(No Model.) 4 Sheets—Sheet 1.

M. G. WILDER.

BOLT HEADING MACHINE.

No. 282,475. Patented July 31, 1883.

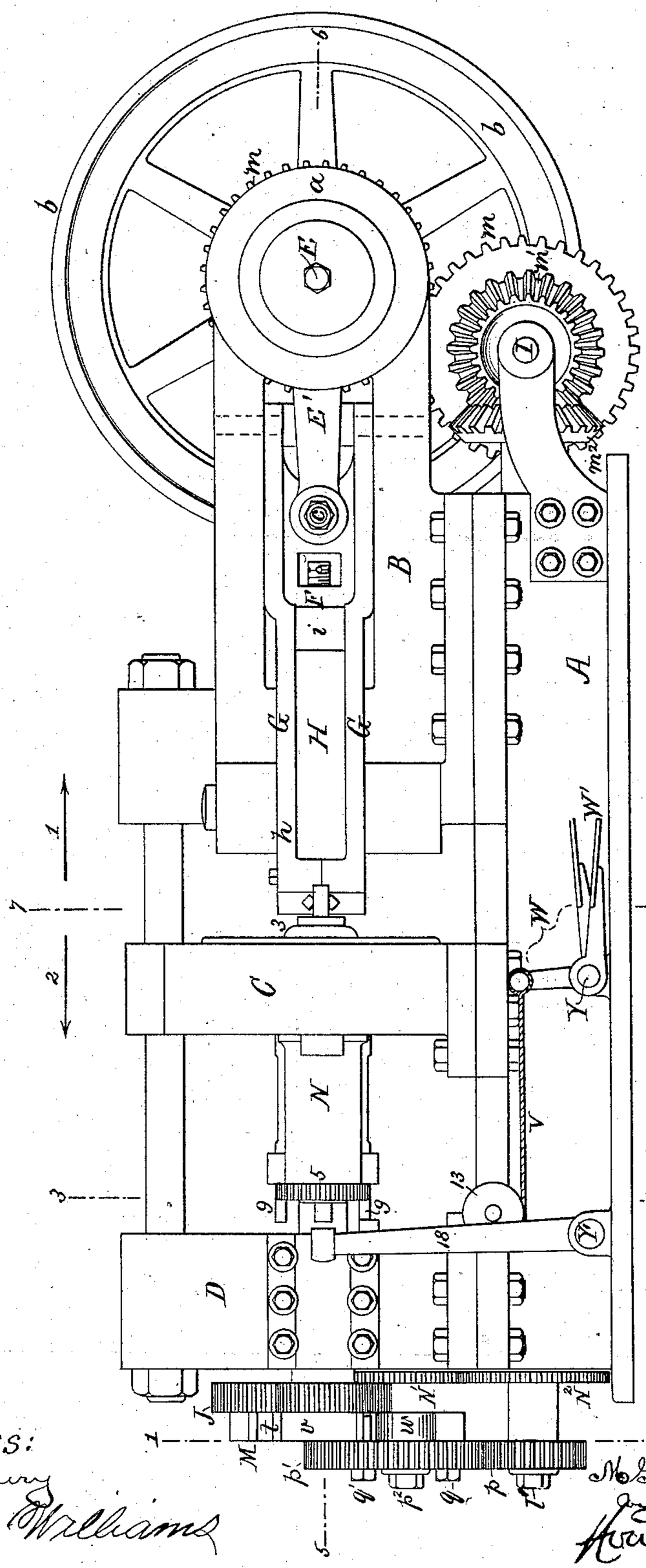

FIG. 1.

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INVENTOR:
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by his attorneys
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M. G. WILDER.

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FIG. 4.

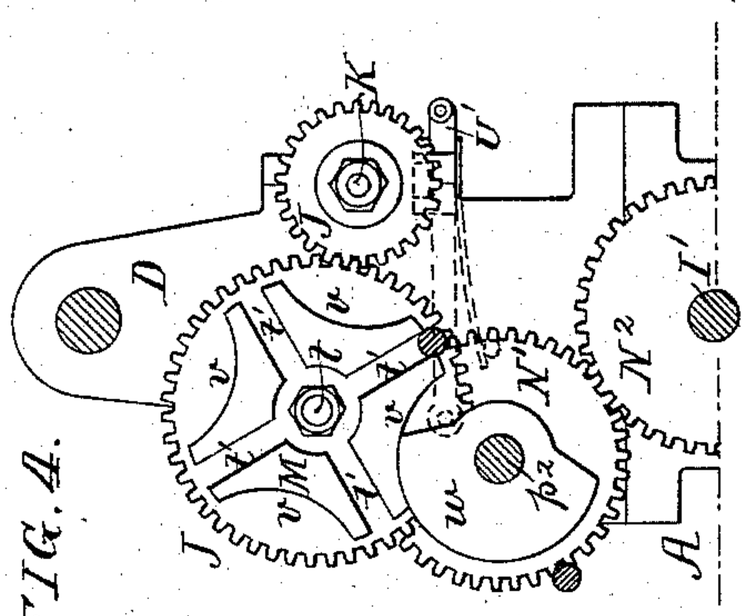


FIG. 5.

