April 18, 1933. T. M. LILLEBERG 1,903,786

DIE HOLDING MEANS

Filed June 20, 1928 3 Sheets-Sheet 1

Fig. 1.

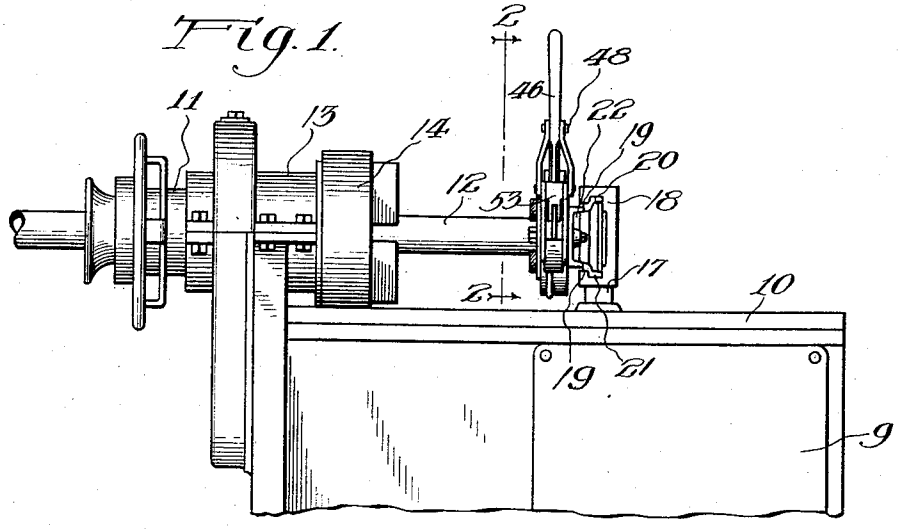


Fig. 7.

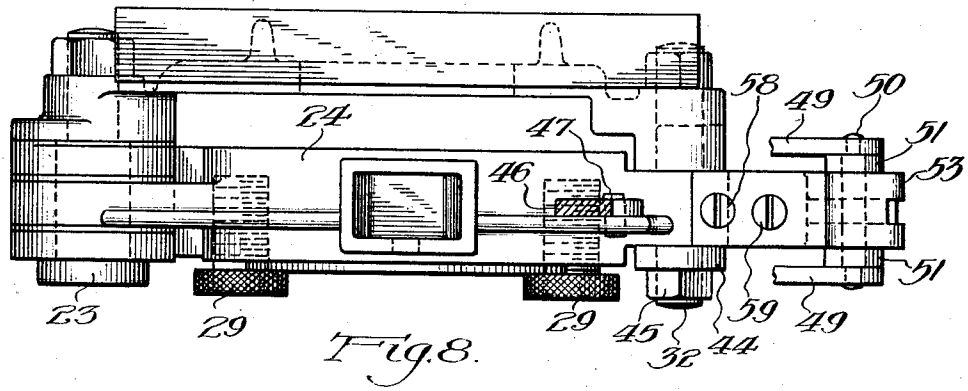
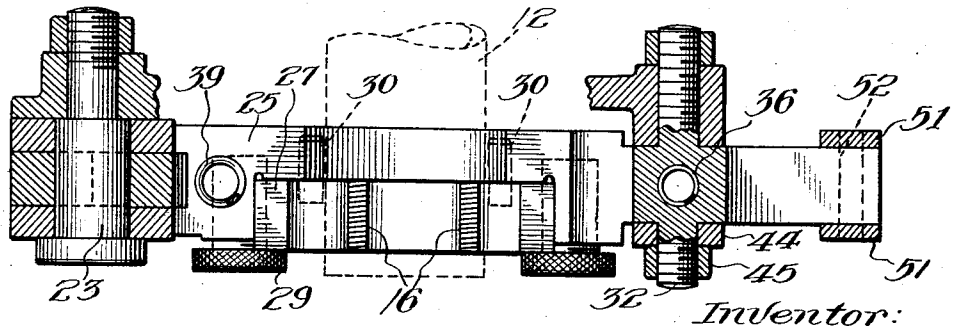


Fig. 8.



