

Dec. 11, 1945.

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2,390,647

SCREW DIE-HEAD

Filed June 13, 1944

2 Sheets-Sheet 1

FIG. 1.

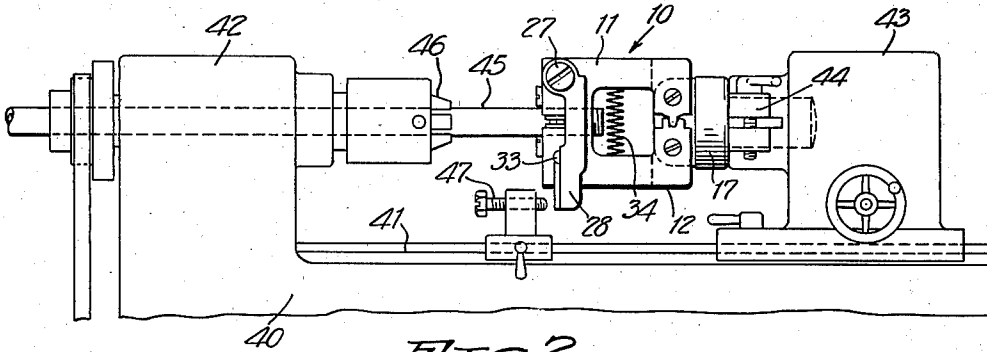


FIG. 2.

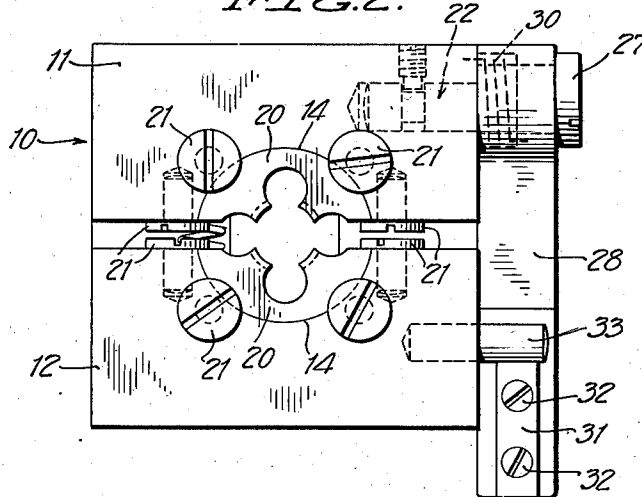
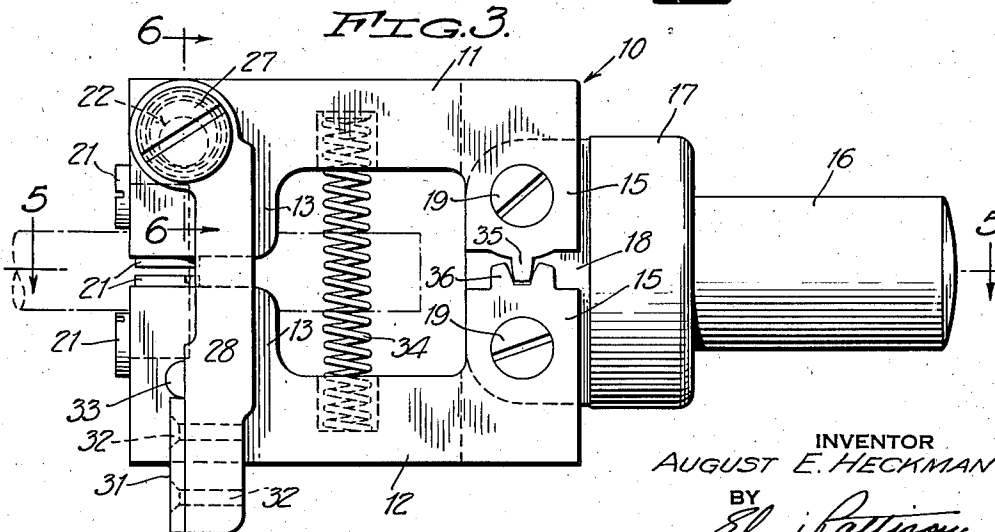


FIG. 3.