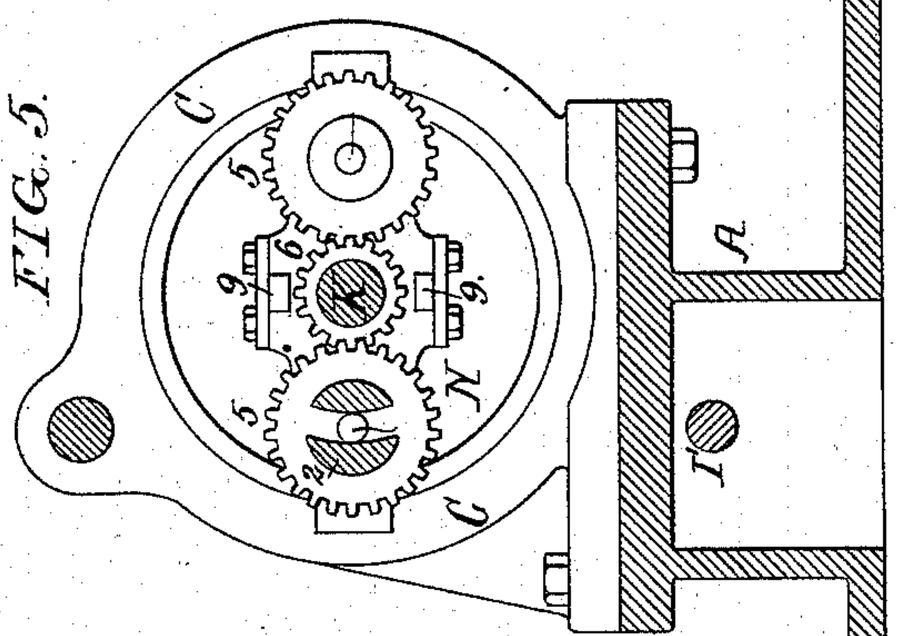


FIG. 3

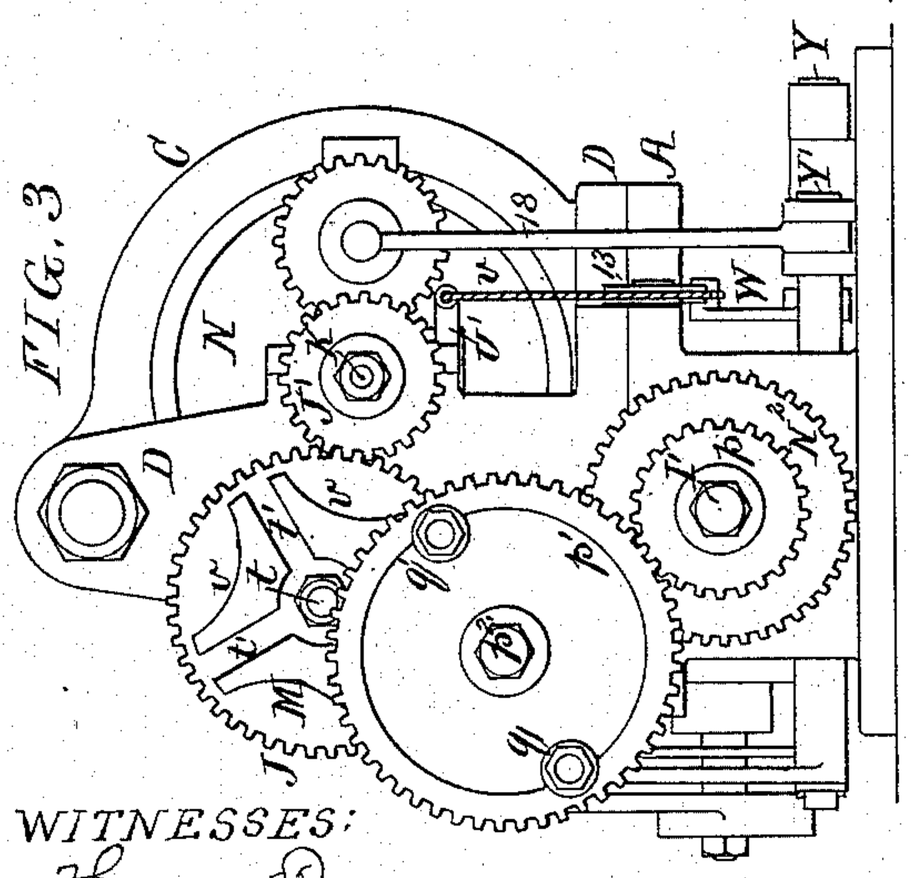
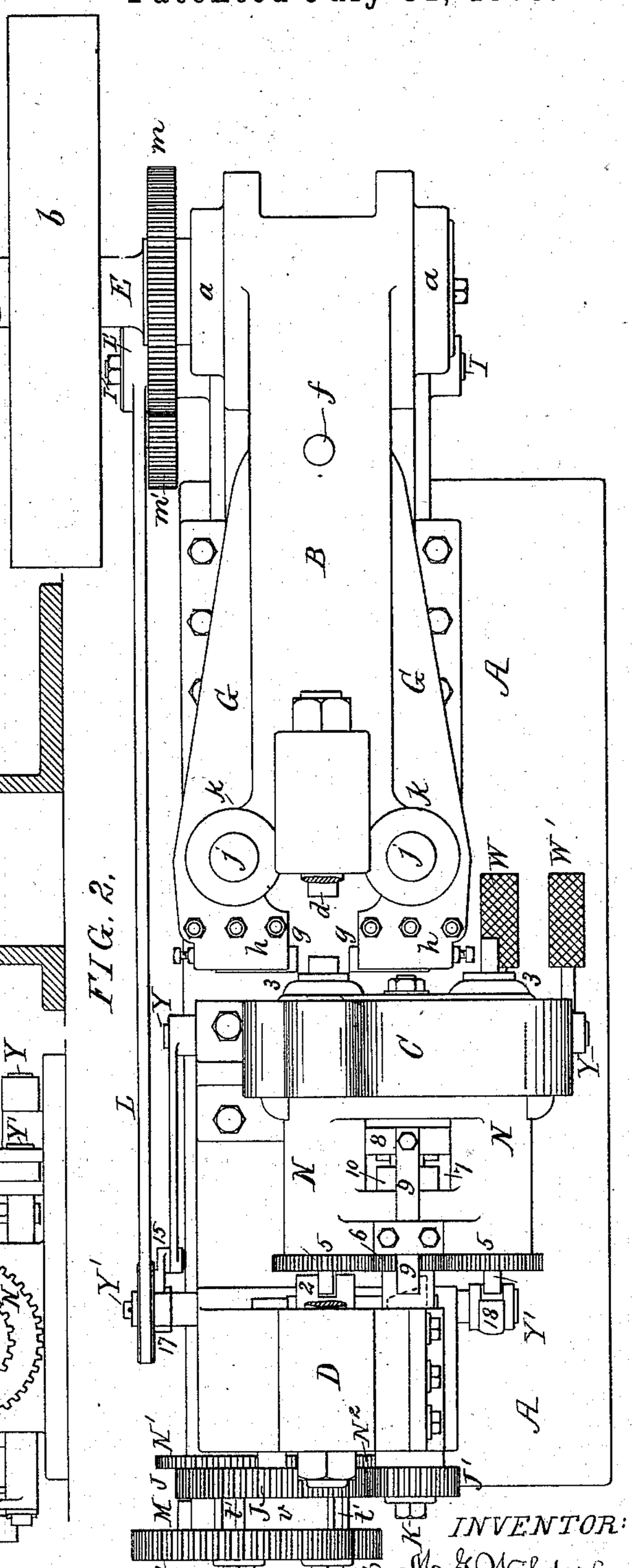