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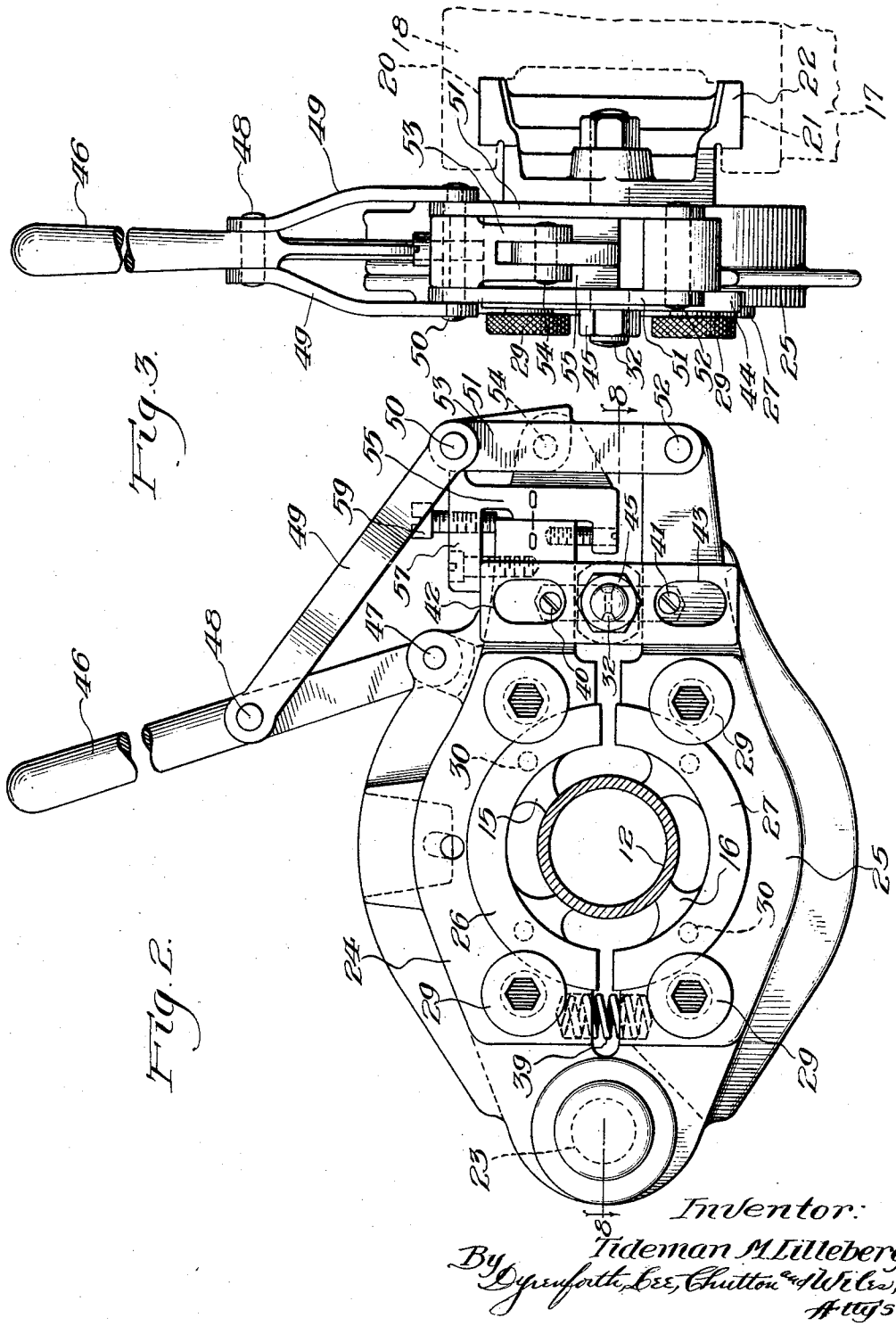


Fig. 3.

Fig. 2.

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Filed June 20, 1928 3 Sheets-Sheet 3

Fig. 5.

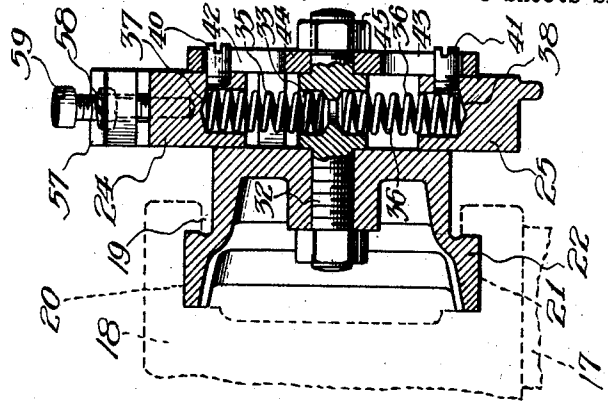


Fig. 4.

