(No Model.) 2 Sheets—Sheet 1.

E. & H. L. AMENT.

SCREW THREAD CUTTING MACHINE.

No. 454,197. Patented June 16, 1891.

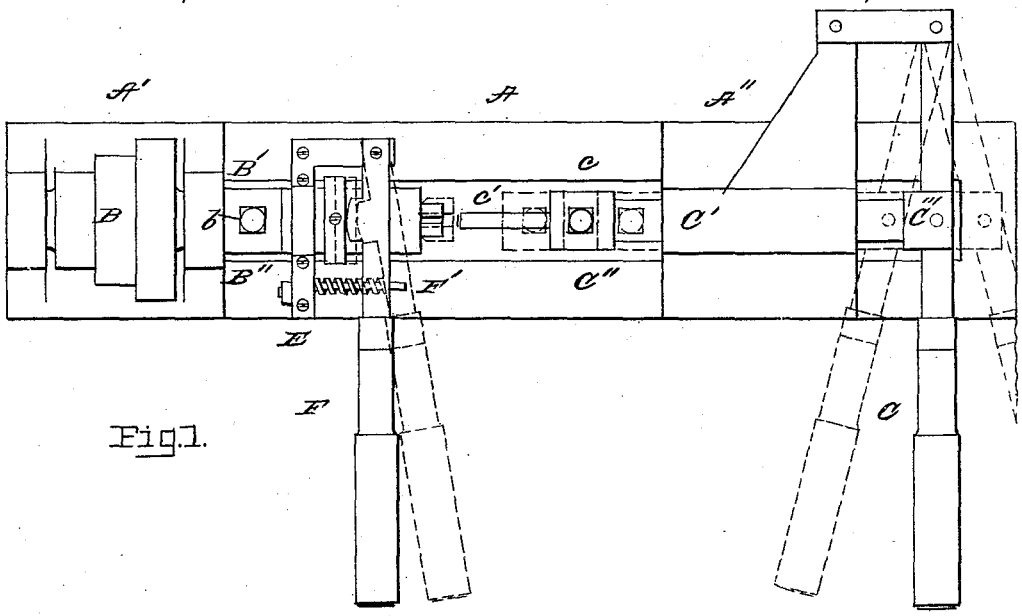

Fig. 1.

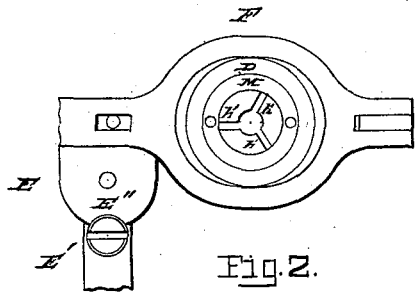

Fig. 2.

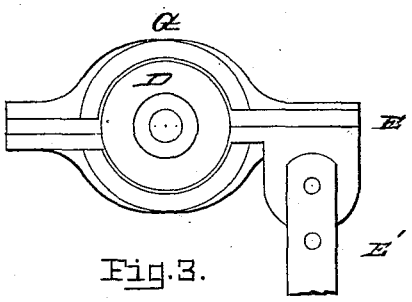

Fig. 3.

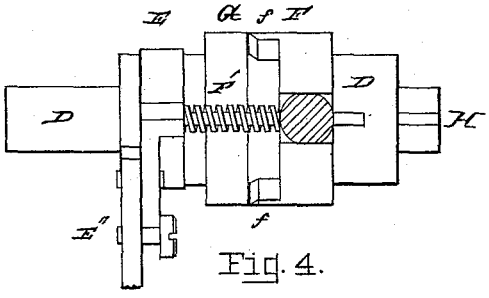

Fig. 4.

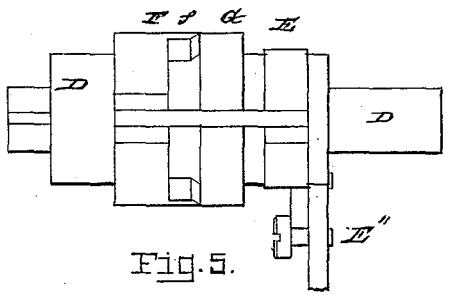

Fig. 5.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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SCREW THREAD CUTTING MACHINE.

