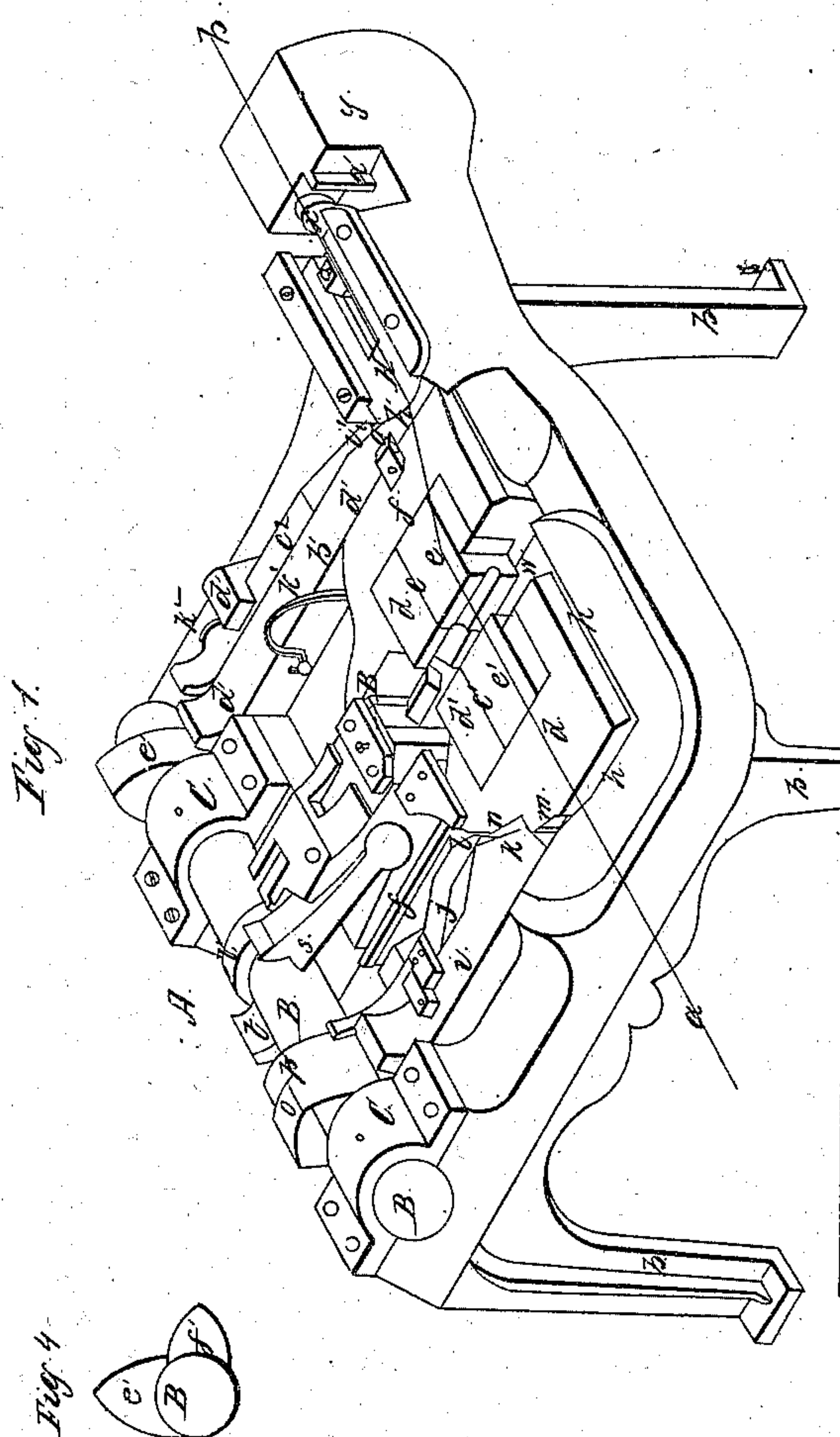


E. B. LOCKE.
MACHINE FOR MAKING BOLTS.

No. 88,493.

