

No. 612,665.

Patented Oct. 18, 1898.

W. S. HOW.
PUNCH.

(Application filed Nov. 30, 1897.)

(No Model.)

FIG. 1.

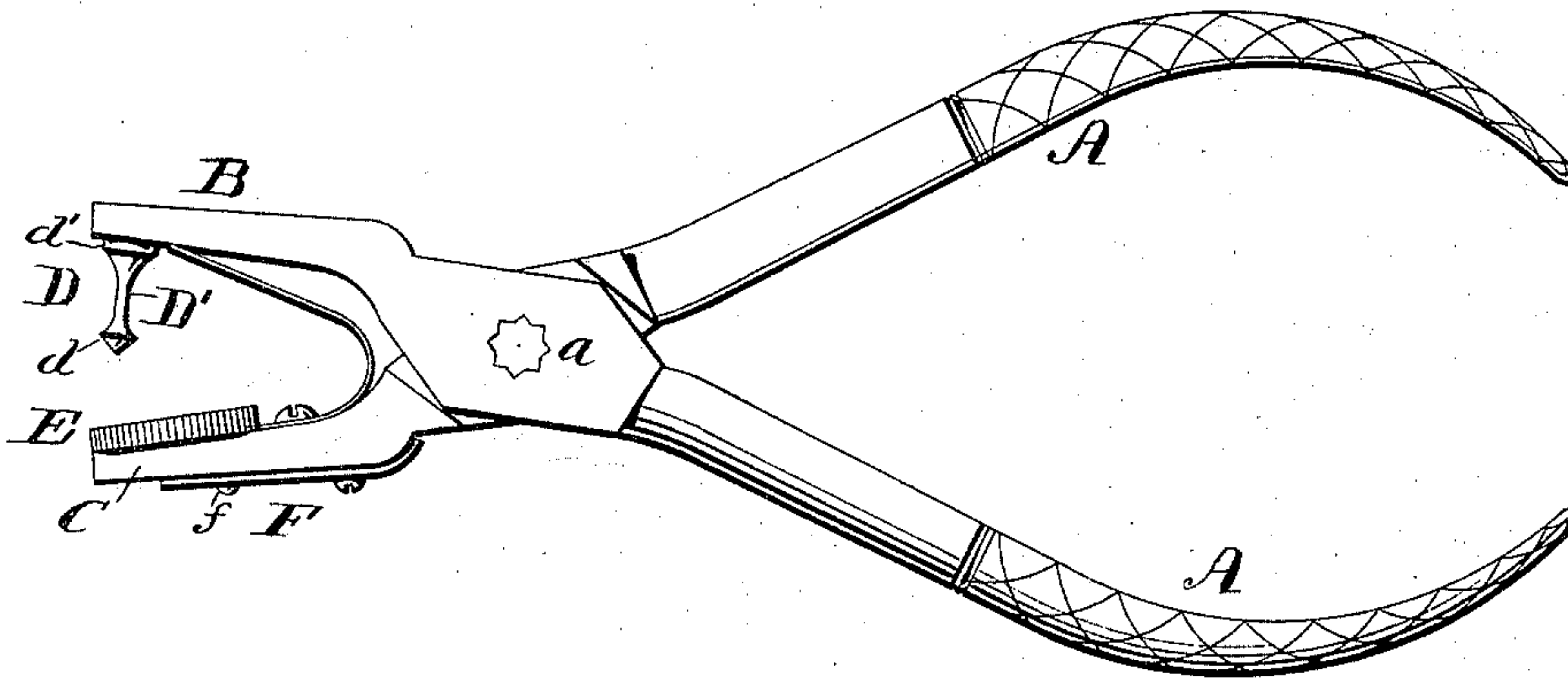


FIG. 2.

