(No Model.) 3 Sheets—Sheet 1.

H. A. FERGUSSON.

BOLT CUTTING MACHINE.

No. 571,434. Patented Nov. 17, 1896.

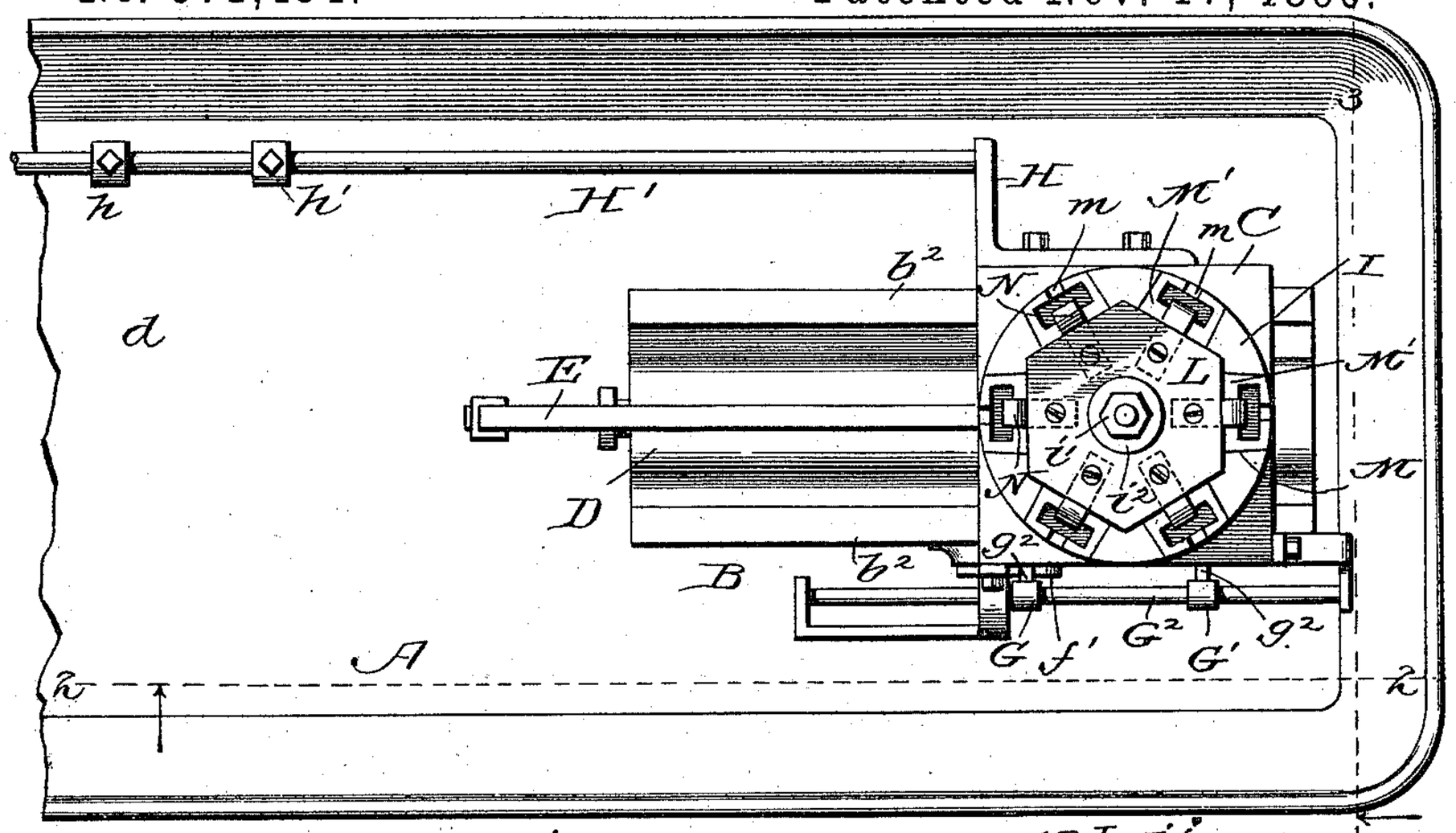

