W. C. STEWART.

NAIL ASSORTING AND DELIVERING MECHANISM.

APPLICATION FILED JAN. 3, 1906. RENEWED NOV. 22, 1909.

958,037.

Patented May 17, 1910.

3 SHEETS-SHEET 1.

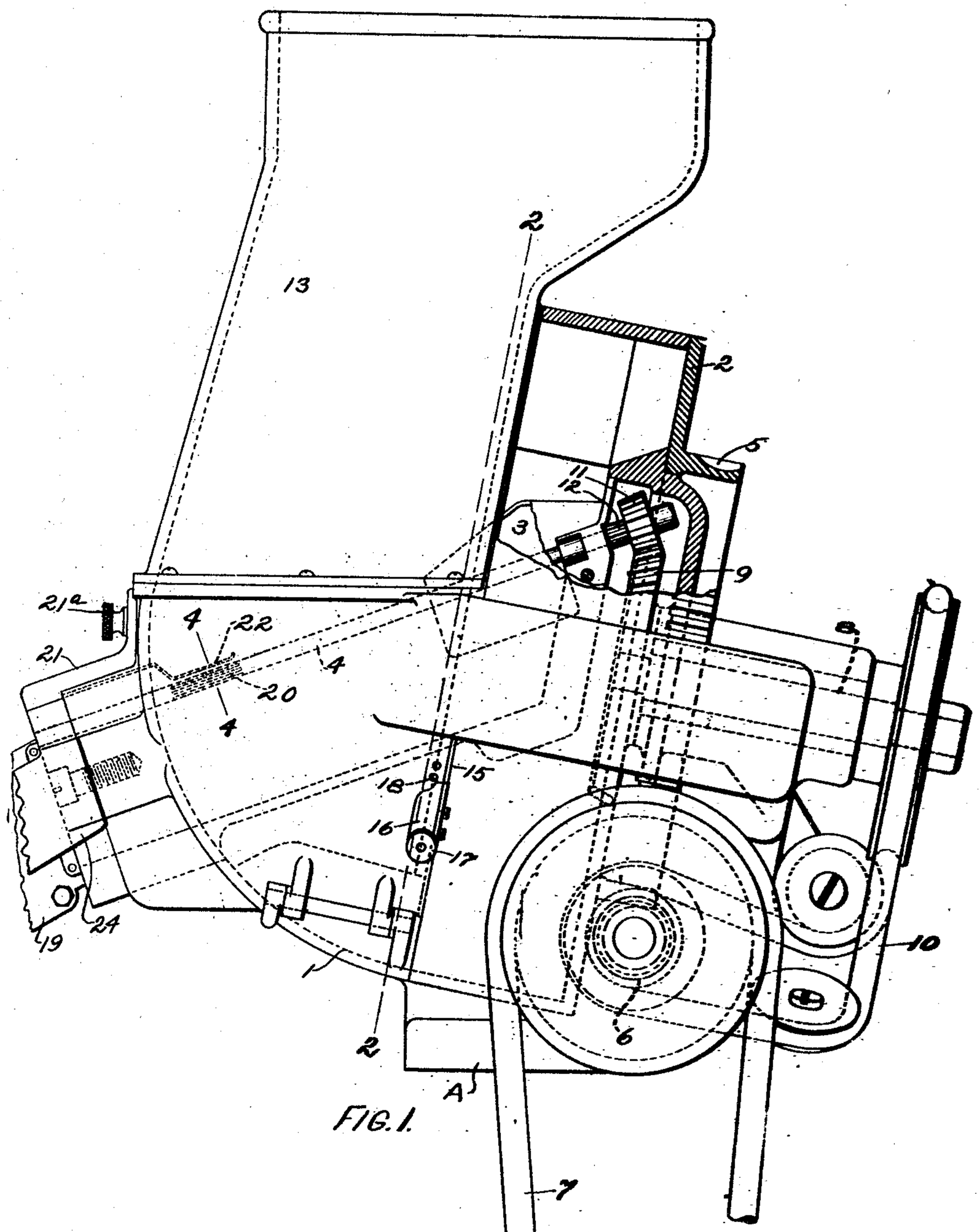

FIG. 1.

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6 SHEETS—SHEET 2.

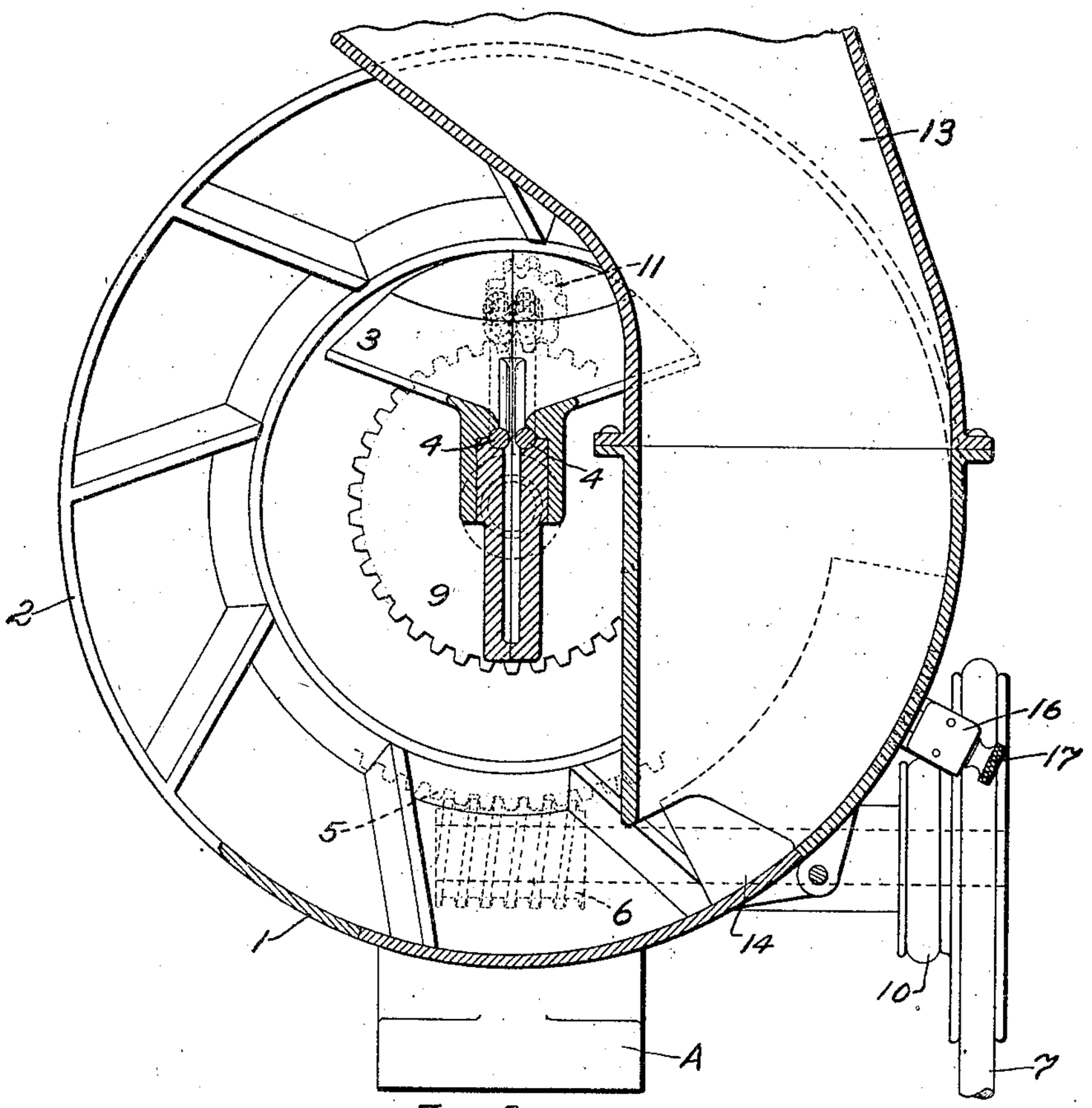

FIG. 2.

