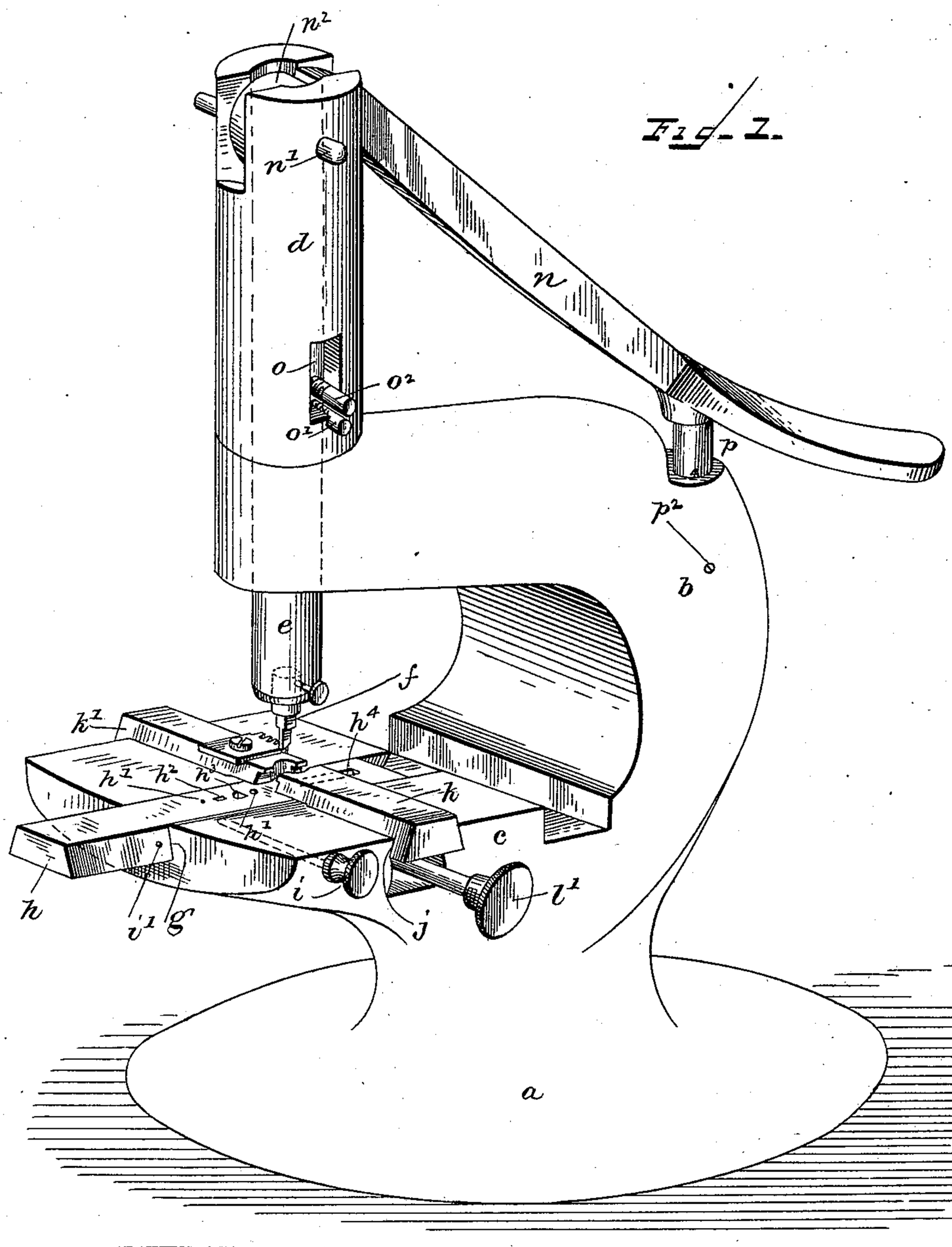
(No Model.) 3 Sheets—Sheet 1.

S. I. SNYDER.

MACHINE FOR PUNCHING METAL.

No. 363,917. Patented May 31, 1887.

Fig. 2.



WITNESSES

Franck L. Durand.