Fig. 1

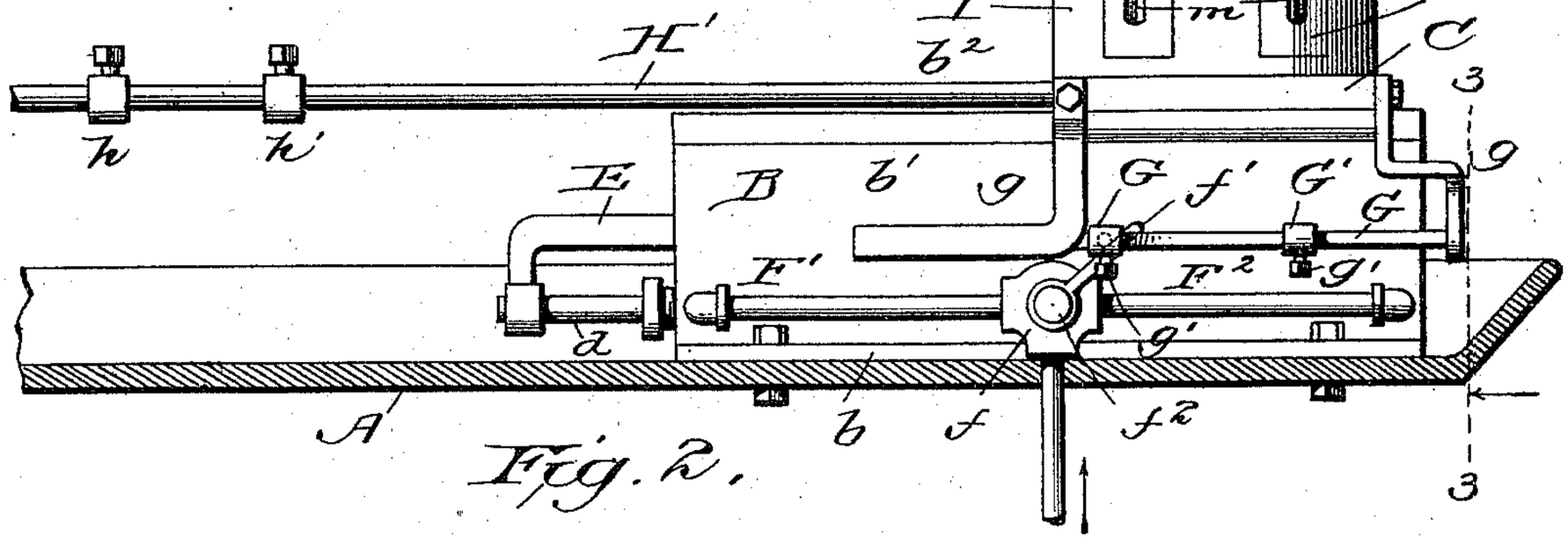

Fig. 2.

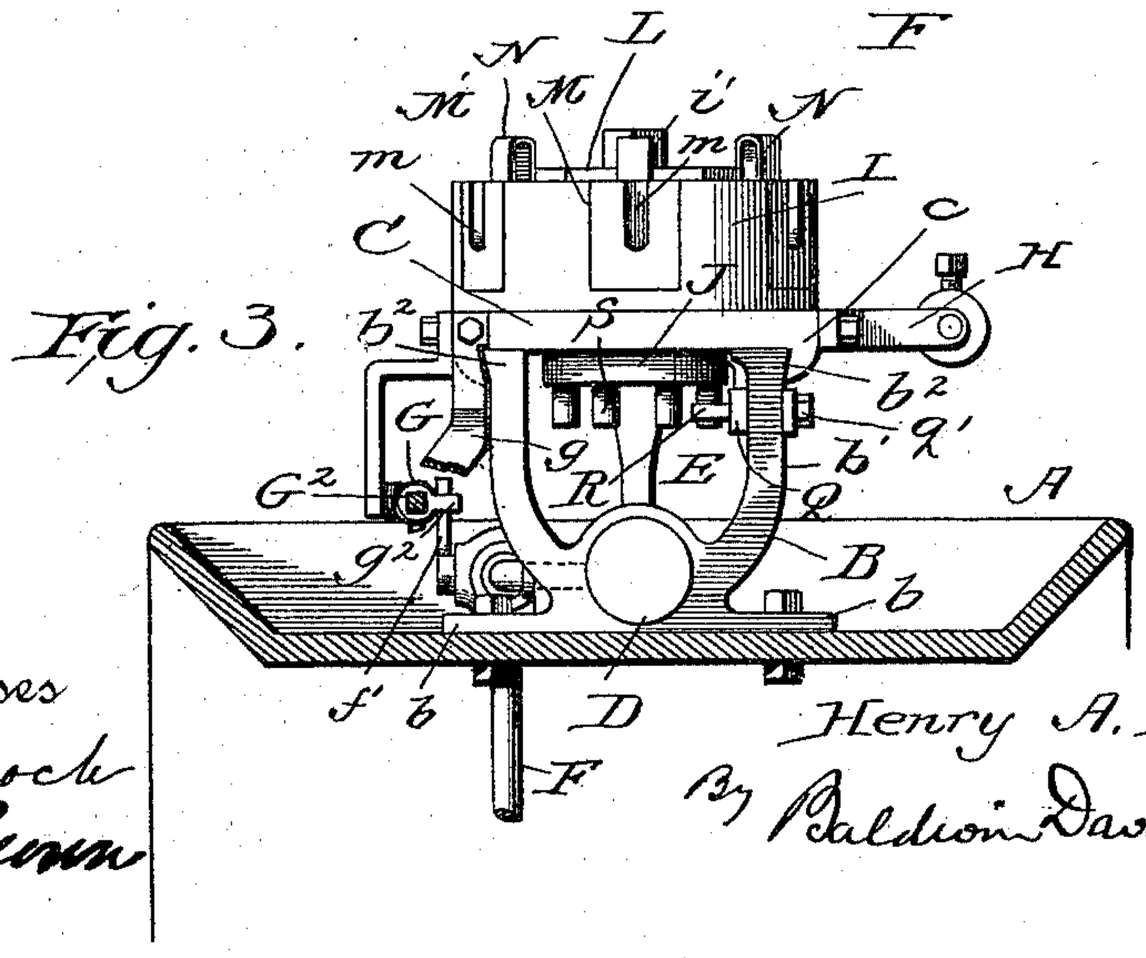

Fig. 3.

