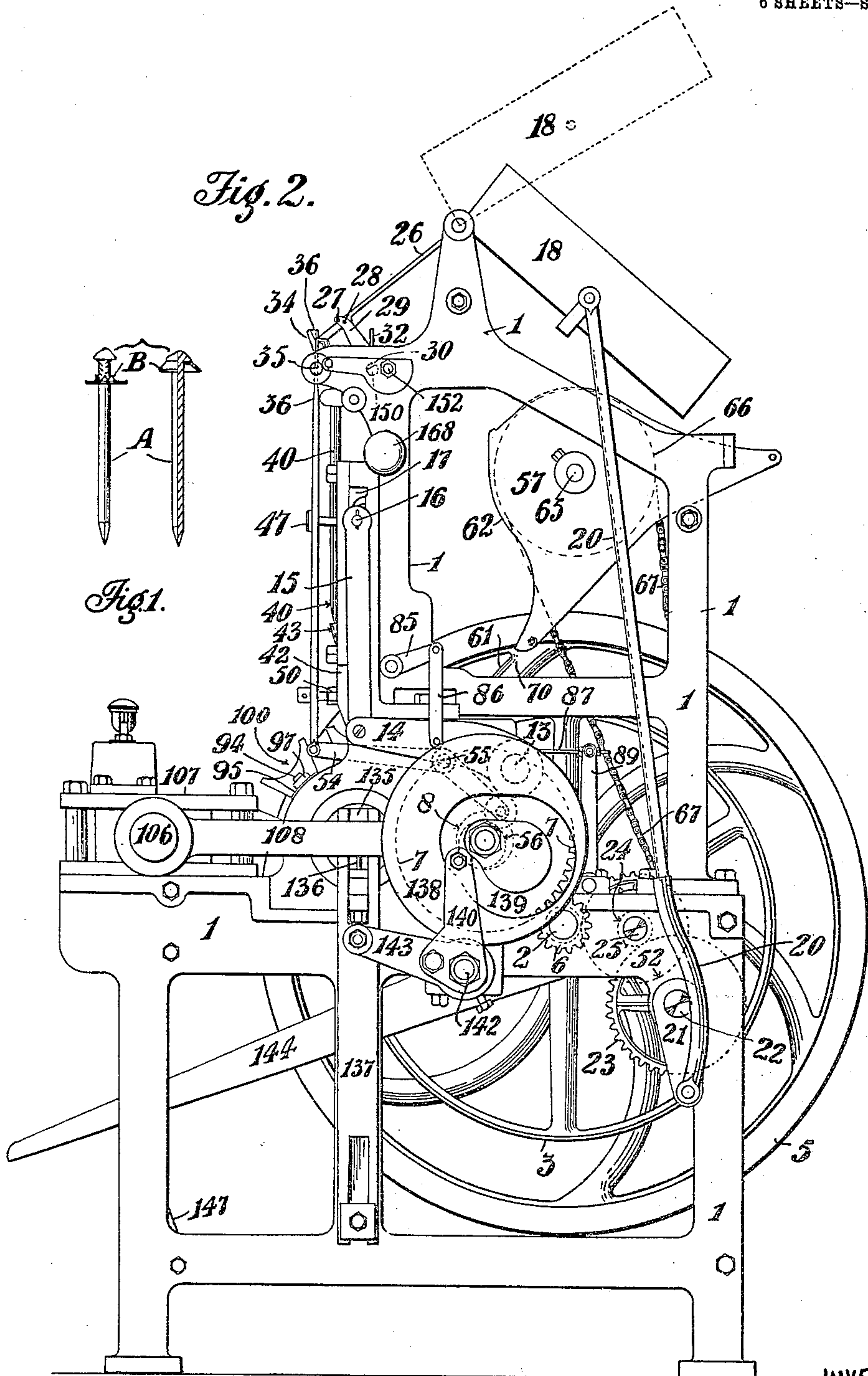


J. B. DAVIES & H. BELL.
MACHINE FOR FORMING ENLARGED OR EXTENDED HEADS UPON NAILS AND THE LIKE.
APPLICATION FILED JULY 10, 1908.

955,635.

Patented Apr. 19, 1910.

6 SHEETS—SHEET 1.



WITNESSES:

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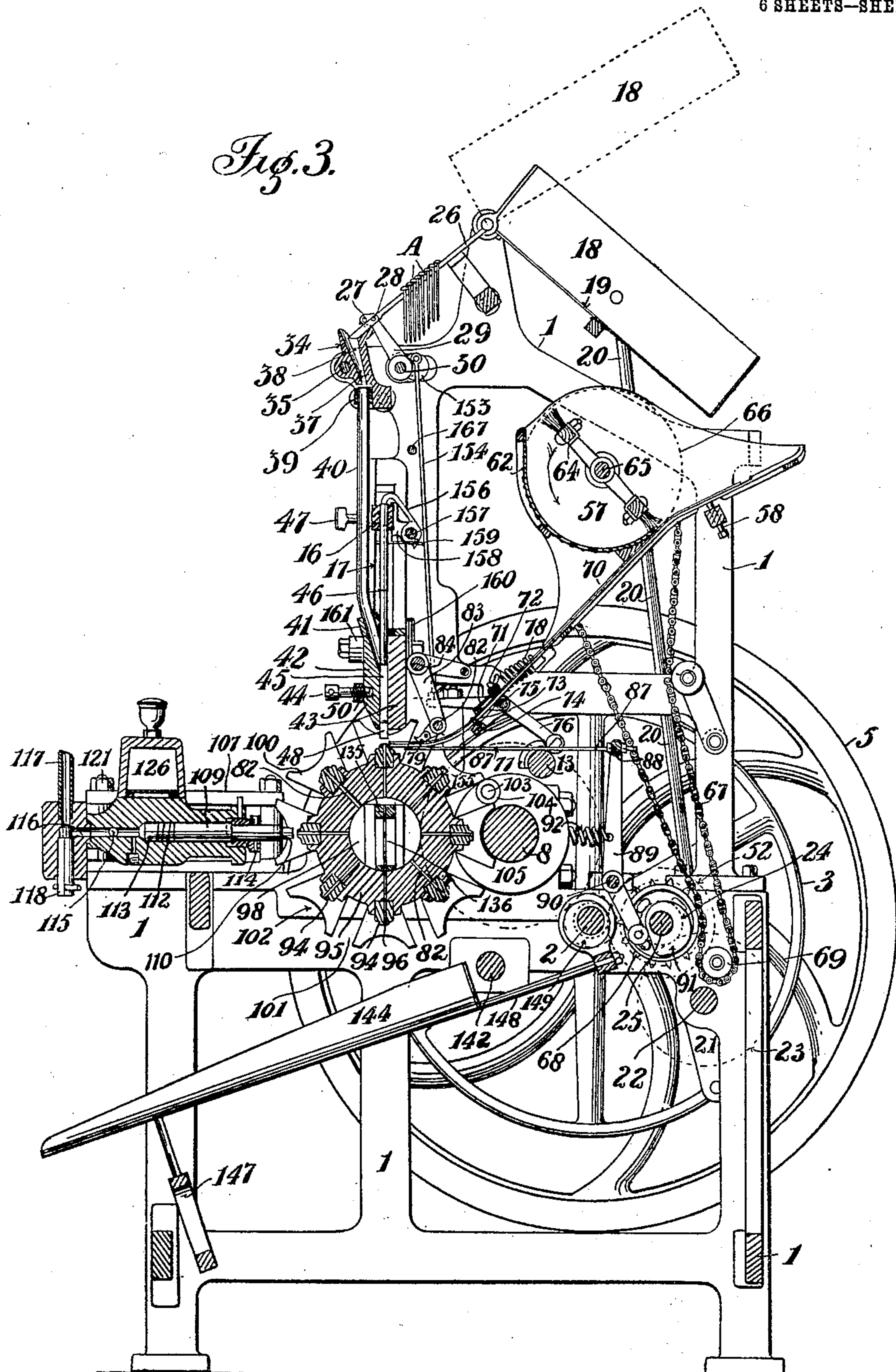
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MACHINE FOR FORMING ENLARGED OR EXTENDED HEADS UPON NAILS AND THE LIKE.

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Fig. 3.



