

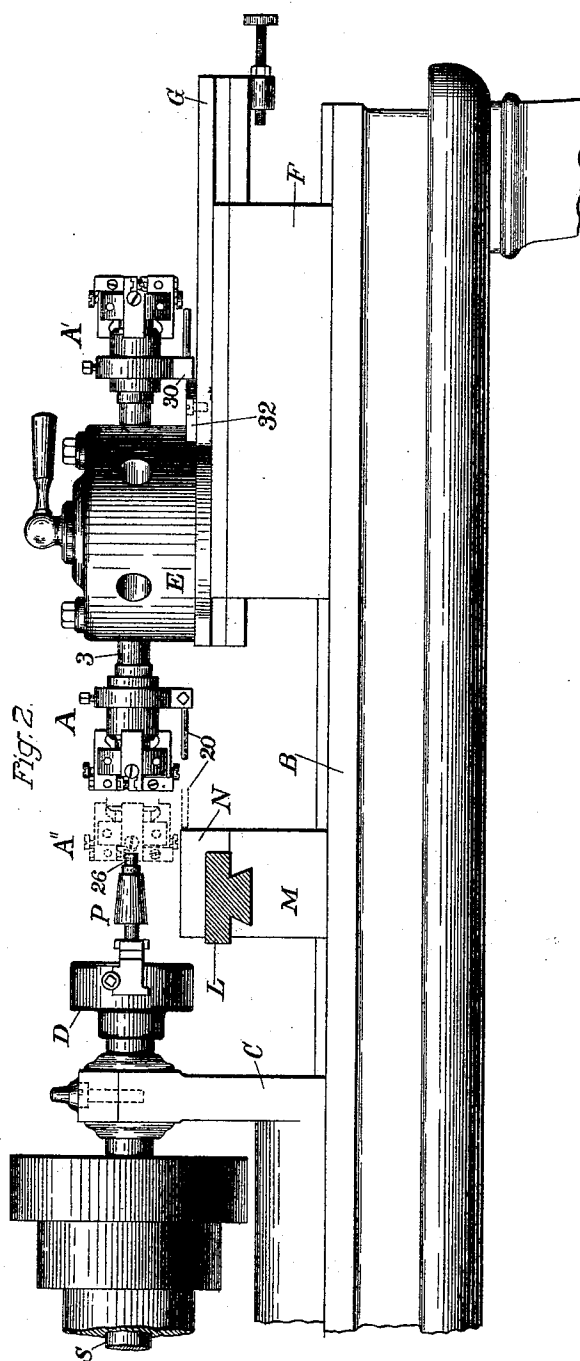
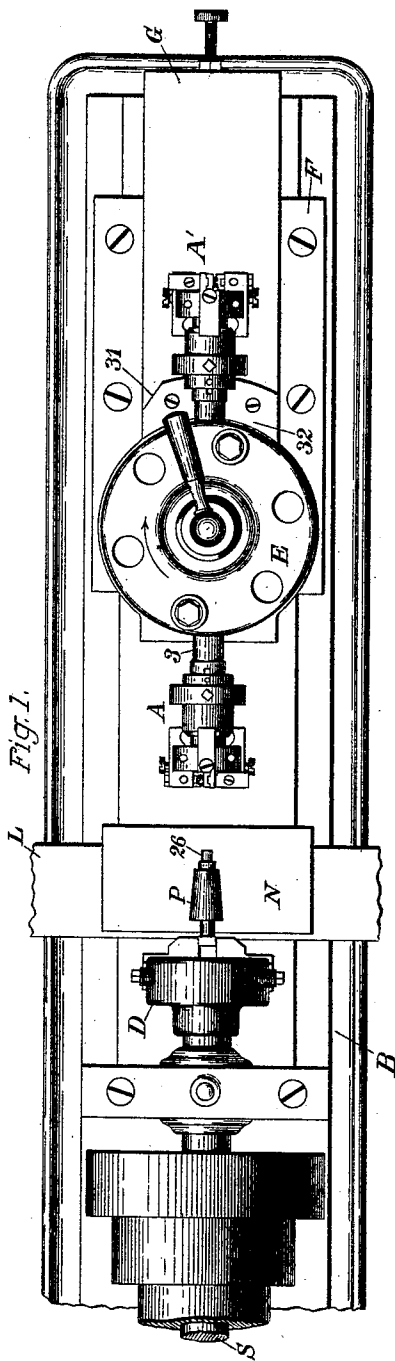
(No Model.)

