Feb. 23, 1932. E. O. WILLIAMSON 1,846,296

SELF OPENING DIE HEAD

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Fig. 1.

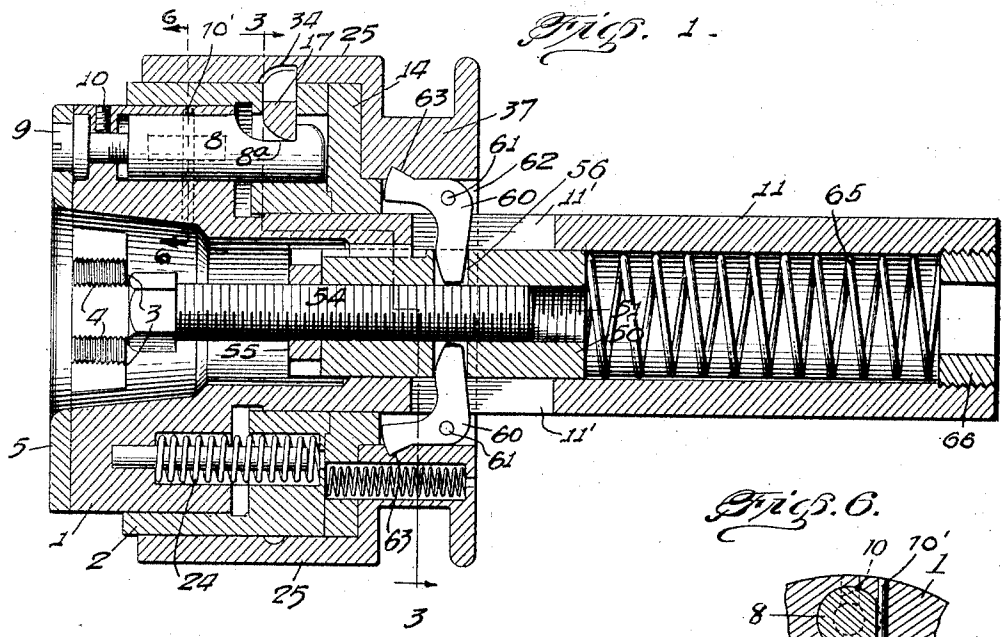

Fig. 6.

Fig. 2.

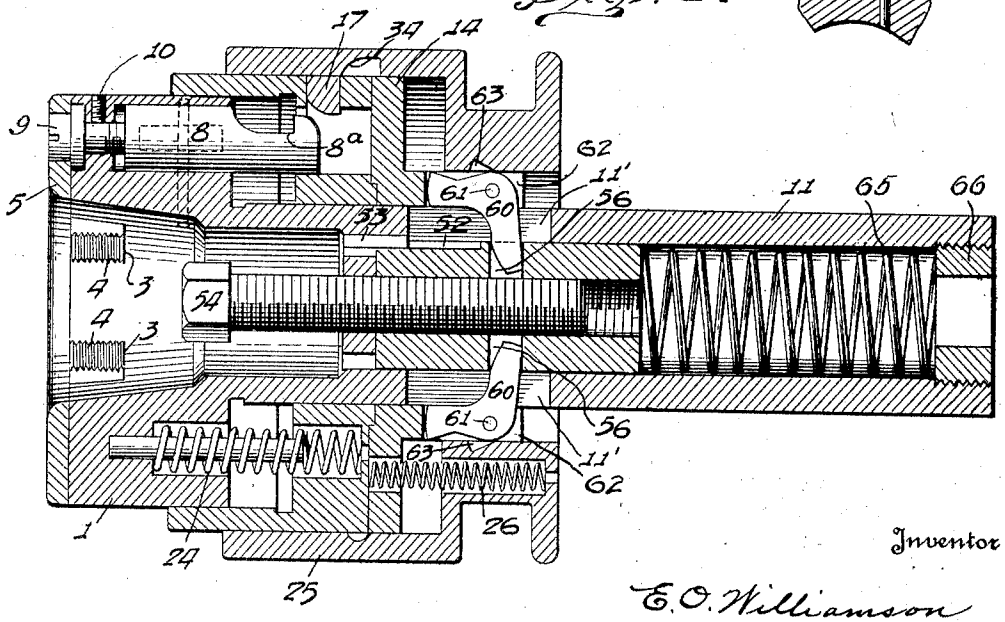

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Fig. 3.