Patented Mar. 30, 1869.



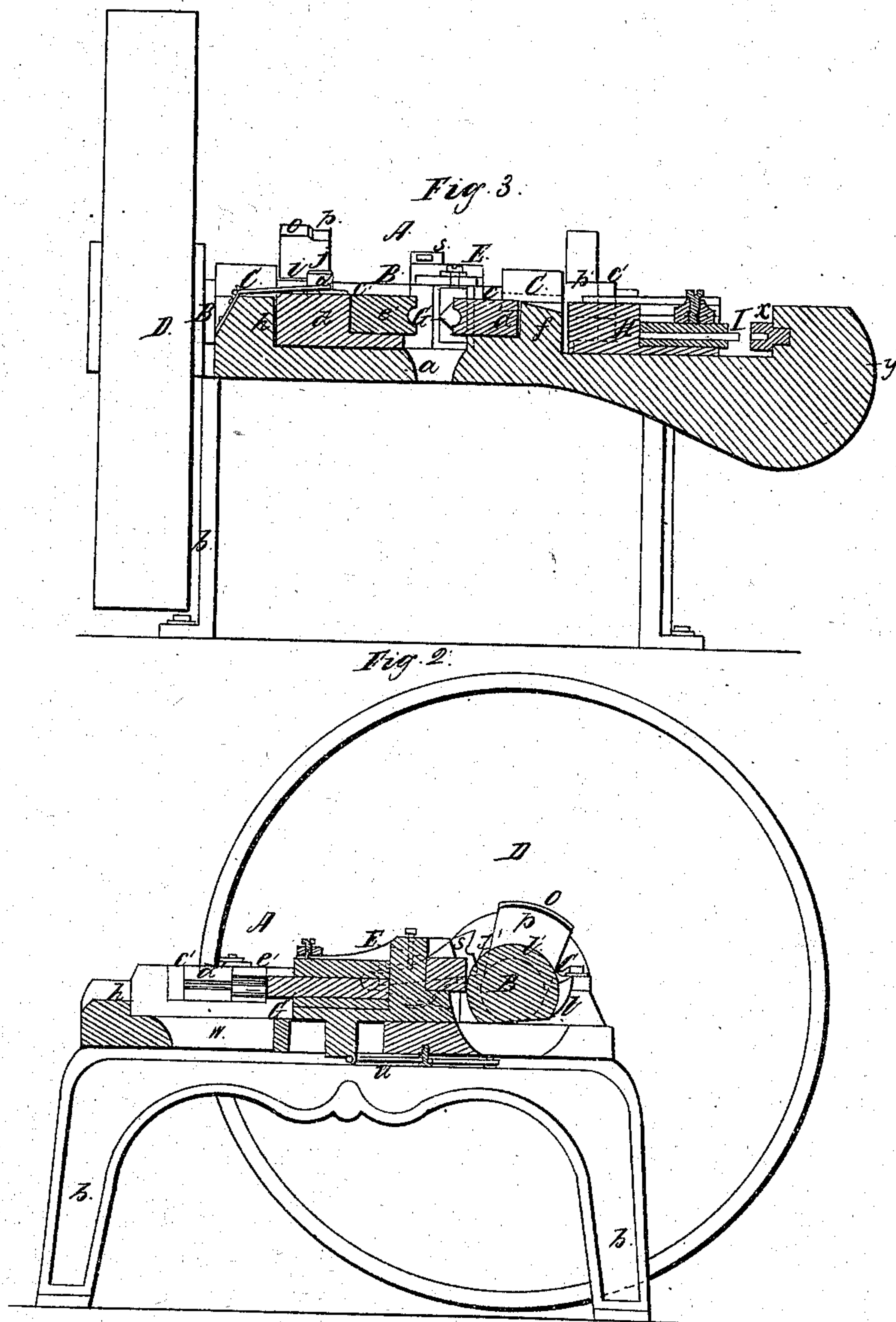
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By his Attorney,
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United States Patent Office.

