No. 808,408. PATENTED DEC. 26, 1905.

W. SPARKS.

PUNCHING MACHINE.

APPLICATION FILED DEC. 23, 1904.

Fig. 1.

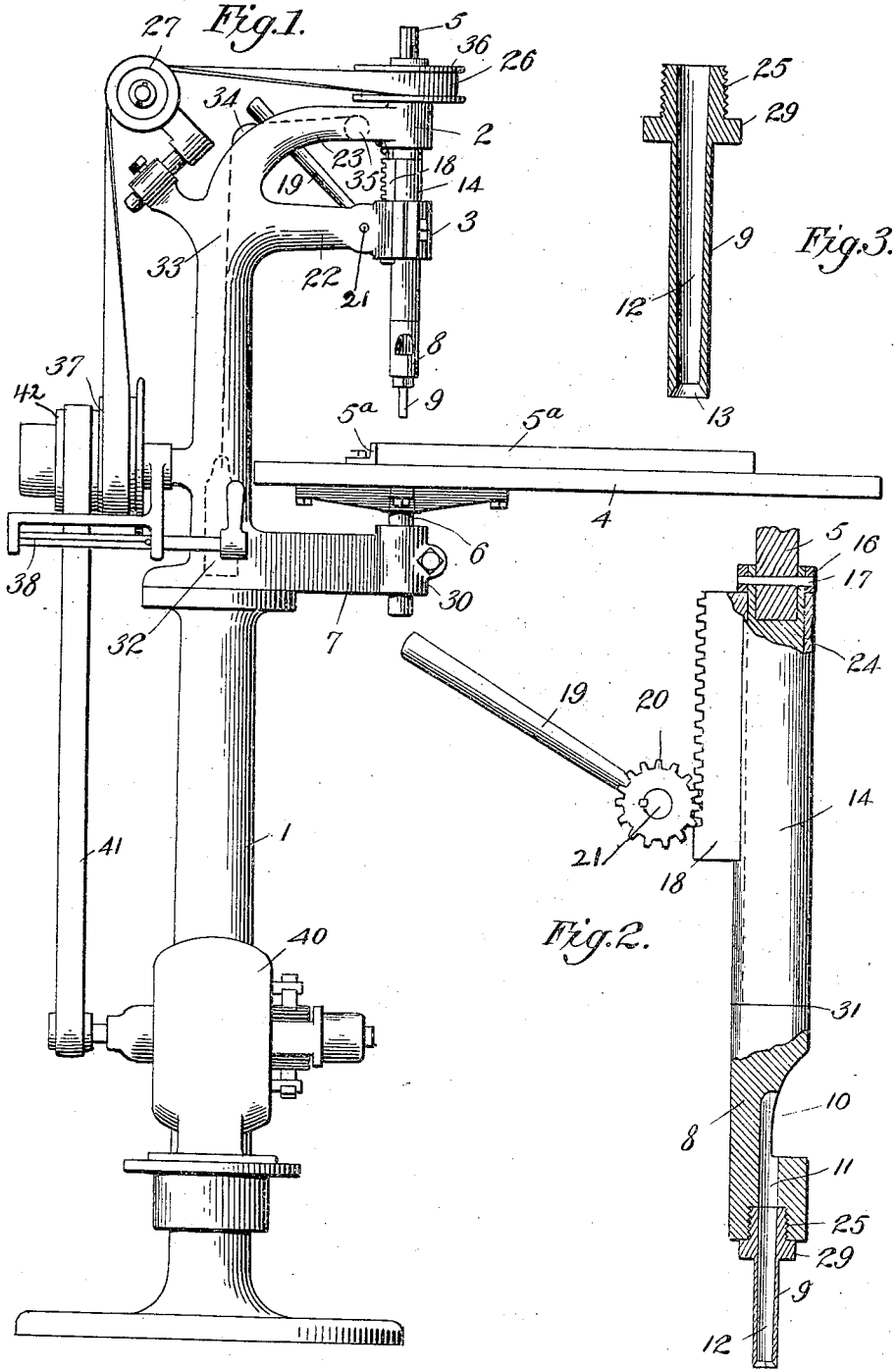


Fig. 3.

Fig. 2.

Witnesses.
James T. Duhamel
A. Heiberg

Inventor
Walter Sparks
By his Attorney
Fred C. Baker.

UNITED STATES PATENT OFFICE.

WALTER SPARKS, OF NEW YORK, N. Y.

PUNCHING-MACHINE.

No. 808,408. Specification of Letters Patent. Patented Dec. 26, 1905.

Application filed December 23, 1904. Serial No. 238,136.

To all whom it may concern:

Be it known that I, WALTER SPARKS, a citizen of the United States of America, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification.

This invention relates to a machine for punching round holes in paper or similar material, the object being to provide a device which can effectively punch a round hole with true and accurate nicety through a mass of paper sheets, no matter what may be the thickness of the mass or quality of the paper or similar material, and may perform the punch with ease and quickness; and the invention therefore consists, essentially, in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and then more particularly pointed out in the claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a front elevation of my improved punching machine. Fig. 2 is an enlarged sectional detail view of the devices for carrying the punch and for rotating and reciprocating the same, showing the punch also in position. Fig. 3 is an enlarged longitudinal sectional view of the punch, showing its inner tapering delivery-passage and its reversely-beveled cutting edge.

Like numerals of reference designate corresponding parts throughout the different figures of the drawings.

