(No Model.) 2 Sheets—Sheet 1.

J. M. SIMPSON.

DIE CARRYING HEAD FOR BOLT THREADING MACHINES.

No. 397,664. Patented Feb. 12, 1889.

Fig. 1.

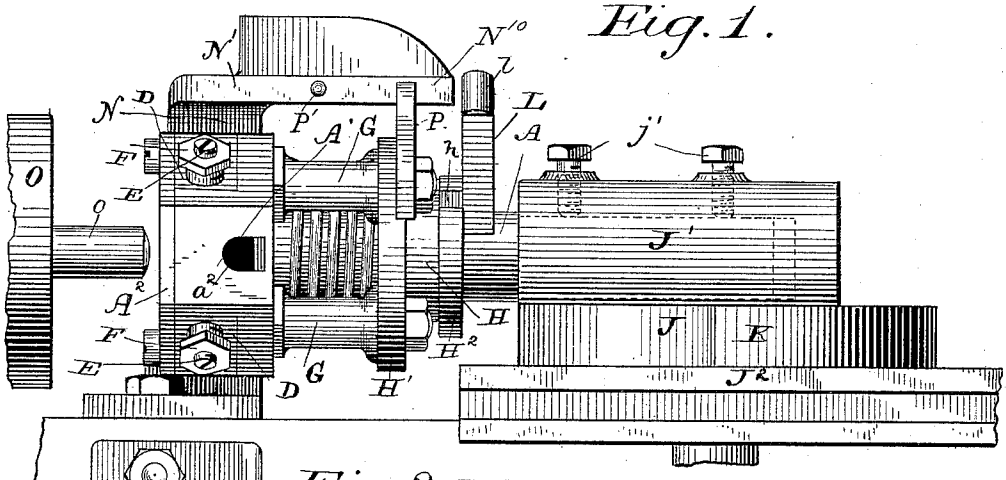


Fig. 2.

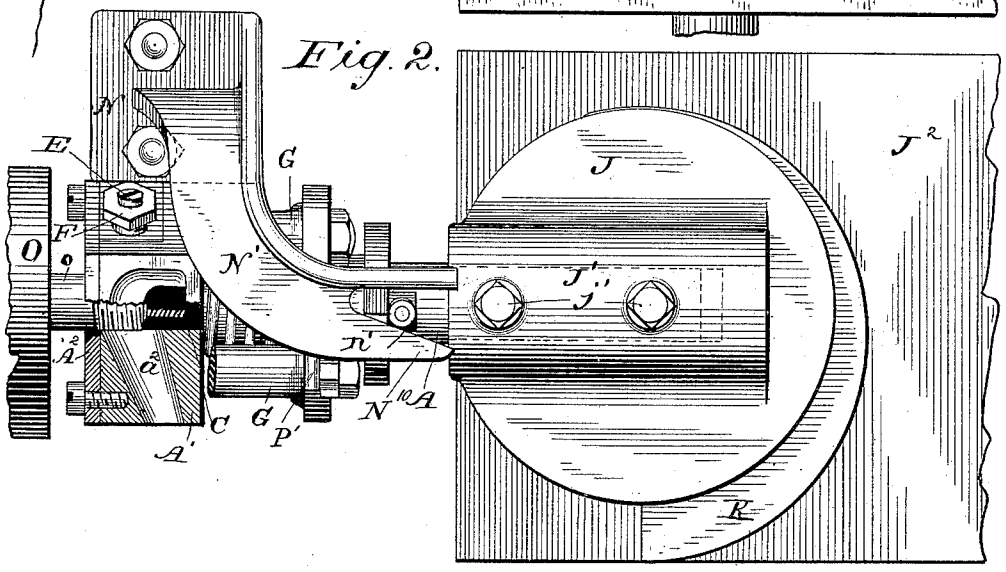
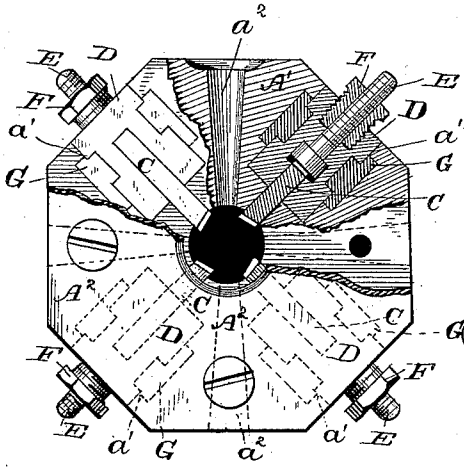


