

March 31, 1931.

R. L. WILCOX

1,798,920

THREADING MACHINE

Filed Jan. 20, 1930

9 Sheets-Sheet 1

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March 31, 1931.

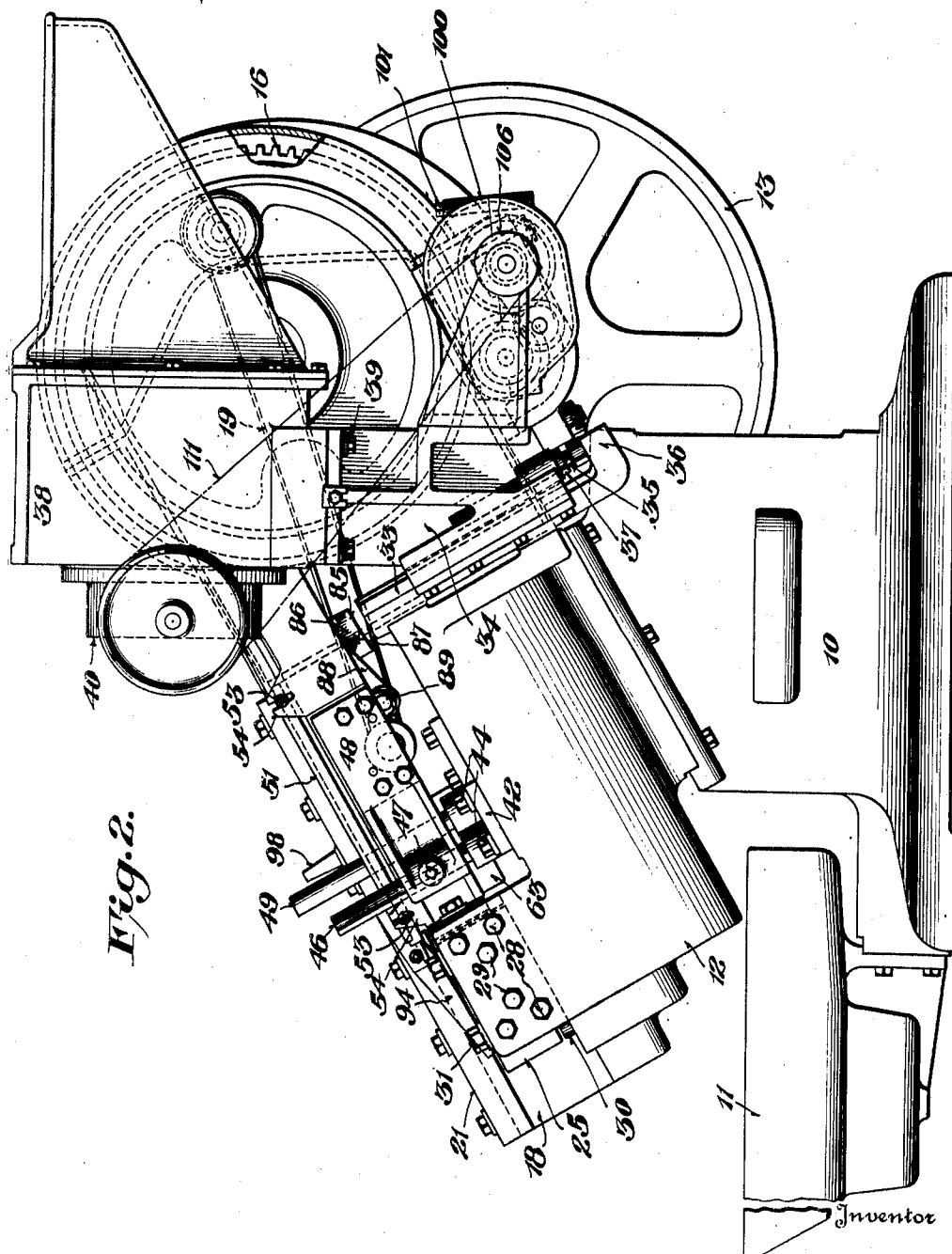
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THREADING MACHINE

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9 Sheets-Sheet 2



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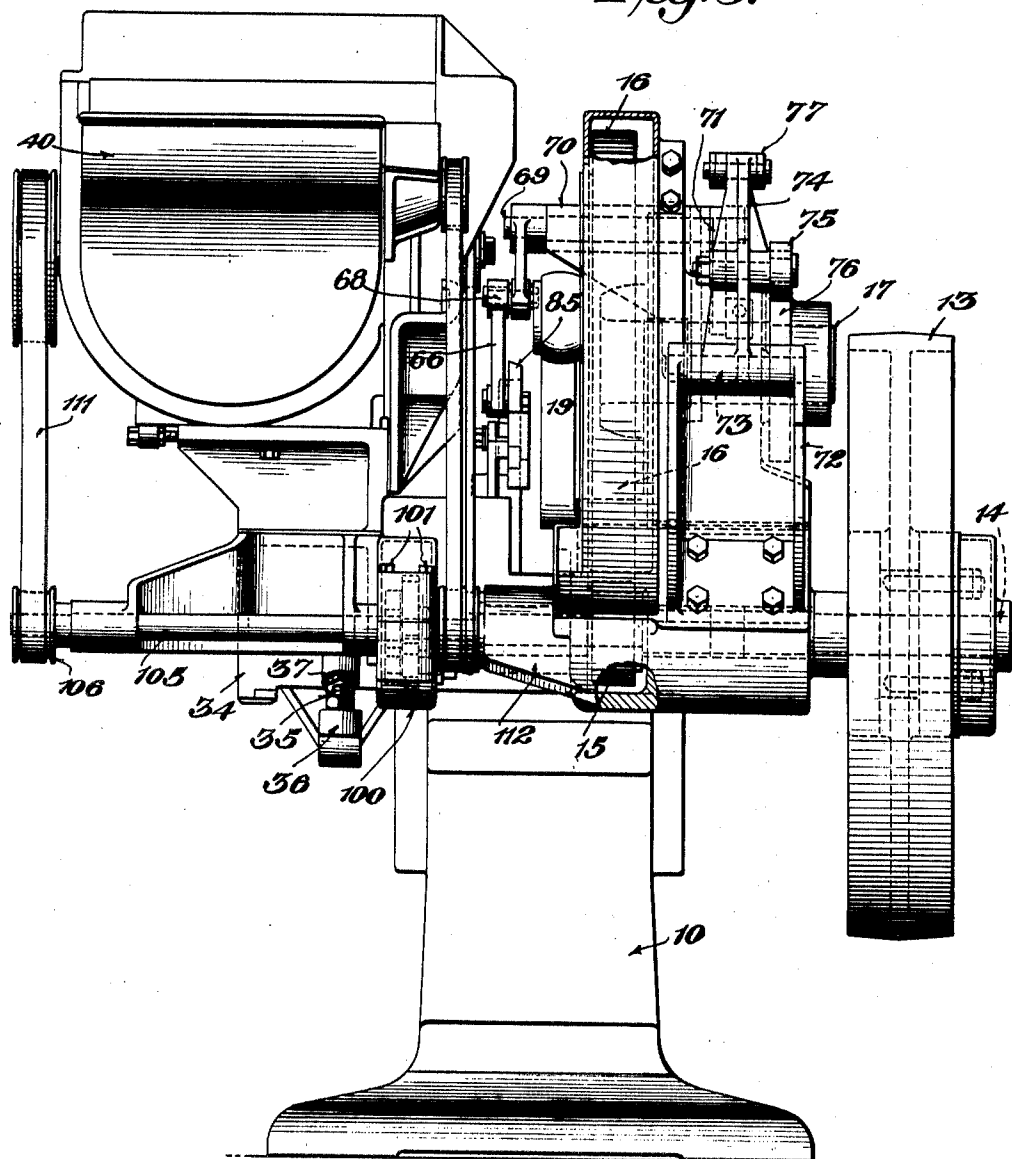
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Fig. 3.