Edwin A. Finckel.

INVENTOR:

Samuel I. Snyder,

by Wm. H. Finckel,

Attorney.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

S. I. SNYDER.

MACHINE FOR PUNCHING METAL.

No. 363,917. Patented May 31, 1887.

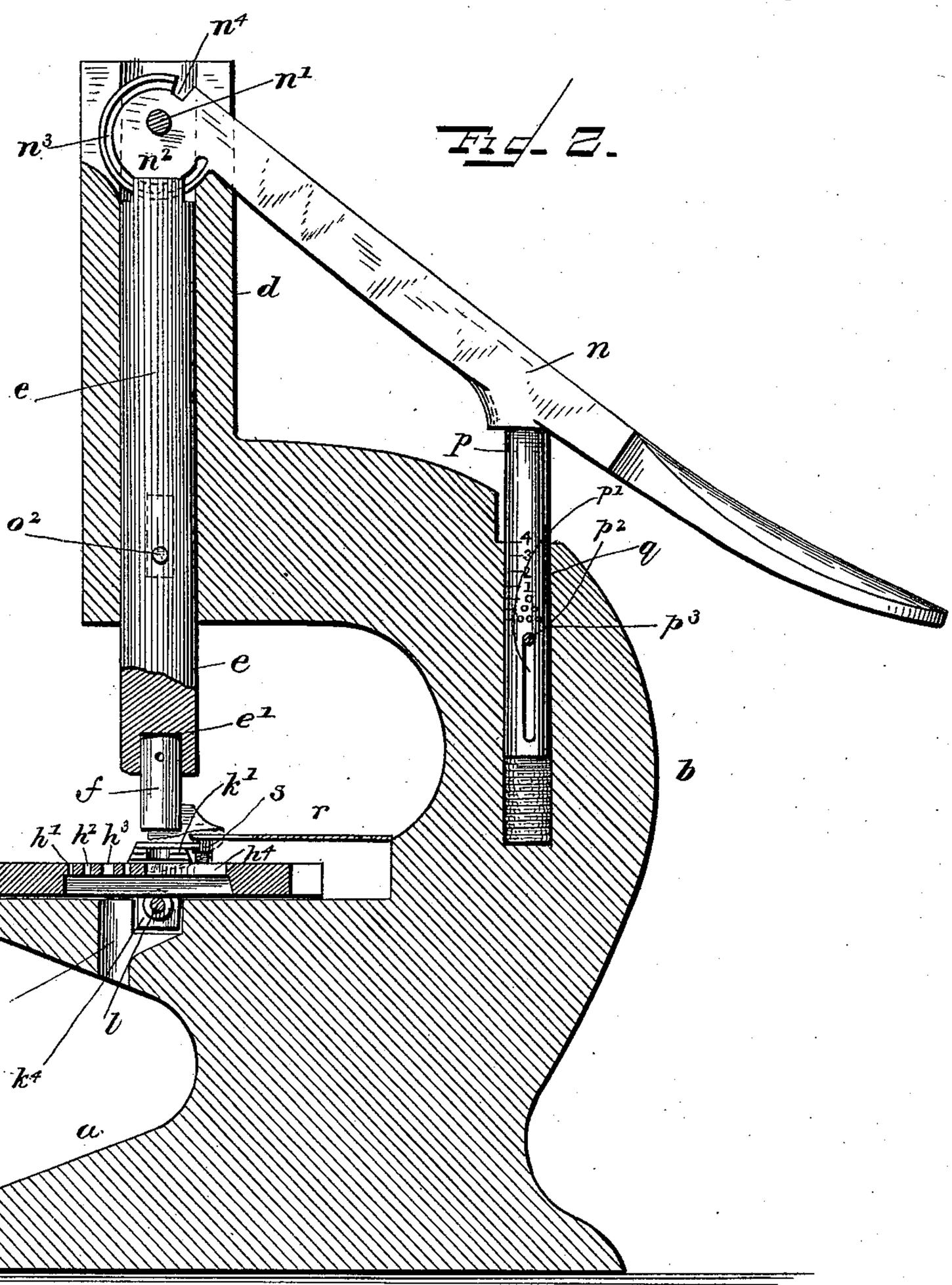


Fig. 2.