WITNESSES:

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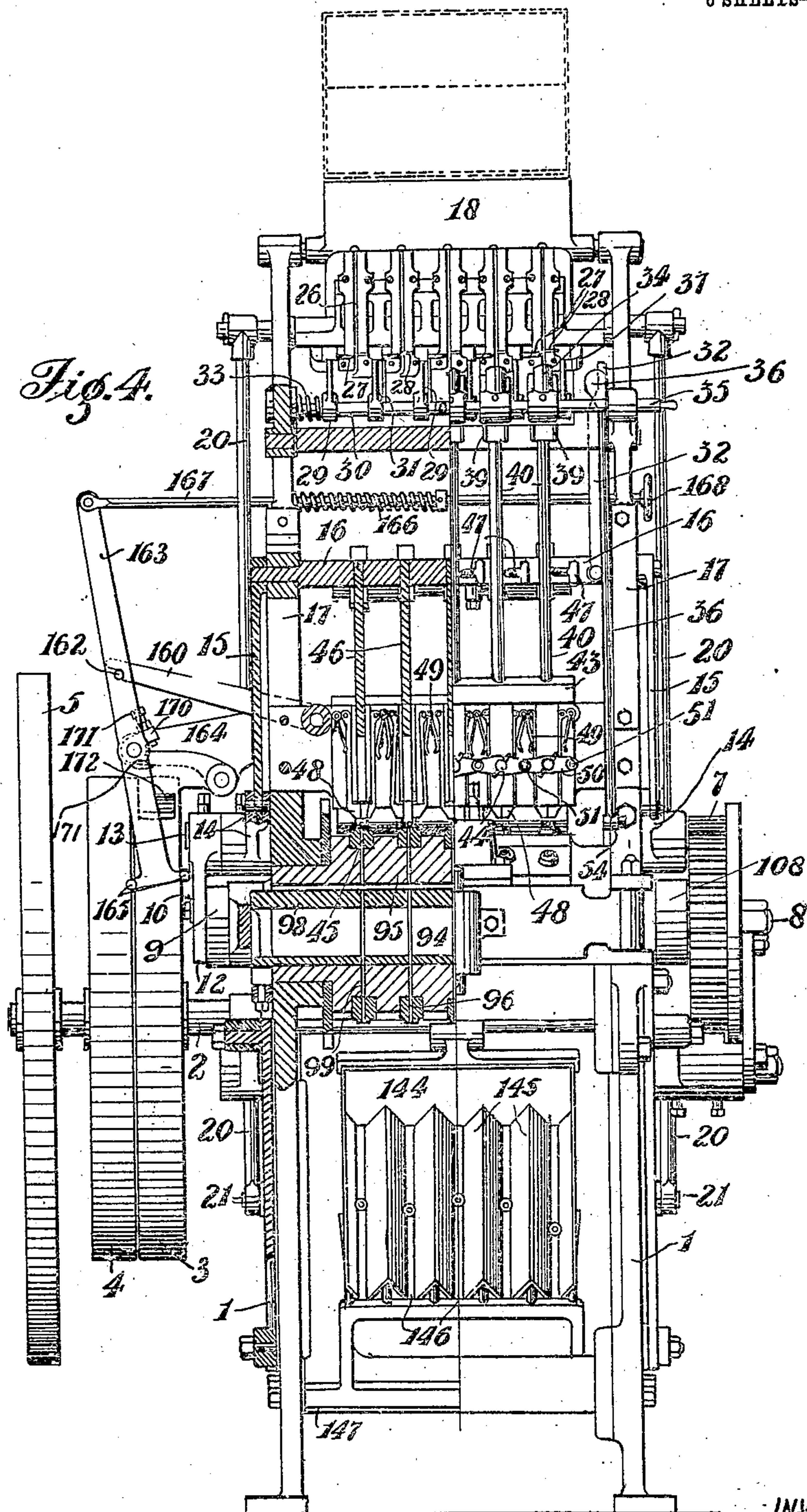
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6 SHEETS—SHEET 3.



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6 SHEETS—SHEET 4.

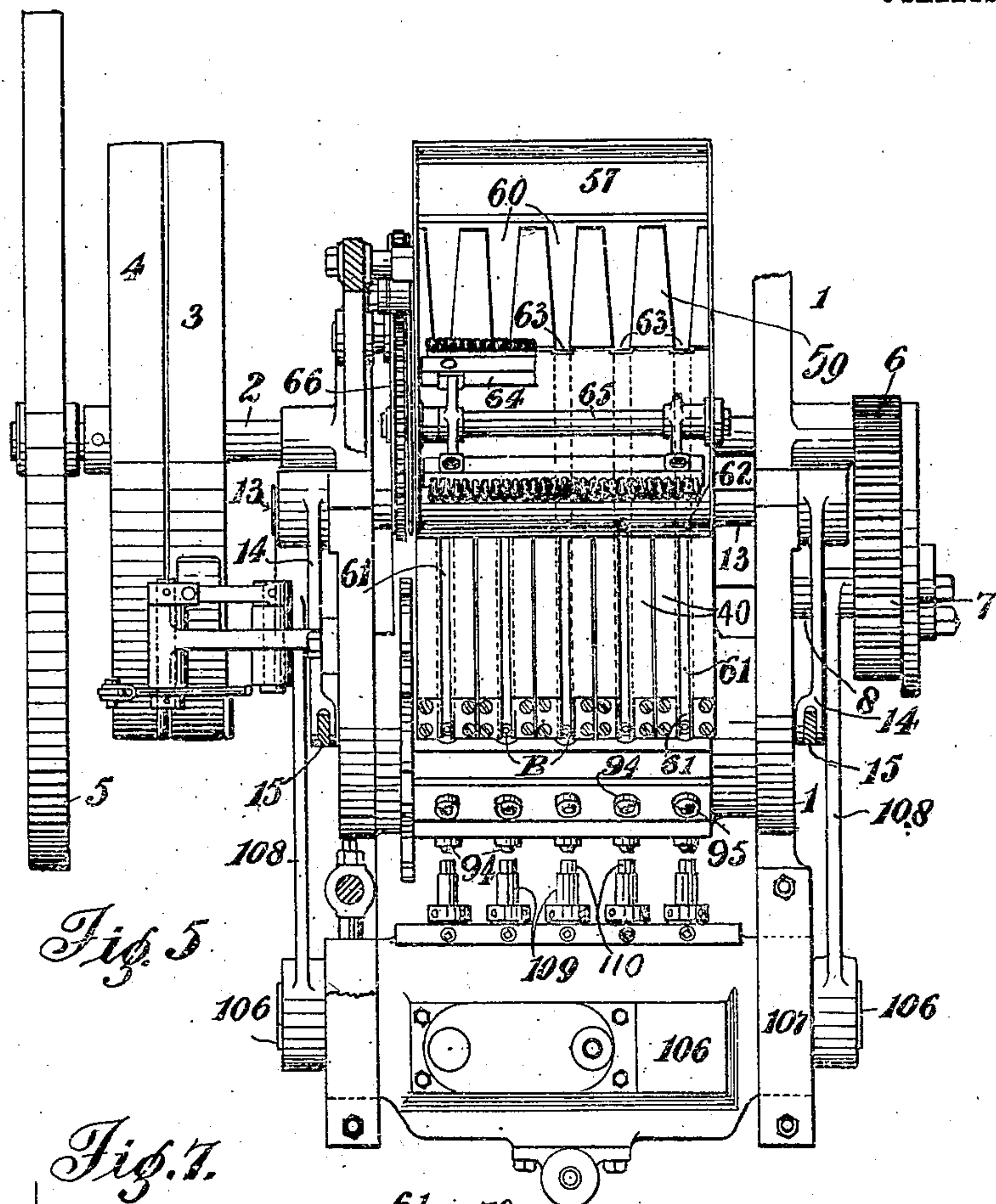


Fig. 5.

