(No Model.) 2 Sheets—Sheet 1.

A. WOOD.

BOLT CUTTER.

No. 375,037. Patented Dec. 20, 1887.

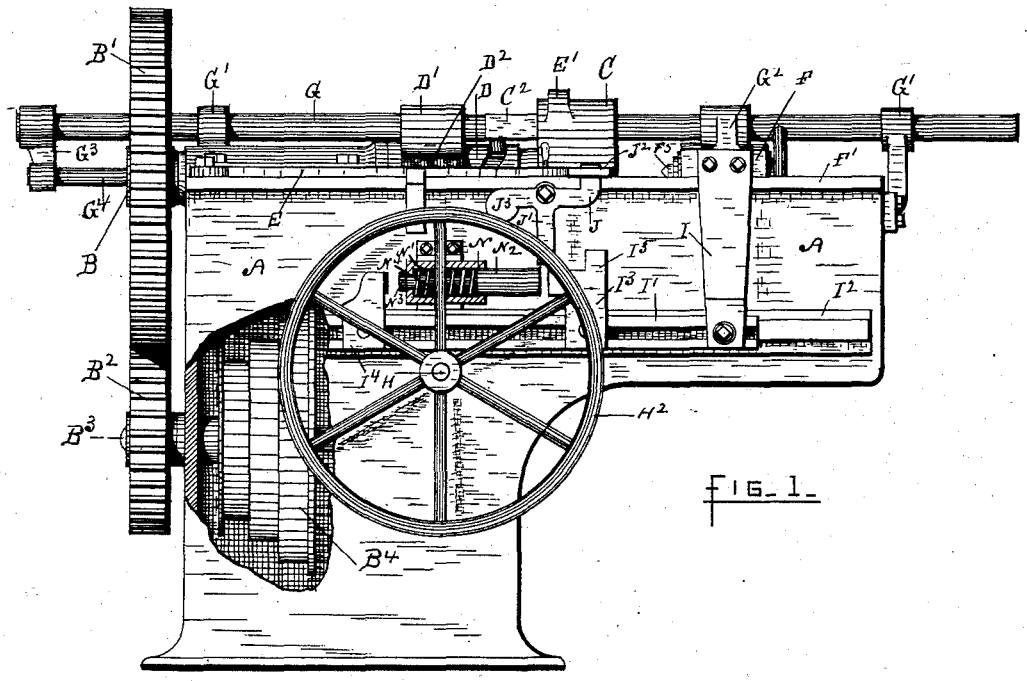

FIG. 1.

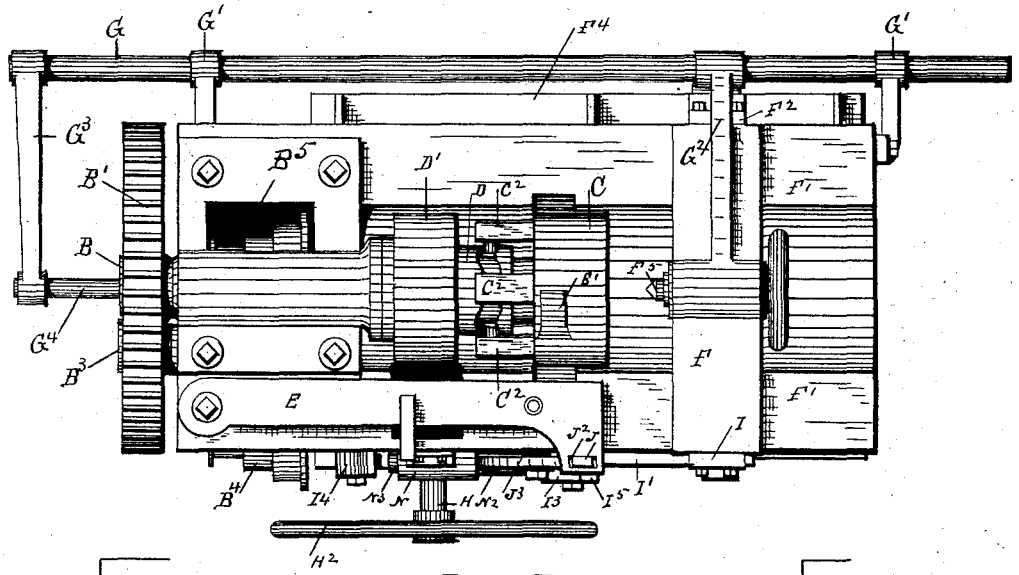

FIG. 2.