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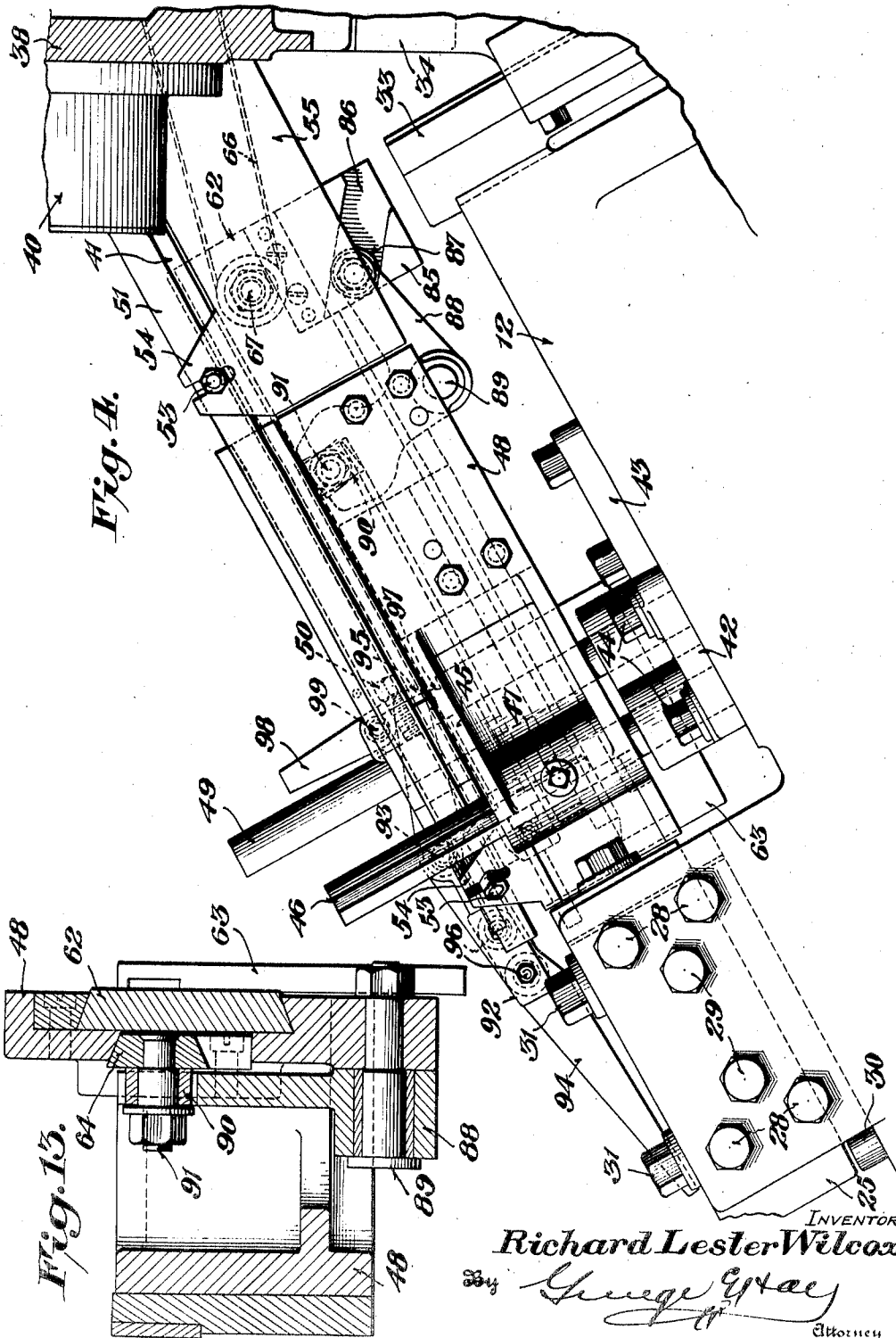
R. L. WILCOX

