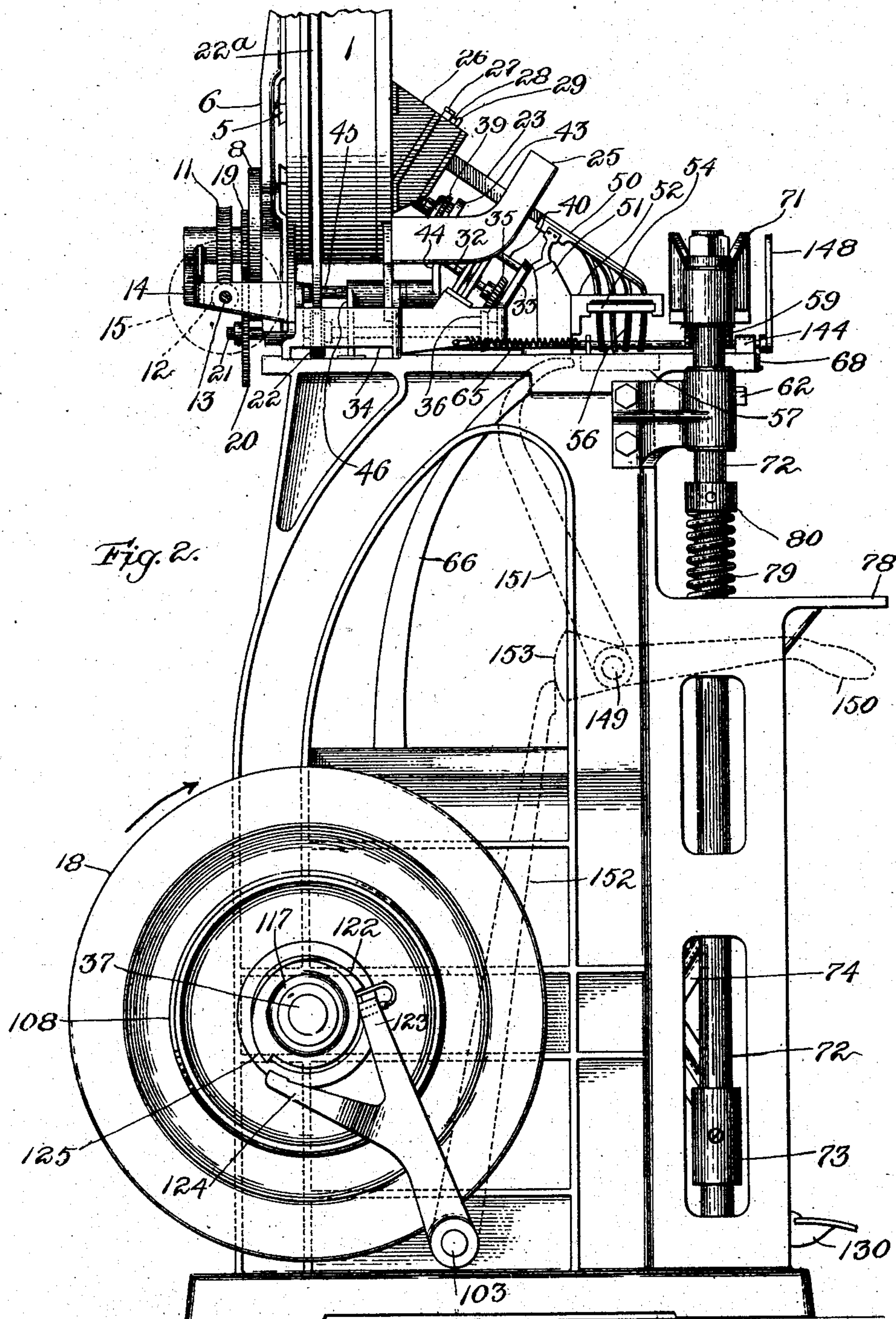


H. W. WINTER.
MACHINE FOR SETTING PROTECTORS FOR BOOTS AND SHOES.
APPLICATION FILED MAR. 5, 1901.

973,604.

Patented Oct. 25, 1910.

5 SHEETS—SHEET 2.



Witnesses:
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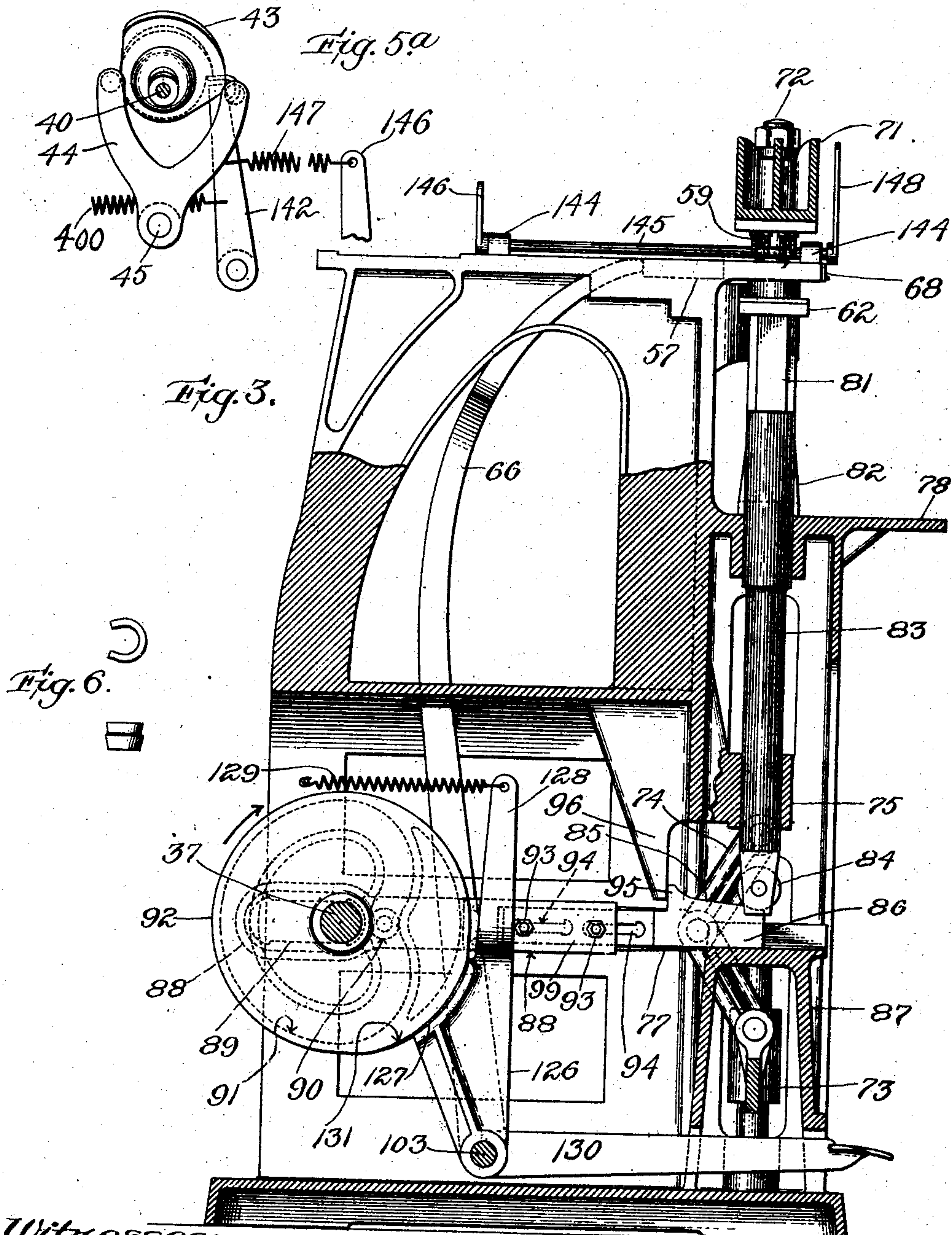
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5 SHEETS—SHEET 3.