Witnesses.

H. M. Fowler.

S. McDonnell

Inventor.

Aaron Wood

By Rufus B. Fowler

atty.

(No Model.)

2 Sheets—Sheet 2.

A. WOOD.

BOLT CUTTER.

No. 375,037. Patented Dec. 20, 1887.

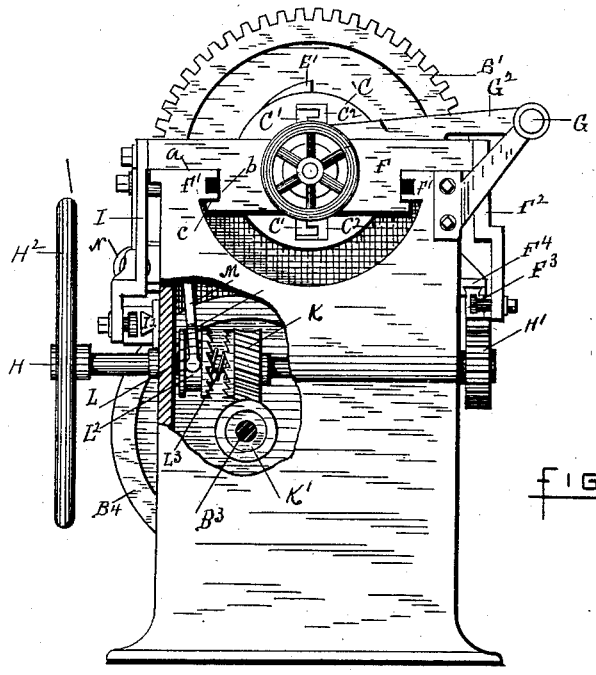

FIG. 3.

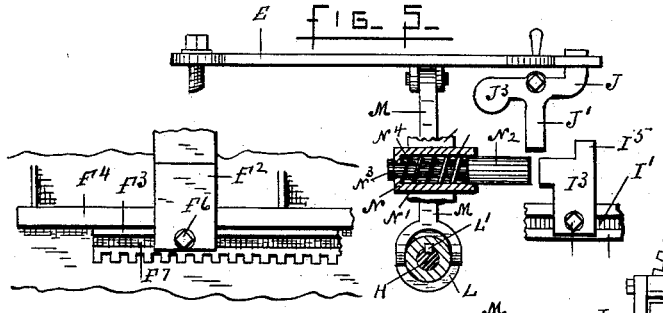

FIG. 5.

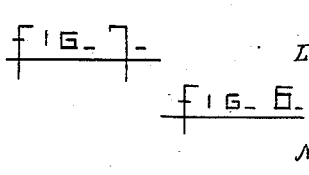

FIG. 7.

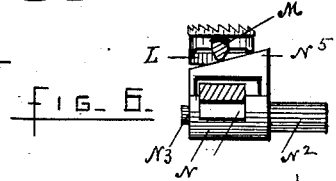

FIG. 6.

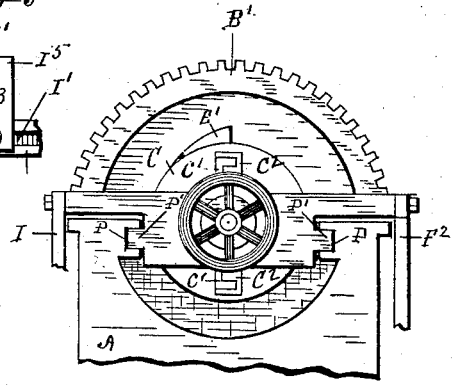

FIG. 4.

