

P. B. OATMAN.
 SCREW CUTTING DIE.
 APPLICATION FILED AUG. 31, 1911.

1,045,597.

Patented Nov. 26, 1912.

2 SHEETS—SHEET 2.

Fig. 3

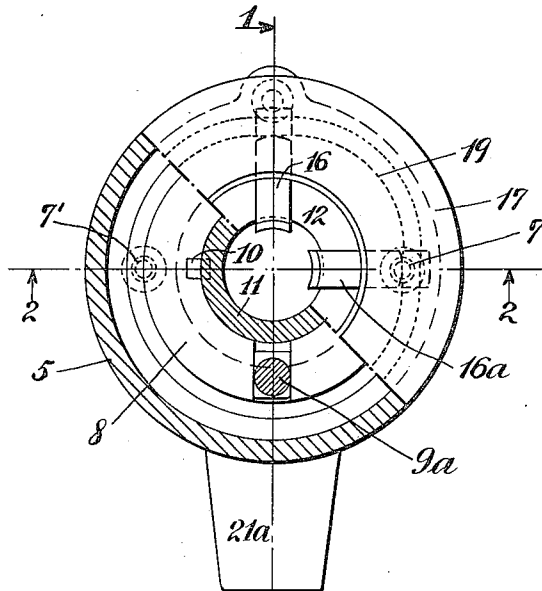


Fig. 4

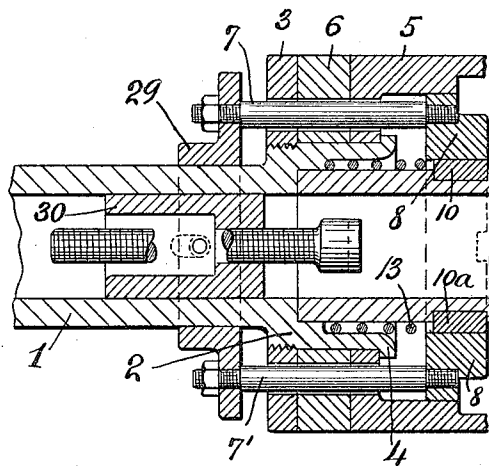
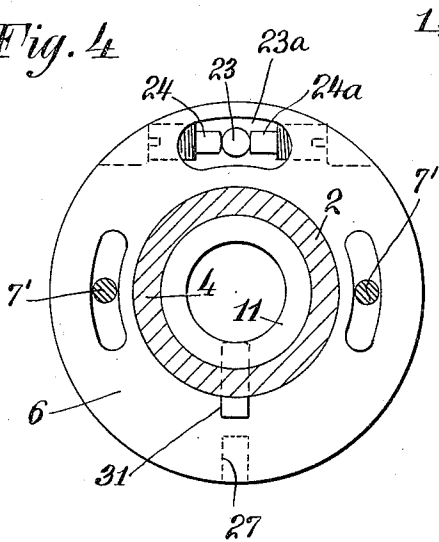


Fig. 5

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UNITED STATES PATENT OFFICE.

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SCREW-CUTTING DIE.

1,045,597.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PAUL B. OATMAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Screw-Cutting Dies, of which the following is a full, clear, and exact specification.

This invention relates to screw-cutting dies of the type in which the thread cutting dies or chasers are automatically opened to permit withdrawing the work.

The invention is especially adapted for use on automatic screw machines, though it is generally useful where cutting screw-threads in considerable quantities of similar or identical pieces is required.

The object of the invention is to provide a tool of great rigidity, so that it will be impossible for the continuous pound of the cooperating parts to shake the die to pieces; to inclose the working parts so that it will be practically impossible for dirt or chips to clog the mechanism; to positively lock the threading dies until tripped by a lever controlled from the outside, or the end of the screw being cut; and to permit rapid adjustment for different sizes of work and rough or finishing cuts.

The invention is a simplification of and an improvement on the structures described in patents of Maxwell, No. 755,028, March 22, 1904, and Mullaney, No. 802,819, October 24, 1905.

In the accompanying drawing which illustrates the invention—Figure 1 is a longitudinal sectional view of a screw-cutting die embodying my invention; Fig. 2 is a similar view on a plane (2—2 Fig. 3) at right angles to that of Fig. 1; Fig. 3 is a plan view partly in section showing the relation of the dies, controlling cams and clutch pins or dogs; Fig. 4 is a sectional view on the line 4—4 of Fig. 1; and Fig. 5 is a longitudinal section of a modification in which the die is automatically opened by the stock being threaded.

