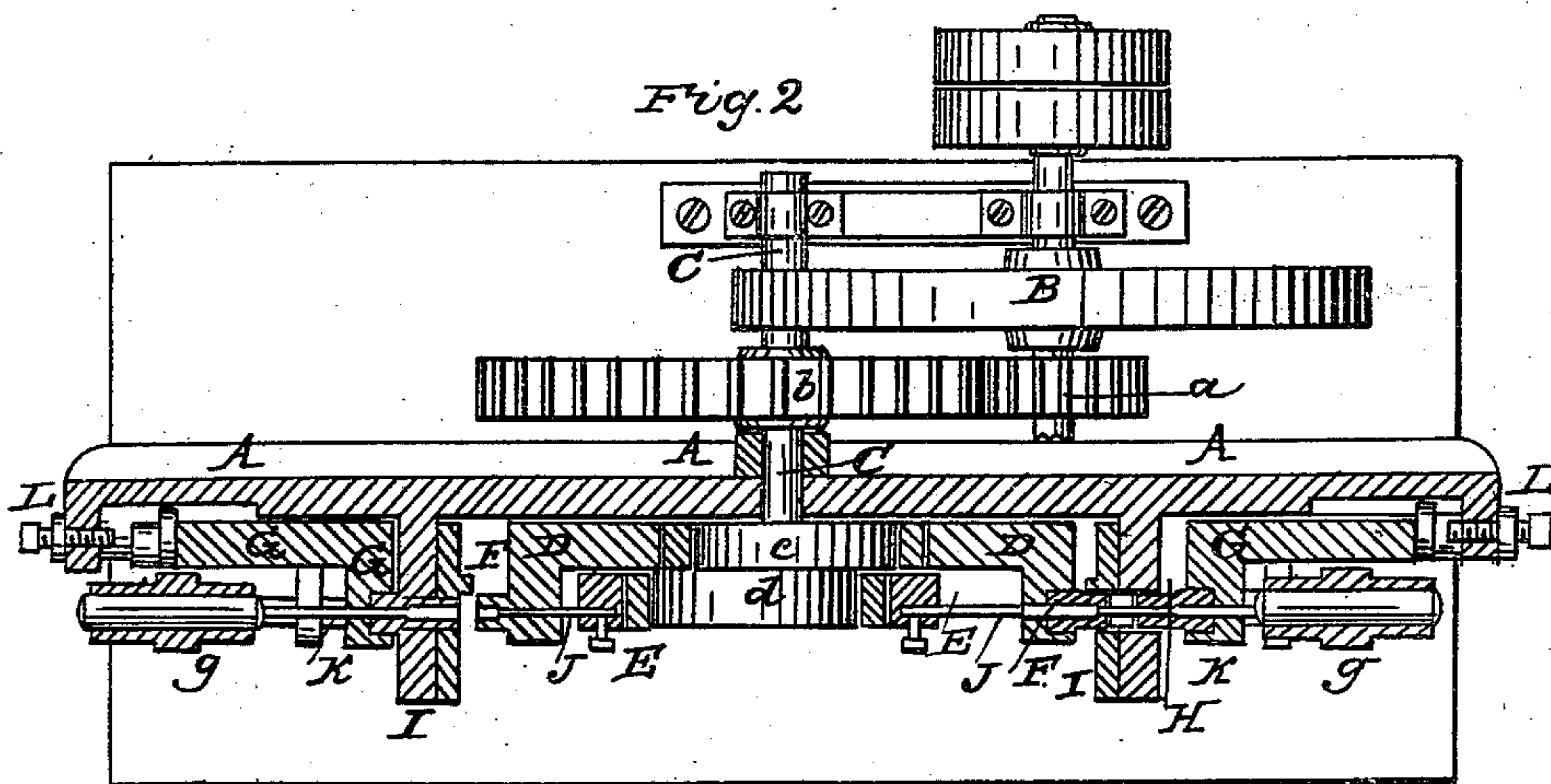