FIG. 2.



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4 Sheets—Sheet 3.

M. G. WILDER.

BOLT HEADING MACHINE.

No. 282,475. Patented July 31, 1883.

FIG. 7.

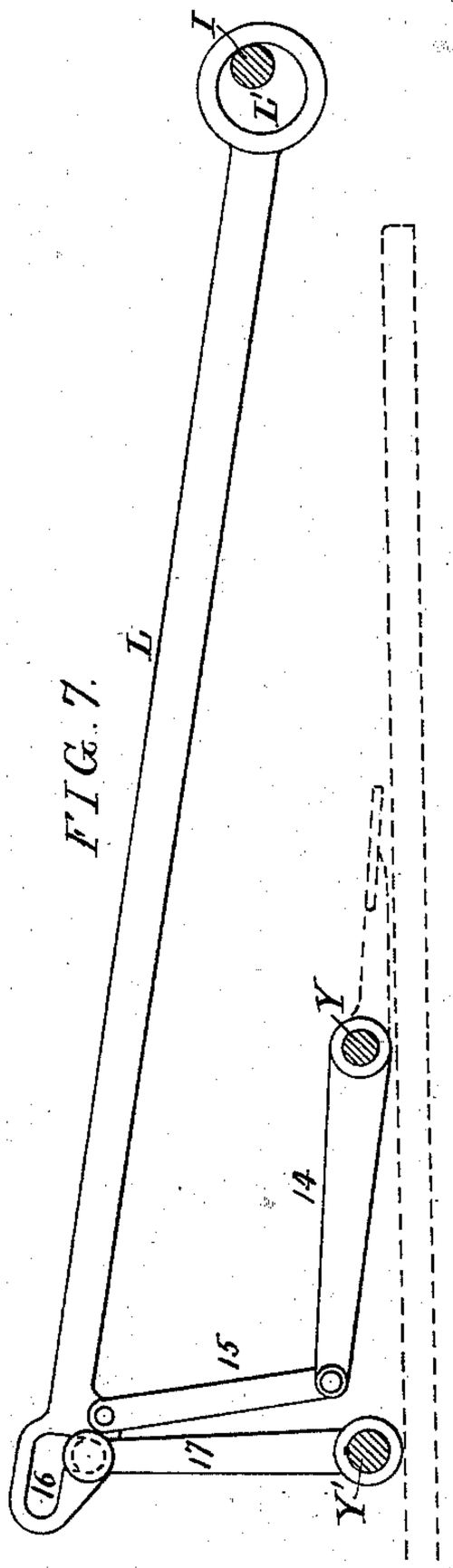


FIG. 6.

