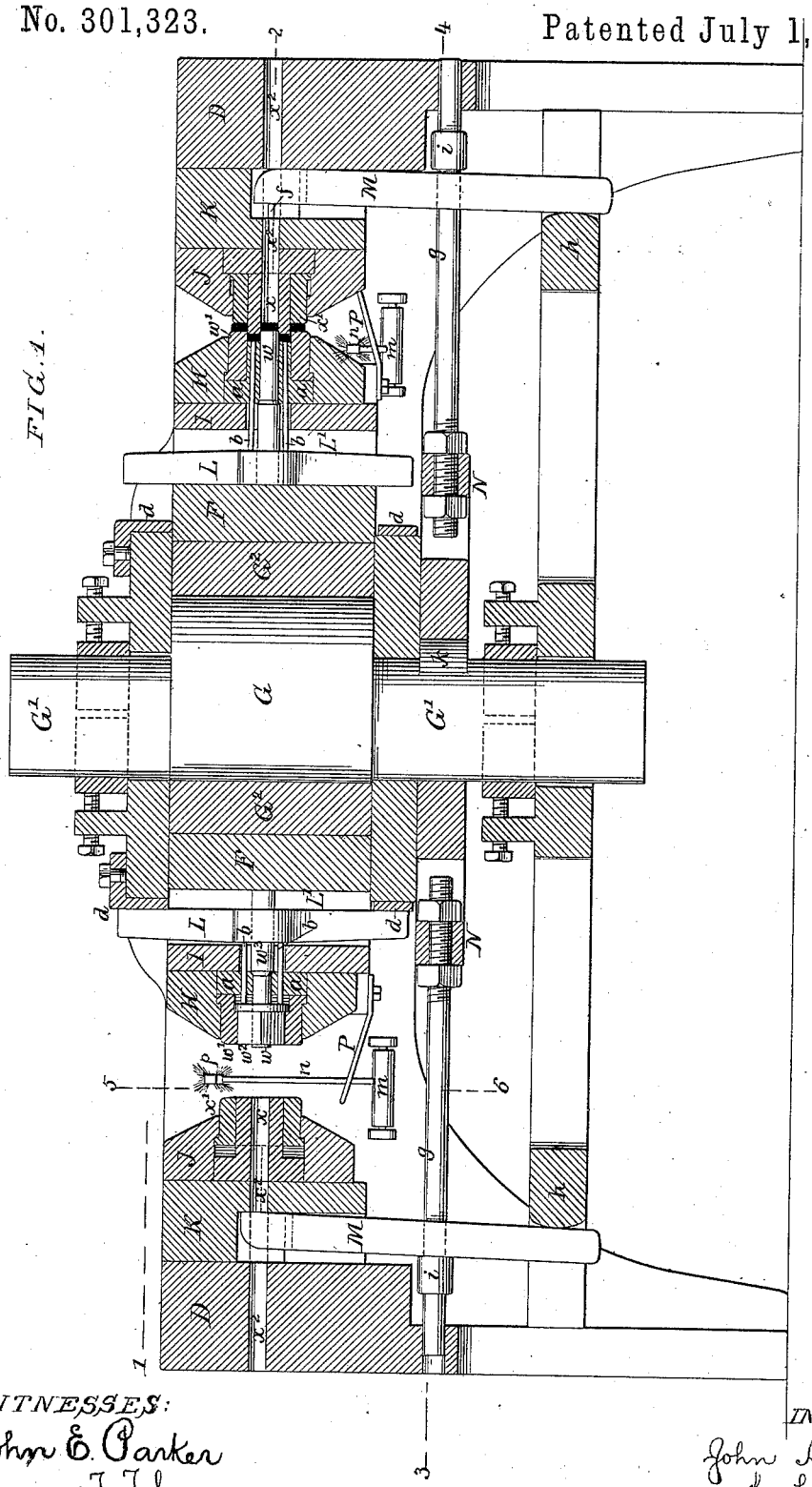
(No Model.) 3 Sheets—Sheet 1.

J. ASHTON.

MACHINE FOR MAKING NUTS AND WASHERS.

No. 301,323. Patented July 1, 1884.