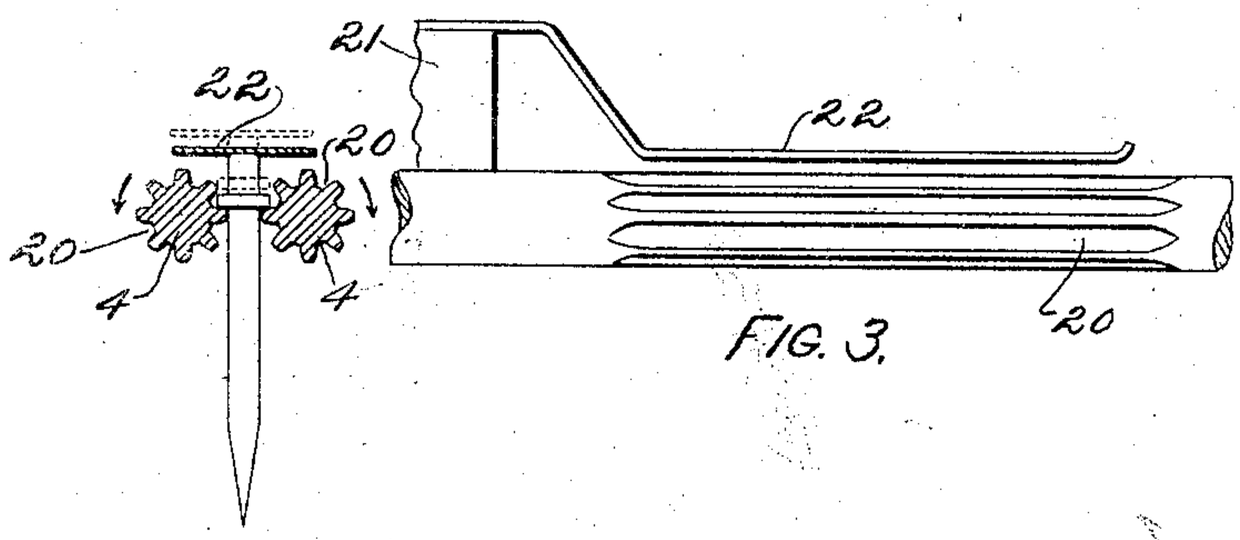

FIG. 3.

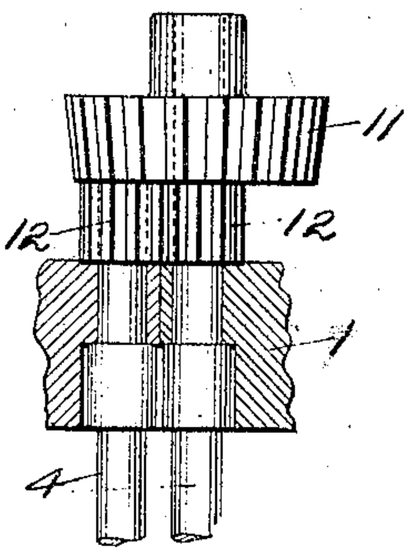

FIG. 4.

FIG. 5.

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FIG. 6.

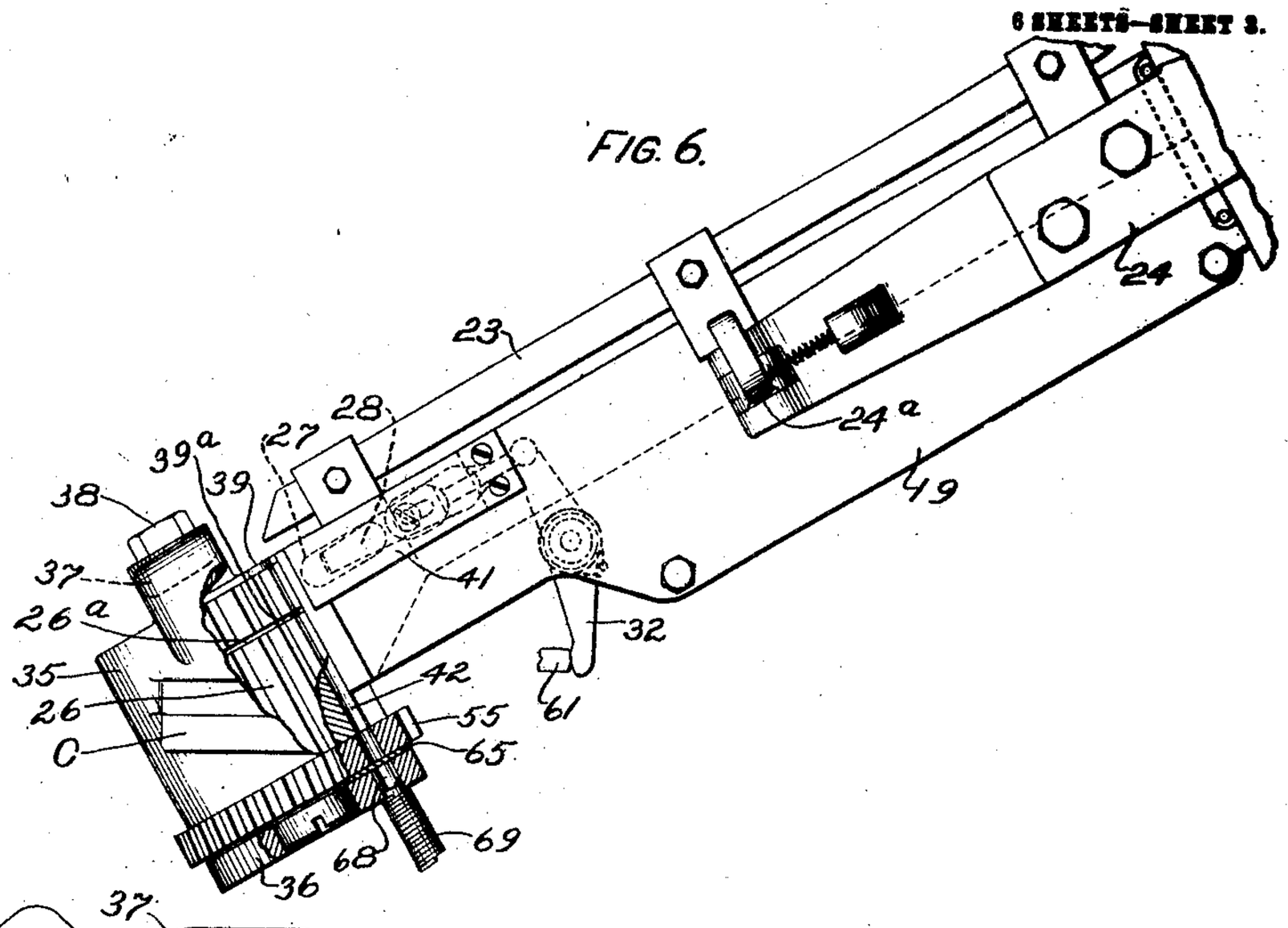
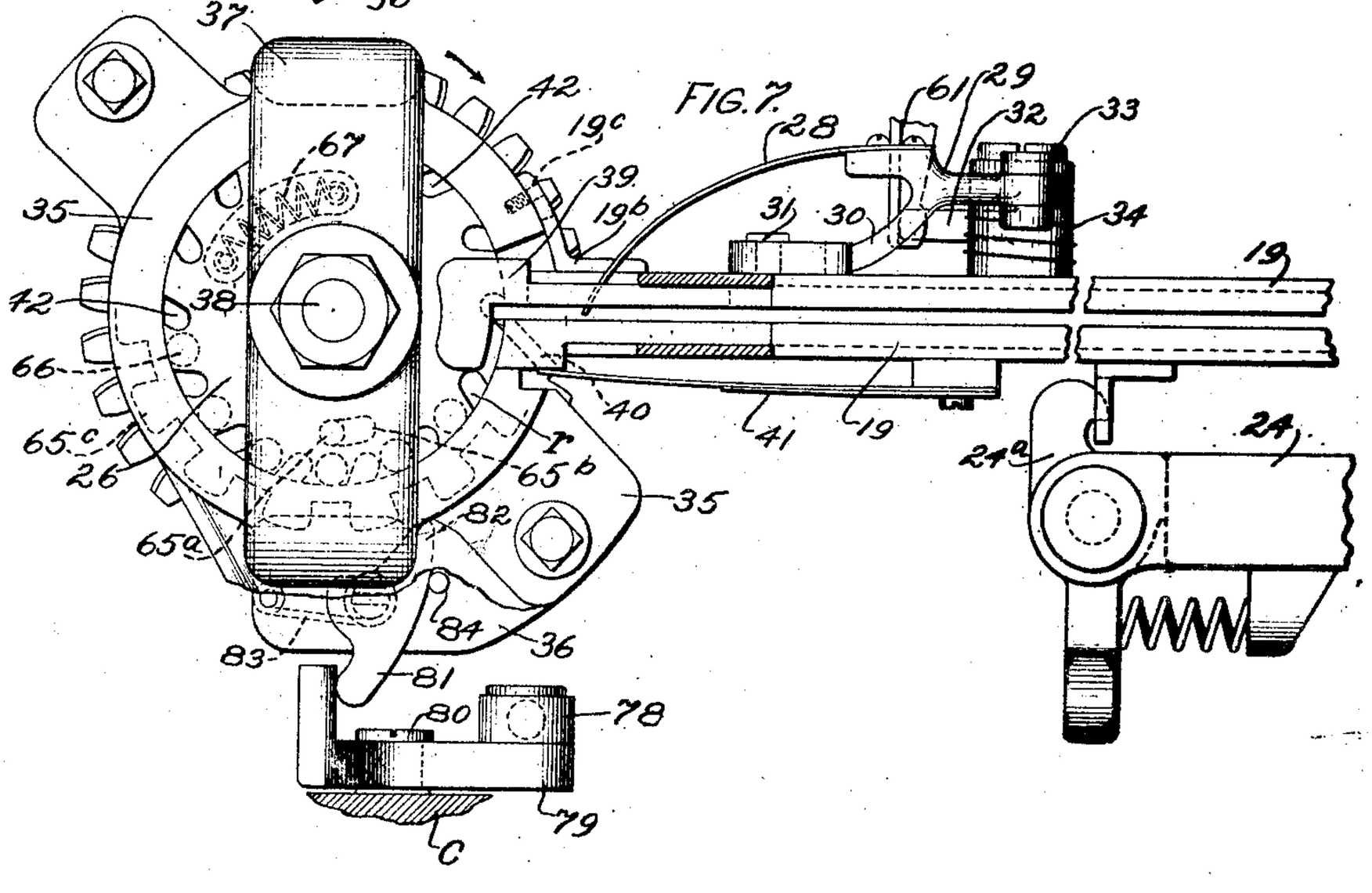