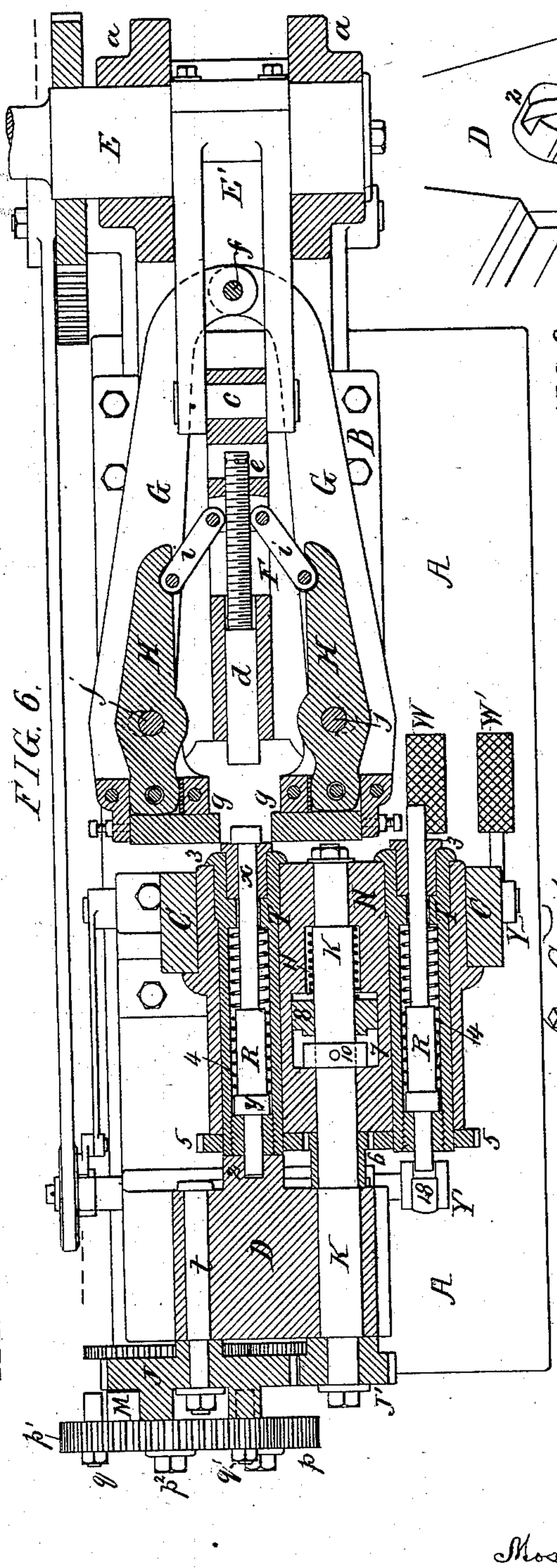


FIG. 8.

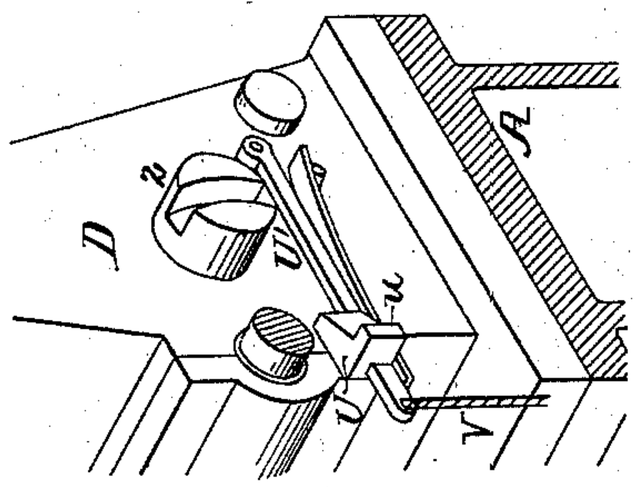
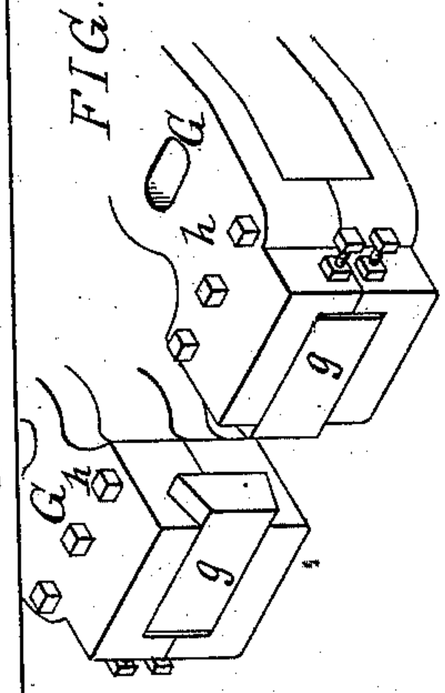


FIG. 9.



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M. G. WILDER.

BOLT HEADING MACHINE.

No. 282,475. Patented July 31, 1883.

FIG. 13.

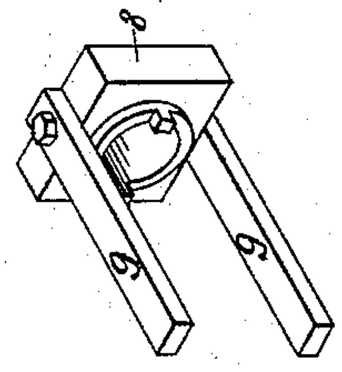


FIG. 10.