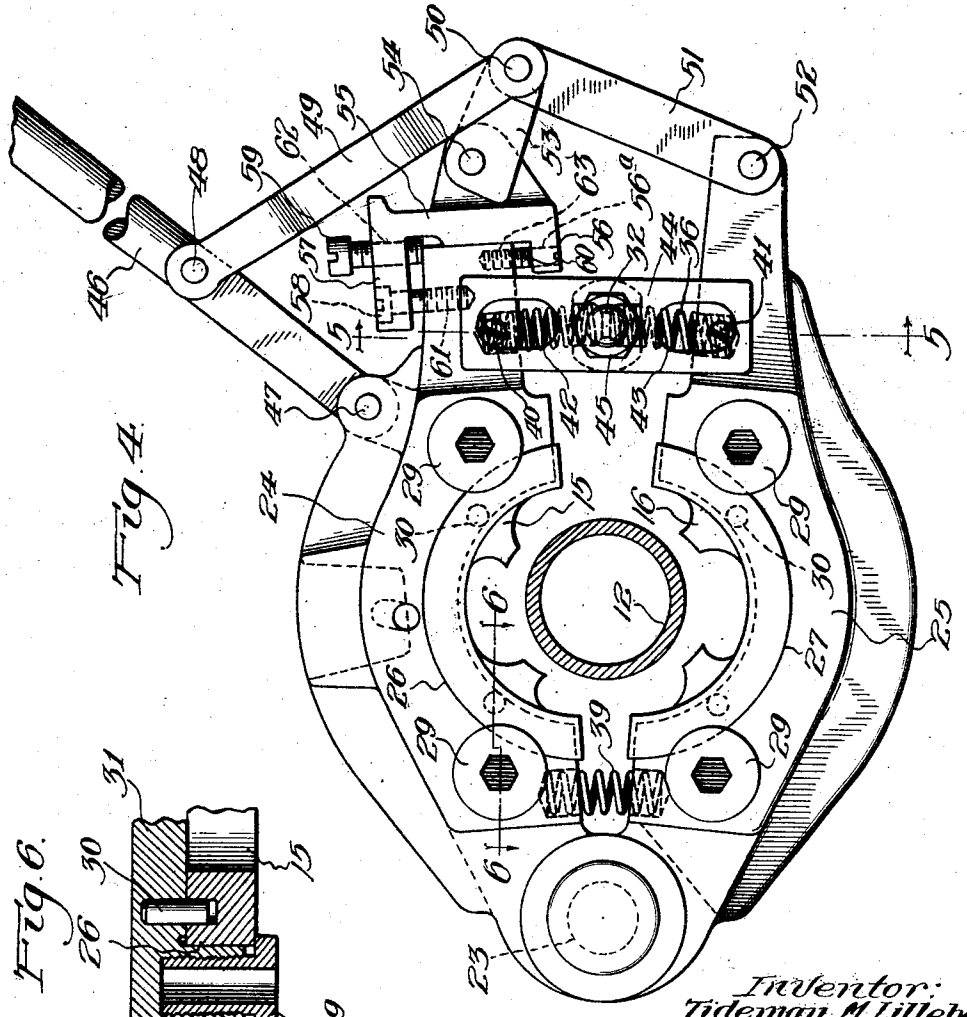


Fig. 6.

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UNITED STATES PATENT OFFICE

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DIE HOLDING MEANS

Application filed June 20, 1928. Serial No. 286,955.

My invention relates, more particularly, to holder structures for threading dies as for example dies to be used in threading pipes and the like.

My primary object is to provide for the holding of a die formed in separate parts in a manner to permit of the conditioning of the die sections to form the die and their ready separation, following the threading operation, to disengage them from the threads cut thereby and thereby permit of the ready withdrawal of the pipe from the die, or the die from the pipe, as desired.

Referring to the accompanying drawings:—

Figure 1 is a view in elevation of the upper portion of a pipe-threading machine embodying my invention.

Figure 2 is an enlarged view of the die and holding means therefor of Fig. 1, the pipe being shown in section, this view being taken at the line 2—2 on Fig. 1 and viewed in the direction of the arrow and showing the die and its holder in closed thread-cutting condition.

Figure 3 is an end view of the mechanism of Fig. 2, the mechanism being viewed from the right hand side of Fig. 2.

Figure 4 is a view like Fig. 2 and of the mechanism therein shown, showing the die and its holder in open position for releasing the pipe after the threading operation.