4 Sheets--Sheet 1.

W. W. TUCKER.
SCREW CUTTING MACHINE.

No. 500,043.

Patented June 20, 1893.



Witnesses:
John L. Edwards Jr.
Fred. J. Dole.

Inventor:
William W. Tucker
By his Attorney,
J. H. Richards.

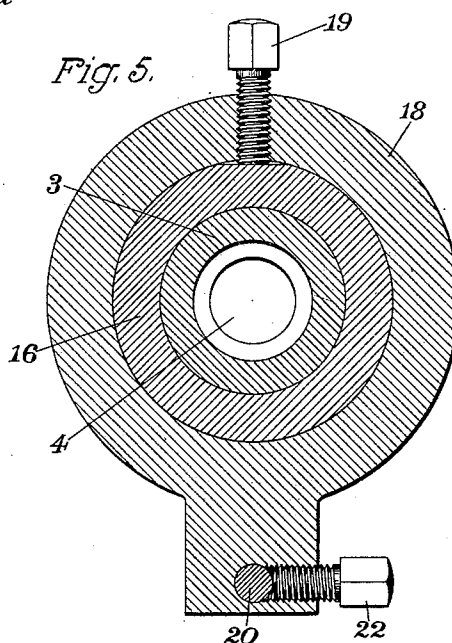
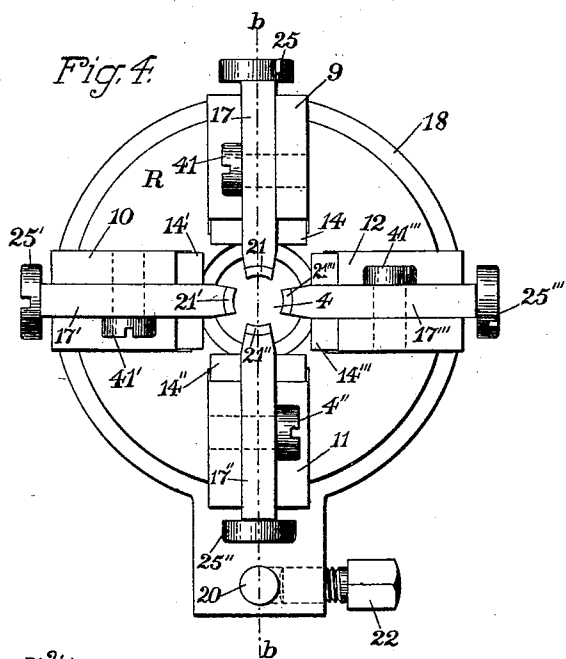
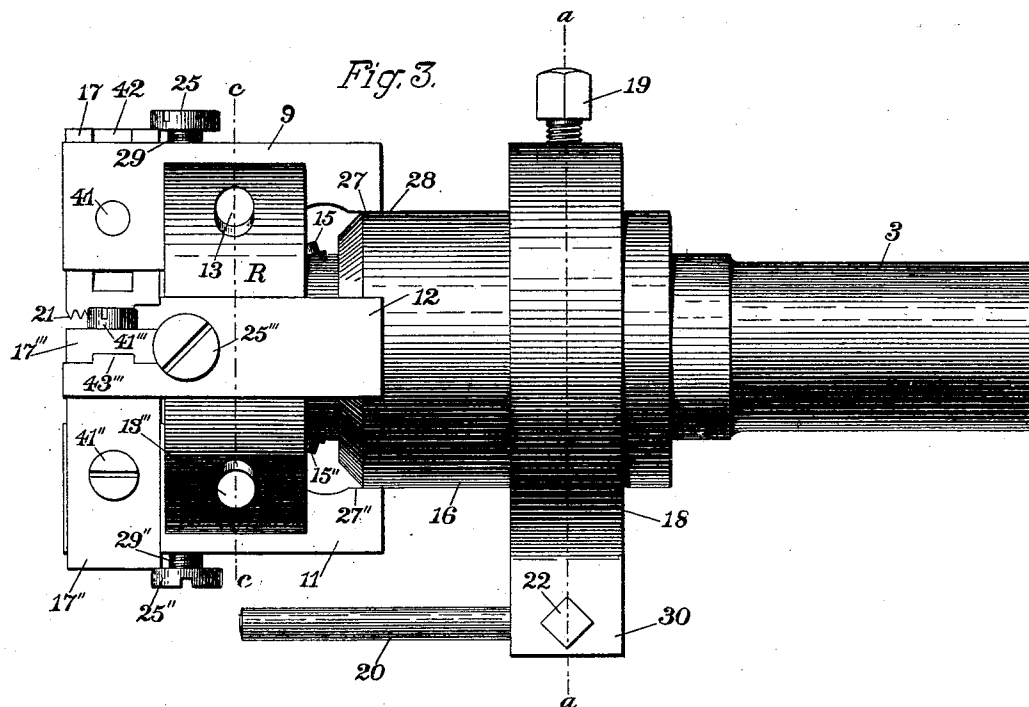