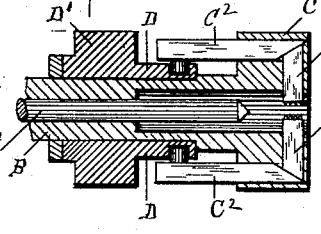

FIG. 8.

Witnesses.

H. W. Fowler

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Inventor.

Aaron Wood

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UNITED STATES PATENT OFFICE.

AURIN WOOD, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO GEORGE PLACE, OF NEW YORK, N. Y.

BOLT-CUTTER.

SPECIFICATION forming part of Letters Patent No. 375,037, dated December 20, 1887.

Application filed April 6, 1886. Serial No. 197,944. (No model.)

To all whom it may concern:

Be it known that I, AURIN WOOD, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Bolt-Cutters, of which the following is a specification, accompanied by drawings illustrating a bolt-cutter embodying my invention, and in which—

Figure 1 is a front view partly in section. Fig. 2 is a top view. Fig. 3 is an end view partly in section. Fig. 4 is a partial end view showing a "tail-stock" adapted to thread unfinished bolts. Fig. 5 is a detached view of a portion of the mechanism for automatically releasing the dies. Fig. 6 is a top view of the sliding plunger. Fig. 7 is a view of a portion of the rack by which the tail-stocks are moved along the ways, and Fig. 8 is a sectional view of the head and a portion of the revolving spindle.

Like letters refer to like parts in the several views.

My present invention is an improvement upon the bolt-cutter forming the subject of Letters Patent No. 79,714, granted to me on the 7th day of July, 1868, and Letters Patent No. 147,462, granted to me February 10, 1874, to which reference is made for a more detailed description of the part employed directly in the operation of threading a bolt.

My invention consists in providing two ways adapted to tail-stocks used for different kinds of work, and also in providing automatic means for releasing the bolt from the dies and reversing the motion of the tail-stock.

In the accompanying drawings, A denotes the bed or frame of the machine; B, a revolving spindle driven through the gears B′ B² from the shaft B³, which carries a cone-pulley, B⁴, with its front side projecting from the frame, and to which a belt is conducted through the rectangular opening B⁵ in the top of the machine.

C is a cylindrical head attached to the spindle and carrying the radially-sliding dies C′, each having an oblique mortise on one side fitting a corresponding tenon on the sliding keys C². Turning upon the spindle B is a cam-ring, D, with an attached disk, D′, having a ratchet-shaped projection, D².

Upon the top of the frame I pivot a latch, E, which is moved to engage the projection D² in the disk D′, and thereby check the revolution of the cam-ring D, while the continued rotation of the head C will cause the dies C′ to be opened when the latch is moved back and withdrawn from the notch D² by the action of the cam-shaped spur E′ on the head C. The construction and operation of this part of the machine is substantially the same as that patented to me in Patent No. 79,714, to which reference may be had for a detailed description of the construction and operation of this portion of the machine.

F is a tail-stock accurately fitting the ways F′ by having a bearing on the surfaces *a*, *b*, and *c*, Fig. 3, and having on the rear side of the machine an arm, F², by which the tail-stock is adjustably connected with a rack, F³, sliding in ways F⁴ on the side of the machine.

G is a rod sliding in the bearings G′, and connected, by an arm, G², with the tail-stock F, by which the rod G is moved in its bearings as the tail-stock moves along the ways F′. Through a yoke, G³, the rod G is connected with a sliding center, G⁴, which is held concentrically in the revolving spindle B. The construction and operation of this part of the machine are substantially the same as that patented to me on the 10th day of February, 1874, No. 147,462, to which reference may be had.

H is a transverse shaft carrying a pinion, H′, and a hand-wheel, H², by which the tail-stock is moved toward the head C in the operation of threading a bolt.