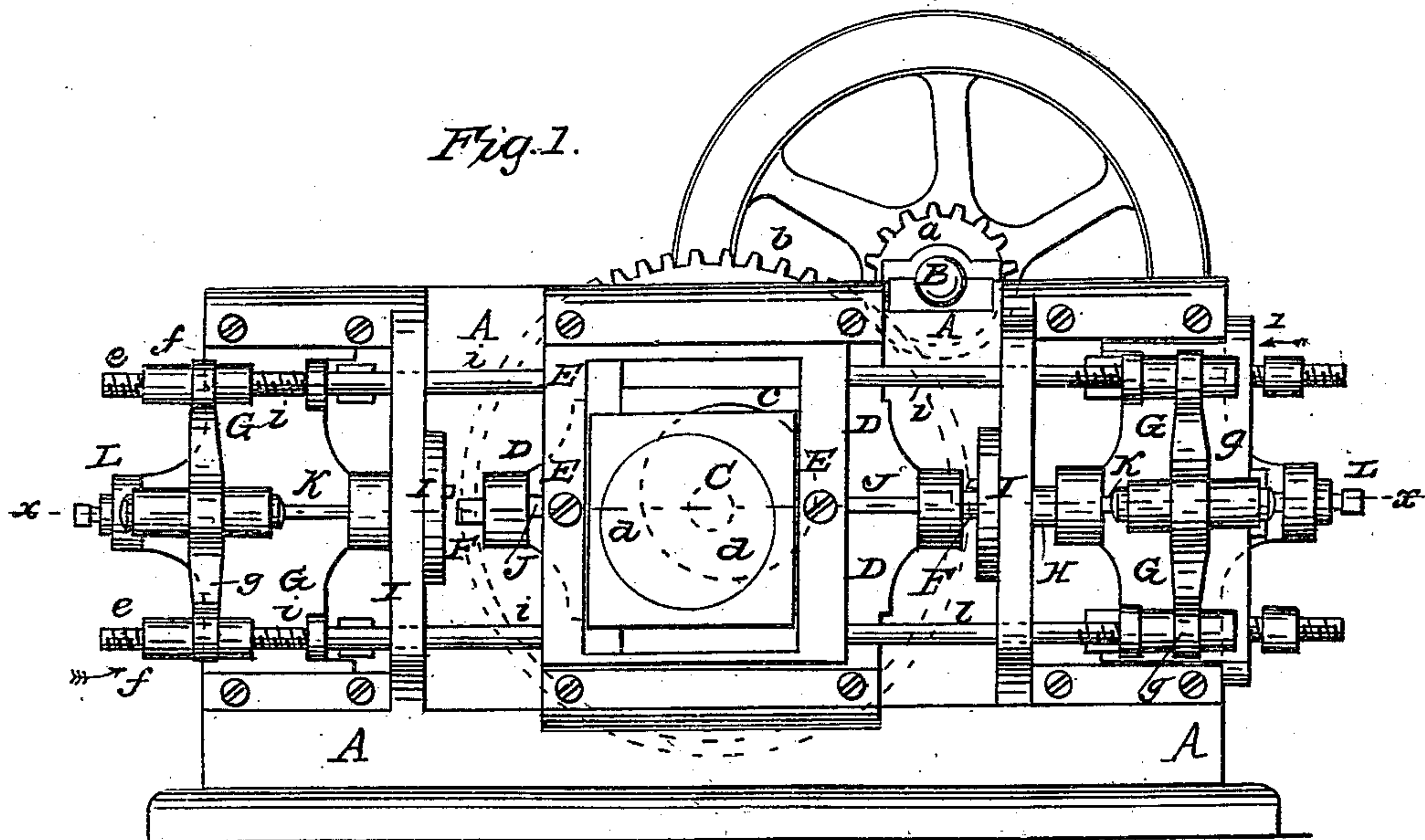