EDWIN B. LOCKE, OF EXETER, NEW HAMPSHIRE.

Letters Patent No. 88,493, dated March 30, 1869.

IMPROVED MACHINE FOR MAKING BOLTS.

The Schedule referred to in these Letters Patent and making part of the same:

To all to whom these presents shall come:

Be it known that I, EDWIN B. LOCKE, of Exeter, in the county of Rockingham, and State of New Hampshire, have made an invention of an Improved Machine for Producing Bolts, Rivets, &c.; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawings, making part of this specification, and in which—

Figure 1 is a perspective view, and

Figure 2, vertical and transverse sections of the machine, taken through the forming-dies, to be hereinafter explained.

Figure 3, a vertical and longitudinal section of the machine, taken through the beater for forming the bolt-heads, to be referred to hereafter.

The constituent parts of the machine comprising the subject-matter of these Letters Patent consist of instrumentalities for seizing the material, and grasping the body of a bolt, rivet, or other kindred article, and of forming a head thereupon, as well as of a device for cutting the bolts, &c., of the desired length, the latter-named device being a desirable adjunct of the machine, rather than a necessary part thereof, the object in combining it therewith being to contain in one machine the necessary means of completing the combined operations before mentioned, and effect an economy, both in the production of machinery, and in a space required for containing such machinery.

Heretofore, in the construction of machinery for making bolts, &c., two dies have been employed for forming the body or shank of the bolt, while the device for forming the heads thereof consisted, first, in a movable trough, or guide, in which was disposed a sliding plunger, the trough first advancing to the dies, and enclosing a portion of the iron rod designed for forming the head of the bolt, and the plunger subsequently advancing within the trough, and condensing or compressing such metal therein, and by this means completing the head of the bolt.

This arrangement of parts is to a considerable extent complicated and clumsy, and one object I have had in view in organizing my present machine, is to avoid several objections incident to such construction of parts.

My invention further relates to means for obtaining a more powerful action upon the movements of the forming-die than has heretofore been accomplished.

The invention consists—

First, in the construction of the forming-dies, whereby such dies are compelled to form the body of the bolt, to hold it securely in position while heading it, and to constitute a chamber, or enclosure, within which to form the head of such bolt, the beating up or forming of such head being effected by means of a sliding bar, or beater, mounted upon and carried by a movable carriage; the reciprocating movements of such carriage being effected by means hereinafter explained.

Secondly, the invention consists in the employment of two sliding bars, provided with cam-grades, of differential angle and power, one of such grades being intended to effect a quick movement of the movable die when approaching its mate, and when little power is required, and the latter being to complete such movement when forming the bolt-head, with a great increase of power, the same being as hereinafter described.

Referring to the drawings, before mentioned as accompanying this specification, and which illustrate my invention, the reader will see that the machine is denoted by the letter A, as composed of a suitable bed-plate, or table, *a*, supported upon four legs, *b b b b*, the frame thus constituted possessing sufficient solidity and strength to support the operative parts of the machine.

The driving-shaft of the machine is shown at B, as mounted transversely upon the rear end of the table *a*, and supported in suitable bearings C C, erected thereupon, such driving-shaft carrying upon its outer end a suitable driving and fly-wheel, D.

The dies for forming the bolt are shown at *c c'*, the former being the stationary, and the latter the movable die.

These dies are each divided into two portions, *d e* and *d' e'*, of which the former constitute the heading-portion, and the latter the portion for supporting the shank of the bolt.

The stationary die *c* is disposed within a box or enclosure, *f*, erected upon the forward part of the machine-bed, and to one side of its centre, while the die *c'* is supported within a sliding carriage, *g*, playing within an enclosure, or guide, *h*, making part of the machine-bed, in such manner as to be caused to approach and recede from the stationary die *c*, the two dies *c* and *c'* being counterparts of each other, and in horizontal and longitudinal alignment with each other.