Fig. 3



Witnesses;
Arthur Johnson
Jean Elliott

Inventor;
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By Burton and Burton
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N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

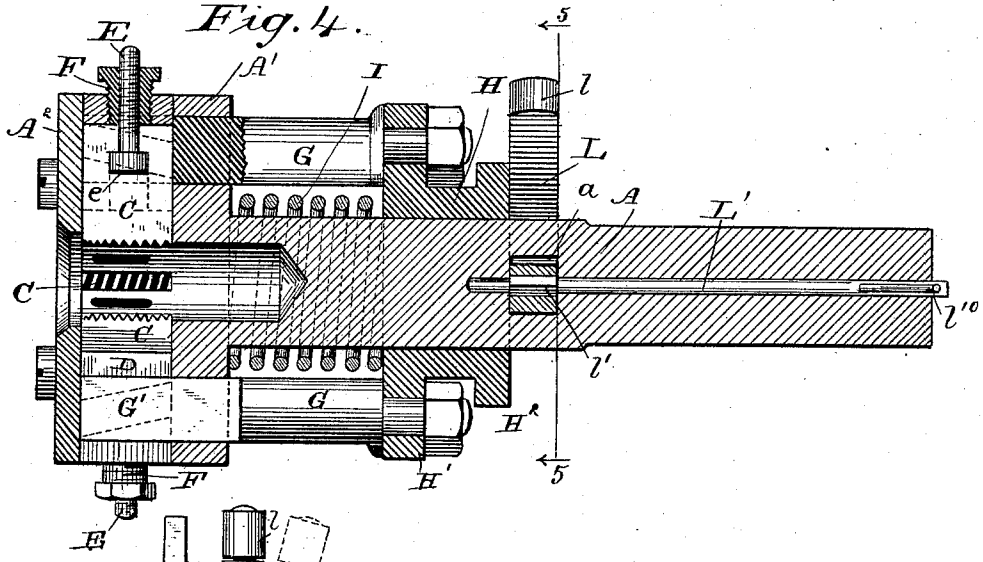


Fig. 5.

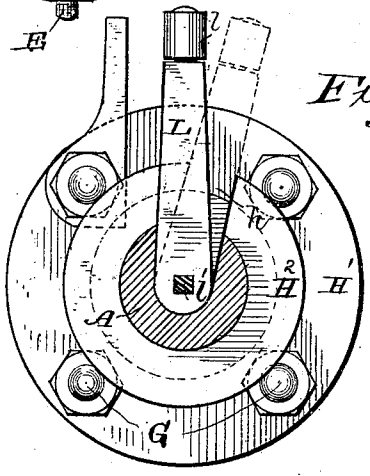


Fig. 6.

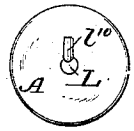


Fig. 9.

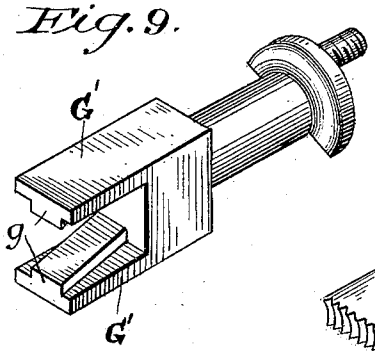


Fig. 7

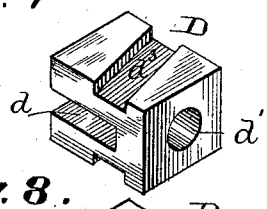


Fig. 8.