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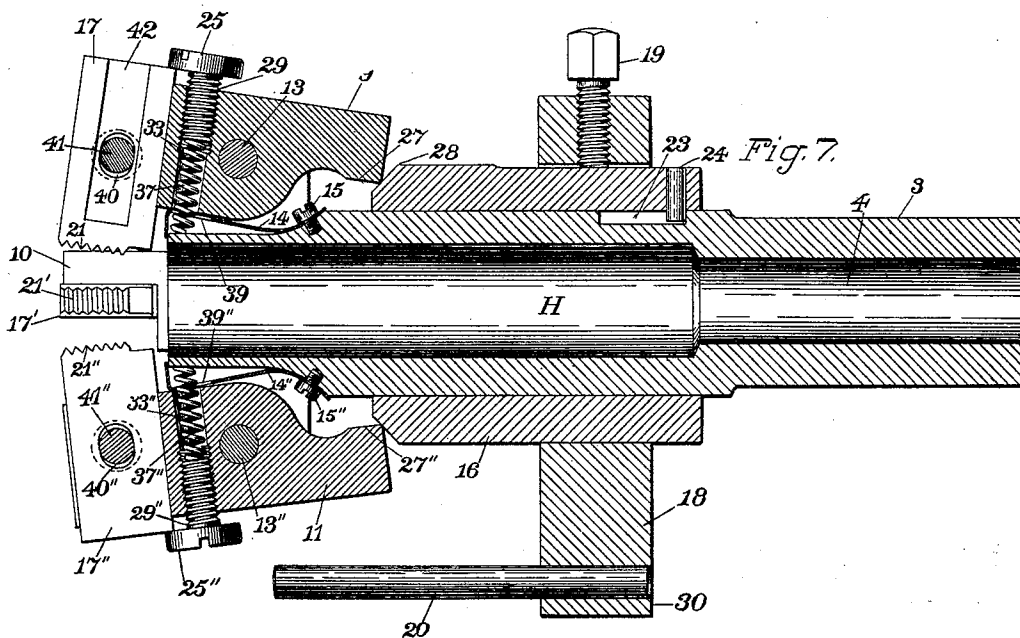
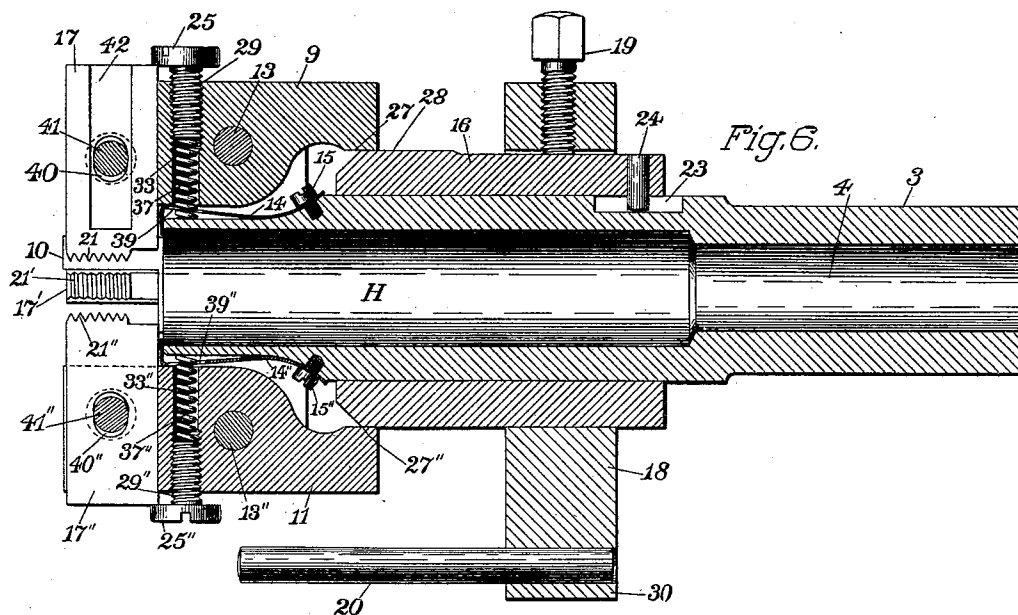
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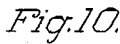
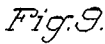
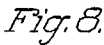
Witnesses:
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4 Sheets—Sheet 4.