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THREADING MACHINE

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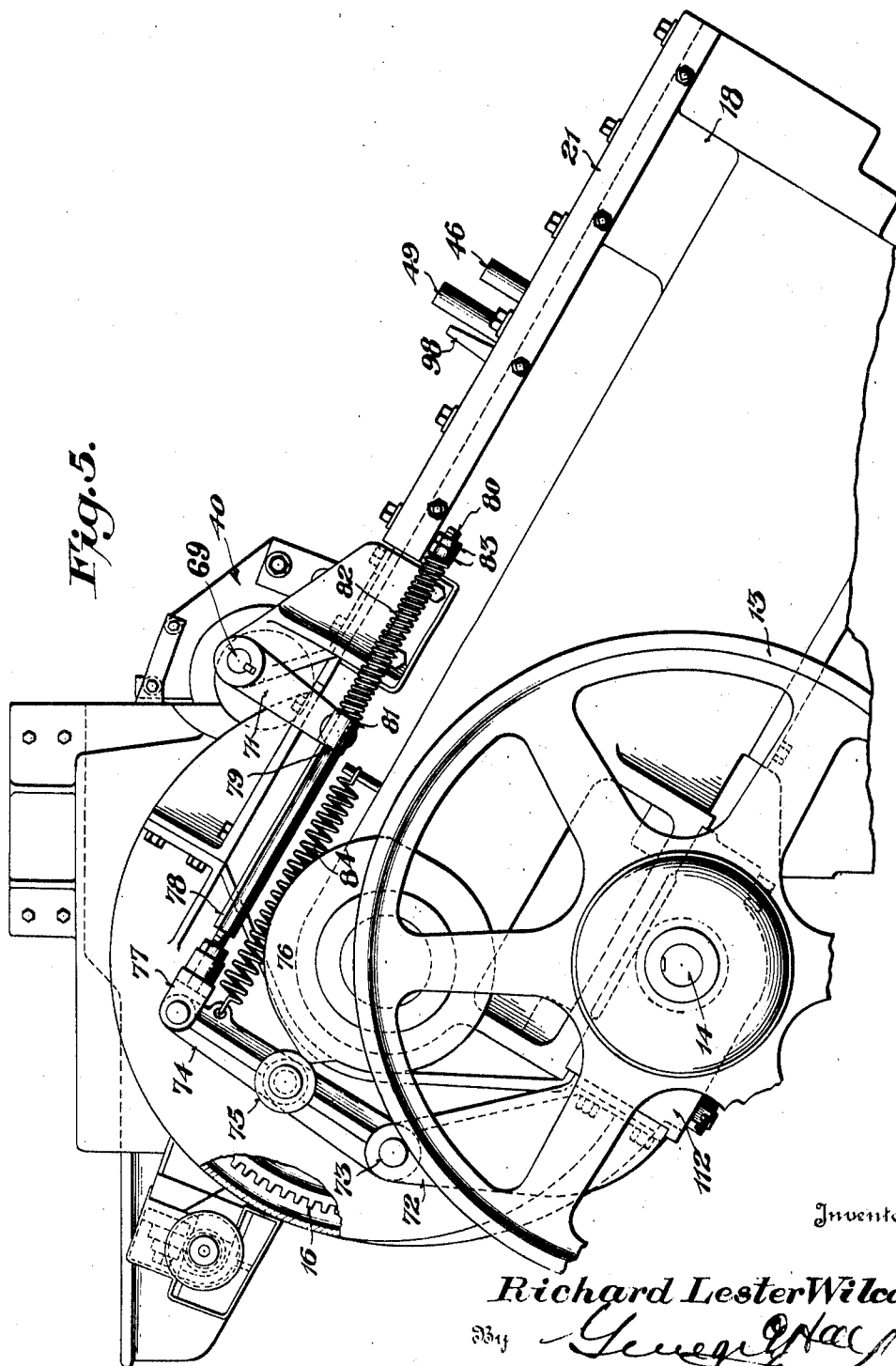
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THREADING MACHINE

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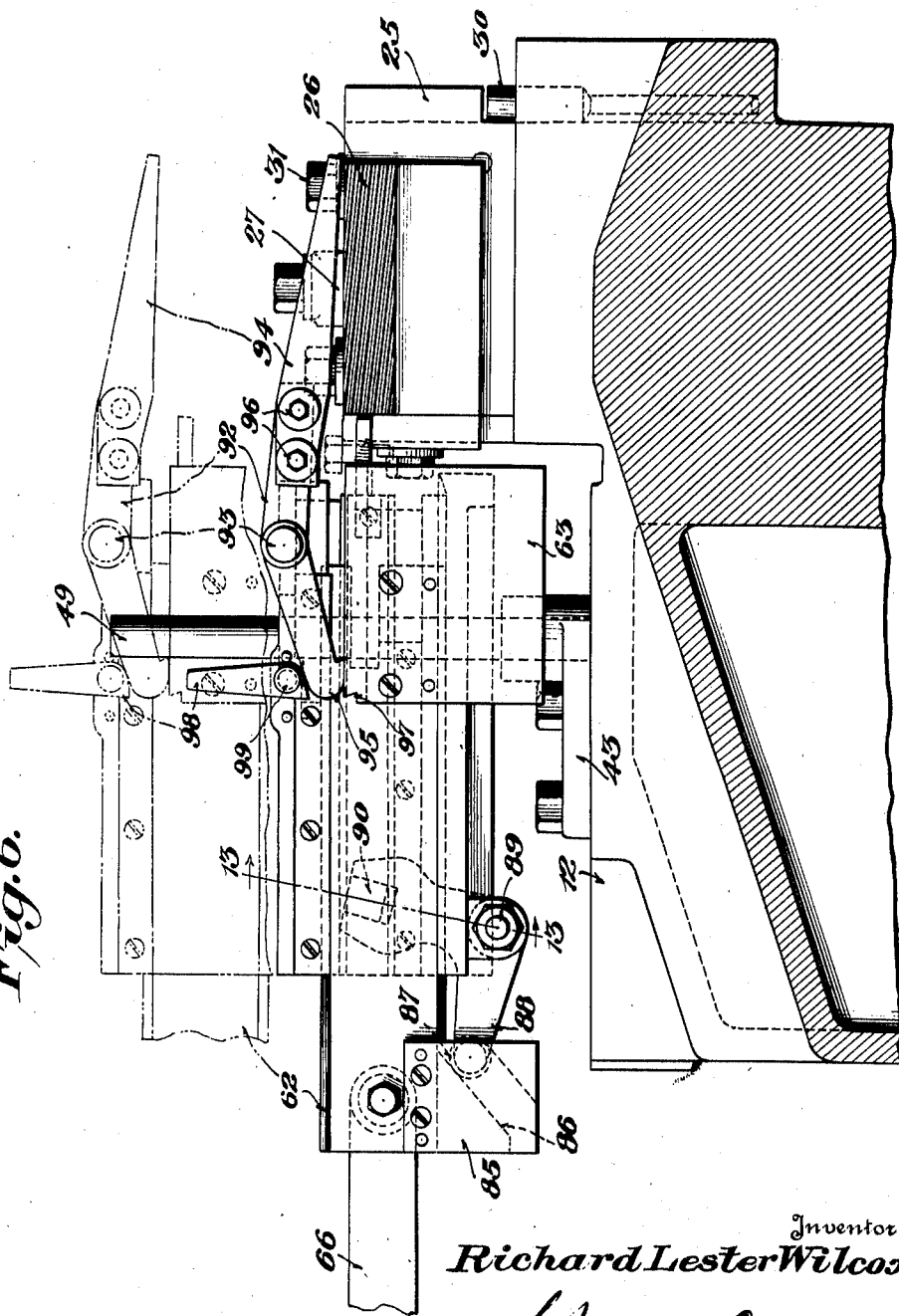
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Fig. 6.