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BOLT CUTTING MACHINE.

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Fig. 4.

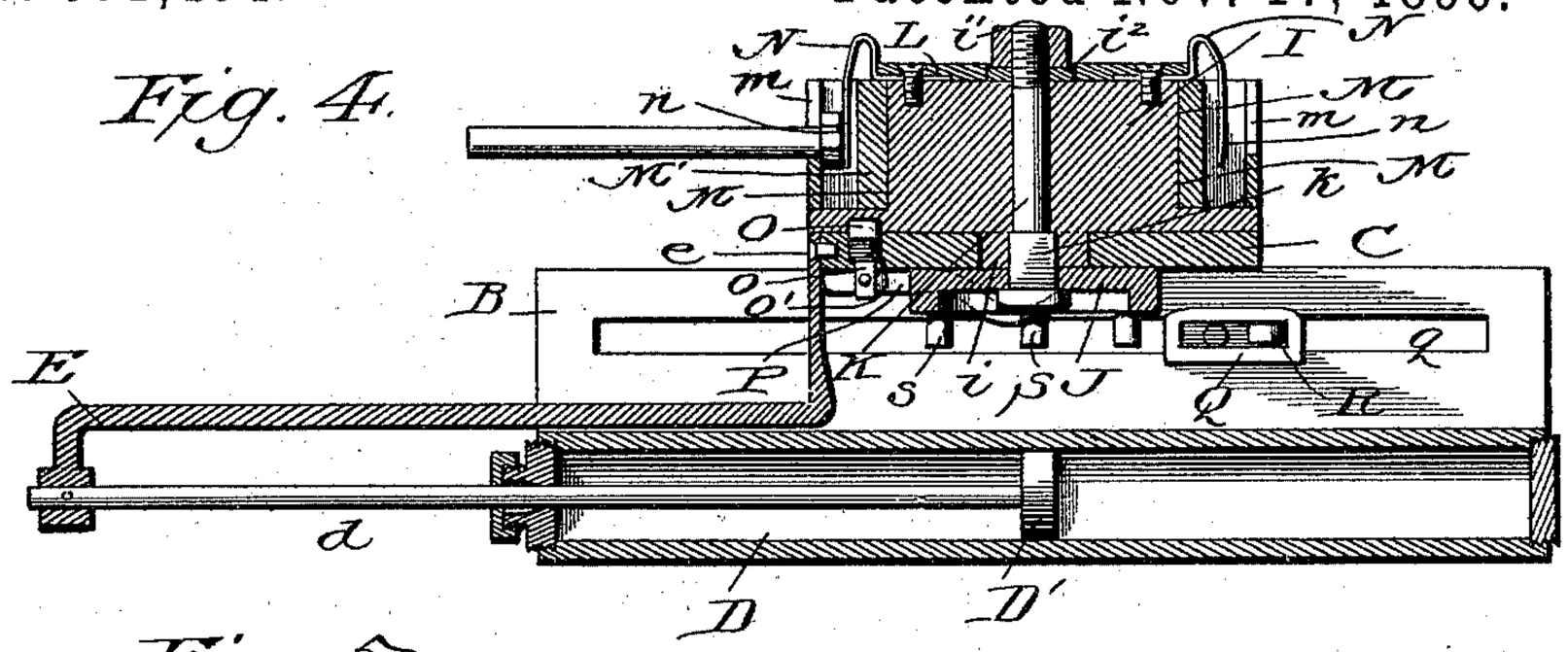


Fig. 5.

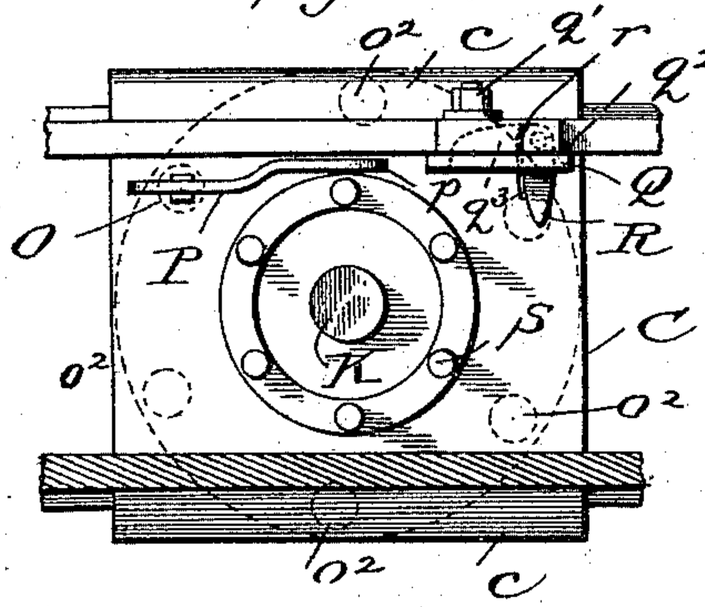


Fig. 6.