Figure 5 is a section taken at the line 5—5 on Fig. 4 and viewed in the direction of the arrow.

Figure 6 is an enlarged, broken, sectional view taken at the line 6—6 on Fig. 4 and viewed in the direction of the arrows.

Figure 7 is a plan view of the die-holding means; and

Figure 8, a section taken at the line 8—8 on Fig. 2 and viewed in the direction of the arrows.

I have chosen to illustrate my invention as embodied in a pipe-threading machine shown in Fig. 1 and as to its general features well known in the art, the machine comprising a frame 9 the top 10 of which is provided with guide-ways (not shown) extending lengthwise thereof, one end of the frame being equipped with a tubular head 11, the opening in which extends longitudinally of the machine and receives the pipe to be threaded, such as that represented at 12. The head 11, which is rotatably mounted in bearings 13 on the frame 9 and is driven by any suitable mechanism (not shown), is provided at its inner end with a chuck-member 14 through which the pipe 12 extends and by which it is equipped to cause it to be rotated by the head 11.

Mounted on the guide-ways referred to for adjustment along the latter, is die and holder mechanism for threading the pipe 12 and constructed in accordance with my invention.

The die to be used is formed of two similar sections 15 and 16, preferably provided by making the die of round form in one piece and then cutting it diametrically therethrough, the sections being preferably formed in this way as it ensures matching of the threads when the sections of the die are locked together to form a rigid die as hereinafter described.

The holder for the die sections 15 and 16 comprises an upright 17 at which the holder engages the guide-ways referred to, this upright terminating at its upper end in a base-portion 18 containing a recess 19 having upper and lower guide-grooves 20 and 21 in which a slide 22 extending crosswise of the axis of the head 11 is mounted.

The slide 22 has pivotally connected therewith, at a stud 23 thereon, a pair of holder levers 24 and 25, which extend crosswise of the axis of the pipe 12 to be threaded, and at opposite sides of said axis and above and below the pipe, respectively, the pivotal connections of these levers with the stud 23 being at ends of these levers and to one side of said axis, as shown.

The holder-levers 24 and 25 are recessed as represented at 26 and 27, respectively, to receive the die sections 15 and 16, the marginal edges of which are engaged by the lapping heads of screws 29 screwed into these levers, the levers 24 and 25 being provided with forwardly-projecting dowels 30 which slidingly extend into recesses 31 (one only of which is shown) in these die-sections.

Positioned on the slide 22, at the side of the pipe 12 opposite that adjacent to which the stud 23 extends, is a stud 32 shown as containing upwardly opening and downwardly opening recesses 33 and 34, respectively, the studs 23 and 32 being preferably so positioned that a line connecting their centers would intersect the axis of the pipe 12 positioned in the machine for threading.

Extending into the recesses 33 and 34 are the lower and upper ends of coil springs 35 and 36, respectively, the upper end of spring 35 and the lower end of spring 36 extending into sockets 37 and 38, respectively, in the levers 24 and 25, these springs being under initial compression and exerting yielding force tending to swing said levers in opposite directions about the pivoting stud 23, other spring means comprising a spring 39, interposed between these levers between the pipe 12 and the pivoting stud 23, also serving to yieldingly swing these levers toward separated condition.

The levers 24 and 25 are provided with stop pins 40 and 41, respectively, which extend into, and are movable up and down in, vertically elongated slots 42 and 43 in a plate 44 secured to the stud 32 to extend adjacent the outer faces of the levers 24 and 25, this plate being held to the stud by a nut 45 screwed on the outer end of the stud. The stop pin cooperating with the upper end of the slot 42 limits upward movement of the lever 24 and the pin 41 in cooperating with the lower end of the slot 43 limits downward movement of the lever 25.

Means are provided for controlling the positions occupied by the levers 24 and 25, to cause these levers to extend into die-open position or die-closed position, at will, these means comprising a lever 46 pivotally connected, as indicated at 47, with the lever 24 and having pivotal connection at 48 with the upper end of a link 49. The lower end of the link 49 is pivotally connected, at 50, with the upper end of a link 51 pivotally connected at 52 at its lower end to the outer end of the die-holding lever 25, the pivot 50 also being connected with the outer end of a link 53, the inner end of which is pivotally connected at 54, with the outer end of the die-holding lever 24. The links 51 and 53 form in effect a toggle the movement of which into and out of extended position, is controlled by the lever 46 through the link 49.