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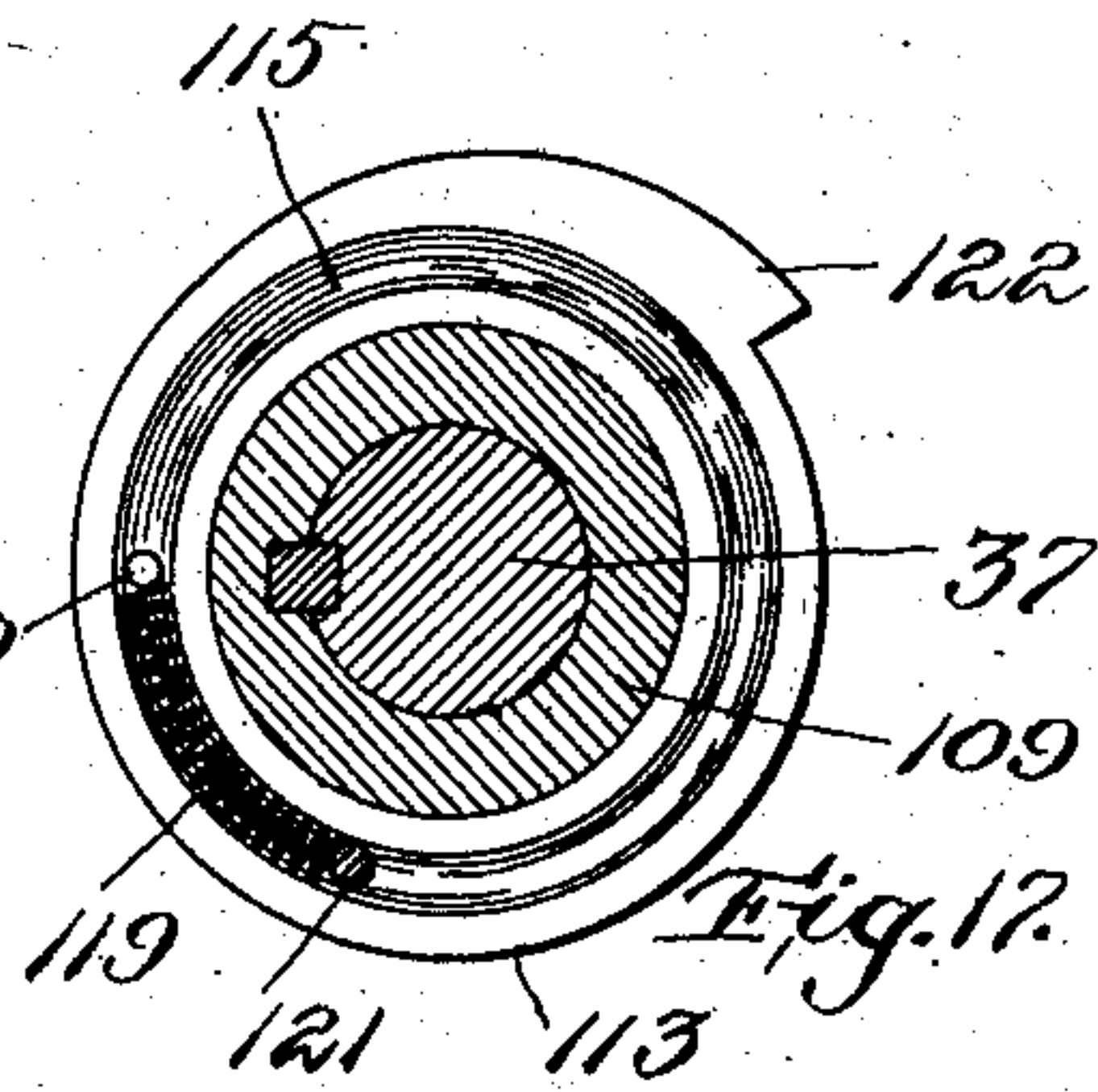
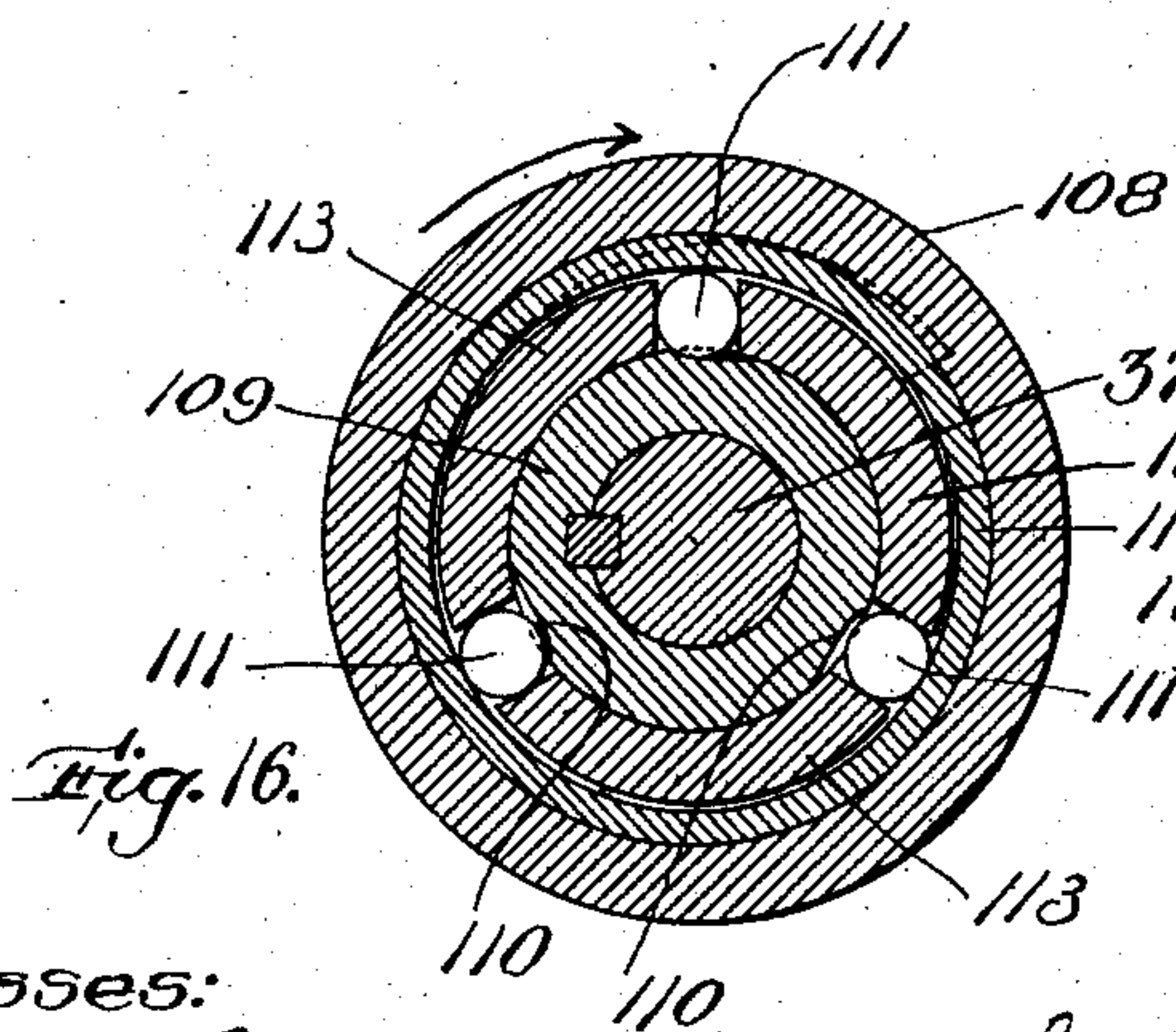
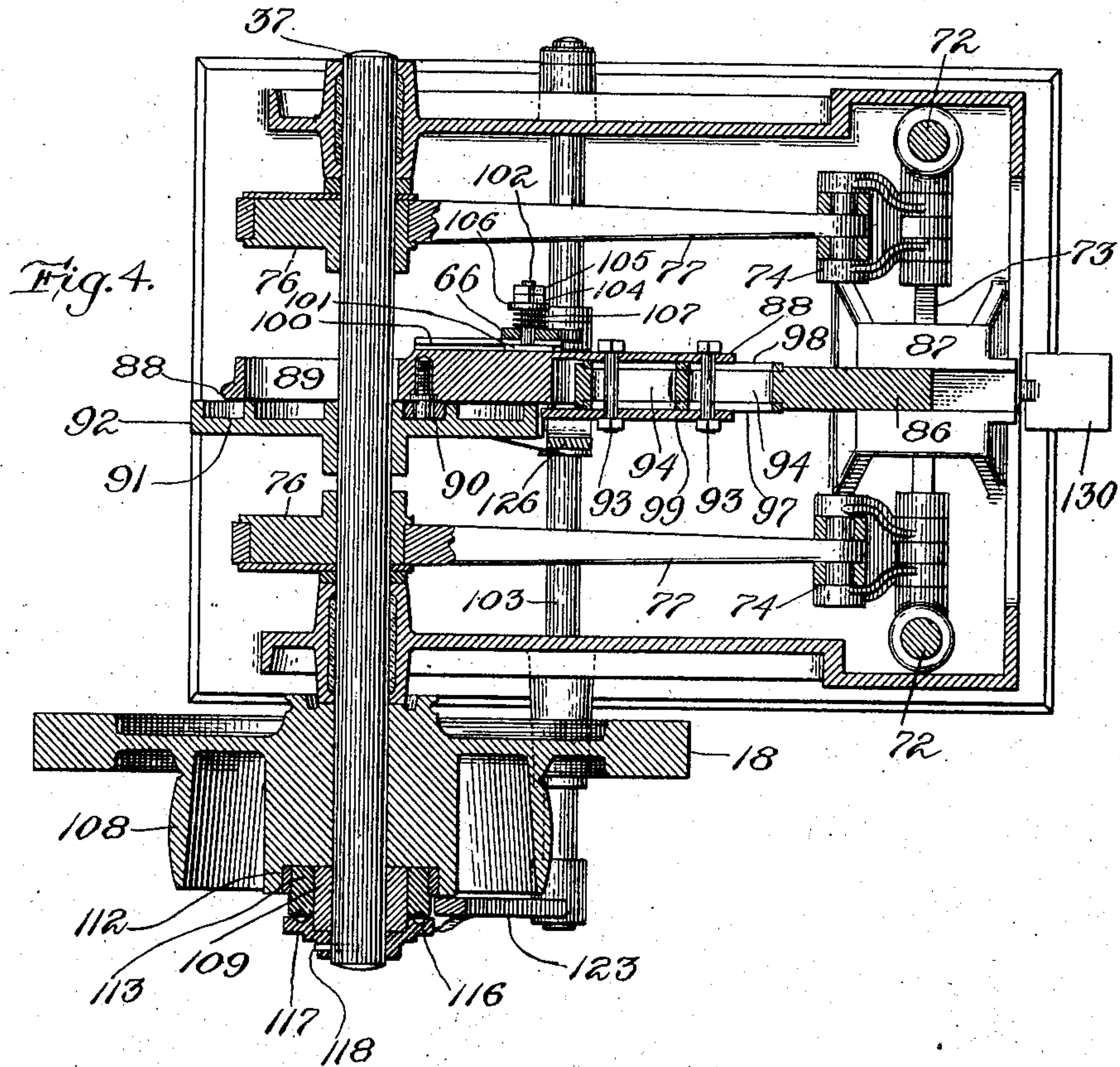
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5 SHEETS-SHEET 4.