FIG. 7.



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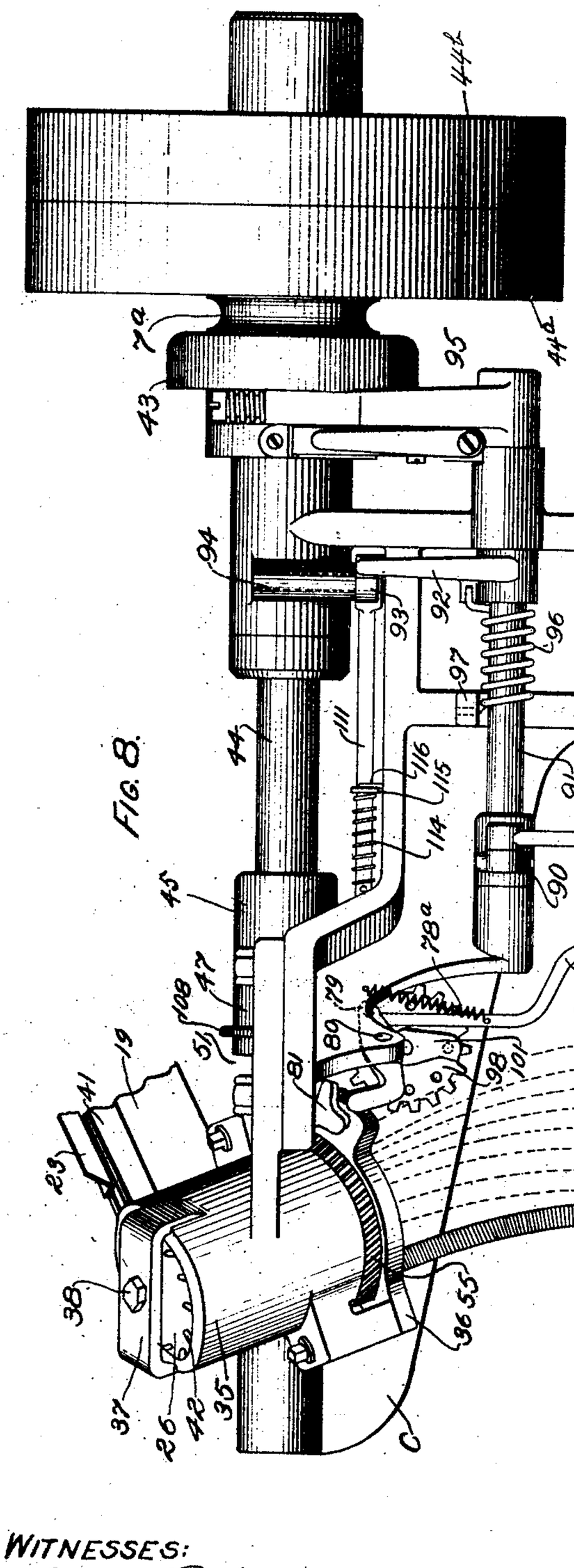

FIG. 8.

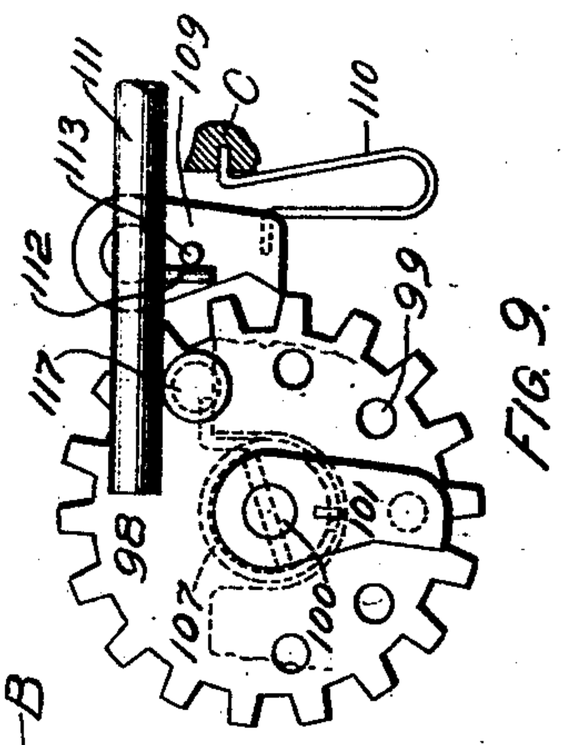

FIG. 9.

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APPLICATION FILED JAN. 3, 1908. RENEWED NOV. 22, 1909.

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Patented May 17, 1910.