The parts of the mechanism just described are such that when the actuating lever 46 is swung to the position shown in Fig. 2, the pivot 50 will be carried into a position in which it is substantially in line with a line drawn through the pivots 52 and 54, as shown, in which position the die-holding levers 24 and 25 are in die-closed position, the positioning of the actuating-lever mechanism as stated, effecting a locking of the levers 24 and 25 in the position stated, in which position the springs 35, 36 and 39 are in compressed condition.

The connection of the link 53 with the die-holder lever 24 is preferably an adjustable one produced, in the particular construction shown, by forming the outer end of the die-holding lever of a separate section 55 carrying the pivot 54 and adjustable crosswise of the body portion of the lever 24 in a direction toward and away from the lever 25. The section 55 is shown as provided with a pair of arms 56 and 57 at which it straddles the outer end of the body portion of the lever 24, the arm 57 carrying set screws 58 and 59 and the arm 56 a guide screw 60, for permitting adjustment of the section 55 up and down on the lever 24. The set screw 58 is journalled in the arm 57 and screws into a threaded opening 61 in the body portion of the lever 24, whereas the set screw 59 is threaded in an opening 62 in the arm 57 and bears against the upper surface of the body portion of the lever 24. The guide screw 60 is screwed into the opening 63 in the body of the lever 24 and at its outer, lower, end is slidable in an opening 56[a] in the arm 56, to thereby serve merely as a guide.

It will be understood from the foregoing that by constructing the die-holder in accordance with my invention it is not necessary in disengaging the pipe from the die, to rotate the pipe at its threads out of the die, but merely to throw the actuating lever 46 to the right in Fig. 2 whereupon the die-holding levers 24 and 25 swing upwardly and downwardly, respectively, to the position shown in Fig. 4, which releases the pipe for removal from its position within the confines of the die, the various parts of the mechanism being so constructed and arranged as shown that the die-holding levers 24 and 25 move in opposite directions substantially the same distance, and that when the actuating lever 46 is operated in the reverse direction to the position shown in Fig. 2, the levers 24 and 25 will move into substantially predetermined position in which the die is closed for cutting the desired threads.

The arrangement of the springs 35 and 36 at the side of the pipe opposite that at which the levers 24 and 25 are pivotally connected by the stud 23 is desirable in order that the necessity for centralizing the die sections be reduced to the minimum.

The purpose of providing the adjustable sections 55 is to provide means whereby the die carrying portion of the lever 24 may be adjusted relative to the die-holder lever 25 to effect the production of oversize or undersize threads, if desired.

In the particular construction shown the holder members 24 and 25 and the stud 32 are so shaped and proportioned, as shown,

that the space between the members 24 and 25 at the stud 32, in the closed position of the device, is of less vertical height than the vertical dimension, namely, the thickness of the stud 32. Thus the members forming the die holder are adapted for rocking movement as a unit on the pivot 23, which is very desirable as the holder device may thereby float so to speak with the work being threaded when the latter is not truly concentric with the axis about which the work rotating means rotate.

While I have illustrated and described a particular embodiment of my invention, I do not wish to be understood as intending to limit it thereto, as the same may be variously modified and altered without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent is:

1. A holder for a sectional die comprising a support, a pair of upper and lower die-section-holding levers pivoted at one end to said support, an abutment on said support adjacent the other end of said pair of levers and located between the latter, springs bearing against said abutment and said levers, respectively, and yieldingly forcing said levers to die-open position, stop means for each of said levers limiting the upward movement of the upper one of said levers and the downward movement of the other of said levers, and lever mechanism having an actuating element fulcrumed on one of said die-holding levers, operatively engaging the other of said die-holding levers and by which said die-holding levers may be moved to die-closed position and be locked in such position.

2. A holder for a sectional die comprising a pair of holder members for the respective die-sections pivotally connected together, a toggle comprising pivotally connected links, said links being pivotally connected, respectively, with said members, a lever pivoted to one of said members, and a link pivotally connecting said lever with the pivotal connection between said toggle links.

3. A holder for a sectional die comprising a pair of holder members for the respective die-sections pivotally connected together, a toggle pivotally connected with said members, a pivotally supported actuating lever, and means connecting said lever with said toggle, said lever in the closed position of said members extending in a position in which it tends, by gravity, to hold said members in closed position.

4. A holder for a sectional die comprising a pair of holder members for the respective die-sections pivotally connected together, a toggle comprising pivotally connected links, said links being pivotally connected, respectively, to said members, a pivotally supported actuating lever, and a link pivotally connecting said lever with the pivotal connection between said toggle links, said lever in the closed position of said members extending in a position in which it tends, by gravity, to hold said members in closed position.