F. WATKINS.

Nut Machine.

No. 84,781.

Patented Dec. 8, 1868.



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Fig. 3

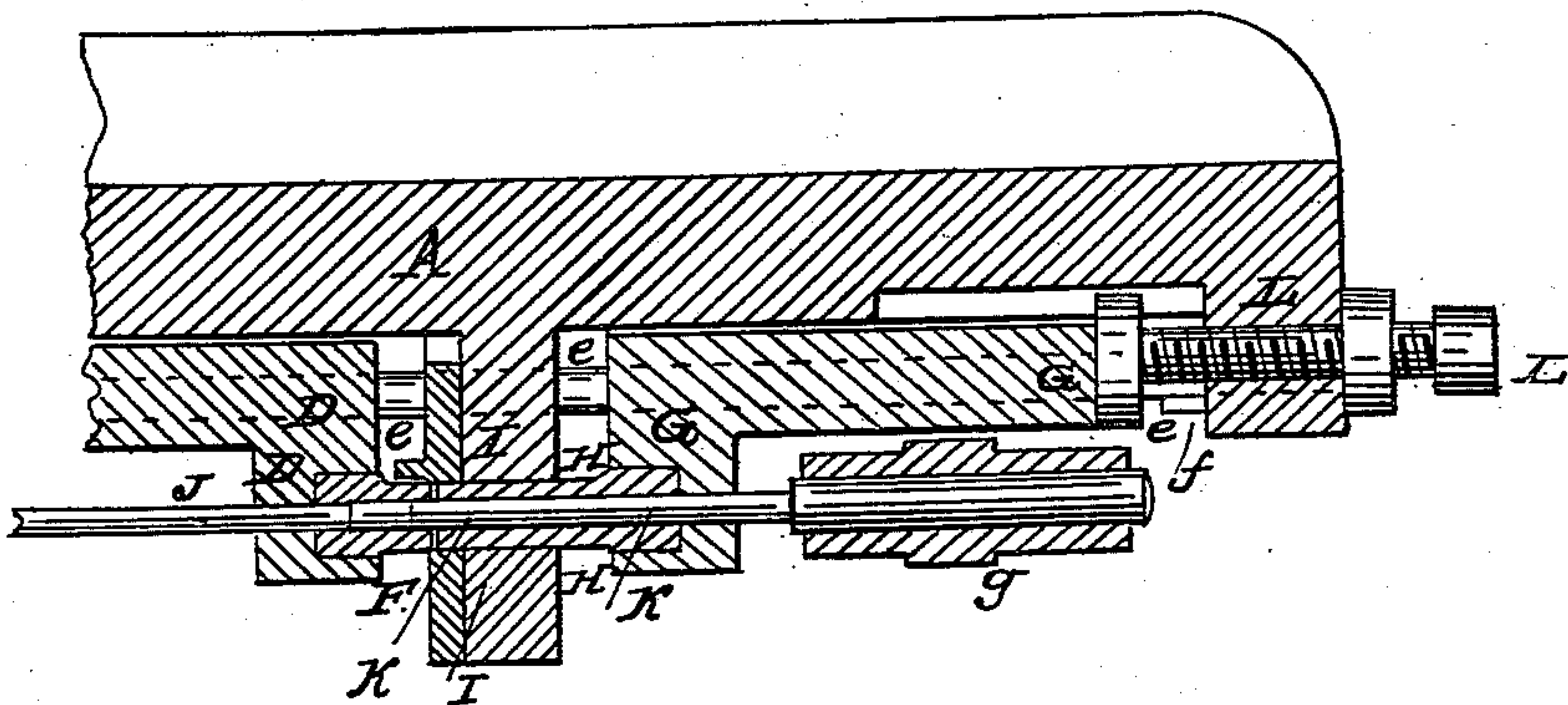


Fig. 4

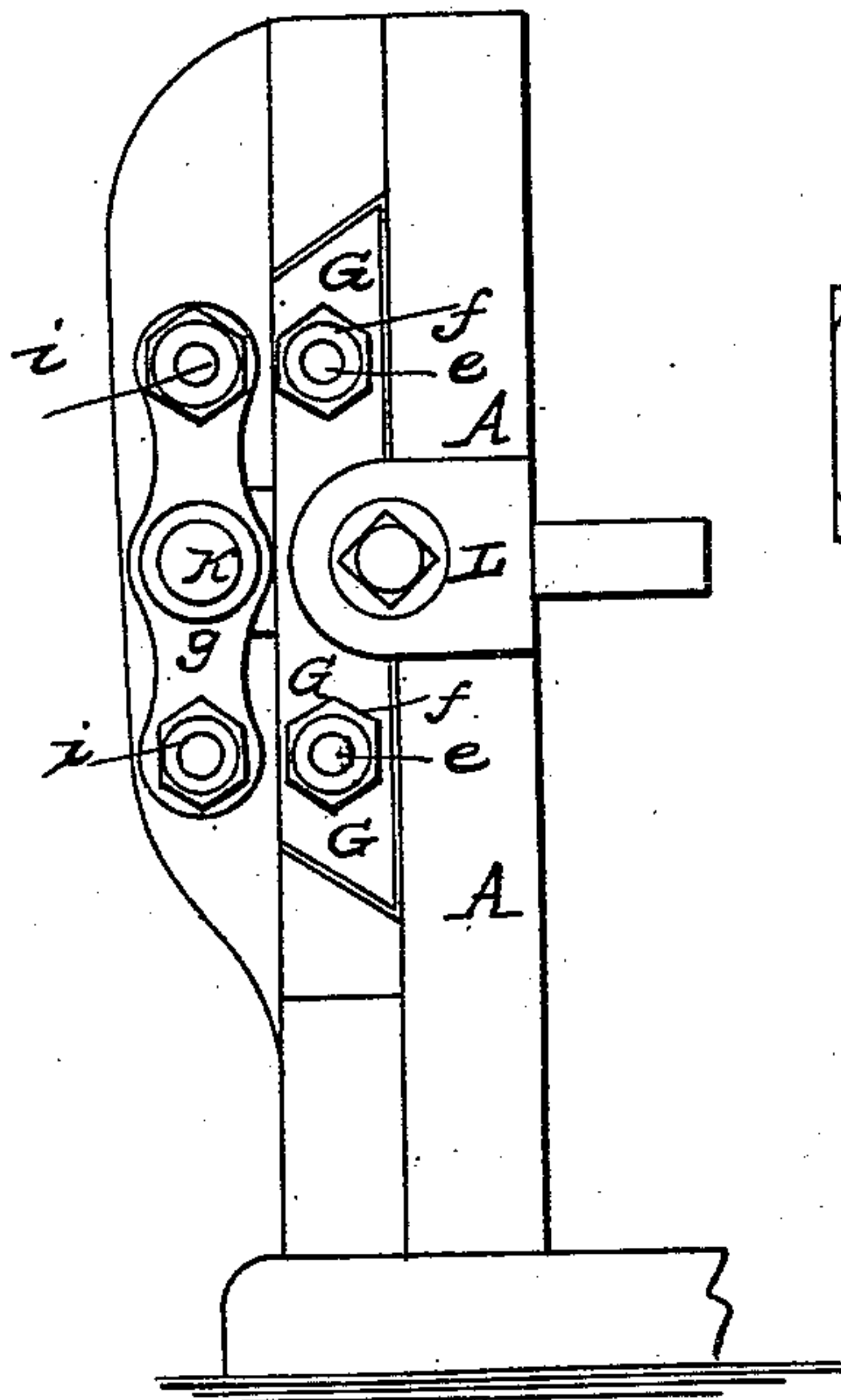


Fig. 5

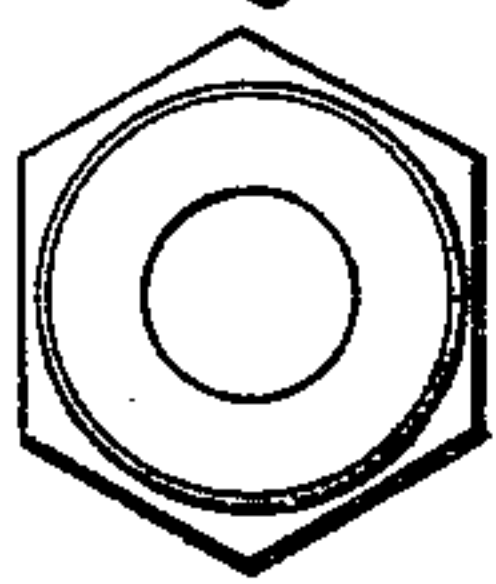
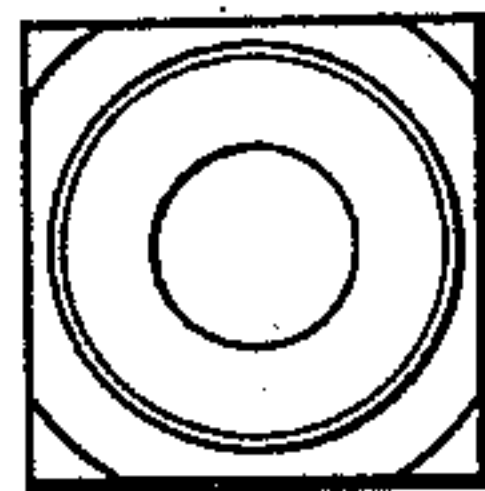


Fig. 6



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UNITED STATES PATENT OFFICE.

FRANCIS WATKINS, OF BIRMINGHAM, ENGLAND.

IMPROVEMENT IN NUT-MACHINES.

Specification forming part of Letters Patent No. **84,781**, dated December 8, 1868; antedated November 28, 1868.

To all whom it may concern:

Be it known that I, FRANCIS WATKINS, of Birmingham, in the county of Warwick, England, have invented a new and Improved Machine for Punching and Shaping Screw-Nuts, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1, Sheet 1, represents a front elevation of my invention. Fig. 2, Sheet 1, is a horizontal section of the same, the plane of section being indicated by the line *x x*, Fig. 1. Fig. 3, Sheet 2, is a detail horizontal section of the same. Fig. 4, Sheet 2, is an end elevation of the same. Figs. 5 and 6, Sheet 2, are face views of nuts as they are made in this machine.

