

(No Model.)

W. H. PAIGE.

MACHINE FOR PUNCHING AND FORMING NUTS.

No. 272,083.

Patented Feb. 13, 1883.

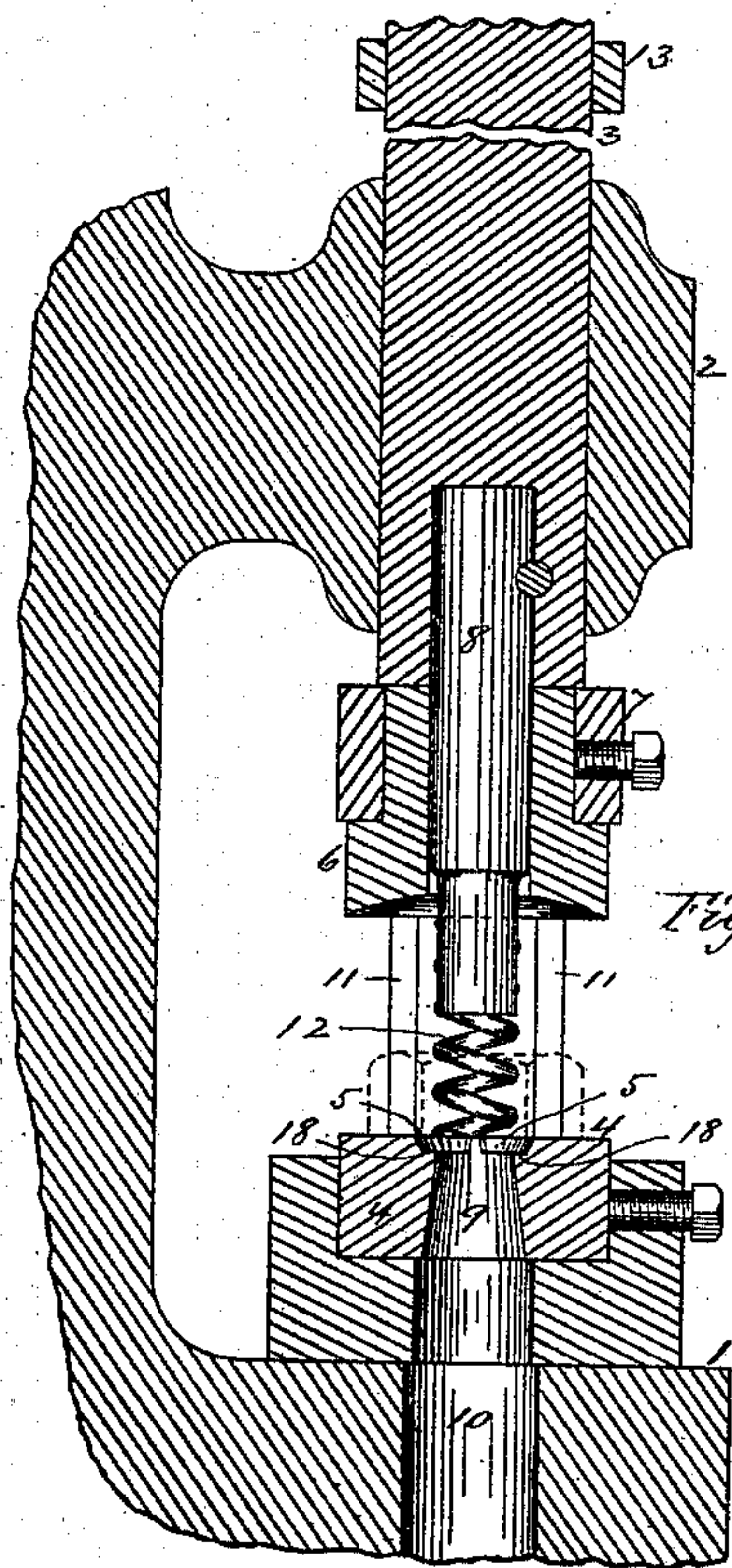


Fig. II

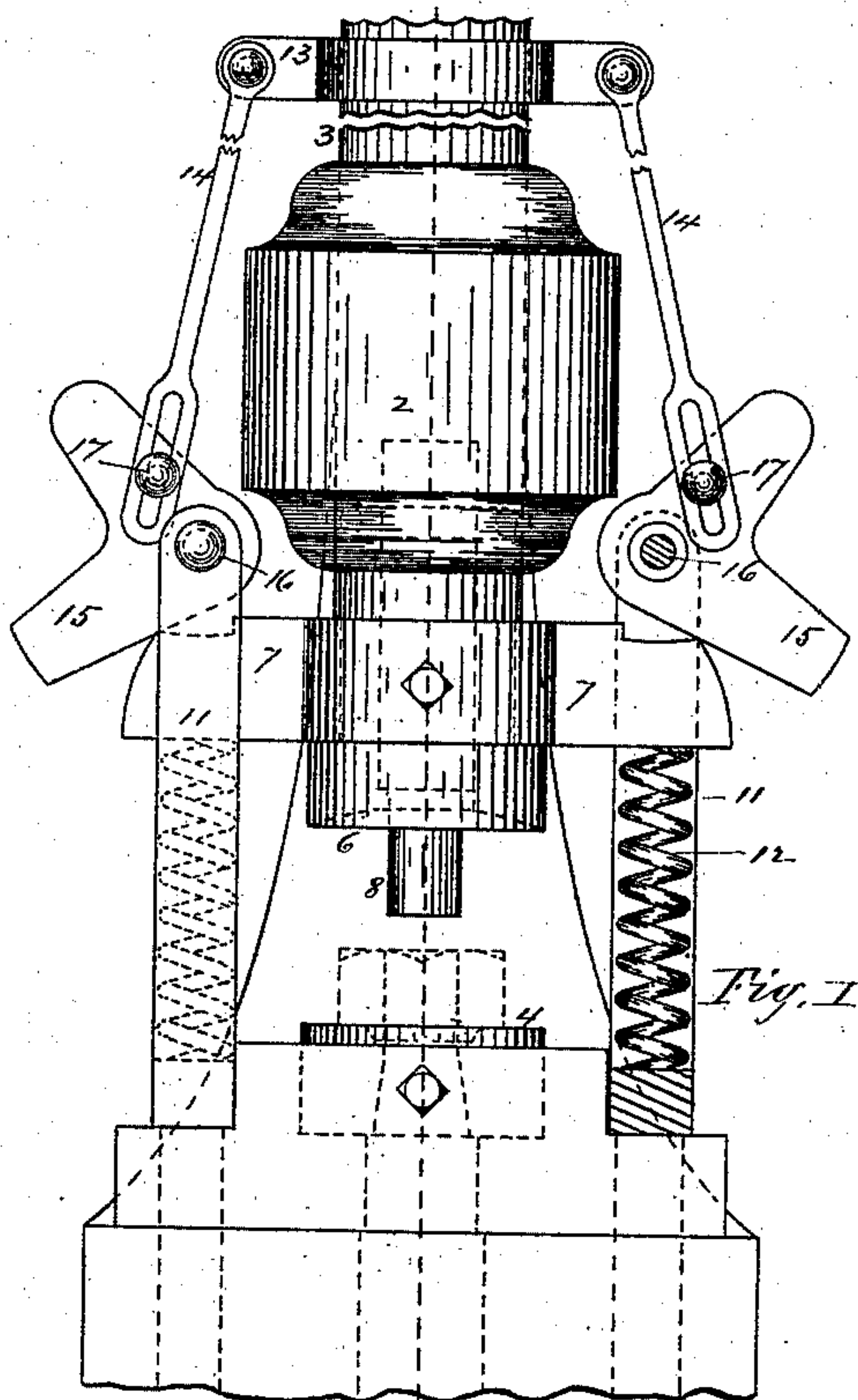


Fig. I

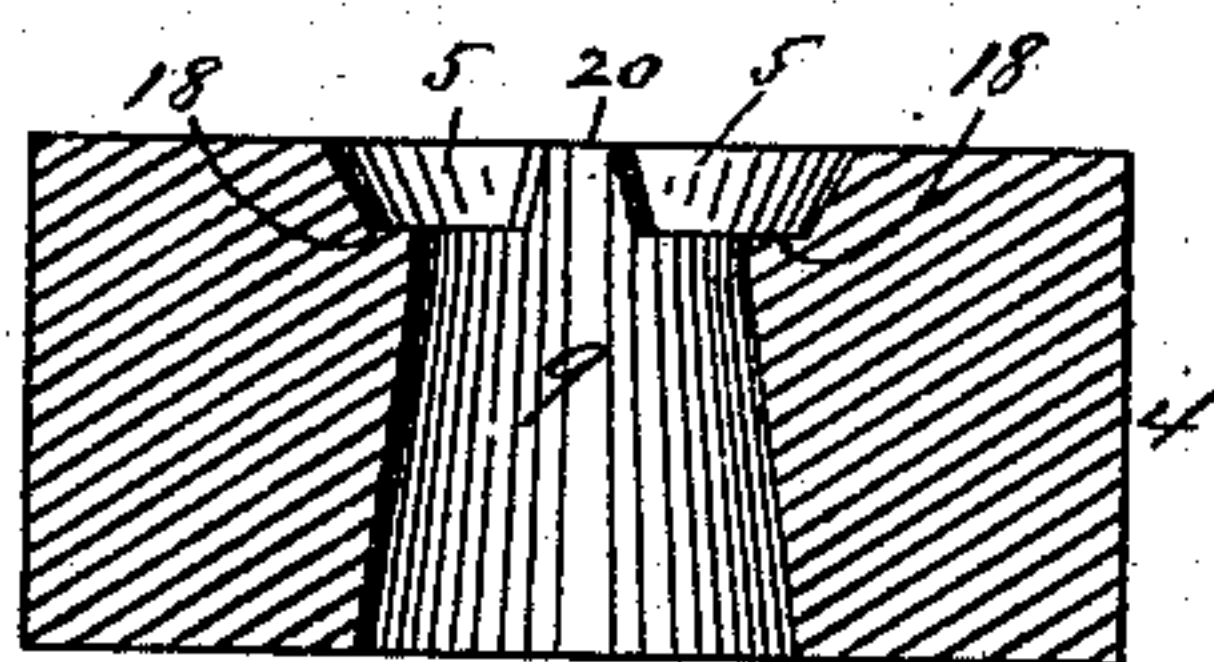


Fig. V

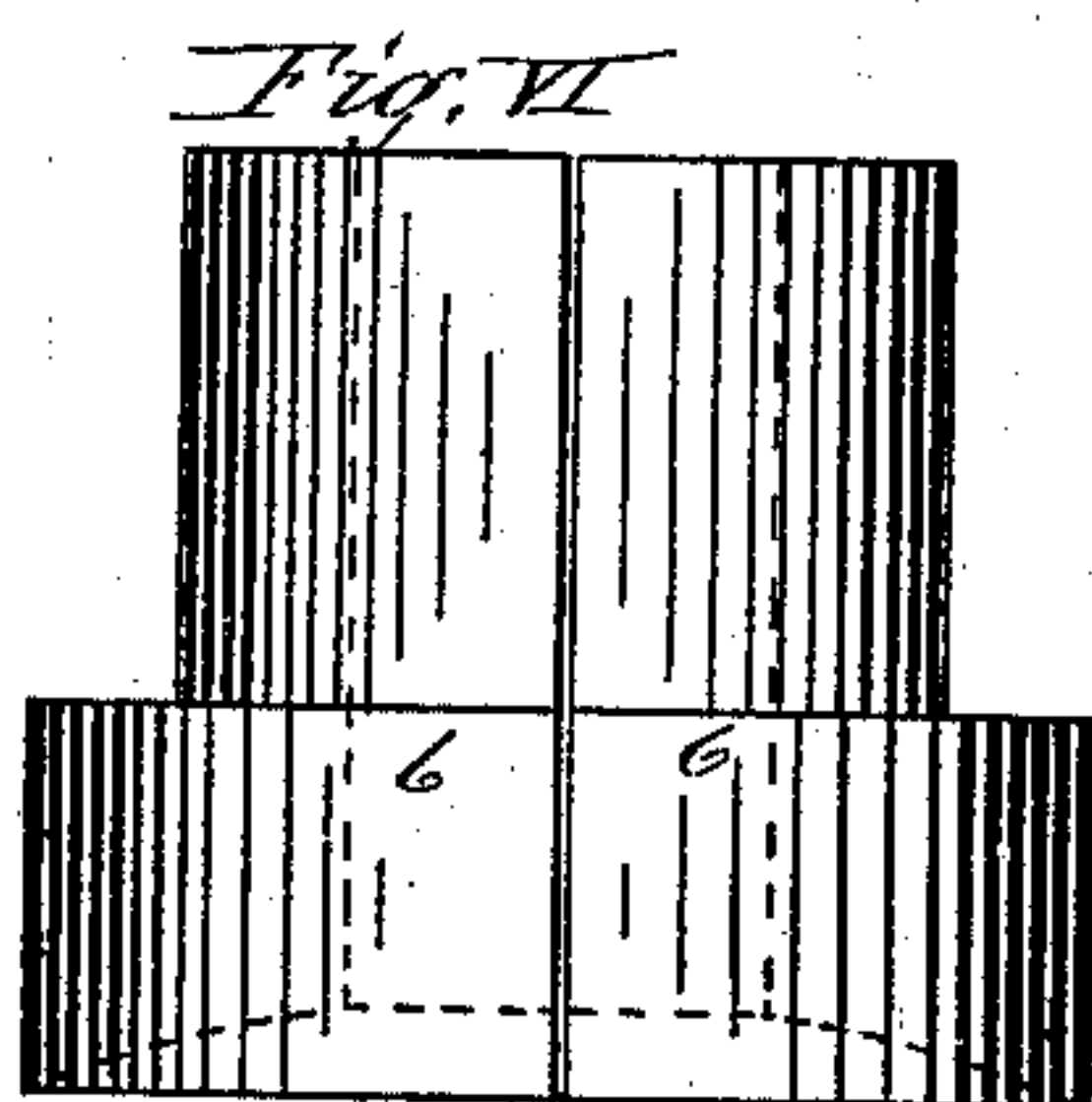


Fig. VI

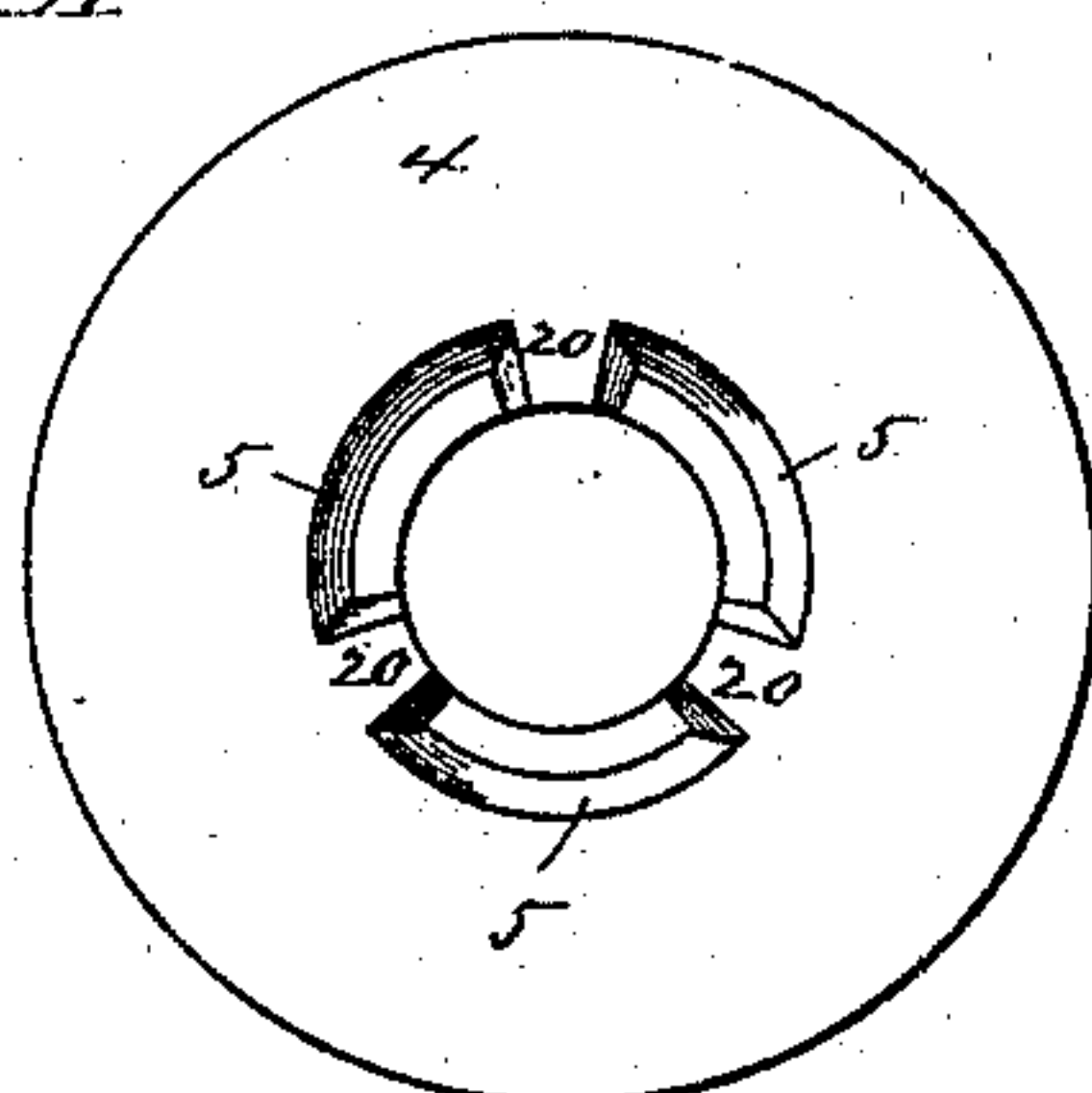


Fig. III

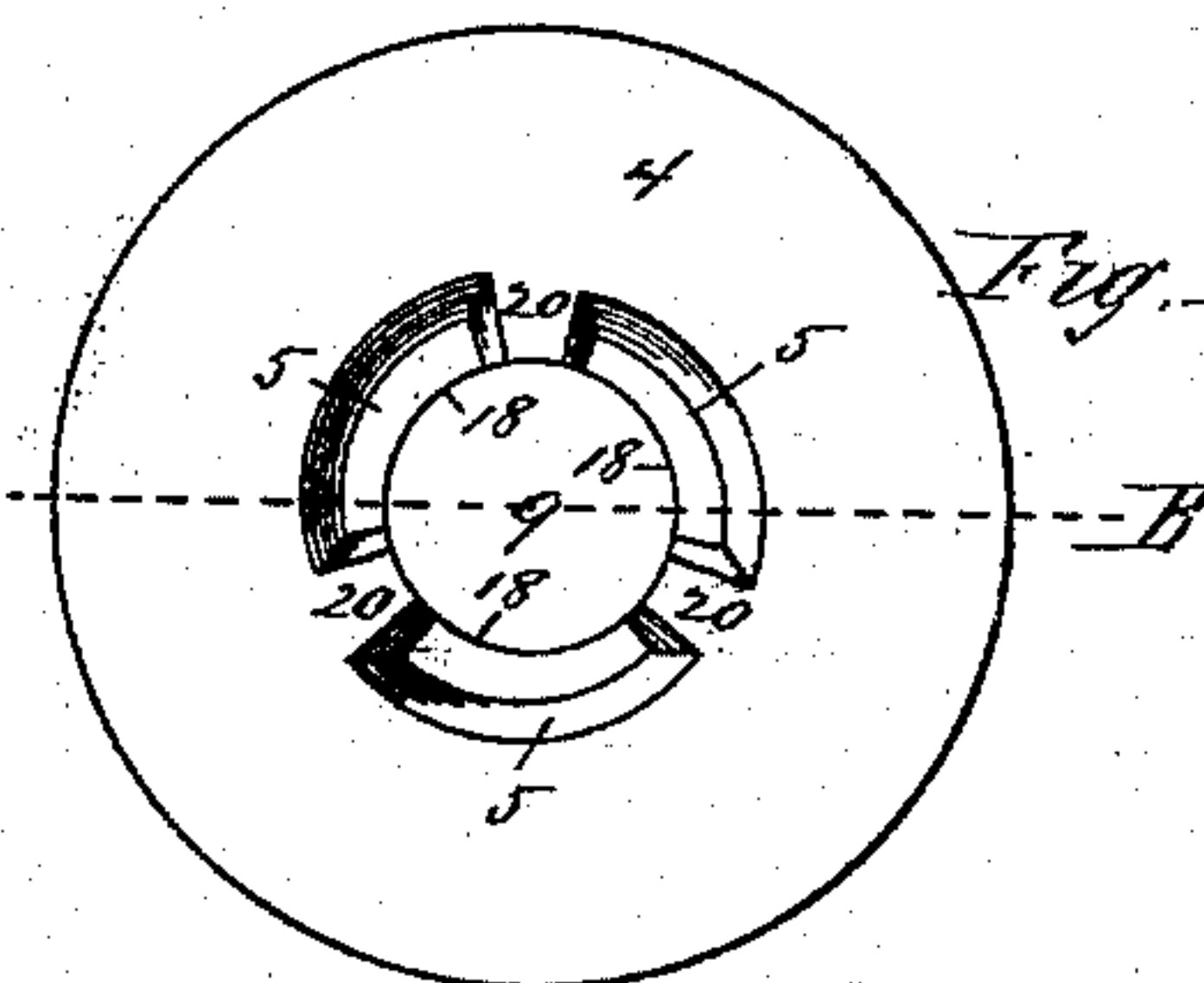


Fig. IV

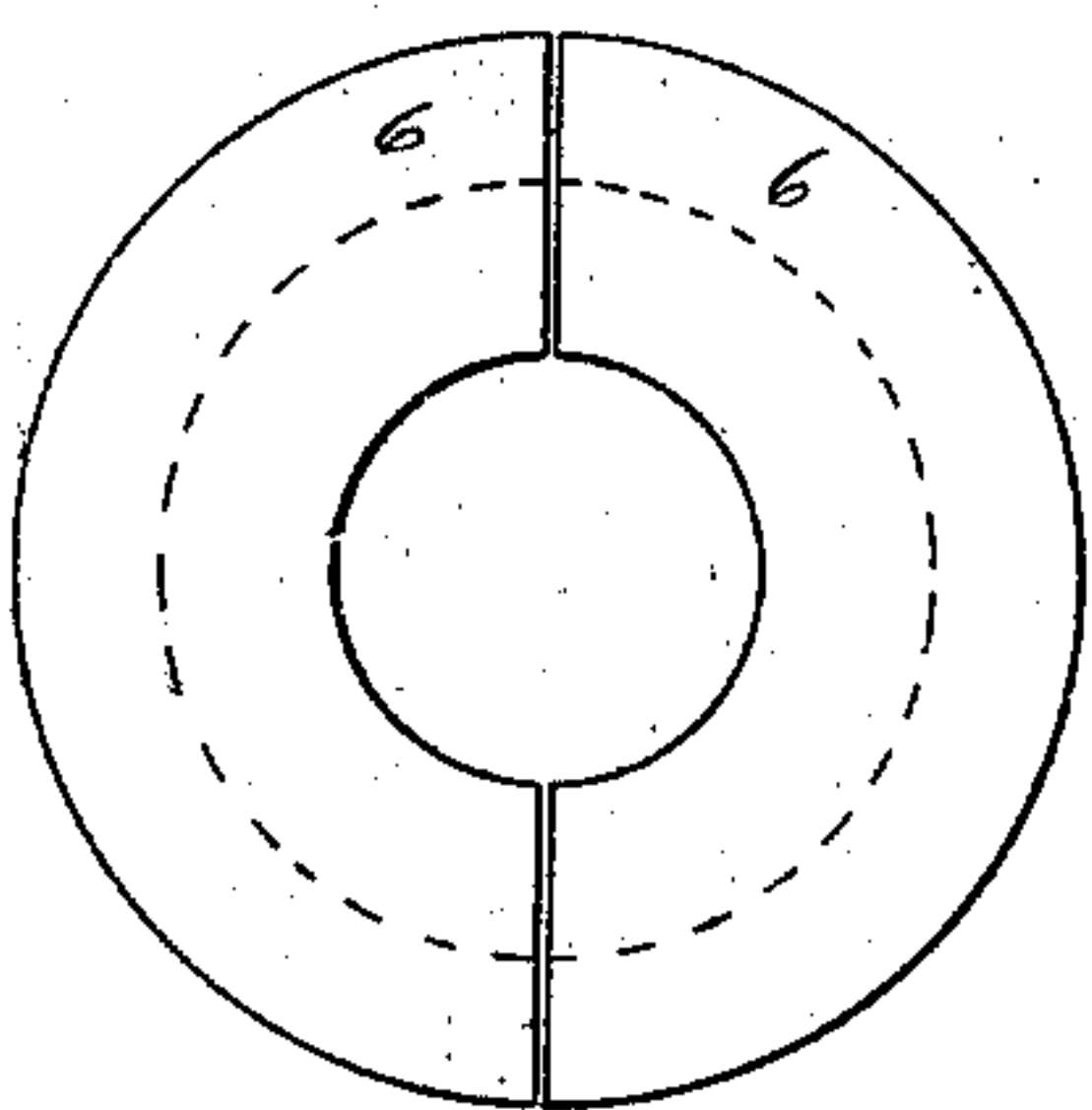


Fig. VII

Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM H. PAIGE, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ALLEN MIDDLETON, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR PUNCHING AND FORMING NUTS.

SPECIFICATION forming part of Letters Patent No. 272,083, dated February 13, 1883.

Application filed February 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PAIGE, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Machinery for Forming Nuts, of which the following is a specification and description.

The object of my invention is to provide a machine for forming nuts, punching the hole to be threaded, and forming the sectional flange or fillet for locking the nut upon the bolt; and I accomplish this by the mechanism substantially as hereinafter described, and illustrated in the accompanying drawings, in which—

Figure I is a front view of a machine made according to my invention. Fig. II is a vertical section of the same at line A of Fig. I. Fig. III is a plan view of the die, having sectional recesses collectively of a general circular form in its upper face to form a corresponding sectional flange or fillet of general circular form on the face of the nut around the hole to be tapped out. Fig. IV is a plan view of a die having sectional recesses collectively of a spiral or eccentric form in its upper face around the central perforation to form a corresponding sectional flange or fillet of a general spiral or eccentric form on the face of the nut and around the hole to be threaded. Fig. V is a transverse vertical section of the die on line B of Fig. IV. Fig. VI is a modification of the follower, showing the same made in two parts vertically; and Fig. VII is a plan view of the lower face of said modification of follower.

In the drawings, 1 represents the bed of the machine, upon or in which is firmly secured the die, as 4, having a hole, as 9, extending down through it to the vertical opening, as 10, in the bed of the machine. In the upper face of the die, as 4, I form recesses, as 5, around the hole 9, leaving portions of the die, as at 20, between these recesses, with their upper face on substantially the same horizontal plane as the face of the die, as shown clearly in Figs. IV and V, and the outer walls of these recesses are beveled or inclined with reference to the upper face of the die, and I prefer that the end walls of these recesses shall be beveled or inclined also, as shown clearly in Figs. IV and V, as that construction will cause the parts, as 20, of the die to wear much longer. To give a

better finish to the sectional flange on the nut I prefer that the recesses, as 5, should extend down to a well-defined shoulder, as at 18, and the hole, as 9, through the die may be larger in diameter at the bottom than at the top to give sufficient clearance.