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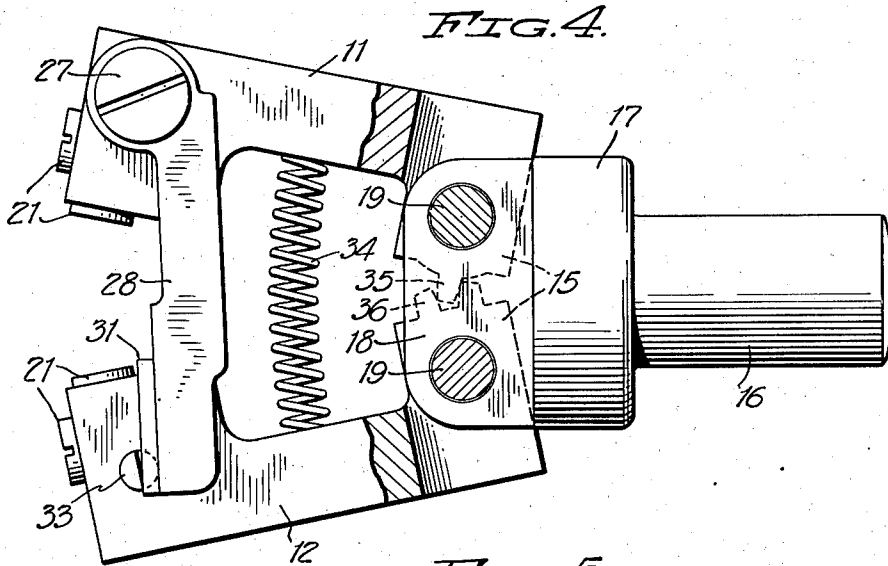
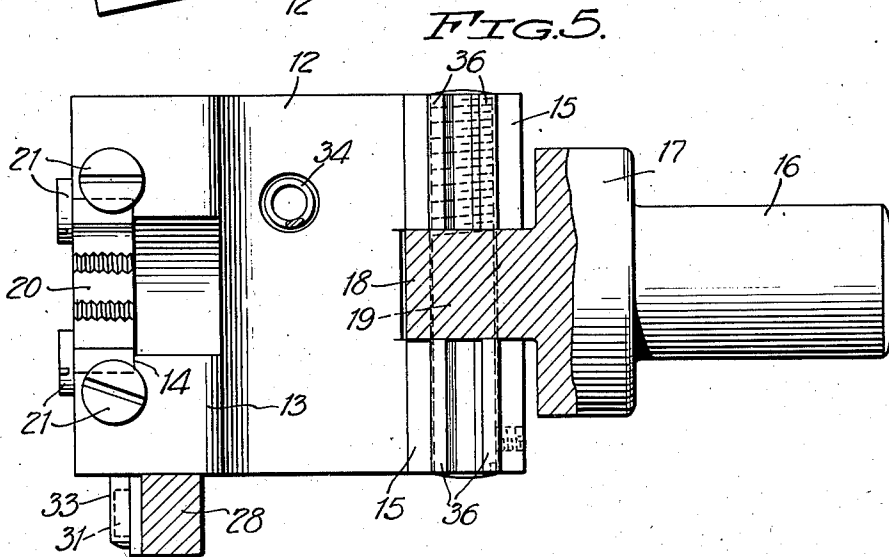
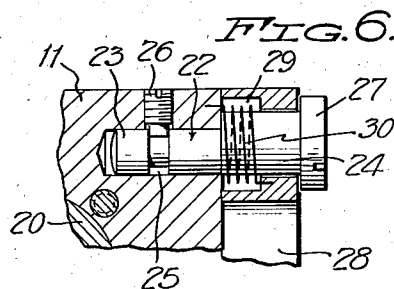
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2 Sheets-Sheet 2



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2,390,647

SCREW DIE-HEAD

August E. Heckman, Seaford, N. Y.

Application June 13, 1944, Serial No. 540,077

6 Claims. (Cl. 10—116)

This invention relates to a screw thread cutting die-head which is automatically releasable and self-opening and automatically closing, and has especial reference to a screw thread cutting die-head which may be used in automatic and other types of lathes.

More particularly the die-head of the present invention is of the type disclosed in my copending application, Serial No. 508,733, filed November 2, 1943, issued as Patent No. 2,357,739, September 5, 1944.

An object of the present invention is the provision of a die-head of the indicated character embodying improvements whereby the thread cutting die sections may be closed in proper relation for ready cutting of the threads, and which sections will open and be disengaged from the cut threads to permit ready withdrawal from the work.

A further object of the invention is the provision of improvements in a die-head of the character mentioned whereby the holder members or jaws of the thread cutting die sections are so constructed and arranged that said sections will move equally and in unison to the open and closed relationship.

A further object is the provision of improvements for releasably latching the thread cutting die sections so that they may operate under proper tension and so that adjustments may be made to maintain the proper cooperative relationship of the die sections to each other.