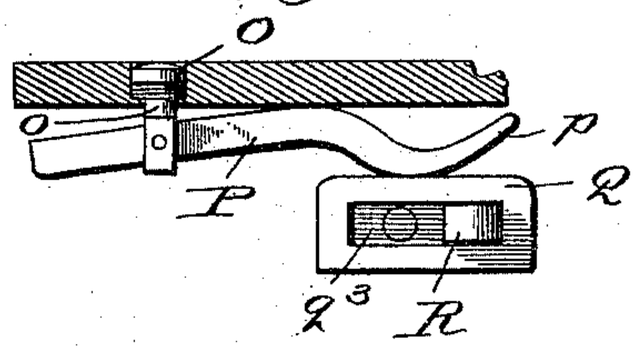


Fig. 7.

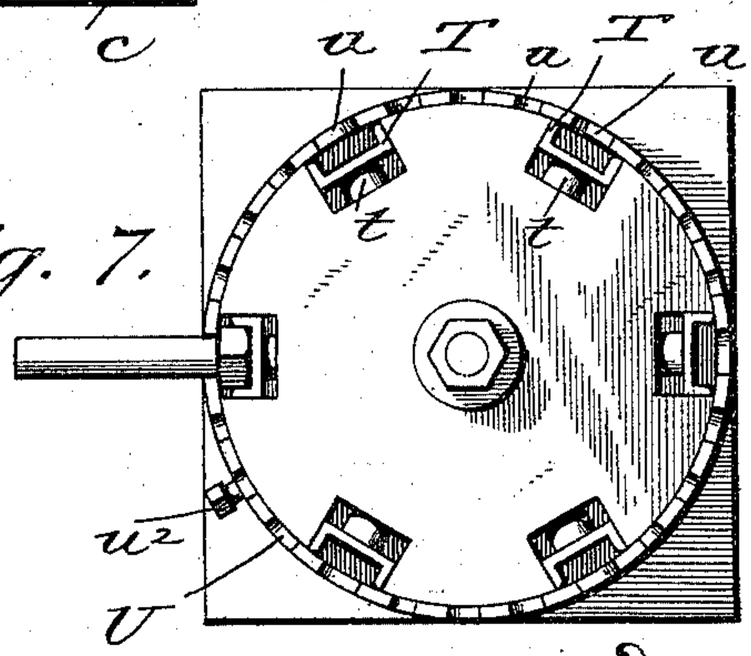
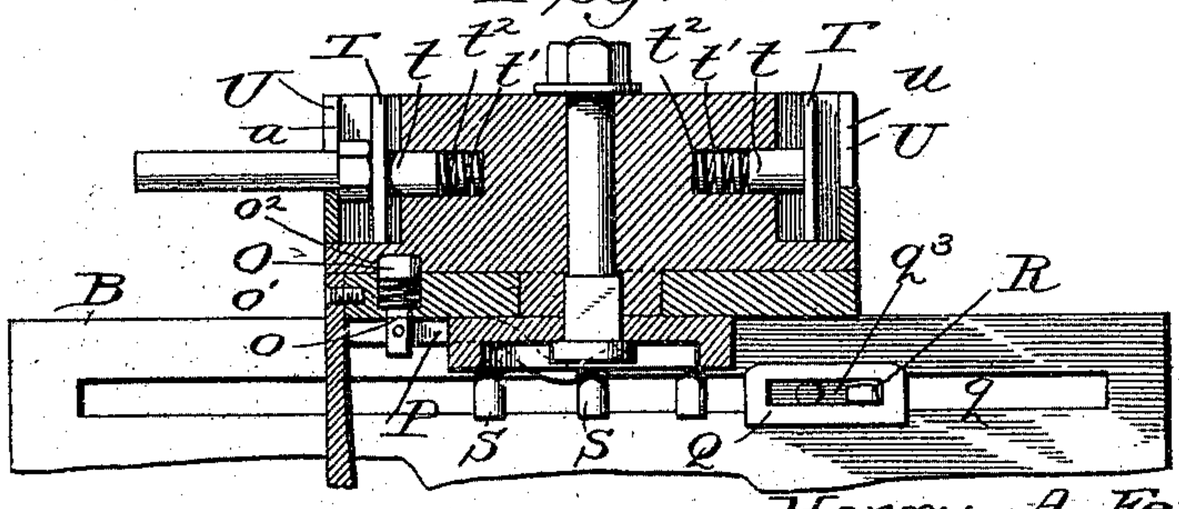


Fig. 8.



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BOLT CUTTING MACHINE.

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Fig. 9.