6 SHEETS—SHEET 5.

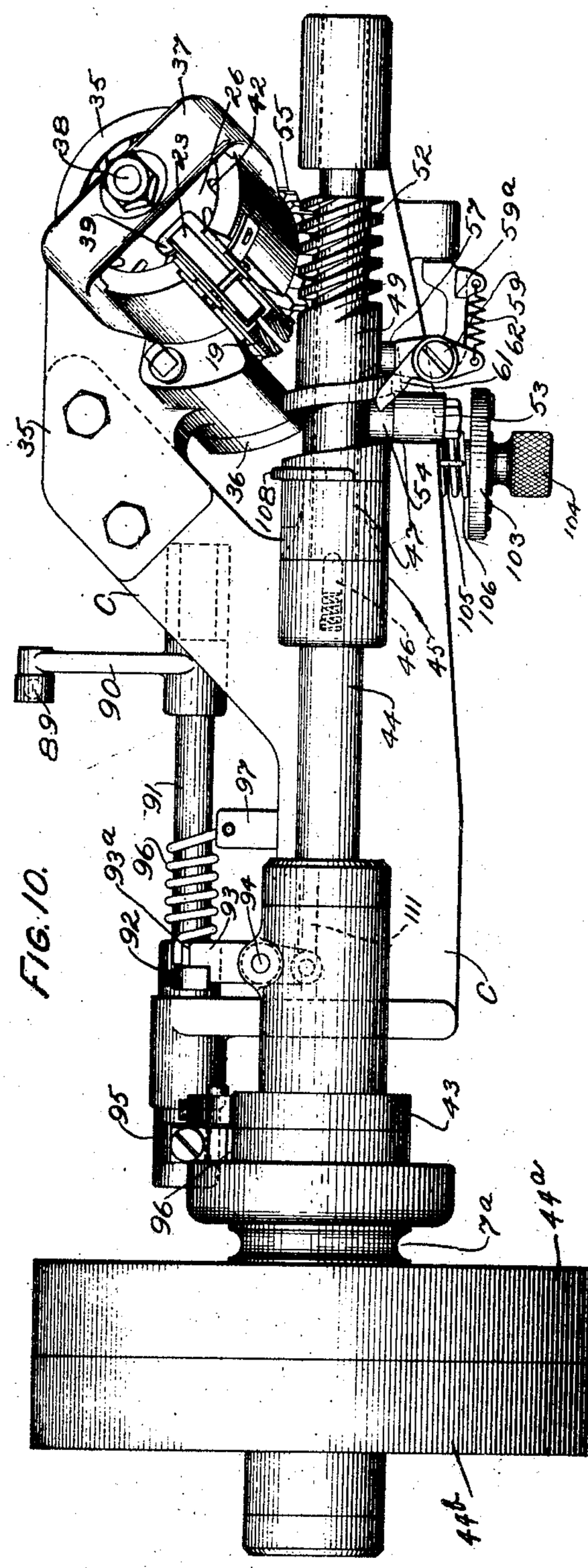

FIG. 10.

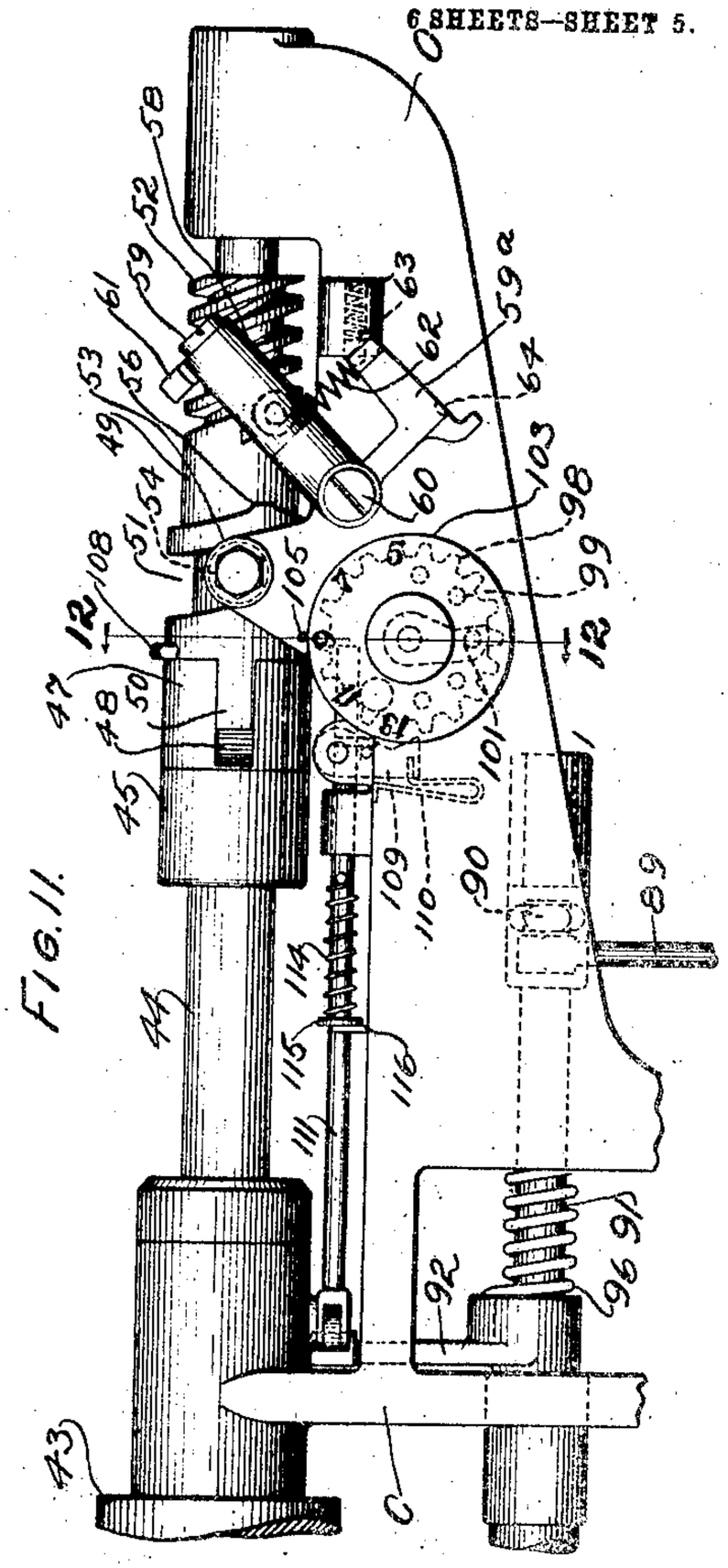

FIG. 11.

FIG. 12.

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NAIL ASSORTING AND DELIVERING MECHANISM.

APPLICATION FILED JAN. 3, 1908. RENEWED NOV. 22, 1909.

