

C. F. MESSINGER.  
CHAMFERING AND COUNTERSINKING MACHINE.  
APPLICATION FILED APR. 22, 1908.

912,250.

Patented Feb. 9, 1909.

5 SHEETS—SHEET 1.

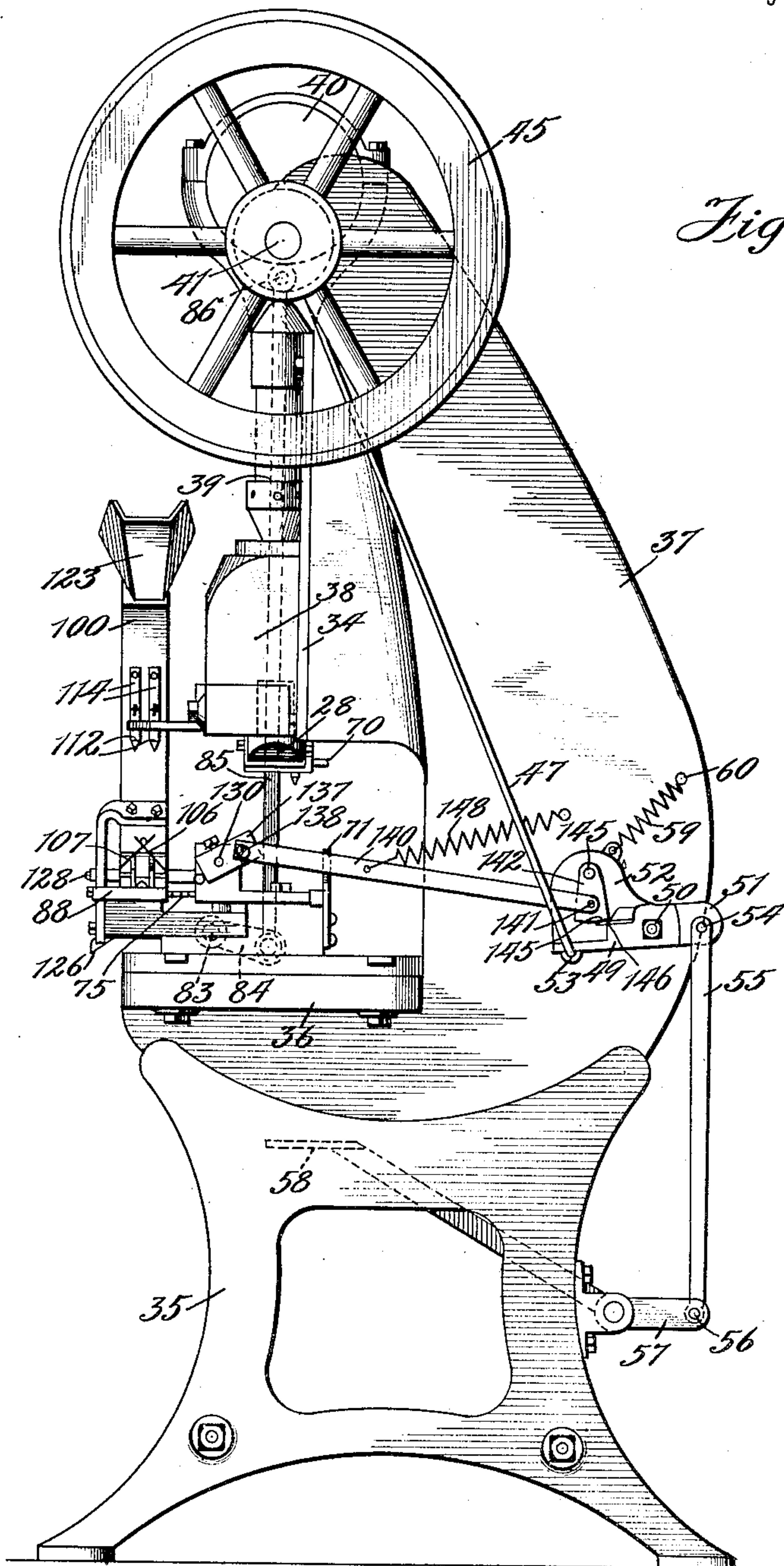


Fig. 1.

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Inventor:

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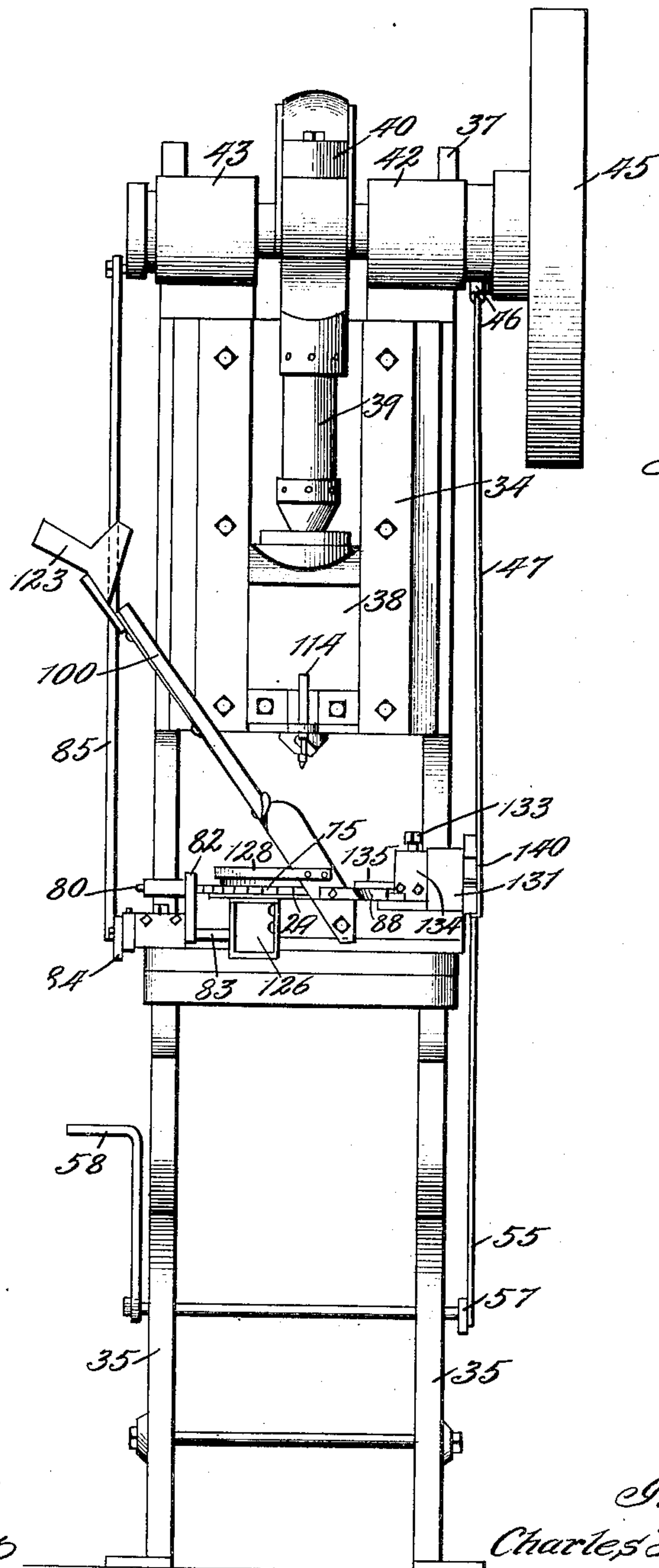


Fig. 2.

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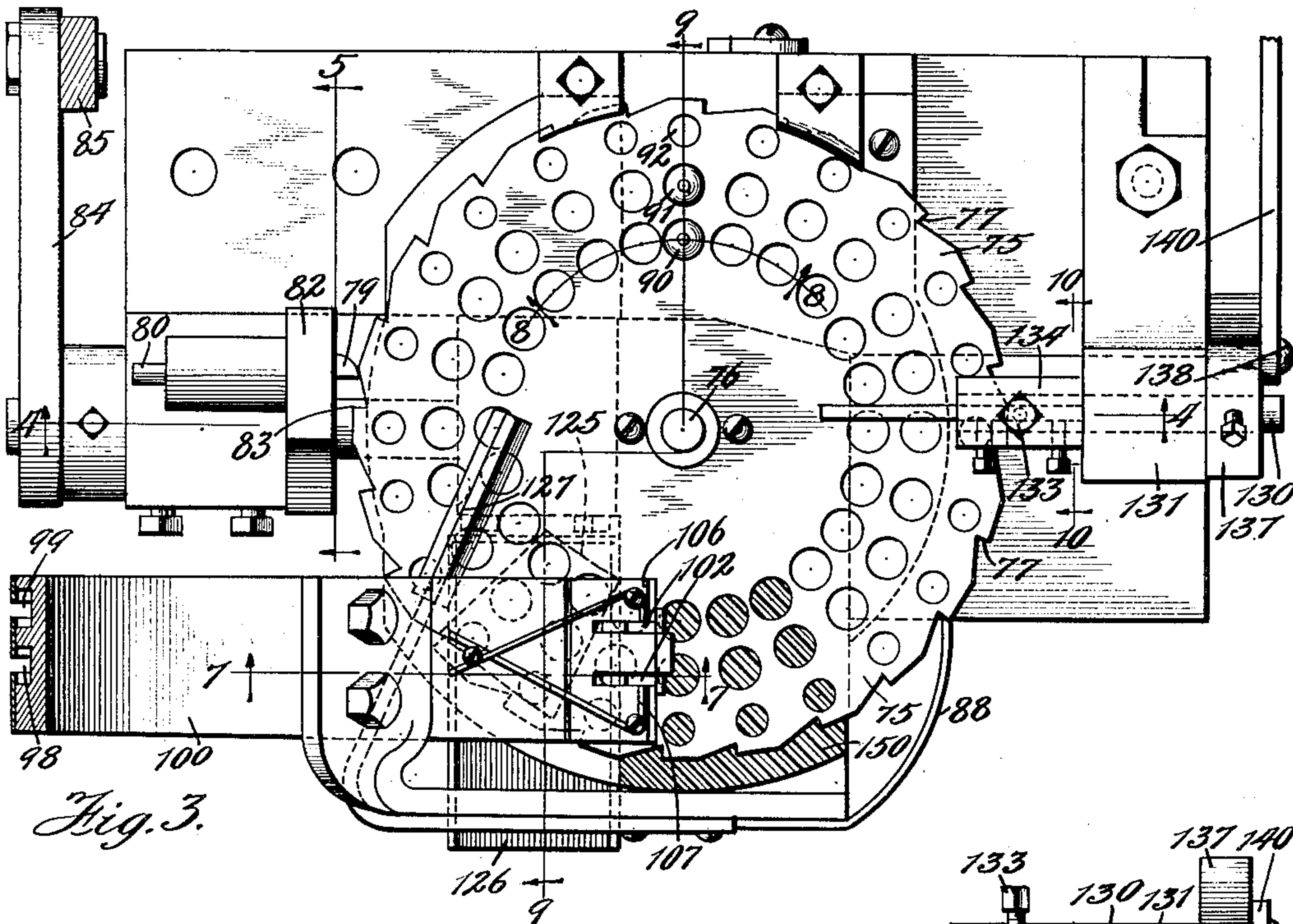


Fig. 3.