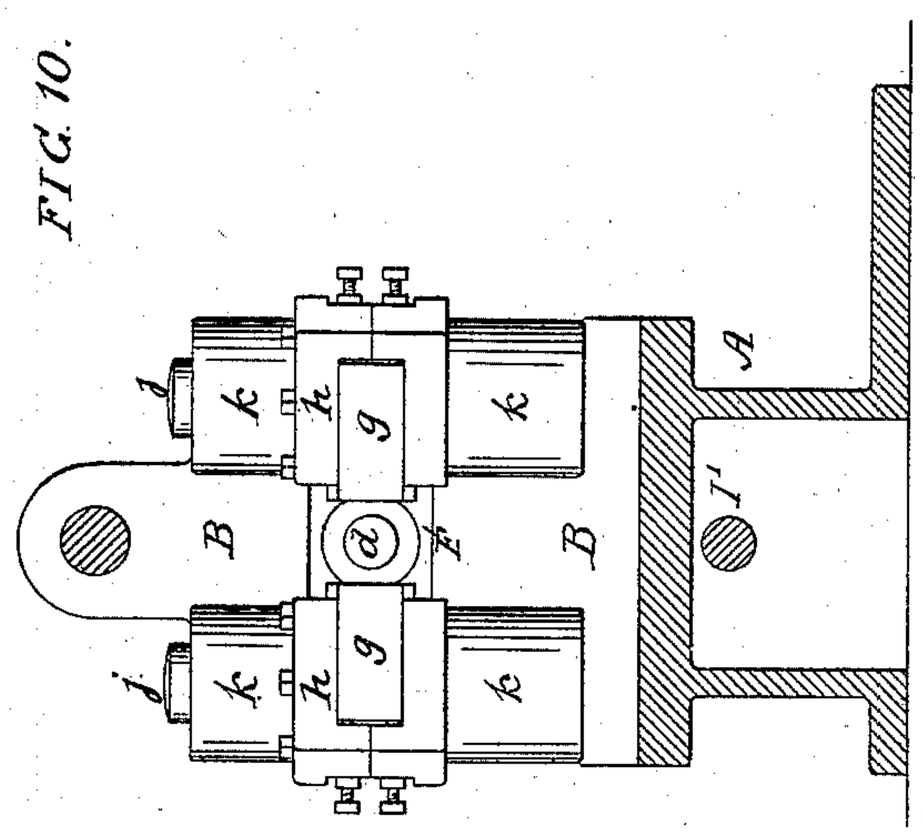


FIG. 12.

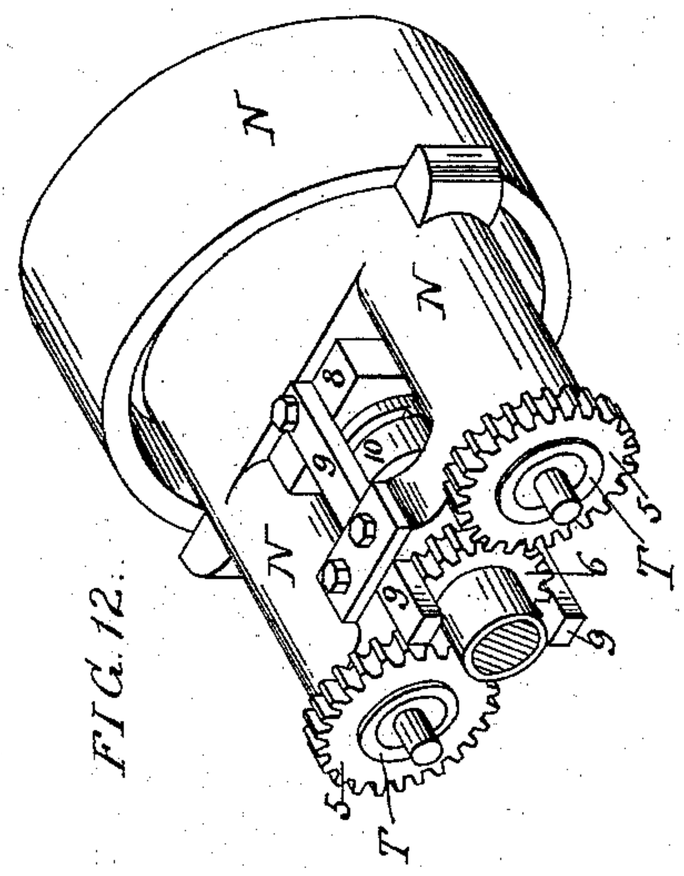
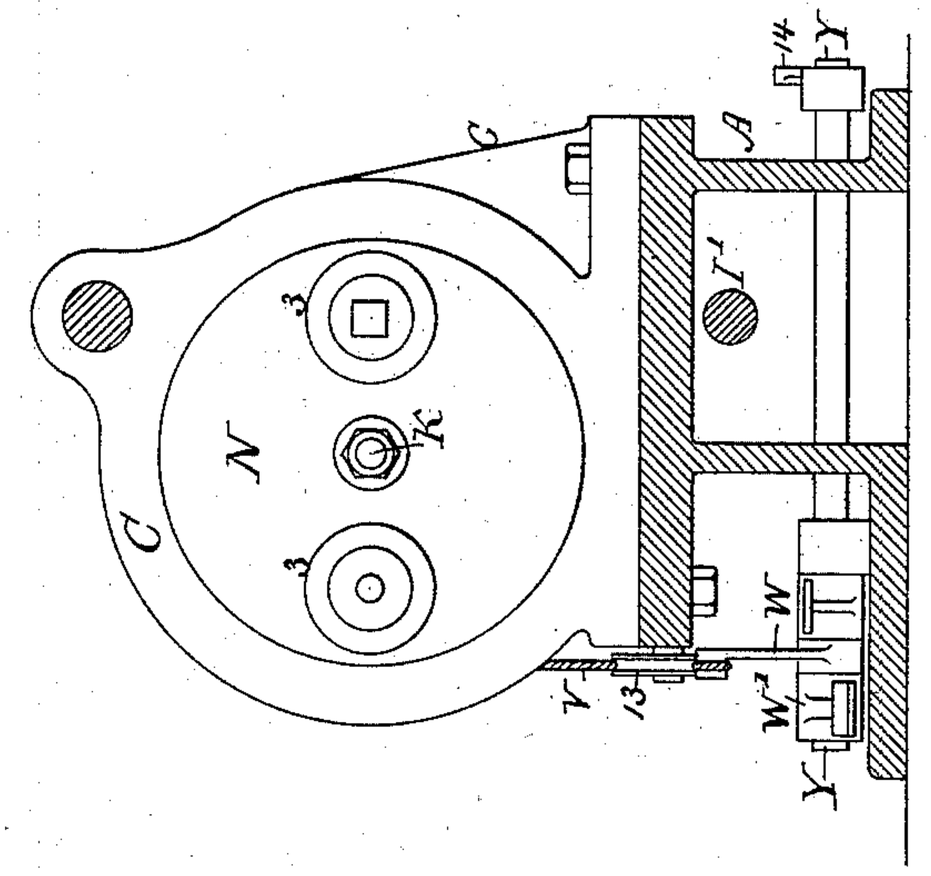