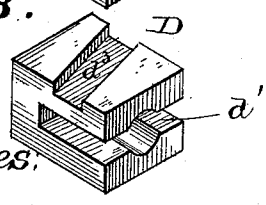
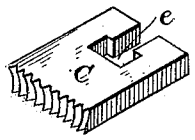


Fig. 10.



Witnesses:
Arthur Johnson
Jean Elliott.

Inventor.
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his attys

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UNITED STATES PATENT OFFICE.

JOSIAH M. SIMPSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM DEERING & COMPANY, OF SAME PLACE.

DIE-CARRYING HEAD FOR BOLT-THREADING MACHINES.

SPECIFICATION forming part of Letters Patent No. 397,664, dated February 12, 1889.

Application filed September 29, 1888. Serial No. 286,721. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH M. SIMPSON, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Bolt-Cutters, which are set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

This invention is designed to provide a means for cutting a thread upon a bolt and removing the bolt from the cutter-head without reversing the rotation and unscrewing the bolt from the cutter, as is the customary process.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a plan. Fig. 3 is a front elevation of the cutter-head with a portion of the inclosing-case broken away to show the interior construction. Fig. 4 is an axial section through the same. Fig. 5 is a section at the line 5 5 on Fig. 4. Fig. 6 is a rear end view of the stem. Figs. 7 and 8 are perspectives of blocks in which the cutters are secured and guided in the head. Fig. 9 is a perspective of one of the reciprocating cams by which the cutters are forced against and withdrawn from the bolt. Fig. 10 is a perspective of one of the cutters.

A is the shank, its forward end being the chambered head A′, to which the other parts are secured. In the head A′ are formed four chambers, a', in which are placed the four cutters secured in their guiding and actuating blocks, as hereinafter particularly described; and after being thus placed in position the cap A^2 is secured over the front end of the head A′. Alternating circumferentially with the chambers a' are the radial ducts a^2, which reach the center of the head and serve the purpose of admitting oil to the bolt while it is being cut and affording discharge for the cuttings. The chambers a' open forwardly, and the cutters in their guiding-blocks are introduced from the forward end, the actuating-cam being introduced from the rear.

C C C C are the cutters. D D D D are their guiding-blocks, which are provided each with the rectangular opening d, extending from the inner face of the block toward the back and meeting the hole d', which extends through to the back of the block. The rectangular opening d is to receive the cutter, which is retained therein by means of the headed bolts E, an aperture, e, being provided in the cutter and extending to its back or outer edge, shaped so as to admit the head of the bolt and afford shoulders to stop it and permit the stem to extend out through the aperture at the back edge and enter and pass through the hole d' in the blocks d.

The bolt being placed in the cutter, the bolt and the cutter are both introduced into the guiding-block D, the stem of the bolt being first inserted into the aperture d' and passed out through the block D, while the cutter enters the rectangular aperture d. The nut F being then screwed onto the protruding end of the bolt E, the cutter is securely clamped in the block. The nut F is both exteriorly and interiorly threaded, so that it is screwed into the block D at the same time that it is screwed into the nut D, thus doubly securing the cutter in position. The block D is provided on the exterior surface with oblique grooves d^3 on opposite sides of the block, and the cam G, in the form of a fork, has two tongues, g—one on each of the interior faces of its branches G′—said tongues being adapted to fit the grooves d^3 in the blocks D. The side walls of the chambers a' in the head A′ are grooved to receive the rectangular portion of the cam G, said rectangular portion including the branches G′ G′, fitting snugly in said grooves and adapted to slide therein longitudinally with respect to the axis of the cutter. Said chambers open through the head A′ on the back side, and the stems of the cam G, protruding from said chambers, enter and are secured in the flange H′ of the collar H, which is fitted on the stem A and adapted to slide thereon. Between the collar H and the head A′, coiled around the stem A within the circle in which the cams G are arranged, there is located the coiled spring I, which reacts between the collar H and the head A′, with a tendency to force the collar back from the head. The movement of the collar away from the head under the action of the spring draws the cams in the same direction, and causes the tongues g to slide in the grooves d^3 of the cut-