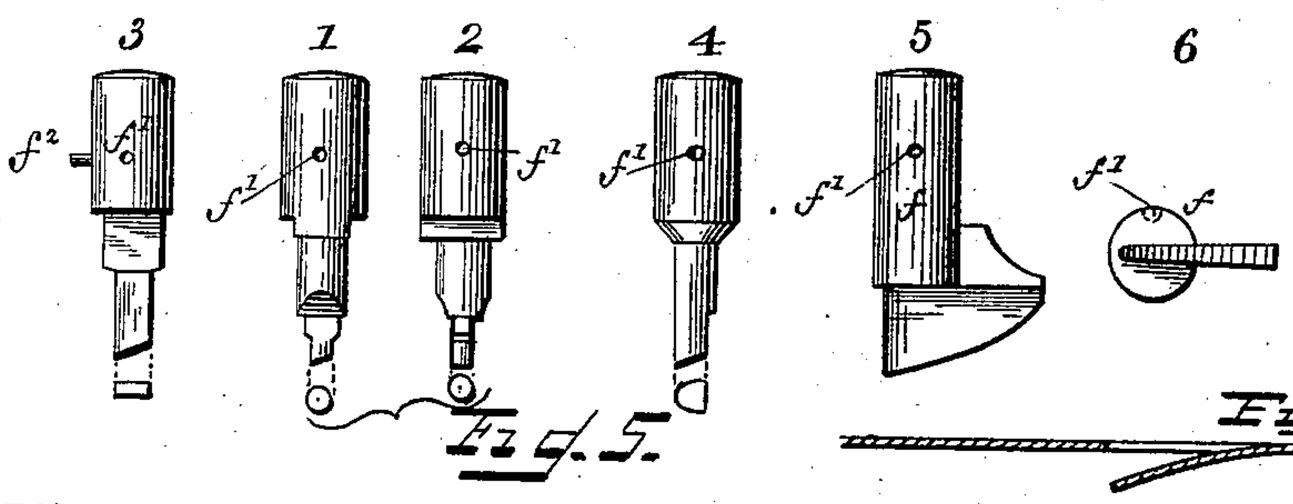


Fig. 5. Fig. 7.

WITNESSES

Franck L. Durand.

Edwin A. Finckel,

INVENTOR:

Samuel I. Snyder,

by Wm. H. Finckel.

Attorney.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

S. I. SNYDER.

MACHINE FOR PUNCHING METAL.

No. 363,917. Patented May 31, 1887.

Fig. 3.

