Sept. 15, 1925. 1,553,378

H. W. HARPER

PUNCH

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FIG. 1

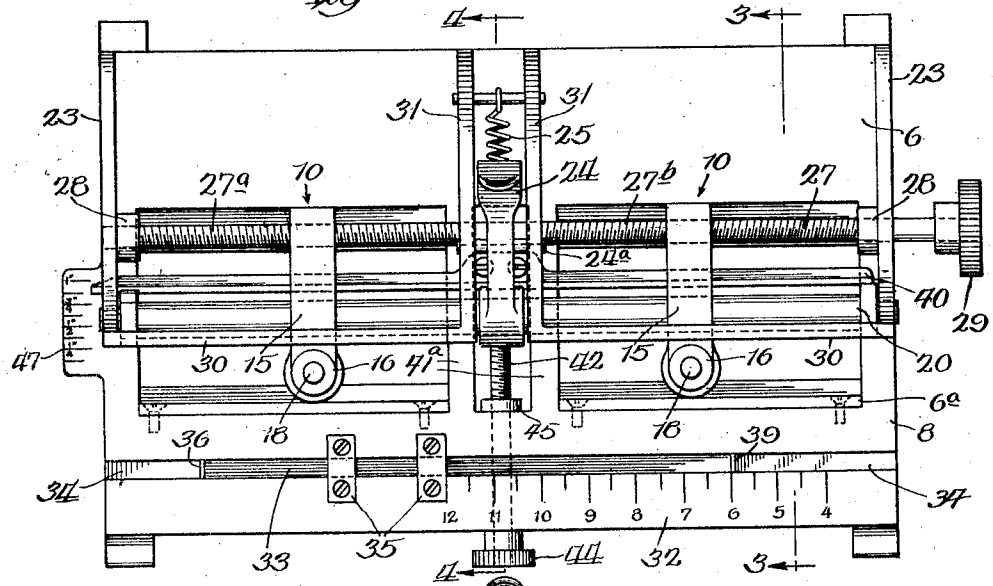
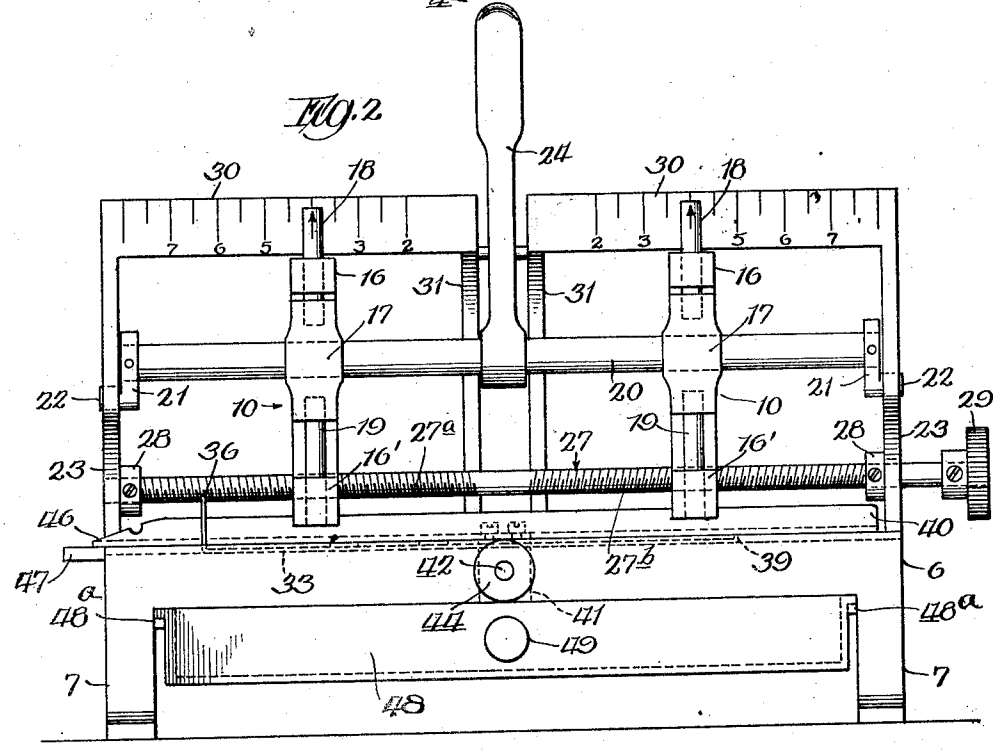