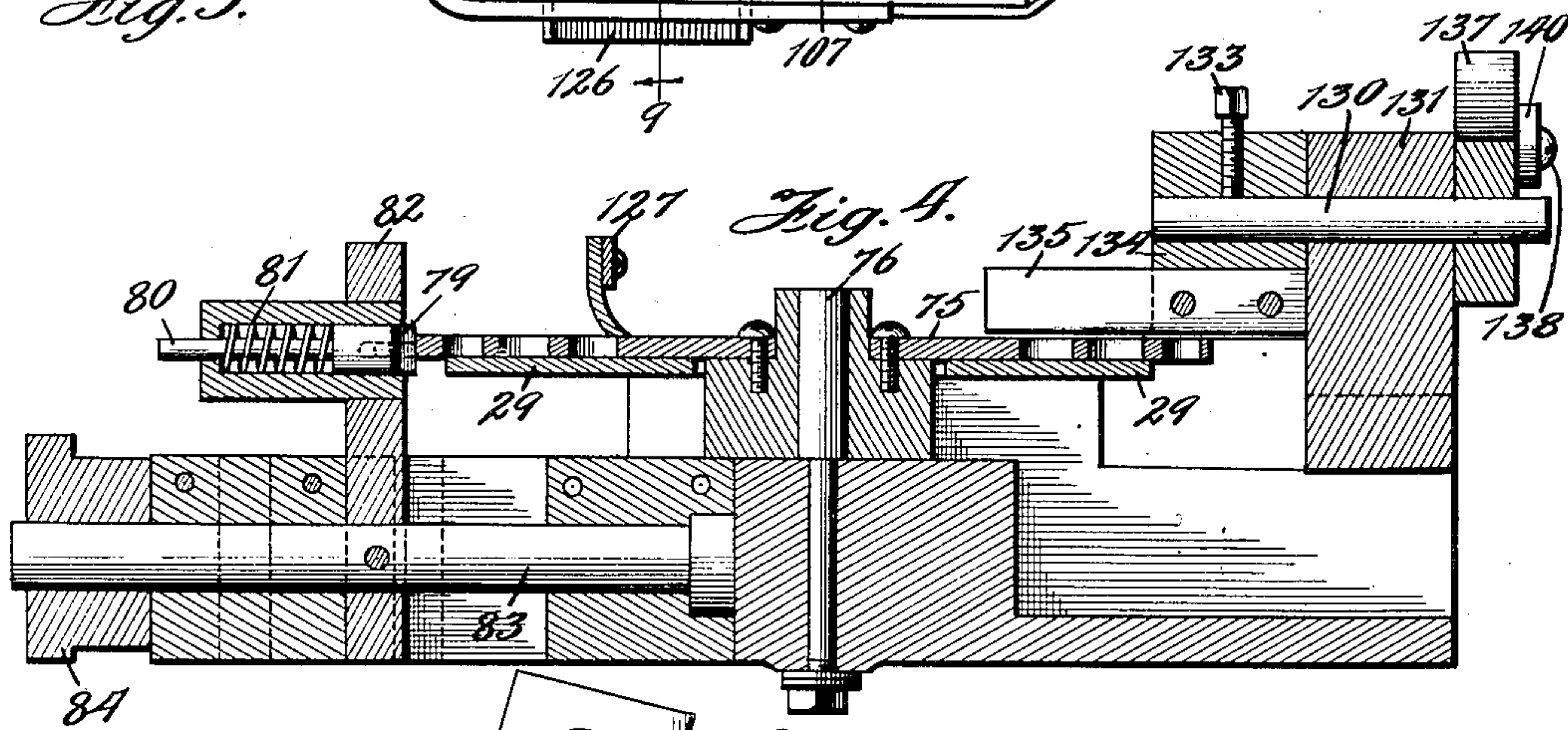


Fig. 4.