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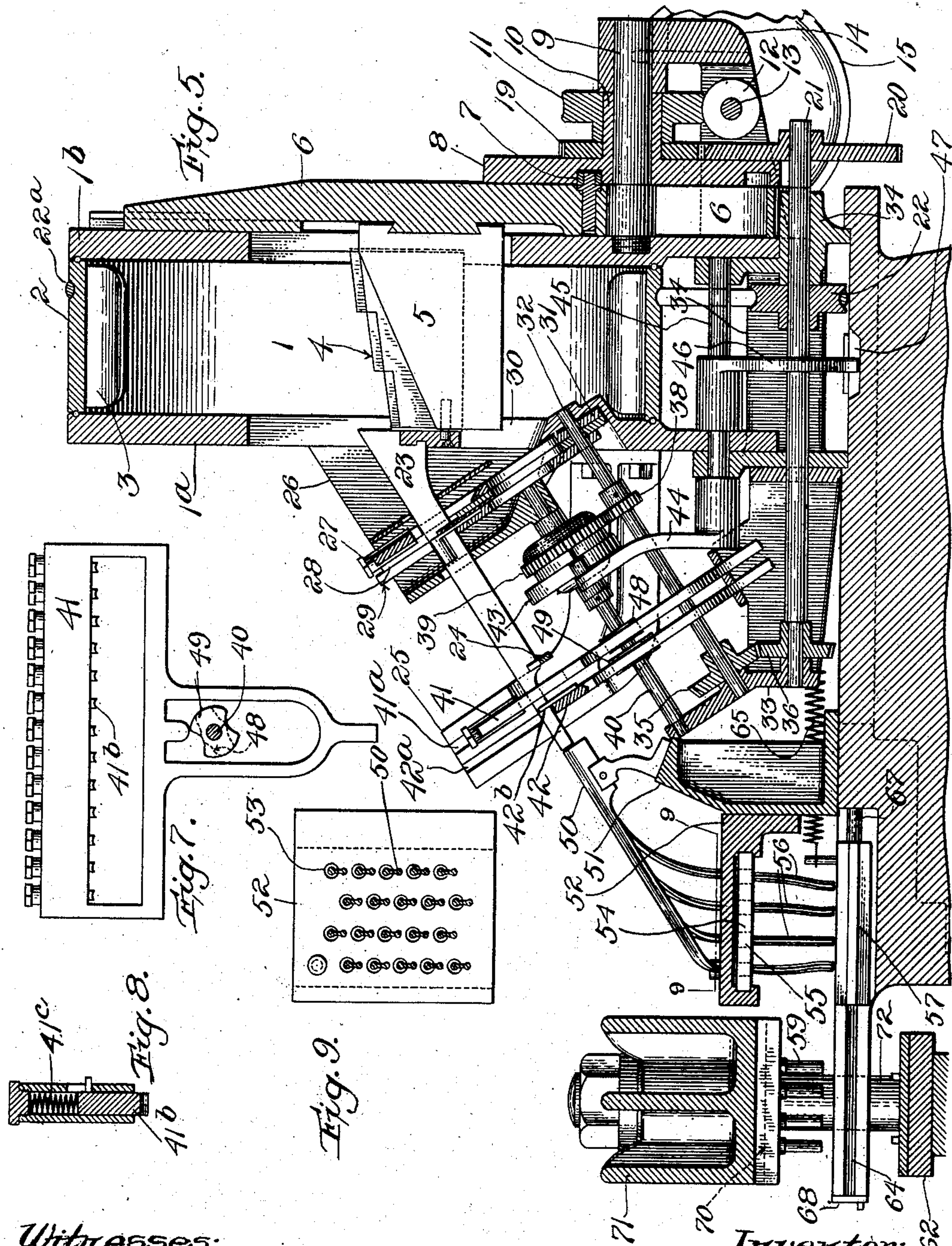
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