No. 454,197. Patented June 16, 1891.

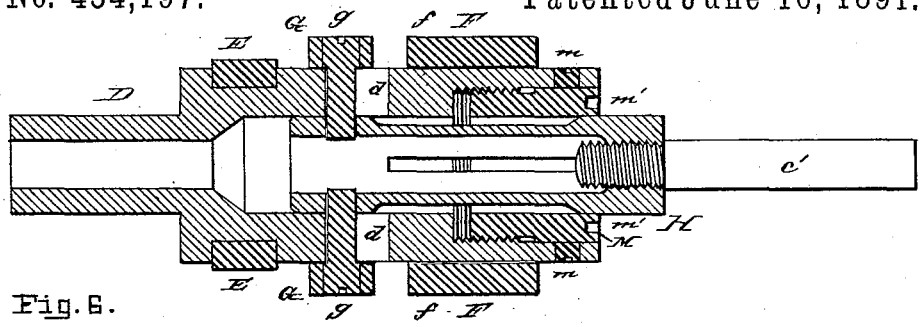

Fig. 6.

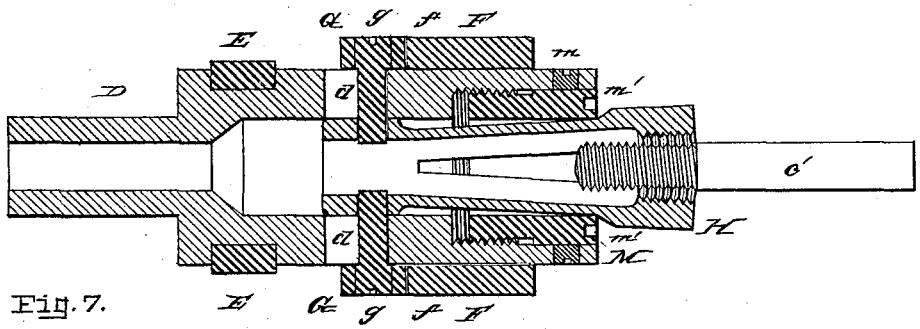

Fig. 7.

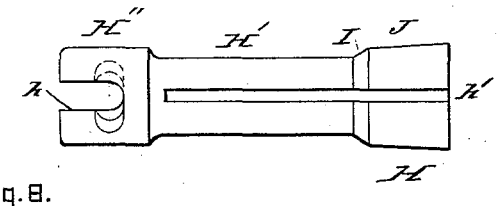

Fig. 8.

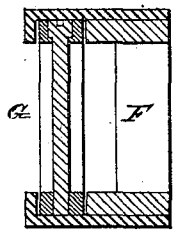

Fig. 9.

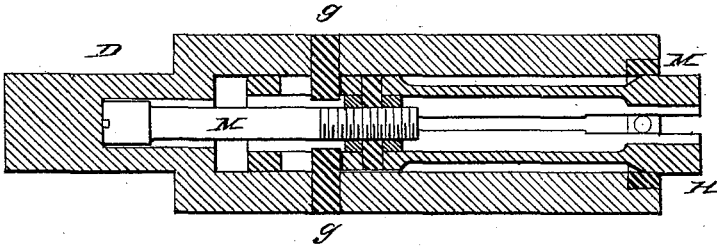

Fig. 10.

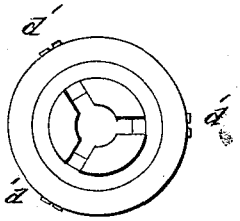

Fig. 11.

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UNITED STATES PATENT OFFICE.

ELZIE AMENT AND HERBERT L. AMENT, OF ROGERS PARK, ILLINOIS.

SCREW-THREAD-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 454,197, dated June 16, 1891.

Application filed February 25, 1890. Serial No. 341,765. (No model.)