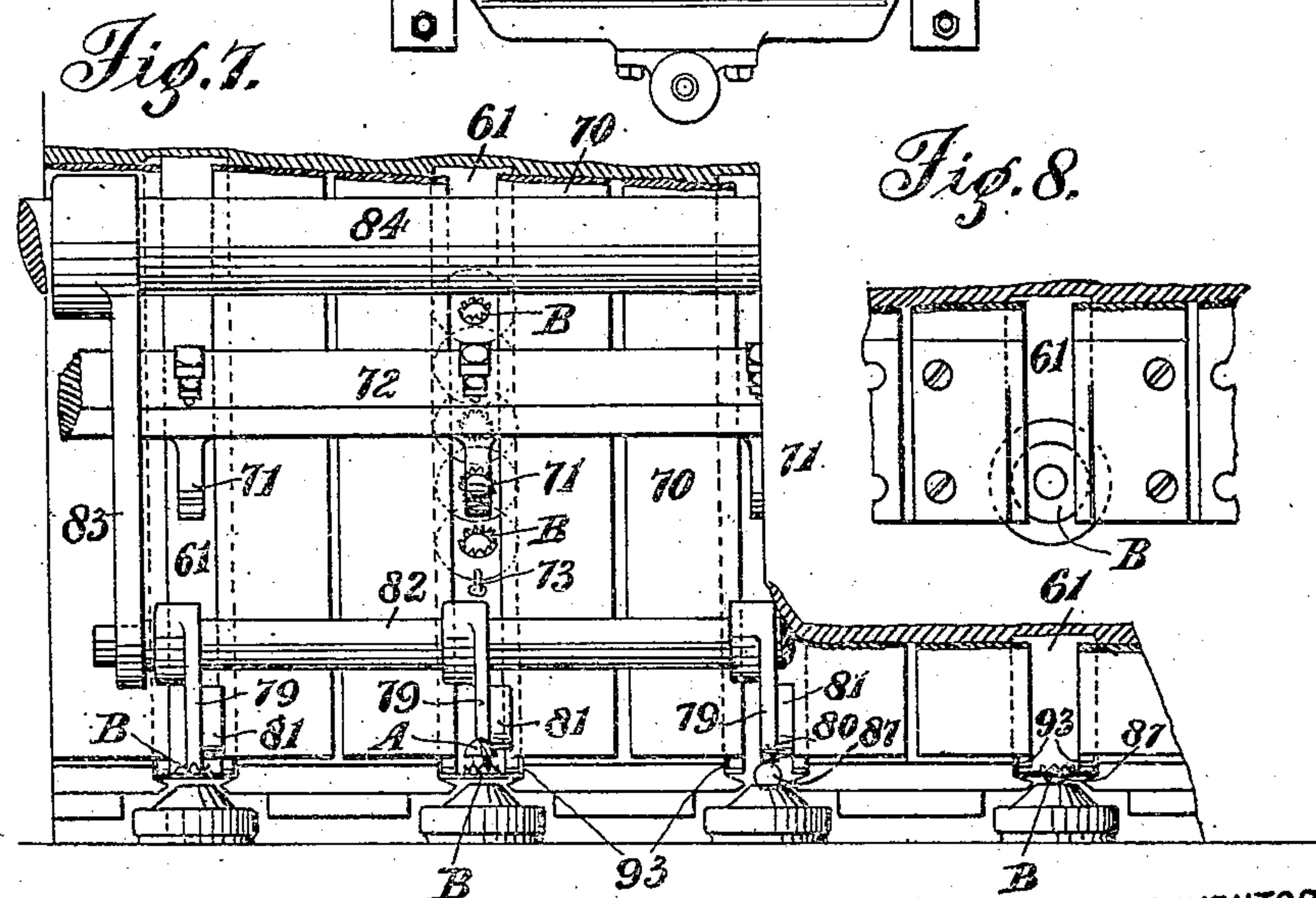


Fig. 7.

Fig. 8.

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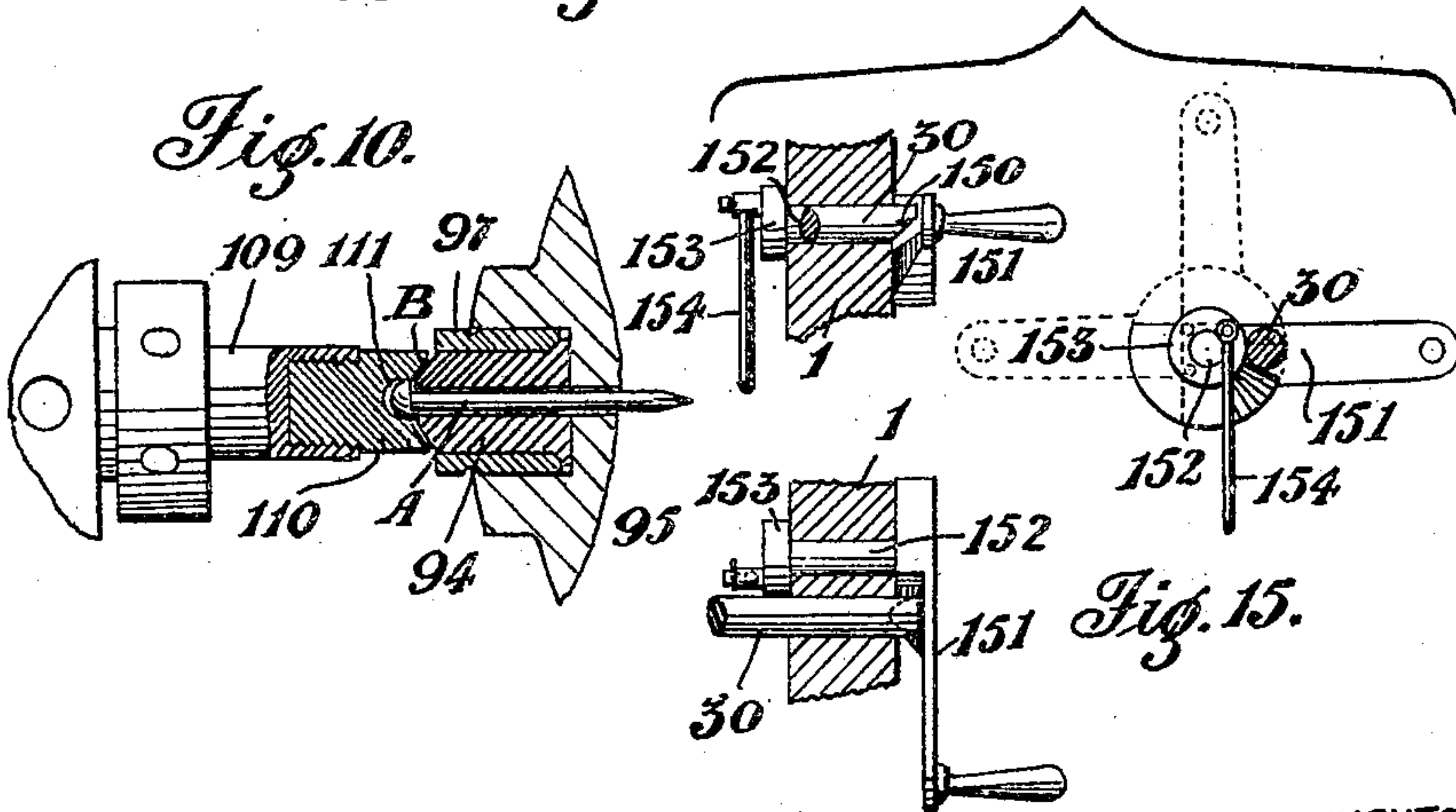
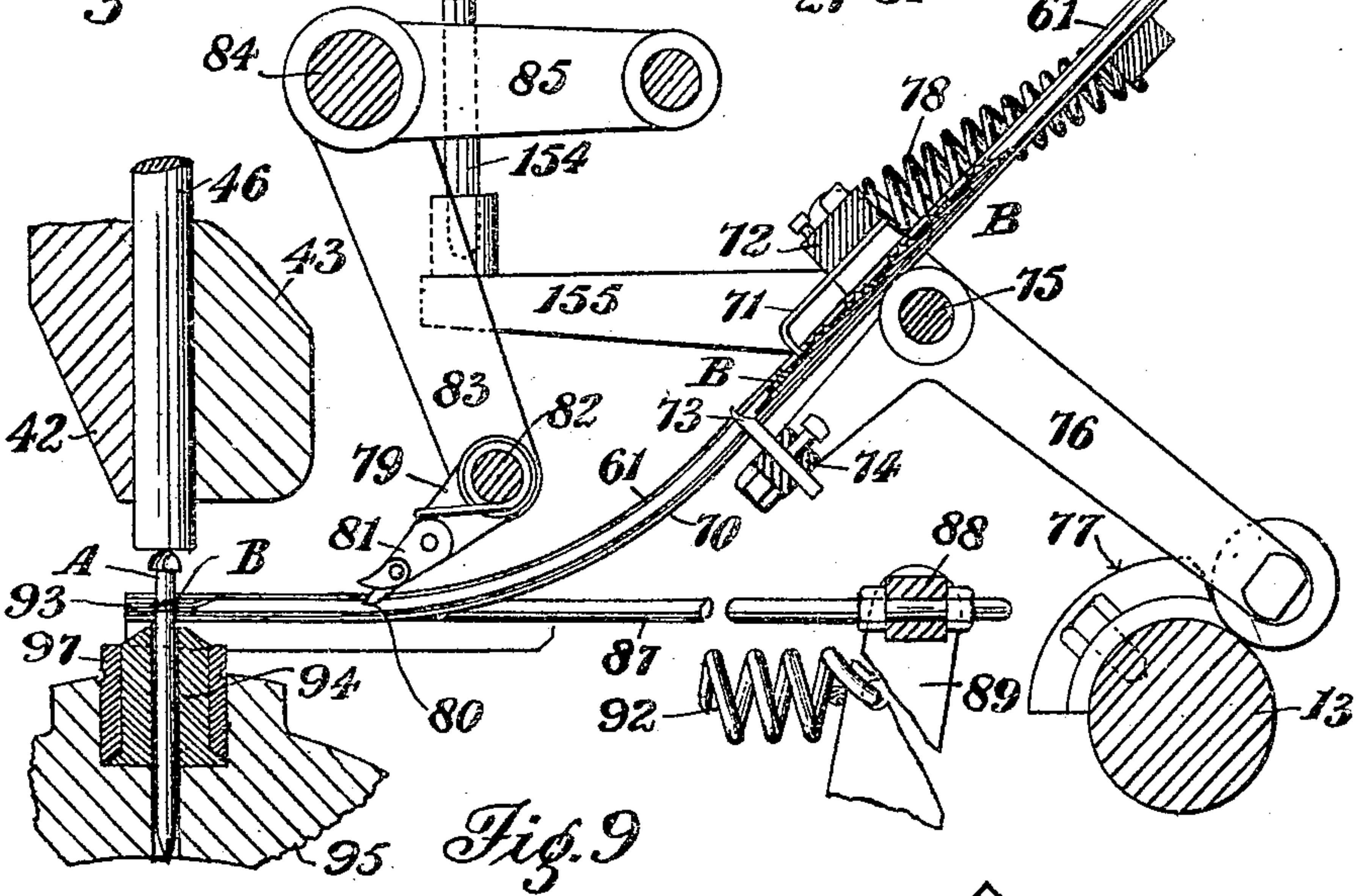