HENRY W. WINTER, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, AND BOSTON, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

MACHINE FOR SETTING PROTECTORS FOR BOOTS AND SHOES.

973,604.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed March 5, 1901. Serial No. 49,733.

To all whom it may concern:

Be it known that I, HENRY W. WINTER, a citizen of the United States, residing at Lawrence, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Machines for Setting Protectors for Boots and Shoes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its primary object to provide a machine for setting simultaneously, according to a predetermined arrangement or design, a considerable number of protectors into the sole or heel of a boot or shoe.

The invention has reference more especially to setting protectors in the soles of boots and shoes, but in part is equally applicable to setting them in heels, and in part, also, is applicable in either case whether the number of protectors set at one time be large or small.

I have illustrated, and shall describe my invention as embodied in a machine for setting a considerable number of protectors simultaneously into the sole of a boot or shoe, but it is to be understood that the invention is not restricted in all respects to this precise embodiment thereof.

In the drawings,—Figure 1 is a front elevation of my improved protector setting machine. Fig. 2 is a side elevation of the machine shown in Fig. 1. Fig. 3 is a side view partly in section of the lower portion of the machine shown in Fig. 1. Fig. 4 is a section on line 4—4 of Fig. 1. Fig. 5 is a sectional elevation of the upper portion of the machine shown in Fig. 1. Figs. 5^a, 6, 7, 8 and 9 are details hereinafter described. Figs. 10 and 11 are details of the holder hereinafter described. Figs. 12 and 13 are details of the holder detents hereinafter described. Figs. 14 and 15 are details of the drivers. Figs. 16 and 17 are details of the main shaft clutch hereinafter described.

The present embodiment of the invention is designed more especially to drive or set protectors substantially such as illustrated in Fig. 6, Sheet 3, of the drawings, namely horseshoe shape in plan, the same being driven edgewise into the material which receives them.

The protectors to be driven or set are placed within a hopper 1, Figs. 1, 2 and 5, the latter, see Fig. 5, comprising front and rear fixed walls 1^a 1^b, and an intermediate shell or ring 2, which is mounted to revolve between the said fixed walls 1^a 1^b. On its interior, the said ring is furnished with inwardly projecting wings or blades 3. These, in the rotation of the ring pick up small quantities of the protectors which are contained within the hopper, and carry them upwardly until they drop off the blades onto a table 4 which is made up of a number of vertically disposed plates fastened in place within hopper 1 and separated slightly so as to leave spaces between them to receive a row of vertically reciprocating blades 5.

The blades 5 are fastened to a slide 6, Figs. 2 and 5, mounted in ways on the back of the hopper, and carrying a cam-roll 7 which works in the groove of a cam 8 loose on a stud 9 projecting from the back of hopper 1. Cam 8 has a hub 10 to which is fast a worm-gear 11, which latter is engaged and driven by a worm 12 on a shaft 13 journaled in a bracket 14 projecting from hopper 1. Shaft 13 has fast to it a pulley 15, Figs. 1, 2 and 5, which is connected by a belt 16, Fig. 1, with a pulley 17 fast to the constantly-driven fly-wheel 18 on the main shaft of the machine.

On hub 10 of cam 8 (see Fig. 5) is also fast a pinion 19 which drives a gear 20 fast to a shaft 21 below hopper 1. Shaft 21 carries a pulley 22 which drives the cylindrical wall or ring 2 of the hopper through a belt 22^a (see Figs. 2 and 5) passing around the cylindrical wall or ring 2 and the pulley 22.

The blades 5 have forwardly-inclined upper edges. In Fig. 5 they are shown in their lowermost position, below the top of table 4. When cam 8 raises the blades to their uppermost position the top edges of blades 5 are brought in line with the tops of a series of raceway sections 23, inclined downward from the table 4, and those protectors which have been picked up by the blades from the table 4 as the blades rise above said table slide down the inclined edges of blades 5 onto and down the said series of raceway sections 23.

The raceway sections 23 are fast at their upper ends to the front plate of hopper 1

and are supported at their lower ends by a cross-bar 24 fast at its ends to two brackets 25 Figs. 2 and 5 which are secured to the front plate of hopper 1. On the front plate 5 1^a is also fastened a trough shaped bracket 26 within which are mounted selecting devices constituted by three slides 27, 28, and 29 which act to push off from the raceway sections 23 all protectors which are descend- 10 ing the said sections with their wrong end foremost, and those protectors which are removed by these slides fall back into the hopper 1 through opening 30 in the front plate of the hopper.

15 The slides 27, 28 and 29 are worked by three cams 31 fast on a shaft 32 which is journaled at its upper end in the front plate of hopper 1 and at its lower end in a bracket 33. The said bracket 33 is fast to a carriage 20 34 mounted in ways arranged crosswise of the top of the frame of the machine, and hopper 1 is also mounted on the said carriage 34.

Shaft 32 has fast to it a gear 35 which is 25 driven by a gear 36 fast to shaft 21, the latter being constantly driven through the means described connecting it with the constantly-driven fly-wheel 18 Figs. 1, 2, and 4, on the main shaft 37 of the machine.

30 From the foregoing, it will be clear that the slide 5 within the hopper, and the slides 27, 28 and 29 working in connection with the raceway sections 23 are constantly in operation. By the action of the slide 5 in 35 lifting protectors from the table 4 and discharging them upon the raceway sections 23 the latter are kept well stocked with protectors. When the said raceway sections 23 are full of protectors the lowermost slide 40 29 in the rising movement thereof pushes off from them all protectors which stop in a position immediately above it on the said raceway sections.

