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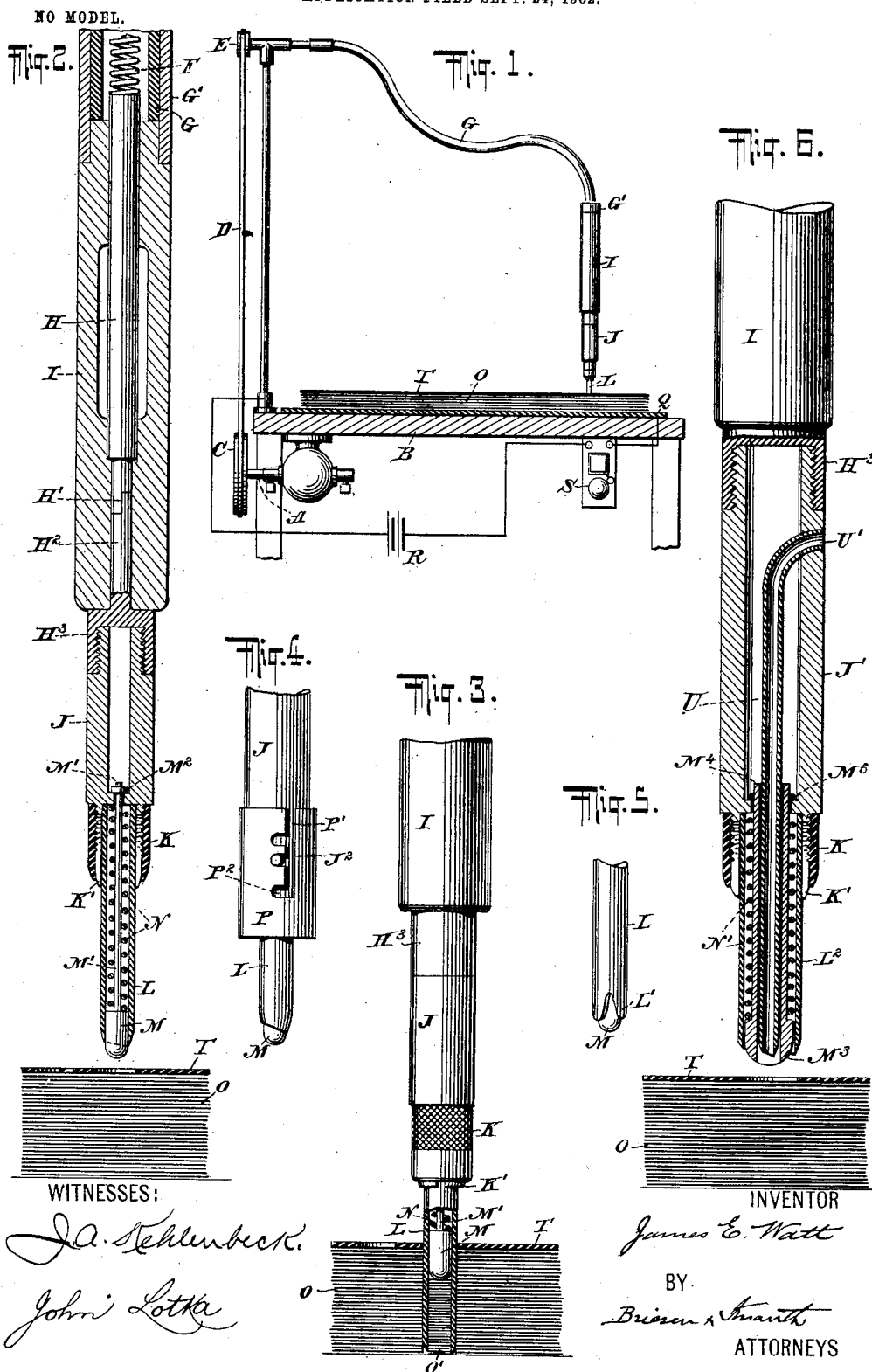
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J. E. WATT.

CUTTING OR PERFORATING MACHINE.

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NO MODEL.



WITNESSES:

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CUTTING OR PERFORATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 762,507, dated June 14, 1904.

Application filed September 24, 1902. Serial No. 124,640. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WATT, a citizen of the United States, residing in the borough of Brooklyn, city of New York, county of Kings, State of New York, have invented certain new and useful Improvements in Cutting or Perforating Machines, of which the following is a specification.

My invention relates to machines for cutting and perforating paper or other material, and is primarily intended for perforating paper in making garment-patterns, but is applicable for many other purposes.

The object of my invention is to provide a simple device of the above-indicated class in which provision is made for temporarily receiving and then automatically expelling the pieces of paper or other material which have been cut or punched out.

Another object of my invention is to provide a cutter which will work very rapidly and without requiring any considerable pressure to hold it against the material.