To all whom it may concern:

Be it known that we, ELZIE AMENT and HERBERT L. AMENT, citizens of the United States, residing at Rogers Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Screw-Thread-Cutting Machines, of which the following is a specification.

Our improvements relate to rapidly-revolving devices driven by steam-power, not to such as perform a certain number of revolutions forward in cutting the thread and then the same number of revolutions backward to discharge the bolt, but to such as revolve continuously forward and in which the discharge of the bolt is procured by an automatic opening of the die and the bolt instantaneously withdrawn.

The die in common use is usually made of two or more pieces, each piece being separately guided by one or more pairs of faces perpendicular to the plane of the axis of the die. They are produced at great cost. Small dust or chips are carried by centrifugal force into the broad and closely-fitting bearings, obstructing their action, and the many projections of the large revolving head make the attendant's proximity thereto dangerous. They are also bulky, unwieldy, and heavy, and adapted, usually, only to machines especially made for the purpose.

The objects of our improvements are, first, to overcome the difficulties above enumerated; second, to provide a tubular die carried in a tubular stock revolving continuously forward to adapt the jaws thereof to be opened and closed to release the bolt and to provide suitable means of opening and closing them and of keeping them open when open and keeping them closed when closed, and, third, to furnish a suitable means for taking up the wear and also render the die slightly adjustable as to size. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the machine with the parts applied together for use. Fig. 2 is a front end view. Fig. 3 is a rear end view. Fig. 4 is a front side view, and Fig. 5 is a rear side view, of a detached portion. Fig. 6 is a central vertical longitudinal section of Fig. 4. Fig. 7 is an exact duplicate of Fig. 6, except that the latter shows the relations of parts with the die closed, while the former shows the relations of same with the die open. Fig. 8 is a side view of the tubular die by itself. Fig. 9 is a vertical section of the collar and lever shown in Fig. 4, except that a single screw is employed in the place of two in the collar, and the lever, by means of hooks, has a bearing upon both sides of the collar, and by means of which the lever may upon occasion be employed to open the die as well as to close it. Fig. 10 is a central vertical longitudinal section; and Fig. 11 is an end view of certain of the features of Fig. 6, but differently applied, and also an additional feature, all of which will be more particularly referred to hereinafter.

Similar letters of reference indicate like parts in all the drawings.

Although our improvements are equally applicable to lathes and to screw and bolt machines generally, they are applied in Fig. 1 to a speed-lathe, in which A is the bed, A′ the head-stock, and A″ the foot-stock. B is the cone-pulley, B′ the spindle, B″ the spindle-socket, and *b* the socket set-screw. C is the foot-stock lever, C′ its spindle, C″ the spindle-socket, and *c* the socket set-screw. The lever C is pivoted in the rear end of the spindle C′, and the farther end linked to an arm of the foot-stock, as represented. One end of the tube D is reduced and secured in this case in the socket B″, and has upon one end of the larger portion an annular groove upon which is secured the box E, the former being allowed to revolve freely in the latter. The lever F, having an oblong aperture through which passes the tube D, is pivoted at the farther end to an arm of the said box E, and is held in a horizontal position by a leg E′, standing upon the lathe-bed, the upper end of which is hinged to the said box in front and firmly secured in position by the clamp-screw E″. The hinge permits the leg to be folded up parallel with the handle of the lever, and also to adapt it to lathes of different swing and width of bed, provided the leg be long enough to pass beyond and rest upon the corner of the bed. The spring F′ is carried upon a rod, one end of which is set firmly in the box E and the other end projected through a slot in the lever F, as shown,

and which spring is adapted to throw the lever to the right and to always keep it at that limit of its movement when not in use. The lever F has two cams *f f* formed upon the left-hand side, one above and one below the tube D, adapted to strike the movable collar G at two opposite points. The collar G carries the threaded part of two screws *g g*, each of which projects through a longitudinal slot *d d* in the tube D, upon opposite sides thereof, and thence into holes *h h* in the rear part of the die H. Said holes are open in this instance upon one side, and which opening of each turns at a right angle and is cut through to the rear end of the die, as shown in Fig. 8. By virtue of the outlets turned thus at a right angle the die by a slight turn in the stock is in a position to be withdrawn and by reverse movement returned without removing the screws or screw, as in Fig. 9, if but one be employed.