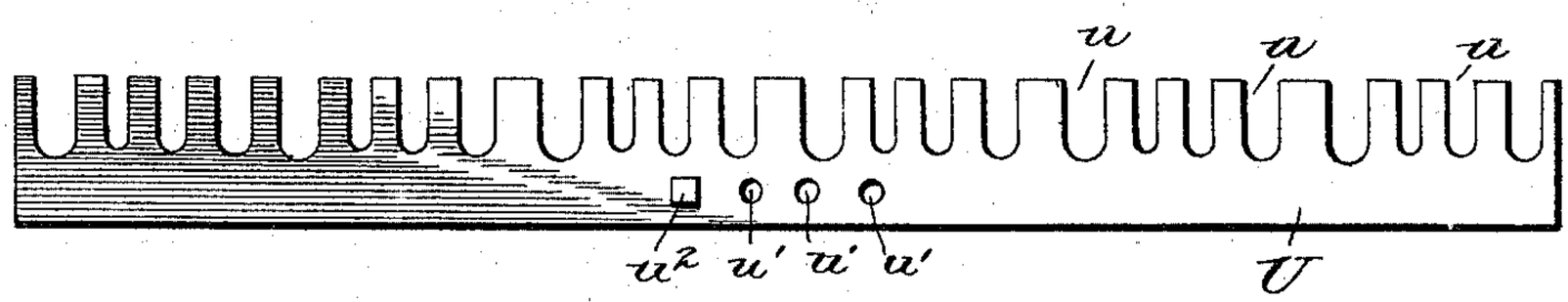


Fig. 10.

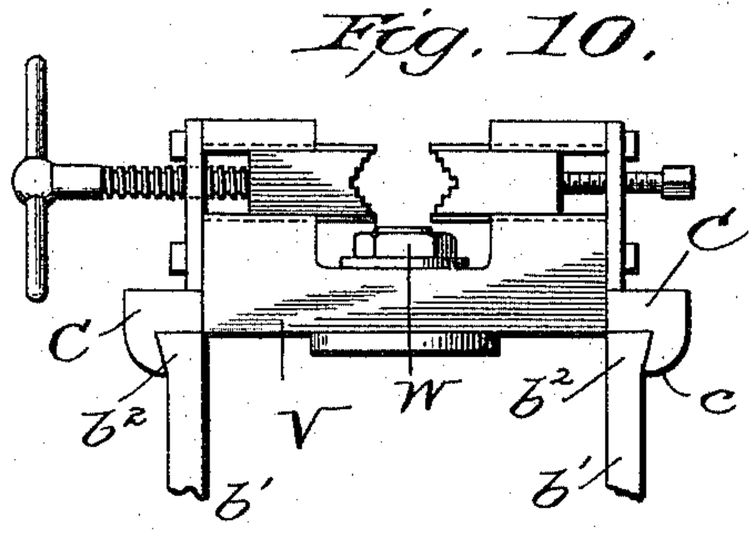


Fig. 11.

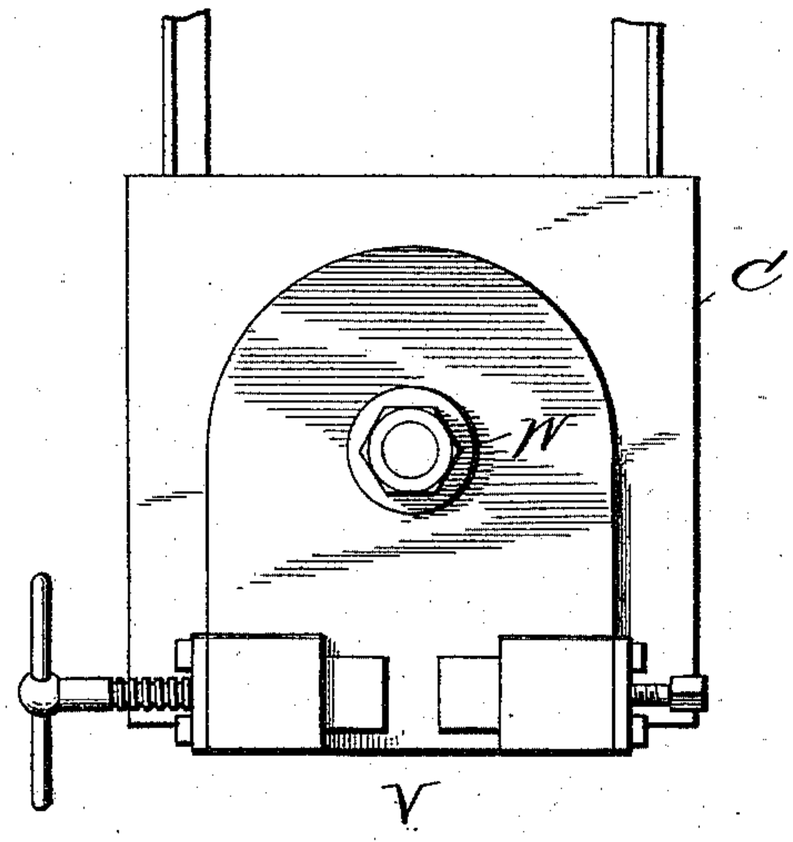
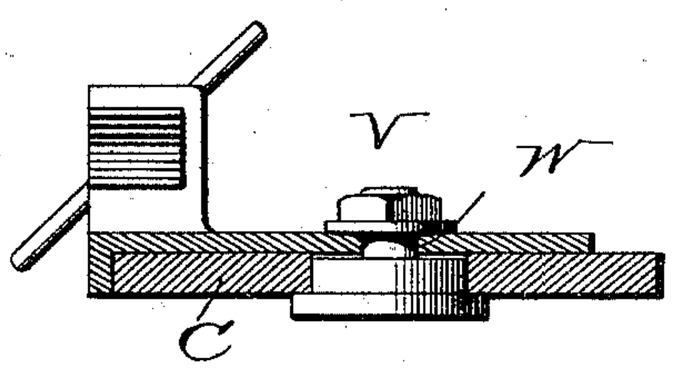