Upon the front of the machine an arm, I, connects the tail-stock with a bar, I′, which slides in ways I² on the side of the machine and carries the dogs I³ I⁴, adjustably attached to the bar I′. The dog I³ has an upward projection, I⁵, which, as the dog advances, strikes the arm J′ of the weighted latch J, which is pivoted on the bed of the machine, thereby withdrawing it from the mortise J² in the latch E, in which it is held by the gravity of its weighted arm J³. Turning loosely between collars on the transverse shaft H is a spiral gear, K, driven by a spiral gear, K′, on the driving-shaft B³.

Sliding on the shaft H and connected with it by a spline, L′, is a collar, L, provided on

its side with teeth which engage similar teeth on the side of the spiral gear and form a clutch by which the rotary motion of the spiral gear K is imparted to the shaft H. The collar L is also provided with a groove, L^2, containing the forked end of the lever M, whose upper end is pivoted to the under side of the latch E. Between the collar L and the spiral gear K, I place a spiral spring, L^3, which serves to maintain the collar apart from the gear K and prevent their clutch-teeth from engaging each other.

Sliding in ways attached to the front side of the machine is a bar, N, having a cylindrical chamber, N′, containing a sliding plunger, N^2, with a plunger-rod, N^3, and a spiral spring, N^4, whose tension is applied in a well-known manner to resist the entrance of the plunger into the chamber N′. To the rear side of the sliding bar N, I attach a wing, N^5, having an oblique edge resting against the lever M.

The operation of threading what is known as a "finished bolt," or one that has been reduced to a true cylindrical surface, is as follows: The tail-stock F is moved away from the head C by means of the hand-wheel H^2, transverse shaft H, pinion H′, and rack F^3 until the center G^4 in the spindle B protrudes beyond the head C. The bolt to be threaded is then placed between the centers G^4 and F^5, and the center F^5 advanced by means of its connected hand-wheel until the bolt is held between the centers in the same manner as "centered" work is usually held in ordinary metal-turning lathes. A lathe-dog is applied to the bolt to prevent it from turning; or the arrangement of cams for seizing the bolt, as shown in the Patent No. 147,462, may be employed. The tail-stock F is then moved along the ways toward the head C by means of the hand-wheel H^2 until the end of the bolt has been carried between the cutting-dies and the operation of cutting a screw-thread has begun, when the cutting-dies, acting as a rotating nut, will continue the feeding motion of the bolt. As the tail-stock F is moved along toward the head C, the bar I′ is also moved along its way on the front of the bed, carrying the dog I^3, which has been suitably adjusted on the bar I′, against the sliding plunger N^2, held in the bar N. As the bar N is prevented from sliding in its way by reason of the oblique edge of the wing N^5 resting against the lever M, the plunger N^2 will be forced into the chamber N′ in the bar N, compressing the spring N^4. The upper end of the lever M is held in position by being pivoted to the latch E, which is held by the latch J entering a mortise, J^2, in the latch E, and the lower end of the lever M is held by means of the spring L^3, whose tension is for this purpose made stronger than that of the spring N^4. The motion of bar I′ and its attached dog I^3, as the compression of the spring N^4 is being completed, will bring the projection I^5 of the dog I^3 against the arm J′ of the weighted latch J, turning the latch on its pivot and withdrawing it from the mortise in the latch E, allowing the force of the spring N^4 to move the bar N and wing N^5 past the lever M, the oblique edge of the wing carrying the lever M inward and moving the latch E forward in position to be engaged by the projecting lip D^2 on the disk D′, thereby checking the rotation of the cam-ring D and opening the dies, by means of the mechanism fully described in the Patent No. 79,714, above referred to. The continued rotation of the head C will bring the cam-shaped spur E′ in contact with the latch E, moving it outward and disengaging it from the ratchet-shaped projection D^2 on the disk D′. As the latch E is moved outward by the action of the spur E′, it will carry with it the end of the lever M, and as the center of the lever is held by the wing N^5, which now serves as a fulcrum, the lower end of the lever M will be moved inward, carrying the collar L toward the gear K, compressing the spring L^3 and causing the teeth on the rotating gear K to engage the teeth on the collar L, thereby imparting a rotary motion to the shaft H and reversing the motion of the tail-stock F and its connected parts and withdrawing the bolt from the cutting-dies. As the tail-stock is moved back, the dog I^4 is brought in contact with the plunger-rod N^3, moving the bar N and wing N^5 past the lever M into the position shown in Fig. 6 and allowing the tension of the spring L^3 to separate the collar L from the gear K, thereby stopping the reverse motion of the shaft H and tail-stock F.

