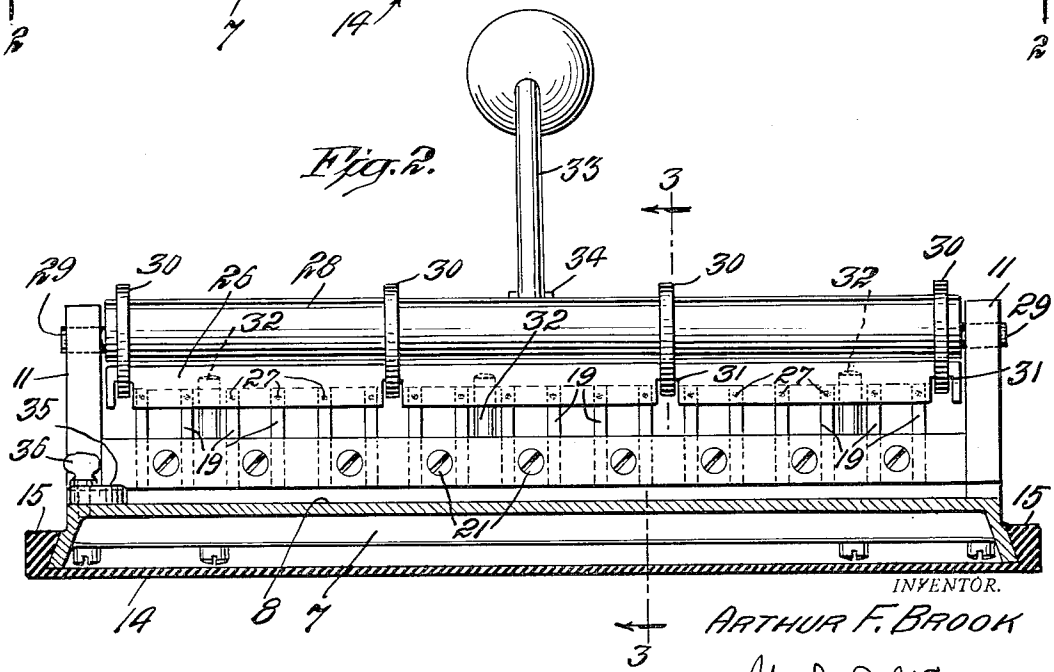


Fig. 2.



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Fig. 3.

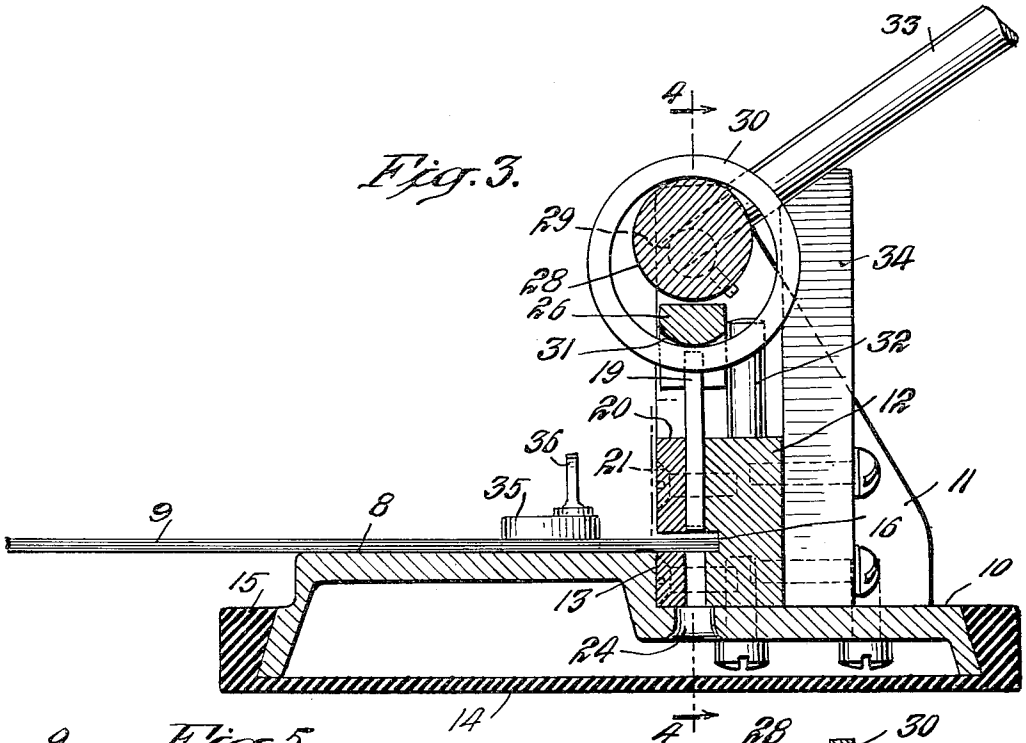
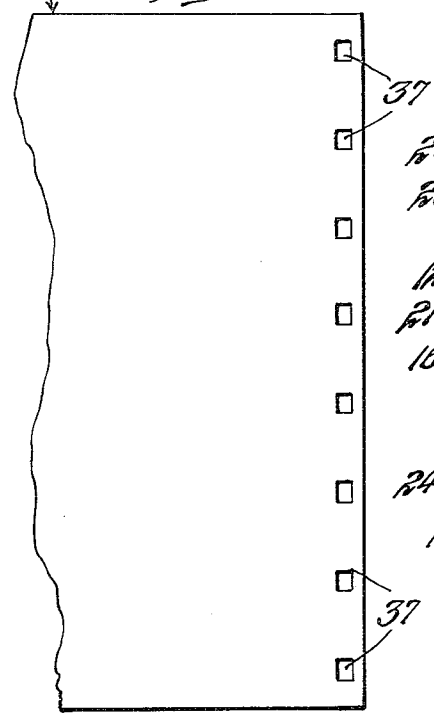