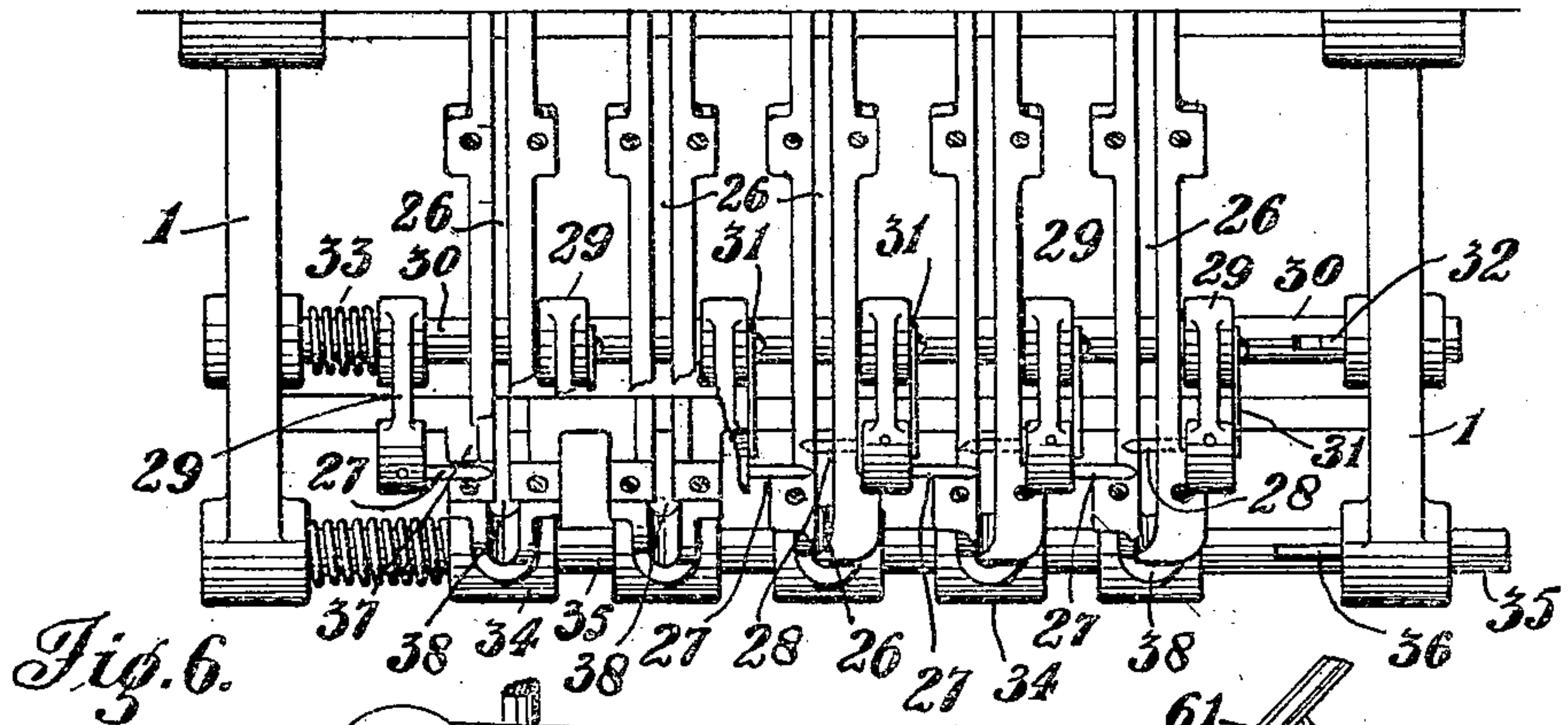
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J. B. DAVIES & H. BELL.
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6 SHEETS—SHEET 5.