Fig. 12.



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UNITED STATES PATENT OFFICE.

HENRY A. FERGUSSON, OF JERSEY CITY, NEW JERSEY.

BOLT-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,434, dated November 17, 1896.

Application filed August 20, 1896. Serial No. 603,340. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. FERGUSSON, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Bolt-Cutting Machines, of which the following is a specification.

According to my invention the bolts to be cut or threaded are held in a turret or revolving carrier which is intermittently fed toward and from the cutting-dies.

My invention includes improved mechanism for reciprocating the turret, novel devices for turning and locking it, and improved means for holding the bolts in position.

In carrying out my invention I mount the turret or bolt-carrier on a sliding carriage, which is reciprocated by fluid-pressure, such as compressed air, and automatically control the mechanism to cause it to reverse the movement of the carriage at the end of each stroke. The turret is pivoted to the reciprocating carriage, and it is provided with mechanism which revolves it at proper times and at proper times locks and unlocks it, means being provided for controlling the operation of the revolving and locking mechanism in such manner that they are properly operated to accommodate bolts of different lengths.

My improved bolt-holding devices are such as to accommodate bolts of different diameters, and they hold the bolts in such manner as to relieve the dies from strain or shock when the bolts are presented to them.

In the accompanying drawings, Figure 1 is a top plan view of a part of a bolt-cutting machine embodying my improvements. Fig. 2 shows a vertical longitudinal section on the line 2 2 of Fig. 1. Fig. 3 shows a transverse section on the line 3 3 of Figs. 1 and 2. Fig. 4 shows, on an enlarged scale, a longitudinal central section through the turret and its operating mechanism. Fig. 5 shows a bottom plan view of the turret and parts connected therewith. Fig. 6 is a detail view, on an enlarged scale, of the locking mechanism. Fig. 7 is a plan view of a modified form of turret. Fig. 8 shows a vertical longitudinal section of the same. Fig. 9 shows a view of the bolt-holding ring developed. Fig. 10 is a detail view in front elevation of a vise or bolt-holder which may be employed in place of the turret. Fig. 11 is a plan view of the same, and Fig. 12 shows a longitudinal central section thereof.

A indicates one end of the bed of a bolt-cutting machine, which may be suitably constructed and supported. The cutting or threading dies may be of usual construction. They are not shown in the drawings, as I do not contemplate any modification of the dies usually employed. At one end of the bed-plate I secure a turret-supporting frame and guide B. This frame has flanges b, which are securely bolted to the bed, and upwardly-projecting sides b', having enlarged heads b^2, that have a dovetail connection with lugs c, projecting downwardly from the carriage C, the arrangement being such that the carriage or plate C is not only supported in a horizontal position, but is guided as it is reciprocated longitudinally toward and from the cutting-dies. The dovetail connection is such as to prevent a vertical movement.

The frame B is formed with or supports a cylinder D, having a reciprocating piston D', the rod d of which is connected with an arm E, secured at e to the carriage C. The cylinder should be equipped suitably to be operated by fluid-pressure.

I preferably employ compressed air, which is admitted through a pipe F to a valve-casing f, from which project branch pipes F' F^2, leading to the front and rear ends of the cylinder. An arm f' extends from the valve f^2, and by suitably operating this arm air may be admitted to either end of the cylinder. Any suitable exhaust may be employed. When the mechanism is properly operated, the carriage C and the turret, which is connected therewith in the manner hereinafter described, will be reciprocated automatically toward and from the cutting-dies.

In order to automatically reverse the movement of the apparatus at proper times, I employ stops G G', secured to a rod G^2, fastened to brackets g, that are secured to the carriage C. Preferably the rod G^2 is square, so as to prevent the stops G G' from turning. These stops are provided with set-screws g', which enable them to be set properly and in any desired positions on the rod, and they are provided with laterally-projecting lugs g^2, that

are adapted to engage with the arm f', the arrangement being such that at the end of each stroke of the carriage the arm f' is shifted to operate the valve to admit compressed air to one or the other end of the cylinder to cause a uniform and constant reciprocation of the turret. A bracket H is secured to the carriage C, and it supports a rod H', having stops h h' that operate the mechanism for opening and closing the cutting-dies. These stops are adjustable and may be set correspondingly with the stops G G' to open and close the dies at the proper time to conform to the stroke of the turret and the length of bolts carried thereby.