FIG. 2



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PUNCH

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Fig. 3

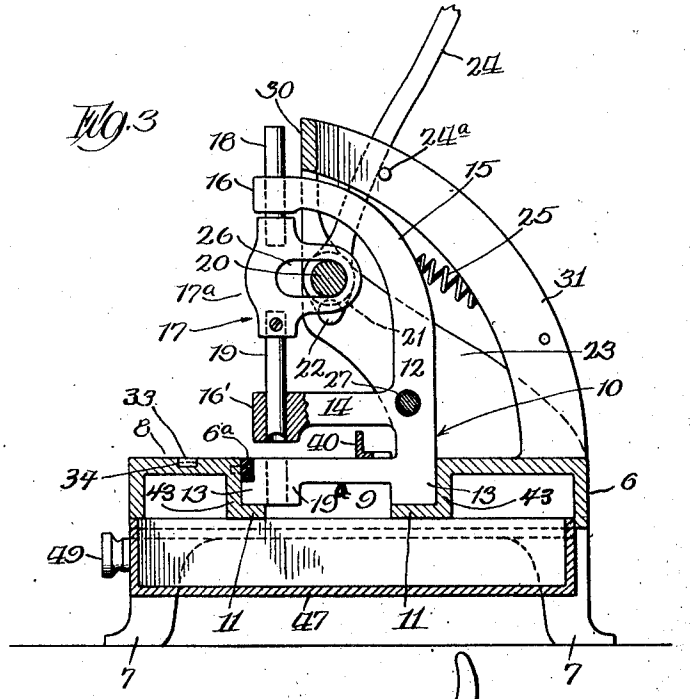


Fig. 4

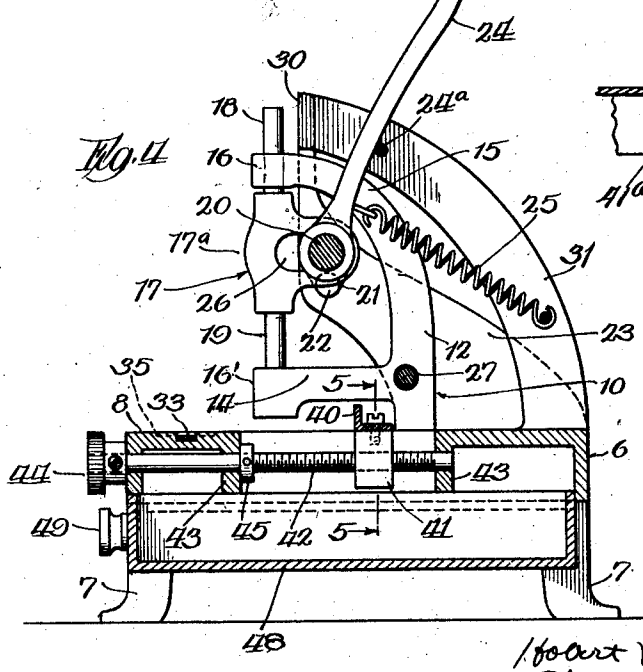
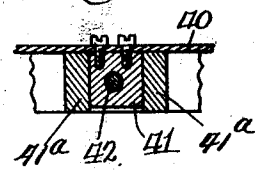


Fig. 5



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UNITED STATES PATENT OFFICE.

HOBERT W. HARPER, OF JOLIET, ILLINOIS.

PUNCH.

Application filed June 30, 1923. Serial No. 648,652.

To all whom it may concern:

Be it known that I, HOBERT W. HARPER, a citizen of the United States, and a resident of Joliet, Will County, Illinois, have invented certain new and useful Improvements in Punches, of which the following is declared to be a full, clear, and exact description.

This invention relates to punches, and its principal object is to provide a novel punch for punching holes in cardboard, paper, cloth, and other relatively thin materials. Another object is to provide a punch having two duplicate sets of relatively movable punching dies, provided with means for moving them relative to each other, whereby two holes may be punched simultaneously, and at any desired distance apart, within given limits. Another object is to provide a punch (having two duplicate, relatively movable punching dies) with a gauge, whereby the material to be punched may be centralized with respect to the dies in order that the holes may be punched equidistant from the opposite edges of the material. Another object is to provide a punch (having duplicate punching dies) with a gauge for determining the distance between the holes and the edge of the material which is parallel to the holes to be punched.

With these and other objects and advantages in view, this invention consists in a punch, having duplicate, relatively movable punching dies, provided with means for moving them relative to each other, and with means for operating the punches of the punching dies simultaneously. The invention further consists in a punch, having relatively movable punching dies, and a gauge for centralizing the material to be punched, with respect to the dies. The invention further consists in a punch, having duplicate punching dies and provided with a gauge for gauging the distance between the punches of the dies and one margin of the material which is to be punched. The invention further consists in the several novel features of construction, arrangement and combination of parts hereinafter fully set forth and particularly defined in the claims.