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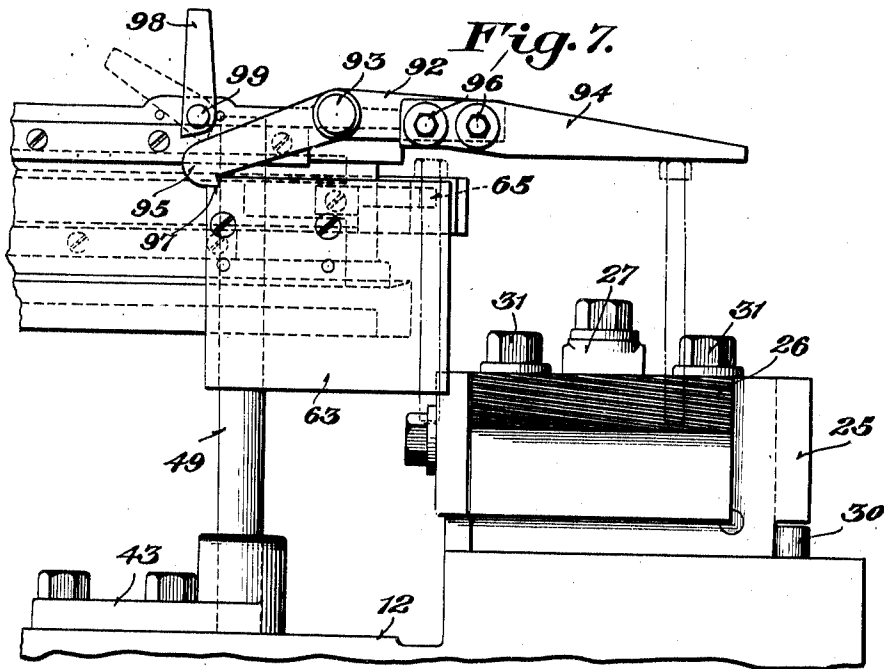
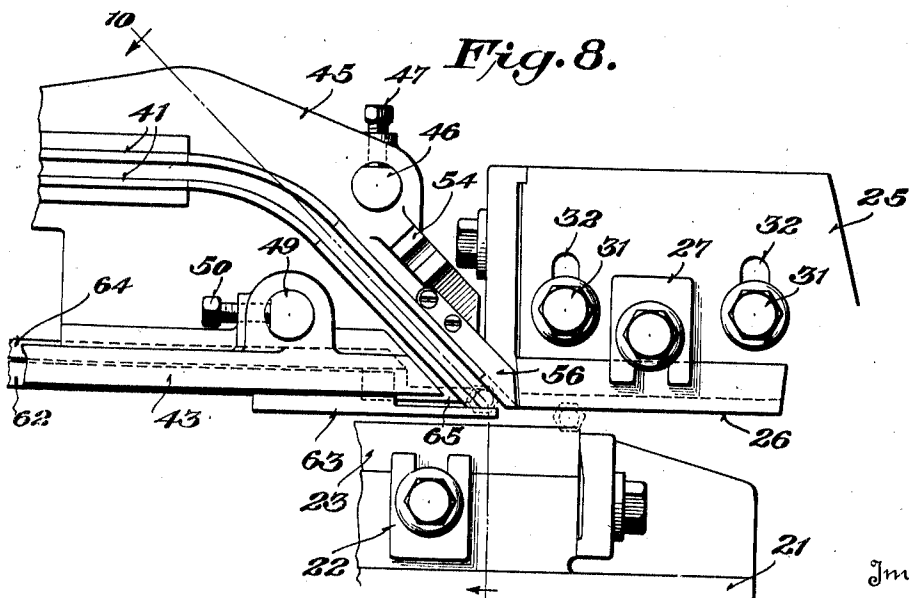
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THREADING MACHINE

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Fig. 9.

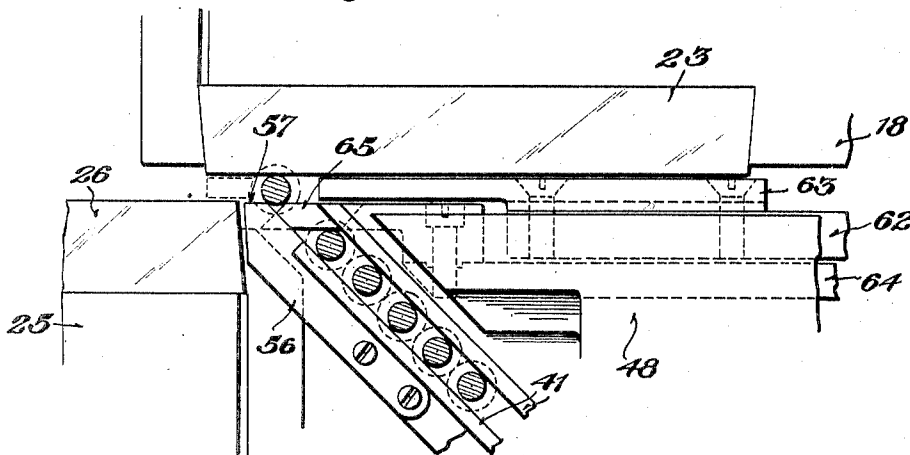
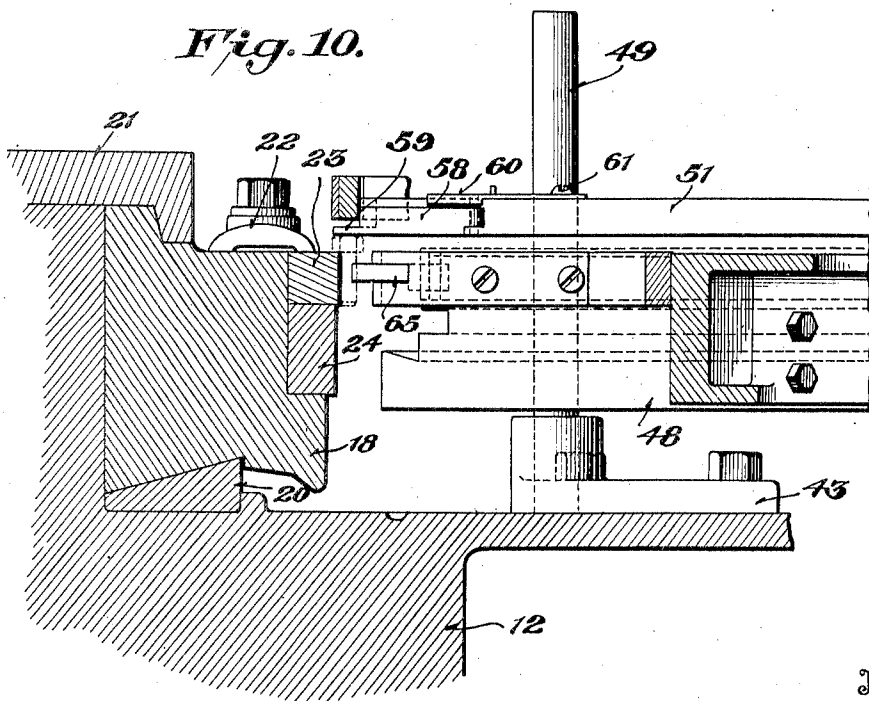


Fig. 10.