The above-described operation of threading bolts is adapted to those bolts which have been reduced to a cylindrical surface, or those known as "finished" bolts. When it is required to thread unfinished or "rough" bolts, the center G^4 is not used, and in place of the center F^5 in the tail-stock a chuck is used, by which the bolt is seized by its head and the end presented to the action of the cutting-dies. Instead of a tail-stock which is moved along accurately-fitting ways, which are necessary in the case of finished bolts in order to preserve a true alignment of the bolt, I use in the case of rough bolts a tail-stock which is capable of a slight lateral motion, allowing the tail-stock to work on the ways to accommodate itself to the irregularities of the bolt. This is common in all bolt-threading machines, and therefore it has been customary in machines of this class to employ a separate machine for finished and rough bolts, as the motion of the tail-stock on its ways in threading rough bolts would soon wear the surface of the way out of truth and destroy its accuracy for threading finished bolts.

I am able to do both kinds of work on the same machine by providing, in addition to the ways which are formed by the surfaces *a b c*, the grooves P, and in providing a tail-stock with tongues P′, Fig. 4, fitting loosely in the grooves P, so as to allow the necessary motion of the tail-stock.

For convenience in adjusting the position of

the tail-stock and the releasing mechanism to suit bolts of varying lengths, I attach the rack F^3 to the arm F^2 by means of a bolt, F^6, whose head is held in a T-slot, F^7, in the rack, allowing the rack to be adjustably attached to the tail-stock.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a bolt-threading machine, the combination, with mechanism for forming a screw-thread and mechanism for holding and presenting the bolts to the action of the screw-forming mechanism, of a bed having two ways adapted for separate and independent bolt-holding devices, substantially as described.

2. In a bolt-threading machine, the combination of hand-wheel H^2, transverse shaft H, pinion H′, and rack F^3, said rack being adjustably attached to the tail-stock, as and for the purpose set forth.

3. In a bolt-threading machine, the combination, with a tail-stock having an attached rack, of shaft H, pinion H′, gear K, and sliding collar L, each having teeth forming a clutch, gear K′, and driving-shaft B^3, as and for the purpose set forth.

4. In a bolt-threading machine, the combination, with mechanism for opening the dies, substantially as described, of a pivoted latch, E, and mechanism actuated by the tail-stock, substantially as described, by which the latch E is made to engage and operate the die-opening mechanism.

5. In a bolt-threading machine, the combination, with the latch E, of the lever M, clutch L, weighted latch J, sliding bar N, having a wing, N^5, plunger N^3, spring N^4, and actuating mechanism attached to the tail-stock, substantially as described.

6. In a bolt-threading machine, the combination, with actuating mechanism for opening the dies and reversing the motion of the tail-stock, of a bar attached to the tail-stock and a dog adjustably attached to said bar, whereby said actuating mechanism is operated at any desired position of the tail-stock, substantially as described.

7. In a bolt-threading machine, the combination, with the latch E, lever M, and sliding clutch L, of the sliding bar N, having a wing, N^5, plunger N^3, spring N^4, weighted latch J, and dogs I^3 and I^4, said dogs being adjustably attached to a bar, I′, connected with and moved by the tail-stock of the machine, substantially as described.

AURIN WOOD.

Witnesses:
ELIZA C. WOOD,
EDWARD S. BEACH.