FIG. 11.



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UNITED STATES PATENT OFFICE.

MOSES G. WILDER, OF PHILADELPHIA, PENNSYLVANIA.

BOLT-HEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 282,475, dated July 31, 1883.

Application filed March 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. WILDER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Bolt-Heading Machines, of which the following is a specification.

My invention relates to improvements in machinery for forming bolt-heads, the nature and object of my improvements being too fully described hereinafter to need preliminary explanation.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of my improved bolt-heading machine; Fig. 2, Sheet 2, a plan view; Fig. 3, a view of the rear end of the machine; Fig. 4, a transverse section on the line 1 2, Fig. 1; Fig. 5, a transverse section on the line 3 4, Fig. 1; Fig. 6, Sheet 3, a sectional plan of the line 5 6, Fig. 1; Fig. 7, a side view of detached portions of the mechanism; Figs. 8 and 9, perspective views of portions of the machine; Fig. 10, Sheet 4, a transverse section on the line 7 8, looking in the direction of the arrow 1, Fig. 1; Fig. 11, a section on the same line, looking in the direction of the arrow 2; Fig. 12, a perspective view of the turret, looking toward the rear of the same; and Fig. 13, a perspective view of part of the clutching mechanism.

To the base-plate A of the machine is secured the frame B and the standard D. A driving-shaft, E, is adapted to bearings *a a* on the frame B, near the front end of the same, and carrying a fly-wheel, *b*, which is also, in the present instance, a pulley for a driving-belt. A cranked portion of this shaft is embraced by one end of a connecting-bar, E′, the opposite end of which is hinged by a pin, *c*, to the reciprocating plunger F, which is guided both laterally and vertically in the frame B, as will be best observed in the transverse section, Fig. 10. The plunger, at and near its front end, contains a cylindrical heading-die, *d*, which can be adjusted longitudinally in the plunger by a screw, *e*, in the manner best observed in Fig. 6. Levers G G are pivoted by a pin, *f*, to the rear end of the frame B, and carry at their outer ends the dies *g g*. It is by the simultaneous movement of these dies toward each other simultaneously, with the forward movement of the plunger and its heading-die, that the bolt-blank *x*, Fig. 6, is headed, the heading-die crushing the end of the bolt-blank, and the dies *g g* reducing the head to the desired shape laterally.

The manner of fitting the dies to the ends of the arms G G and of providing for their adjustability is shown in the perspective view, Fig. 9, and need not be minutely described, as it forms no part of my present invention. Near the front end of each arm, at the rear of its die *g*, is a recess for containing the rounded end of the front and short arm of a lever, H, each arm being preferably made in two parts, bolted together, as indicated in Fig. 9. The two levers H H are pivoted to the frame B by pins *j j*, which pass freely through elongated openings in the levers G G, and through the projections *k k*, Fig. 10, of the frame.

To the long arm of each lever H is connected one end of a link, *i*, the opposite end of the link being connected to the reciprocating plunger F, the relation of these links to the levers when the plunger is retracted to its full extent being shown in Fig. 6. As the plunger reciprocates a vibrating motion must be imparted to the levers H H through the medium of the toggle-joint links *i i*, and a vibrating motion must be imparted to the arms G G; hence the dies *g g* must be moved alternately from and toward each other, the elongated openings in the said arms, through which openings their pivot-pins *j j* pass, permitting this movement.