958,037. **Patented May 17, 1910.**

6 SHEETS—SHEET 6.

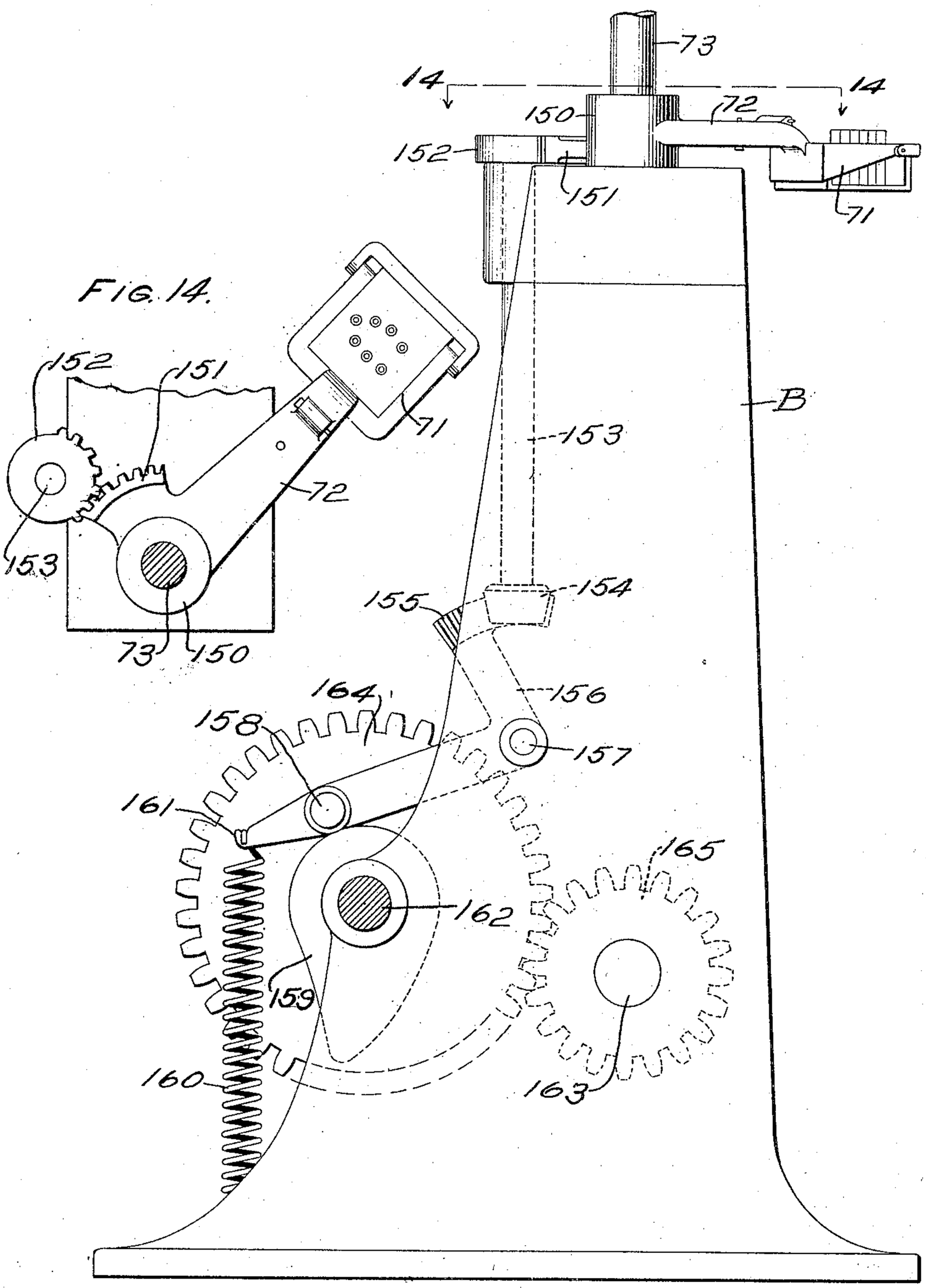

FIG. 14.

FIG. 13.

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UNITED STATES PATENT OFFICE.

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NAIL ASSORTING AND DELIVERING MECHANISM.

958,037. Specification of Letters Patent. Patented May 17, 1910.

Application filed January 3, 1908, Serial No. 409,141. Renewed November 22, 1909. Serial No. 529,309.

To all whom it may concern:

Be it known that I, WILLIAM C. STEWART, a subject of the King of Great Britain, residing at Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Nail Assorting and Delivering Mechanisms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to a nail assorting and delivering mechanism, and more especially to such mechanism as may be applied to or associated with boot and shoe heeling machines.

As generally stated, the object of the present invention is to provide an organized nail assorting and delivering mechanism which will be efficient in operation, act with certainty and precision in assorting nails and delivering them to other means for further manipulation or driving, and wherein the parts shall be combined and arranged in a simplified manner for conjoint operation, as will best appear from the following description in connection with the drawings, which show one form of the invention for illustrative purposes.

In the drawings:—Figure 1 is a side elevation, partly in section, of the nail hopper and its working mechanism; Fig. 2 is a sectional elevation on line 2—2 of Fig. 1; Fig. 3 is a detail in side elevation of one of the rollers of the roller raceway; Fig. 4 is a detail in section, on line 4—4 of Fig. 1, of the roller raceway, showing a nail in position between the rollers; Fig. 5 is a detail in plan of the upper end of the roller raceway, showing the immediate means for driving the rollers; Fig. 6 is a side elevation of the lower portion of the raceway, exterior to the nail hopper, showing at its lower end the nail-receiving cylinder; Fig. 7 is a plan of the parts shown in Fig. 6, somewhat enlarged, with the raceway cover removed; Fig. 8 is an elevation, from the rear, of the mechanism for rotating the nail-receiving cylinder, including the nail carrier of a heeling machine; Fig. 9 is a detail, in elevation, of the counting mechanism used in connection with the nail-receiving cylinder; Fig. 10 is a plan of the main parts shown in Fig. 8; Fig. 11 is a front elevation of the mechanism shown in Fig. 10, omitting the clutch; Fig. 12 is a detail in section on line 12—12 of Fig. 11, looking in the direction of the arrows; Fig. 13 is a side elevation showing the nail carrier and the means for operating the carrier from a moving part of the machine; and Fig. 14 is a section on line 14—14 of Fig. 13.

In the embodiment of the invention selected for illustration, and referring more particularly to Figs. 1 to 5 inclusive, 1 is a nail hopper supported on a bracket A of the frame B (Fig. 8) and provided with a rotating nail elevating wheel 2 having a bearing on the hopper and carrying buckets for elevating nails in the usual manner from the mass in the lower part of the hopper, and delivering them upon a shelf or table 3 within the hopper. The table 3 guides the nails to the upper end of a roller raceway comprising parallel rolls 4, 4, which extend within the hopper, and are mounted in suitable bearings as shown in Fig. 1. The nail elevating wheel is provided with an annular gear 5, at its rear, which is driven by a worm 6 (Fig. 2) in turn driven by friction belting 7, actuated, as may be convenient, from any running part of the machine, for instance, the sheave 7^a (Figs. 8 and 10). Extending through gear 5, is a shaft 8, on the end of which, within the hopper, is mounted a bevel gear 9, the shaft 8 being rotated by means of a friction drive 10, driven preferably from the same source of power as the friction drive 7. The bevel gear 9 meshes with a bevel gear 11 (Fig. 5) on the upper end of one of the rollers 4, and each of the rollers carries a pinion 12 which pinions mesh with each other. Thus the rollers are each rotated outwardly in opposite directions (see the arrows in Fig. 4). The bearings for the rollers 4, 4 are such (see Figs. 2 and 5) that there is space left between them sufficient for nails delivered to the table 3 with their points down to extend between the rollers but be supported thereon by means of their heads. Nails are fed to the hopper 1

through the chute 13, which chute extends down into the hopper at one side (Fig. 2), leaving an opening at its base through which nails are fed into the base of the hopper by the weight of the nails above them in the chute. The opening at the base of the chute is of such size as to always maintain the mass of nails in the hopper proper at a height relatively to the nail buckets on the rotating wheel 2, so that the buckets may always be supplied with a sufficient quantity of nails, and yet the congestion caused by a great mass of nails in the hopper will be avoided. In order to vary the amount of this opening at the base of the chute 13, as may be necessary, there is provided an adjustable gate 14. This gate (Figs. 1 and 2) is mounted within a slot 15, in the side of the hopper, and may be raised and lowered in said slot by the handle 16 and locked in any desired position by placing the spring pressed stop-pin 17 carried by the handle in any one of the holes 18 in the side of the hopper. Thus the flow of the nails from the chute to the hopper and the height of the nails adjacent the buckets may be regulated as may be necessary. As the bucket wheel 2 rotates it will constantly deliver to the table 3, and to the roller raceway, a series of nails which will slide down the rollers by gravity and those properly positioned will finally be delivered out of the hopper and into an exterior raceway 19. Of course, many nails will be delivered to the table 3 with their heads down, or sidewise, or in some other position so that their points will not extend downwardly between the rollers 4, 4 and although these nails are incorrectly delivered to the rollers so as to be delivered from the hopper, they will, nevertheless, in many instances remain supported by the rollers and will slide down on top of the rollers until they are prevented from further movement by the front wall of the hopper 1. It is, therefore, desirable that some means be provided to relieve the roller raceway of the congestion of nails which will form at the front wall of the hopper and to keep the lower ends of the rollers clear of improperly positioned nails so that nails correctly delivered to the rollers may pass on through the front wall of the hopper and to the exterior raceway 19. To accomplish this object, in the illustrative embodiment of the invention, the rollers 4, 4 are provided adjacent to front wall of the hopper with a series of longitudinal depressions 20, forming a ribbed or corrugated surface shown most clearly in Fig. 3. Extending over this corrugated surface and carried by a removable cover plate 21 mounted, by means of the screw clamp 21ª, in the front wall of the hopper, is a leaf-spring 22, of such width as to effectively cover the space between the rollers (see Fig. 4) and of such height above the rollers that in order to pass under it the nails must dip down under it. The depressions 20 permit the heads of all correctly positioned nails to drop below the plane of the upper surface of the rollers and thus pass under the spring 22. The upper end of the spring 22 terminates short of the upper end of the corrugated surface. It is obvious, as may be seen by reference to Fig. 4, that the heads of all correctly positioned nails will slide into the depressions 20 and will rest beneath the spring 22 upon the ribs on the rollers, and that with the rollers 4, 4 rotating in the direction of the arrows in said figure, the nails will be constantly worked upwardly against the under side of the spring 22. The spring 22, however, acts as a yielding cover plate to prevent the nails being fed out from between the rollers by the action of the corrugated surface. The nails, by this device, are constantly agitated and are thus separated and aided in their progress down the raceway. It is also obvious that if a nail is delivered to the raceway so that instead of dropping between the rollers it extends transversely thereof, and remains supported by the rollers until it slides against the spring 22, it will either fail to force itself under the spring and will therefore drop from the raceway, or if it does get under the spring the ribs upon the rollers will act as teeth to engage the nail and feed it to one side or the other and thus off of the rollers and back into the hopper. A similar action occurs with all improperly positioned nails. It is seen that the corrugated portion of the rollers thus performs two functions, first, to agitate the nails whereby they are separated so that they may be fed singly and smoothly to the exterior raceway; and, second, to act as a nail deflector to deflect from the raceway nails which have been improperly placed thereon.