The tubular die H is of one piece. The exterior of the rear end is large enough to fill the tube D at a movable fit, and the exterior of the front end is formed with two conical faces I J, facing backward, the former at an angle of about forty-five degrees and the latter at only a slight angle—so slight that it is nearly a cylindrical face. The exterior of the middle portion is turned down small enough to allow the jaws to open sufficiently to release the bolt, as shown in Fig. 7. The middle and rear portions of the interior are bored out large enough to be below the plane of the teeth formed upon the interior of the front end and allow also some space for chips. The stock of the middle portion should also be left the proper thickness for springs for the same when the tube shall have been divided by incisions *h' h' h'* into jaws. The jaws are finally spread and tempered, the spring portion being given a spring temper and the toothed portion a die temper. The preferable process is to cut the incisions, spread the jaws, temper the spring portion, and finally tap and temper the toothed portion; also, the preferable form of spring and jaw is a tube of larger external diameter and a deep scallop for the spring next to the pluuger-head, and which, being in use in split jaws for various purposes, need not be further illustrated in this connection. The outer end of the tube D is counterbored and the counterbore refilled by a screw-shell or bushing M, a portion of each of which is threaded. The unthreaded portion of the tube carries one or more set-screws *m m*, which seize upon the unthreaded portion of the bushing. This bushing receives the wear which would otherwise come upon the tube D, and is adapted, by means of a wrench fitted to holes *m' m'*, to be turned in or out upon the slightly-inclined face J, Fig. 8, for the purpose of taking up the wear and also for the purpose of rendering the die slightly adjustable as to size. Turning the screw-shell M in and out virtually shortens and lengthens the tube relative to the die.

In Fig. 10 the relations of the tube and die are in certain respects reversed. The adjusting-screw and bushing are separate. The adjusting-screw is applied to the die. The slots *d d* are cut in the die. The screws *g g* are secured in the tube and do not move with the die. The relations of certain other parts are also reversible; but the principles both of those shown and those not shown are preferably applied in Figs. 1 and 6.

In Fig. 6 the die is driven by the screws or pins *g g*, projected into the plunger-head H'''; but in Fig. 10 they are assisted by screws or pins *d' d' d'*, projected between the jaws of the die-head, and which obviate the necessity of proportionately strong springs H'' in a large die.

The operation of the machine is substantially as follows: The machine, as represented in full lines in Fig. 1, is in readiness to proceed to thread a bolt. The attendant, by means of the lever C, introduces the end of the bolt *c'* into the rapidly-revolving die H, which readily catches on and cuts an additional thread at each revolution. The bolt thereby continues to feed into the die until the stop or shoulder C''' reaches the footstock, at which juncture (see Fig. 6) the bolt ceases to feed farther, and the die then begins to feed onto the bolt and continues so to do until the parts I J are drawn out of the tube far enough to allow the spring of the jaws to open the die and release the bolt, as shown in Fig. 7. The attendant then by a backward movement of the lever C quickly withdraws the bolt, removes it from the socket, and inserts another, and having by means of the lever F, through the medium of the cams *f f*, collar G, and screws *g g*, thrown the die back into the tube, thereby closing it, is in readiness to proceed as before.

It will be observed that the conical face I closes the die, but the latter is held closed solely by the cylindrical face J; that the movement of the die in being opened and closed is strictly a longitudinal one relative to the tube D; that the device has an unobstructed central space which may be utilized in threading screws or rods of unusual length, and that the device may be used while in revolution, reciprocation, revolution and reciprocation combined, or in axial and reciprocal silence.

Having now fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a thread-cutting device, a stock-tube carrying a tubular threading-die the jaws of which are opened by a reciprocation of the die forward and spring of jaws and held open by spring of jaws and closed by a reciprocation of the die backward and an inclined face of jaw and held closed by a cylindrical or otherwise slightly-inclined face of jaw and portion of tube surrounding same, substantially as and for the purpose set forth.