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1,798,920

THREADING MACHINE

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Fig. 11

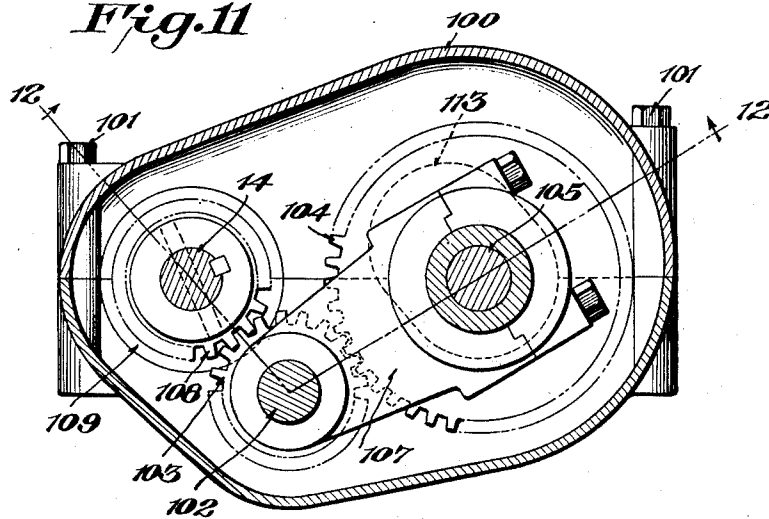
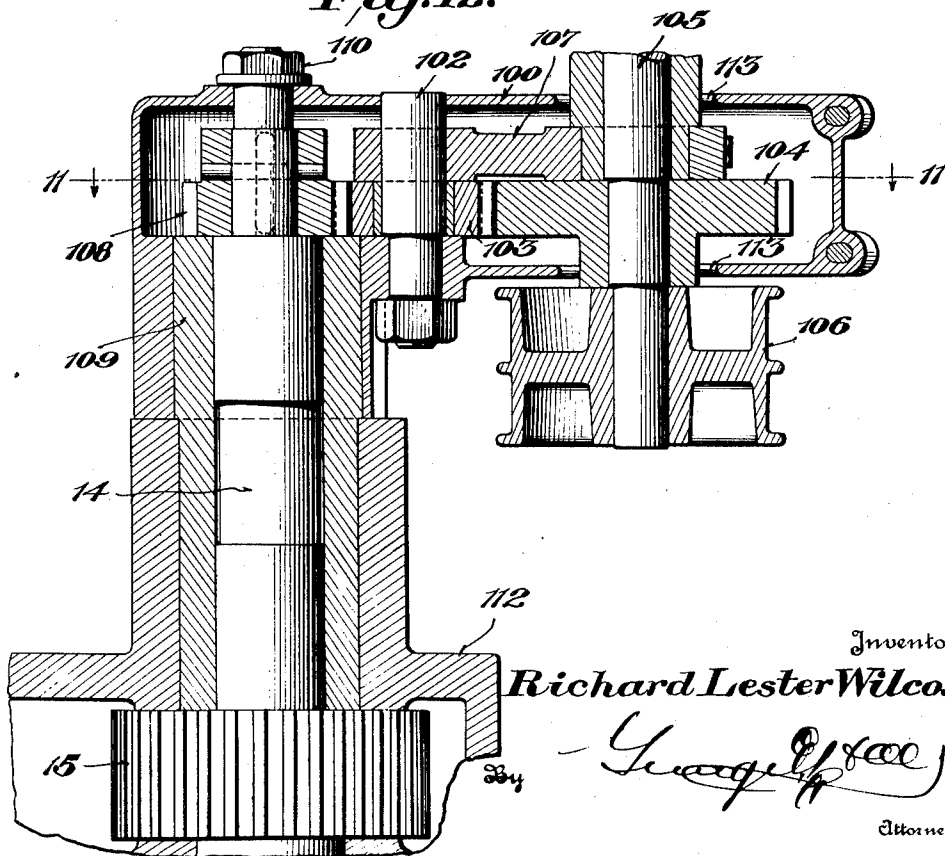


Fig. 12.



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UNITED STATES PATENT OFFICE

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THREADING MACHINE

Application filed January 20, 1930. Serial No. 422,146.

This invention relates to a new and improved threading machine of the roll thread type.

In a machine of this character it is desirable to operate upon blanks of various lengths and upon blanks of the same length wherein the length of thread rolled thereon varies, and to accomplish this with the minimum adjustments.

It is advantageous also that the blanks be conveyed in a continuous stream to a point where they are presented to the dies, with the minimum mechanism.

These and other new and useful objects are accomplished in the threading machine herein shown and described, and in addition thereto means are provided whereby it is impossible for more than a single blank to enter or lie between the dies or be positioned therebetween at one and the same time, the stream of blanks being entirely shut off after a blank has entered between the dies and until it has passed between and been released by the dies.

To these and other ends my invention consists in the threading machine, having certain details of construction and combinations of parts, as will be hereinafter described and more particularly pointed out in the claims.

In the drawings, wherein like numerals of reference designate like parts in the several figures:

Figure 1 is a fragmentary plan view of my improved threading machine;

Figure 2 is a side view thereof;

Figure 3 is an end view thereof;

Figure 4 is an enlarged side view of the chute mechanism and associated parts adjacent thereto;

Figure 5 is an enlarged side view of the threading machine, substantially opposite that portion of the machine shown in Figure 4;

Figure 6 is an enlarged view of a portion of the threading machine showing particularly the fixed die, the slide mechanisms and associated parts, the parts in section being illustrated as taken generally upon line 6—6 of Figure 1;

Figure 7 is an enlarged view of a portion of the mechanism substantially as shown in

Figure 6 with the safety device in the position opposite to that shown in Figure 6;

Figure 8 is an enlarged fragmentary plan view of that portion of the threading machine immediately adjacent to the delivery end of the chute;

Figure 9 is an enlarged fragmentary plan view of a portion of my improved threading machine as illustrated in Figure 8, but showing a plurality of blanks in the chute and one blank about to be passed between the threading dies;

Figure 10 is an enlarged sectional elevation of that portion of the mechanism shown in Figure 8, the parts in section being taken generally on line 10—10 thereof.

Figure 11 is a sectional view of the hopper device parts, upon line 11—11 of Figure 12;

Figure 12 is a sectional view of the hopper device parts, upon line 12—12 of Figure 11; and

Figure 13 is a transverse sectional view of the slides and adjacent parts, taken generally upon line 13—13 of Figure 6.

In the drawings, 10 designates the pedestal or base having a pan 11 connected therewith to receive the finished product and lubricant, if any, after passing through the machine, and secured to the top of the pedestal at an angle of approximately 30° is the body member 12.

Power is transmitted to the machine through a driving wheel 13 fixed on the shaft 14, having a pinion 15 thereon, the teeth of which mesh into those of a gear 16 upon the shaft 17. The shaft 14 is journaled in a bracket 112.

Slidable within the body member 12 between the gib 20 and a cap 21 is the gate 18 that is connected with the gear 16 by the pitman 19, whereby reciprocatory movement is imparted thereto. Secured to the gate by the clamp 22, or the like, upon a suitably sized filling block 24, is the movable die 23.

A die block 25, to which the stationary die 26 is secured by the clamp 27, or the like, is adjustably mounted on the body member 12 toward and away from the gate, by screws 29 and stop screws 28, substantially as shown in Figure 1. A stud 30 in the body member

12, in engagement with the die block 25, provides additional support for the die block and in part absorbs the end strain thereof. The die block is held in any of its adjusted positions on the body member by the bolts 31 which pass through slots 32 therein.