On shaft 32 is fast a pinion 38 which 45 meshes with a loose gear 39 mounted on a shaft 40 parallel with shaft 32. Gear 39 is connected with and disconnected from shaft 40 by a start and stop clutch mechanism of any approved construction, for example, 50 of the well-known Horton type. The said mechanism in its essential particulars may correspond substantially with the similar mechanism hereinafter described as employed in connection with the main shaft 55 of the machine, which will be described later. The said clutch mechanism is arranged, as described hereinafter, to be thrown into action by the operator to connect gear 39 with shaft 40, and is thrown 60 out of action to disconnect gear 39 and shaft 40 automatically after gear 39 and shaft 40 have made one revolution. That is to say, each time the clutch is thrown into action by the operator, the shaft 40 is caused to 65 make one revolution and stop.

Shaft 40 in making one revolution performs two functions, *i. e.* it shifts carriage 34 transversely upon the frame of the machine, first a short distance in one direction and then back to its original position again, 70 and it also twice operates an escapement comprising two supplementary slides 41 and 42 so as to allow two protectors to pass successively down each raceway section 23, but with a definite interval of time between the 75 freeing of the first protector and the freeing of the second protector.

To shift the carriage 34 sidewise I have herein shown a cam 43, Figs. 5 and 5^a, fast to shaft 40. Cam 43 engages a yoke 44 80 which is fast to a rock-shaft 45 journaled in bearings on carriage 34. On rock shaft 45 is fast an arm 46 which enters a socket 47 in the top of the frame of the machine. As yoke 44 is swung sidewise by cam 43, the engagement of arm 46 with the fixed frame- 85 work results in a traversing movement being communicated to carriage 34. The two supplementary slides 41 and 42 are operated by two double-throw cams 48 and 49 fast to 90 shaft 40. See Fig. 7, Sheet 5. Immediately upon shaft 40 being set in motion when the operator throws the clutch into action, the said slides 41 and 42 are operated in the 95 order named, after which cam 43 shifts carriage 34 sidewise (to the left in Fig. 1) and holds it in that position while the slides 41 and 42 are again operated by cams 48 and 49, after which cam 43 shifts carriage 34 100 back to its first position (to the right in Fig. 1,) whereupon shaft 40 completes its revolution and is automatically stopped.

The ends of slides 41 and 42 slide in guideways 41^a 42^a in the brackets 25. Slide 41 is furnished with a series of pendent 105 clamping blocks 41^b, Fig. 7, Sheet 5, adapted to make contact, in the descent of the slide, with the backs of protectors upon the raceway sections 23. The blocks 41^b correspond in number with the said raceway sections, 110 there being one block for each of said sections, and they are independently movable upon the slide 41. Each one is contained within a chamber or recess of the slide 41, and each is acted upon by an expansion 115 spring 41^c, Fig. 8, Sheet 5, so as to cause them to act with yielding force against the protectors. Should one of said blocks take bearing against a misplaced or otherwise unduly prominent protector upon one race- 120 way section before the other blocks take bearing against protectors on the other raceway sections, such block will yield without interfering with the continued descent of the slide. The described construction in- 125 sures that all of the protectors in position beneath slide 41 upon the raceway sections 23 shall be clamped and held securely in the descent of slide 41.

Slide 42 carries detents 42^b which in their 130

uplifted position extend past the raceway sections 23, in front of protectors straddling the latter.

The raising of slide 41 releases the protectors previously held thereby, and permits the protectors on the respective raceway sections 23 to slide down the latter until they are arrested by contact of the bottom protectors with the uplifted detent 42^b of slide 42. In the following descent of slide 41 the clamping blocks 41^b thereof engage with the second protector on each raceway-section, and the ensuing depression of slide 42 releases the bottom protectors, permitting them to pass on down toward the point in the machine at which they are driven or set.

Below the raceway sections 23 is arranged a second group of raceway sections 50, which latter are fixed to the top of the frame of the machine. The number of raceway sections 50 is a multiple of the number of the upper raceway sections 23. Thus, there may be twice as many raceway sections 50 as there are raceway sections 23, so that when carriage 34 occupies one position the raceway sections 23 are in line with the upper ends of alternate raceway sections 50, and when carriage 34 occupies its other position the raceway sections 23 are in line with the upper ends of the intermediate raceway sections 50. The feeding devices carried by carriage 34 operate to feed two protectors down each raceway section 23 as above described for each rotation of shaft 40. The first lot of protectors fed down raceway sections 23 are discharged onto the alternate raceway sections 50, after which carriage 34 is shifted sidewise so as to bring raceway sections 23 in position to feed the second lot of protectors onto the remaining raceway sections 50. In this way, fewer upper sections 23 are required in a machine setting or driving a considerable number of protectors into the work at a time than would otherwise be the case, and the feeding devices thereby are simplified considerably, and made smaller, so as to take up very much less space.

Fast to the top of the frame of the machine is a stand 51, Fig. 5, Sheet 5. To the front of the said stand is fastened the bracket 52 shown in plan in Fig. 9, Sheet 5. The horizontal plate or web of the said bracket is formed with a number of passages 53 there-through into which the lower ends of the raceway sections 50 extend, and in which they are fastened. The protectors descend through the passages 53 as they slide down the raceways. The bracket 52 is formed at the front and rear sides thereof, below the horizontal plate or web, with guides or slideways, which are represented in Fig. 5. To these guides or slideways is applied a removable plate 54, which is formed with a

number of passages which are similar to the perforations 53 in bracket 52, immediately above the same, and which register with said passages 53, so that as the protectors leave passages 53 they enter the passages in plate 54.

To plate 54 is fastened a third group of raceway sections 56 whose upper ends extend into the passages in the said plate as far as the top of said plate, so that as the protectors descending the raceways leave the sections 50 they pass onto the ends of sections 56.

The protectors descending the raceway sections 56 discharge from the lower ends thereof into the passages 58 of a holder 57 (shown detached in Figs. 10 and 11, Sheet 1) which at that time occupies a position immediately below raceway sections 56, as in Fig. 5, with the driver-passages 58 of the holder registering each with the lower end of a raceway section 56. Fig. 10, Sheet 1, shows the holder in plan, with part broken away, and Fig. 11, Sheet 1, is a side elevation thereof, partly broken away. The holder 57 after receiving the protectors is moved forward into position under a group of drivers 59, and holds the protectors in line with the respective drivers while the drivers descend to drive them into the work. The driver-passages in holder 57 occupy the same relative positions as the protectors are to occupy in the sole into which they are to be driven, and the relative arrangement of drivers 59 is also the same, so that as the said drivers descend to drive or set the protectors they will register with and enter the driver-passages in holder 57.

Projecting into each driver-passage 58 in the holder 57 is a yielding detent 60 which engages with the protector that passes into the driver-passage from one of the raceway sections 56. The said detent detains the protector from passing entirely through said driver-passage. These yielding detents 60 are each made as a spring and may be formed as shown in plan and end elevation in Figs. 12 and 13, Sheet 1. The body of the spring is arranged within a pocket 61, Fig. 11, provided in holder 57. One arm of the spring is bent laterally at right angles, as shown, and the end of the bent portion projects into the corresponding driver-passage 58 as shown in Figs. 10 and 11, Sheet 1. When the drivers 59 pass through driver-passages 58 to set the protectors, the latter are forced past the detents 60 and out of the holder into the sole which is supported on a work rest 62; the detents 60 being crowded back into their pockets 61 out of the path of the drivers. Preferably, the holder 57 is made of three plates of metal suitably fastened together, with the pockets 61 provided only in the middle plate, so that when the

two outer plates are in position the spring detents 60 are locked in position in their pockets 61.

