

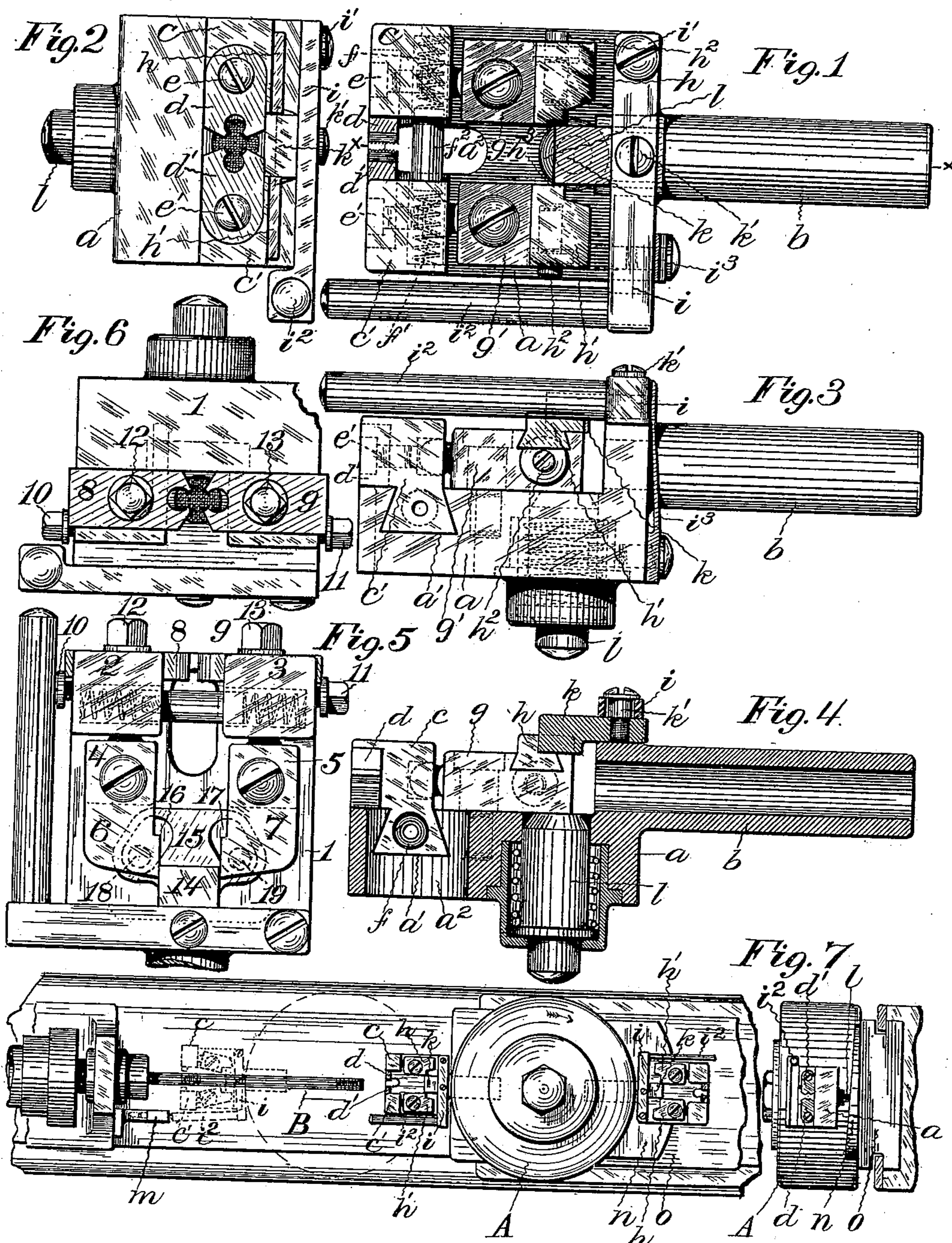
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Patented Oct. 17, 1899.

E. H. WILLIAMS.  
SCREW CUTTING TOOL.

(Application filed Aug. 16, 1898.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## SCREW-CUTTING TOOL.

SPECIFICATION forming part of Letters Patent No. 635,272, dated October 17, 1899.

Application filed August 16, 1898. Serial No. 688,693. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN H. WILLIAMS, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented a certain new and useful Screw-Cutting Tool, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

My invention relates to a device for cutting screw-threads, and is particularly adapted for use in the many forms of turret-head screw-lathes or other metal-working machines in which the stock and tools are fed toward each other in the same axial line during the cutting operation.

The object of my invention is to provide a device having the cutting-die formed of separable sections which will be securely and positively held in proper alinement during the cutting operation and instantly released and separated when a predetermined length of thread has been cut, thus allowing a rapid withdrawal of the tool from the stock upon which it has been operating; further, to provide positive automatic means for operating the sections of the die both in their opening and closing movements.