FIG. 1.



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(No Model.) 3 Sheets—Sheet 2.

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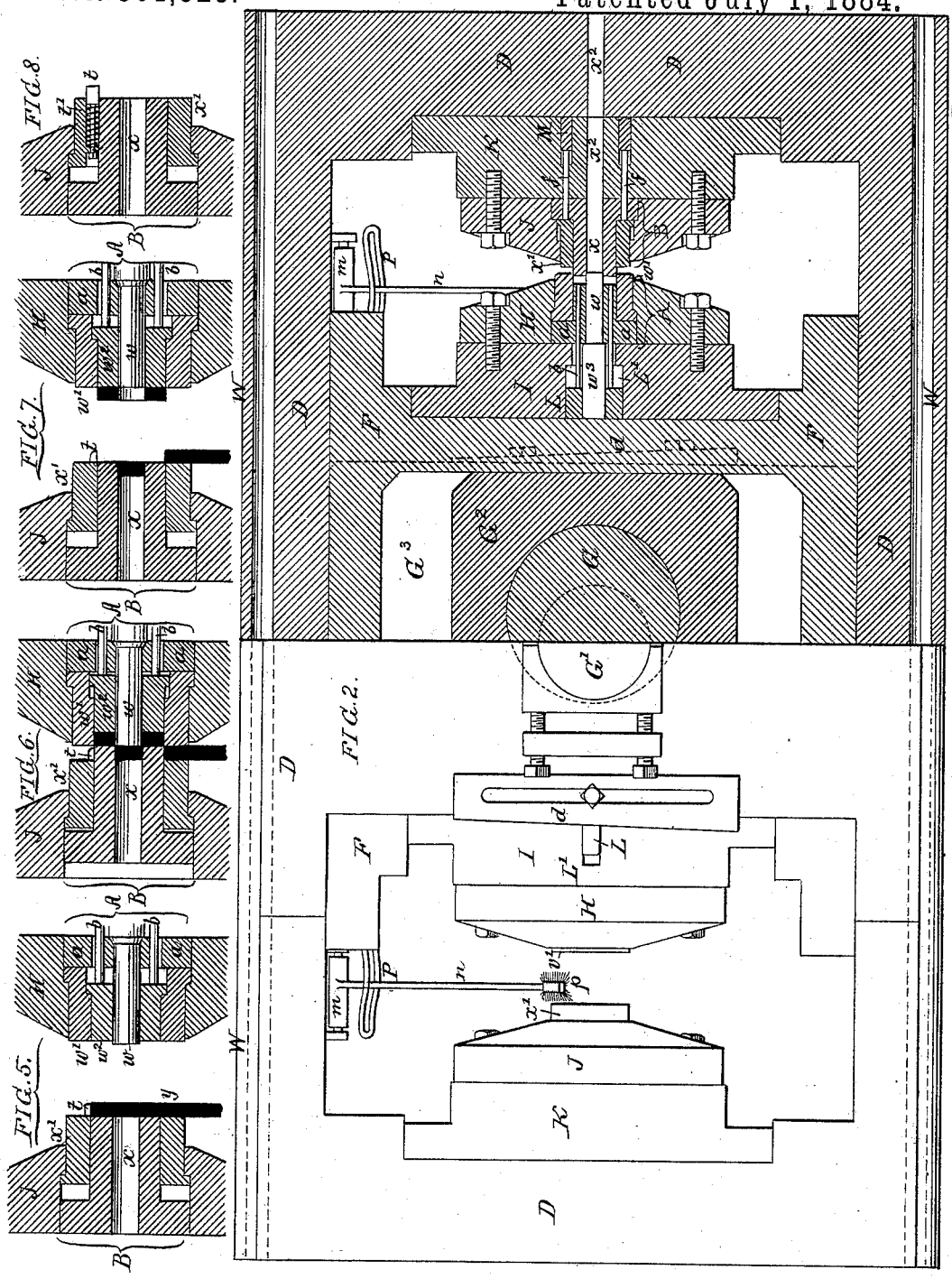

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(No Model.) 3 Sheets—Sheet 3.

J. ASHTON.

MACHINE FOR MAKING NUTS AND WASHERS.