In the drawing 1 represents a mandrel which carries the several operative parts of the die; it is provided with a cylindrical shank and an enlarged end 2 screw-threaded near the base to engage a collar 3. At the end of the enlarged part is a low circular flange 4 to form an abutment for the re-

tainer 5 and adjusting ring 6. Both the 55
retainer and adjusting ring are slotted (see Figs. 1, 2 and 4) with arc shaped slots on opposite sides of the center to permit circular adjustment around two trip-pins 7, 7'. These pins are threaded at the ends and are 60
secured to a sliding clutch ring 8, which has a transverse slot to releasably engage two pins or dogs 9, 9^a, carried by die-head 12. The clutch-ring is provided with key-ways in sliding relation to keys 10, 10^a set 65
in a bushing 11 firmly secured to the mandrel 1 by a pin 31, which forms a key for holding the ring 6 against rotation (see Fig. 1).

12 is an annular die-head rotatably 70
mounted on the end of the bushing 11 with its interiorly projecting flange seated against the end of said bushing. A strong helical spring 13 around the outside of the bushing urges the clutch-ring toward the 75
die-head 12, and when the pins 9, 9^a, of the latter are in register with the slot in the clutch-ring, the die-head and dies are locked to the mandrel and against rotation or movement. When unclutched, however, 80
the die-head is free to turn to expand the dies. The die-head is provided with radial slots, see Fig. 3, in which slide the cutters or chasers 16, 16^a, etc., the radial position being determined by a stationary cam 17 85
secured by four set-screws 18, 18^a, to the retainer 5. The cam has a rearwardly projecting cam-rib 19 having radially sloping walls and the chasers are undercut or grooved to engage the cam-rib, as clearly 90
shown in Figs. 1 and 2. It is evident, therefore, that when the die-head 12 is turned relatively to the cams the chasers will shift toward or from the center of the tool.

When the device is operated the die-head 95
is adjusted to the diameter required and the clutch set. The chasers are thus locked against radial movement and the die-head against rotation. When the limit of cutting is reached a pin or projection connect- 100
ed to the device which feeds the stock to the tool pushes against arm 21^a and releases the clutch, permitting the die-head to rotate relatively to the cam and expand the dies. The engagement of the chasers with the 105
work is sufficient to turn the die-head and expand the dies, but the operation is facilitated and quickened by the spring 25. The

lever 21^a can also be actuated by hand. When the die-head is turned back again by the handle 14, the clutch will reseal and the device is ready for a new operation. The
 5 spring 25 is seated in the annular space between the retainer 5 and a flange 26 of the die-head; one end of this spring bears against a pin abutment 27 on the retainer 5 and the other against a stud 28 carried by
 10 the die-head, and the spring is under compression when the chasers are in working position. As soon as the clutch is opened the spring thus assists in automatically opening the dies.

15 It will be seen that the foregoing construction embodies a stationary shank carrying a fixed cam, in combination with a rotatable die-head carrying radially movable chasers, which is released to automati-
 20 cally expand the dies by the withdrawal of the clutch, the clutch being longitudinally movable on the shank. In this respect, this invention broadly distinguishes from the patents hereinbefore referred to.

25 In order to adjust the diameter of cut, whether above or below standard, it is necessary to rotate the cam relatively to the chasers and die-head. For this purpose, the retainer 5 is rotatable on the shank between
 30 the keyed ring 6 and the shoulder 4, through a pin 23 which projects into slot 23^a of ring 6. Set-screws 24, 24^a, in keyed ring 6, engage pin 23 on opposite sides, and the desired angular adjustment of the retainer
 35 and cam is effected by these screws, one being screwed out and the other in, according to the adjustment of cutting diameter desired. To prevent movement of the re-
 40 tainer and cam during cutting of a thread, the pin 23 must be tightly held between the tangential screws 24, 24^a. Or one screw would suffice, if placed on the side to oppose the cutting device. By providing sufficient
 45 amplitude of slots in the various parts, threads above or below standard, with proper chasers for either direction, can be cut. To assist this, retainer 5 and ring 6
 50 will be provided with graduations. The threaded ring 3 serves to clamp the retainer 5 and ring 6 tightly against shoulder 4 to prevent loose play.

In Fig. 5 I have shown a modification in which the clutch is opened by the work itself. The pivoted lever is replaced by a
 55 sliding collar 29; inside the hollow mandrel is a cylindrical plunger 30 slidably fitting the bore and connected to the sleeve 29 by a pin extending through a slot (shown in dotted lines). In the plunger 30 is a long
 60 adjusting screw, the head of which may engage the work as it comes from the chasers, and pushing back the sleeve 29, disengages the clutch ring from the pins 9, 9^a, and opens the clutch in exactly the same
 65 way as already described.