Near the upper end of one side of the body member is a plate 33 which may be made integral therewith or separate and secured thereto as may be desired. Upon this plate is slidably mounted the hopper bracket 34, through the manipulation of the screw 35, the head of which rests against the lug 36 and is locked in its adjusted position by the nut 37. The hopper mechanism 38, which can be of any preferred type, is supported upon this bracket and is secured thereon so as to be adjustable horizontally by screws 39. Associated with this hopper mechanism is a clearance mechanism 40, also of any preferred type. The hopper mechanism is thus adjustable relatively to the body member in a plane substantially parallel thereto and also horizontally. Connected and adjustable with the hopper mechanism are companion chute plates 41. The lower ends of the chute plates are curved inwardly toward the threading dies, as shown in Figure 8, so that they terminate substantially in line with the fixed die, whereby a blank passing from the chute is presented directly in line with said dies. By so constructing the chute plates the use of transfer mechanisms with their objectionable features is thus obviated. The hopper mechanism, clearance mechanism and chute plates, except as modified herein, are of any preferred form and constitute no part of this invention.

Adjacent to each other, on the body 12, are the brackets 42 and 43. The bracket 42 is adjustable toward and away from the gate and is secured in its adjusted positions by the bolts 44 which pass through slots in the bracket.

The outer chute plate near its lower end is fixed to a bracket 45 which forms a rigid support therefor and is slidable upon the pin 46 fixed in the adjustable bracket 42 and held in its adjusted positions by the set screw 47. The inner chute plate 41 is fixed to a bracket 48 which is slidably mounted upon a post 49 in the fixed bracket 43 and held in its adjusted position by the set screw 50.

Above the opening between the chute plates is a cover plate 51 supported adjustably at its opposite ends by studs 52 and 53, the latter being mounted in a lug 54 on the bracket 45 and the former in a plate 55 preferably connected with the hopper mechanism and forming an additional support for the outer chute plate. To accommodate heads of blanks of various sizes passing along the chute plates the cover plate 51 is moved toward and away from the top of the chute plates as required.

Fixed to the inner end of the outer chute plate 41 is a guide plate 56, which extends beyond the chute plate, and having a guide face 57, which substantially fills the space between the opening in the chute plates and the fixed die, so as to thereby guide the blank from the column or stream of blanks into line with the dies. During the movement of the blank against the guide face 57 the underside of the head rests on the top of guide plate 56, thus insuring a proper axial position of the blank relative to the dies.

At times it is desirable and convenient that the operator may have access to the lowermost blank in the column of blanks in the chute and others adjacent thereto. So as to make these blanks thus accessible, I provide an extension latch 58 which is pivotally connected on the cover plate 51 and having an extension lip 59 that projects beyond the end of the chute plates and terminates at a point over the movable die or adjacent thereto, substantially as shown in Figure 1. This extension lip insures proper alignment of the blank with the dies and prevents the same from tipping or tilting, as may be liable to occur from time to time. This latch is held rigid against accidental movement on the cover plate by a spring clamp 60, which is fixed to the cover plate by a screw 61 or the like. Lifting up with the fingers the outer end of the spring clamp 60, releases the latch, which can be moved to one side, as desired, upon its pivot mounting. When shifted to an angle of substantially 90° to the cover plate, all of the blanks in the lower end of the stream of blanks are exposed.

Movably mounted in the bracket 48 is a slide 62, having fixed thereto a pusher finger 63, which moves parallel to the dies and engages the lowermost blank in the stream of blanks and advances it with sufficient pressure to insure the engagement of the blank by the dies.

Also mounted in the bracket 48 adjacent to the slide 62, is a cut-off slide 64, on the outer end of which is a cut-off finger 65 with an angular pointed nose, which during the movement of the slide passes between the two lowermost blanks out of the chute and into contact with the movable die in advance of the pusher finger 63, substantially as shown in Figure 9. This cut-off finger at the same time prevents the escape of any further blanks in the column until withdrawn. The slide 62 derives a reciprocatory movement through the pitman 66 between the stud 67 and the arm 68 upon a rock shaft 69 that is journaled in the fixed bracket 70. On this rock shaft, opposite to the rock arm 68, is the rock arm 71.

On the body 12 is the lever bracket 72, having a stud 73 therein, upon which is journaled the rock arm 74 carrying a cam roll 75, 130

which is in constant engagement with the face of the cam 76 on the shaft 17, through the action of the spring 84. Pivotaly connected with the rock arm 74 is a yoke 77, into which is threaded one end of a rod 78 that has a shoulder 79 between its ends where the reduced portion 80 of the rod passes through the block 81 that is pivotaly connected with the arm 71.

A spring 82 encircles the portion 80 of this rod between the block 81 and jamb nuts 83 threaded thereon, substantially as shown in Figure 5.

Motion is transmitted to the cut-off slide primarily from the pusher slide and so arranged as to travel in opposite directions. The mechanism whereby this is accomplished comprises a cam plate 85 fixed to the slide 62 and having a cam groove 86 within which travels the cam roll 87 upon one arm of a rock lever 88. This latter lever is journaled upon a stud 89 fixed in the bracket 48, one arm of which is slotted, and movably mounted therein is a block 90 journaled upon a stud 91 fixed in the slide 64.

The rock arm 88 is mounted on the fixed stud 89 and oscillates thereon as the roll 87 travels in the cam groove as the slide 62 reciprocates, and the parts are so arranged that as the slide 62 returns or moves away from the fixed die, the slide 64 advances toward said die and the cut-off finger 65 cuts off the lowermost blank in the chute and into position in front of the pusher finger as before described.

As the slide 62 having the pusher finger 63 thereon moves toward the fixed die to push the blank into position between the dies, the slide 64 moves away from the fixed dies, allowing the column of blanks in the chute to gravitate toward the pusher finger 63 ready for the above operations to be repeated.

The timing of the movement of the slide 62 is such that the pusher finger 63 after it has started the blank to be rolled remains in its forward position while the moving die is traveling forward and rolling the thread, and does not return until the thread has been completely rolled, after which it returns, uncovering the stream of blanks and permitting another blank to be advanced in front thereof.

I have provided means whereby to prevent more than a single blank being between the dies. This means consists generally of a rock lever 92 journaled on a stud 93 fixed in the bracket 48 and having a blade arm 94 fastened thereto by screws 96 or the like. This blade arm 94 projects directly over the space between the dies and is of sufficient length to extend to the finishing end of the stationary die. The rock lever 92 terminates in a hook end 95 opposite to the blade arm. The blank as it leaves the chute passes under the blade arm 94 substantially as shown in Figure 6,

and as it is pushed to its position between the dies is engaged thereby. Thus, the rock lever 92 is moved upon its pivot mounting by reason of the fact that the underside of the blade arm 94 rides against the top of the head, substantially as shown in Figure 7, at which time the hook end 95 is moved downwardly in rear of the pusher finger 63 and there remains until the blank has passed out of the dies, when the support provided by the blank for the blade arm 94 being removed, the latter drops by gravity and lifts the hook end 95 to its former position out of the path of the pusher finger 63.