Similar letters of reference indicate corresponding parts.

This invention relates to a new machine for cutting, shaping, and punching screw-nuts of all kinds, the machine consisting of two working parts, in each of which nuts are being formed, the two parts working alternately, so that a nut is being cut, shaped, and punched on one side while a finished nut is being ejected from the other side, and thus the power required to drive one machine is utilized to operate two.

On the main shaft of the machine is a driving-wheel which gears into a spur-wheel, and thereby drives another shaft, on which are keyed two cams, actuating two slides, which carry compound punches, the solid punches carried by one slide working within the ring-punches carried by the other. The machine is double-acting, and there are similar tools at each end of each slide.

The slide which carries the ring-punches actuates two other slides, opposite its two ends, by means of rods fixed to the first slide and passing through the others. The rods have adjustable nuts upon them, and allow a certain amount of independent motion in the end slides, which also carry ring-punches similar to those carried by the slide which actuates them. Dies or forming-boxes, in which the

articles to be made are formed, are secured to the frame of the machine by means of bolts or otherwise.

When the machine is set in motion, a bar is placed between the forming die or box and the ring-punch of the central slide, which punch forces off a piece and drives it into the forming die or box against the ring-punch of the outer slide, which forms the bottom of the box. A continued advance of the cutting-punch carries the blank into the die-box until it is firmly compressed between the two ring-punches, the motion of the outer punch being arrested by a set-screw fitted in the frame.

The face of the outer ring-punch has the shape which is to be given to the face of the nut, and by the pressure the blank is formed as desired. The shaping-punch is made removable, as well as the stationary die and the cutting-punch, so that the machine may be adapted to make various sized and shaped nuts.