Within each driver-passageway 58 is a short section of raceway 63, which is fastened to the middle plate of the holder, and which projects into driver-passageway 58. These short sections 63 serve to position and guide each protector in its driver-passageway 58 in the holder 57 while being driven into the sole.

The holder 57 is mounted in ways 64, Figs. 1 and 5, that are provided on the top of the frame of the machine, and the holder is moved in one direction, *i. e.*, rearwardly, so as to place the same in position beneath the delivery raceway-sections 56, by a spring 65, and in the opposite direction, *i. e.* forwardly in position beneath the drivers, by a lever. The said lever may be actuated either automatically or manually. In full lines Fig. 2 I have represented a lever 66 which is actuated automatically from the main shaft 37 of the machine as will be described later. A stop pin 67, Fig. 5, projecting from the frame of the machine, limits the rearward movement of holder 57, and a stop 68 on the front of the machine, Figs. 1 and 5, limits the forward movement of holder 57. Stop 68 is made as a gate pivoted at 69 Fig. 1 on the front of the frame of the machine, so that when it is desired to remove holder 57 the stop may be swung upwardly on pivot 69 out of the way whereupon the holder may be withdrawn endwise from the ways 64.

Drivers 59 are made of U-shape in cross-section, as shown in Figs. 14 and 15, Sheet 1, so as to fit around the short raceway sections or inner guides 63 in the driver-passageways of holder 57, and each driver is made with a shank which is fastened in a plate 70, Figs. 1, 5 and 14, which is removably mounted in a crosshead 71. Crosshead 71 is carried by two rods 72 72 mounted to slide vertically in bearings on the frame of the machine. Fast to the rods 72 near their lower ends is a cross-bar 73, Figs. 1, 3 and 4, which is connected by two pairs of toggle-levers 74 with a cross-bar 75, fast to the frame of the machine. The two pairs of toggle-levers 74 are operated by eccentrics 76 on main shaft 37 through pitmen 77, Figs. 1 and 4.

The frame of the machine is made with a table 78 at its front, Figs. 1, 2 and 3, on which rest springs 79 through which the said rods 72 pass collars 80 fast to the rods 72 rest upon the upper ends of the said springs. These springs 79 serve to partly support the weight of the cross-head 71 and rods 72 72, and assist in raising the said parts after they have been depressed by the action of their operating mechanism.

The work rest 62 is secured to the top of a head 81 which is mounted in ways on stands 82 fast to table 78, see Fig. 1, and said head

is fast to or integral with the upper end of a plunger 83 which is mounted to slide vertically through bearings in the frame of the machine. Plunger 83 carries at its lower end a cam roll 84 which is engaged by a cam 85 provided on a slide 86. Slide 86 at its forward end, see Figs. 3 and 4, is mounted in ways on the top of a standard 87 integral with the frame of the machine. Slide 86 is connected with one end of a bar 88, Fig. 4, the other end of which is formed with a slot 89 through which extends the main shaft 37, which latter assists in guiding the bar 88 in its movements. Bar 88 carries a cam roll 90 which enters a cam-groove 91 formed in a wheel 92 fast to main shaft 37. When cam-slide 86 is advanced the work-rest 62 is moved upwardly to compress the work against the under side of holder 57, and it is held raised while the protectors are being driven. By the return movement of the cam-slide 86 toward the rear of the machine the work-rest is then lowered into a position where it is more convenient for the operator to remove the work, and to place a fresh piece of material in position on the work rest.

In order to provide for driving or setting protectors into soles of different thicknesses, the work-rest is connected with its operating cam with provisions for accommodating the extent of the rise of the work-rest to the thickness of the work being operated upon. Herein slide 86 is yieldingly connected with bar 88 so that when the sole, during the ascent of the plunger 83 and the work-rest, is firmly clamped between the work-rest and the underside of holder 57, the resistance which the sole offers to being further compressed may cause the connections between cam-slide 86 and bar 88 to give and permit slide 86 to come to rest while bar 88 completes its regular extent of movement. To accomplish this, the bar 88 is slotted at its front end to receive the rear end of slide 86, the sides of the bar being clamped against the opposite sides of the slide by means of bolts 93 which extend through longitudinal slots 94 formed in slide 86. For frictional purposes, and also for taking the wear, strips of "fiber" 97 and 98 are interposed between the slide and the opposite portions of the bar.

When, during the ascent of plunger 83 the sole on work-rest 62 is brought to bear against the under side of holder 57, further upward movement of plunger 83 ceases as soon as the work has been compressed to the predetermined extent. This prevents further outward movement of cam-slide 86 and during the remainder of the forward movement of bar 88 the parts slip on each other, the frictional engagement between them being sufficient to hold plunger 83 elevated

against the downward pressure of the drivers. When bar 88 is retracted, the cam-slide 86 moves back with it until a projection 95, Fig. 3, on slide 86 engages a lug 96 projecting from the frame of the machine which prevents further rearward movement of slide 86, while the bar 88 completes its receding movement.

The preferred mode of actuating lever 66 automatically is as follows:—In ways 100, Fig. 4, provided on one side of bar 88 is mounted a block 101, which carries a stud 102. The said stud 102 projects through a slot in lever 66, which latter is mounted loosely on a rock-shaft 103 mounted in bearings on the frame of the machine, and at its outer end the said stud 102 is threaded to receive on it a nut 104 and a check nut 105. On stud 102 between a washer 106 and the lever 66, is a spring 107, which acts to press lever 66 against the side of bar 88, so that said lever is connected with bar 88 by the frictional contact between the lever and bar and between block 101 and its ways. Nuts 104 and 105 enable the desired degree of frictional contact to be secured. By means of this connection between lever 66 and bar 88 the forward movement of bar 88 acts to shift lever 66 forward, carrying holder 57 with it until said holder 57 strikes its forward stop 68, after which block 101 and lever 66 are permitted to remain stationary, while bar 88 completes its forward movement. This forward movement of lever 66 and holder 57 occurs during the very first part of the forward movement of bar 88, and the holder 57 reaches its forward position before drivers 59 in their descent reach the plane of the holder.

The machine is so timed that lever 66 is started forward at the same time that drivers 59 begin to descend. The upward movement of work-rest 62 begins simultaneously with the descending movement of drivers 59, but the sole on the work-rest is brought to bear against the under side of holder 57 before the protectors are pushed by the drivers past the detents 60 in holder 57.

I combine the band pulley 108 and fly-wheel 18 with the driving-shaft 37 by means of start and stop mechanism enabling me to occasion at will the operation of the machine to effect the driving of a set of protectors, the said mechanism operating automatically to bring the said driving shaft to a state of rest when one revolution thereof has been completed. Any approved form of start and stop mechanism may be employed for the purpose. I have in the accompanying drawings illustrated a suitable construction embodying the principles of the well-known Horton clutch, which I will now proceed to explain as follows, reference be-

ing had more especially to Figs. 1, 2, 4, 16 and 17:—

109, Figs. 4, 16 and 17 is a cam-sleeve, keyed to shaft 37, and formed with cam-surfaces 110, Fig. 16. Said cam-sleeve projects into a counterbore in the end of the hub of fly-wheel 18, which counterbore is lined with a bushing 112. Between the cam-sleeve and bushing is located a loose ring 113, having slots in which are contained the rolls 111 working in connection with the cam-surfaces 110. To the end of shaft 37 a disk or cap 117 Figs. 1 and 4 is fastened by a pin 118 Fig. 4. The proximate faces of the said disk or cap and the end of ring 113 are grooved as at 115, Fig. 17, and receive between them in the grooves 115 and 116 a spiral spring 119, Fig. 17, which is compressed between a pin 120 carried by ring 113 and a pin 121 carried by cap 117.

