

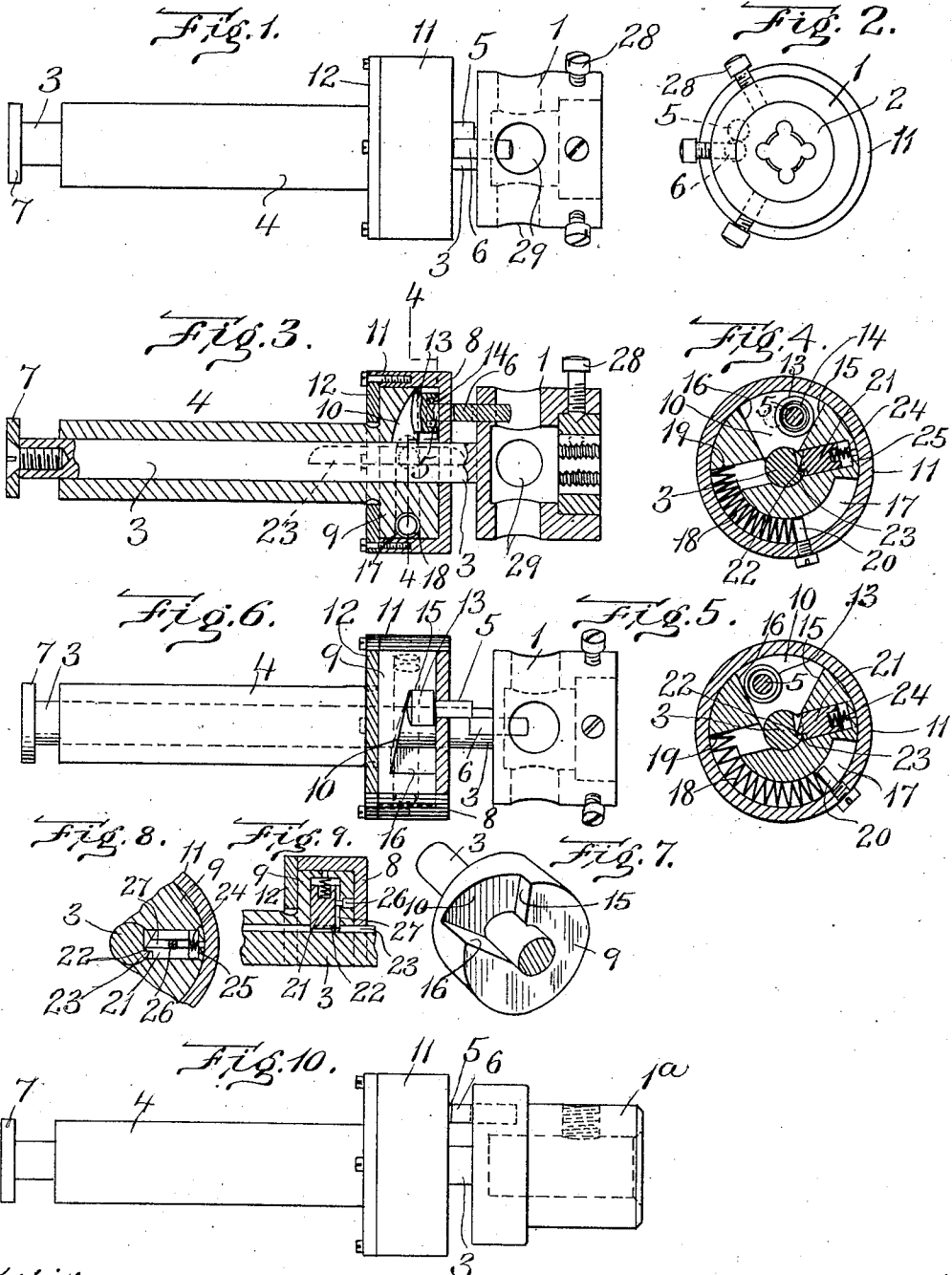
A. L. BRYANT & M. C. SMITH.

DIE OR TAP HOLDER.

APPLICATION FILED APR. 28, 1910.

1,050,802.

Patented Jan. 21, 1913.