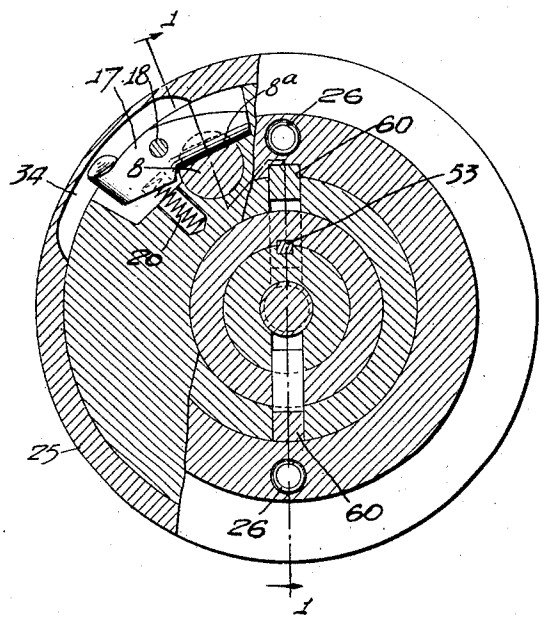


Fig. 5.

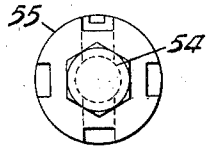
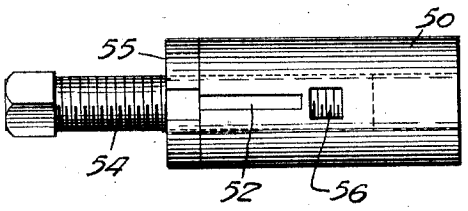


Fig. 4.



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UNITED STATES PATENT OFFICE

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SELF-OPENING DIE HEAD

Application filed April 18, 1931. Serial No. 531,175.

The invention relates to certain improvements in die heads of the general type exemplified in Patent No. 1,615,676, dated January 26, 1927, and has for its object to provide the head with adjustable means, set in operation by the work, for retracting the chasers immediately a predetermined length of thread has been cut, thereby insuring uniformity of the product in respect of the selected length of the cut thread.

The invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a sectional elevation of the die head taken on the line 1—1 of Fig. 3, with the parts in operative position.

Fig. 2 is a similar view showing the parts in inoperative position.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a side elevation of the tripping abutment.

Fig. 5 is an end view thereof.

Fig. 6 is a section on line 6—6 of Fig. 1.

Referring to the drawings, 1 indicates the body of the head provided with an axial bore or work receiving recess and an integral hollow shank 11. The body 1 is provided with radial slots 3, in which are mounted the threading dies or chasers 4, which are moved radially in the slots 3 by cam studs, not shown, but of the general character and arrangement shown in the patent aforesaid. Secured to the fore part of the body is the annular front plate 5, which serves to retain the chasers in engagement with their operating cams.

Mounted in a longitudinal bore in the body and to one side of the axial bore is a locking pin 8 having a notch 8*a* adapted to receive a trip lever, to be hereinafter described, the locking bolt being adjustable in the body portion by means of a stud 9, which is rotatably mounted in the body portion and engages the threaded bore of the bolt 8. The stud is locked in its adjusted position by means of a set screw 10, which is threaded in an opening in the side of the body and bolt 8 is prevented from turning by a pin 10′ engaging a flat section of said bolt.