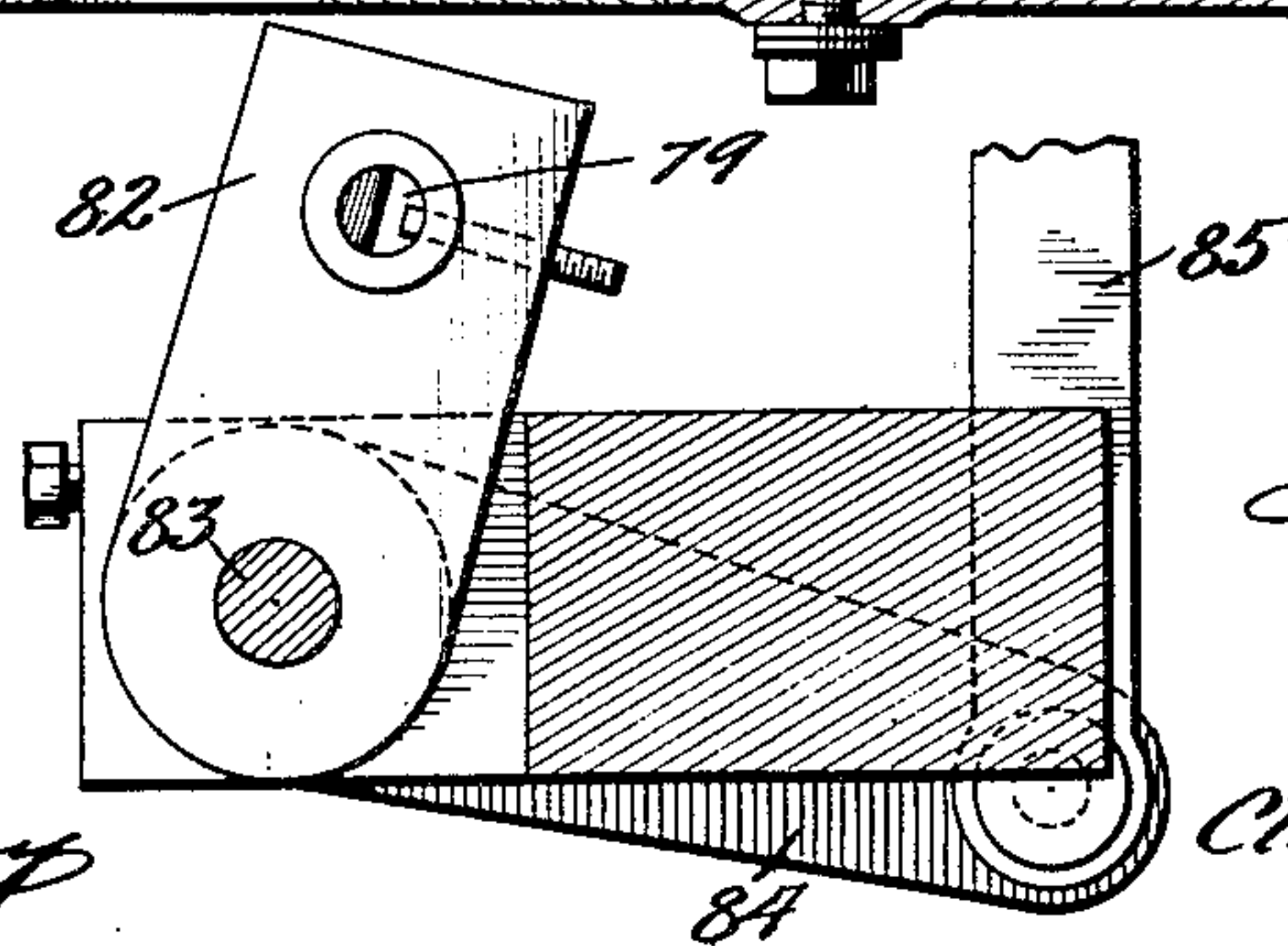


Fig. 5.

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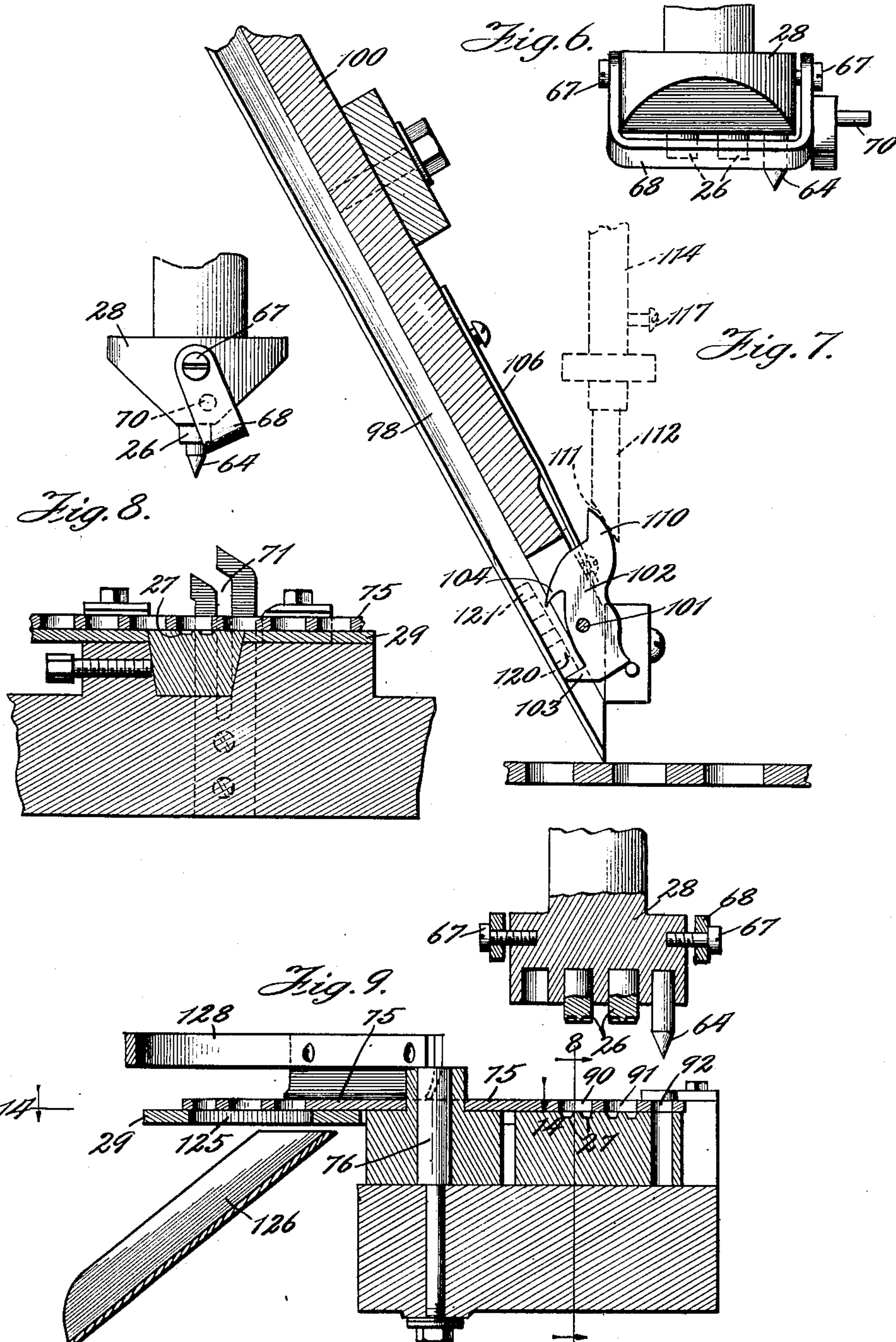


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5 SHEETS—SHEET 4.