Referring now to Figs. 6 and 7 the exterior raceway 19 is of usual construction, namely consisting of a pair of parallel bars suitably spaced apart and between which the nail extends, the nail being supported on said bars by means of its head. The raceway 19 is also provided with the usual cover plate 23. The raceway 19 is preferably removable from the machine and is held in place by means of a spring catch 24ª upon a bracket 24 extending from the nail hopper. The upper end of the raceway has a bearing in the portion of the hopper forming a bearing for the lower end of the roller raceway and its lower end has a bearing upon the support for the nail-receiving cylinder 26, as will be hereinafter described. It has been found that when operating it at a high rate of speed the progress of the nails down the raceway by gravity alone is not fast enough to properly supply the nail receiver. To overcome this difficulty and effect a

proper delivery of the nails the following means are preferably employed. One of the side plates of the raceway 19 is cut away toward its lower end to form an opening at 27 (see dotted lines Fig. 6) so that the nails resting in the slot of the raceway are exposed. Operating in this slot is a spring-finger 28 which, for convenience, may be termed an "accelerator finger". The finger 28 is mounted upon one end of an arm 29 which has an extension 30 provided with a slot which embraces a pin 31 upon the raceway. The other end of the arm 29 is pivoted to the upper end of a lever 32 pivotally mounted upon a stud 33 extending from the side of the raceway. Surrounding the stud 33 is a coiled spring 34 one end of which is secured to the side of the raceway, the other end of which bears upon the lower end of the lever 32 in such manner that the lever is maintained in position so that the accelerator finger 28 is normally in its retracted position, or at its greatest distance from the delivery end of the raceway. Means hereinafter described are provided to oscillate the lever 32 upon its carrying stud, so that the accelerator finger 28 is given a reciprocatory motion longitudinally of the raceway, being guided in its movement by the pin and slot connection 30, 31. The movement of the lever 32 is such that the accelerator finger 28 is carried on its backward movement (to the right Fig. 7) beyond, say, the fourth or fifth nail from the delivery end of the raceway, so that with its forward movement all of the nails ahead of it are carried forward from the end of the raceway, quickly and sharply. The finger 28 acts, therefore, as an accelerator to speed the endmost nails in the raceway into position for rapid delivery to the nail receiver. It should be particularly noted that the accelerator finger 28 is, of itself, yielding. In the illustrative embodiment of the invention it is formed of a light leaf spring. This is for the reason that the movement of the nails at the delivery end of the raceway should be accelerated by a very light pushing action so as to eliminate crowding and jamming against the nail separating devices. It has been found in practice that if a stiff finger is used to engage and accelerate the nails, even though such finger be lightly spring pressed, the weight of the metal alone, as the finger is moved forward, is sufficient to cause a jamming of the nails and prevent a proper separation thereof from the raceway. With, however, an accelerator finger arranged so that the yield is within itself, and such yield is therefore unimpeded by any intervening part when it becomes necessary for the finger to move backwardly during its forward movement to prevent a jamming of the nails, such jamming is effectively overcome. Those skilled in the art will understand the effectiveness of such an accelerator, as above described, without further dilation upon its action and advantages.

In the embodiment of the invention selected for illustrative purposes, the nail assorting mechanism heretofore described has been shown as combined with means for delivering a group or gang of nails to the nail driving devices of a heeling machine, for instance, such a machine as is shown in United States patent to Raymond 317,199, May 5, 1885, wherein nails are delivered as a gang to a distributor which arranges the nails in proper order for insertion, all as is well known to those skilled in the art. It should be distinctly understood, however, that the type of heeling machine shown in the Raymond patent above referred to is not the only type or kind of machine with which the invention can be used. A description of the preferred form of nail delivering mechanism will now be given.

Referring now to Figs. 6 to 10 of the illustrative embodiment of the invention, the nail receiving cylinder 26 is mounted within a hollow cylindrical support 35 in turn supported upon a bracket C carried by the frame B. The support 35 is provided with a yoke 37 which supports the upper end of a stud 38 upon which the nail receiving cylinder 26 is rotatively mounted. The lower end of the stud 38 is supported in a bottom plate 36 (Fig. 6) secured to the support 35. The hollow cylinder 35 is provided with an opening in its periphery, in which the lower end of the exterior raceway 19 is adapted to rest. To aid in supporting it in position the raceway carries a slotted bracket 19^b engaging a pin 19^c on the support 35. This lower end of the raceway 19 is so formed (see Fig. 7) that the nails in the raceway are prevented from sliding directly out of its end but are forced to be delivered sidewise therefrom. In order to obtain this sidewise delivery of the nails the nail raceway is provided with a plate 39 which extends from one of the side rails of the raceway, across the end of the raceway opening and over the nail cylinder 26. This plate is spaced at sufficient distance from the end of the other side rail of the raceway so that nails may be passed between the plate 39 and the raceway end. To retain the descending nails in proper vertical relation to the nail receiver 26 for efficient delivery thereto, a second plate 39^a, similar to the plate 39, extends from the raceway below the plate 39 and into a circumferential slot 26^a, in the nail receiver (see Fig. 6). The nails in resting against these plates are supported preferably at substantially right angles to the surface of the raceway. In order to retain the endmost nail at the delivery end of the raceway and against the plates 39 and 39^a a pair of pins 40 (Fig. 7)

may be provided, extending through one of the side-rails of the raceway and pressed forward by means of a leaf-spring 41 mounted on the raceway. The pins 40 thus normally close the transversely arranged exit from the raceway. As these pins 40 are spring pressed, if any force is exerted upon the endmost nail in a sidewise direction, the pins are readily forced back against the spring 41 to such an extent that the nail may be delivered.