The periphery of ring 113 is provided or formed with a tooth 122 which, when main shaft 37 is not in motion, rests against the yielding extremity of a detent 123 herein shown as an arm fast to rock-shaft 103, and so long as the said tooth and arm remain in engagement with each other the rolls 111 are held by the ring 113 on the deepest parts of cam-surfaces 110 of cam-sleeve 109, with the hub of the fly-wheel 18 and sleeve 109 disconnected from each other. When detent 123 is swung out of engagement with lug 122, the spring 119 pushes ring 113 forward until the ring 113 carries the rollers 111 onto the shallower parts of cam-surface 110, whereupon the hub of the fly-wheel 18 and sleeve 109 are locked together through the rollers and consequently rotary movement will be communicated to the shaft 37.

Detent 123 is made with an arm 124, Fig. 2, and the cap 117 is provided with a cam 125, so that after main shaft 37 has about completed one revolution the cam 125 engages arm 124 and positively swings detent 123 back into the path of tooth 122, which engages therewith thereby preventing further movement of ring 113. Stopping the ring 113 when the main shaft 37 is in motion causes the deepest parts of cam-surfaces 110 to come under or opposite rollers 111, thereby disconnecting the hub of fly-wheel 18 from sleeve 109.

To rock-shaft 103 is fast a brake-arm 126, Figs. 3 and 4, the shoe 127 of which engages the periphery of the wheel 92 on main shaft 37. To the extension 128 of brake-arm 126 is connected one end of a spring 129, the other end of which is connected to the frame of the machine, and this spring holds brake 126 in engagement with wheel 92 and detent 123 in the path of lug 122 after cam 125 has acted on the detent through arm 124 and passed beyond said arm. Fast to rock-

shaft 103 is a treadle 130, by depressing which the operator may at will cause the start and stop mechanism to effectuate one revolution of the main shaft 37.

5 On the periphery of wheel 92 there is a swell 131 so that after treadle 130 has been depressed and released by the operator the brake 127 by its engagement with said swell will insure the stoppage of the shaft 37 just
10 as it completes one revolution.

While spring 129 serves to return detent 123 into the path of lug 122, and brake arm 126 into engagement with wheel 92 when the operator releases treadle 130, yet cam
15 125 by engaging arm 124 positively stops the machine at the completion of one revolution of shaft 37 even though the operator may inadvertently or otherwise keep his foot on the treadle 130.

20 The construction of the start and stop mechanism by means of which the operator is enabled to connect gear 39 with the shaft 40 of the feeding devices at will is substantially the same as that which has just been
25 described.

Fast to the top of the frame of the machine at one side thereof (see Figs. 1, 2, 3 and 5^a) are brackets 144 in which is journaled a rock-shaft 145 carrying at its rear
30 end an arm 146 connected by a spring 147 with detent 142 of the start and stop mechanism pertaining to gear 39. At its opposite end, at the front of the machine, the rock-shaft 145 has fast thereon a hand-lever 148.

35 When it is desired to load holder 57 with protectors the operator swings lever 148 to the right thereby disengaging detent 142 from the tooth or lug of the said start and stop mechanism for gear 39 and causing the
40 said mechanism to act. When shaft 40 has made one revolution the said lug engages detent 142 and shaft 32 and shaft 40 thereby automatically are disconnected. Detent 142 is held normally within the path of rotation of the tooth or lug of the said start
45 and stop mechanism by means of the spring 400, which is shown in Fig. 5^a.

The operation of the machine is as follows:—The operator first swings lever 148
50 to the right, which causes the feeding devices to be set in action and to feed protectors into one half of the passages in holder 57 and then to shift sidewise and feed protectors into the other passages of the holder,
55 after which the feeding devices shift back to their first position and are automatically thrown out of action. After the holder has been loaded with protectors the operator places a sole to be operated on upon the
60 work-rest 62, and depresses treadle 130, which causes main-shaft 37 to make one revolution and stop.

At the start of main shaft 37, the holder 57 is shifted forward into position between

drivers 59 and the sole on the work-rest 62. 65
The work-rest 62 meantime is ascending and by its ascent it brings the sole to bear against the under side of holder 57, while at the same time drivers 59 descend. As the
70 drivers descend they enter and pass through the driver-passages 58 in the holder forcing the protectors from said driver-passages 58 and into the sole on the work-rest. After the protectors have been driven or set, the
75 work-rest lowers, the drivers are raised, and the holder 57 is retracted to its position below the raceway-sections 56, after which the motion of the parts ceases. The operator
80 now, by the handle 148, operates the rock-shaft 145 to start the protector feeding devices into action, and while such devices are engaged in filling the holes of the holder 57 he removes the sole which has had protectors
85 set or driven into the same, and places a fresh sole upon the work-rest, after which the operations are repeated.

In some instances it may be found desirable to replace the automatic holder operating mechanism by means under separate control of the operator, by which the
90 holder 57 may be shifted by hand from its rear position under the raceway-sections 56 forward into position under the drivers, and in Fig. 2 of the drawings I have shown by
95 dotted lines a convenient form of such means. Having reference to said figure, 149 represents a rock-shaft journaled in the frame of the machine, to which is fast a hand lever 150. On rock-shaft 149 is also
100 fast an arm 151, the free end of which engages holder 57. When hand-lever 150 is swung down by the operator, arm 151 is swung forward, carrying with it holder 57 until the latter strikes its forward stop 68. When the hand-operated means is embodied
105 in the machine in place of the automatic means for operating the holder, it is quite desirable that means be provided to prevent the drivers from being operated at any other time than when the holder is in proper position below them. To secure this result,
110 I have shown in Fig. 2 means for locking detent 123 in the path of lug 122 until holder 57 is given its proper position below the drivers 59, the said means being arranged to automatically free the detent when
115 the holder is in its proper position below the drivers. Said means herein is shown as comprising an arm 152 fast to rock-shaft 103, which arm is swung forward in unison
120 with detent 123 when treadle 130 is depressed, and a segment 153 on rock-shaft 149, which segment locks the arm 152 in the rear position of the latter so long as the driver-passages of holder 57 are not in line
125 with the drivers 59. The said segment passes out of the path of arm 152 when the rock shaft 149 has been moved far enough

to place the holder 57 in its proper forward position.

One special object in view in interposing yielding operating connections between lever 5 66 and its operating cam in the automatic arrangement first described, and in employing the locking devices in the hand-operated mechanism just explained, is to guard against possibility of injury resulting from 10 failure of one or more protectors to pass fully into the driver-passages of holder 57 in descending the delivery raceway-sections 56. In the absence of such provisions, should a protector project above the holder 57 its 15 engagement with one of said raceway-sections would result in injury to the parts during the advance of the holder in case the holder were moved positively, or would prevent the holder from being moved fully forward in case the holder were advanced by 20 hand, in which event the drivers in their descent would miss the driver-passages and hit the upper surface of the holder, with resulting injury.

My invention, with suitable modification in the arrangement, etc., is equally as well fitted for setting protectors in the heels of 25 boots or shoes as it is for setting them in the soles thereof.