No. 500,043.

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UNITED STATES PATENT OFFICE.

WILLIAM W. TUCKER, OF HARTFORD, CONNECTICUT.

SCREW-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 500,043, dated June 20, 1893.

Application filed March 10, 1893. Serial No. 465,464. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. TUCKER, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Screw-Cutting Machines, of which the following is a specification.

This invention relates more especially to that class of screw-cutting machines in which the screw-cutting die is carried by a revolving turret mounted on a slide movable longitudinally of the axis of the piece to be threaded; the object being to furnish an improved die of the so-called "self-opening" class and means for automatically re-setting the die.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a screw-cutting machine furnished with my present improvements. Fig. 2 is a front elevation of the machine and screw-cutting mechanism shown in Fig. 1. Fig. 3 is an enlarged front elevation of the screw-cutting die shown on a smaller scale in Figs. 1 and 2. Fig. 4 is an end elevation of the screw cutting die as seen from the left hand in Fig. 3. Fig. 5 is a cross-sectional view in line *a-a*, Fig. 3. Fig. 6 is a vertical longitudinal section through the die shown in Figs. 3 and 4, showing the chaser-holders set in position ready for use. Fig. 7 is a view similar to Fig. 6, showing the chaser-holder-actuating wedge retracted for opening the dies when the die is to be quickly withdrawn from the threaded piece of work. Fig. 8 is a transverse sectional view in line *c-c*, Fig. 3. Fig. 9 is a plan view of the forward end of the die-body, shown with the chaser-holders removed but with the guard-springs in place. Fig. 10 is an end elevation of the parts shown in Fig. 9, as seen from the left hand in said figure.

Similar characters designate like parts in all the figures.

For the purposes of a general description of the turreted screw-cutting machine shown in Figs. 1 and 2, said machine is shown furnished with two "self-opening" dies embodying certain features of my present improvements; which dies are designated in a general way, and respectively, by *A* and *A'*; said dies, however, are each of the same detail

construction, and in this respect no distinction is made between them in the following description.