Many heeling machines are designed to support the shoe in the machine in such position that nails must be driven upwardly to attach the heel to the shoe and in such cases if nails are assorted and delivered to a raceway, as is customary, with their points down, it is necessary to reverse them before they are driven. In other heeling machines the nails are driven downwardly into the heel, either to load the heel or to attach the heel to the shoe. In the present instance, the parts of the machine are preferably so arranged that nails are selected directly from the raceway with their points down and are maintained in this position throughout the distributing and driving operations, that is, there is no reversal of the nails after they are delivered from the nail raceway. To the accomplishment of this object, in the illustrated embodiment of the invention, the nail receiving cylinder 26 has been placed immediately adjacent to the delivery end of the raceway 19 and with its axis at substantial right angles to the surface of the raceway (see Fig. 6). The periphery of the cylinder has formed in it longitudinal recesses 42 for the reception of single nails. Thus, as the nail cylinder 26 is rotated by a step-by-step motion so as to bring successive recesses in alinement with the end of the opening in the raceway, through means hereafter to be described, a series of nails are forced by the accelerator 28 forwardly toward such recesses so that the endmost nail rests in the recess which has been placed at the end of the raceway (see Fig. 7). Rotation of the cylinder will cause successive recesses 42 to pick off successive nails and deliver them sidewise out of the raceway past the retaining pins 40 when such pins are used. The hollow cylinder 35 prevents such selected nails from falling outwardly from the receiving recesses 42.

It has been common heretofore to rotate a nail cylinder for receiving a group or gang of nails by means of pawl and ratchet mechanism, but when such driving gear is used it is necessary to provide some means to prevent overthrow of the rotating cylinder so that each of its nail receiving recesses may be properly alined with the opening in the raceway, and it is also necessary to provide separate devices for locking the rotating ratchet against backward motion. Such means to rotate the nail receiving cylinder have been improved by providing devices which insure a positive rotation of the cylinder. The preferred form of such devices will now be described.

A clutch of the well known "Horton" type is indicated (in Figs. 8 and 10) at 43 mounted on a shaft 44 which shaft is driven by a belt engaging the fast and loose pulleys 44^a and 44^b. The belt is shifted from the fast to the loose pulley by hand, to allow of hand manipulation, and the clutch is preferably thrown in and out by operation of the machine. Fast on the shaft 44 is a sleeve 45 (Figs. 10 and 11) provided with one or more spring pressed pins 46 which engage a second sleeve 47 on the shaft 44. The second sleeve 47 is provided with a pair of longitudinal slots 48. A third sleeve 49 on the shaft 44 is provided with a pair of longitudinal lugs 50 at the end adjacent the sleeve 47, which extend into the slots 48 on said sleeve, said slots acting as guideways for the lugs in longitudinal movement of the sleeve 49 upon the shaft. The sleeve 49 is provided with a cam groove 51 and with a worm 52. The bracket C in which the shaft 44 is journaled is provided with an auxiliary bearing 53 which supports a roller-stud 54 so arranged as to project into the cam groove 51. The cam 51 is so constructed that as the shaft 44 rotates, carrying with it the sleeve 49 owing to its connection with the sleeve 45, the sleeve 49 and its worm 52 will be reciprocated longitudinally of the shaft during its rotation. The nail cylinder 26 is provided at its lower end with a worm gear 55 (Fig. 6) with which the worm 52 is adapted to mesh. With such a construction, it is evident that as the worm 52 is rotated in one direction (as illustrated, toward the operative, viewing Fig. 11) the longitudinal movement to the right, controlled by the cam 51, is such that the threads of the worm turn idly between the teeth of the gear 55 and do not rotate said gear. On the other hand the longitudinal movement of the worm to the left, while still rotating in the same direction, will operate to turn the gear 55 (in the direction of the arrow, Fig. 7) with greater speed than would be possible if no longitudinal movement were given to the sleeve 49. Thus the nail-receiving cylinder 26 is positively driven with a step-by-step motion by means constantly in working engagement, the feeding movement being accelerated by the construction of the driving devices so that the sudden start and stop of the receiver incidental to receiving nails singly from the raceway at high speed is controlled and the receiver locked by its actuating means. Over-running of the nail receiving grooves in the receiver, so that a nail could not be properly delivered to its receiving recess, or skipping of nails is pre-

vented. The connection between the sleeves 45 and 47, by means of the spring pressed pins 46, acts as a safety device to disconnect the worm 52 from the shaft 44 should the nail cylinder 26 or other moving parts become jammed during the feeding of nails, or for any other reason.

The means for reciprocating the accelerator-finger 28 will now be described.

One wall of the cam groove 51 in the sleeve 49 extends slightly above the surface of the sleeve and this extending wall is provided with a cam surface 56 (Fig. 11). Adapted to engage this cam surface (see Fig. 10) is a roller 57 on the lower arm of a bell crank lever 58, pivotally mounted upon a stud 59, which is rotatively mounted upon a stud 60, extending from the bracket C. The upper arm 61 of the bell crank lever 58 is adapted to engage with the lever 32 which carries the accelerator-finger 28 (Figs. 6 and 7). The roller 57 is normally pressed toward the cam 56 by means of a spring 62 extending between a lug on the bell crank lever 58 and a lug on an extension 59ª formed on the supporting stud 59. The stud 59 is normally maintained in position for the roller 57 to engage the cam 56 by means of a spring pressed pin 63 mounted in a socket on the bracket C and adapted to engage a recess 64 in the extension 59ª. The stud 59 carrying the bell crank lever 58 is rotatively mounted on the stud 60 so that the upper arm 61 of the bell crank may be withdrawn from engagement with the lever 32 of the accelerator to permit ready removal of the raceway 19 from the machine. With such a construction it is seen that with each rotation of the sleeve 49 and therefore with each step-by-step movement of the nail receiving cylinder 26 the accelerator-finger 28 is reciprocated to engage behind a number of endmost nails in the raceway 19 and then to force them quickly forward to be engaged, one by one, by the nail-receiving recesses 42 and removed from the raceway. The reason for providing an accelerator to speed the lowermost nails in the raceway forward toward the nail-receiving cylinder, is, that if the nails were allowed to slide down the raceway by gravity alone they would not be supplied fast enough to fill every recess in the cylinder as it rotates past the delivery end of the raceway. Means is thus provided to fill each successive recess 42 of the cylinder 26 when said cylinder is rotated at a high rate of speed.

All nails delivered from the raceway to the nail-receiving cylinder are retained within the cylinder by means of a cover plate 65 which is preferably mounted on the stud 38 between the worm gear 55 and the bottom plate 36 (see Fig. 6). This cover plate is provided with a series of openings 66 (shown in dotted lines in Fig. 7) which normally are out of register with the nail-receiving recess 42 and are so maintained by means of a spring 67 secured at one end to the cover plate 65 and at its other end to the cylinder 26, and extending within a recess in the cylinder. The cover plate 65 is maintained in position with its holes 66 between the nail-receiving recesses 42 by means of a pin 65ª extending from the cylinder 26 and into a slot 65ᵇ in the cover plate. The engagement of the ends of the slot with the pin limits the movement of the cover plate in either direction around the stud 38. The cover plate 65 is also provided around its periphery with a series of lugs or teeth 65ᶜ (see dotted lines Fig. 7), one for each of the recesses 42 for a purpose to be hereinafter described.

The bottom plate 36 is provided with a series of holes 68 (Fig. 6) which coincide with the nail-receiving recess 42 and from each of these holes 68 depends a coiled wire distributing tube 69 as is usual in heeling machines. The lower end of these distributing tubes project into a distributer plate 70 (Fig. 8) which is in the form of a removable block having therein a series of holes corresponding in number to the number of nails it is desired to drive in a heel. These holes are arranged in the form of a horseshoe, as is customary, so that the nails may be driven evenly within the outer periphery of the heel. Below the distributer plate 70 is mounted a nail carrier 71 upon an arm 72 adapted to swing about a stud 73 on the main frame and move the nail carrier from a position beneath the distributer plate to a position beneath the nail driving devices. One form of means for thus moving the nail carrier from a moving part of the machine is shown in Figs. 13 and 14, wherein B is or may be part of the machine supporting frame carrying the stud 73 on which is the hub 150 of the carrier arm 72. The hub 150 has a gear segment 151, the teeth of which mesh with the teeth of a gear 152 mounted on the upright shaft 153, the lower end of which carries a gear 154 which is engaged by a segment 155 formed on one end of a lever 156 pivoted at 157 to the main frame. Said lever 156 carries at its other end a pin or roll which is held in engagement with an actuating cam 159 by means of a spring 160, one end of which is connected to the end of the lever 156 at 161 and the other end to a fixed part of the frame, as will be clear. The cam 159 is secured to the counter shaft 162 mounted in the main frame, and driven from the driving shaft 163 by suitable gears 164, 165, connecting said shafts. From this construction it will be apparent that rotation of the shaft 162 will cause the cam 159 to impart a reciprocating or rocking move-

ment to the segment 155 and consequently move the nail carrier in the manner hereinbefore described.