Fig. 5.



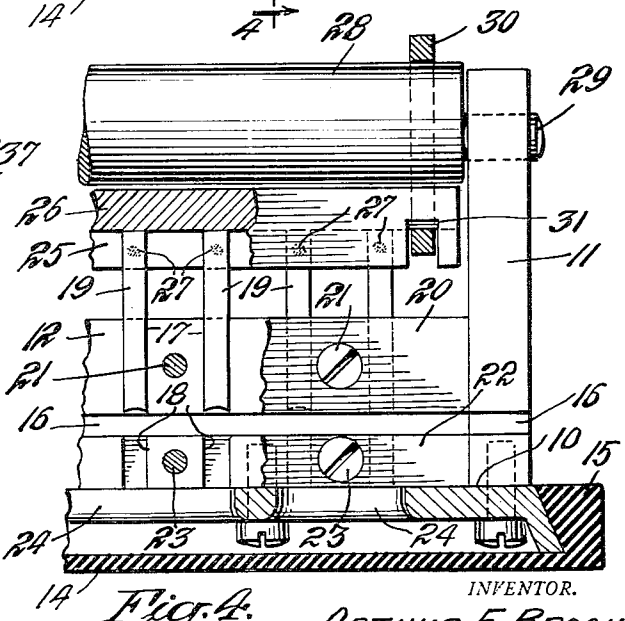


Fig. 4.

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United States Patent Office 2,745,492 Patented May 15, 1956

2,745,492

PUNCH FOR PERFORATING SHEETS TO RECEIVE THE RINGS OF MECHANICAL BINDINGS

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Application September 16, 1953, Serial No. 380,436

5 Claims. (Cl. 164—91)

The invention herein disclosed is a punch for perforating sheets which are to be secured in mechanical bindings.

Special objects of the invention are to provide a simple, practical, easily operated device which can be readily used by anyone, without previous experience, to punch the necessary holes in the sheets. Such a device is particularly useful in offices, shops and factories where it is desirable at times to bind up special reports, results of investigations and projects, etc., in permanent booklet form.

Further special objects of the invention are to provide a punch suitable to such purposes which will be of portable, light weight, low cost construction, made of few sturdy parts which will not get out of order even with careless handling and which will generally be practical and desirable for the uses indicated.

Other desirable objects and the novel features of construction, combination and relation of parts through which the purposes of the invention are attained, are set forth and will appear more fully in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure, however, may be modified and changed as regards the immediate illustration, all within the true intent and scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a top plan view of one of these new hand punches;

Fig. 2 is a front elevation and part vertical sectional view of the same, the section taken on substantially the plane of line 2—2 of Fig. 1;

Fig. 3 is a vertical transverse sectional view, on a larger scale, on substantially the plane of line 3—3 of Fig. 2;

Fig. 4 is a broken longitudinal sectional view on substantially the plane of line 4—4 of Fig. 3;

Fig. 5 is a broken plan view showing how with use of the edge gage the perforations may be centered so as to be at equal distances from upper and lower edges of the sheets.

The machine illustrated embodies a flat, generally horizontal, hollow base 7 having, as shown in Fig. 3, an upper level 8 at the front providing a table for the sheets 9, and a lower level 10 at the back affording support for end uprights 11 and the die block 12.

The upper and lower levels of the base are shown connected by an abrupt shoulder 13, Fig. 3, which provides an abutment for the die member 12.

The hollow base is shown closed in at the bottom by a resilient pad 14 having edge flanges 15 engaged over the flaring edges of the base. This pad in addition to providing a resilient cushion, serves as a container for holding the cuttings from the punches.

The die is of special construction, made up of the bar 12 extending longitudinally of the base between the upright end posts 11, grooved horizontally across the

front at 16 to receive the ends of the sheets, and grooved vertically in the front above and below the horizontal groove to provide the upper guides 17 and the lower die cutting passages 18 for the punches 19.

The upper guide grooves 17 are shown closed at the front by a longitudinally extending plate 20 secured by screws 21, and the die grooves 18 are shown closed across the front by a similar longitudinally extending plate or bar 22 secured to the main bar or block 12 by screws 23.

The base is shown in Figs. 3 and 4 as having openings 24 in line with the die passages to pass the cuttings down into the chamber provided in the base.