My improved screw-cutting tool comprises a die-body, designated in a general way by *H*, which has at one end thereof the usual stem 3 whereby to support the die in the turret of the screw-machine; and which has at the other end thereof the head or flange *R* wherein to support the chaser-carriers. Said die-body is shown having a central bore, 4, (Figs. 4 to 10, inclusive,) for receiving the end of the piece being threaded, when this piece is of considerable length. For the purpose of receiving the several chaser-carriers or holders, the head *R* of said die-body is shown having formed therein the four radial slots designated in Fig. 10 by 5, 6, 7 and 8, respectively; in said slots are pivotally supported the corresponding series of chaser-carriers or levers designated by 9, 10, 11 and 12, respectively. Said chaser-holders together with the details used in connection therewith, being alike in construction and mode of operation, a detailed description of one of them will suffice as a description of them all.

The chaser-holder 9, shown at the upper side of the view in the several figures of the drawings, is fitted closely between the side-walls of the slot 5, and is pivotally supported in said slot by means of the pivot-pin 13, (Figs. 3, 6, 7 and 8,) which is usually a tapered pin firmly driven into the shank-head *R*. The forward or projecting end (at the left hand in Fig. 3), is constructed to carry the screw-cutting chaser 17, whose inner end is furnished with the usual cutting-teeth 21, and which bears at its outer end against the head 25 of the adjusting-screw 29, whereby the chaser may be adjusted radially of the die for accurately setting the same. The preferred arrangement of the adjusting screw 29 is best shown in Figs. 6 and 7, it being screwed into the threaded outer end of the hole 33, which below the point of the screw contains the lever-actuating spring 37 whose inner end reacts against the bottom surface of the aforesaid slot 5.

For holding the chaser in place on the chaser-holder, said chaser has formed therein the slot 40, (Figs. 6 and 7) through which passes a binding-screw 41 that is screwed into

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the chaser-holder 9, as indicated in the drawings. For maintaining the chaser accurately in position on the chaser-holder without throwing too much stress upon said binding-screw 41, the chaser has formed therein the slot or groove 42, which fits over a corresponding tongue, 43, on the said chaser-carrying holder 9. This arrangement will be readily understood by comparison of Figs. 3, 4, 6 and 7. By means of this construction the principal strains upon the chaser laterally thereof, or longitudinally of the die-shank, are taken by the tongue and groove, so that the binding-screw is subjected to but comparatively little strain.

For the purpose of preventing the collection of chips and dirt under the chaser-carrying levers 9, a guard-spring, 14, is fitted into the lever-slot in the head R of the die-body H, being held in place at the rearward end of said slot by the screw 15, as will be understood by comparison of Figs. 6 to 10, inclusive. The forward end of said guard-spring is bent at about a right angle, and the point thereof fits closely the forward or outward surface of the die-body, as illustrated in Figs. 6, 7 and 9; while the angle of said spring bears outwardly against the inner surface of the chaser-carrying lever 9. Near the forward end of the spring an opening, 39, is made in the guard-spring 14 for the passage of the aforesaid lever-actuating spring 37, so that said actuating-spring may bear against the die-body as required for the proper operation of the lever. One of said guard-springs being fitted into each of the aforesaid slots, 5, 6, 7 and 8 of the die-head R, (see Fig. 10,) the tool is securely guarded against the entrance of chips between the chaser-levers and the central portion of said die-body.

The details used in connection with the chaser-holders 10, 11 and 12, are designated by the same characters with the addition of prime, second and third marks, respectively, as are used in connection with the chaser-holder 9.