It may be well to explain here the objects of the combination which constitutes this feature of my invention. Dies carried by vibrated arms are to be preferred to dies carried by reciprocating bars, as mechanism for operating the former may be less complex than that usually connected with the latter; but if vibrated arms are used, their pivots should be as far as possible from the dies, for the shorter the arms the greater will be the departure from parallelism of the faces of the dies as they move toward each other. For this reason the arms G G, from the dies to the pivot *f*, are of the length shown.

A cog-wheel, *m*, on the driving-shaft E gears into a similar wheel on the shaft I, Fig. 1, which

is geared by miter-wheels m' and m^2 to a longitudinal shaft, I′, having its bearings in the bed of the machine, and, extending to the rear end of the same, carries a pinion, p, gearing into a cog-wheel, p', which is adapted to turn on a stud, p^2, secured to the standard D, Fig. 3. The wheel p' has two opposite pins, q q', each carrying on the inner face of the wheel an anti-friction roller. To another stud, t, secured to the standard D, is hung a cog-wheel, J, which gears into a pinion, J′, on a shaft, K, the latter having its bearings in the standard D and carrying the turret N, which, as described hereinafter, has two dies for receiving the bolt-blanks to be headed. On the face of the wheel J is a star-wheel, M, having four radial grooves, t', so arranged that each groove is at right angles to the adjoining groove. As the cog-wheel p' revolves one of its pins, carrying an anti-friction roller, will enter a groove of the star, traverse that groove, and in doing so turn the wheel J until the anti-friction roller escapes from the groove, so that during every revolution of the wheel p' there will be two intermittent movements of the wheel J, which gears into the pinion J′ on the shaft K; but the several wheels, through the medium of which the wheel p is driven, are such that it will make but half a revolution for every revolution of the driving-shaft E, the wheel J making one-fourth of an intermittent revolution, and the wheel J′ half of an intermittent revolution during one revolution of the said driving-shaft. It will thus be seen that the shaft K, which carries the head or turret N of the machine, will make half a revolution, will then have an interval of rest, and then make another half-revolution, and so on. It is essential that this shaft K should be locked when at rest, for which purpose I make in the edge of the star-wheel four concave recesses, v, each adapted to the edge of a segment, w, on a cog-wheel, N′, which is adapted to turn on the stud p^2, and which is driven by a cog-wheel, N^2, on the longitudinal shaft I′. The segment w is of such an extent that it will always prevent the star-wheel from turning when it is not under the influence of one or other of the pins q on the wheel p'.

It will be seen on reference to Fig. 6 that the shaft K, which carries the turret, is out of line with the plunger and heading-die, the turret itself, a general view of which is shown in Fig. 12, carrying two tubular shafts, T T, placed at equal distances from the center of the shaft K, and arranged to intermittently turn in and independently of the turret; and into one end of each shaft T is fitted a removable die, 3, adapted to the bolt-blank x to be headed. An ejector, R, Fig. 6, contained within each shaft, forms an abutment for the blank when acted on by the die d, a collar, y, on this ejector bearing against a shoulder in the shaft, which bears against a projection, 2, on the standard D, so that the latter, and not the shaft or the turret, has to resist the action of the heading-die d. It will be understood that I am now referring to that shaft T which, for the time being, is in line with the heading-die, as shown in Fig. 6, on reference to which it will be seen that one end of the ejector extends a short distance into a recess of the fixed abutment 2; but on reference to Fig. 5 it will be seen that this recess is of such segmental form that when the time comes to turn the turret the ejector can pass freely from the same. A spring, 4, is retained within each shaft T, and tends to force the ejector outward. On each shaft T is a cog-wheel, 5, Figs. 5 and 6, and both wheels gear into a pinion, 6, secured to the shaft K, the wheels and pinion being so proportioned that while the shaft makes one-half of an intermittent revolution each shaft T makes one-quarter only of a revolution. The object of this will be understood when it is remembered that the faces of the dies are flat, as shown in Fig. 9, and that the four sides of the bolt-head must be presented at different times to the dies. If the bolt has to have a hexagonal head, the wheels 5 5 and pinion 6 must be so proportioned that each shaft T must make one-sixth or one-third of a revolution for each action of the plunger. An opening, 7, Figs. 2, 6, and 12 extends through the turret, and this opening contains a sliding clutch-block, 8, best observed in the perspective view, Fig. 13, the block being loose on the shaft, but compelled to turn with the turret N, the block having two fingers, 9 9, adapted to guides in the turret and projecting rearward from the block, on the face of which are two teeth, the block and its teeth forming, with a collar, 10, provided with like teeth, and secured to the shaft K, a clutch. A spiral spring, 11, contained in a chamber in the turret, tends to maintain the block in gear with the collar; but there is a device controlled by the attendant which tends to maintain the clutch out of gear with the collar, and this consists of a wedge-shaped block, U, Fig. 8, attached to a spring-arm, U′, secured to the standard D, a cord, V, attached to the end of the arm, passing over a guide-pulley, 13, to one arm of a bell-crank lever, W, which is loose on a rock-shaft, Y, referred to hereinafter. When the turret is just completing half a revolution, one of the fingers 9 of the clutch-block 8 comes in contact with the inclined side of the wedge-formed block U, and hence the clutch is thrown out of gear and the turret released from the control of the shaft K, and will remain stationary while the shaft revolves, the turret being retained by a small projection, u, on the said block U. The turret will remain stationary until the attendant depresses the treadle-arm of the bell-crank lever W, by doing which the wedge-shaped block U will be depressed and moved away from the finger of the clutch-block 8, when the latter will be moved by the spring 11 into gear with the collar 10, when the turret will make another half of a revolution, and the

clutch will be again thrown out of gear, in the manner described above, the attendant having meanwhile released the treadle.