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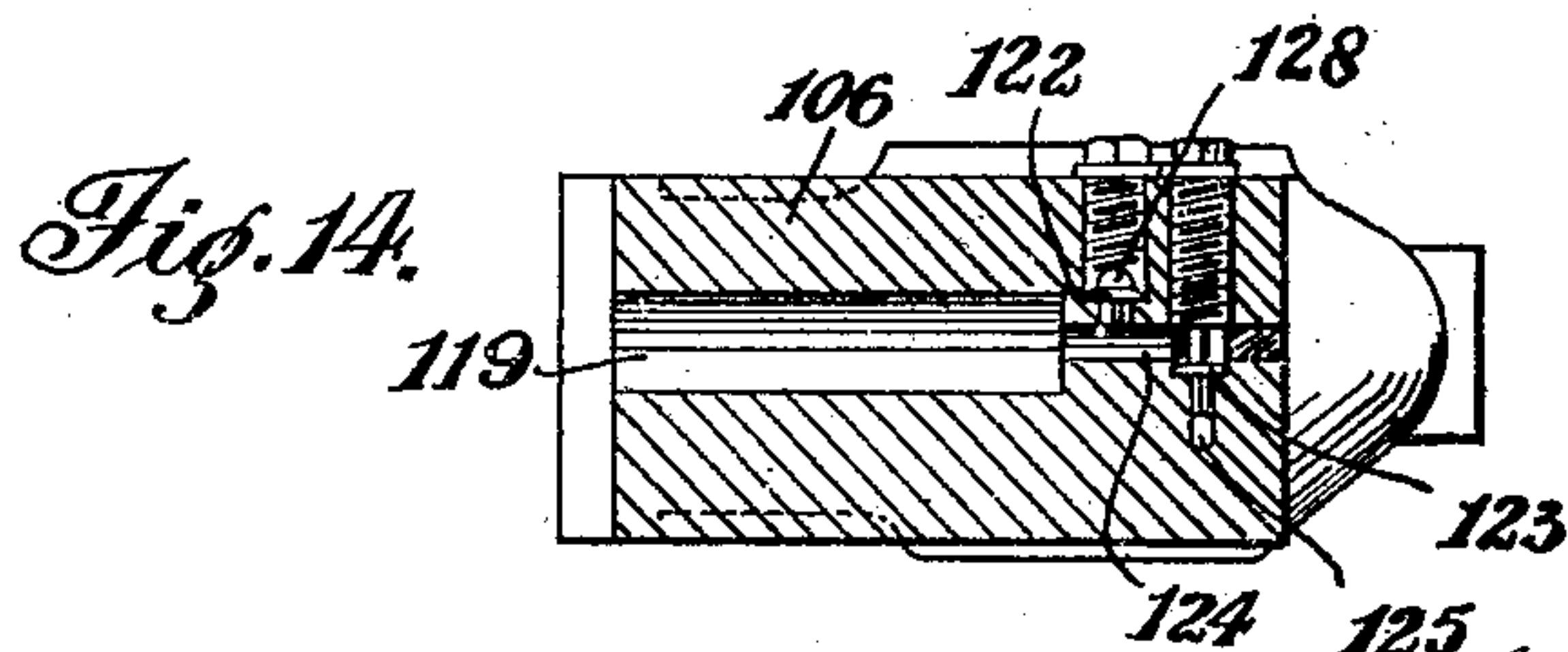
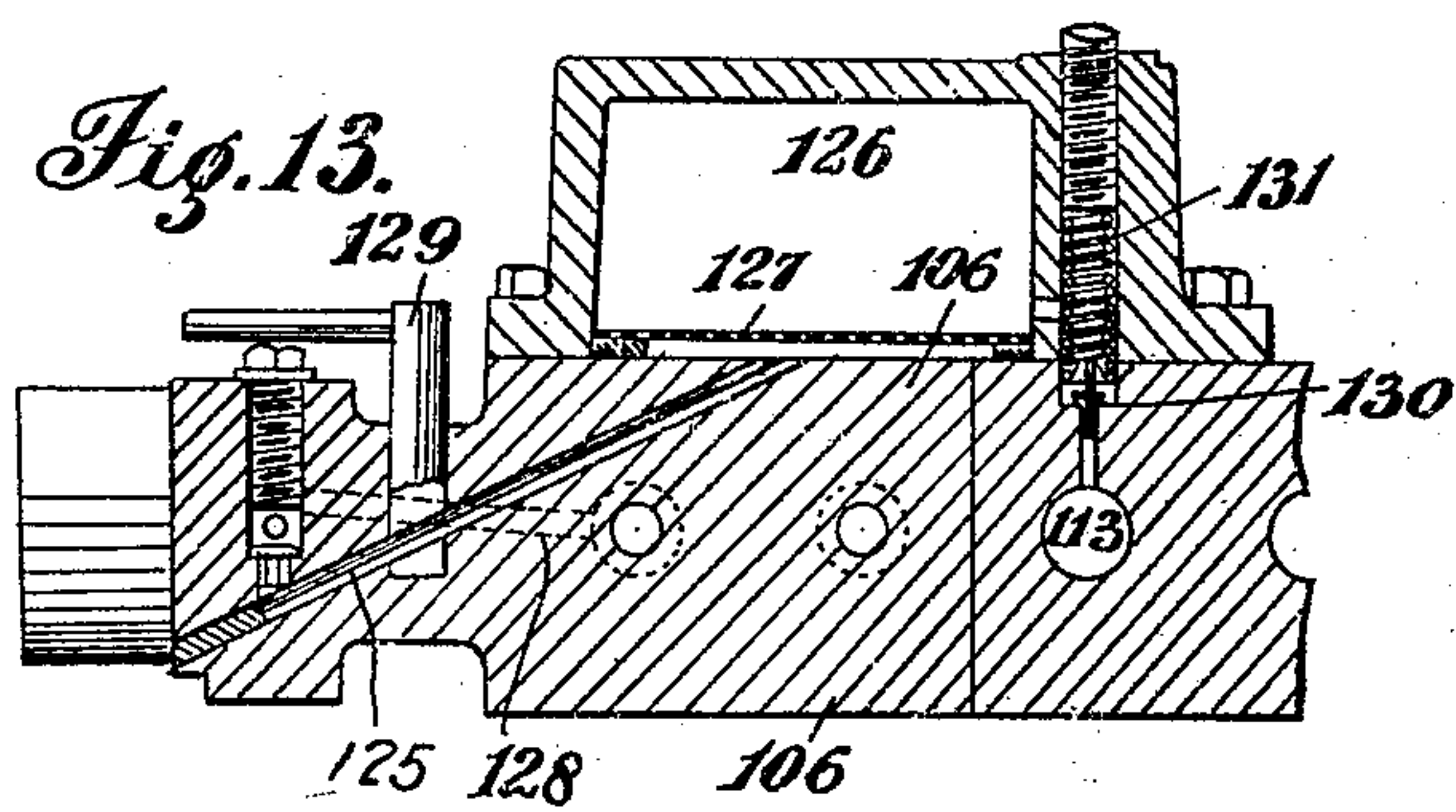
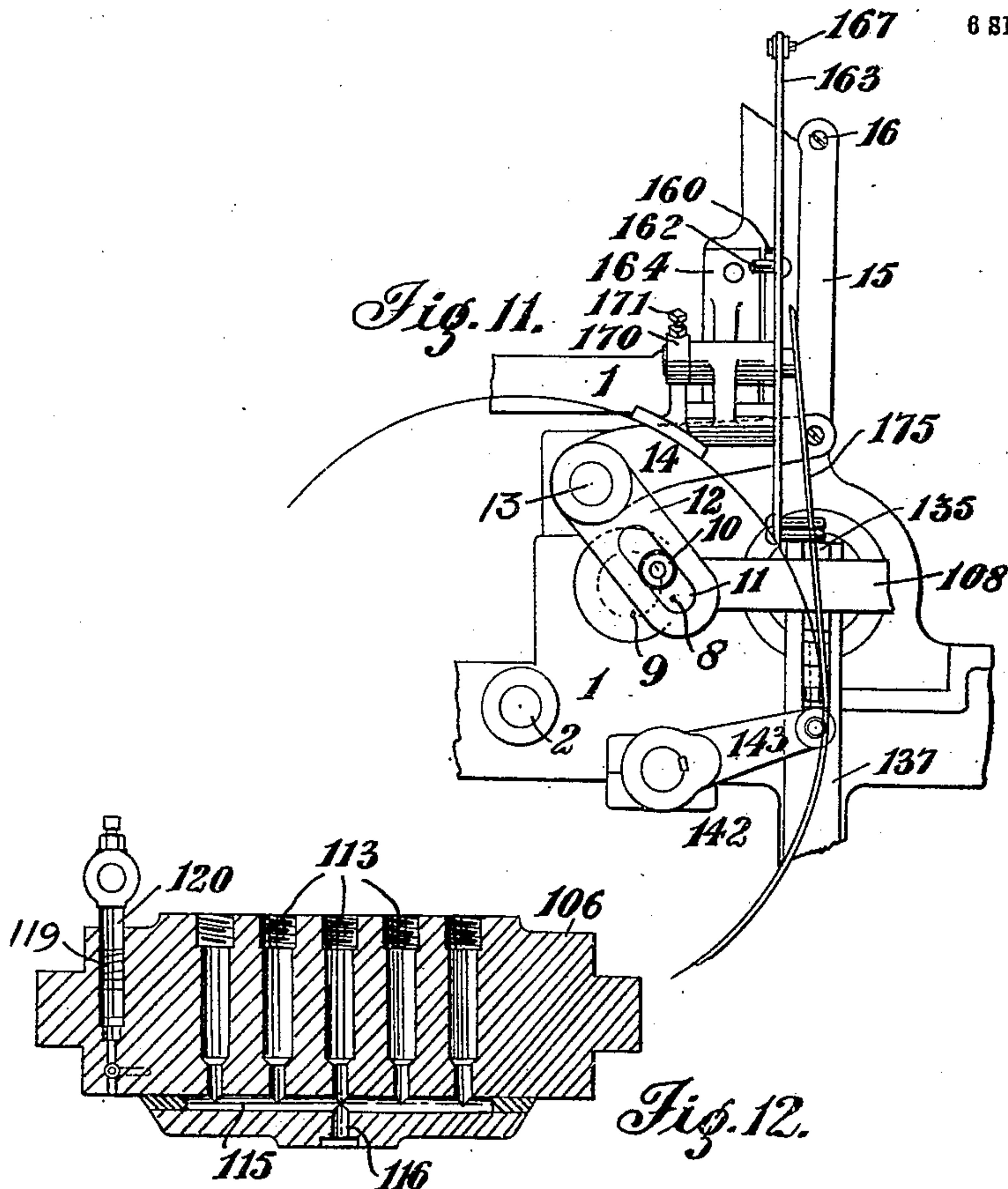
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APPLICATION FILED JULY 10, 1908.