As a means for setting the chaser-levers and their chasers in proper position for use, (as in Figs. 3, 4 and 6) a tubular wedge, 16, is fitted to slide closely but freely on the middle portion of the die-body between the head R thereof and the stem whereby said die-body is supported in the turret E of the screw-cutting machine. For actuating said tubular wedge, this is shown provided with a stop-carrying clamp-ring, 18, which is adapted to be set on said wedge at suitable points longitudinally thereof, by means of the set-screw 19 operating in a well-known manner, see Figs. 3, 5, 6 and 7. Said stop-ring 18 in its lower projecting end 30 is bored longitudinally of the die-body to receive the stop-rod 20, which is held in place in said stop-ring and longitudinally of the die-body by means of another set-screw, 22, shown best in Figs. 3, 4 and 5. As a means for properly limiting the longitudinal movement of said wedge on the

shank of the die-body, said body is shown having formed therein the slot 23, Figs. 6 and 7, and the sliding wedge 16 is shown having a pin, 24, fixed therein and whose point projects into the aforesaid slot 23. In Fig. 7, said tubular wedge is shown in its extreme rearward position, being limited by its said stop-pin striking the end-wall of said slot 23. By this means the opening movement of the chaser-carrying levers 9 and 11, is properly limited, and they are prevented from being thrown out too far by the springs 37 and 37". The lever-actuating spring 37 being contained in the inner end of the lever-perforation 33, (which perforation, it will be seen, is alongside of the chaser 17,) acts between the screw 25 and the die-body for retracting the chaser-lever. By this means, also, on removing said screw 25, said spring may be removed and replaced without the necessity of removing the chaser-lever from the die-body. This feature permits the ready replacing of the springs when any breakages thereof occur, and is otherwise convenient in keeping the tool in proper repair. Also, by removing the screw and spring as set forth, access is had through said perforation 33, and through the opening 39 in the guard-spring 14, to the space inclosed between the guard-spring and die-body, so that any dirt accumulating in that space may be readily removed without disassembling the die.

In using the die, this is fixed by the stem thereof in the turret, as E, of a suitable screw cutting machine; said turret being mounted upon the slide G, and this supported to move longitudinally of the machine on the slide-block F. Since the same do not form any part of my present invention and are also well known in the art, I have omitted to show the usual means for operating the slide G or for locking, unlocking, and revolving the turret E on the slide. The piece of work to be threaded, (as, for instance, the projecting end 26 of the plug-cock P,) is or may be held in a suitable chuck, D, which is shown fixed to the spindle S of the lathe-head C; this head being carried, as usual, upon the bed B of the screw-cutting machine. These machines are ordinarily furnished with a cross-slide block, M, carrying an ordinary cross-slide, L, which is usually fitted to have a considerable movement transversely of the lathe-body B for carrying cutting-off tools not shown herein.

Underneath the working position of the screw-cutting die, I provide a stop located in position for striking the aforesaid stop-rod 20 of said die, and, through this and the said stop-carrying clamp-ring 18, retracting the aforesaid tubular wedge from its position shown in Fig. 6 to that shown in Fig. 7 at the moment of completing the screw-cutting operation. As a matter of convenience, said stop-plate or abutment, which is herein designated by N is shown supported on the slide-block M, and may or may not have a movement thereon with the slide L; it being suffi-

cient that said stop-abutment shall be maintained in proper position for always intercepting the forward movement of the stop-rod 20 while the screw-cutting die is in use. If preferred, obviously, the abutment N may be any suitable piece or block suitably supported on the bed B. In practice, I prefer to fix said abutment on the usual slide-block M when the machine is provided with such block, since this block is usually fitted to be adjustable longitudinally of the bed of the machine; which adjustment is convenient for properly locating the abutment itself.