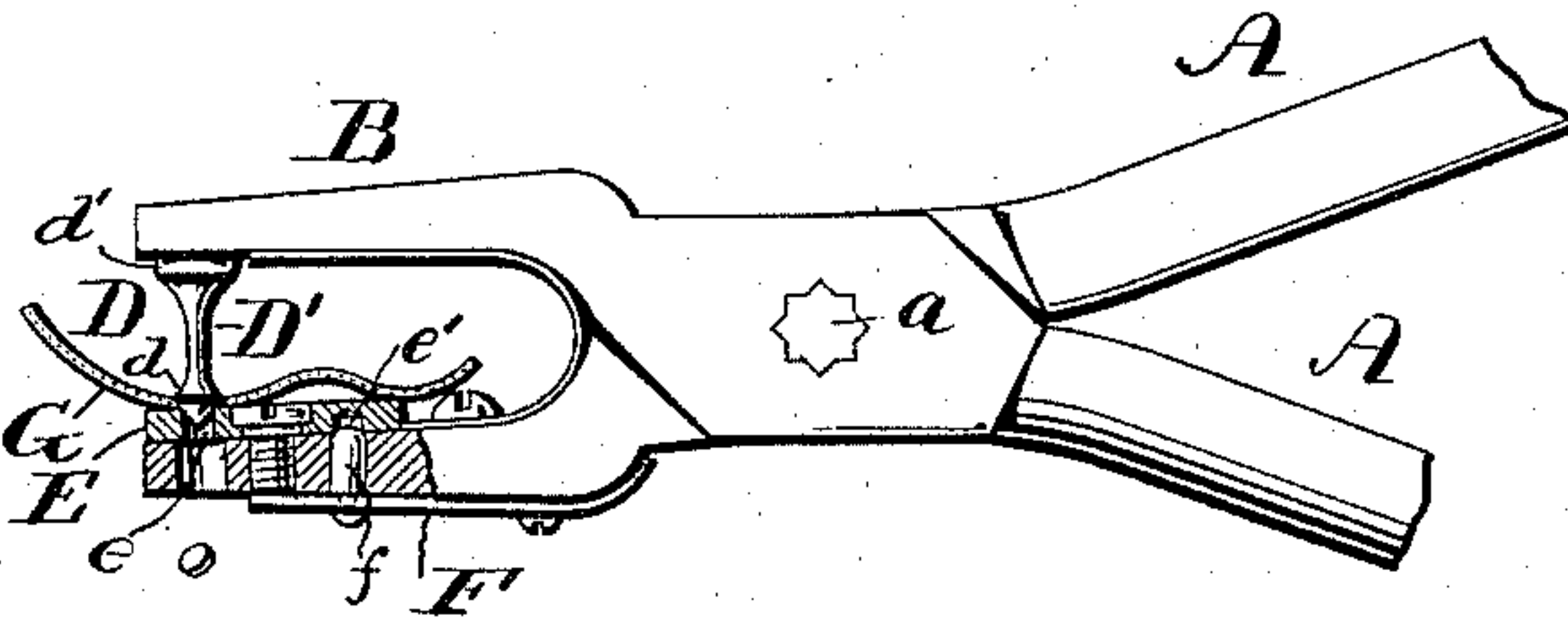


FIG. 3.

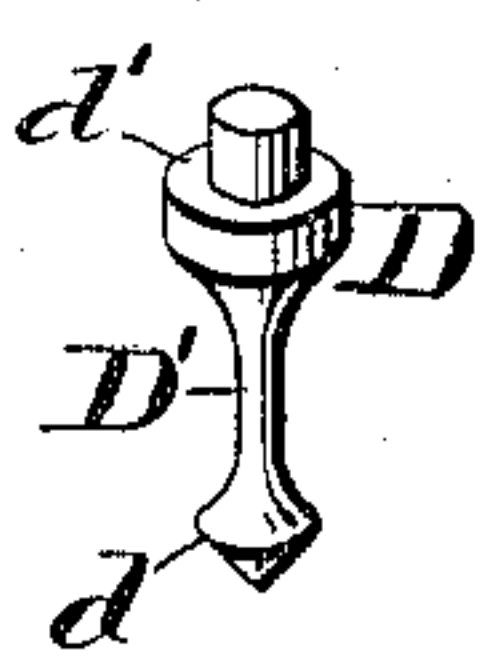


FIG. 4.