The bolt-carrier or turret I is preferably cylindrical and is formed with a boss i, that extends through the carriage C. Beneath the carriage C is a disk J, through which extends the squared shank k of a bolt K. The squared shank also extends through the boss i, and the bolt passes through the cylinder I and receives on its upper end a nut i' and a washer i^2. The arrangement is such that the turret or cylinder I and the disk J are free to turn relatively to the plate or carriage C. I provide the cylinder with a series of recesses M, in which are fitted recessed blocks M'. Preferably the blocks have a dovetail sliding connection with the turret and may be inserted and removed vertically. Each of the blocks is recessed in such manner as to receive the head of a bolt, and it is slotted at m to receive the shank of the bolt, as indicated in Fig. 4. The recess in the block preferably extends from top to bottom thereof, while the slot m, which is narrower than the recess, extends from the top downwardly about one-half the depth of the block. Within each recessed block I arrange a spring N. Its lower free end n is adapted to bear against the head of the bolt, as shown in Fig. 4. Its upper end is bent and secured beneath a plate L, secured to the top of the turret, which also serves to hold the blocks M' in place. These springs not only serve to hold the bolts in a true horizontal position, but also take the strain or shock from the dies when the bolts come in contact with them.

The turret is locked to the carriage C by means of a bolt O, which has a square shank o, extending through the carriage. The head of the bolt is adapted to fit when depressed in a recess in the carriage, and it is normally pressed upward by a spring o'. The end of the bolt is adapted to enter a series of recesses o^2, corresponding in number with the number of bolt-holding blocks M'. The lower end of the shank of the bolt O is secured to a latch-lever P, having a curved rear end p, adapted to engage with a tripping-block Q, secured to the frame B and adjustable thereon. This block extends through a longitudinal slot q in the frame and is secured in place by a bolt and nut q'. It is flanged at q^2 and recessed at q^3 to receive a pivoted dog R. The arrangement is such that the block Q may be adjusted to any desired position within the limits of the slot q. The end p of the lever P is adapted to engage with the flange of the block Q. When thus engaged, as shown in Fig. 6, the bolt O will be withdrawn from engagement with the turret, and the latter will be free to turn relatively to the carriage C. As soon, however, as the lever P is moved away from the block the bolt will be raised by its spring o' and thus lock the carriage and turret together. The disk J is provided with a series of downwardly-projecting pins S, which are adapted to engage with the dog R, which projects from the block Q. This dog is pivotally connected with the block and is held in position by a spring r. As shown in Fig. 5, the pivoted dog is arranged in a recess in the block and may be turned to the left, as viewed in Fig. 5, to enter the recess, but it is held against farther movement to the right by the walls of the block. In Fig. 5 the parts are in such position that the carriage and turret are locked together. When the carriage and turret are moved farther to the right, as viewed in Fig. 5, the latch-lever P will first ride over the top of the block Q, thus disengaging the locking-bolt O, and then one of the pins S will strike against the dog R. As the carriage and turret farther move to the right the turret will be turned about its axis one-sixth of a revolution. By this organization the bolt-holders in the turret may be successively brought into proper position to present bolts successively to the cutting-dies. In operation the pin which engages the dog R will, after it is turned, pass by the dog, but on the return of the pin the dog will yield to allow the pin to pass it without moving it, and the bolt O will properly operate to lock the carriage and turret together. The mechanism is so timed as to operate harmoniously. The turret is locked and unlocked and turned at or near the end of its backward stroke, and the valve controlling the fluid-pressure is correspondingly operated at the proper time to advance and retract the turret when it is in proper condition to present a bolt to be threaded or to withdraw a threaded bolt from the dies. Likewise the stops h h' are adjusted to open and close the dies at proper times relatively to the adjustment of the turret-operating mechanism.

The turret may be constructed as shown in Figs. 7, 8, and 9. In fact, this special construction of turret is preferred. In this instance the cylinder is provided with a series of recesses in which are mounted a series of recessed blocks or liners T, having inwardly-projecting studs t, abutting against spiral springs t', located in radial recesses t^2 in the cylinder. An annular plate U is secured around the periphery of the cylinder, and is provided with a series of slots or recesses u to receive the shanks of the bolts. It will be observed by reference to Fig. 9 that the slots are of different widths to accommodate bolts of different diameters. There should be a

series of slots or recesses of the same width, and also separate series of other slots or recesses, so that a number of bolts of the same diameter may be operated upon when desired, and then the plate may be shifted to operate on bolts of different diameters. The plate is provided with a series of holes u' to receive a bolt or screw u^2 for securing it in position. The arrangement of the holes is such as to properly locate the plate relatively to the recesses in the turret. Sometimes it is desirable to operate on bolts of great length or of larger diameter than usual. I then prefer to remove the turret and replace it by a vise V of usual construction, such as shown in Figs. 10, 11, and 12. The turret may be readily removed by withdrawing the bolt K and the disk J and securing the vise in position on the carriage C by locking devices W, in the manner indicated in Figs. 10, 11, and 12.

