F. WATKINS.

Machine for Tapping Bolts.

No. 45,452. Patented Dec. 13, 1864.

Fig. 1,

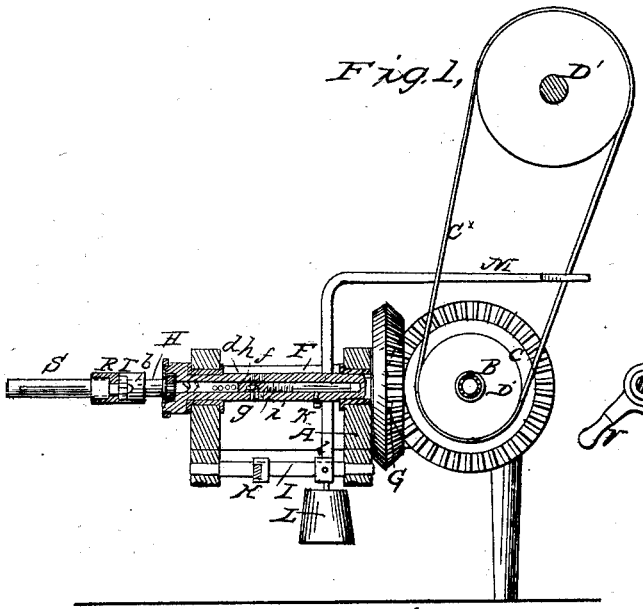


Fig. 3,

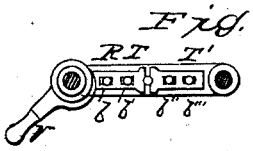


Fig. 3.

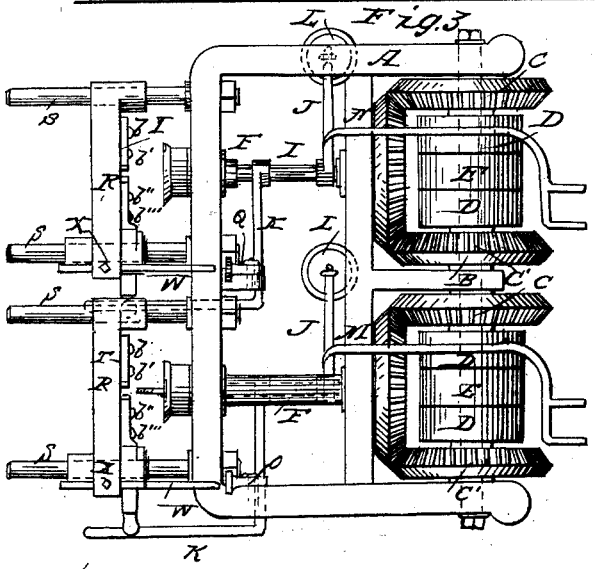
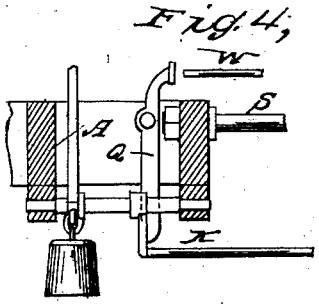


Fig. 4,



Witnesses.
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UNITED STATES PATENT OFFICE.

F. WATKINS, OF LONDON WORKS, IN BIRMINGHAM, ENGLAND.

MACHINE FOR TAPPING BOLTS.

Specification forming part of Letters Patent No. **45,452**, dated December 13, 1864.

To all whom it may concern:

Be it known that I, F. WATKINS, of London Works, Birmingham, England, have invented a new and Improved Machine for Cutting Screw-Threads upon Bolts and for Tapping Nuts; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a transverse vertical section of this invention. Fig. 2 is a plan or top view of the same. Fig. 3 is a detached elevation of the clamping device. Fig. 4 is a detached sectional view of the automatic belt-shipper.

Similar letters of reference indicate like parts.

A represents the main frame of the machine, which is made in any convenient form and supported by the legs *a a a*, or any convenient device. This frame forms the bearings for a stationary shaft, B, which is made hollow for the purpose of conveying oil to the bearings of the wheels and pulleys.

C C′ are bevel-wheels, which turn loosely on the shaft B and to which motion is imparted by the pulleys D D′, which are firmly connected to the same and revolve with them on the shaft B, being driven by a suitable belt, C*, from the line-shaft D*.

E E are loose pulleys, which are situated between the pulleys D D′ and support the belt C* when the machine stops. To effect this purpose the weight or spring which governs the position of the belt-shipper has to be disconnected and the belt shipper shifted to the requisite position by hand.