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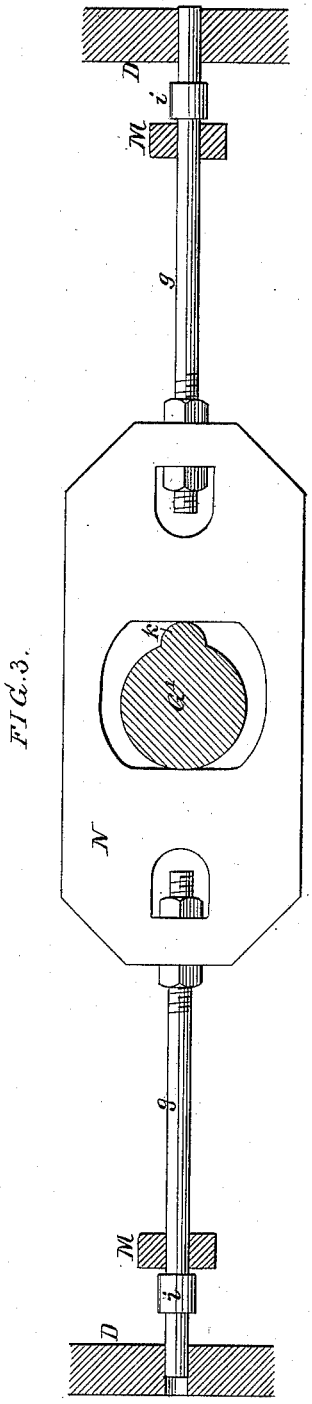

FIG. 3.

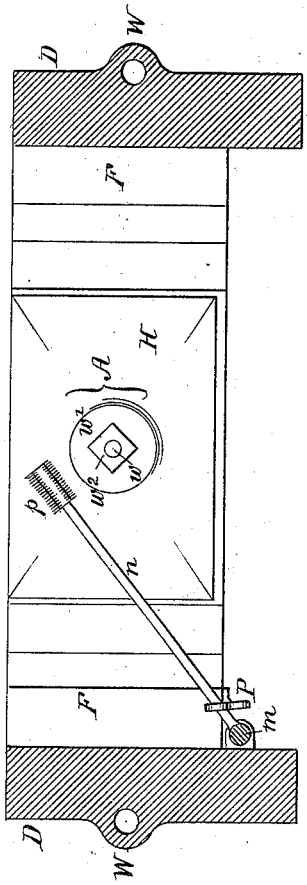

FIG. 4.

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UNITED STATES PATENT OFFICE.

JOHN ASHTON, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR MAKING NUTS AND WASHERS.

SPECIFICATION forming part of Letters Patent No. 301,323, dated July 1, 1884.

Application filed December 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN ASHTON, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Nut and Washer Machines, of which the following is a specification.

The object of my invention is to construct a machine for rapidly punching from bars or plates of metal finished nuts or washers; and this object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a longitudinal section of my improved nut and washer machine; Fig. 2, Sheet 2, a sectional plan on the line 1 2, Fig. 1; Fig. 3, Sheet 3, a sectional plan on the line 3 4, Fig. 1; Fig. 4, a transverse section on the line 5 6, Fig. 1; Figs. 5, 6, and 7, Sheet 2, enlarged diagrams illustrating the operation of the machine; and Fig. 8, Sheet 2, a view of a die with yielding gage-pin forming a part of my invention.