A further object of my invention is to provide means for regulating the depth to which the machine or tool will work and for giving a signal to the operator when the entire stack or pile of sheets has been perforated.

An example of my invention is shown in the accompanying drawings, in which—

Figure 1 is an elevation of the complete machine with parts in section. Fig. 2 is a longitudinal sectional elevation of the perforating-tool proper. Fig. 3 shows the lower portion of the perforating-tool in operation, the lower extremity of the tool appearing in section. Fig. 4 shows the means for regulating the depth of the perforation. Fig. 5 illustrates another form of perforating-tool, and Fig. 6 is a sectional elevation of still another form of my tool.

The improved cutting or perforating tool is of the rotary character, and motion may be imparted to it in any suitable way. I have shown, for instance, a drive-shaft A, journaled upon a suitable frame B and carrying a pulley C, from which motion is transmitted by a belt D to another pulley E. The latter is mounted upon a flexible shaft F of any improved construction. This shaft may be in-

closed in a case G, as usual, at the end of which is located a collar G'. At the free end of the flexible shaft F is secured a spindle H, which thus rotates with the shaft, and this spindle is connected by a suitable joint H' with an additional spindle portion H², having at its lower end an enlargement H³, which is screw-threaded. This enlargement also forms a shoulder, which together with the collar G' serves to hold in place against longitudinal movement a handle I, which is loosely mounted on the spindle H H'. By means of this handle the operator can readily hold and guide the tool. The screw-threaded portion of the enlargement H³ receives a tubular casing J, which rotates with the spindle, and which at its lower end is provided with a chuck K, of any suitable construction, for the purpose of holding the perforating bit or cutter L. This cutter is made tubular and fits into a suitable recess at the lower end of the casing J. The free edge of the cutter is sharpened and may be either a continuous edge, as in Figs. 2 and 4, or the cutter may have a plurality of arms or teeth L', as shown in Fig. 5. Preferably the cutting edge is arranged obliquely, as clearly shown in Figs. 2 and 4, so that when the tool is brought down against the material to be cut only a small portion of the cutting edge will at first come in contact with the material, thus facilitating the starting of the cut. The chuck may consist of a sleeve and of jaws K', which are pressed together by turning the sleeve, this being a well-known construction. Within the cutter L is located the plunger or ejector M, which is mounted to slide lengthwise and normally may project slightly beyond the edge of the cutter, being held in such position by a spring N, which is coiled within the cutter around the stem M' of the plunger and may bear directly against the lower end of the casing J. When the plunger M moves upward, its stem M' is received within the central space of the hollow casing J. In order to limit the outward movement of the plunger, a collar M² may be secured to the upper portion of the stem M'. The lower face of the plunger, where it projects from the cutter, is preferably made with a convex or hemispherical surface, as shown. The purpose of this is to en-

able the plunger to serve as a convenient guide in bringing the tool into the proper position for operation. In explanation of this I will state that the paper to be perforated, O, is generally covered by a templet T, which is made of comparatively thick material and is provided with apertures at those portions where the underlying paper O should be perforated. Thus the plunger may be moved over the surface of the templet T without scratching or cutting the same, and when one of the apertures of the templet is reached the plunger will automatically drop into the same, and the edge of the cutter will engage the paper O.

It will be understood that as the operator presses the tool down upon the material to be cut, as indicated at O, the plunger will first yield sufficiently to allow the cutting edge to engage the material, and then as the cutter passes through the material the plunger will recede more and more, but not to the same extent to which the tool has penetrated into the material, for the reason that the cut-out pieces O' which accumulate within the cutter are compressed by the action of the spring N, as shown in Fig. 3. When the cutter is removed from the operative position, the spring will expel the pieces O', leaving them on the table Q, and thus the interior of the cutter will be emptied, so as to be ready for the next operation.

When it is desired to have the tool penetrate only to a predetermined depth, I may employ a stop or gage—for instance, such as shown in Fig. 4. This stop consists simply of a sleeve P, having a longitudinal slot P', with one or more lateral extensions P'', any one of which may receive a pin J'', projected from the casing J. This sleeve may be readily slipped on from below after the cutter has been secured in the chuck and will, according to its adjustment upon the casing J, limit the penetration of the cutter more or less. It is also desirable to prevent the cutter from penetrating into the material upon which the sheets of paper or other substance O are supported. For this purpose I may provide the arrangement illustrated in Fig. 1, where the plate or table Q upon which the sheets O are supported is made of conducting material and is connected in an electrical circuit with a battery or other source of electricity R, an alarm or signal S, and the perforating-tool itself. Thus the circuit will be closed as soon as the tool touches the plate Q, and the bell or other signal S being actuated the operator will know that the material has been cut through entirely and that he should withdraw the tool. Since the tool rotates, the electrical contact will always be a perfect one, as in the event of the supporting-plate Q being superficially oxidized the action of the tool will almost immediately remove the non-conductor and produce a clean metallic surface.

