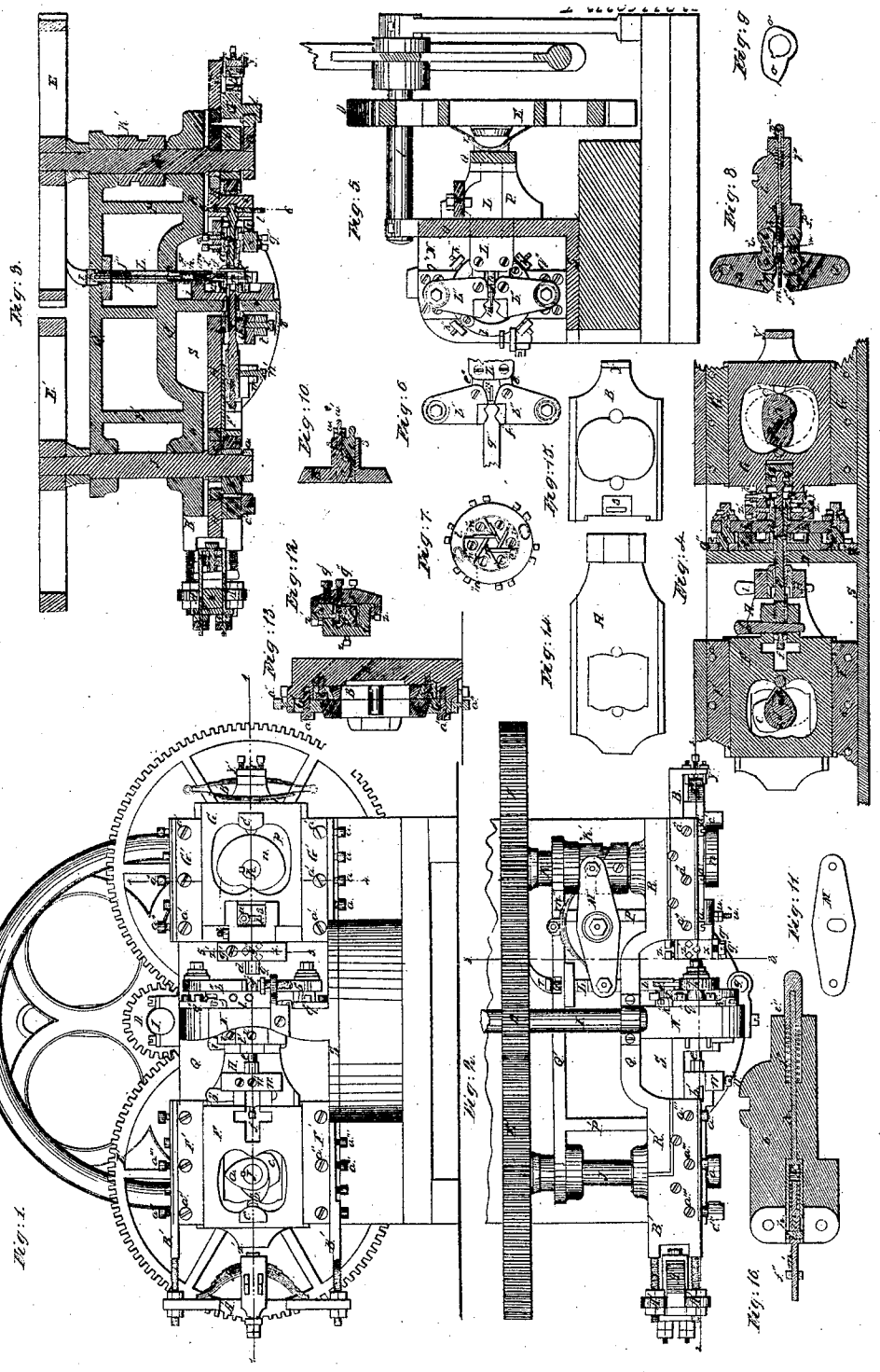
R. H. COLE.

MACHINE FOR MAKING METALLIC NUTS.

No. 18,499. Patented Oct. 27, 1857.



UNITED STATES PATENT OFFICE.

R. H. COLE, OF ST. LOUIS, MISSOURI.

NUT-MACHINE.

Specification of Letters Patent No. 18,499, dated October 27, 1857.