Slidably mounted on the body 1 is a shell 2, which carries the cam studs, which actuate the chasers 4, in the manner and form described in the patent aforesaid, said shell also carrying trip lever 17, which is pivoted on the pin 18 and is normally moved to engaging relation with the notch 8*a* of the locking bolt 8 by helical spring 20, thereby locking the shell 2 to the body 1. The nose of the trip lever 17, when the latter is in locking relation, projects beyond the periphery of the shell, as indicated in Figs. 1 and 3.

The body 1 and the shell 2 are provided with aligning recesses at diametrically opposite points to receive helical springs 24, which effect an axial movement of the shell on the body, when the trip lever 17 is disengaged from the locking pin 8.

Slidably mounted on the shell 2 is a tripping sleeve 25 having the usual spool section 37 adapted to be engaged by a yoke of the general type shown in the patent aforesaid. Mounted in aligning recesses in the rear face of the shell 2 and the spool section of the sleeve 25 are helical springs 26, which normally tend to move the sleeve axially on the shell. Formed on the interior of the sleeve 25 is a recess 34 into which the nose of the trip lever 17 normally projects, the forward wall of the recess being curved or beveled and lying in close proximity to the nose of the trip lever, so that a relatively slight axial movement of the sleeve on the shell will cause the inclined wall of the recess 34 to rock the trip lever 17 and thereby unlock the shell 2 from the body 1 and permit said shell to move axially on the body, which movement will cause the chaser cam studs to retract the chasers 4.

The hub of the shell 2, which engages the shank 11 on the body, is provided at diametrically opposite points with slots 62 in which locking dogs 60 are pivoted on pins 61, the noses of the dogs engaging notches or recesses 63 in the spool section of the sleeve 25 to lock the sleeve to the shell and the tails of the dogs projecting through slots 11′, 11′ formed in the tubular shank 11.

Slidably mounted in the bore of the shank 11 and held against rotation therein by a key 53 is a tubular member 50 provided with in-

terior threads 51 and having diametrically opposite openings 56, which are engaged by the tails of the locking dogs 60, said member 50 also having a key-way 52 formed in the surface thereof to be engaged by the key 53. Mounted for axial adjustment within the threaded bore of the member 50 is a screw stud 54, which is locked in its various positions of adjustment by means of a set nut 55. The tubular member 50 and the screw spindle 54 constitute an adjustable abutment to be engaged and moved by the work to effect the instant retraction of the chasers 4 when a predetermined length of thread has been cut. It will be understood that the screw spindle 54 may be supplied with a head of any proper form to engage the end of the work being threaded. Mounted in the shank 11 is a helical spring 65, confined between a ring 66, threaded into the shank and the end of member 50 and serving to return the abutment and the latches to normal position, indicated in Fig. 1, when the die head is closed.