With the foregoing, other objects, benefits and advantages of the invention will appear when the following specification is read in connection with the accompanying drawings, in which,

Figure 1 is a side elevational view of a screw thread cutting die-head embodying the features of the invention upon a lathe.

Figure 2 is a front elevational view of the die-head per se, the same being shown closed.

Figure 3 is a side elevational view thereof.

Figure 4 is a view similar to Figure 3 but showing the die-head open, and portions being broken away to show certain features.

Figure 5 is a longitudinal sectional view taken on the line 5—5 of Figure 3 and looking in the direction indicated by the arrows.

Figure 6 is a detail sectional view taken on the line 6—6 of Figure 3 and looking in the direction indicated by the arrows.

Referring now more particularly to the drawings, it will be apparent there is shown a screw thread cutting die-head 10 including die holding or supporting jaws or members 11 and 12 substantially similar to each other. Each of the members 11 and 12 is rectangular in plan and somewhat wider than it is long. There is an inwardly projecting front portion 13 having a segmental seat 14. Each jaw 11 and 12 has inwardly projecting

rear apertured lugs 15 in spaced relation to each other. The apertures in said lugs are in axial alignment. The jaws 11 and 12 are hingedly or pivotally mounted on a shank 16 having a circular abutment 17 and a diametrically disposed lug 18 on the abutment 17. The lug 18 fits between the lugs 15 of each jaw 11 and 12 when the latter are assembled with respect to said lug 18. Thus a pair of lugs 15 is disposed at each side of the lug 18 and the lugs 15 of each pair are on the jaws 11 and 12 respectively. A pivot 19 in the form of a headless bolt extends through the lugs 15 of each jaw and the lug 18, said pivot 19 being in threaded engagement with one of the lugs 15 and loose in the other lug 15 and the lug 18. In this manner the jaws 11 and 12 are hingedly or pivotally connected for movement to open and closed relation on axes extending at right angles to the longitudinal axis of the shank 16. Suitable segmental screw die sections 20 are secured in position on the seats 14 respectively of the jaws. Each section 20 is held in place by locking screws 21 driven into the related jaw with the heads of the screws 21 bearing on the section 20. The die sections 20 are complementary to each other and when the jaws 11 and 12 are in the closed relation the die sections cooperate to provide a thread cutter concentric to the axis of the shank 16.

The jaws 11 and 12 are releasably held in the closed relation by a latching device presently to be described. A stud 22 is provided which consists of a portion 23 and a portion 24 eccentric to the portion 23. The portion 23 is smaller in diameter than the portion 24 and the axis of the former is offset with respect to the axis of the latter. The portion 23 has a circular groove 25 therein, and said portion 23 is received in a bore in the jaw 11. A set screw 26 carried by the jaw 11 projects into the groove 25 to hold the stud 22 in place. The portion 24 has a kerfed head 27. A trigger arm 28 has a hole in its upper end to receive the stud portion 24, and said end also has a recess 29 larger in diameter than the diameter of the portion 24 to accommodate a helical torsional spring 30 having one end in engagement with the jaw 11 and its other end in engagement with the arm 28, as shown in Figure 6. The head 27 of the stud 22 engages the arm 28 to keep it in pivotal connection with the portion 24. The spring 30 constantly urges the arm 28 to a latching position and is yieldable to allow said arm to be moved to a releasing position. The lower end of the arm 28 has a case hardened abutment 31 secured thereto by screws 32. The abutment 31, if desired, may be formed integral with the arm 28. A case hardened half round abutment pin 33 is secured to the jaw 12 so that the arm 28 and its abutment 31 may cooperate therewith to latch the jaws 11 and 12 in the closed relation

with the die sections 20 in functioning relation for the thread cutting operation.

It will be understood that the spring 30 holds the arm 28 against the pin 33 while the abutment 31 engages said pin to latch the jaws 11 and 12 in the closed relation. A helical expansion spring 34 is arranged between the jaws with the opposite ends of the spring disposed in sockets respectively in the jaws. This spring 34 has a normal tendency to constantly urge the jaws to the open relation. The jaws are limited in their pivotal movement to the open relation by the abutment 17 which the jaws engage. By turning the eccentric stud 22 as required the trigger arm 28 may be adjusted together with the abutment 31 with respect to the pin 33, thereby making it possible to vary the closed relation of the jaws and their die sections 20. Thus the die sections 20 may be adjusted to make a first rough cut thread and then a fine or finish cut thread.

