

A. C. STONE.
PERFORATING MACHINE.
APPLICATION FILED MAR. 23, 1911.

1,015,356.

Patented Jan. 23, 1912.

2 SHEETS—SHEET 1.

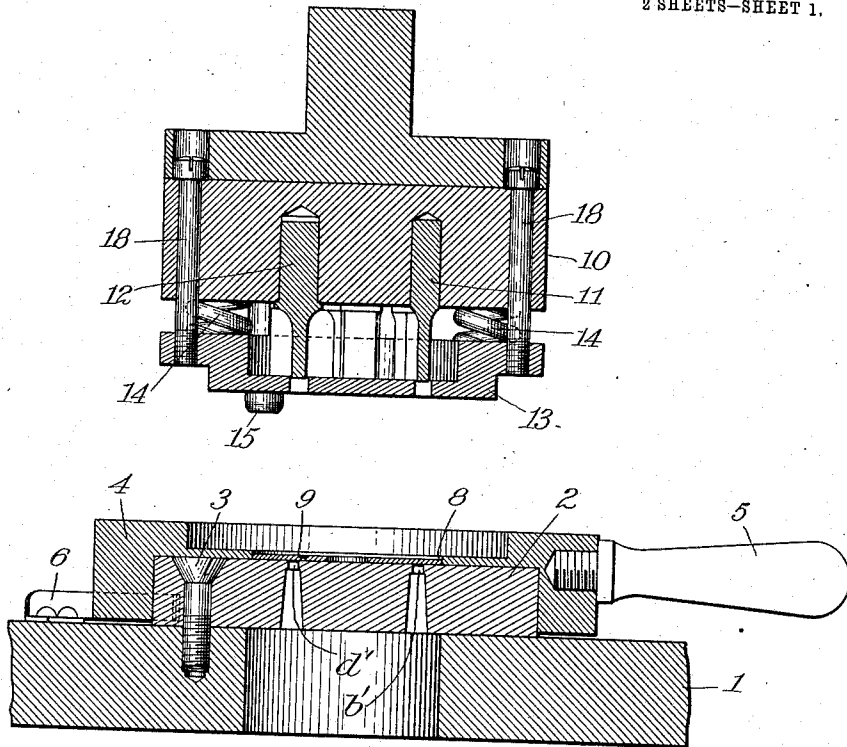


Fig. 1.

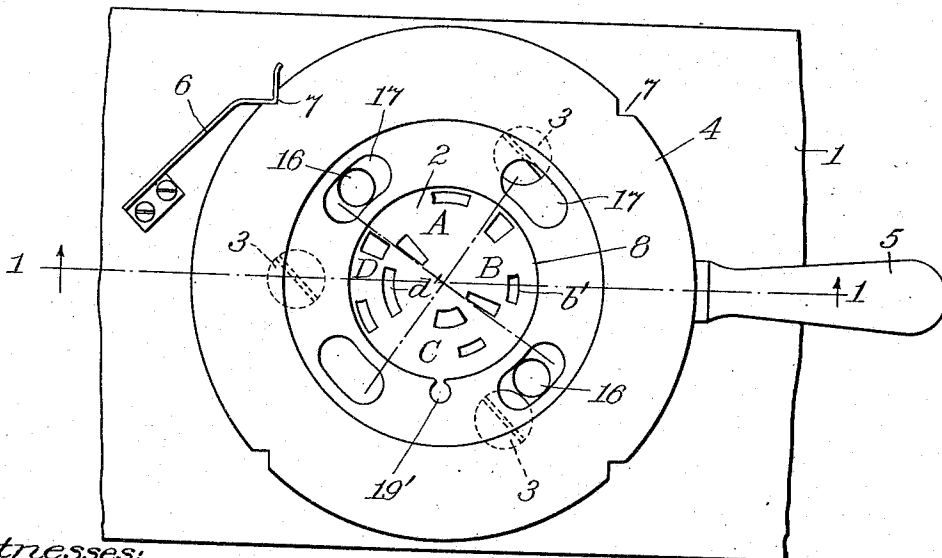


Fig. 2.