The plunger, as 3, is adapted to move vertically in its socket or guide, as 2, and the punch, as 8, which may be slightly reduced in diameter at the lower end, is secured in the plunger by a key, or in any desired manner, and a follower, as 6, is provided with a vertical hole, through which the punch 8 will move freely, and a yoke, as 7, is firmly secured to the follower, each end of said yoke being adapted to move freely in a vertical direction in a vertical guide, as 11, secured to the bed of the machine.

An elbow, as 15, is pivoted, as at 16, in the upper end of each vertical guide 11, and in a position directly above the yoke 7, and a bar, as 13, is secured to the plunger 3, to each end of which bar is pivoted a rod, as 14, slotted at its lower end, with a pin, as 17, extending through said slot and secured in the elbow at a point above the pivot 16 and a little outside of a vertical line extending through the latter.

A spring of any desired form, as 12, is placed beneath the yoke 7, between it and the bed of the machine, to keep the yoke in its most elevated position when not forced down by the plunger.

The operation of the machine is as follows: A nut of any desired form is placed on the die 4, as shown in dotted lines in Figs. I and II, and, power being applied to the machine, the plunger being forced down, the axes of the punch 8 and of the die 4 being coincident, the punch cuts a hole through the nut, forcing the metal taken from the nut down through the hole 9 in the die. In this operation the metal, in being moved downward, is forced outward also between the bottom of the nut and the top of the die, and this metal is forced into, completely fills, and takes the form of these recesses 5, and thus forms the sectional flange on the lower face of the nut, and the surplus metal is forced down through the opening 9 and through the bed of the machine. As soon as the punch has made the hole in the metal the follower has reached the upper face of the nut, and the concave lower face of the follower is

forced down upon and gives a convex form to the upper face of the nut, and also forcing the nut down upon the die, while the punch is still within the hole it made in the nut. The metal at the recesses 5 is forced thereinto, and is made dense and firm. When the follower has moved nearly down to the nut the yoke 7 has moved down also sufficiently to permit the lower arms of the elbows 15 to drop in above and upon the ends of the yoke. When the plunger moves up it carries with it the punch also, which moves up through the follower, while the latter remains in its position upon the nut, being held in that position by the elbows bearing upon the ends of the yoke, the follower thus forcing the nut off the punch until the plunger moves high enough to cause the slotted ends of the rods 14 to engage against the studs or pins 17, and, as the plunger moves up, pull the lower arms of the elbows out from their position upon the yoke. When this occurs the elasticity of the springs 12 quickly forces up the yoke to its most elevated position, and the machine is ready for the same operation upon another nut.

Instead of making the follower, as 6, solid, I may make it divided in a vertical direction, as shown in Figs. VI and VII, so that should the punch 8 become upset and move hard in the follower the yoke might be removed from the follower and the two parts of the latter removed from the punch, and the latter repaired or a new one inserted in place in the plunger.

It is evident that the elbows 15 may be made of any other convenient or desirable form—as, for example, they may be made in the form of eccentrics—and for convenience I denominate these parts 15 “cams” or “latches,” inasmuch as each performs the function of a cam.

It is evident that the slotted rods 14 may be connected with the plunger 3 in any other manner than through the medium of the cross-piece 13, and they may be also made adjustable as to their length either by a socket and screw-thread joint or in any other convenient manner.

The die, as 4, having the recesses, as 5, therein, may be used in any ordinary punch-machine, and without the follower, yoke, cams, and other accompanying follower-operating mechanism, if it is not desired to give the upper face of the nut the convex form, but to leave its upper face in its original condition.

Having thus described my invention, what I claim as new is—

1. The combination, in a machine for punching and forming nuts, of a plunger, a punch secured thereto, a follower adapted to be moved along said punch, a yoke secured to said follower and actuated by springs in its upward movement, pivoted cams or latches for holding the yoke and follower in a stationary position while the punch is withdrawn from the nut, and rods connecting the plunger with said cams or latches to release the yoke during the upward movement of the plunger, substantially as described.

2. The combination, in a nut-punching machine, of a die having a beveled sectional recess around its central hole, and a punch for punching the hole in said nut and forcing the metal of the blank into said sectional recess to form a beveled sectional flange or fillet on the face of a nut, substantially as described.

WILLIAM H. PAIGE.

Witnesses:

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