I will first proceed to describe the mode of forming a nut in accordance with my invention, referring only to those parts of the machine (shown in Figs. 5, 6, and 7) which act upon the metal, and leaving to a later part of the specification the description of the mechanism for operating these parts. The machine has a die, A, and counter-die B, the die A consisting of an outer fixed block, w', a fixed central punch, w, and an intermediate sliding block, w^2, which is of the same shape as the desired nut, is adapted to an opening of like shape in the outer block, w', and has a central opening for the reception of the punch w. The counter-die B consists of a central fixed tube, x, and an outer block, x', adapted to slide thereon, the fixed tube having a central opening of the same diameter as the punch w, and having an external shape similar to that of the sliding block w^2, the outer sliding block, x', of the counter-die being similar to the outer fixed block, w', of the die. The counter-die B is fixed; but the die A is carried by a frame to which a reciprocating motion is imparted, as described hereinafter, and at the commencement of the operation the die and counter-die are separated, so as to permit the insertion of the bar y between them, as shown in Fig. 5, a gage-pin, t, on the block x' of the counter-die serving as a stop for the bar. The die A then advances, and the fixed punch w and outer block, w', act simultaneously upon the bar y, the punch forming the central opening in the nut, and the outer block acting on the metal outside of the limits of the desired nut, and forcing the same over the tube x of the counter-die, the outer block, x', being forced rearward, and the sliding block w^2 of the die yielding to permit the nut to enter the opening of the die-block w'. (See Fig. 6.) The die A is then retracted and the outer block, x', of the counter-die advances, so as to thrust the bar y outward beyond the face of the tube x, Fig. 7, and permit it to be readjusted prior to a repetition of the operation. As the die A reaches the limit of its rearward movement, the sliding block w^2 is projected, so as to eject the nut from the opening of the die-block w', as shown in Fig. 7.

In making a washer a die and counter-die of substantially similar character to those described above are used, the shapes of the various blocks of the die and counter-die being modified to accord with the shape of the washer.

Figs. 1, 2, 3, and 4 show an organized machine for carrying out my invention. D is the fixed frame of the machine, which is in the present instance quadrangular, and has at each end a counter-die, B, one for a nut and the other for a washer. Guided on the frame D is the sliding frame F, which has at each end a die, A, that at one end being constructed for the formation of a nut, and that at the other end for the formation of a washer, these dies co-operating with the counter-dies B, and acting alternately as the frame F is reciprocated. The reciprocation of the frame F is effected by means of an eccentric, G, on a vertical driving-shaft, G', the latter being adapted to bearings in the frame D, and the eccentric having a block, G^2, which is guided in a transverse slot, G^3, in the frame F. Other means of reciprocating the frame may, however, be adopted, this forming no essential part of my invention. The projecting ends of the shaft G' may be furnished with pulleys or gear-wheels for receiving power from any adjacent

shaft, and the machine may be placed either horizontally, as shown, or upon either side or either end. The parts composing each die A are adapted to an opening in a chuck, H, bolted to a block, I, which is secured to one end of the sliding frame F, and the parts composing each counter-die are carried by a chuck, J, bolted to a block, K, which is secured to one end of the fixed frame D. The blocks I and K may form part of the frames F and D, if desired; but detachable blocks are preferred, as permitting more ready access to some of the parts of the machine. The block w' of each die A has a rear bearing against a block, a, adapted to the rear end of the opening in the chuck and interposed between the die-block w' and the block I, so that an extended bearing of each block w' is insured without the necessity of replacing the part a when said block w' has to be renewed, the block a not being subjected to wear. Washers may be introduced behind the blocks w' to set the same out as they are reduced in length by grinding; or the entire die may be set out by a steel plate introduced between the block I and frame F, or between the block I and chuck H, the counter-die being likewise set out by a plate interposed between the block K and frame D, or between the said block K and the chuck J. Each die-block w' has at the inner end a flange, which, by contact with a shoulder in the chuck H, prevents the withdrawal of the block; and the ejector-blocks w^2 and x' have similar flanges for a like purpose, the opening in the block w' for the ejector w^2 and that in the chuck J for the ejector x' being of such length as to permit the necessary movement of the said ejectors. Set-screws may be employed for securing the blocks w' and tubes x in place in the chucks, if desired. The stem w^3 of each punch w passes through the block a and bears against the frame F, a shoulder on the stem of the punch preventing the longitudinal withdrawal of the same from the die. In the blocks K and frame D are openings x^2, forming a continuation of the central opening of the tube x, and serving to permit the escape of the punchings. Through openings in the block a of the nut-forming die A pass pins b, which bear at the front ends upon the block w^2, and at the rear ends upon a bar, L, which is free to slide in a slot, L′, in the block I, and is guided upon the stem w^3 of the punch w. The opposite ends of said bar L project above and below the frame F, so that as said frame reaches the limit of its inward movement said projecting ends of the bar will strike wedges d on the fixed frame D, and thus effect the outward movement of the ejector-block w^2 in the die, the wedges d being adjustable, so that any desired extent of movement may be imparted to the ejector-block. In the case of the washer-die a special ejector-block may be dispensed with, the pins b themselves forming the ejector, as shown, and being operated in the manner above described. The sliding block x' of the counter-die is acted upon by similar pins, f, guided in the flanged end of the tube x, the outer ends of said pins f bearing upon the forked upper end of a lever, M, which is hung to a rod, g, guided longitudinally in bearings in the frame D, this rod having a collar, i, bearing against the lever M, and the lower end of said lever bearing against a cross-bar, h, of the frame D, as shown in Fig. 1. The rods g project from a yoke, N, which is acted upon by a cam, k, on the shaft G′, (see Fig. 3,) so as to cause the alternate vibration of the levers M and the alternate operation of the sliding-blocks x' of the counter-dies B. The rods g are adjustable longitudinally in respect to the yoke, so that the amount of lost motion of each rod before its collar i strikes the lever M may be varied, and the throw of the said lever thus regulated; or the same result may be effected by adjusting the collar i; and levers pivoted to the bars h and acted upon by the rods g may be used, if desired. To bearings on one side of the frame D are hung rock-shafts m, having arms n, the ends of which are furnished with brushes or wipers p. These arms are acted upon by cams P on the sliding frame F, and are caused to vibrate as said frame is reciprocated, the arms being of such length that the brushes or wipers are carried past the faces of the dies and counter-dies on each vibration of the arms. The brush or wiper may be saturated with oil at suitable intervals, so as to provide for the automatic lubrication of the dies and counter-dies after each operation of the same.