Witnesses:
Patrick J. Conroy
E. B. Conlinson

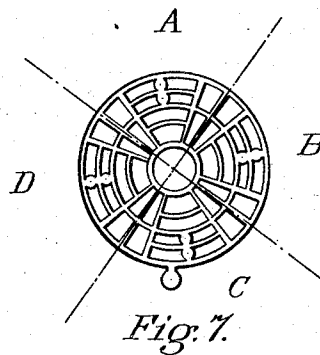
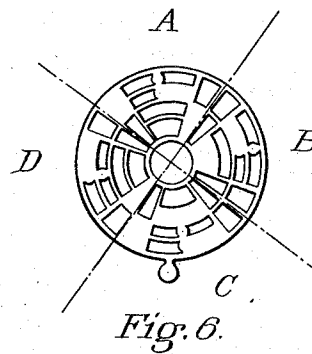
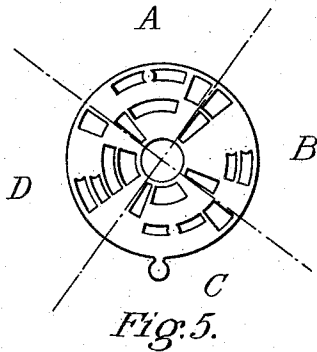
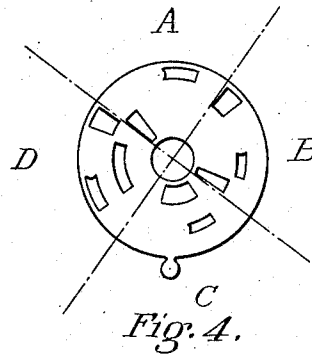
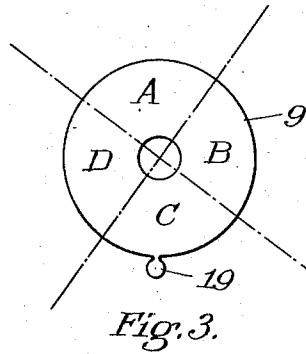
Inventor:
Arthur C. Stone
by Brown & Woodworth
Atty's.

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2 SHEETS—SHEET 2.



Witnesses:
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E. B. Tomlinson.

Inventor:
Arthur C. Stone
by Brown & Woodworth
Atty's.

UNITED STATES PATENT OFFICE.

ARTHUR C. STONE, OF PROVIDENCE, RHODE ISLAND.

PERFORATING-MACHINE.

1,015,356.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed March 23, 1911. Serial No. 616,534.

To all whom it may concern:

Be it known that I, ARTHUR C. STONE, a citizen of the United States, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Perforating-Machines, of which the following is a specification.

My invention relates to perforating machines and its object is to improve, simplify, and cheapen the cost of constructing and operating the same as hereinafter set forth.

When a sheet or strip of material is to be perforated in a manner involving the removal of a large proportion of the original surface by a large number of perforations, it is necessary to perform successive operations, for the reason that the material of the die-plate is not strong enough to permit the performance of the entire perforating operation at a single stroke. For example, considering the work to be done as the production from a blank such as shown in Fig. 3, of the perforated disk shown in Fig. 7, it has not been found possible to produce the forty perforations therein shown at a single stroke by means of forty punches cooperating with a die-plate provided with forty corresponding dies.

By means of my present invention I am enabled to produce the perforated disk shown in Fig. 7 with only ten punches and dies instead of forty, thereby greatly reducing the cost of the apparatus. I also effect a considerable saving in time of handling and in the setting of the dies and punches, inasmuch as the work is all performed in a single machine.

In the drawings which accompany and form a part of this specification, Figure 1 is a section of the die-plate and its cooperating punching head and the workholder with an unpunched disk in place, the other parts of the machine being omitted for the sake of clearness. Fig. 2 is a plan view of the die-plate and work-holder with said disk omitted. Fig. 3 is a plan view of a blank, and Figs. 4, 5, 6 and 7 are plan views of said blank after the first, second, third and fourth punching operations, respectively.