Punches 19 are shown connected together at the top in their spaced relation by being entered in a groove 25 in a punch head or bar 26, secured in this relation by point indenting, spot welding or otherwise fixing the ends of the punches in the groove, as indicated at 27, Figs. 2 and 4.

Reciprocation of the punch head is effected in the illustration by an overstanding roller 28 having eccentric pintles 29 journaled in the end posts 11, this eccentrically journaled roller bearing on top of the punch bar and carrying encircling rings 30 which engage in arcuate grooves 31 cut across the lower edge of the bar. The punches 19 are lowered by downward thrust of the eccentric roller 28 against the top of the punch bar 26, said thrust continuing all the while said roller is being turned in a clockwise direction as viewed in Fig. 3, and the punches 19 are raised by upward thrust from the rings 30 against the bottom of the punch bar, this thrust continuing all the while the roller 28 is being turned in a counter-clockwise direction as viewed in Fig. 3. As will be noted, the inside diameter of a ring 30 is equal to the sum of the diameter of the roller 28 and the vertical dimension of the punch bar 26 in a plane including the axis of rotation of the pintles 29 and the longitudinal center lines of the punches 19.

This construction provides a free floating connection between the eccentric actuating roll and punch head, enabling the punches to operate smoothly without any frictional or binding tendencies such as otherwise might result from inaccurate register or alignment of parts

To avoid bending strain on the punches such as might be occasioned by downward rolling action on top of the punch bar the latter is shown as braced at the back by upright guide rods 32 extending upward from the die bar 12.

A hand lever 33 is shown connected with the mid-portion of the eccentric roll shaft 28 and a stop bar 34 is shown secured to the back of the die bar 12, Fig. 3, to limit the backward throw of the handle and eccentric stroke of the shaft.

The horizontal groove 16 in the die bar 12 provides an accurate guide and backstop for the sheets.

An edge gage is shown in the form of a circular member 35, secured eccentrically at the left-hand edge portion of the table by a set-screw 36. On loosening this screw the gage may be turned one way or the other to locate the edge of the sheet in proper relation to the punches, thereby to insure, as shown in Fig. 5, that sheets may be punched so as to place the end perforations 37 at equal distances from the upper and lower ends of the sheets.

The machine may be of a light, portable character, easily carried from a storage space to a place of use on a desk or the like, and easily operated by a simple one-way and back, rocking movement of the handle.

After setting the edge gage, if that is required, the only action needed is to insert the sheets up against the backstop and edge gage and then to lower and raise the handle. The operation of the eccentric shaft and lifting

rings is simple and direct and provides with slight effort, all power that may be needed to punch a group of sheets to be bound.

Another advantage of the simple, direct acting parts is that no special lubrication is required, thus largely avoiding the possibility of getting lubricant on papers operated on.

The loose rings have a free rolling action in respect to both the eccentric shaft and the punch bar, permitting self-adjustment and avoiding binding tendencies.

What is claimed is:

1. A punch of the character disclosed comprising a base, a die member on said base having spaced die openings, a punch bar, punches secured to said punch bar in cooperative relation to said die openings, a shaft journaled eccentrically over said punch bar, rings loosely encircling said shaft and punch bar and thereby confining said punch bar to said eccentrically mounted shaft and means for rocking said shaft to impart reciprocating motion to said punch bar and punches.

2. A punch of the character disclosed comprising a base having upper and lower levels connected by an abrupt upright shoulder, a die member secured on the lower level of the base against said shoulder and having upright die openings, punches cooperable with said die openings, a bar connecting said punches, an eccentrically mounted shaft journaled on the base over said punch bar and rings surrounding said shaft and punch bar and loosely suspending the punch bar from the shaft.

3. A punch of the character disclosed comprising a base having upper and lower levels connected by an abrupt upright shoulder, a die member secured on the lower level of the base against said shoulder and having upright die openings, punches cooperable with said die openings, a bar connecting said punches, an eccentrically mounted shaft journaled on the base over said punch bar and rings surrounding said shaft and punch bar and loosely suspending the punch bar from the shaft, said die member comprising a bar having a horizontal groove in the face of the same and vertical grooves above and below said horizontal groove in which the punches operate, and front plates secured over said vertical grooves and cooperating therewith to provide said die openings for the punches.

4. A punch of the character disclosed comprising a base, a die member on said base having spaced die openings, a punch bar, punches secured to said punch bar in cooperative relation to said die openings, a shaft journaled eccentrically over said punch bar, rings loosely encircling said shaft and punch bar and thereby confining said punch bar to said eccentrically mounted shaft and means for rocking said shaft to impart reciprocating motion to said punch bar and punches, and upright guides engageable by said punch bar.

5. A punch of the character disclosed comprising a base, a punch bar guided to operate vertically over said base, an operating shaft journaled eccentrically over said punch bar and coupling members extending from said punch bar up over the eccentrically mounted shaft and disposed at the ends and at intermediate points in the length of said punch bar and shaft, said coupling members being in the form of rings loosely surrounding the punch bar and shaft and freely rotatable in the operation of said mechanism.

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