When the machine is arranged on end or vertically instead of horizontally, as shown, the wiper p performs the additional function of removing the nut or washer, the latter on being ejected from the die falling on the wiper, which has been moved to a position beneath the die. The nut or washer is then carried off by the wiper as it swings back, and is removed therefrom by a suitable striker, so as to fall into a convenient receptacle.

Various means of vibrating the arms n may be adopted; but the cams P are preferred as the simplest.

When a yielding gage-pin, t, is desired in place of the fixed gage-pin shown in Figs. 5, 6, and 7, said pin may be arranged to slide in a recess in the inner edge of the outer sliding block, x', of the counter-die B, as shown in Fig. 8, this gage-pin having a guided stem, and being acted on by a spring, t', so that it will yield when subjected to the pressure of the die A, but will resume its original position on the retraction of said die.

On each side of the frame D is a tubular projection, W, for the reception of a stay-bolt, which may be inserted in the case of the breaking of the frame, this bolt serving to brace the frame longitudinally, and to maintain the parts in line both laterally and ver-

tically. More than one of such tubular projections may be formed on each side of the frame, if desired.

I claim as my invention—

1. The combination of the portion I of the movable frame of the machine, the outer fixed die-block w', the confining-chuck H, and the block a, interposed between the portion I of the frame and the base of the die-block w', as set forth.

2. The combination of the movable frame of the machine, the die-holding chuck H, and the fixed center-punch, w, having a shoulder bearing against the block a at the base of the portion w' of the die, as set forth.

3. The combination of the block K, the counter-die B, comprising the fixed central tube, x, and outer sliding block, x', and the chuck J, secured to the block K, and serving to confine both parts of the counter-die thereto, as set forth.

4. The combination, in a counter-die, of the central fixed portion, x, and the outer sliding block, x', having a projecting gage-pin, t, as set forth.

5. The combination of the central fixed portion, x, of the counter-die, the outer sliding block, x', and the gage-pin t, free to slide in an opening in said block x', and acted upon by a spring, t', as set forth.

6. The combination of the die and counter-die, with the pivoted arm n, carrying a wiper, p, and with means for vibrating the arm as the die is reciprocated, as set forth.

7. The combination of the die and counter-die, the pivoted arm n, carrying a wiper, p, and the reciprocating frame F, having a cam, P, acting on said arm n, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ASHTON.

Witnesses:
JOHN M. CLAYTON,
HARRY SMITH.