When the blank has been pressed into the required form, the solid or piercing punch advances through the end ring-punch and pierces the blank, making a hole of the required diameter, and forcing the punchings into the hollow cutting-punch, from which they are discharged again by means of another piercing-punch during the backward motion of the cutting-punch. During the said backward motion of the cutting-punch the end ring-punch is dragged along by means of adjustable nuts formed on the ends of the rods which pass through the block to which the said end punch is attached, and by such motion of the end punch the finished blank is discharged from the stationary die. While this is being done the tools at the other end of the slides are beginning the operation of cutting off the blank, the making of which is in all respects similar to that already described.

In the accompanying drawing, A represents the frame of the machine. B represents the main driving-shaft, carrying a pinion, *a*, which gears into a spur-wheel, *b*, mounted on a horizontal shaft, C, as shown. The shaft C carries two cams, *c* and *d*, which respectively actuate two sliding frames, D and E, imparting to them reciprocating motion. The cams *c* and *d* project about from opposite sides of

the shaft, so that the frames are moved in opposite directions. The slide D carries two tubular cutting-punches, which are held in suitable sockets, as shown, so that they can be removed if desired. One punch, F, is arranged on each side of the shaft C, and as the whole mechanism is exactly the same on one side of the shaft as it is on the other, I will only describe the arrangement on one side, which will consequently be a description of the other side.

From each side of the slide D project two or more rods, *e e*, (see Fig. 4,) which pass through a sliding frame, G, on which a punch, H, is held. The rods *e* pass loosely through the frame G, and do not move the same, except when they move in the direction of the arrows 1, Fig. 1, when nuts *f*, fitted to their ends, carry the frame G toward the shaft C.

The punch H is of the same outer diameter and shape as the punch F, and is also perforated like the same. The punches F and H are also in the same plane.

I is a stationary die projecting from and secured to the frame A, and being perforated that it may receive the punches F and H, as shown in Fig. 3.

From the frame E projects a punch, J, the diameter of which is as large as the hole in the punch F. To the ends of rods *i i*, which project from the frame E, is also fastened a cross-head, *g*, in which another punch, K, of the same diameter as the punch J, is held.

The operation is as follows: The end of an iron bar is held against stops *h h*, provided on the face of the die I, as shown by red lines in Fig. 2 on the left-hand side. The machine being then set in motion, the punch F moves toward the die I and cuts off a blank of the required size and forces the same into the die. There the blank is pushed against the end of the punch H, and as the same can move independent of the other devices, it is moved by the punch F and the blank until it strikes against an adjustable screw-stop, L, secured

to the frame A, as shown. The further motion of the punch H is then stopped, but the punch F continues to move slightly toward it, and thereby the blank is pressed between the faces of the two punches and receives the required form, as indicated in Fig. 3. When the blank has been thus pressed the forward motion of the punch F ceases and the frame E commences to move backward—that is, toward the shaft C—and thereby the piercing-punch K is set in motion, the same passing through the punch H and through the blank into the punch F, as indicated in Fig. 3, thereby perforating the blank and pushing the punching into the punch F, as shown. Then the frame D commences to recede, drawing the punch F toward the shaft C, and the punching is ejected from the punch F by the punch J during this receding motion of the punch. When, during the same motion, the nuts *f* strike against the frame G, the same will also be carried toward the axle C, and will thereby be moved through the die I, so as to discharge the blank from the same.

While the blank is being cut, pressed, and punched on one side of the machine the other side ejects the blank and punching, and is thereby prepared for another blank. While a nut is formed on one side of the machine a different sized and shaped nut can at the same time be formed on the other side.

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

The combination, with each other, of the reciprocating frames D and E, stationary die I, punches F, J, and K, slide G, punch H, and stop L, all made, arranged, and operating substantially as and for the purpose herein shown and described.

F. WATKINS.

Witnesses:

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