Witnesses:
H. P. Condit
E. Baethelme

Inventors:
A. L. Bryant
M. C. Smith
by Wright & Brown
Attys.

UNITED STATES PATENT OFFICE.

ARTHUR L. BRYANT AND MORTON C. SMITH, OF ATHOL, MASSACHUSETTS.

DIE OR TAP HOLDER.

1,050,802.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed April 28, 1910. Serial No. 558,297.

To all whom it may concern:

Be it known that we, ARTHUR L. BRYANT and MORTON C. SMITH, of Athol, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Die or Tap Holders. of which the following is a specification.

This invention relates to a holder adapted to be used in automatic screw machines for holding a tap or die while the latter is acting upon the work.

Our object is to provide a holder which will restrain or limit the rotation of the tap or die while the latter is being threaded upon the work, but will, at the same time permit axial movement of the die or tap in accordance with the pitch of the screw being cut, until the tap or die becomes disengaged from the restraining holder, whereupon the abutment by which the die or tap is restrained will be retracted sufficiently far to avoid striking or being struck by the cooperating abutment on the die, or that member of the holder by which the same is directly carried.

Our object further is to provide an automatically acting device by which the holder may be restrained against free movement in the direction opposite to that of thread-cutting, to enable it to be run off from the finished thread.

In carrying our invention into effect we have devised a novel and improved holder in which either a die for forming threads on the outside of a screw, or a tap for threading the walls of a hole, may be held.

The preferred embodiment of the invention is illustrated in the accompanying drawings in which,

Figure 1 represents a side elevation of the holder. Fig. 2 represents an end elevation of the same. Fig. 3 represents a longitudinal section of the same. Fig. 4 is a cross-section on the line 4—4 of Fig. 3. Fig. 5 is a view similar to Fig. 4, showing the parts in a different position. Fig. 6 is an elevation similar to Fig. 1, but showing the parts broken away to illustrate the working of the device. Fig. 7 is a perspective view of the cam portions of the holder by which the restraining abutment is operated. Figs. 8 and 9 are sectional views showing in detail

views at right angles to each other of the tooth or dog for restraining the die when being backed off from the work. Fig. 10 is an elevation illustrating a modification of the holder adapted to hold a tap, the other view showing a holder more particularly adapted for a die.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, the die-holder comprises a die socket or carrier 1 having a head portion in which the die 2 is secured, and having also a shank or stem 3. Surrounding the shank of the die socket is a sleeve 4 which constitutes the holding member of the die-holder. This member is secured in the turret head of an automatic screw machine and is held against rotation. It holds the die against rotation by means of cooperating abutments 5 and 6 here shown as being in the form of pins, one of which is carried by the holder proper, and the other by the head 1 of the die socket. These pins or abutments engage, as shown in Fig. 1, and hold the die against rotation when the work is rotated. When the cutters of the die have taken hold on the work, the pitch thereof and of the thread cut by them draws the die forward in the direction of the axis of the work, or in other words, longitudinally. To permit of this movement the shank 3 of the die carrier is made longer than the sleeve 2 and is freely movable axially therein. Thus the die is enabled to move in exact accordance with the pitch of the screw being cut. A flange or washer 7 is secured to the rear end of the die carrier shank and prevents the latter from being withdrawn entirely from the holding sleeve 4.

The axial movement of the die continues as long as the abutments 5 and 6 remain in contact, but during the progress of such movement the abutment 6 is gradually drawn along the abutment 5 until it passes the end thereof. Thereafter the die carrier is released and free to turn with the work, and the cutting of the thread ceases. In previous screw-cutting machines having means of similar nature to hold back the die until the thread has been cut, difficulty has been encountered by reason of the