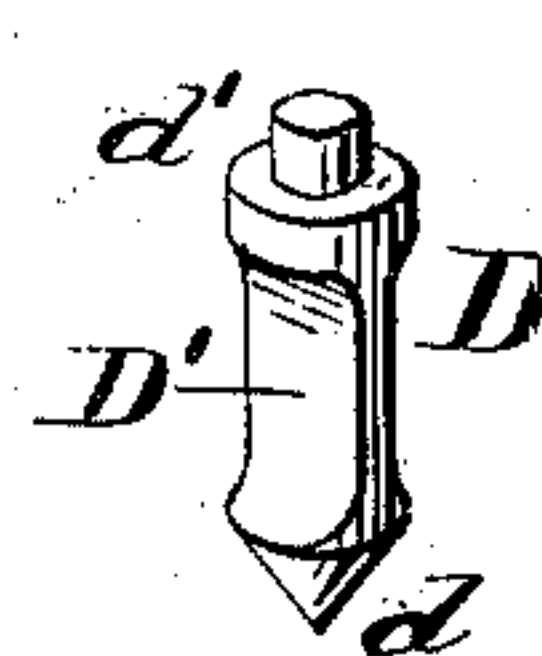
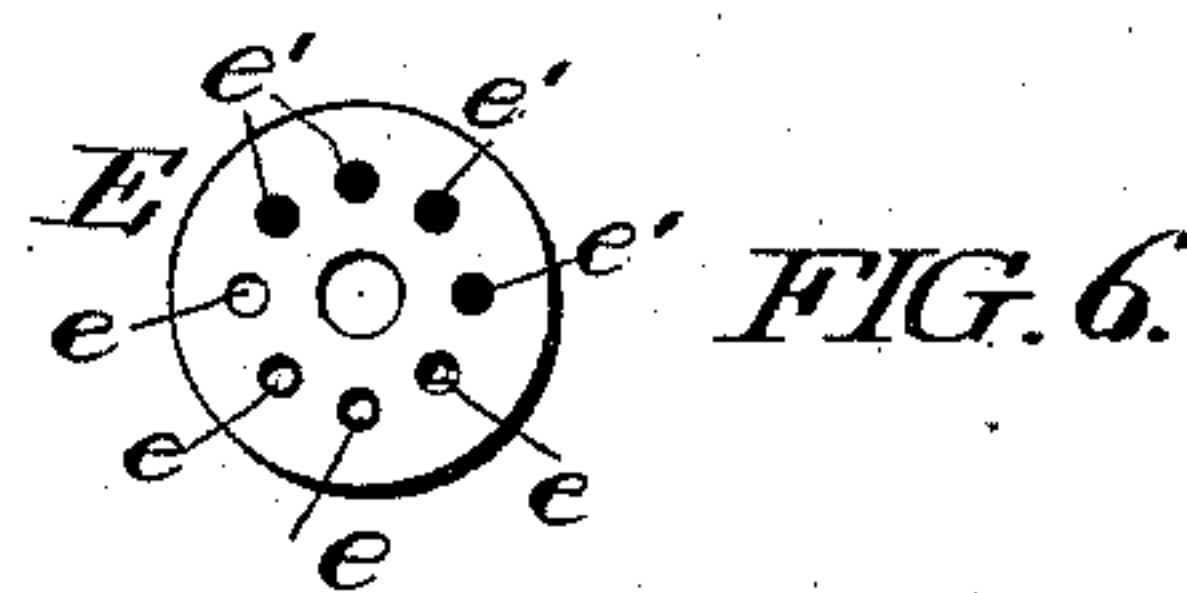
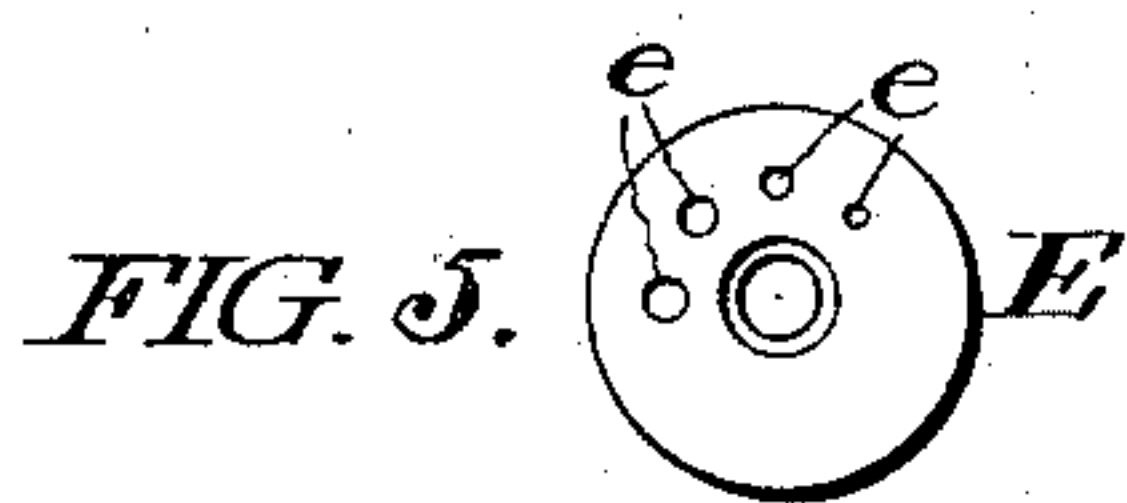
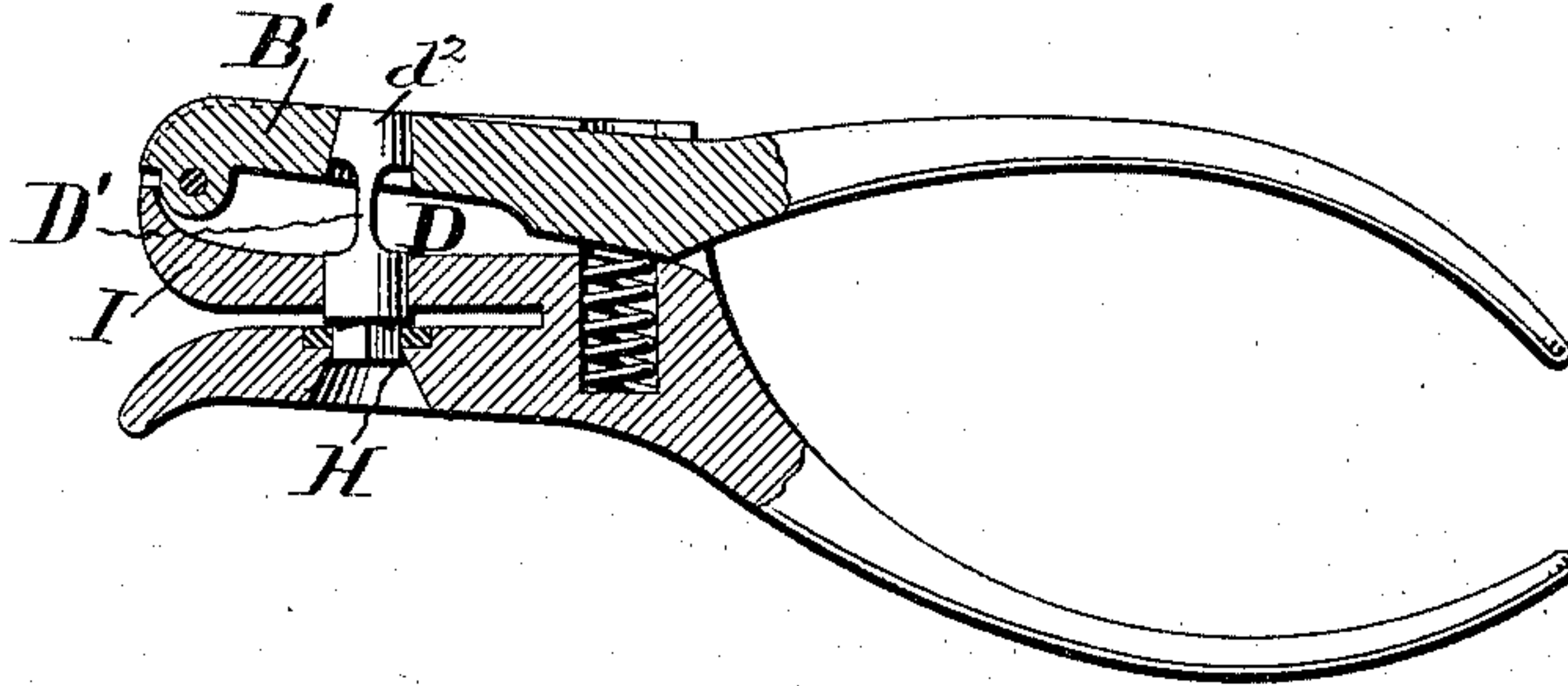