To all whom it may concern:

Be it known that I, RICHARD H. COLE, of St. Louis, in the State of Missouri, have invented an Improvement in the Manufacture of Metallic Nuts; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, Figure 1 being a side elevation of an improved nut-making machine; Fig. 2, a top view; Fig. 3, a horizontal section in the line 1, 1, of Fig. 1; Fig. 4, a vertical section of a portion of said machine in the line 2, 2, of Fig. 2; Fig. 5, a vertical transverse section in the line 3, 3, of Fig. 2; and the figures from 6 to 20, inclusive, are views of detached portions of said machine.

Similar letters indicate like parts in all the figures.

My improvement in the manufacture of metallic nuts, consists in the preliminary shaping of the end of the heated bar to make it correspond on all sides—save one—with the cross-section of the die box of the machine into which it is to be thrust by the punch. The said preliminary shaping may be effected by means of an attachment to nut-making machines which will be hereinafter set forth.

The shape of the metallic frame P, P′, Q, Q′, R, R′ and S, of my improved nut-forming machine, is so clearly represented in the accompanying drawings that I shall only describe it in connection with the movements which are combined therewith.

The die-box of my improved metallic nut-forming machine, is composed of movable segments n'', n'', placed within a perforated cup-shaped case l, which is combined with the right-hand side of the centrally projecting vertical supporter N, of the frame of the machine in such a position that the perforation in the bottom of said case, will be opposite a corresponding aperture in said supporter.

Recesses are cut in the inner, or actuating, surface of each of the die-box segments n'', n'', for the reception of steel plates m'', m'', which form the sides of the interior portion of the die-box. The die-box segments are secured in any desired position by means of horizontal screws which are supplied with eccentric washers let into recesses in the faces of said segments, and by a series of radiating screws which pass through the rim of the case l, and act against the outer surfaces of said segments,—as represented in Figs. 4, 7, 17, 18, 19 and 20. Figs. 17, and 18, being enlarged front views of die-boxes for forming four-sided and six-sided nuts, and Figs. 19 and 20, are sections of said boxes, cut in the direction of the red lines in Figs. 17 and 18.

The aforesaid attachment to nut-forming machines, is composed of the vibrating levers b'', b'', (Figs. 6, and 8,) and the parts combined therewith by which they are operated. These levers (b'', b'',) are combined with the right-hand side of the supporter N, by means of the fulcrum pivots d'', d'', and the base-plates q'', q'', (Figs. 4 and 5,) which are secured above and below the die-box in such positions that a vertical line passing through the center of said pivots, will pass immediately in front of the center of the mouth of the die box; so that when said levers are brought into the position shown by Fig. 6, the preliminary nut-blank shaping box, formed by the juxtaposition of the dies secured in the inner ends of said levers, will be exactly opposite the mouth of the die-box. The levers b'', b'', are jointed to the horizontal sliding-plate L, by means of the bridle-pieces e'', e''. The said plate L, slides in guiding apertures in the portions R, and Q′, of the frame of the machine and a reciprocating motion is imparted to said plate, by means of an oscillating lever M, which works upon a pivot that is secured to and rises above the portion P, of the frame of the machine. An oscillating motion is imparted to the lever M, by means of a pin which descends from its right-hand end into a zigzag groove in the rotating sleeve K′, on the cam shaft K. The actuating pin which descends from the opposite end of the lever M, passes into a notch in the upper edge of the sliding plate L, which enables said pin to have the requisite lateral play while it is imparting the necessary reciprocating motion to said plate.

The pivot on which the oscillating lever M, works, is received into a transversely oblong opening in the central portion of the latter, (see Fig. 11,) and the said lever is pressed forward by means of a pivoted spring m''', with such force as to keep the aforesaid pivot at the rear end of the oblong opening in the lever, when the machine is working properly; but when any extraordinary strain is brought to bear upon the levers b'', b'', and the plate L, the spring m''', will yield a sufficient distance to relieve the said parts and prevent breakage.

The zigzag groove in the sleeve K′, is com-

posed of two annular portions united to each other by two spiral portions;—the front annular portion of said groove extending half way around the sleeve and the other portions thereof embracing the remainder of the periphery of the sleeve.