In operation, the die head is mounted on a drill press, lathe or other suitable machine with which devices of this kind are usually employed, the head being advanced and retracted as a whole for each threading operation. In the threading operation, the parts of the head are in the relation shown in Fig. 1 with the shell locked to the body and the outer sleeve locked to the shell and the chasers 4 are in their projected relation within the body. The head is advanced until the work to be threaded is engaged by the chasers and the advancing movement of the head continues until the work encounters the forward end of the abutment, constituted by the threaded spindle 54, the continued movement of the head causing the spindle to shift the member 50 longitudinally in the bore of the shank 11 and trip the dogs 60 out of engagement with the recesses 63 in the outer sleeve, thereby unlocking the latter from the shell and permitting the springs 26 to move the sleeve 25 axially on the shell with the result that the inclined face of the recess 34 on the interior of the shell, which is separated from the nose of the trip lever by a narrow space, immediately engages the trip lever and moves the same out of locking engagement with the locking pin 8, thereby unlocking the shell from the body and permitting the springs 24 to force the shell longitudinally of the body, thereby retracting the chasers 4, the several parts occupying the position shown in Fig. 2. It will be apparent that, by adjusting the screw spindle 54 of the abutment, the release of the dogs 60 from engagement with the sleeve 25 may be accurately regulated and will be followed immediately by the rocking of the trip lever 17, due to the movement of the outer sleeve under the action of spring 26, thereby unlocking the shell 2 from the body 1 and permitting the said shell to be instantly moved axially of the body under the influence of springs 24, which effect the immediate withdrawal of the chasers 4 from engagement with the work. After each threading operation has been completed, the movement of the head is reversed and the outer sleeve 25 engages a suitable stop to arrest the movement of the same, an example of which is shown in the patent aforesaid. The continued movement of the head causes the body portion 1 to slide within the shell 2 until the trip lever 17 engages the locking pin 8 and the head and shell move together, the movement of the shell causing the dogs 60 to shift the abutment axially of the bore of the shank 11 and back to normal or initial position, the noses of the dogs engaging the recesses 63 in the sleeve and locking the shell to the sleeve, the movement of the abutment being assured by action of spring 65, the several parts of the apparatus being restored to the position illustrated in Fig. 1 and ready for the next threading operation.

What I claim is:

1. In combination with a die head including a body having a hollow shank and carrying radially adjustable chasers, a shell slidable on said body and carrying means for opening and closing said chasers and also carrying a trip for locking the shell to the body against the tension of spring means normally tending to move the shell axially of the body and a tripping sleeve slidable on the shell and having an internal recess shouldered to operate the trip and permit the shell to move axially on the head and retract the chasers; of a dog pivoted to the shell and adapted to lock the shell to the sleeve, an abutment slidable in the hollow shank and engaging the dog to move the same into unlocking position when the abutment is moved by the work being operated upon, and spring means interposed between the shell and the sleeve to move the sleeve axially of the shell when said dog is retracted.

2. A device as described in claim 1 in which the abutment is adjustable in length, whereby the engagement thereof by the work may be regulated.

3. A device as described in claim 1 in which the abutment comprises a bushing splined to the interior of the shank and a screw spindle adjustable longitudinally of the bushing and extending toward the front of the head.

4. A device as described in claim 1 in which the abutment is returned to its initial position by the dog when the shell is moved into locking engagement with the head.

5. A die head body having radially operating chasers and a hollow shank, a shell slidably mounted on said body and having means for moving said chasers to operative and inoperative position, a trip for locking the shell to the body, a sleeve slidable on the shell having an interior shoulder for releasing the trip,

springs interposed between the body and shell and between the shell and sleeve normally tending to effect relatively axial movements of said parts, dogs pivoted to the shell and adapted to engage recesses in the sleeve to lock said parts together, and an abutment slidable in said shank and having openings engaged by the dogs, said abutment being engageable by the work being operated upon to retract the dogs from locking relation when a predetermined length of thread has been formed by the chasers.

6. A device as described in claim 5 in which the abutment comprises an internal bushing splined to the interior of the shank and a screw spindle engaging the bushing and extending toward and adjustable relatively to the chasers.

7. In combination with a die head including a body having a hollow shank and carrying radially adjustable chasers, a shell slidable on said body and carrying means for opening and closing said chasers and also carrying a trip for locking the shell to the body against the tension of spring means normally tending to move the shell axially of the body and a tripping sleeve slidable on the shell and having an internal recess shouldered to operate the trip and permit the shell to move axially on the head and retract the chasers; of a dog pivoted to the shell and adapted to lock the shell to the sleeve, an abutment slidable in the hollow shank and engaging the dog to move the same into unlocking position when the abutment is moved by the work being operated upon, spring means interposed between the shell and the sleeve to move the sleeve axially of the shell when said dog is retracted, and a spring in the shank engaging the abutment to insure the return of the latter to normal position.

In testimony whereof I affix my signature.

EDWIN O. WILLIAMSON.