2. In a thread-cutting device, a tubular

stock carrying a tubular threading-die, one end of the latter being divided by longitudinal incisions into spring-jaws, and the automatic reciprocation of the die forward produced by the feeding of the die onto the longitudinally-silenced bolt, substantially as and for the purpose set forth.

3. In a thread-cutting device, a tubular stock carrying a tubular die of one piece, a portion thereof being divided longitudinally into spring-jaws, and the reciprocation of the die backward produced by means of a lever, collar, and screws, substantially as and for the purpose set forth.

4. In a thread-cutting device, the combination of a stock-tube with a tubular die longitudinally guided therein, each jaw thereof having a spring and cam-face and the die reciprocated backward by means of a lever adapted to be shifted by the attendant, substantially as and for the purpose set forth.

5. In a thread-cutting device, a tubular die having a plunger-head united by springs to the jaws of a die-head, the exterior of said die-head being formed with one conical and one cylindrical face, the said springs being adapted to open the jaws and to hold them open, and the said conical face to close the jaws and the said cylindrical face to hold them closed, substantially as and for the purpose set forth.

6. In a thread-cutting device, a stock tube or barrel carrying a tubular die, the plunger-head of which is united by springs to the jaws of the die-head, the exterior of the die-head also being formed with one conical and one cylindrical or otherwise slightly-inclined face, the latter in conjunction with an adjusting-screw adapted to take up the wear and to adjust the die slightly as to size, substantially as and for the purpose set forth.

7. In a thread-cutting device, the combination of the tubular stock D, tubular die H, two or more spring-jaws H′ H″, conical face I, and cylindrical face J, substantially as and for the purpose set forth.

8. In a thread-cutting device, the combination of the tubular stock D, tubular die H, two or more spring-jaws H′ H″, conical face I, cylindrical or otherwise slightly-inclined face J, bolt *c′*, the latter as one of the means employed in the extraction of the die, and stops C‴, substantially as and for the purpose set forth.

9. In a thread-cutting device, the combination of the tubular stock D, tubular die H, spring-jaws H′ H″, inclined faces I J, lever F, collar G, screws *g g*, and slots *d d*, substantially as and for the purpose set forth.

10. In a thread-cutting device, the combination of the tubular stock D, tubular die H, spring-jaws H′ H″, inclined faces I J, and combined adjusting-screw and bushing M, substantially as and for the purpose set forth.

11. In a thread-cutting device, the combination of the tubular stock D, tubular die H, spring-jaws H′ H″, inclined faces I and J, and adjusting-screw M, substantially as and for the purpose set forth.

12. In a thread-cutting device, the combination of the tubular stock D, lever F, bar E, and support E′, substantially as and for the purpose set forth.

13. In a thread-cutting device, the combination of the stock tube or barrel D, plunger-head H‴, springs H″, die-jaws H′, and the inclined faces I and J, substantially as and for the purpose set forth.

14. In a thread-cutting device, the combination of the tube D, tubular die H, slots *d d*, and pins or screws *g g*, substantially as and for the purpose set forth.

15. In thread-cutting devices, the combination, in a tubular die, of the plunger-head H‴, springs H″, jaw-head H′, inclined faces I J, and holes *h h*, having outlets, substantially as and for the purpose set forth.

16. In a thread-cutting device, the combination of the stock-tube D, tubular die H, spring-jaws H′ H″, inclined faces I J, and lever F, substantially as and for the purpose set forth.

17. In a thread-cutting device, the combination of the tubular stock D, tubular die H, spring-jaws H′ H″, inclined faces I J, and driving screws or pins *d′ d′ d′*, substantially as and for the purpose set forth.

18. In a thread-cutting device, the combination of the tubular spindle B′, tubular stock D, and tubular die H, substantially as and for the purpose set forth.

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HERBERT L. AMENT.

Witnesses:
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S. E. AMENT.