Within a longitudinal perforation in the sliding plate L,— composed of a small cylindrical bore at the center which unite larger bores, or sockets, at each extremity,—I place the displacing rod m', the socket rod h, h', and the springs combined therewith; and so arrange them in relation to the other parts of the machine, that at the moment the levers b'', b'', are thrown into the position for discharging a finished nut, (see Figs. 5 and 8,) the displacing rod m', will be thrust forward between the inner ends of said levers a sufficient distance to unerringly eject therefrom the finished nut and then be instantly withdrawn, to allow of the insertion therein of the end of the heated bar which is to be shaped into the next nut.

The body m, of the displacing rod m', is received within the socket h, of the rod h', and is retained therein by the key l', which passes through its body and works in slots in opposite sides of the socket h. The shank projecting from the inner end of the body m, of the displacing rod, is embraced by the spiral spring p'', which, acting against the bottom of the socket h, keeps the displacing rod m', thrust forward to its utmost capacity unless it should happen to be brought in contact with some unyielding body, when it will give back to prevent straining or breakage. The socket at the rear end of the plate L, receives around the rod h, the spring j'', which spring acts between the bottom of said socket and the cap i'', on to the rear end of said rod, to draw back and retain the rod in the position shown in Fig. 16, when not driven inward by force.

A perforation in the projection f'', from the rear vertical lining plate m'', of the die-box, receives and guides the displacing rod m', in its movements. The said projection f'', also constitutes the rear side of the preliminary nut-shaping box formed by the juxtaposition of the levers b'', b'', and prevents the bulging of the heated metal on that side when said levers compress and shape the end of the bar as they are drawn into the position shown by Fig. 6. The instant that the levers b'', b'', reach the position shown by Fig. 6, the angular punch d, moves forward against the blank in the said preliminary shaping-box, cuts it from the bar, and drives it into the die-box; the said levers remaining in the aforesaid position just long enough for said blank to be converted into a perforated nut and driven out into the said preliminary shaping box, when the lever M, moves forward the plate L, and throws said plate and the levers b'', b'', into the position shown by Fig. 16, at which moment the revolution of the toothed wheel F, on the cam shaft K, brings the cam r, on the inner face of said wheel, against the cap i'', on the rear end of the rod h', and instantaneously thrusts forward said rod as also the displacing rod m', into the position shown in Figs. 5 and 8, to eject the said nut clear of the machine; and then the levers b'', b'', remain in said position a few seconds or just long enough to enable the end of another heated bar to be inserted between their inner ends to be operated upon in the manner above set forth.

The various movements are imparted to the respective parts of my improved nut-forming machine, by means of the cams on the cam shafts J, K, and the cam r, on the inner face of the toothed wheel E. Motion is imparted to the said cam shafts by means of the equal-sized toothed wheels E, E', on their rear ends being thrown into gear with the pinion D, on the driving shaft I. As soon as the levers b'', b'', reach the position shown by Fig. 6, the cam p, on the shaft K, is brought against the roller in the inner face of the opening in the sliding plate G, and the cam o, on said shaft is brought in contact with the roller in the inner face of the sliding plate B, which cams, by their united action, carry forward the angular punch d, and its interior round punch f', against the partially formed nut-blank in the preliminary forming box, and carry it against the edge of the front lining plate of the die-box with sufficient force to cleanly cut it from the bar and carry it into the die-box. As soon as the said blank commences to enter into the die-box, the cam b, on the shaft J, is brought to bear against the roller in the inner face of the aperture in the left hand sliding-plate F, and by its action thereupon it forces the round punch e, into the die-box through a central perforation in the yielding bottom of said box, and thereby causes the blank within said box to be simultaneously operated upon by the two equal-sized round punches e, f', while it is held between the angular punch d, and the yielding bottom of the nut box; and while the hole is thus being formed in the nut within the die-box, and the metal thereby displaced is being forced into the body of the nut, the sliding plate H, with which the bottom of the die-box is combined, bears against an adjustable spring A, (see Fig. 4,) which allows the bottom of said box to give back to accommodate itself to the increased thickness of the nut caused by the said displacement of metal in forming the hole therein. The round punches e, f', continue to advance toward each other until their inner ends are brought nearly in contact with each other, and at that instant the plate G, is relieved from the action of the cam o,