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J. V. Thomas Jr.

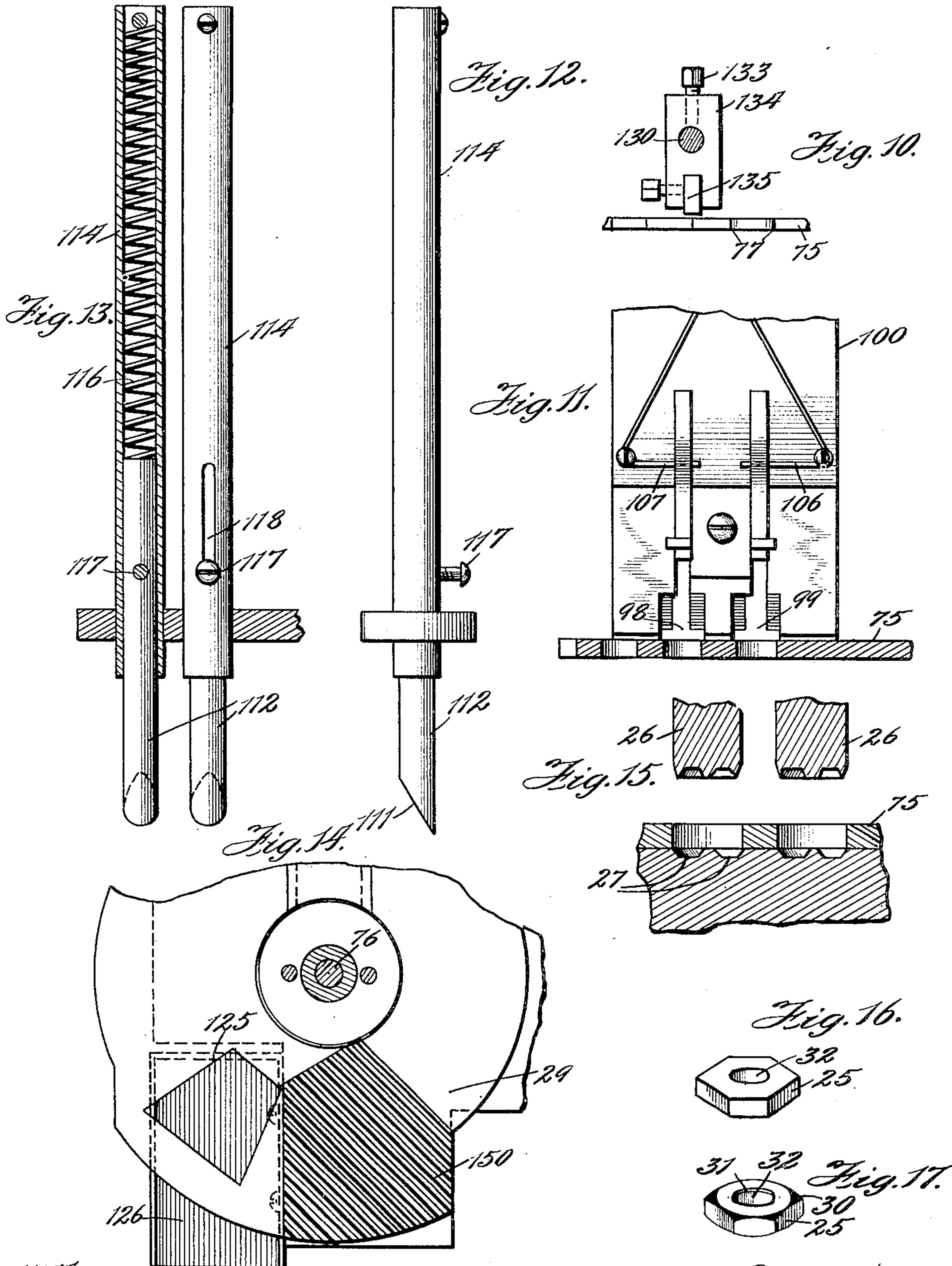
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5 SHEETS—SHEET 5.



Witnesses:

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# UNITED STATES PATENT OFFICE.

CHARLES F. MESSINGER, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHICAGO NUT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## CHAMFERING AND COUNTERSINKING MACHINE.

No. 912,250.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed April 22, 1908. Serial No. 428,513. Substituted for application filed April 1, 1907, Serial No. 365,807.

*To all whom it may concern:*

Be it known that I, CHARLES F. MESSINGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Chamfering and Countersinking Machines, of which the following is a specification.

This invention relates generally to machines for chamfering and countersinking any object made of relatively soft metal but for the purpose of description is referred to as a machine for operating upon nuts.

The object of the invention is to provide an automatic machine which will take a blank having a hole therein and countersink one or both ends of the hole and at the same time chamfer off the outer corners of the nut or other object which the machine is designed to work.

The invention consists in mechanism for accomplishing the foregoing objects, which can be made with reasonable economy, readily put in place, which is efficient in operation and is not readily liable to get out of order.

More in detail the invention consists in a novel carrier for feeding the nuts to the chamfering and countersinking tools, combined with an automatic mechanism for stopping the machine so that the dies may not be injured in the event of more than one nut occupying the place of one nut in the feeding mechanism approaching the chamfering and countersinking dies, and in novel features and details of construction which will be hereafter more fully described and claimed as the specification proceeds.