FIG. 7.



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UNITED STATES PATENT OFFICE,

WOODBURY STORER HOW, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF SAME
PLACE.

PUNCH.

SPECIFICATION forming part of Letters Patent No. 612,665, dated October 18, 1898.

Application filed November 30, 1897. Serial No. 660,197. (No model.)

To all whom it may concern:

Be it known that I, WOODBURY STORER HOW, a citizen of the United States, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Punches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a certain improvement applicable to punches for perforating thin sheet rubber, paper, metal, &c., and relates particularly to that class of this character of punches designed to be operated by hand-pressure.

The object of my improvement is to produce a punch of this character that is simple in construction, efficient in action, and that will effect a complete and clean perforation.

To this end my invention consists in providing punches of the character above named with flexible perforators rigidly secured to one of the jaws thereof, as will be more particularly described hereinafter and then pointed out in the claim.

In the accompanying drawings, which illustrate several applications of my improvement, Figure 1 is a view in elevation of a rubber-dam punch provided with my flexible perforator. Fig. 2 is a similar view, with some parts in section and some parts broken away, designed to illustrate the operation of the device. Fig. 3 is a detached perspective view of the flexible perforator. Fig. 4 is a similar view of a somewhat modified form of flexible perforator. Figs. 5 and 6 are top and bottom plan views, respectively, of the die-plate of the rubber-dam punch shown in the preceding figures. Fig. 7 is a view, partly in section and partly in elevation, of a conductor's ticket-punch provided with my flexible perforator.