The reciprocating rectilinear movements of the carriage *g* are effected by two sliding-bars *i j*, which are disposed upon the upper surface of the machine-bed, and at right angles with the driving-shaft thereof, the outer or forward end of these bars being formed with cam-grades *k l*, to impinge against two inclined faces *m n*, formed upon the rear side of the movable die carriage *g*.

The two bars *i j* are placed alongside of each other, and with their rear ends in alignment with two segmental cams *o p*, fixed upon the driving-shaft *b*, such sliding bars being retracted toward such cams, and away from the die-carriage, by springs, suitably applied to their under side, and to the machine-frame, the bar *j* being so situated, with respect to its fellow and the two cams *o p*, as to be first advanced, and produce a portion of the advance movement of the movable die, the subsequent advance of the bar *i* completing such movement of the die.

The cam-grade *l* of the bar *j*, and the inclined face *n* of the carriage *g*, are of such respective angles as

to produce a sudden and quick partial forward movement of the movable die toward its mate, while the cam-grade *k* and inclined face *l* are disposed at such an acute angle, with respect to each other, as to complete the movement of the die at a much slower rate of speed, but with greatly increased power, it being understood, and will be seen by referring to the accompanying drawing, that the outer bearing of the bar *j* is its fellow-bar *i*, while the outer bearing of the latter is the outstanding rim, or ledge which partially encloses the carriage *g*.

The retraction of the sliding carriage is caused by a spring suitably applied to it, and to the ledge last mentioned, or by any suitable means.

The sliding carriage, carrying the header for forming the head of the bolt, is shown at *E*, as disposed upon the top of the machine-bed, and sliding within ways, or guides *ff*, formed thereupon, such carriage being disposed at right angles to the driving-shaft, and a plunger, or heading-tool, *G*, suitably combined therewith, the disposition of the sliding carriage, and its header being such, that the latter shall be in axial alignment with the recesses of the dies *c c'*, the heading-portion of such recesses being of such a size, with respect to the plunger, as when in contact with each other, to be filled by it.

The reciprocating movements of the sliding carriage *E* are effected as follows:

A vibrating arm, *s*, is pivoted to one side of the said carriage, and with its rear extremity in alignment with a cam, *t*, fixed to the driving-shaft, a revolution of such cam, by means of the arm *s*, having the effect of advancing the plunger *G*, the retraction of such plunger or its carriage being effected by a spring, *u*, suitably applied to its under part, and to the machine-bed, or by any suitable means. The peculiar disposition of the vibrating arm *s*, with respect to the cam *t*, enables great power to be had over the plunger, the advance of such plunger within the head-receiving portions *d d'* of the dies being carried so far, with respect to the shank portion thereof, as to form a head upon the bolt of any desired depth, the plunger being applied to its carriage in an adjustable manner, in order to vary the extent of its entrance within the dies, in order to produce heads of varying depth.

The disposition of the cams *o*, *p*, and *t*, with respect to the sliding bars *i* and *j*, and the carriage *E*, are such that the former shall first cause the dies to meet, and the plunger subsequently to enter such dies, and form the head of the bolt, the sliding bar *i*, during such process of heading the bolt, serving, with the aid of the ledge *h*, before mentioned, as a solid, unyielding abutment, to maintain the dies in contact.

The above-described combination and organization of parts comprise the principal features of my invention, and serve to form a bolt.

To enable mechanics, to whom this specification is chiefly addressed, to understand its operation, the following brief description will suffice.

A rod, or bar of iron, at a red heat, is to be inserted between the dies *c* and *c'*, and so far into the head-portion thereof as practice shall determine proper for giving the requisite head to the bolt. A revolution of the driving-shaft, by means of the cams *o*, *p*, and *t*, first closes the dies, and grasps the stem, or body of the bolt, and subsequently advances the plunger, and produces the head of such bolt. The passage of the said cams past the bars *i j*, and the carriage *E*, allowing such parts, and the die-carriage *g*, to return to their normal positions, as shown in fig. 1 of the drawings.