Two transverse rock-shafts, Y Y′, extend through and have their bearings in the base A of the machine, and to the shaft Y, on one side of the machine, is secured a treadle, W′, and to the same shaft, on the opposite side of the machine, is secured an arm, 14, connected by a rod, 15, to an eccentric rod, L, near the outer end of the same, the front end of the rod being adapted to an eccentric, L′, on the shaft I. The outer end of the eccentric rod has an L-shaped slot, adapted to a pin on the upper end of an arm, 17, secured to the shaft Y′, to which is also secured the knocking-out arm 18, the head of the latter being directly opposite that ejector R of the turret which is farthest away from the plunger F when the turret is stationary. When the finished bolt has to be ejected, the attendant depresses the treadle W′, and thereby raises the outer end of the eccentric rod L to the position shown in Fig. 7, so that the pin at the upper end of the arm 17 will be within the limit of the recessed portion of the L-shaped slot, and consequently the arm 17 must be so operated by the eccentric that the arm 18, acting on the ejector, will push the headed bolt from the die in the turret.

When the machine is in operation, the plunger F and its heading-die will reciprocate continuously and simultaneously with the continuous vibration, in opposite directions, of the side dies, *g g*, the turret-shaft will have an intermittent rotation, moving to the extent of half a revolution, then become stationary, and then complete the other half of a revolution, the movement of the turret depending upon the action of the attendant, as also does the ejecting of the headed bolt-blank. While the turret is stationary and the heading devices are operating on a bolt-blank in one of the dies an attendant has time to introduce a heated blank into the other die of the turret, having first caused the ejection of a headed bolt therefrom by placing his foot on the treadle W′. When the head of the bolt is completed, the attendant depresses the treadle W′, and thus induces the mechanism described above to turn the turret to the extent of one-half of a revolution, thereby causing the die, with the heated blank, to assume a position directly in line with the heading-plunger, while the die containing the blank already headed is opposite the ejector-arm 18.

I claim as my invention—

1. The combination, in a bolt-heading machine, of dies *g g* and *d* and mechanism for operating the same, with a turret containing two dies for receiving the bolt-blanks, a driving-shaft for rotating the said turret, and a clutch under the control of the operator for clutching the shaft to and releasing it from the turret, substantially as described.

2. The combination of the reciprocating plunger F, the two arms G G, pivoted to the frame in front of the plunger, and carrying the dies *g g*, with the levers H H, pivoted to the frame, connected to the said arms, near the outer end of the same, and to the plunger by links *i i*, all substantially as specified.

3. The combination of the plunger, the die-carrying arms G G, pivoted to the frame, with the levers H H, connected to the plunger and to the arms, and pivoted to the frame by pins passing through elongated slots in the said arms, all substantially as described.

4. The combination of the turret having two dies for receiving bolt-blanks, the shaft K, which carries the turret, mechanism for clutching the same to and unclutching it from the shaft, and mechanism whereby the said shaft is intermittently rotated, substantially as set forth.

5. The combination of the turret, the shaft K, and clutch-collar thereon, with the sliding block 8, adapted to an opening in the turret, and with mechanism whereby the unclutching of the block is placed within the control of an attendant, substantially as specified.

6. The combination of the spring-arm U′, pivoted to the frame, and carrying a block, U, having an inclined side, with the turret and its clutch-box, having fingers 9 9, substantially as specified.

7. The combination of the turret, its two shafts T T, each having an ejector, R, a collar on the ejector bearing on a shoulder on the shaft, with an abutment, 2, on the frame, the said abutment having a segmental recess for the reception of the end of the ejector, substantially as set forth.

8. The combination of the shaft K, the turret, and its two shafts T T, each having a cog-wheel, 5, the central wheel, 6, secured to the shaft K, and mechanism for imparting an intermittent rotation to the shaft, substantially as specified.

9. The combination of the shaft K and its turret, the star-wheel M, geared to the said shaft, the wheel *p′*, driven from the shaft I through the medium of intervening gearing, and having pins adapted to the grooves of the star-wheel, with a segment, N′, which also derives its motion from the said driving-shaft, and which is adapted to concave recesses in the star-wheel, substantially as specified.

10. The combination of the turret-wheel and its ejectors R, with the ejecting-arm 18 on a shaft, to which is secured the arm 17, with an eccentric on the driving-shaft, and an eccentric-rod having an L-shaped slot, adapted to a pin on the said arm 17, and with mechanism connected with a treadle for raising and lowering the said rod, substantially as set forth.

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

MOSES G. WILDER.

Witnesses:

HARRY SMITH,

HENRY HOWSON, Jr.