When the bolt is between the dies the slide 62 cannot return and uncover the stream of blanks in the chute, because the hook end 95 would engage the notch 97 in the pusher finger 63 and hold the finger and slide with which it is associated from return movement. Hence, as the pusher finger is in front of the stream of blanks, none can escape from the chute so long as the blade arm 94 is in its elevated position. With this mechanism it is impossible for more than a single blank to occupy the space between the dies and injure either the adjacent mechanism or the dies. If the slide 62 cannot return as normally because prevented by engagement of the rock lever 92 with the pusher finger, the spring 82 will be compressed and absorb the motion of the cam 76 without imparting movement to the rock shaft 69.

For convenience in adjusting the machine and watching the operation of some of the parts, and for other reasons, without feeding blanks to the dies, I have provided means for preventing the return of the pusher fingers 63, even though no blank is between the dies, comprising a stop finger 98 that is mounted upon a stud 99 upon the bracket 48.

In one of its adjusted positions, such as shown in Figure 6, the stop finger is held in its operative position, but if it is desired to maintain the hook end 95 in the rock lever 92 in the path of the finger 63, this latter finger is pushed to the dotted lines shown in Figure 7.

In operation the blanks pass from the hopper through the chute mechanism, pass the clearance mechanism and successively arrive at the lower end of the chute from whence they escape one by one into the path of the pusher finger by the action of the cut-off finger and then advanced through the dies under the safety mechanism that prevents another blank entering between the dies and after passing between the dies, the blank drops therefrom fully threaded into the pan 11, which also receives the lubricant, if any is used, after it has served its purpose on the dies.

By loosening the set screw 47 and 50 and manipulation of the screw 35 the hopper mechanism, chute mechanism, pusher and

transfer fingers, and safety mechanism, all as a unit, are adjusted toward and away from the bed of the machine to accommodate blanks of various lengths, after which the parts are again held securely by the set screws 47 and 50 and the jamb nut 37.

A longer or shorter thread is sometimes required on the same length blank and to provide for such contingency the chute and hopper mechanism is adjusted in exactly the same manner, occupying different positions relative to the body of the machine for the same length blank. Thus a single adjustment is all that is required with this machine and this is so simple and the parts requiring adjustment so accessible as to require the minimum labor and practically no skill.

The extreme up and down positions of the pusher and cut-off slides and adjacent mechanism are shown in Figure 6, the full lines being approximately their extreme down position, and the dotted lines being approximately their extreme up position, the latter being for long blanks having short lengths of threads, and the former the reverse.

The open space between the chute plates may be varied by adjustment of the bracket 42 upon the bed of the machine and the hopper 38 on the bracket 34 after loosening screws 39.

One of the features of my invention is the means for operating from the same shaft having a fixed axis, the hopper mechanism irrespective of its relative position in respect to the bed of the machine. This mechanism consists essentially of a gear carrier 100, preferably made in two parts and secured together by bolts 101 or the like, and in which is a stud 102, upon which is journaled a pinion 103, the teeth of which mesh into those of a gear 104, fixed on the hopper shaft 105, upon which is a driving pulley 106. A connection 107 also connects the stud 102 and shaft 105. On the shaft 14 is a pinion 108. The gear carrier is journaled on the bushing 109 upon the shaft and is held against endwise movement thereon by the nut 110. An opening 113 in the side walls of the gear carrier 100 permits movement of the latter relative to the hopper shaft 105. The belt 111 is connected with the pulley 106 and by means of which the hopper mechanism is actuated.

The axis of the shaft 14 is constant but the horizontal axis of the shaft 105 varies according to the relative position of the hopper mechanism upon the body member. Power is constantly derived by the shaft 105 from the shaft 14 irrespective of such various positions of the latter, through the pinions 108, 103 and gear 104. This is accomplished through the gear carrier 100 holding the pinion 108 and gear 103 in mesh with each other and the connection 107 holding the gears 103 and 104 in mesh with each other.

Within the scope of the appended claims,

minor changes and alterations may be made, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described.

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

1. In a threading machine; a pair of dies; means for guiding blanks to the dies; and means for pushing the blanks from the guiding means to engage both dies, all of said means being adjustable as a unit.

2. In a threading machine; a pair of dies; means for guiding blanks to the dies; means to prevent the escape of more than one blank at a time from the guiding means, all of said means being adjustable as a unit.

3. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; and means to insure the presence of only a single blank between the dies at one time, all of said means being adjustable as a unit.

4. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for preventing the escape of more than one blank at a time from the guiding means; and means to insure the presence of only a single blank between the dies at one time, all of said means being adjustable as a unit.

5. In a threading machine; a pair of dies; hopper mechanism; means for guiding blanks from the hopper mechanism to the dies; means for pushing the blanks from the guiding means to engage both dies, the said means and hopper all being adjustable as a unit.

6. In a threading machine; a pair of dies; and means for guiding blanks to the dies, arranged so that the blanks will travel continuously in substantially the same plane at an angle to the horizontal, a portion of the path of travel being in a substantially straight line and another portion in a curved path, the latter being adjacent to the delivery end of the guiding means.

7. In a threading machine; a pair of dies; and means for guiding blanks to the dies that travel continuously by gravity in a stream at an angle to the horizontal, comprising in part, a clutch mechanism that is curved adjacent to the dies and terminates in a plane that is approximately coincident with the face of the dies.

8. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for preventing the escape of more than one blank at a time from the guiding means; and means for holding the pushing means against movement while a blank is between the dies.

9. In a threading machine; a pair of dies;

means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for preventing the escape of more than one blank at a time from the guiding means; and means for holding the escape means against movement while a blank is between the dies.

10. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for preventing the escape of more than one blank at a time from the guiding means; and means, as a movable member controlled in part by a blank between the dies, for holding the pushing means against movement while said blank is between the dies.

11. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for preventing the escape of more than one blank at a time from the guiding means; means, as a movable member controlled in part by a blank between the dies, for holding the pushing means against movement while said blank is between the dies; and means for locking the movable member when holding the pushing means.

12. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; and a rock member actuated in one direction by the blank between the dies that will engage and hold the pushing means against movement.

13. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; and a rock member in the path of movement of a blank between the dies which is actuated by such blank and by reason thereof holds the pushing means against movement.

14. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; and a rock member projecting over the open space between the dies and terminating adjacent to the extension limit of movement of the dies in the path of movement of a blank between the dies, which is actuated by such blank and by reason thereof holds the pushing means against movement.