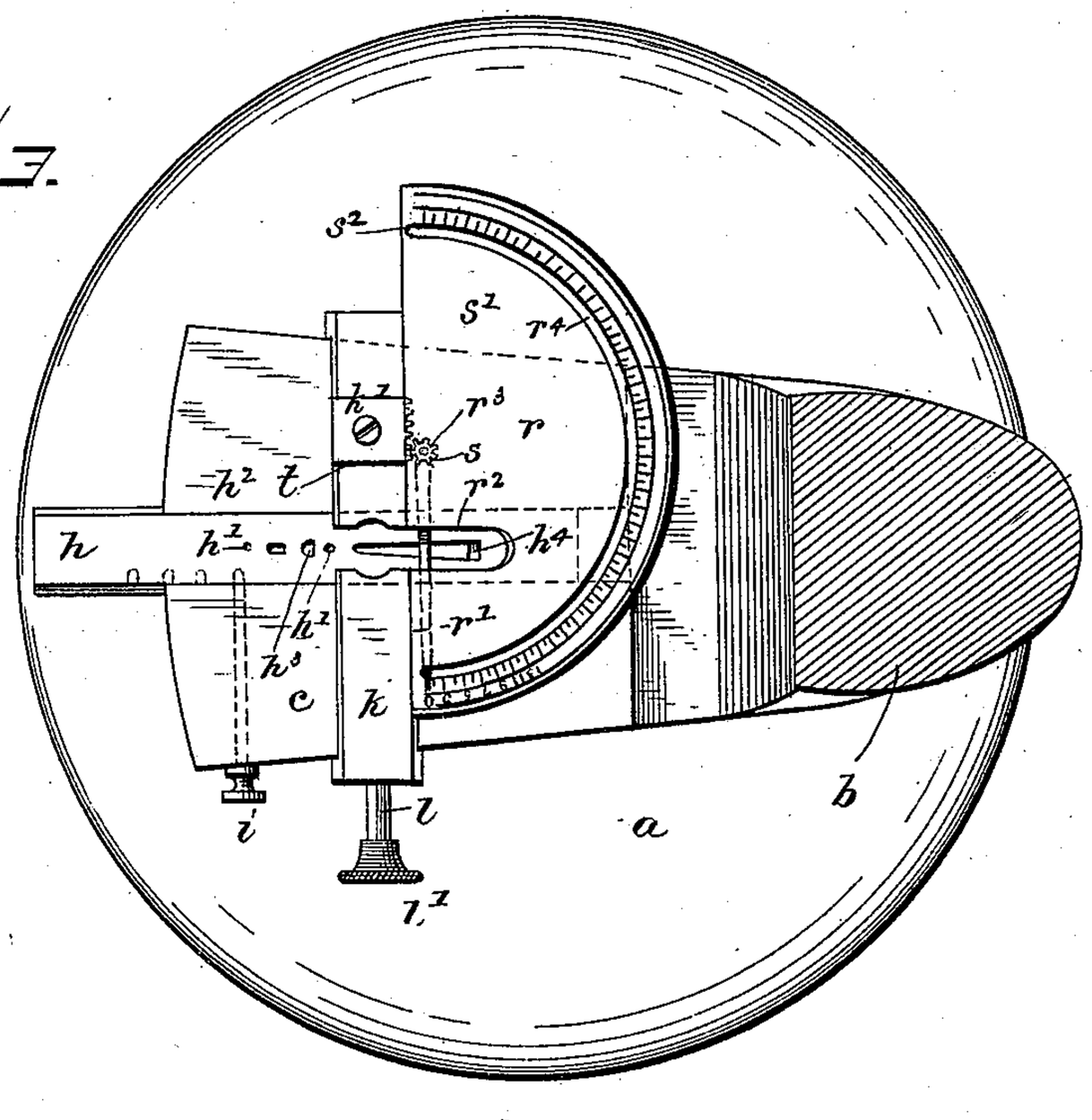
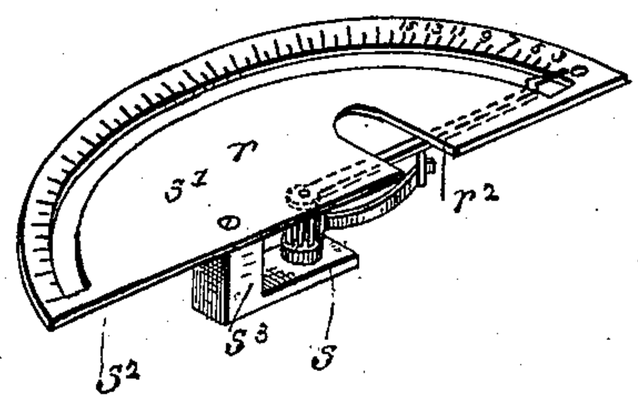


Fig. 4.

Fig. 6.



WITNESSES

Franck L. Ourand.

Edwin A. Finckel.

INVENTOR:

Samuel I. Snyder,

by Wm. N. Finckel,

Attorney.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL I. SNYDER, OF CLEARFIELD, PENNSYLVANIA.

MACHINE FOR PUNCHING METAL.

SPECIFICATION forming part of Letters Patent No. 363,917, dated May 31, 1887.

Application filed February 15, 1887. Serial No. 227,675. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL I. SNYDER, a citizen of the United States, residing at Clearfield, in the county of Clearfield and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Punching and Gaging Mainsprings and other Articles, of which the following is a full, clear, and exact description.

The primary object of this invention is to provide a machine for watch-makers' use in punching and gaging springs; but the principles involved in the construction of my machine adapt it for use for many analogous purposes. However, for simplicity's sake, I will describe my invention in this specification as a watch-maker's tool.