In Figs. 1 and 2 the turret E is shown provided with two screw-cutting tools, A and A', of duplicate construction and set the one opposite to the other. The tool at the left hand is shown set ready for use the same as in Figs. 3, 4 and 6. In Fig. 2, the screw-cutting tool is shown, by dotted lines at A'', advanced into engagement with the piece of work P, and with its stop-rod 20 striking against the face of the abutment N ready for retracting the tubular wedge 16 on the farther forward movement of the tool. This movement having been effected, the wedge is drawn back to nearly the position shown in Fig. 7, so that the rearward ends 27 of the chaser holders 9 slide off from the outer surface 28 at the point of said wedge, thereby allowing the chasers to open as shown in said figure. This operation having been effected, the slide G is drawn back to its position in Figs. 1 and 2, making the machine ready for the turning of the turret. This latter operation carries the die last used around toward the back of the machine, (as indicated by the arrow on the turret E, Fig. 1) and brings the lower end 30 of said clamping 18 in engagement with the cam-face 31 of the re-setting cam 32; this cam is shown fixed on the slide G immediately rearward of the turret E, and operates to throw forward said tubular wedge, and to thereby re-set the chaser-holders in their operative position shown in Figs. 1, 2, 3, 4 and 6, ready for a repetition of the foregoing operations.

Having thus described my invention, I claim—

1. In a screw-cutting machine, the combination with the work-holding spindle, and the turret and its carrying slide, of the self-opening die carried in the turret and having a longitudinally-movable wedge for re-setting the chaser-holders of the die, the chaser-holders carried by said die, a stop-abutment secured to the bed of the machine, a stop carried by the wedge with its abutting end outside the plane of movement of the work, and in position for engagement with said abutment on the forward movement of the die to retract the wedge and thereby permit the die to open, substantially as described.

2. In a screw-cutting machine, the combination with the bed of the machine, the work-holding spindle, the turret and its slide, of the self-opening die carried in the turret and having the cylindrical longitudinal wedge, for

re-setting the chaser-holders of the die, the stop-carrying ring adjustably-secured to the wedge, the stop carried by said ring, and the abutment secured to the bed of the machine in position to be engaged by the said stop in its forward movement, to retract the wedge and permit the opening of the die, substantially as described.

3. In a die of the class specified, the combination with the die-body, and with the chaser-carrying lever pivotally supported in a slot therein with a space between the inner side of the lever and the die-body, of the guard-spring intermediate to said lever and die-body and having the bent forward end closing the forward end of the slot below the lever, substantially as described.

4. In a die of the class specified, the combination with the die-body having a slotted head for receiving the chaser-carrying lever, and with means for actuating said lever, of the guard-spring closing the forward end of the slot below said lever and having an opening therein, and a spring carried in the lever and projecting therefrom through said guard-spring opening against the die-body, substantially as described.

5. In a die of the class specified, the combination with the die-body having the slotted head for receiving the chaser-carrying lever, of the lever 9 carrying the radially-adjustable chaser 17 and having a perforation entirely through the same alongside of said chaser, the chaser-adjusting screw 25 fitting in the threaded outer end of said lever perforation, and the spring in said perforation and acting between said screw and the die-body, whereby the spring may on removal of the screw be removed and replaced without removing the lever from the die-body, substantially as described.

6. In a die of the class specified, the combination with the die-body having a shank and a series of chaser-levers, of the wedge carried and fitted to slide on the shank, means for supporting the die in a screw-cutting machine, a fixed abutment, as N, located beyond the path of the die, and a stop carried by the wedge in position for engaging said abutment to retract the wedge on the shank of the die-body, substantially as described.

7. In a screw-cutting machine, the combination with the bed of the machine, the turret, its slide, the self-opening die and its operating wedge, of a stop carried by said wedge, an abutment located upon the bed in position to be engaged by one end of the stop in the forward movement of the turret to retract the wedge and allow the opening of the die, and a cam located upon the turret slide or support to engage the opposite side of the stop during the rotation of the turret to force the wedge outward and automatically re-set the die, substantially as described.

8. In a screw-cutting machine, the self-opening die carried in the turret, and having

the longitudinally movable wedge, the turret and its slide, the stop carrying ring upon the wedge, the stop carried thereby, and the abutment to engage one side of the stop in its longitudinal movement to press the wedge inward, a cam-abutment to engage the opposite side of the stop to press the wedge outward when the turret is revolved, and an adjusting screw or device to adjustably secure the stop-ring to the wedge, substantially as is described.

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Witnesses:

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