1 designates the main standard or frame of the machine, which supports the mechanical parts and which may be of any suitable shape and as large or as small as desired. In connection with this frame the punch is arranged to operate above a table 4, carried by a rod 6, which is swiveled in a clamp-bearing 30, formed as a part of an extension-arm 7, which is integral with or securely fastened to the main standard 1 at a suitable point in its height. Also in connection with the standard 1 is arranged a driving mechanism for rotating the punch or cutter at the proper speed. On the table I place any suitable adjustable guides, as 5^a 5^a, for use in alining and properly localizing relatively to the punch the sheets of paper or similar material to be punched, perforated, eyeleted, or otherwise acted upon.

At the top of the standard 1 is a curved or forwardly-projecting arm carrying a bearing 2, and below it another horizontally-extending arm 22, carrying a bearing 3, which is located below the bearing 2, said bearings 2 and 3 being for the purpose of carrying the means for supporting and rotating the punch. 9 denotes said punch, which is hollow, having a screw-threaded portion 25 at its upper end, adjacent to which is a collar 29. This screw-threaded portion 25 screws tightly into the lower end of a drive-shaft 8, having a central bore 11 of proper size and form to coincide with the end of the hollow passage 12 in the tubular punch 9. In the side of the shaft 8 is a notch 10, cut in far enough to lay open the passage 11, and thus afford at this point an exit for the chips or waste delivered through the passages 12 and 11 from the cutting edge 13 of punch 9. It will be further noted that the interior passage 12 in punch 9 is a delivery-passage for the chips or waste and tapers from the top to bottom, so that the mouth at the cutting edge 13 is smaller in diameter than the passage in the upper end of the punch, this shape being necessary in order to enable a free discharge of the chips. Furthermore, the bevel of the cutting edge 13 is in a reverse direction to the taper of the passage 12. This bevel has been found by experience to accomplish the best results when set at, say, sixty degrees, although I do not wish to be restricted to this angle. It may be from forty degrees to seventy degrees or otherwise. The shaft 8 for the punch has at 31 a shoulder formed thereon, and above this shoulder the shaft is of a less diameter, forming the rod 24, at the upper end of which is a ring 16, which is secured to rod 24 by means of a pin 17, said pin passing not only through the ring 16 and the rod 24, but also through the lower end of an upwardly-extending bar 5. The rod portion 24 of shaft 8 is surrounded, between the ring 16 and the shoulder 31, by a sleeve 14, which is carried in the bearing 3 in a vertically-movable position, so that it can be adjusted either up or down, in such adjustment obviously carrying with it the shaft 8, which latter is considered as a drive-shaft for the punch, inasmuch as it rotates within the vertically-movable sliding sleeve 14, while the bar 5 rotates and is also vertically movable within the upper bearing 2. The sleeve 14 is provided with an integral rack 18 on one side engaged by the teeth of the pinion 20, supported on a pin 21, that is journaled in the horizontal arm 22 of the main frame. Said pinion 20 is provided with a handle 19, whereby it may be partially rotated, the result of which is to move the rack 18 and sleeve 14 up and down, which movement in turn

moves the punch up and down. This rack or pinion device is in reality a feed device for feeding forward the punch into its work while the punching operation is in progress.

The punch and its drive-shaft, together with the upwardly-extending bar 5, are kept normally in their elevated position, as shown in Fig. 1, by means of a counterbalancing weight, shown in dotted lines at 32, hung on the end of a cord 33, which passes upward and around the guide-rollers 34 and 35 in the main frame 1, and the end of the cord 33 is fastened to the upper end of the rack 18 or the sleeve 14, as indicated in Fig. 1. Thus it will be seen that the weight normally keeps the punch in its uppermost position above the table 4; but by means of the handle 19, which may be lifted, the punch can be fed gradually down to and through its work, no matter what the thickness of the latter may be or of how many sheets of paper or other material it may consist.

Divers driving means may be employed to actuate the shaft 8 and punch 9. One example is shown in the drawings. A flanged drive-pulley 36 is secured on the upwardly-extending bar 5. This mode of applying a belt to actuate the drive-shaft is a convenient one, and the belt 26 passes around the drive-pulley 36. Belt 26 leads around an idler 27 to fast and loose pulleys 37 and 42, in connection with which there is a belt-shifter 38. 40 denotes some suitable motor, as an electric motor, on the base of standard 1, from which power is communicated by the belt 41 to the fast pulley 42. In this way the machine is driven.

The operation will be very evident from the foregoing description of the construction and combination of the parts. Heretofore it has been found extremely difficult to perforate a multitude of sheets of paper with accuracy and despatch and without leaving a bur or riser at the edge of the hole. With my improvement, however, the hole can be punched or cut through any number of sheets, and each hole will be clean, distinct, and with no leaving of the paper around the edge. When the sheets to be punched have been placed upon the table, the power will be turned on and the punch or drill given a rotation of the requisite number of revolutions, and then by gently moving the handle 19 the punch can be depressed and fed through the work until all the sheets have been perforated. In the present extensive use of perforated pages or sheets for books or temporary binders this machine will be found to be of great value. It has been found an easy matter with my punch to enlarge a hole a trifle or more after it has once been punched.

Many changes in the precise construction and embodiment of the parts may be made without varying from the invention. The exact form of the punch or drill may vary— as, for instance, the cutting edge may, if desired, be an arc of a circle instead of a complete circle.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A hollow punch having an inner delivery-passage tapering from one end to the other, and provided with a cutting edge beveled in the reverse direction.

2. A hollow punch, having a cylindrical exterior surface, and provided with an inner delivery-passage tapering from one end to the other, and also with a cutting edge beveled in the reverse direction.

3. The combination with a driving-shaft having a central passage with a lateral outlet for the discharge of waste material, of a hollow punch connected to the shaft and having an inner delivery-passage tapering from one end to the other, and provided with a cutting edge beveled in the reverse direction.

Signed at New York city this 22d day of December, 1904.

WALTER SPARKS.

Witnesses:
JOHN H. HAZELTON,
I. HEIBERG.