The invention, stated in very general terms, consists in two holding-jaws moved synchronously and equally to center the spring to be punched over a die and under a punch, and to hold it while being punched and strip it from the receding punch; also, in gages for ascertaining the thickness and width of springs, all as I will now proceed to more particularly set forth and claim.

In the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is a perspective view; Fig. 2, a vertical longitudinal section with some parts in elevation; Fig. 3, a horizontal section above the work-table, with the width-gage in position; Fig. 4, a vertical cross-section of the arm and work-table. Fig. 5 shows several forms of punches. Fig. 6 is a perspective view of the width-gage detached, and Fig. 7 is a section of some of the work done by my machine.

The pedestal *a* has an arm or goose-neck, *b*, which overhangs a work-table, *c*, the said arm having a tubular head, *d*, to receive the punch-stock *e*, in which is arranged the punch *f*, as presently explained. The work-table is provided with a longitudinal way, *g*, in which is arranged to be slid back and forth or adjusted the die *h*. This die may be of steel, and is provided with a series of matrices, h' h^2 h^3 h^4, and each of these matrices is centered, as desired, beneath the punch, and held there by a pin, *i*, engaging one of a series of holes or sockets, *i'*, in the side of the die, the pin *i* being arranged in the work-table. Crossways *j* are made in the work-table at right angles to the way *g*, and in these ways are arranged the work-centering jaws *k k'*. These jaws are provided with nuts k^2 k^3 on their under sides, having, respectively, left and right hand threads, and engaged by right-and-left hand screw-rod *l*, having an operating-head *l'*. These jaws have truly-squared adjacent faces *m m'*, by which the work is grasped and firmly held while being punched when the jaws are caused to approach one another by the rotation of the screw *l*, and the upper edges of these faces are provided with the overhanging lips m^2 m^3, which prevent the work from buckling, and also strip it from the receding punch.

The punches *f* are fitted in a socket, *e'*, in the punch-stock *e*, and secured against displacement by endwise or rotary movement by any suitable device—such, for example, as a set-screw, e^2, passed into the stock and engaging a socket, *f'*, in the punch. These punches may be provided with any suitable device to serve as a guide in properly setting them in the punch-stock, and I have shown for this purpose a pin, f^2, to engage a notch in the punch-stock.

The matrices h' h' may be various sizes of round openings to co-operate with corresponding punches, *f*, shown in side and front view at 1 and 2 of Fig. 5. The matrix h^2 may be rectangular to co-operate with the punch *f*, (shown in side view at 3 in Fig. 5,) and the matrix h^3 may be semicircular or elliptical to co-operate with the punch *f*, (shown in side view at 4 in Fig. 5,) all to correspond with usual holes made in mainsprings of watches for use in securing them in place, while the matrix h^4 co-operates with the punch *f*, (shown in side and bottom view in Fig. 5,) to form a tongue on a mainspring for use in applying it, as shown in Fig. 7; and, so far as I am aware, no watch-maker's tool has heretofore been produced for enabling a repairing jeweler to make this tongue, the springs so constructed coming to the jeweler from the manufacturer, and the jeweler is thus compelled to keep a stock of sizes of this kind of spring, whereas with my machine he can provide any spring with such a tongue; but the shape of the matrices and punches will be limited only by the kind or

character of the work for which the machine is designed.

The punch-stock *e* is arranged to be reciprocated vertically in the head *d*, and I give it a positive motion in both directions by a hand-lever, *n*, fulcrumed on a pin, *n'*, in the head *d*. This lever has a flat head, n^2, in the opposite sides of which eccentric grooves n^3 are formed, which engage pins or lugs e^2 (see Fig. 4 and dotted lines, Fig. 2) on ears projecting vertically from the sides of the punch-stock. The lugs e^2 may be introduced into the grooves n^3 through the opening n^4 in the lever-head. The head n^2 of the lever *n* is in effect a cam, and its perimeter bears upon the head of the punch-stock in depressing said stock, while its grooves engage the lugs on the ears of the punch-stock to effect an equally positive retracting movement of the punch-stock.