tendency of the abutments to strike at each rotation of the die. This occurs from the fact that the abutments will spring and yield a slight amount when the end of one 5 has passed almost away from the end of the other, the yielding being sufficient to enable the abutments to pass each other, but upon then springing back to normal position, the one projects far enough into the 10 path of the other to cause interference, resulting in breakage or wear of the parts. It is the main object of this invention to overcome this difficulty by arranging one of the abutments in such a manner that immediately upon withdrawal of the other 15 from engagement with it, it is retracted out of the path of the other in such manner that it cannot strike or be struck by the other. The means by which we accomplish this object is to make one of the abutments, as the 20 pin 5, axially movable, and to mount it in such a way that when pressed upon laterally by the other abutment, it is projected to its fullest extent, but when released, it is immediately retracted. For this purpose the pin 5 is directly carried by a shell 8 loosely mounted upon the sleeve 4 in such manner that it may be rotatable, while the inner end of the pin is engaged with a cam 30 surface on the sleeve or holder. For structural reasons, the portion of the holder carrying the cam is made as an enlarged head 9 having a notch in its end face, the bottom of which notch forms the cam surface 10. The shell 8 has a wall which over- 35 lies the end of the head 9 and a flange or rib 11 which surrounds the periphery of the head. A detachable annular disk 12 is secured to the flange 11 and by engaging the rear face of the head holds the shell in place. The abutment pin 5, as appears from Figs. 3 and 6, has an enlarged head 13, between which and the end wall of the shell 8 is a spring 14 which tends to retract the 40 pin and hold its head against the cam surface 10. When the shell is so placed that the head is near the deepest part of the cam notch, the abutment pin 5 is most fully retracted, while on the other hand when the 50 shell is rotated with respect to the holding sleeve 4 the pin rides up on the cam surface and is projected. By engagement of the pin with either of the radial walls 15 and 16 which form the boundaries of the cam notch, the rotation of the shell with respect to the holding sleeve and its head is limited. The head 9 also has a peripheral groove 17, shown in Figs. 4 and 5, in which is contained a spring 18, one end of which bears against a shoulder 19 at the end of the 60 groove and the other end of which reacts against an abutment 20 on the shell. This abutment is preferably a pin or screw in-

serted through the flange of the shell 8 and 65 projecting into the groove 17. When the die is engaged with the work and its abutment pin is caused by the pressure of the work to press against the abutment pin 5, the latter with its carrying shell is moved ro- 70 tarily and is caused to ride up the inclined surface 10 until it strikes the shoulder 15. Thereupon it is held stationary and in turn holds the die. When, however, the die is advanced so far along the work as to draw 75 the abutment pin 6 past the pin 5 and out of engagement therewith, the spring 18 becomes operative to return the shell into normal position until the pin 5 abuts against the stop shoulder 16. The pin is then at 80 the deepest part of the cam notch and is retracted by its own spring 14 a sufficient distance to clear the end of the abutment pin 6 and enable the latter to move past it at each revolution without engagement. 85 By this means both pins are protected against breakage through striking and, which is perhaps of greater importance, they are guarded against wear and rounding off of their end edges by reason of rubbing of one over the other, a result which would very shortly materially shorten the effective length of the pins. 90

For backing off the die from the work we provide a spring-actuated dog or tooth 21, 95 which in this embodiment of the invention is carried by the head 9 of the holder and is contained in a radial slot in such head. This dog has a tooth 22 on its end which engages an axially elongated tooth 23 on the 100 shank 3 of the die-carrier. Both the teeth 22 and 23 are beveled so that they may pass each other when the die is rotated by the work in the direction of thread-cutting rotation, but they engage and hold the die sta- 105 tionary as soon as the work is reversed. The dog 21 is pressed inward by a spring 24 contained between the outer end of the dog and a shoulder 25 at the end of the recess in which the dog is held. A key in the nature 110 of a pin or screw 26 set into the end of the head 9 prevents the dog from rotating in its socket, and retains the toothed end thereof at the proper angle to engage the tooth 23 of the shaft 3. This key enters a slot 27 115 in the side of the dog. For structural reasons the channel or socket in which the dog 21 is contained intersects the bore of the holder and extends entirely to the opposite boundary of the head from that in which the 120 dog is contained. This construction is employed in order that the dog may be put in place and in order that the shoulder 25 may be provided without the insertion of a separate piece. 125

The holder above described is shown as being fitted with a die for surrounding the work. This die is contained in a recess in

the carrier head 1 and is secured therein by a number of set screws 28. The recess extends beyond the socket wherein the die is held and is intersected by radial holes 29 extending to the periphery of the head 1 and provided to permit escape of chips. In the form shown in Fig. 10 the head 1^a is somewhat elongated so that it may contain the shank of a tap. Otherwise the construction and arrangement of the two forms of holder are the same.