When operating with a revolving turret, it is necessary before admitting the compressed air to the cylinder to accurately "set" the machine for the bolts to be cut. Blocks M' of proper construction are first placed in position, and the springs N are clamped tightly in place. The blocks are filled with the bolts to be cut, and the stop h' is set to open the die-holder when a thread of sufficient length is cut, and the stop G' is set to turn the valve f^2 at the moment the die-holder is opened to admit air to the front end of the cylinder. The block Q is moved until the dog R strikes one of the pins S in the disk J. Then the bolt O will be withdrawn, and the block should be firmly clamped in position. The carriage C is then drawn back until the turret is turned sufficiently to bring another bolt into position. Then the stop h should be clamped so as to close the die-holder in readiness for the next bolt. The stop G is, in its turn, set to turn the valve to admit air to the back of the cylinder. When the adjustments are thus made, the compressed air may be turned on and the machine started. Compressed air enters the back of the cylinder, thus forcing the carriage forward and pressing the bolt held in the turret against the dies, which begin to cut the thread. As the thread is being cut the valve f^2 will be gradually turned until air is admitted to the opposite end of the cylinder. Then the die-holder will open and the slide will move back. The locking-bolt is withdrawn, and the turret is turned until a new bolt is brought into proper alinement. Then the die is closed and the valve again admits air to the back of the cylinder. These movements are repeated to cause the continuous operation of the machine. As each bolt is threaded it is removed from the turret and replaced by an unthreaded one. The machine, it will be observed, is entirely automatic, the operator being only required to remove the threaded bolt and replace it by an unthreaded one at each operation.

When the vise (shown in Figs. 10, 11, and 12) is used in place of the turret, the stop G' is set to turn the valve to withdraw the bolt from the die after the thread is cut, and the stop G is slipped back out of use. When an uncut bolt has been clamped in the vise, the valve is turned to admit air to the back of the cylinder by hand.

I claim as my invention—

1. The combination of a revolving turret or bolt-carrier having a series of devices for carrying the bolts, a reciprocating carriage, fluid-pressure operating mechanism for actuating the carriage, a rod mounted on the carriage and carrying devices for opening and closing the dies, devices carried by the carriage for controlling the operation of the fluid-pressure mechanism to reciprocate the carriage, and mechanism actuated by the reciprocation of the carriage to turn the turret.

2. The combination of the sliding carriage, the revolving turret or bolt-carrier mounted thereon, the pins projecting from the turret for revolving it, the dog engaging the pins at each reciprocation of the carriage to turn the turret, a cylinder, a piston, connections between the piston and the carriage, a valve for controlling the admission of fluid to the opposite ends of the cylinder, devices carried by the carriage for operating the valve, and devices also carried by the carriage for opening and closing the dies.

3. The combination of the reciprocating carriage, the revolving turret mounted thereon, a series of downwardly-projecting pins connected with the turret, a locking-bolt, a latch-lever for operating it, an adjustable tripping-block for operating the latch-lever, and a dog carried by the adjustable block, adapted to act on the pins to turn the turret.

4. The combination of the reciprocating carriage, the revolving turret carried thereby, a bolt for locking the turret to the carriage, a latch-lever for operating the bolt, downwardly-projecting pins connected with the turret, an adjustable tripping-block acting on the latch-lever, a dog carried thereby, acting on the pins, a cylinder, its piston, connections between the piston and the carriage, a valve for controlling the admission of fluid to the cylinder, and adjustable stops carried by the carriage for controlling the movement of the valve.

5. The combination of a reciprocating and revolving turret or bolt-carrier, fluid-pressure mechanism for reciprocating the turret, adjustable stops moved correspondingly with the turret to control the operation of the fluid-pressure mechanism, means for turning the turret and locking it, and an adjustable block and dog for controlling the operation of the turret revolving and locking devices.

6. A bolt-carrier or turret having a series of recesses in its periphery, and an adjustable annular plate secured to its periphery and provided with a series of slots or recesses of different widths.

7. A bolt-carrier or turret provided with recesses for the heads of the bolts, springs press-

ing against the heads of the bolts to hold them in position and receive end thrust, and an annular plate having a series of slots or recesses of different widths adjustably secured to the periphery of the cylinder.

8. The combination of the reciprocating carriage, means for actuating it, a revolving turret or bolt-carrier pivotally connected with the carriage and having a series of downwardly-projecting pins, a bolt for locking the carriage and turret together, a latch-lever for operating the bolt, an adjustable tripping-block having a flange adapted to engage with the latch-lever, and a pivoted spring-pressed dog mounted on the block and adapted to engage with the pins to revolve the turret.

In testimony whereof I have hereunto subscribed my name.

HENRY A. FERGUSSON.

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HARMANUS NEFF.