Figure 1 is a side, and Fig. 2 a front view of an ordinary punch press having the mechanism of my invention applied thereto. Fig. 3 is a plan view of the principal operating parts of my invention removed from the press. Fig. 4 is a central sectional detail view on line 4—4 of Fig. 3. Fig. 5 is a detail view taken on line 5 of Fig. 3. Fig. 6 is a side detail view of a head carrying the chamfering and countersinking die tools proper, showing a guard mechanism attachment. Fig. 7 is a front detail view of the supplemental feeding mechanism or chute for feeding nuts down to the main feeding plate or disk of the machine. Fig. 8 is a detail rear view of a portion of the bed of the machine, and a side view of the part illustrated in Fig. 6.

Fig. 9 is a side view, partially in section, of the parts illustrated in Fig. 8. Fig. 10 is a detail view taken on line 10—10 of Fig. 3. Fig. 11 is a side detail view of the lower end of the nut chute as seen from the right side of Fig. 7. Fig. 12 is a front and Fig. 13 a side view of the rods attached to the punch press head which engage the escapements of the inclined nut chute. Fig. 14 is a detail plan view of the supplemental bed of the machine, showing the entrance to the slide or runway by means of which the finished nuts escape from the machine. Fig. 15 is an enlarged detail view of the chamfered and countersinking dies. Fig. 16 is a perspective view of a nut blank before it has been operated upon by the machine of my invention, while Fig. 17 is the corresponding view of the finished product.

The machine is designed to take a plurality of nut blanks 25 such as are illustrated in Fig. 16, and automatically carry them between upper and lower dies, those particularly illustrated in Fig. 15 being designed to chamfer the corners 30 of the nut and countersink the upper ends 31 and also the lower ends (not shown) of the hole 32 through the nut. In order to carry out this work it is necessary that the upper die, or more properly die member, 26 mounted in the head 28 and the corresponding lower die, or more properly die member, 27 mounted or formed in the table 29 shall be operated by a powerful machine and that the nut blank shall be accurately fed in between the die members. In order to do this, I provide an ordinary punch press, which forms no part of the invention proper, the same consisting of a base frame 35 carrying a bed plate 36, from which rises a main frame 37 in which are mounted suitable guides 34 in which slides a punch head 38. This punch head is suspended in the guides upon a suitable connecting rod 39 which has its upper end secured to an eccentric 40 suitably mounted upon a shaft 41 journaled in the upper portion of the frame 37 at 42 and 43 in the ordinary manner. Rotating the shaft 41 will therefore cause the reciprocation of the head 38 toward and from the bed plate 36. On the shaft 41 is a wheel normally in communication with an external source of power by means of a belt or any other suitable mechanism. Between the shaft 41 and this wheel 45 is a clutch mechanism, of any one of the ordinary types



of construction, the details of which are not necessary, to be shown here, adapted when "thrown in" to cause the wheel 45 to operate the shaft 41, and when "thrown out" to disconnect said wheel and shaft. When the clutch is thrown in as above described the pin 46 is in the position shown in Fig. 2; when the pin 46 and rod 47 are moved upward a short distance from the position in said figure the clutch is thrown out. This upward movement or throwing out of the clutch is caused by a spring, not shown, within the mechanism of the clutch.

Pivoted upon a suitable pin or stud 50 projecting from the frame 37 of the press, is a lever 51, having on its forward end an enlarged portion 52. Also pivoted on the stud 50 adjacent to this lever is a supplemental lever 49 pivotally connected at 53 to the rod 47. The rear end of the lever 51 is pivotally connected at 54 to the rod 55', which rod is in turn pivotally connected at 56 to one end 57 of a foot lever 58. The enlarged end 52 of lever 51 has connected to it a spring 59, secured at some convenient place as 60 to the frame 37. The lever 51 and supplemental lever 49 are normally locked together by the combined action of dog 142 and spring 59 which will, together with the operation of this part of the device, be hereafter described.

In applying the invention to the punch press just described, there is secured in the lower end of the punch head 38 a block 28 heretofore referred to, carrying in its lower end one or more of the upper dies 26 and upon the table 36 I mount by screws 66 supplemental table 29 above referred to. From this block 28 extends a guide pin 64 adapted to enter a suitable hole 92 in the feed plate 75 to insure the feed plate, to be hereafter described, always being in proper register with the die members.

Pivotally mounted upon pins or studs 67 extending from opposite sides of the block 28 is a U shaped strip or bar 68 adapted to normally hang down in the position of Fig. 8 and partially cover the upper die 26. Extending from one portion of the strip or bar 28 is a pin 70 adapted to enter and travel in a cam track 71 secured to the table 29, the same being so shaped that as the block 28 ascends it will cause the bar 68 to move in the arc of the circle upon the pins 67 and thus throw away from the dies 26 and 27 any object which comes in contact with this bar 68, thereby, as will more fully appear hereafter, stripping from the dies 26 any finished nuts which tend to stick to them as the dies ascend; in other words, this is an automatic "knock out." I do not limit myself to the form of the cam track 71 here shown. Any controlling mechanism which will operate the knock out bar 68 in the manner described may be used without departing from the spirit of the invention.

In order to deliver nut blanks or other articles to be worked upon to the dies 26 and 27, I pivotally mount as shown upon the center of the base 29 a horizontal main feed plate 75. On the outer edge or periphery of this plate 75 are notches 77 adapted to be engaged by a ratchet dog 79 on the end of the rod 80 normally spring pressed by the spring 81 into contact with these notches 77. This dog is, as shown in Figs. 3 and 4, mounted in one arm 82 of a bell crank journaled upon a shaft 83. The other bell crank arm 84 is connected with the vertical rod 85 whose opposite end is connected to a crank pin 86 on the shaft 41 heretofore described. Rotation of the shaft 41 rocks the bell crank 82—84 and causes the dog 79 to reciprocate along the periphery of the disk 75 and in so doing rotate the same in a counter clockwise direction as viewed in Fig. 3. In order to be sure that the frictional contact of the dog 79 will not in withdrawing from the notches 77 in the plate 75 partially rotate the disk in a clockwise direction, I provide a suitable spring catch 88, which locks the plate in position during the retracting motion of the arm 82.