To this end my invention consists in the device as a whole, in the combination of the parts, and in the details of such parts and their combination, as hereinafter described, and more particularly set out in the claims.

Referring to the drawings, Figure 1 is a plan view of the device. Fig. 2 is an end view of the parts shown in Fig. 1, looking from the left. Fig. 3 is an edge or side view. Fig. 4 is a sectional view on the line  $xx$  of Fig. 1. Fig. 5 shows a plan view of a modified form of the device. Fig. 6 is an end view of the device shown in Fig. 5, looking toward the cutting-dies. Fig. 7 is a plan and end view of a portion of a metal-working machine, showing my improvement attached to the turret to illustrate its operation.

In the accompanying drawings the letter  $a$  denotes the base or support, terminating at one end in a hollow shank  $b$ , suitably formed to be inserted and held in a tool-holder such as is provided in the turret of an ordinary lathe. This support  $a$  has near its forward

end an angular slideway  $a'$ , adapted to control the movement of and retain the slide-blocks  $c$   $c'$ , insuring the latter against all movement whatever except in a line at right angle to the axis of the stock. A portion of the base  $a$ , between the slide-blocks and below and in the rear of the cutters, is cut away, as at  $a^2$ , allowing free egress to chip or other waste material liable to collect and clog the operation of the device. Cutter-sections  $d$   $d'$  are secured to these slide-blocks in any suitable manner, as by screws  $e$   $e'$ , the slide-blocks being preferably mortised to provide a firm seat for the cutter-sections. The slide-blocks, with their cutter-sections, when allowed free movement are forced apart along the slideway  $a'$  by springs  $f$   $f'$ , coöperating with a spring-plug  $f^2$ . The latter being of sufficient length to extend within the slide-blocks acts both as a supplemental guide and stiffener for the blocks. It will be readily seen from this construction and arrangement of the slide-blocks and opening-springs that the instant the trip-block hereinafter described releases the slide-blocks there is absolutely nothing to prevent an instantaneous and unrestrained separation of the slide-blocks and cutter-sections.

Levers  $g$   $g'$ , pivoted to the support  $a$  and having ball-and-socket connections with the slide-blocks  $c$   $c'$ , respectively, confine the latter, with the cutter-sections, to certain positions. The exact position and adjustment of the slide-blocks and cutters, however, are determined by the position of the adjustable stop-plates  $h$   $h'$ , coöperating with the trip-block  $k$ . These plates have a lateral adjustment on their respective levers, slideways being provided in the levers, in which the plates are moved and adjusted, as by screws  $h^2$ . The inner edges of the plates are cut away, abrupt shoulders being thus formed, as at  $h^3$ . When the cutter-sections are in their closed or cutting position, the shoulders  $h^3$  rest against the trip-block  $k$ , a firm and rigid connection being thus formed to hold the cutters against separation.

A trip-lever  $i$ , pivoted to the support, as at  $i'$ , and having an extension  $i^2$ , transmits the proper movements to the trip-block  $k$  through the medium of a stud  $k'$ . This trip-block  $k$

moves in a suitable slideway formed in the support *a* and is normally forced forward to engage the shoulders *h*<sup>3</sup> of the stop-plates by the spring *i*<sup>3</sup> bearing against the trip-lever *i*.

5 The letter *l* denotes the closer. It consists of a spring-pressed plug mounted within a suitable retainer in the support and provided with a cone-shaped head adapted to engage and force apart the levers *g g'*, together with  
10 the stop-plates, upon coming in contact with a suitable cam-surface. As will be readily seen, as soon as the stop-plates are forced apart a sufficient distance the trip-block, under the action of the spring *i*<sup>3</sup>, will be forced  
15 forward to engage and lie between the shoulders *h*<sup>3</sup>.

In the modified form of my invention shown in Figs. 5 and 6 the base or support 1 has slide-blocks 2 3 and operating-levers 4 5  
20 mounted upon it in the same manner as in Fig. 1. The stop-plates 6 7 in this form are integral with the levers 4 5. The cutter-sections 8 9 are mounted in suitable slideways formed in the slide-blocks and are moved and  
25 adjusted by screws 10 11. Set-screws 12 13 are employed to lock the cutter-sections after they are once properly adjusted. The trip-block 14 has an extension 15 underlying the stop-plates and provided with guide-slots 16 17.  
30 Pins 18 19, fast in the under side of the stop-plates, project within these slots, and thus form a positive guide for the levers 4 5 in their opening and closing movements.

It is obvious that in either of the forms  
35 shown cutter-sections forming dies of various sizes may be used. The attachment and adjustment of these cutter-sections being easily and quickly made, a device is obtained which may be used for cutting threads of various  
40 sizes and of different pitch, a single device doing the work which would ordinarily require several separate and costly tools.