955,635.

Patented Apr. 19, 1910.

6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

JOSEPH BARTLETT DAVIES, OF MELBOURNE, VICTORIA, AND HARCOURT BELL, OF
SOUTH MELBOURNE, VICTORIA, AUSTRALIA.

MACHINE FOR FORMING ENLARGED OR EXTENDED HEADS UPON NAILS AND THE
LIKE.

955,635.

Specification of Letters Patent.

Patented Apr. 19, 1910.

Application filed July 10, 1908. Serial No. 442,991.

To all whom it may concern:

Be it known that we, JOSEPH BARTLETT DAVIES and HARCOURT BELL, subjects of the King of Great Britain, residing at No. 330 Flinders Lane, Melbourne, accountant, and No. 12 Sturt street, South Melbourne, engineer, respectively, in the State of Victoria, Commonwealth of Australia, have invented certain new and useful Improvements in Machines for Forming Enlarged or Extended Heads upon Nails and the Like, of which the following is a specification.

This invention relates to certain improvements in a machine for forming enlarged or extended heads upon nails and the like in which such enlargement or extension consists of a separate disk or washer.

This invention refers more particularly to a machine for the manufacture of nails having dome or inverted cup-shaped heads of sheet metal for use with corrugated iron, for which Letters Patent were applied for in U. S. A. No. 391476/07.

Though this invention is hereinafter described as relating more especially to a machine for forming the enlarged or extended heads upon nails of the kind mentioned it will be well understood that it is equally applicable to the formation of enlarged or extended heads upon other cognate articles such as screws etc. and in this specification the term "nails" will be held to include all such. Furthermore the term "disks" will be held to include washers and the like from which such enlarged or extended heads might be formed.

The object of our invention is to provide certain improvements in the aforesaid machine in which the operation of affixing the disk to the nail is mechanically effected thereby producing a nail with an enlarged or extended head in a state fit for galvanizing.

The improvements in the aforesaid machine are as hereinafter described and shown in the accompanying drawings in which a complete machine is illustrated adapted to deliver 5 nails with enlarged heads at each operation.

In order that our invention may be the better understood we will now proceed to

describe the same by reference to the accompanying drawings, in which:—

Figure 1 comprises two separate views of the nail which this machine as hereinafter described is designed to manufacture it being however understood that our invention is not confined entirely to the manufacture of these particular nails. Fig. 2 is a side elevation of our improved machine complete taken from the right hand side. Fig. 3 is a similar side elevation taken in section through the center of the machine. Fig. 4 is a front view of the machine shown partly in section. Fig. 5 is a plan of the machine with the nail feeding mechanism removed showing the disk magazine, feeding mechanism, die cylinder and pressure plungers. Fig. 6 is a detail view in plan of the mechanism for assembling and delivering the nails one at a time as discharged from the nail magazine. Figs. 7 and 8 are detail views in plan of the disk races and feeding mechanism. Fig. 9 is a detail enlarged view in section of the disk feeding mechanism. Fig. 10 is a similar detail view of a die and pressure plunger. Fig. 11 is a side elevation of a portion of the left hand side of the machine showing the operation of the tripping and cut-off gear. Fig. 12 is a horizontal section of the reciprocating beam carrying the pressure plungers showing the pump mechanism for maintaining the pressure. Fig. 13 is a longitudinal enlarged section of the said beam taken upon the line $x-x$ of Fig. 12. Fig. 14 is a cross section also enlarged of the said beam taken upon the line of the pump. Fig. 15 shows detail views of the cutting off mechanism.

Referring to Fig. 1 A represents a nail and B a disk which forms upon the said nail an enlarged or extended head. The nails A are preferably ordinary wire nails having wings upon the underface of the head while the disks B are made preferably from tin plate being stamped out in such a way that a number of burs are formed upon the upper face while the disk itself is preferably slightly domed or dished inversely to assist in the operation of feeding as hereinafter described. As these nails A are forced home the said burs engage with small pro-

jecting wings upon the under face of the nail head the securing of the disks being completely effected by the subsequent dipping in molten zinc or galvanizing. This machine will be herein described as relating to the manufacture of these nails as shown in Fig. 1 but it may be modified so that it may be adapted for the formation of enlarged or extended heads of other disks upon other nails.

1 is the main framework of the machine which is constructed of two slide frames, one erected upon each side with cross beams and stay rods comprising together a rectangular frame. Within this framework is mounted a cross shaft 2 carrying a fast pulley 3 and a loose pulley 4 and a fly wheel 5. Up the other end of the shaft 2, on the right hand side of the machine, and upon the outside of the framework, is a spur pinion 6 which gears with a spur wheel 7 upon the main shaft 8. This main shaft 8 is mounted in suitable bearings in the framework 1, and extends across the machine from side to side. Upon the other end of the main shaft 8, that is to say upon the left hand side of the machine, is provided an eccentric 9 having an antifriction roller 10 engaging a slot 11 in a downwardly projecting arm 12. This arm 12 is secured to another cross shaft 13, which also extends across the machine from side to side working in suitable bearings within the framework 1 and is actuated with a reciprocating or rocking motion by means of the eccentric 9 and arm 12. The rocking shaft 13 carries at each end a forwardly projecting arm 14 connected to vertical rods 15, attached at their upper ends to a cross beam 16 working in vertical guides 17 one upon each side of the framework 1.

The mechanism for assembling the nails and delivering them one at a time is as follows:—At the top of the framework 1 is a magazine 18 of known construction having in its floor or bottom a series of slots or channels 19. This magazine 18 is hinged at its forward lower edge and is connected by rods 20 to cranks 21 mounted upon each end of a rotating shaft 22. The magazine 18 is thus actuated with a vertical swinging motion by which the nails therein are separated and caused to fall into the said slots or channels 19 suspended from their heads as shown in Fig. 3. The connecting rods 20 are made telescopic to obviate the danger of an operator being caught thereunder. The rotating cross shaft 22 is operated from the driving shaft 2 by a series of spur wheels and pinions. The shaft 22 carries a toothed wheel 23 gearing with a spur wheel 24 mounted upon a cross shaft 25 which carries a toothed wheel 52 driven by a spur pinion upon the shaft 2 preferably formed by a se-

ries of teeth being cut upon the surface thereof. The magazine 18 is provided with a series of inclined races 26 extending forward from its lower edge and corresponding with the slots or channels 19. At each upward motion of the magazine 18 the nails hanging in the slots or channels 19 are delivered by gravity into the inclined races 26 down which they pass as shown in Fig. 3. At the lower end of each of these races 26 suitable mechanism is provided for separating out the nails and delivering them one at a time, which is shown more particularly in detail in Fig. 6. For this purpose each race 26 is provided with two fingers 27 and 28, a forward and upper finger 27 and a rearward and lower finger 28 passing through the bars forming the races 26. The fingers 27 and 28 are mounted upon upwardly projecting brackets 29 upon a reciprocating shaft 30. The lower rearward fingers 28 project from the left hand side of the brackets 29 and are pointed at their ends to enable them to readily pass between the shanks of the nails. These fingers 28 bear against springs 31 upon the side of the brackets 29 whereby they are permitted to give should they at any time engage an uneven shank or other obstruction. The upper forward fingers 27 working upon the faces of the races 26 are mounted upon the right hand side of the brackets 29. As the shaft 30 reciprocates the fingers 27 and 28 alternately cross the races 26 and subject the nails to intermittent rests cutting them off one at a time and delivering them in regular consecutive order as required. The shaft 30 is given its reciprocating motion from a vertical sliding plate 32 of variable width which engages a slot in the said shaft 30, and is connected at its lower end to the beam 16 before described and works against a spring 33. At the bottom of the nail races 26 is provided a series of gates 34 (one for each race) mounted upon a further reciprocating shaft 35. These gates 34 are adapted in their movement to feed the nails one at a time from the bottom of each race 26 and for this purpose each race 26 is turned at the bottom (as shown in Fig. 6) in the direction of the delivering movement of the gates 34. The reciprocating shaft 35 receives its cross motion from a vertical sliding plate 36 engaging a slot within the same and operated with a vertical movement as herein-after described. The gates 34 mounted upon the reciprocating shaft 35 work upon a stationary face plate 37 secured to the framework 1 and are formed with inclined recesses 38 so arranged that when in the right hand position the nails are held in the turned portions of the races 26 but when they (the gates 34) move to the left hand position the nails are released and fall downward

through the recesses 38 into tubes 40. These tubes 40 are held upon the face plate 37 by spring clips 39 (Fig. 4) so that they may be easily removed and replaced at any time should they be choked with nails. These tubes 40 discharge into inclined recesses 41 formed in covers 42 held upon a stationary cross beam 43. Within this cross beam 43 are a series of vertical channels 45 within which work plungers 46 attached to the reciprocating cross beam 16 by thumb screws 47 while at the bottom of each channel 45 is a pair of jaws 48 having springs 49. The recesses 41 are arranged at the side of the channels 45 and the nails pass therefrom into the said channels 45 as the plungers 46 rise and are then driven through the jaws 48 as the said plungers 46 descend. These covers 42 are secured to the cross beam 43 by locking bars 50 having notches at each end engaging headed projecting pins 51 and held in place by thumb screws 44. Thus by releasing the thumb screws 44 half a turn the covers 42 may be removed. The sliding plate 36 operating the gate 34 is given a vertical movement by being attached at its lower end to a lever 54 (Fig. 2) pivoted at 55 to the framework and engaging a cam 56 at its other end upon the main shaft 8 (as shown in dotted lines in Fig. 2).