15. In a threading machine; a pair of dies; means for guiding blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; and means, comprising in part, a cut-off member actuated from the pushing means to prevent the escape of more than one blank at a time from the guiding means and so timed that the member is projected between the two blanks ad-

jacent to the die in advance of the pusher means.

16. In a threading machine; a pair of dies; means for guiding the blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means to prevent the escape of more than one blank at a time from the guiding means; and an operative connection between the pushing means and escape means, whereby the escape means and in advance of the latter is actuated from the pushing means.

17. In a threading machine; a pair of dies; means for guiding the blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means to prevent the escape of more than one blank at a time from the guiding means, each of said pushing and escape means having a substantially reciprocatory movement and a positive connection between said means, whereby the escape means derives its motion from the pushing mechanism.

18. In a threading machine; a pair of dies; means for guiding the blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; comprising in part a slide, means to prevent the escape of more than one blank at a time from the guiding means; comprising in part a slide, and a cam actuated rock mechanism between the said slides, and so timed that the means to prevent the escape of more than one blank at a time from the guiding means will operate in advance of the pusher means.

19. In a threading machine; a pair of dies; means for guiding the blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means to prevent the escape of more than one blank at a time from the guiding means; and an operative connection between the pushing means and escape means, whereby the escape means is actuated from the pushing means, comprising a cam connected with one of said means and a rock member movable about an axis fixed relative to the pushing means and having an operative engagement with the other of said means.

20. In a threading machine; a pair of dies; means for guiding blanks to the dies having a slot therein, through which the blanks travel; means for pushing the blanks from the guiding means to engage both dies; and means to prevent the escape of more than one blank at a time from the guiding means, the arrangement of said means being such that when the escape means uncovers the end of said slot the pushing means is in front thereof.

21. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a simi-

lar adjustment and also movable toward and away from the other bracket; and chute plates connected with said brackets.

22. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment and also movable toward and away from the other bracket; and chute plates connected with said brackets that are curved in the direction of their length and between which the blanks travel to the discharge end of the chute plates where they are successively discharged in substantially the same plane as the face of the dies.

23. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment and also movable toward and away from the other bracket; chute plates connected with said brackets, one chute plate being shorter than the other; and a guide plate forming an extension of the shorter chute plate and providing a support for the blanks while out of the chute and traveling a limited distance in a plane substantially parallel with the face of the dies.

24. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment and also movable toward and away from the other bracket; chute plates connected with said brackets, one chute plate being shorter than the other; and a guide plate providing a support for the blanks near the discharge end of the chute and in a path at an angle thereto while being presented between the dies.

25. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment and also movable toward and away from the other bracket; chute plates connected with said brackets; a fixed member forming a support for the first of said brackets; and an adjustable member forming a support for the latter of said brackets.

26. In a threading machine; a pair of dies; a fixed bracket; a chute member adjustably connected with the bracket; a second bracket adjustable toward and away from the first mentioned bracket; a chute member adjustably mounted thereon; and a chute plate connected with each of said chute members and positioned relatively to each other so as to leave an open space therebetween through which blanks travel.

27. In a threading machine; a pair of dies;

means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment; chute plates connected with said brackets; and means for pushing the blank from the guiding means to engage both dies movably mounted upon one of said brackets.

28. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment; chute plates connected with said brackets; and means to prevent the escape of more than one blank at a time from the guiding means, both of said means being movably associated with one of said brackets.

29. In a threading machine; a pair of dies; means for guiding the blanks to the dies, comprising in part a bracket adjustable in a path substantially perpendicular to the face of the dies; a second bracket having a similar adjustment; chute plates connected with said brackets; means to prevent the escape of more than one blank at a time from the guiding means, both of said means being movably associated with one of said brackets; and independent mechanism for moving both of said means in opposite directions.

30. In a threading machine; a pair of dies; means for guiding the blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for reciprocating the pushing means, comprising in part a rock member; a connection between the rock member and pushing means; a cam for actuating the rock shaft; and a connection between the cam and rock shaft.

31. In a threading machine; a pair of dies; means for guiding the blanks to the dies; means for pushing the blanks from the guiding means to engage both dies; means for reciprocating the pushing means, comprising in part a rock member; a connection between the rock member and pushing means; a cam for actuating the rock shaft; and yielding means between the cam and rock shaft, whereby the cam may continue to operate if movement of the rock shaft is prevented.

32. In a threading machine; a pair of dies; hopper mechanism; means for guiding blanks from the hopper mechanism to the dies; means for pushing the blanks from the guiding means to engage both dies, the said means and hopper all being adjustable as a unit; a shaft; and means for actuating the hopper from the shaft, comprising intermediate positively actuated mechanism that will function in any of the adjusted positions of the hopper.

33. In combination; a shaft; a hopper adjustable relatively to the shaft; and means for positively actuating the hopper from the shaft irrespective of the relative position of

the latter, comprising a carrier movably connected with the shaft; a pinion rotatably connected with the carrier; a hopper shaft; a connection between the shaft and the part upon which the pinion rotates; a pinion on the first mentioned shaft, the teeth of which mesh into those of said pinion; and a gear associated with the hopper shaft, the teeth of which also mesh into those of the first mentioned pinion.

34. In combination; a shaft; a hopper adjustable relatively to the shaft; means for positively actuating the hopper from the shaft irrespective of the relative position of the latter, comprising a hopper shaft; a stud or the like connected with the carrier, the axis of said hopper shaft and stud being constant relative to each other; a connection between the hopper shaft and stud; and a train of gears and pinions connecting the hopper shaft and shaft, one of such trains of gears being on the shaft, another on the stud, and another upon the hopper shaft.

35. In combination; a shaft; a hopper adjustable relatively to the shaft; means for positively actuating the hopper from the shaft irrespective of the relative position of the latter, comprising a pinion upon the shaft; a stud or the like carrying a pinion and movable around the axis of the shaft; a hopper shaft, having a connection with the stud, whereby the latter will maintain a constant position relative to the former; and a gear upon the hopper shaft, the teeth of which mesh into those of the pinion upon said stud.

36. In combination; a shaft; a hopper adjustable relatively to the shaft; means for positively actuating the hopper from the shaft irrespective of the relative position of the latter, comprising a carrier journaled on the shaft; a stud or the like fixed in the carrier and occupying during the movement of the carrier a position wherein the axis thereof is relatively constant with that of the shaft; pinions connecting the shaft and stud; a hopper shaft having a movement about the axis of the shaft independent of the carrier; a connection between the hopper shaft and stud; and a gear upon the hopper shaft, the teeth of which mesh into those of the pinion on the stud.

37. In a chute, the combination with a cover plate shorter than the chute; of a latch movably connected therewith and forming an extension of said plate.

38. In a chute, the combination with a cover plate shorter than the chute; of a latch movably connected therewith and forming an extension of said plate; and means for locking the latch against accidental movement.

In testimony whereof, I have hereunto affixed my signature.

RICHARD LESTER WILCOX.