The invention is clearly illustrated in the drawings accompanying this specification, in which:

Fig. 1 is a plan of a punch embodying a simple form of the present invention; Fig. 2 is a front elevation thereof; Fig. 3 is a vertical, cross section taken on the line 3—3 of Fig. 1; Fig. 4 is a vertical, cross section taken on the line 4—4 of Fig. 1, and Fig. 5 is a detail, vertical, longitudinal section taken on the line 5—5 of Fig. 4.

Referring to said drawings, which illustrate a simple embodiment of the present invention, the reference character 6 designates a base mounted upon legs 7 and having a flat table 8 upon which the material to be punched is placed during the punching operation. In its present form, the base 6 is formed with a lengthwise extending guideway 9 in which are mounted two duplicate sets of punching dies 10 that are movable relative to each other in said guideway. In its present form, the guideway has two lengthwise extending ribs 43 which are formed with supporting ledges 11 upon which the punching dies rest, and upon which they travel when being adjusted to their various positions.

Inasmuch as the punching dies 10 are duplicates of each other, I shall proceed to describe one of them, it being understood that such description applies to both. Each punching die comprises a frame 12 of substantial construction, and formed with feet 13 that are guided between the ribs 43 and rest upon the ledges 11 of the guideway. One foot 13 is notched at its upper edge to receive a rib or bead 6^a which is secured to the base, and said rib or bead acts to hold the front end of the frame 12 down on its support. The frame 12 is formed with a forwardly extending bracket 14 and with an upwardly extending bracket 15 which overhangs the bracket 14, and both brackets terminate bosses 16, 16^1, in which the punch member 17 is guided to move in a vertical direction. In the form illustrated, the head 17^a of the punch member 17, has an upwardly extending guide stem or pin 18 secured therein, which is guided in a bearing aperture formed in the boss 16, and the punch proper 19 is secured in the lower end of the head 17^a and is guided in a bearing aperture formed in the lower boss 16^1. The die 19^a is formed in the foot 13.

Means are provided for reciprocating the two punches simultaneously, and in the simple form illustrated in the drawings, said means comprises a lever having operative connections with both punches. As shown, the lever comprises a rod 20 which extends

lengthwise of the base and has a crank arm 21 at each end, which is provided with a stud shaft 22 which is rotatively mounted in an upstanding bracket 32 that projects up from the base 6. There is one bracket at each end of the base and it may be of any suitable and desirable form. Centrally disposed on the rod 22 is a handle 24 by which the lever is actuated, and a coiled tension spring 25 is secured to said handle and to some stationary part of the device and acts to retract the punches 19 and restore the parts to normal position. A pin 24^a acts as a stop for the handle and limits its backward movement. The rod 20 extends through slots 26, formed in the heads 17^a of the punch members, and in the punching operation the rod 20 swings upon the axis of the stud shafts 22 and moves through said slots in the heads of the punch members, thereby crowding the punches down when the handle is moved forward, and retracting the punches when the handle is moved back. It is obvious that the two sets of punches may be moved relative to each other along the guideway of the base, and that in any position of adjustment they will be operatively connected with the actuating lever.

The two sets of punching dies 10 are moved relative to each other by means which will now be described. In the simple form shown, said means comprises a threaded rod 27, having right and left hand threads 27^a, 27^b thereon, that are threadedly engaged in threaded apertures formed in the frames 12 of the punching dies. The threaded rod 27 is rotatively mounted in the brackets 23 and has collars 28 secured thereon which bear against the inner sides of the brackets 23 and prevent endwise movement of the rod 27. One end of the rod 27 projects beyond the bearing bracket in which it is mounted, and has a knob or wheel 29 mounted thereon by which the rod may be turned in adjusting the punching dies relative to each other.

Supported upon the upper ends of the brackets 23 are duplicate gauges 30, which have graduations or scale marks thereon that indicate the distance between the centers of the punches. The gauges extend toward each other from the brackets 23 and their adjacent ends are supported from the base by brackets 31. In adjusting the punches to punch holes at a pre-determined distance apart, the knob 29 is turned in the proper direction until the guide stems 18 of the punches register with the scale marks on the gauges indicating the distance between the punches.