In order that the jaws 11 and 12, and therefore the die sections 20, move equally and in unison to the open and closed relation, there are provided intermeshing gear teeth 35 and 36 on the lugs 15 respectively of the jaws. The lugs 15 with their teeth function as gear sectors. Thus the die sections 20 will be closed in proper relation for ready cutting of the threads, and also will open and be disengaged from the cut threads to permit ready withdrawal from the work.

The die-head hereinabove described is shown in use in an automatic lathe by way of example. The lathe 40 includes a bed 41, a fixed head stock 42, and a sliding head stock 43. The shank 16 of the die-head 10 is clamped to the head stock 43 by a clamp 44. A piece of work 45, such as a pipe, rod, or other cross-sectionally round stock to be externally screw threaded is carried by a chuck 46 on the head stock 42, the work 45 and the shank 16 being coaxial. Consequently, the die sections 20 in the closed relationship will be coaxial to the work for the thread cutting operation. Slidably adjustable along the bed 41 is a stop 47 in the path of the abutment 31 on the arm 28. The position of the stop 47 determines the length of the portion of the work to be threaded.

With the disposition of the parts shown in Figure 1, when the die-head 10 is closed, the head stock 43 is slid along the bed 41 toward the work 45 which is being rotated by the driven chuck 46. As the die sections 20 engage the end of the work 45 the thread cutting commences and continues until the abutment 31 encounters the stop 47, whereupon the abutment 31 will be disengaged from the pin 33 and the arm 28 will be swung backwardly on its pivot 22. The spring 34 immediately causes the jaws 11 and 12 to open, thereby disengaging the die sections 20 from the work and so permitting the ready withdrawal of the die-head 10. Upon return movement of the die-head 10 by the head stock 43 the jaws 11 and 12 may be closed and latched manually or by means incorporated in the lathe for that purpose, preparatory to the next threading operation.

While I have shown and described what I consider to be the most practical embodiment of my invention, I wish it understood that such changes in construction and design as come within the scope of the appended claims may be resorted to if desired without departing from the spirit of my invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a die-head, the combination of pivotally connected die supporting jaws, resilient means constantly acting on said jaws and having a normal tendency to move said jaws to open relation with respect to each other, and a device to releasably retain said jaws in a closed relation, said device including a fixed abutment on one of said jaws, a trigger, a pivot consisting of eccentrically related portions integral with each other, the first of said portions secured to one of said jaws, the second of said portions engaged with said trigger, said trigger thus being mounted for pivotal movement and also being adjustable, said trigger being releasably engageable with said abutment, and resilient means coacting with said trigger to keep the trigger under suitable tension while it is engaged with said abutment.

2. In a die-head, the combination of companion die supporting jaws, spaced pairs of lugs on said jaws, a shank, a pivot extending through the lugs of each jaw and a portion of the shank to connect each jaw for pivotal movement to open and closed position, and gear teeth on the lugs of one jaw which mesh with teeth on the lugs of the other jaw to cause the jaws to move in unison in response to pressure exerted on either of said jaws.

3. In a die-head, the combination of pivotally connected die supporting jaws, resilient means constantly acting on said jaws and having a normal tendency to move said jaws to open relation with respect to each other, and a device to releasably retain said jaws in a closed relation, said device including a fixed abutment on one of said jaws, a trigger, means mounting said trigger on the other of said jaws for pivotal movement and also for adjustment, said trigger being releasably engageable with said abutment, and resilient means coacting with said last means to constantly keep said trigger under suitable tension while the trigger is engaged with said abutment.

4. In a die-head, the combination of pivotally connected die supporting jaws, resilient means constantly acting on said jaws and having a normal tendency to move said jaws to open relation with respect to each other, and a device to releasably retain said jaws in a closed relation, said device including a fixed abutment on one of said jaws, a trigger, and means mounting said trigger on the other of said jaws for pivotal movement and also for adjustment, said trigger being releasably engageable with said abutment, said last means consisting of a pivot composed of eccentrically related portions integral with each other, one of said portions secured to the related die supporting jaw and the other portion engaged with said trigger.

5. In a die-head having die supporting jaws which are opened by spring action, a latching device cooperating with said jaws to releasably latch them in the closed relation, said device including a trigger arm, an eccentric stud on one of said jaws providing an adjustable pivot for said trigger arm, and means to resiliently urge said trigger arm to the latching position.

6. In a die-head, the combination of hingedly connected die supporting jaws, and coacting means on said jaws to cause one jaw to move to open and closed position in response to corresponding movement of the other jaw, so that both jaws will move equally and in unison, said coacting means comprising intermeshing gear sectors.