The mechanism for assembling and feeding the disks one at a time consists of a disk magazine 57, which is constructed as shown more particularly in Fig. 5. This disk magazine 57 rests upon an adjusting screw 58 at the back, by which its elevation may be regulated and is provided with an inclined floor or bottom at the rear having a series of plates 59 which divide the said floor or bottom into a number of channels 60 corresponding with the number of nail races previously described. Each of these channels 60 connects with a disk race 61. The front of the disk magazine 57 is formed by a curved plate 62 the lowermost edge of which is formed with a series of vents 63 corresponding with the races 61, and so shaped that the disks can only pass through in one way when lying with the burs projecting upward, and each vent 63 is made of such a size to conveniently accommodate the bur. The magazine 57 is provided with revolving brushes 64 mounted upon a cross shaft 65 and moving in the direction as shown by the arrow. This cross shaft 65 with the brushes 64 is driven by a sprocket wheel 66 actuated by a chain 67. This chain 67 gears with a toothed sprocket 68 mounted upon the shaft 25 and passes around an idler 69 so that rotary motion is imparted to the brushes 64 from the said shaft 25 which is driven as previously described. The revolving brushes 64 continually agitate the disks and by removing those which

do not assemble in the proper position with burs upward to pass through the vents 63 into the races 61 maintain the feed of the said disks. The disks on entering the races 61 through the vents 63 pass downward by gravity and for this purpose the races 61 are formed upon the upper face of a plate 70. These races 61 are formed with an open slot upon the upper side through which the burs project (as shown in Fig. 7) and the disks slide downward therein by gravity each one overlapping that immediately below it with its lower edge bearing against the bur of the other as shown in Fig. 9. The plate 70 within which are the races 61 extends downward from the magazine 57 at an incline being curved at the bottom to a horizontal position (Fig. 9). The races 61 are provided with an escapement device by which the disks are fed forward one at a time consisting of a series of spring fingers 71 (one for each race) mounted on a cross bar 72 arranged over the face of the plate 70 and bearing on the top of the disks in conjunction with a series of pins 73 (one for each race) attached to a cross bar 74 arranged underneath the plate 70 and projecting up through the said races 61. The spring fingers 71 and upwardly projecting pins 73 are adapted to alternately obstruct the passage of the disks in the races 61 and for this purpose are both connected to a shaft 75 mounted underneath the plate 70 to which is attached an arm 76 operated by a cam 77 on the rocking shaft 13 the return movement being effected by a spring 78. The races 61 in the plate 70 are further provided with mechanism for feeding the disks forward consisting of a series of pawl or fingers 79 (one for each race) adapted to move up and down within the open slot of the races 61 and thus carry the disk released by the pins 73 downward around the curve of the plate 70. These pawls or fingers 79 are made with projecting points 80 which engage the open slots of the races 61 and with guides 81 which bear upon the side of the said slots. These pawls or fingers 79 are mounted upon a cross bar 82 and reciprocating motion is imparted by the said cross bar 82 being carried by arms 83 at each end attached to a cross shaft 84 having a rearwardly extending arm 85 which is connected by another arm 86 to the lever 14 which is mounted on the rocking shaft 13 and actuates the cross beam 16. Each race 61 is further provided with a feed rod 87 by which the disks are carried forward to the end of the same to a portion immediately over the dies. These feed rods 87 are arranged horizontally and project in through the bottom of the races 61 and obtain their reciprocating motion by being attached to

a cross bar 88 supported upon levers 89 pivoted on the framework at 90 and operated by the end of one of the levers 89 engaging a cam 91 upon the cross shaft 25 before described the return movement being obtained by a spring 92. Each race 61 is formed at its lower or outermost end with a spring 93 upon each side which bear upon the disks and hold them in position immediately over the dies.

The dies 94 upon which the extended heads of the nails are shaped are formed upon an intermittently rotating cylinder 95 and each series or row of dies corresponds with the number of nail and disk races of which five are shown in the drawings. The dies 94 are mounted in horizontal rows or series upon the face of the cylinder 95 and in the accompanying drawings eight of such rows or series are shown. Each die 94 is provided with an internal hole 96 corresponding with the shank of the nail, and is held in place by a bush 97 so that they may be at any time removed or adjusted if required. Each die 94 is of a shape corresponding with that of the finished nail head. The cylinder 95 is provided with an internal core 98 and also with a number of holes 99 corresponding with the central holes 96 of the dies 94, and these holes 99 pass right through to the internal core 98. Intermittent rotating motion is imparted to the cylinder 95 by means of a star wheel 100 having alternate rectangular recesses 101 and curved recesses 102 one each corresponding for each row or series of dies 94. This star wheel 100 is actuated by pin 103 and roller 104 mounted eccentrically upon a disk 105 upon the main shaft 8 moving in the direction as shown by the arrows in Fig. 3. The roller 104 upon the pin 103 engages one rectangular recess 101 in each revolution of the shaft 8, and thereby in each revolution moves it forward one-eighth of a revolution. Alternately the curved recesses 102 bear upon the shaft 8 and the cylinder 95 is thereby held at rest in the proper position until it receives its next forward movement by the eccentric roller 104 engaging the next rectangular recess 101. A notch 104' in the shaft 8 permits the passage of the corners of the star-wheel when the star-wheel is rotated.

A cross beam 106 is provided upon the front of the machine working in suitable slides 107 upon each side actuated with a backward and forward reciprocating motion by means of pitmen 108 connected at their inner ends to eccentric cams upon each end of the main shaft 8. The cross beam 106 is provided with a series of pressure plungers 109 having dies 110 let into the ends thereof, and recessed to a shape corresponding with the dies 94 and the head of the nail as sub-

sequently formed, except that the part of the die 110 which engages the center of the nail head is recessed, as at 111, so that the pressure is applied immediately over the shank of the nail and not upon the edges of the head in order to more securely clench the disk upon the nail to form the enlarged or extended head. Each pressure plunger 109 is constructed with packings 112 and works within a recess 113, having a bush 114 in the rear face of the beam 106 so that they may be adjusted when required. Each of the recesses 113 connects with a cross channel 115 by which oil or other liquid under pressure may be supplied to the back of the said pressure plungers 109 and thereby maintain the same all under one constant pressure and causing the same constant pressure to be imparted to all the dies. For this purpose the channel 115 is connected by means of a further channel 116 to a pipe 117 having a stop cock 118 leading to an accumulator or head of liquid by which a constant pressure may be maintained. The pressure of oil or other liquid is also maintained upon the pressure plungers 109 by means of a pump operated by the motion of the machine, and for this purpose the beam 106 is provided with a recess 119 upon one side which engages a fixed piston 120, or a separate pump may be provided to maintain the pressure of oil in the accumulator. This piston 120 is attached to one of the bolts 121 upon the framework and the rear end of the said recess 119 is provided with two valves 122 and 123 respectively connecting with a channel 124. This channel 124 connects by means of another channel 125 to a reservoir 126 arranged upon the top of the beam 106 having a perforated plate 127 at the bottom thereof for straining the oil or other liquid. The channel 124 leading from the piston recess 119 connects through the medium of the valve 122 to a channel 128 which connects in its turn with one of the plunger recesses 113 and thereby with all the recesses 113 of the pressure plungers 109. The channel 125 is also provided with a stop cock 129 by which the supply of oil or other liquid may be cut off from the operation of the pump piston 120 when the pressure is maintained. The beam 106 is further provided with an escape valve 130 arranged in the recess 131 for relieving any undue pressure which may be obtained while in operation.

Within the internal core 98 of the cylinder 95 is a vertically reciprocating beam 135 by which the nails are discharged after the enlarged or extended heads are formed thereon. This reciprocating beam 135 is provided with a series of downwardly projecting rods 136 corresponding with the central holes or recesses in the dies 94. The reciprocating beam 135 is connected at each

end to a sliding bar 137 mounted upon the main framework upon either side of the machine. These sliding bars 137 are operated from the main shaft 8 by means of a cam 138 having a slot 139 concentrically shaped for the major portion of its path, and the rest so shaped as to impart a periodic movement to the arm 140 having a roller which gears therewith. This arm 140 is mounted upon a cross shaft 142 which passes across the machine from side to side, and is provided at each end with a forwardly extending arm 143. These arms 143 are connected to the sliding bars 137 upon each side whereby an intermittent vertical reciprocation is imparted to the said cross beam 135.