ter-holding blocks D. The direction of slope of said tongues and grooves is such that the described motion of the collar and cams back from the head draws the blocks D and the cutters C, secured therein, outward from the center of the cutter-head, while the contrary motion of the collar forces the cutters in toward the center. This cutter-head is designed to be mounted upon a turret, J, which revolves about its center to bring the head axially in line with the bolt to be threaded, the shank A being secured in the socket J′ on said turret by suitable set-screws, j'. To the bed J^2, upon which the turret is mounted, there is secured an eccentric-cam, K, in such position that it will engage the flange H^2 of the collar H as the turret is revolved, and, thus engaging it, will force it forward on the stem A.

In the stem A, just back of the rearmost position of the collar H, there is formed the aperture a, into which is inserted the latch L, which protrudes radially with respect to the stem and is provided at the outer end with an anti-friction roll, l. This latch is secured at the center of the stem A upon the torsion-spring L′, which is inserted in a longitudinal opening, a', made in the stem A from the rear end, and is provided with the square portion l', which enters a square opening in the end of the latch L. This torsion-spring L′ is held fixedly at the rear end by means of the cotter-pin l^{10}, as shown in Figs. 4 and 6. The position of the latch L, in which it is normally held by the torsion-spring L′, is that shown in full lines in Fig. 5. The collar H has the notch h extending from its inner circumference—*i. e.*, from the surface of the stem A—to its outer circumference and through the whole thickness of the flange H^2. This flange is of suitable size to admit the latch L, and is in such position as to admit said latch when the latter is deflected from its normal position to that shown in dotted line on Fig. 5.

N is a bracket secured upon a portion of the bed of the machine which does not move with the turret J, but is fixed in its relation to the axis of the bolt-holding head or chuck O. This bracket extends up over the cutter-head and has the arm N′ projecting toward the turret J directly above the axis of the stem A. In the rear end of this arm N′ there is provided a notch having the sloping face n', which operates as a cam to engage and actuate the latch L.

The operation of this device is as follows: The bolt o being fixed in the chuck O, the cutter-head being secured in the turret, and the turret being revolved to bring the cutter-head axially in line with the bolt, the flange H^2 of the collar H is engaged by the eccentric-cam K, and thereby the collar is forced toward the cutter-head, compressing the spring I between it and the said cutter-head. This movement of the collar H releases the latch L, which may be supposed to have been engaged in the notch h of the flange H^2, and the torsion-spring L′ thereupon swings said latch to the position shown in full lines in Fig. 5, where it is out of line with the notch h. The advance of the collar also causes the cams G to force the blocks D and the cutters C toward the center of the cutter-head. The collar of the flange H^2 now running off the cam K at the shoulder k, further advance of the collar and of the parts actuated by it is arrested, and the latch L, having been carried out of the line of the notch h, now prevents the return of the collar on the stem A, and said collar, by means of its connections described, firmly holds the cutters in the position which it has caused them to assume in the head, and the turret now continuing to revolve until the cutter-head is in axial line with the bolt, and being then advanced upon the revolving bolt, performs its work of cutting the thread as it advances until the anti-friction roll l upon the end of the latch L, entering the notch in the end of the bracket N′, and being engaged by its cam-edge n', is gradually moved aside as the cutter-head advances, rocking the latch L until it is again in line with the notch h, whereupon the spring I, reacting against the collar H, forces that collar back, reversing the hereinabove-described movement of the cams G and blocks D and withdrawing the cutters C radially away from the bolt. This reverse action is as nearly as possible instantaneous, being effected by the reaction of the spring the instant the latch L is in position to enter the notch h. The cutter-head is now in position to be withdrawn from the bolt by direct movement from the turret, which is accomplished by familiar means applicable to such mechanism, and is not necessary to be herein shown.