The gage for ascertaining the thickness of the work is constructed as follows: A slot, *o*, is made in the head *d* of the arm *b*, and at its bottom and flush therewith is fixed in the head a pin, *o'*. Another pin, o^2, is fastened to and moves with the punch-stock *e*, and this pin o^2 is parallel with the pin *o'*. By movement of the punch-stock the pin o^2 is moved toward and from the pin *o'*, and their range of movement is made to conform to any arbitrary scale in use by jewelers or spring-makers and others. The movements of the pin o^2 and its distance from the pin *o'*, and hence the thickness of any piece of material grasped between these pins, is indicated on the graduated pin *p*, arranged in a socket, *q*, in the arm *b*, and depressed by the handle *n* coincidently with the descent of the pin o^2. This graduated pin may be secured in the socket in arm *b* by a pin, *p'*, in the arm engaging a longitudinal slot, p^2, in the pin; and in order to keep the said graduated pin in operative position it is supported upon a spring, p^3, dropped in the bottom of the socket *q*, and of proper strength to graduate the descent of the pin *p*.

The gage for width, (shown in detail in Fig. 6,) consists of a plate, *r*, having Dennison's or other scale marked thereon, and having a straight-edge, *r'*, to fit against the jaws *k k'*, any suitable device being employed to firmly secure the gage to the work-table in this position. The plate is provided with a work-sight, r^2, and it is also provided with a vertical arbor, r^3, having rigidly affixed thereto a pinion, *s*, which, when the gage is in position, (see Fig. 3,) meshes with a toothed rack, *t*, on the jaw *k'*, so that as the jaw is moved longitudinally the pinion will be rotated. The arbor r^3 is provided with a pointer, *s'*, having a finger, s^2, projecting through a slot, r^4, in the gage-plate and movable over the scale on said plate. This pointer is kept normally at zero by a hair-spring, s^3, or other suitable device. Now, it is obvious that when the parts are in the position of Fig. 3, if a spring or other piece of work the width of which it is desired to ascertain be placed between the jaws *k* and *k'* and said jaws be caused to approach the said work, the pinion will be rotated until the jaws come in contact with the work, and the pointer will traverse the scale and indicate the "gage" or width of the work on said scale. The sight r^2 admits of the punching of the work while the gage is in place; or, in other words, the gage used need not be removed to effect the other operations of the machine.

I have shown the plate only partly graduated, but it will be understood that it will be graduated in any desired manner to obtain the desired result.

An opening, *v*, may be made in the work-table to permit the escape of waste material.

The head *d* may be recessed from front to rear to receive the head of the handle *n*.

What I claim is—

1. A work-table provided with right-angle ways intersecting beneath a punch-stock and in line therewith, combined with a die having one or more matrices, and work-centering jaws arranged in said ways, and a punch-stock and punch, substantially as described.

2. A die, jaws, and means, substantially as described, to cause said jaws to approach and recede with respect to one another over said die to center the work, and lips on said jaws overhanging the work to prevent it from rising out of said jaws, combined with the punch and punch stock, and a lever connected to said punch-stock to operate it positively in both directions, substantially as described.

3. A machine for punching tongues in watch-springs, comprising a die having an elongated matrix of substantially the shape of the tongue to be formed, jaws for centering the spring and holding it over said matrix, and a punch having an active face corresponding with the matrix and co-operating therewith, and a punch-stock to receive said punch, and means for operating such punch-stock, substantially as described.

4. An arm, *b*, a head thereon provided with a slot, *o*, and a pin, *o'*, a punch-stock having a pin, o^2, parallel with the first-named pin, and an indicator, *p*, combined with the operating-handle of the punch-stock, whereby the thickness of the materials may be gaged, substantially as described.

5. The work-centering jaws movable toward and from one another, provided with a toothed rack, combined with a gage-plate having a pointer and a pinion on the pointer shaft or arbor meshing with the toothed rack on the work-centering jaw, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand this 14th day of February, A. D. 1887.

SAML. I. SNYDER.

Witnesses:
J. BOYNTON NEVLING,
CURTIN NEVLING.