In the use hereinabove described the tool acts as a perforator and the pieces O' punched out are simply waste. The tool may, however, also be employed for cutting circular pieces or disks of suitable material—that is, in such a case the pieces O' would be the final product and the remainder of the material would be waste. In some cases it might be desired to produce not simply disks, but disks having a central perforation, or, in other words, rings. Such rings, for instance, if cut out of leather or similar material would be suitable for use as washers. A construction suitable for this purpose is shown in Fig. 6. The handle I, enlargement H³, and tubular casing J', together with the chuck K K', are substantially the same as hereinabove described, as is also the cutter L². The spring-pressed plunger or ejector M³, which is contained within the tubular cutter L², is, however, itself tubular and receives the central hollow cutter U for producing the central hole in the cut-out portion of the material. N' is the spring for pressing the plunger M³ outward, and M⁵ is the collar secured to the upper end of the plunger-stem M⁴ to limit the outward movement of the plunger. The exposed end of the plunger may be rounded, as in the construction previously described, and the cutting edges of the cutters L² and U may be oblique for the purpose and with the advantage hereinabove set forth. The plunger M³ expels the rings which the tool cuts out, while the small central pieces which are cut by the central cutter U move upward in the said cutter and will finally work out through an aperture U' at the side of the casing J'. Instead of this I might make the central cutter with a spring-pressed plunger on the inside of it, in which case this central cutter would be substantially identical in construction with the cutter L of Fig. 2.

By expelling the cut-out pieces O', I avoid scattering them to the detriment of the work. For the sake of clearness I have considerably exaggerated in the drawings the thickness of the body of the cutter relatively to its cutting edge. In practice the thickness of the cutter-body is very small.

It will be understood that various modifications may be made without departing from the nature of my invention.

In sundry of the appended claims I have referred to the cutter as a "rotary" cutter. I do not wish, however, to be understood as limiting myself to a cutter which rotates continuously in one direction; but the term as used is to be interpreted as including a cutter which rotates intermittently or a cutter which rotates first in one direction and then in the other.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the spindle, the handle mounted thereon loosely, the tubular cas-

ing rigidly secured to the spindle, the chuck carried by said casing, the tubular cutter held by said chuck to rotate with said casing, the plunger mounted to slide in the cutter, and having a stem arranged to extend into said casing, and the spring coiled about said stem in the cutter and arranged to press the plunger toward the cutting end of the tool.

2. The combination with a rotary cutting-tool provided with a projection upon its outside, of a gage consisting of a sleeve adapted to fit the said tool exteriorly and provided with a longitudinal slot having lateral branches adapted to receive the projection of the tool.

3. In a cutting-machine, the combination with a rotary tool made of conducting material and a supporting-plate likewise made of conducting material, of an electrically-actuated indicating device or alarm in circuit with the said tool and supporting-plate.

4. A rotary cutting-tool having a continuous elliptical cutting edge equidistant from the axis of said tool.

5. A rotary cylindrical cutting-tool having a continuous cutting edge flush with the inner surface of said tool and equidistant from the axis of said tool, said cutting edge being vertically sinuous relatively of the plane of rotation of said tool.

6. The combination of a hollow rotary cutting-tool with a plunger movable lengthwise within the tool and adapted to project beyond the cutting edge thereof, the projecting portion of the plunger being convex.

7. The combination of a hollow cutting-tool and a plunger movable lengthwise in said tool and arranged to project beyond the cutting edge thereof, the projecting portion of the plunger being hemispherical.

8. The combination of a rotary hollow cutting-tool having an elliptical cutting edge disposed obliquely in relation to its axis of rotation, with a plunger movable lengthwise in

said tool and arranged to project beyond the cutting edge thereof.

9. The combination of a hollow cutting-tool having an elliptical cutting edge disposed obliquely with reference to the longitudinal axis of the tool, with a plunger movable lengthwise within said tool and adapted to project beyond the cutting edge thereof.

10. The combination of a hollow cutting-tool, the cutting edge of which is disposed obliquely with reference to the longitudinal axis of the tool, and a plunger movable lengthwise within the tool and arranged to project beyond the cutting edge thereof, the projecting portion of the plunger being convex.

11. The combination of two cutters, one located within the other, so as to leave a space between them, and a plunger movable lengthwise of the tool between the said cutters, each of said cutters having a continuous, sinuous cutting edge equidistant from its axis.

12. The combination of two hollow cutters located one within the other with a space intervening between them, and a plunger movable lengthwise in the space between said cutters, each of said cutters having a continuous, sinuous cutting edge equidistant from its axis.

13. The combination of two cutters, one located concentrically within the other and both held to rotate in unison, and a plunger arranged to move lengthwise in the space between the two cutters, each of said cutters having a continuous, sinuous cutting edge equidistant from its axis.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES E. WATT.

Witnesses:

HARRY E. DUKE,
WILLIAM T. HEAD.