which enables the spring B′, to throw it back to its extreme right hand position; but the round punch *e*, still advances a sufficient distance to carry the thin disk of waste metal, left between the nearly meeting ends of the two round punches, into the mouth of the aperture in the angular punch *d*,—left open by the retreating round punch *f*′,—at which moment the sliding plate G, is relieved from the inward action of the cam *p*, and is thrown outward by the action of the cam *n*, against the projection C′,—and simultaneously therewith, the sliding plate F, is relieved from the inward action of the cam *b*, and is thrown outward by the action of the cam *a*, against the projection *c*″, on said plate; and simultaneously with the said latter movements, the cam *c*, on the shaft J, acts against the roller in the inner face of the aperture in the sliding plate H, and carries it inward a sufficient distance to cause the bottom of the die-box, combined therewith, to force the perforated nut entirely out of said die-box, and deposit it in the preliminary nut-blank shaping box between the ends of the levers *b*″, *b*″; and while the said plate G, is retained in its extreme outer position by the cam *n*, the heel *o*′, of the cam *o*, strikes against the roller in the inner face of the aperture in the sliding plate B, and thereby causes a sudden outward movement of the round punch *f*′, for the purpose of throwing the before mentioned thin disk of waste metal out of the open mouth of the aperture in the angular punch *d*;—and as soon as this has taken place, all parts of the machine are in the proper position for receiving the end of the heated metallic bar preparatory to the formation of another nut.

The accompanying drawings clearly represent the manner in which the respective sliding plates B, G and F, H, are every way held and adjusted within horizontal recesses in the right and left front portions R, R, of the frame of the machine.

The round punch *f*′, is combined with the front projection *s*, from the sliding plate B, which projection works in an aperture in the sliding plate G; and the angular punch *d*, is combined with a recessed projection on the inner end of the said sliding plate G, by means of the socket-ring *d*′, the clamp *x*, and the set screws *z*, *z*′, *g*′, *g*″, as represented in the drawings, or in any other suitable manner.

The socket which receives the bottom of the nut box, is secured to a front projection from the inner end of the sliding plate H, by means of the keys *i*, *i*, the clamp *t*′, and set screw *v*. The round punch *e*, is combined with a recessed projection from the inner end of the sliding plate F, by means of the clamp *w*, the key *b*′, and the set screws *f*, and *w*′. The adjustable spring A, is secured to the perforated vertical holder A′; and the said spring holder is received on to screw-shanks which project outward from the plates B′, B′, that are bolted to the top and bottom of the portion R′, of the frame of the machine, and is retained in any desired position thereupon by means of double sets of screw nuts—as shown in the drawings.

The actuating spring B″, is bolted to a forward projection from the outer end of the sliding-plate B, and bears against the outer end of the sliding plate G. The said spring serving the purpose of drawing outward the former plate and forcing inward the latter plate at all times, and keeping them in close contact with the actuating surfaces of the cams *o*, *p*.

In constructing my improved nut forming machines, machinists can vary the proportions and the arrangement of the respective parts as they may deem expedient.

The drawings represent dies combined with the inner ends of the levers *b*″, *b*″, for shaping six-sided nuts; but it will readily be perceived that dies for shaping four-sided, or any other form of nut, will operate just as perfectly when combined with said levers.

The preliminary shaping of the end of the heated bar, by which it is made to correspond on all sides—save one—with the cross section of the die-box of the machine, prevents the necessity of cutting off, by the punch, more than the width of one side of the nut to be formed; and therefore, this manner of forming nuts prevents a very great waste of metal, when compared with other methods of making nuts by machinery, and also causes a very considerable saving of power in operating the machine.

Having thus fully described my improvement in the manufacture of metallic nuts, what I claim as my invention and desire to secure by Letters Patent, is—

The preliminary shaping of the end of a heated metallic-bar, to make it correspond on all sides—save one—with the cross section of the finishing die-box; by which the necessity of cutting off by the punch of more than one side of the nut to be formed is prevented and from which results a very great saving of metal in manufacturing many sided nuts, at the same time that considerable saving of power is produced in operating the machine; but this I only claim when the said preliminary shaping of the exterior portion of a nut is accomplished immediately in front of the mouth of a die-box, substantially in the manner herein set forth.

R. H. COLE.

Witnesses:
A. R. CORBIN,
S. H. SHAKSPEARE.