My invention will first be described in connection with the well-known "Ainsworth" rubber-dam punch for use by dentists, as illustrated in Figs. 1 to 6, inclusive, and will next be described in connection with a conductor's ticket-punch of ordinary construction. (Illustrated in Fig. 7 of the drawings.)

Briefly stated, the Ainsworth rubber-dam punch consists of two members pivoted together at *a* and forming handles *A A* and jaws *B C*. A solid male punch or perforator *D*, having a conical point, is rigidly secured to the jaw *B*, and a die-plate *E* is centrally pivoted upon the jaw *C*. The pivoted die-plate *E* is provided with a series of holes *e*, which vary in size and which are arranged concentrically around the pivotal center of the plate, and means are also provided for locking the plate in any position to which it may be rotated in order to present die-holes of the desired size to the perforator *D*. This detent mechanism in this instance consists of a spring *F*, secured to the jaw *C* and having a lug *f* working in an opening in said jaw *C* and adapted to engage notches *e'* on the under side of the die-plate. The diameter of the coned cutting or punching head *d* of the perforator *D* is greater than the diameter of the largest hole of the die-plate, whereby holes of various sizes may be punched with the same perforator.

In accordance with my invention the perforator *D* is made flexible or is provided with a flexible stem or shank *D'* for a purpose which will presently be made obvious. The perforator is best made flexible by reducing the diameter of its shank *D'* for a suitable distance between the base of its coned cutting or punching head *d* and its end *d'*, which is rigidly connected to the jaw *B*. The flexible stem or shank of the preferred form of perforator is round in cross-section in order that the perforator may be flexed in all directions. If preferred, however, the flexible shank may be of any other shape—such, for instance, as in the modification shown in Fig. 4, in which the shank is flattened or of plate-spring form. This modified perforator is adapted to be secured to the jaw *B* of the punch with its flat side arranged crosswise of the punch, whereby the perforator can only be flexed in the direction of the longitudinal axis of the punch.

In operating the above-described punch the die-plate *E* is rotated to cause a hole of the proper size to register with the perforator *D*, the detent device *F* serving to hold the die-plate in proper position during the sub-

sequent perforating action of the punch. A sheet of rubber or other material G is placed upon the die-plate and the handles A A brought together by the hand and the coned point of the perforator forced through the material to cut a hole therein of the desired size. As the perforator is rigidly connected to the jaw B it moves in the arc of a circle about the pivot *a* of the punch as a center when the punch is operated, and consequently the inner side of the coned head of the perforator will first come in contact with the inner edge of the die-plate hole, and as the perforator is further forced into the die-plate hole it may be deflected outwardly to complete the contact of the entire coned head with the die-plate hole, and thus cut a perfectly clean and complete hole in the rubber. A like result is effected by similar deflection of the flexible perforator in any direction if for any reason the die-plate hole should not exactly register with said perforator.

In Fig. 7 I have shown my flexible perforator as applied to a conductor's ticket-punch of well-known construction and in which the flexible perforator D is rigidly connected to the jaw B' thereof. Perpendicular movement of the perforator relatively to the die-hole H is secured by means of a guide I, and the plate-spring D' of the perforator prevents the same from binding in its guide by compensating for the arc movement of the perforator. The perforator in this instance is detachably connected to the jaw B' by means of a cone-base *d*², frictionally fitted in a corresponding socket in the said jaw B', whereby the perforator may readily be adjusted or

removed. The operation of this punch will be understood without further explanation.

From the above description it will be seen that with punches provided with my flexible perforator a more complete and cleaner perforation may be effected than is possible with punches having rigid perforators fixed to one jaw thereof; that this desirable result is attained in the most simple manner and without the employment of complex construction, and that the said flexible perforator compensates for any reasonable defects in the construction of the punch and also for wear of the parts.

It is obvious that my flexible perforator may be of any suitable size, shape, and construction, and that it may be used upon punches of various kinds, to the jaws of which it may be connected in any suitable manner.

I claim as my invention—

A punch consisting of two members pivoted together, the jaw of one member being provided with a die-hole, and the jaw of the other member being provided with a flexible perforator rigidly connected to said jaw and adapted to register with said die-hole and capable of being deflected laterally to the line of operative movement of said perforator, substantially as and for the purpose hereinbefore set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WOODBURY STORER HOW.

Witnesses:

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