5. A holder for a sectional die comprising a pair of holder members for the respective die-sections pivotally connected together, one of said members having a section adjustable thereon in a crosswise direction toward and away from the other of said members, and locking means for holding said members in closed position comprising cooperating parts operatively connected together and with said section and with the other of said members, respectively.

6. A holder for a sectional die comprising a pair of holder members for the respective die-sections pivotally connected together, one of said members having a section adjustable thereon in a crosswise direction toward and away from the other of said members, and toggle mechanism comprising links pivotally connected together and pivotally connected with said section and the other of said members, respectively.

7. A holder for a sectional die comprising a pair of pivoted holders for the respective die sections movable automatically to open position, toggle mechanism operatively engaging said members for actuating the latter to closed position and comprising elements pivotally connected together and operatively engaging said members, means engaging said toggle mechanism at the joint between said elements and by which said toggle is operated, and stop means preventing the spreading of said members to a position in which the elements of said toggle mechanism assume dead center position.

8. A holder for a sectional die comprising a pair of pivoted holder members for the respective die sections, spring means urging said members apart, toggle mechanism operatively engaging said members for actuating the latter to closed position and comprising elements pivotally connected together and operatively engaging said members, means engaging said toggle mechanism at the joint between said elements and by which said toggle is operated, and stop means preventing the spreading of said members to a position in which the elements of said toggle mechanism assume dead center position.

9. A holder for a sectional die comprising a pair of holder members for the respective sections of the die and pivoted on a common axis, said members being located above, and below, respectively, the work to be threaded, stop means engageable by the upper one of said members for limiting the downward movement of the latter, the space between said members at said stop means when said members are in die-closed position being greater vertically than the vertical height of said stop means to permit said members to

swing as a unit on said common pivot, and means engaging said members for holding them in die-closed position.

10. A holder for a sectional die comprising a pair of holder members for the respective sections of the die and pivoted on a common axis, said members being located above and below, respectively, the work to be threaded, stop means engageable by the upper one of said members for limiting the downward movement of the latter, the space between said members at said stop means when said members are in die-closed position being greater vertically than the vertical height of said stop means to permit said members to swing as a unit on said common pivot, and means engaging said members, respectively, and bodily movable therewith for moving said members to die-closed position.

11. A holder for a sectional die comprising a pair of holder members for the respective die-sections pivotally connected together, one of said members having a section adjustable thereon in a crosswise direction toward and away from the other of said members, locking means for holding said members in closed position comprising cooperating parts operatively connected together and with said section and with the other of said members, respectively, and means for operating said cooperating parts into member closing position.

12. A holder for a sectional die comprising a pair of holder members for the respective die sections pivotally connected together, one of said members having a section adjustable thereon in a crosswise direction toward and away from the other of said members, toggle mechanism comprising links pivotally connected together and pivotally connected with said section and the other of said members, respectively, and means for actuating said toggle mechanism.

13. A holder for a sectional die comprising a pair of holder members for the respective sections of the die and pivoted on a common axis, said members being located above, and below, respectively, the work to be threaded, means engageable by the upper one of said members for limiting the downward movement of the latter comprising a stationary stop member and a spring engaging said stop member and yieldingly resisting lowering of the upper one of said holder members, the space between said holder members at said stop means when said holder members are in die-closed position being greater vertically than the vertical height of said stop means to permit said holder members to swing as a unit on said common pivot, and means engaging said member for holding them in die-closed position.

14. A holder for a sectional die comprising a pair of holder members for the respective sections of the die and pivoted on a common axis, said members being located above, and below, respectively, the work to be threaded, stop means located between said holder members and engageable by the upper one of said members for limiting the downward movement of the latter, the space between said members at said stop means when said members are die-closed being greater vertically than the vertical height of said stop means to permit said members to swing as a unit on said common pivot, and means engaging said members for holding them in die-closed position.

15. A holder for a sectional die comprising a pair of holder members for the respective sections of the die and pivoted on a common axis, said members being located above, and below, respectively, the work to be threaded, a stationary stop member located between said holder members, springs interposed between said stop member and said holder members, respectively, and yieldingly resisting movement of said holder members toward each other, the space between said holder members at said stop member when said holder members are in die-closed position being greater vertically than the vertical height of said stop member to permit said holder members to swing as a unit on said common pivot, and means engaging said holder members for holding them in die-closed position.

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