In the plate 75 just described, I provide three sets of radially arranged holes, 90, 91 and 92, the first two of said holes being the two upper dies 26, and the holes 92 being adapted to have the directing pin 64 pass through them as heretofore described. The result of this is that when a particular hole 92 is engaged by the pin 64, the two holes 90 and 91 in the plate adjacent thereto will be in such a position that the dies 26 may pass through them into engagement with the dies 27. I provide the holes 91 and 92 so that a nut blank may be fed into each one of them at a proper point in the revolution of the disk 75 and may then be carried by this disk into engagement with the working dies 26 and 27 and after being operated by them, be carried to a point where they may be delivered from the machine. As I have provided two sets of working dies 26 and 27 in radial position, it is of course necessary to provide two adjacent holes 90 and 91 at each operative position of the machine; but if a larger or smaller number of operating dies were provided on each radius of the plate, a greater or less number of these nut retaining holes would have to be provided. I so space the holes 92 around the circumference of the plate 75, and so proportion the parts controlling the stroke of the crank arm 82 and consequently of the dog 79 heretofore described, that each complete revolution of the shaft 41 which makes a complete reciprocation of the head 38 and consequently of the pin 64, will move this plate 75 from one hole 92 to the next during one such complete reciprocation of the head 38 of the punch press, the plate 75 being of course at rest during the period of time while



the dies are acting on nuts in the plate, being so locked by pin 64.

I deliver the nut blanks which are to be operated upon by the machine to the plate 75 by means of suitably supported inclined chute 100, which chute is divided into two separate tracks or passage ways 98 and 99, one adapted to deliver nut blanks to the holes 91 heretofore described, and the other being adapted to deliver nut blanks to the holes 90 heretofore described. If only one set of these holes were used, only one passageway would be required, and were more than two of such sets of holes placed radially in the plate an additional number of passage ways in chute 100 would be required. In each of the passage ways, near its bottom, is pivotally mounted at 101, an escapement dog 102, having a tooth 103 adapted to rest in front of and below the bottom nut 120 in a particular chute passage way, and another tooth 104 adapted to be, as shown in Fig. 7, over the central hole in the next succeeding nut 121. These escapements 102 are held in the positions of Fig. 7 by springs 106 and 107, as shown in Fig. 11. Extending from the upper portions of the escapements 102 are projecting arms 110, the arm on each escapement being adapted to be engaged by the angular face 111 on one of the rods 112 which are, as best shown in Figs. 12 and 13, slidably mounted in tubes 114 rigidly connected to the punch head 38. These rods 112 are normally pressed down by springs 116 within the respective tubes, the possible motion of the rods being limited by the screws 117 entering the particular rod through the slot 118. The purpose of this spring connection between each rod 112 and its tube 114 is to allow movement of the rod in the event of an imperfect nut being under escapement 102 and preventing the escapements moving when the rods strike it. This to prevent breaking of one or both the parts. As a particular rod 112 descends upon its particular escapement dog 102, the face 111 of the rod strikes the arm 110 and rocks the escapement in a counter clockwise direction from the position of Fig. 6, with the result that the bottom nut 120 is released and allowed to pass on down the chute into the adjacent hole in the feed plate 75, while the next succeeding nut 121 is retained temporarily in position in the chute by the tooth 104 entering its center. When the punch block starts to ascend, the rod 112 is withdrawn from the arm 110, thereby allowing the spring to return the escapement 102 to normal position of Fig. 7. This withdraws the tooth 104 from the nut 121 and allows it to fall down against the tooth 103 ready to be delivered to the feed plate 75 upon the next descent of the punch block and its attached rod 112. It is of course understood in connection with the foregoing that the operator feeds nut

blanks into the passage ways of the chute 100 through the hopper 123 and that there is a continuous row of nut blanks extending up each passage way in the chute 100 from the escapements 102. When the nut blanks have thus been fed through the chute 100 into the holes 90 and 91 in the feed plate 75, and have passed under the dies 26 and 27 and have been countersunk and chamfered in the manner described, the plate carries them on around the top of the base plate 29 until they come to the opening 125 leading into the delivery chute 126, from which the finished nuts fall into any suitable receptacle.

In order to insure all finished nuts falling out of the holes in the feed plate 75, I provide a wiper 127, mounted on a suitable supporting arm 128, adjacent to the entrance 125 to chute 126, which wiper has upon it some flexible material which will enter the passing holes in the plate 75 sufficiently to dislodge the nuts therein so that they will drop through the opening 125 into the chute 126 in the manner described.