From the foregoing description it will be seen an automatic screw-cutting die of particular advantage for automatic screw machine work has been provided, wherein the number of parts is reduced, and moving
 70 parts screened from the entrance of chip or dirt.

Having thus described my invention, I declare that what I claim as new and desire to secure by Letters Patent, is:—

75 1. In a screw cutting die, the combination of a shank, a die carrying head rotatably mounted on said shank and held against longitudinal movement thereon, clutch pro-
 80 jections carried by said die head, a clutch member slidably mounted on said shank and having projections interlocking with said die head projections to hold said die head
 85 against rotation during cutting of the thread, and means for actuating said clutch member to release the die head to stop cutting of the thread.

90 2. In a screw-cutting die, the combination of a shank, a head rotatably mounted on said shank and held against longitudinal movement thereon, radially movable dies carried
 95 by said head, a cam carried by the shank for moving the dies radially upon rotation of the head, clutch projections carried by said head, a clutch member slidably mounted on
 100 said shank and having projections interlocking with said die head projections to hold said die head and dies stationary during the cutting of the thread, and means for moving
 105 said clutch member rearwardly on the shank to release the die head and expand the dies.

110 3. In a screw-cutting die, the combination of a shank, a head carrying chasers rotatably mounted thereon and held against longitudinal movement, a longitudinally movable
 115 clutch member carried by the shank for engaging and holding the head against rotation while cutting a thread, actuating means for the clutch, and means carried by the shank and engaging the chasers for moving
 120 them radially when the head is rotated.

125 4. In a screw-cutting die, the combination of a shank, a die-head rotatably mounted on the end thereof, a spring-pressed movable clutch member mounted on the shank behind
 130 the head adapted to engage and hold the head against rotation, and a trip-piece connected to said clutch member and adapted to be shifted to release the die-head.

135 5. In a screw-cutting die, the combination of a shank, a head rotatable thereon carrying chasers, a cam carried by the shank engaging the chasers, a clutch member sliding
 140 on the shank and held against rotation, said clutch member being movable away from the head in disengaging, and means for moving the clutch member away from the head
 145 to permit expansion of the dies.

150 6. In a screw-cutting die, the combination of a tubular shank, a rotatably mounted

head carrying dies, means holding the head against longitudinal movement on the shank, a cam carried by the shank and engaging the dies to move them radially when the head is rotated, a clutch member sliding on the shank and engaging the head to lock it against rotation, and means for moving the clutch away from the head and thereby permitting automatic expansion of the dies by rotation of the die-head.

7. A screw-cutting die comprising a shank, a die-head rotatable thereon, dies carried by the die-head, a cam in fixed relation to the shank engaging the dies, a clutch member in sliding relation to the shank adapted to engage the die-head, and means for tripping the sliding clutch member to expand the dies.

8. A screw-cutting die comprising a shank, a clutch ring sliding thereon, a spring for moving said clutch ring in one direction, means for moving said clutch ring against said spring in the opposite direction, a die-head rotatably mounted on said shank and held against longitudinal movement, projections carried by said die-head adapted to be engaged by said clutch ring when moved in response to said spring to prevent rotation of the die-head on the shank, a cam carried by the shank, and radially movable dies carried by said die head and engaged by said cam, whereby movement of the clutch ring against said spring will disengage the

die-head and automatically open said chasers upon rotation thereof.

9. A screw-cutting die comprising a shank, a spring-pressed clutch member slidably mounted thereon, a die-head rotatably mounted on the shank, means for compressing the spring and disengaging the clutch from the die-head, a stationary cam for shifting the dies when the die-head is rotated, and means for angularly adjusting the cam on the shank to permit adjustment of the diameter of cut.

10. A screw-cutting die comprising a shank, a spring-pressed clutch member sliding on the shank, a die-head rotatably mounted on the shank and held against longitudinal movement, means for compressing the spring and disengaging the clutch member from the die-head, a stationary cam for shifting the dies, means for adjusting the cam angularly to vary the cutting adjustment of the dies, a pin connected to the cam, and a tangential screw for shifting the pin to effect different cutting adjustments and holding the cam against rotation by the work.

In testimony whereof I affix my signature, in presence of two witnesses.

PAUL B. OATMAN.

Witnesses:

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G. N. KERR.