What I claim is:—

1. In a setting machine, in combination, driving or setting devices, means for presenting articles thereto to be driven, including a series of delivering raceways, a 35 series of supply raceways less in number than the delivering series, and means to cause said supply raceways to deliver to different portions of said series of delivering raceways successively, substantially as described. 40

2. In a setting machine, in combination, a series of supply raceways, driving or setting devices, and intermediate devices for presenting articles to said devices to be 45 driven, including a series of delivering raceways in number equal to a multiple of the number of supply raceways, and means to cause said supply raceways to supply the raceways of said delivering series in alternating succession, substantially as described. 50

3. In a driving or setting machine, in combination, a series of supply raceways, driving or setting devices, and intermediate devices for presenting articles to said devices 55 to be driven, including a series of delivering raceways greater in number than the supply raceways, and means to shift said supply raceways to cause them to supply raceways of the delivering series in alternating succession, substantially as described. 60

4. In a driving or setting machine, in combination, a hopper, a series of supply raceways, means to load protectors contained in said hopper onto the said raceways, a

series of delivering raceways, greater in 65 number than said supply raceways, and means to shift said hopper and supply raceways transversely to feed to the delivering raceways in alternating succession, substantially as described. 70

5. In a driving or setting machine, in combination, a hopper, a series of supply raceways, means to load protectors contained in said hopper onto the said raceways, a carriage supporting said hopper and 75 supply raceways, a series of delivering raceways, and means to shift said carriage to cause protectors to be fed to the delivering raceways in alternating succession, substantially as described. 80

6. In a protector-setting machine, in combination, a series of supply raceways, means to load protectors upon the same, feeding or escapement devices for controlling the discharge of the protectors from said supply 85 raceways, a series of delivering raceways greater in number than the supply raceways, and means to cause said supply raceways to supply protectors to different raceways of the series of delivering raceways in alternating succession, substantially as described. 90

7. In a protector-setting machine, in combination, driving or setting devices, means for operating the same, a holder for protectors to be driven, means for filling said 95 holder with protectors in readiness to be driven, and automatic start and stop mechanism for said filling means under control of the operator whereby said filling means may be brought into action at the will of the operator and after filling the said holder will automatically come to rest, substantially as described. 100

8. In a protector-setting machine, in combination, a series of drivers and operating connections therefor, start and stop mechanism therefor, under control of the operator whereby at the will of the latter the said drivers may be brought into action and will then automatically come to rest, a holder for 110 protectors to be driven, means for filling said holder with protectors in readiness to be driven, and automatic start and stop mechanism for said filling means under control of the operator whereby said filling means 115 may be brought into action at the will of the operator and after filling the said holder will automatically come to rest, substantially as described.

9. In a protector-setting machine, in combination, a series of drivers and operating connections therefor, start and stop mechanism therefor under control of the operator, whereby at the will of the latter the said drivers may be brought into action and then 125 will automatically come to rest, a holder for protectors to be driven, means for filling said holder with protectors in readiness to

be driven, means to cause the holder to traverse between the filling position and the driving position, and a safety device for preventing injury to the protector-supplying and driving devices in case said holder is prevented from moving to the driving position, substantially as described.

10. In a driving or setting machine, in combination, driving devices, a work-rest, a surface opposing the said work-rest and against which the work is pressed by the work-rest in the movement of the latter toward the said surface, and means to operate the said work-rest comprising essentially a rotary cam, a bar operated thereby, a slide provided with a cam in operative connection with the work-rest, and a frictional coupling between the said bar and the said slide whereby to compensate for variations in the thickness of the work.

11. In a protector-setting machine, in combination, a series of drivers and operating connections therefor, a holder for protectors to be driven, means for supplying the said holder with protectors, a work-rest, and means to operate said work-rest comprising essentially a rotary cam, a bar operated thereby, a slide provided with a cam in operative connection with the work-rest, and a frictional coupling between said bar and said slide whereby to compensate for variations in the thickness of the work.

12. In a protector-setting machine, in combination, a series of drivers and operating connections therefor, a holder for protectors to be driven, means for supplying the said holder with protectors, a work-rest, and means to produce relative movement of the said work-rest and holder with respect to each other to compress against the holder the work into which protectors are to be driven, the said means comprising essentially a rotary cam, a bar operated thereby, a slide provided with a cam in operative connection with the work-rest, and a frictional coupling between said bar and said slide whereby to compensate for variations in the thickness of the work.

13. The holder having a driver-passage therethrough, and composed of superimposed sections, the intermediate section being formed with an interior pocket at one side of said driver-passage, and said pocket being covered by the adjacent section and containing a U-shaped detent-spring one arm of which abuts against the inner wall of such pocket and the other arm is adapted to engage a protector standing in the driver-passage.

14. The holder having a driver-passage and a guide therein to enter between the sides of a protector, said holder comprising superimposed sections, the intermediate section being formed with an interior pocket

at one side of said driver-passage, said pocket being covered by the adjacent section and containing a U-shaped detent-spring, one arm of which abuts against the inner wall of the said pocket and the other arm projects laterally into the driver-passage to engage a protector therein.

15. The combination with a holder movable laterally from loading position to driving position and provided with holding devices for a plurality of articles to be set or driven, the said devices acting with yielding lateral pressure upon the said articles before and while being driven, and a series of drivers by which the said articles are driven from the said holding devices into the stock, of means acting when the holder occupies the said loading position to directly load or charge different sub-groups of the said holding devices successively with articles in readiness to be driven.

16. The combination with a laterally movable holder provided with holding devices for a plurality of articles to be set or driven, the said devices acting with yielding lateral pressure upon the said articles before and while being driven, and a series of drivers by which the said articles are driven from the said holding devices into the stock, of a series of guides for the articles, means to deliver the articles to the said guides, means acting when the holder occupies the loading position to cause the articles to be delivered from the guides directly to different sub-groups of the said holding devices successively in readiness to be driven from the latter into the stock, and means for moving the holder from the guides to the drivers and vice versa.

17. In a machine for setting bent protectors, in combination, a holder having a plurality of pockets provided with inner guides for positioning the protectors therein and in being driven, and with yielding detents for retaining the protectors in said pockets and in engagement with the said inner guides, protector-supplying devices also provided with inner guides for the protectors to cause the latter to register with the inner guides of the holder, and escapement-devices operating to regulate the passage of the protectors from said supplying devices into the said pockets.

18. In a protector-setting machine, in combination, a holder provided with a plurality of pockets corresponding in shape to that of bent protectors to be set, adapted to make edge-presentation of the said protectors for being driven, and having means for engagement with the protectors to determine the position of the same in being driven, means for charging the holder with the protectors in successive sub-groups, and means for driving the entire series of pro-

tectors simultaneously yielding devices acting against the exteriors of the protectors and pressing them toward said means of engagement.

5 19. In a setting machine, in combination, a series of drivers, means to operate the drivers, a series of raceways, means to automatically supply to the said raceways the articles which are to be driven, a holder movable
10 from charging position to driving position,

a stop to arrest said holder at driving position, and means acting through frictional engagement to move said holder from charging position into engagement with said stop.

In testimony whereof I affix my signature, 15
in presence of two witnesses.

HENRY W. WINTER.

Witnesses:

WM. A. MACLEOD,
CHAS. F. RANDALL.