In order that the holes may be punched equidistant from the opposite edges of the material which is to be punched, I provide a side gauge and gauge bar which cooperate with the punches to determine the location of the edges of the material relative to the punches. This gauge is shown at 32 and the side gauge bar at 33. The gauge and gauge bar extend lengthwise of the table 8 and are located at the surface thereof. The gauge bar 33 is slidably mounted in a lengthwise extending slot 34 formed in the face of the table 8 and is conveniently retained in said slot by two plates 35 which are countersunk into the table and secured thereto by screws, as shown. The gauge bar has an upstanding end portion 36 which forms a stop against which the material is placed, in locating it upon the table, and the other end of the gauge bar is formed with an upstanding bent end portion 39 for limiting the outward movement of the gauge bar. When drawn out to its farthest point, the end 39 encounters one of the plates 35. Said end also acts as a pointer and cooperates with the graduations or scale marks on the gauge 32 to indicate the location of the stop 36. The scale 32 is graduated to indicate the distance of the stop 36 from a point midway between the punches, so that when the point 39 is adjusted to the point on the gauge 32, corresponding to the width of the sheet to be punched, the median line of said sheet will coincide with a point midway between the punches, when an edge of the sheet is brought into engagement with the stop 36. When the side gauge bar 33 is adjusted to locate a sheet of given width, and one end of the sheet is placed against the stop 36 of the gauge bar, the sheet is thereby centralized with respect to the punches, so that the holes punched therein are made equidistant from the opposite edges of the sheet, irrespective of the distance between the punched holes.

For the purpose of punching the holes at various distances from the margin of the sheet which is parallel with the punched holes, I provide an adjustable end gauge bar which extends parallel with a line running through the punches 19. Said end gauge bar is seen at 40, and is mounted upon a supporting block 41 which contains a threaded aperture in which is threadedly secured a threaded member 42 which is rotatively secured in the flanges 43 on the underside of the table portion 8. Said threaded member 42 extends ont through the base and has a knob 44 secured upon its outer end by means of which the threaded member 42 may be rotated. Said threaded member is held against longitudinal movement by the knob 44 and by a collar 45 secured on the member, as is clearly illustrated in Fig. 4. By turning the threaded member in the proper direction, the end gauge bar 40 may be moved forward or backward, that is to say, toward or away from the punches 19. One end of the end gauge bar contains a pointer 46 which cooperates with a graduated scale 47 upon the table 8, and indicates the dis-

tance of the end gauge bar 40 from the punches 19.

Below the dies 19ª of the punches, is a drawer 47 for receiving the punchings, and said drawer is shown as supported upon ribs 48ª carried by the base 6. A knob 49 is secured to the front of the drawer and furnishes means whereby it may be withdrawn to empty the contents.

In the operation of the device, and assuming that it is desired to punch two holes, four inches apart in a sheet of cardboard, paper or other relatively thin material which is six inches wide, and assuming that it is desired to punch said holes seven-eighths of an inch from one edge, the knob 29 is turned in the proper direction until the punch stems 18 stand in front of the graduation mark "4" on the scale 30. This brings the punches four inches apart. The side gauge bar 33 is then adjusted to bring the pointer 39 thereof into register with the graduation mark "6" on the gauge 32. The knob 44 is then turned in the proper direction until the pointer 46 of the gauge bar registers with the graduation mark "7/8" on the gauge 47. The sheet to be punched is then placed upon the table 8, with one edge in contact with the gauge bar 40 and an edge (which is at right angles to said edge) in contact with the stop 36 of the gauge bar 33. The handle 24 is then drawn forward, thereby forcing the punches 19 through the sheet and into the apertures of the dies 19ª. The handle is then released and the spring 25 restores the punches to normal position.

The advantages of a punch constructed in accordance with the above description is readily apparent. It is particularly useful in punching holes in sheets or strips of paper, cardboard, covers and the like that are to be bound together, and particularly useful in the photographer's art in punching holes in photographs and covers therefor. By reason of its universal adjustability, it is very efficient since it enables the user to punch equidistant holes in sheets that are to be bound together and may be readily adjusted to accommodate sheets of varying widths where the desideratum is to have holes spaced at pre-determined distances which vary in accordance with the width of the material.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention; I desire, therefore, not to limit myself to the exact form of construction shown and described, but intend, in the following claims, to point out all of the invention disclosed herein.

I claim as new, and desire to secure by Letters Patent:

1. In a punch, the combination of a base, brackets extending up therefrom, two duplicate sets of relatively movable punching dies slidably mounted on said base, means for moving said punching dies relative to each other, and an actuating lever for the punch members of said punching dies, said lever having a handle portion, two arms rotatively mounted on said brackets and a punch actuating rod connecting said two arms and engaging the punch members of both of said punching dies.

2. In a punch, the combination of a base, two sets of relatively movable punching dies, mounted thereon, each punching die having a punching member formed with a transverse slot, means for simultaneously moving said punching dies toward and away from each other, and an operating lever for said punching members having a handle and having a rod extending through said slots, and terminating in crank arms pivotally supported on the base.

3. In a punch, a punching die comprising a frame having an internally threaded aperture for engagement with a threaded rod and formed with a die, there being upper and lower apertured brackets formed on said frame, and a punching member having a stem guided in one bracket and a punch guided in the other bracket, said punching member having means for operative connection with an operating lever.

HOBERT W. HARPER.