The operation of the device is as follows: Referring to Fig. 7, the cutter-sections being  
45 closed the hollow shank of the tool is inserted and clamped in one of the tool-holders of the turret A, which is adapted to be moved or fed toward the stock B until the required work has been performed upon said stock,  
50 then retracted and revolved until a second tool has been brought into proper position to be fed toward the stock. As the turret and tool are moved forward the stock B is rotated rapidly and as it comes in contact with  
55 the cutting-die a thread is formed upon the stock. When a predetermined length of thread has been cut, the extension *i*<sup>2</sup> of the trip-lever *i* comes in contact with an adjustable stop *m*, located at a fixed point on the machine. The trip-block *l* is forced from be-  
60 tween the shoulders of the stop-plates, and the cutter-sections being absolutely unrestrained as to outward movement are instantly forced apart and out of engagement  
65 with the stock, as shown in dotted outline. The turret now retracts, and during its revolution the cutter-sections now open are reset

as the closer-plug *l* is forced upward by a cam-surface *n*, located on the turret-slide *o*. From the construction of the device as here shown 70 it will be readily seen that the timing of the opening of the die may be adjusted to a nicety. Moreover, the cutting-die being located at the extreme front of the device and having its cutter-sections movable in a line at right an- 75 gle to the axis of the stock allows the cutting of a thread of uniform and full depth even up to a shoulder on the stock.

It is evident that other means than those shown herein may be employed to secure the 80 instant opening of the cutter-sections, and I do not wish to limit myself to the exact means here shown, as any means for instantly releasing and opening the several sections of the die without otherwise altering their posi- 85 tion with relation to the support will come within the scope of my invention.

I claim as my improvement—

1. In combination, in a screw-cutting tool, a rigid support, a sectional cutting-die mount- 90 ed in the support and movable only in a line at right angle to the axis of the stock operated upon, means for effecting an instantaneous, unrestricted and direct outward movement of the sections of the die, and means 95 independent of the opening mechanism for closing the sections of the die.

2. In combination, in a screw-cutting tool, a rigid support, a separable cutting-die mount- 100 ed in the support and movable only in a line at right angle to the axis of the stock operated upon, means for rigidly locking the sections in their closed position, means for effecting an instantaneous, direct and unre- 105 stricted outward movement of the sections of the die, and means independent of the locking and opening mechanism for closing the die.

3. In a screw-cutting tool, in combination, a rigid support, a separable cutting-die hav- 110 ing a plural number of cutter-sections mounted in the support and movable only in a line at right angle to the axis of the stock operated upon, each independently adjustable with respect to a common locking device, a 115 trip device adapted for locking and instantaneous releasing actions with respect to the cutter-sections, and means independent of the locking and releasing mechanism for closing 120 the cutter-sections.

4. In combination, in a screw-cutting tool, a support, a slideway formed in the support, slide-blocks carrying cutter-sections adapted to be moved along the slideway, levers for moving the slide-blocks having ball-and- 125 socket connections therewith, and automatic means for permitting an instantaneous and unrestrained movement of the levers and appurtenant mechanism.

5. In combination, in a screw-cutting tool, 130 a support, slide-blocks carrying cutter-sections movably mounted in the support, levers for moving the slide-blocks, a trip-block, adjustable stop-plates mounted on the levers

and adapted by their position to determine the position of the slide-blocks and their cutter-sections, and automatic means independent of the trip-block for forcing the levers and appurtenant mechanism to their closed position.

6. In combination, in a screw-cutting tool, a support, slide-blocks carrying cutter-sections movably mounted in the support, means for adjusting the cutter-sections, a trip-block adapted for locking and instantaneous releasing actions with respect to the cutter-sections, stop-plates adapted to engage the trip-blocks, to lock the levers and appurtenant mechanism, and means independent of the trip mechanism for forcing the cutter-sections to their closed positions.

7. In combination, in a screw-cutting tool, a support, slide-blocks movable in the support and provided with cutter-sections mounted in position to have a full and unobstructed field of operation on their work, means for permitting an instantaneous, direct and unrestricted movement of the slide-blocks and their cutter-sections from their working to their open position in a line at right angle only to the axis of the stock operated upon,

and means independent of the releasing mechanism for forcing the slide-blocks and their cutter-sections to their closed positions. 30

8. In combination, in a screw-cutting tool, a rigid support, slide-blocks carrying cutter-sections movably mounted in the support and having movement only in a line at right angle to the axis of the stock, levers controlling the movements of the slide-blocks and having ball-and-socket connections therewith, automatic means for locking or instantaneously releasing the levers and appurtenant parts, and means independent of the locking and releasing mechanism for resetting the die. 40

9. In combination, in a screw-cutting tool, a rigid support, cutter-sections movably mounted in the support, a movable trip mechanism adapted for locking and instantaneous releasing actions with respect to the cutter-sections, and means interposed between the trip mechanism and cutter-operating mechanism for independently adjusting the several cutter-sections. 45

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