The bevel-wheels C C′ gear into a corresponding bevel-wheel, G, mounted on one end of the hollow shaft or mandrel F, which rotates in suitable bearings in the frame A, and the opposite end of which is supplied with a square socket to receive the die H or a suitable chuck for holding the taps. Two or more such shafts or mandrels are arranged side by side in one and the same frame, so that one operator is enabled to attend simultaneously to two or more devices. The belts C*, which impart motion to these mandrels, are shifted, if desired, by the forked arms M of the bell-crank levers J M, which are attached to rock-shafts I that have their bearings in suitable boxes below the mandrels F.

The arms J of the bell-crank levers J M are loaded with weights L, and arms K, which are firmly secured to the rock-shafts I, are bent at right angles and extend out in front of the machine, so that they can be conveniently reached by the operator, or, if desired, said arms may be made to connect with suitable treadles to be operated by the feet.

The levers or arms K are held in a horizontal position, or nearly so, by the action of the pawls Q, which are hinged to suitable lugs or ears projecting from the inner surface of the front cross-bar of the frame A. When these pawls are pushed back, the weights L turn the bell-crank levers J M in the direction of the arrows marked near them in Fig. 2, and the belts C* are carried to the pulleys D. By depressing the arms K so that the same will be held by the pawls Q the belts are shifted to the pulleys D′ and the motion of the mandrel is reversed.

The bolts to be cut or, if desired, the taps used for tapping, are secured in jaws T T′, which are secured in carriages R, moving on slides S. The jaws T T′ are adjusted and secured to the slides by bolts *b b′ b″ b‴*, (see Fig. 3,) or one of said jaws may be firmly secured in the required position and the other operated by the cam U and hand lever V. The bolts *b b′*, &c., pass through oblong slots in the jaws, so that the latter can be moved closer together or farther apart, according to the thickness of the article to be placed between them, and after said article has been adjusted in the proper position it is clamped by the action of the hand-lever V and cam U on the end of the jaw T.

Adjustable rods W, secured in the brackets X, which rise from the carriages R, serve to release the pawls Q automatically as soon as either of the carriages has moved to the desired point.

For the purpose of pointing and chamfering the bolts a tool, Y, is used, which is secured to a shank, Z, in the interior of the hollow mandrel F, as clearly shown in Fig. 1 of the drawings. As the point or cutting-edge of the tool wears away, the pin *d*, which connects the same with the shank Z, is changed into either of the holes *e e′ e″ e‴* and nearly the whole of the cutting-tool can be used.

The shank Z is held in place by a pin, *f*, which passes through a hole, *h*, in the mandrel F and through a slot, *g*, in said shank, causing the same, together with the cutting-tool, to revolve with the mandrel, but allowing it to move freely backward and forward. The pin *f* can be adjusted by placing it in either of the holes *h*. A spring, *i*, which bears on an adjustable stop, *k*, in the mandrel forces the shank and the tool in the direction of the arrow marked thereon in Fig. 1.

The operation is as follows: When the head of the bolt is secured between the jaws T T′, the machine is put in motion by throwing the belt on the pulley D′, which is accomplished by depressing the lever K until it is caught by the pawl Q. The carriage is then slid up until the bolt enters the die, and if a right hand die is used and the motion of the mandrel is from right to left, a thread is formed on the bolt, and the bolt together with the carriage is drawn toward the machine so long as the mandrel continues to revolve in that direction. As the carriage is drawn in the inner end of the rod W comes in contact with the upper end of the pawl Q, forcing the same back and releasing the lever K, so as to allow the weight to fall and throw the band on the pulley D. The motion of the machine being thereby reversed, the screw is caused to back out of the die, from which it may be removed and the operation repeated.

When it is desired to point the bolts, the cutting-tool Y is properly adjusted within the mandrel F, and the bolt as it comes through the die comes in contact with the cutting-edge of said tool, which cuts off the corners as required. It will be seen that if the tool Y was rigid in the mandrel the chip taken by the cutting-tool would be equal to the thread of the screw, and to avoid such a result the tool is free to slide back, being held only by a spring, *i*. By this arrangement the tool is enabled to take only the proper cut, and allowance is made for a certain amount of variation in the length of the bolts.

To arrange the machine for tapping nuts, a chuck for holding the taps is used in place of the die, the nuts are held by the grip-jaws T T′, and the machine is operated similar to other well-known machines used for the purpose.

The object in using one side of the machine for screwing and the other for tapping is that the operator will more readily detect any imperfection or wear in the taps or dies, insuring a perfect fit to the nut and bolt.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The arrangement of the levers, weights, and pedals, substantially as herein described, for the purpose of reversing the motion of the machines.

2. The gripping device, constructed as herein described and shown, for holding round headed bolts and "stud ends."

3. The hollow stationary axle, in combination with the fast pulleys connected firmly to the hubs of the bevel-wheels and with the loose pulley running loosely on said axle, substantially as and for the purpose specified.

4. The yielding cutting device, arranged substantially as herein set forth, for the purpose of cutting or chamfering the ends of the bolts during the process of threading.

F. WATKINS.

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