The foregoing description has been based on the assumption that the die is held stationary while the work rotates. It is to be understood, however, that the same principles of operation would apply in case the work is stationary and the die-holder is rotated. In the latter case the action of the abutments in restraining the die-carrier and the surrounding holder from relative rotation will be the same, the die being then limited to rotation in one direction instead of being limited or restrained to entire lack of rotation. It is also not essential that the retractable abutment should be carried by the holder 4, as the abutment 6 on the die-carrier could be made retractable in a manner similar to that already described, without departing from the spirit of the invention.

We claim,—

1. A die-holder for automatic screw machines, comprising a die socket having a shank, a head, and a pin extending from said head parallel with said shank, a cam sleeve surrounding said shank and within which the latter is movable rotarily and axially, said sleeve having a cam surface inclined or offset axially, a shell rotatably mounted on said sleeve inclosing the cam portion thereof; a spring-retracted pin carried by said shell adapted to engage the pin of said die socket head to hold the die from turning with the work; and a spring acting on said shell with a tendency to turn the latter into such position that said spring-retracted pin is at the deepest end of said cam surface; whereby the said pin is normally retracted to the fullest extent.

2. A threading tool holder comprising a tool-carrying head, a holder therefor with respect to which said head is movable longitudinally of the work, complementary abutments on the head and holder for limiting the rotation of the head, said abutments being drawn apart as the head is advanced along the work, and means for retracting one of them as soon as they have been thus drawn apart, whereby to avoid striking of the abutments in the subsequent free relative rotation between the head and holder.

3. A threading tool holder for an automatic screw machine having an abutment for limiting its rotary movement when the

tap or die carried thereby is engaged with the work, a complementary abutment, and means for withdrawing one of said abutments from the path of movement of the other.

4. A die holder comprising a member having provisions for securing a threading tool, a secondary member beside said first member, abutments on the two members adapted to make contact to restrain the rotary movement of the first member, while permitting relative axial movement of the members, means for causing projection of one of said abutments in response to pressure exerted laterally thereon by the other, and means for retracting said abutment upon disengagement thereof from the other.

5. A die-holder tool comprising a member or carrier having provisions for holding a threading tool, an abutment on said carrier, a holding member, an abutment carrier rotatably mounted upon said holding member, a complementary abutment mounted upon said abutment carrier, and movable axially with respect thereto, being adapted to engage the abutment of said first-named carrier, means normally tending to retract said second abutment, and means for projecting said abutment when the abutment carrier is moved rotarily relatively to said holding member.

6. A threading-tool holder comprising a carrier adapted to hold a threading tool and mounted with capability of free rotary and axial movement, a restraining member mounted adjacent to said carrier, complementary abutments on said carrier and restraining member adapted to limit the rotary movement of said carrier, but so arranged as to permit unrestricted axial movement of the latter, a shell by which one of said abutments is carried and with respect to which it is axially movable, said shell being mounted rotarily on said restraining member, means tending to turn said shell in one direction, and a cam against which said abutment is pressed and by which it is projected when the shell is rotated in the opposite direction.

7. A threading tool holder comprising a carrier to which the threading tool is secured, said carrier having a shank and an enlarged head, a pin projecting from said head parallel with said shank, a retaining sleeve mounted loosely upon said shank, a head on said sleeve, said head having a notch in one end with an axially inclined wall forming a cam surface and radial stop walls, a shell mounted on said head with provision for rotary movement thereon, a pin carried by said shell and projecting therefrom parallel with said first-named pin and in the path of rotation thereof, said pin also projecting into said notch and engaging the

cam wall thereof, a spring acting between
the head of said pin and the wall of said
shell for retracting the pin and holding its
head in engagement with said cam surface,
5 a tooth formed on said shank parallel with
its axis and a dog or pawl carried by said
head and adapted to engage said tooth.

In testimony whereof we have affixed our
signatures in presence of two witnesses.

ARTHUR L. BRYANT.
MORTON C. SMITH.

Witnesses:

HORACE W. ARCHIBALD,
RODNEY S. HUFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