In the particular drawing selected for illustrating the principle of my invention, 1 represents a bed-plate to which the die-plate 2 is secured in any suitable manner, as for example by the screws 3.

4 is a work-holder arranged axially with respect to said die-plate and provided with a handle 5, or other suitable means whereby it may be intermittently rotated with respect to the die-plate. When placed in the desired position, it is locked by the detent 6 which cooperates with one of the notches 7 in the periphery of the work-holder and carrier. The work-holder is provided with a seat 8 for receiving the blanks 9 which are to be perforated, and when using a circular blank as shown, it is provided with a projecting portion 19 which fits into the indentation 19' in said seat, so as to prevent the work from turning in the work-holder. A suitable cooperating punching head 10 is arranged axially above the die-plate and is provided with a series of punches 11, 12 which, when the head is forced on the die-plate, pass through the stripper 13 and then into the work. The stripper is held away from the punches by the springs 14, and its relation thereto is governed in the present instance by the bolts 18. The pins 15, of which only one is shown in Fig. 1, take into the holes 16 in the die-plate for the purpose of guiding the punching head, and the rotary work-holder is provided with a series of holes 17 which are arranged so as to expose the holes 16 when the detent is in cooperation with one of the notches 7.

The die-plate shown in the present instance is divisible into four quadrants, A, B, C and D, on each of which is placed a group of dies which are spaced differently from the dies of any other quadrant. In the present example herein specifically described, the total number of dies in the die-plate is ten; and the total number of perforations in the finished product is forty. Ten perforations are made at each stroke of the punch and the successive appearances of the work after each punching operation are shown in Figs. 4, 5, 6 and 7, respectively.

At the first stroke of the punch, the work is perforated as shown in Fig. 4. After the first stroke of the punch, the work-holder and carrier is given a quarter turn, and after the next stroke of the punch, the work contains the perforations shown in Fig. 5, again the work-holder is given a quarter turn and after the third stroke of the punch, the disk is perforated as shown in Fig. 6. Then the work-holder is given a final quarter turn and after the fourth stroke of the

punch the disk will be provided with the perforations shown in Fig. 7, the perforating operation being completed.

It will be obvious that by means of the apparatus above described, I am enabled to reduce the number and hence the cost of the punches and dies to one-fourth of that heretofore required, and also that the operations necessary to produce the finished product shown in Fig. 7 require much less time than where the work has to be removed from one machine to another after each punching operation.

It will be understood of course that while I have described with some particularity one of several forms of my invention which is now in successful commercial use, I do not desire to limit myself thereto, inasmuch as many modifications may be made therein by those skilled in the art, without departing from the fundamental principle involved.

It will further be understood that the number of punches and dies employed may vary with reference to the total number of perforations to be produced. For example, one half of the whole number may be employed, and the perforating be done with two strokes of the punch and one-half revolution of the work-holder. In like manner, punches and dies equal, to say, one-sixth of the whole number of perforations might be employed, with a corresponding increase in punch-strokes and work-holder movements.

I claim:

1. In a perforating machine, in combination, a die-plate provided with dies in number sufficient to produce at one operation a fractional part of the total number of perforations desired, said dies being grouped symmetrically upon said die-plate, and each group being spaced differently from the rest, a punching head provided with punches corresponding to said dies, a work-holder arranged axially with said die-plate and punching head, and means whereby said work-holder may be rotated.

2. In a perforating machine, in combination, a die-plate provided with dies in number sufficient to produce at one operation a fractional part of the total number of perforations desired, said dies being grouped symmetrically upon said die-plate, and each group being spaced differently from the rest, a punching head provided with punches corresponding to said dies, a work-holder arranged axially with said die-plate and punching head, means whereby said work-holder may be rotated, and means for locking said work-holder in position.

In testimony whereof, I have hereunto subscribed my name this 11th day of March, 1911.

ARTHUR C. STONE.

Witnesses:

GEO. K. WOODWORTH,
E. B. TOMLINSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."