In order to protect the dies 26 and 27 from injury in the event of two nuts being piled one on top of the other in a common hole in the plate 75 passing around the machine and being thus carried to a position where said nuts will both be between said dies, I provide a mechanism whereby such a pile of nuts will automatically stop the machine. A shaft 130 is journaled in a suitable support 131 on the right side of the machine as viewed in Fig. 2. Rigidly secured to this shaft by means of a set screw 133 is a crank arm 134, carrying a bar 135 normally grazing or slightly clearing the plate 75 over the holes 90 and 91, in which the nut blanks are carried to the punch dies. This bar 135 is located as shown between the point of delivery from the chute 100 and these dies 26 and 27, and it is also so located that any nut or other obstruction upon the plate 75 above its surface will strike said bar and cause it to move the crank arm 134 and shaft 130 in a counter clockwise direction as viewed in Fig. 1. On the opposite end of this shaft 130 is another crank arm 137, to which is pivotally connected at 138 one end of a rod 140 whose opposite end is pivotally connected at 141 to a lever 142 pivoted at 143 upon the enlarged portion 52 of the lever 51 heretofore described. This lever 142 has some form of a pointed tooth 145 adapted to engage the angular corner 146 of said supplemental lever 49 so that when the operator depresses foot lever 58 and thus moves the parts to the position of Fig. 1, this lever 142 normally holding the supplemental lever 49 and attached rod 47 in the position shown. In this position the machine operates continuously as long as the operator holds his foot upon the foot lever. When now with



the machine thus in continuous operation, an obstruction, such as a nut blank out of its normal position on the plate 75, attempts to pass under the bar 135, the engagement of the nut blank with that bar rocks the shaft 130 in a counter clockwise direction as heretofore described with the result that the lever 137 pulls the rod 140 to the left, as viewed in Fig. 1; whereby the angular corner 145 on the trigger 142 is pulled off from the angular corner 146 on the supplemental lever 49. As soon as this takes place, the spring (not shown) in the main clutch mechanism controlling rod 47 immediately lifts the left hand end of the supplemental lever 49 and attached rod 47 thus, as heretofore described, throwing out the clutch and stopping the machine, this notwithstanding the fact that the foot lever is still depressed by being engaged by the operator's foot. The operator now removes his foot from the operating lever thus permitting spring 59 to return said lever to normal position. The operator now removes the foreign obstruction from the plate 75 and depresses lever 58 thereby rotating lever 51 in a counter clockwise direction, thereby starting the machine. As soon as this depression has gone far enough to allow the latch 142 to assume its normal position of Fig. 1, the spring 148 pulls the bar 140 and attached parts into this position.

In the complete operation of the entire machine, parts of which have heretofore been described, the operator starts the machine as just described and feeds a plurality of nut blanks into the hopper 123. These blanks slip down the passage ways in the chute 100 against the escapements 102. With repeated descents of the punch press, nuts are fed one by one in the manner described into each pair of holes 90 and 91 in the rotating plate 75. If properly so fed, they pass under the bar 135 without moving the same. If improperly fed, so that they protrude seriously above the surface of the plate 75, they cause said bar 135 and its attached parts to stop the machine in the manner described. If the nut blanks succeed in passing this bar 135 as they should, they finally reach a position where they are between the punch dies 26 and 27. When the upper dies 26 strike the lower dies 27 the nut blanks are chamfered and countersunk as described, and as the head 28 ascends, carrying the dies 26 away from the nuts the knock out mechanism strips the nuts from the dies, the plate 75 carries them on around under the wiper 127 over the hole 125, where they drop from the feed plate into chute 126 and thence into any suitable receptacle.

I have described the machine as both chamfering and countersinking but manifestly dies to do only one of said operations or to perform some other similar operation

may be used without departing from my invention.

In the base plate 29 I make adjacent to the bottom of the chute 100 corrugations or ridges 150, across the path of travel of the nut blanks in the holes 90 and 91, the same being designed to be engaged by any nut blanks which do not fall in flat position in the holes in the plate and thus cause said blanks to turn themselves over to flat position before reaching the bar 135.

I claim:

1. In a machine of the class described in combination with two die members and means for bringing them into operative engagement; means for feeding a plurality of objects to be worked upon, one at a time, between the dies and automatic means capable of stopping the movement of the die members adapted to be engaged and set in motion by an object to be worked upon which is carried by said feeding mechanism but is out of its normal position thereon.

2. In a machine of the class described in combination with two die members and means for bringing them into working engagement, means for feeding a plurality of objects to be worked one at a time between the die members, a bar adjacent to the feeding mechanism adapted to be engaged and moved by one of the objects to be worked upon misplaced upon the feeding means and about to pass between the two parts of the die and mechanism connecting said bar to the clutch and a clutch controlling the power applied to the machine the whole so arranged that when said bar is moved as described it cuts off the power from the machine.

3. In a machine of the class described in combination with two die members and means for bringing them into operative engagement, power driven means for feeding a plurality of the objects to be worked upon, one at a time, between the dies, a shaft journaled adjacent to the feeding mechanism, a crank arm extending over said shaft carrying a rod or bar extending over a portion of the feeding mechanism adapted to be engaged by objects to be worked upon misplaced upon the feeding mechanism, another crank arm secured to said shaft, a connecting rod having one end secured to said second crank arm, a trigger mechanism having the other end of said rod pivotally secured thereto and a mechanism for controlling the application of power to the machine normally engaged by said trigger mechanism in such a way that power is then supplied to the machine and that when an object misplaced upon the feeding mechanism of the machine strikes said bar and tilts the first mentioned shaft, it releases said trigger mechanism and shuts off the power from the machine.

4. In a machine of the class described in



combination with two die members and  
means for bringing them into operative en-  
gagement, a feed plate adapted to carry ob-  
jects to be worked upon between the die  
5 members, there being holes in said feed plate  
adapted to register with said die members,  
means for feeding objects to be worked, one  
into each successive hole in said feed plate  
and means adjacent to the point of said feed-  
10 ing of the objects to be worked, adapted to  
engage said objects as they are dropped into

the holes in the plate to turn said objects  
over to normal position as and for the pur-  
poses set forth.

In witness whereof, I have hereunto sub- 15  
scribed my name in the presence of two wit-  
nesses.

CHARLES F. MESSINGER.

Witnesses:

DWIGHT B. CHEEVER,  
C. J. CHRISTOFFEL.