At the bottom of the machine is provided a classifying trough or sieve 144 by which any nails without disks or disks without nails or imperfectly formed nails are separated out. The bottom of this classifier consists of a series of inverted V-shaped plates 145 having channels 146 between of such a width that any nails without disks or disks by themselves may pass therethrough, but the nails with the enlarged or extended heads are retained and caused to pass downward, and are discharged into a receptacle for the purpose. This separating sieve 144 is adapted to reciprocate and for this purpose is supported at its forward end by arms 147 hinged to the framework 1 and at the rear by arms 148 attached to an eccentric 149 mounted upon the cross shaft 2.

Means are also provided for cutting off the feed of the nails independently or of both the nails and disks at the same time. For this purpose the cross shaft 30 before described in connection with the nail feeding mechanism is provided on its outer end with an inclined face 150 which is engaged by a tripping lever 151 mounted upon a spindle 152 upon the framework 1 of the machine (Fig. 15). For the purpose of cutting off the feed of disks a disk 153 is mounted on the inner end of the spindle 152 to which is eccentrically attached a downwardly extending rod 154 seated at its lower end within a socket upon a forwardly extended arm 155 which is mounted upon the shaft 75 to which the spring fingers 71 are connected. The rod 154 is so positioned in its eccentric attachment to the disk 153 that by a turn of ninety degrees of the tripping lever 151 the arm 155 is not depressed while the said lever 151 engages the inclined face 150 of the shaft 30 and forces the same back against the pressure of the spring 33 thus locking the fingers 28 across the channels 26 and thereby cutting off the feed of nails. By turning the tripping lever 151 a full half turn or about one hundred and eighty degrees the rod 154 depresses the for-

wardly extending arm 155 and locks the spring fingers 71 in their downward position within the races 61 and thereby also cuts off the feed of disks. Means are also provided in addition for throwing the machine out of gear when any irregularly formed nail or a nail assuming an incorrect position or other obstruction is met with as the nails are fed forward beneath the operation of the plungers 46. These plungers 46 are as before described held upon the reciprocating beam 16 by means of thumb screws 47 so that should they meet with any undue resistance the beam 16 will descend without them, leaving the said plungers 46 in an elevated position. For the purpose of throwing the machine out of gear upon this contingency the beam 16 is provided with a series of trippers 156 mounted upon a cross shaft 157 supported in brackets 158 attached to the said beam 16. The point of each of these trippers 156 bears upon the upper end of their corresponding plungers 46 (as shown in Fig. 3), and springs 159 are provided upon their under face to hold them in position. A tripping lever 160 is also provided pivoted upon a bracket 161 attached to the beam 43 having its inner point so arranged that the trippers 156 just miss the same when in their normal position. When however any one of the trippers 156 is elevated by a plunger 46 it engages the point of the lever 160 and depresses the same. This lever 160 engages a pin 162 upon the belt fork lever 163. This belt fork lever 163 is pivoted to a bracket 164 on the framework 1 and is provided at its lower end with prongs 165 which engage the driving belt 175 working on the pulleys 3 and 4. The belt fork lever 163 is pressed outward by means of a spring 166 upon a rod 167 connected to the same and extending across the machine and having a handle 168 at its outer end. When the belt fork lever 163 is thus released by the tripping lever 160 disengaging the pin 162 the driving belt 175 is moved across from the fast pulley 3 to the loose pulley 4 and the machine is thereby stopped. To assist in the stoppage of the machine, the belt-fork lever 163 has rigidly secured thereto the trigger 170 having an adjusting screw 171 and an upwardly disposed lower shoulder 171¹ between which is received the projecting end of a brake block 172 pivoted at its inner end to the bracket 164 and adapted to bear upon the fast pulley 3 when the said belt fork lever 163 is released. The pivot spindle of the tripping lever 160 in the bracket 161 is also connected to a lever upon the front of the machine having a handle. Thus at any time should any contingency occur the machine may be thrown out of operation by moving this lever releasing the belt fork lever 163.

In describing the operation of the machine we will follow one nail race and its corresponding disk race and die and plungers. The nails A move by gravity down a race 5 26 from the magazine 18 and are then held at the bottom of the said race 26 first by the finger 27 assuming that the beam 16 is in its lowermost position. As the beam ascends the fingers 27 and 28 as operated by the sliding plate 32 reverse their position with regard to the race 26 and the finger 28 passes 10 between the two last nails holding the rest back while the last nail falls down against the gate 34. As the beam 16 descends the fingers 27 and 28 again reverse their position 15 while the gate 34 moves across to the left as operated by the sliding plate 36 allowing the nail to pass through the inclined recess 38 into the tube 40 point foremost. The 20 nail passes down the tube 40 into the recess 41 where it lies against the plunger 46. As the plunger 46 rises the nail falls into the channel 45. The mechanism is so arranged that one nail is delivered into each channel 25 45 for every revolution of the main shaft 8. At the same time the disks B are passing down from the magazine 57 through the race 61 where they are alternately held by the spring fingers 71 and the upwardly projecting pins 73. With each revolution of 30 the main shaft 8 a disk is fed forward first by the pawl or finger 79 and then by the feed rod 87 into the end of the race 61 where it is held by a spring 93, upon each side, immediately under the channel 45 within which 35 is the nail A. As the die 94 upon the cylinder 95 comes into position immediately underneath the disk B in the end of the race 61 and the nail A in the channel 45 it is 40 held stationary by the semicircular recess 102 bearing on the main shaft 8. The plunger 46 then descends forcing the nail through the jaws 48 and through the central hole of the disk B and into the die 94. The die 94 45 then moves around into the horizontal position on the cylinder 95 and while again being held stationary by the semicircular recess 102 of the star wheel 100 bearing on the main shaft 8 the pressure plunger 109 on 50 the sliding beam 106 exerts pressure on the head of the nail securely clamping the disk to the same. The die cylinder 94 continues to rotate intermittently one-eighth of a revolution at each operation and when the die 55 94 is in the inverted vertical position the sliding beam 135 and rods 136 discharge the completed nails therefrom on to the classifying trough or sieve 144 where those imperfectly formed are separated out.

60 We claim:—

1. In a machine for forming enlarged or extended heads upon nails and the like the combination with a series of races adapted to feed the nails of a series of reciprocating

gates, one for each race, having inclined 65 channels adapted to alternately correspond with the bottom of the said races leading to the tubes through which the nails pass and moving upon a face plate substantially 70 as described.

2. In a machine for forming enlarged or extended heads upon nails and the like the combination with a series of races adapted to feed the nails of a series of reciprocating 75 gates, one for each race, having inclined channels adapted to alternately correspond with the bottom of the said races leading to the tubes through which the nails pass and moving upon a face plate the said races being 80 turned at the bottom in the direction of the reciprocating movement of the said gates substantially as described.

3. In a machine for forming enlarged or extended heads upon nails and the like the combination with covers over the spring 85 jaws through which the plungers force the nails of means for locking the same in place consisting of a pivoted locking bar having notches at each end engaging projecting headed pins with a wing nut in the center 90 on the pivot screw so that tension may be applied thereto substantially as described.

4. In a machine for forming enlarged or extended heads upon nails and the like the combination with a disk magazine having a 95 series of inclined races leading therefrom of an escapement device arranged one for each race consisting of a spring finger bearing upon the top of the race and a pin projecting upward through a hole in the bottom of 100 the race both the spring fingers and the upwardly projecting pin being attached to a rocking shaft so that they alternately obstruct the passage of the disks substantially 105 as described.

5. In a machine for forming enlarged or extended heads upon nails and the like the combination with a series of races leading from the disk magazine and curved at the 110 bottom from an inclined to a horizontal position of a series of pawls or fingers, one for each race, adapted to move up and down within the open slots of the said races and feed the disks around the said curves of the said races substantially as described. 115

6. In a machine for forming enlarged or extended heads upon nails and the like the combination of a series of races leading from a disk magazine, an escapement device consisting of a series of spring fingers bearing 120 upon the top of the said races and a series of pins projecting up through the bottom of the said races alternately obstructing the passage of the disks, a series of swinging pawls or fingers adapted to carry the disks around 125 the curve in the said races, a series of reciprocating rods adapted to feed the disks forward into position and a series of springs at

the end of the said races to prevent the disks being fed past the point where the nails are driven therethrough substantially as described.

5 7. In a machine for forming enlarged heads on nails, the combination of a series of inclined races, a stationary face plate provided with inclined recesses, a gate-shaft provided with gates adapted to register alternately with said races and said inclined
10 recesses respectively, means for reciprocating said gate-shaft longitudinally of said

face-plate, an assembling means, and channels leading from the inclined recesses to the assembling means.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JOSEPH BARTLETT DAVIES.
HARCOURT BELL.

Witnesses:

CLEM. A. HACK,
E. L. ROSMAN.