It sometimes happens, owing to the texture of the metal of the bolt, that the cutters in forming the thread produce and leave a slight burr upon the bolt, which so engages the cutters that they will not readily relieve from the bolt when the action of the spring I would tend to withdraw them. A single smart tap or blow upon the cutter-head or bolt, which will give a slight jar to the parts, will disengage the cutters in so far as they are held by this circumstance, and in order to cause such a blow automatically I provide the tappet P, which is secured to the flange H′ of the collar H, being fastened under the nut which secures one of the cams G to said collar, said tappet standing up in a direction about parallel to the direction of the latch L when it is in position out of engagement with the notch and just far enough from said latch so that the point N^{10} of the bracket-arm N′ will pass between the end of the latch L and the end of the tappet, and as the cutter-head advances, carrying the roll l of the latch L into the notch of the bracket N′, the stud P′, projecting from said bracket, strikes the tappet and jars the cams G, and through them the cutters C, sufficiently to disengage them from the thread which they are cutting, so that they

will immediately be relieved from it when the spring I has the opportunity to draw them away, as described.

I claim—

1. In combination with the head having the chamber a', the cams reciprocating longitudinally therein, the cutter-holding blocks engaged by said cams, the cams and blocks having the one a tongue and the other a groove oblique to the reciprocation of the cams, and the collar H, sliding on the stem of the head and connected to all the cams, whereby they may all be reciprocated longitudinally simultaneously and equally, substantially as set forth.

2. In combination with the head having the chamber a', the cams reciprocating longitudinally therein, and the cutter-holding blocks engaged by said cams, the cams and blocks having the one a tongue and the other a groove oblique to the reciprocation of the cams, the collar H, connected to the rear protruding end of the cams, and the spring I, interposed between the head and said collar and tending to force the collar away from the head, whereby the cutters are held normally removed from the center of the cutter-head, substantially as set forth.

3. In combination with the cutter-head, cams G, and cutter-holding blocks D, constructed substantially as described, the collar H, secured to the rear end of the cams, and the spring I, reacting between the collar and the head to force them apart, and the latch L, pivoted to the stem of the head and adapted to be moved into position behind the collar H when it is forced forward to compress the spring, substantially as and for the purpose set forth.

4. In combination with the cutter-head, the cutter-holding blocks D, and their actuating-cams G, the collar H, secured to the rear end of the cams, and the spring I, interposed between the collar and the head, and the latch L, pivoted to the stem of the head, the collar H, having the notch h in its rear edge adapted to receive the latch, and the spring L′, actuating the latch to hold it normally aside from the notch h, whereby when the collar is forced forward to actuate the cams and the cutter-blocks the latch L is caused to engage behind the collar and detain it forward, substantially as set forth.

5. In combination with the cutter-head and cutter-holding blocks therein, and the cams G, by which they are actuated, the collar H, which actuates said cams longitudinally with respect to the shaft and having the notch h in its rear edge, the turret to which the cutter-head is secured, the fixed cam K, eccentric to the axis of said turret and in position to engage the collar H at the rear as the turret is revolved, the latch L, pivoted to the stem A, and the spring L′, tending to actuate the latch aside from the notch h, whereby the revolution of the turret forces forward the collar H and the cams G and the latch L locks them forward, substantially as set forth.

6. In combination with the cutter-head having the devices which force the cutters toward the center, and the collar H, which actuates them, provided with a notch, h, the latch L, which locks said collar in the position in which it holds the cutters toward the center and adapted to enter said notch, the bracket N, fixed with respect to the bolt-holding chuck, and having the cam-faces n', located in the path of the latch L as the cutter-head advances toward the chuck, whereby the latch is tipped into position to enter the notch h, substantially as and for the purpose set forth.

7. In combination with the cutters having the aperture c, the bolt E, having the head adapted to enter said aperture, and its stem adapted to extend out through the same, the block D, having the rectangular aperture to receive the cutter, and the hole d' to admit the bolt, and the nut F, screwed onto the end of the bolt, substantially as and for the purpose set forth.

In testimony whereof I have set my hand this 20th day of September, 1888.

JOSIAH M. SIMPSON.

Witnesses:
A. L. UPTON,
ARTHUR JOHNSON.