The dies *c c'* may be so constructed as to sever the bolt from the bar, or blank simultaneous with the act of forming it, in which case the bolt, upon separation of the dies, would fall through an orifice, *w*, made in the machine-bed, below such dies. This, however, would produce bolts of unvarying length, which, in practice, would not be desirable.

The secondary, or incidental features of my invention, as before premised, consist of a cutter, adapted for convenience in cutting bolts of requisite length.

H, in the accompanying drawings, denotes a sliding

carrier, supported upon the front edge of the machine-bed, to one side thereof, and parallel, or thereabouts, to the axis of the driving-shaft. To such carrier *H*, I affix a shearing-plate; while in alignment therewith, I affix to the abutment, or extension *y*, before mentioned, a second shearing-plate, *a'*, the two plates serving as shears, to cut the bolts into requisite lengths.

The advance of the sliding carrier *H* is effected by a sliding bar, *b'*, disposed upon the upper surface of the machine-bed, and to one side of the box *f*, before mentioned as containing the stationary die *c*, such sliding bar being disposed alongside of a second sliding bar, *c'*, and the two being supported in suitable guides, or ways *d' d'*, and operating in connection with two wiper-cams, *e' f'*, Figure 4, fixed to one extremity of the driving-shaft, in such a manner that, upon a revolution of such cams, the bar *b'* shall first advance, and by impinging against the carrier *H*, advance such carriage, and its cutter, while the bar *c'* shall subsequently retract the carrier to its normal position.

To accomplish these movements, the forward extremity of the bar *b*, and the inner face of the carrier *H*, are formed with angles, or inclined grades *g' h'*.

In like manner, the sliding bar *c'* is formed with an angular termination, *i*, to work within a corresponding-shaped recess, formed in the rear face of the punch-carrier *H*.

The retraction of the bars *b' c'* is effected by springs *k' k'*, or other means suitably applied.

To adapt the machine above described to making rivets, which it is well known are provided with round, convex heads, the heading-dies *d d'* are to be changed for others, suitably formed, to present such shaped heads.

This change may be made very expeditiously, and with little trouble, and in this respect my machine possesses great advantages over others in use.

I would call the reader's attention to the fact that the beater, or plunger *G* performs another important office, in addition to that of forming the head of the bolt, that is, it serves as a gauge to regulate the insertion of the iron rod within the dies, in order to produce heads of different depths.

The plunger-carriage, in addition to the movement which forms the head, has a preliminary and short movement imparted to it by an auxiliary cam, *l'*, fixed to the driving-shaft, alongside of the cam *t*, the said cam *l'* impinging against the rear end of the carriage, and being so situated, with respect to the cam *t*, as to cause a short movement of the carriage and plunger, in advance of the general movement effected by such cam *t*, this preliminary movement of the plunger bringing it to such a position that the iron rod, upon being introduced between the dies, shall abut against it, and, as before observed, determine the proportionable amount of such rod to be admitted to form the head of the bolt. As the plunger is applied to its carriage in an adjustable manner, this advance of the plunger may be varied at pleasure.

Claims.

I claim as my invention, and desire to secure by Letters Patent of the United States, as follows:

1. I claim the arrangement and combination of the sliding bars *i* and *j*, with the carriage *g*, the former being provided with the differential cam-grades *k* and *l*, and the latter with the inclines *m* and *n*, the whole operating in manner and for the purpose as before explained.

2. I claim, as a means of operating the cutter-carrier *H*, the combination and arrangement of the bars *b'* and *c'*, such bars being inclined upon their forward ends, and operating in connection with the said carrier, provided, as before explained, in such manner as to effect the reciprocating movements of such carriage, substantially as hereinbefore set forth.

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