In order that the nails which have been delivered to the nail-receiving cylinder 26 from the raceway may be delivered from the cylinder as a group or gang through the distributing block 70 and into the nail carrier 71, means is provided for actuating the cover plate 65 to bring its holes 66 beneath the lower ends of the nail recesses 42 just at the time when the nail carrier has reached its position beneath the distributer block. The preferred form of such means comprises a spring pressed pin 74 (Fig. 8) mounted on the nail-carrier arm 72, which pin is adapted to engage, on the movement of said arm to bring the nail carrier under the nail distributer, the depending arm 75 of a small bell crank lever mounted on a stud 76 extending from the bracket which supports the nail distributer 70. To the other arm 77 of this small bell crank lever there is pivoted a rod 78 the other end of which in turn is pivoted to one end of a lever 79 pivotally mounted upon a stud 80 on the bracket C. The other end of the lever 79 is so formed as to be adapted to engage the outer end 81 of a lever pivotally mounted on the bottom plate 36 (Fig. 7). The other end 82 of this lever is adapted to project between and engage the teeth 65^c on the periphery of the cover plate 65. The end 82 of this lever is normally maintained out of engagement with the teeth 65^c by means of a coiled spring 83 arranged to normally force said end outwardly. A stop pin 84 limits the outward movement of said end of the lever. A spring 74^a maintains the bell crank lever arm 75 normally in positon to be engaged by the pin 74. The rod 78 may be provided with a turn buckle 78^b so that adjustment may be made for wear or for other purposes as may be desired. With such a construction when the carrier arm 72 is swung to bring the carrier 71 beneath the distributer 70 the spring pressed pin 74 engages the arm 75 of the bell crank lever and draws the rod 78 downwardly thus actuating the lever 79 to engage the outer end of the lever 81—82 and force its inner end into engagement with one of the teeth 65^c so as to rotate the cover plate 65 about the stud 38 and bring its holes 66 beneath the nail-receiving recesses 42.

The rotation of the shaft 44 is initially started preferably by means of the following mechanism: After the nail carrier 71 has received a gang of nails from the nail cylinder by actuation of the cover plate 65, as above described, it is moved, as is customary in heeling machines, from its position beneath the distributer 70 to a position beneath the nailing devices. On the beginning of the movement of the carrier 71 from the distributer a spring pressed pin 85 (Fig. 8) mounted in the carrier arm 72 engages the lower end 86 of a small bell crank lever pivoted at 87 on the bracket which supports the distributer. To the other arm 88 of this small bell crank is pivoted the lower end of a rod 89 the upper end of which is in turn pivoted to a crank 90 on a rock shaft 91 mounted in bearings upon the bracket C (Fig. 10). The rock shaft 91 also carries a crank arm 92 adapted to engage in a recess at one end of a trip-lever 93 pivoted at 94 on one of the bearings of the shaft 44. The rock shaft 91 also carries a stop arm 95 adapted to engage with the usual lug 96 on the loose sleeve of the "Horton" clutch. The crank arm 92 is kept normally in contact with the lever 93, and the bell crank arm 86 normally in position for engagement by the pin 85, by means of a coiled spring 96 on the rock shaft 91, having one end engaging said crank arm and the other end held from movement in a lug 97^* extending from the bracket C. The rod 89 may also be provided with a turn buckle 89^a if desired. With such a construction it is readily seen that as the carrier arm 72 moves the nail carrier 71 away from the distributer 70 the pin 85 will move the bell crank 86—88 in such a direction as to pull downwardly on the rod 89 and thereby move the crank arm 92, and the stop arm 95, away from the lever 93, and the stop 96 on the "Horton" clutch, respectively. The removal of the stop arm 95 from its lug allows the clutch to engage and starts rotation of the shaft 44. The removal of the crank arm 92 out of the recess in lever 93 is for the purpose of performing another function as will hereinafter appear.

When used in connection with a heeling machine the nail cylinder 26 is so designed as to have about its periphery a sufficient number of nail recesses 42 to accommodate the greatest number of nails that may be utilized in nailing a heel of any size upon a shoe. In the present instance the cylinder 26 has been shown with fourteen such nail recesses. It is obvious, however, that in different sizes of shoes a different number of nails will be required as there is more or less space in each to insert the nails. Thus in small sizes or in the heels of ladies' shoes it is desirable to use only five nails, whereas on the larger sizes, and particularly in the larger sizes of men's shoes, it is desirable to use as many as thirteen nails. It is therefore seen that it is highly desirable that the machine be provided with means for predetermining the number of nails which shall be delivered to the nail-receiving cylinder, so that only as many nails may be delivered from said cylinder to the driving mechanism of the machine as may be necessary for the particular size of heel being operated on. To the accomplishment of this object there

has been provided on the machine what may be termed a counting mechanism, which is under control of the operative as to its setting, and may be set to deliver any desired number of nails up to the full capacity of the nail-receiving cylinder. Although there are fourteen nail recesses in the illustrative nail-receiving cylinder it is obvious that one of them will always be at the end of the raceway when the cover plate is moved to deliver the nails as a gang, and, therefore, as the nail in the raceway is held therein by its head it cannot be delivered to the cylinder. If such delivery could take place it would also allow the next nail in the raceway to immediately fall into said recess and slip into the distributer on top of the first nail, and so on, with the result that the delivery of nails would become choked. There is, therefore, a blank in the bottom plate 36 at the raceway end and thus the capacity of the nail receiving cylinder shown for illustrative purposes is thirteen nails.

The lever 93 above referred to is used in connection with the mechanism for counting varying predetermined numbers of nails into the nail cylinder 26. The preferred construction of this mechanism and its connection with the lever 93 will now be described.

Mounted on a hollow stud 97 (Fig. 12) extending transversely through the brackets C and at right angles to the axis of the shaft 44 is a pinion 98, which may be termed a "counting wheel." This pinion is provided with a series of circumferentially arranged holes 99 (Fig. 9). Within the hollow stud 97 extends a pin 100 having on its end adjacent to pinion 98 an arm 101 which extends from the pin 100 radially of the pinion 98 and is provided on its surface, next the surface of the pinion, with a projection or pin 102 adapted to enter any one of the series of holes 99 and thus lock the arm and pinion together. The other end of the pin 100 is provided with a disk 103 (Figs. 10 to 12) having marked thereon a series of figures, which disk may be turned by means of a thumb-nut 104 to bring any one of the figures in the series opposite an index 105 in the bracket C. The arm 101 is normally maintained with its pin 102 in engagement with one of the holes 99 by means of an expansion spring 106 having bearings between the disk 103 and the bracket C but said pin 102 may be easily disengaged from the hole in which it happens to be by pressing inwardly on the disk 103, thereby compressing the spring 106 and sliding the pin 100 through the hollow stud 97. Encircling the hollow stud 97 is a coiled spring 107, having one end secured to the stud and its other end secured to the bracket C so that when the pinion 98 is turned in one direction it tends to constantly wind up the spring 107.

On the sleeve 49 which carries the worm 52 is a circumferential rib 108 provided with a broken away portion so that it does not extend wholly around the sleeve. The pinion 98 is so located beneath the shaft 44 that when the sleeve 49 rotates, the rib 108 engages between the teeth of the pinion and in the movement of the sleeve to the left (in Fig. 11) operates to turn the pinion in a contra-clockwise direction. The cut out portion of the rib 108 is so placed that on the movement of the sleeve 49 to the right (in Fig. 11) the teeth of pinion 98 are not engaged, and no movement is therefore given to the pinion, but during this movement of the sleeve 49 to the right the rib 108 is moved to a position where it can, and does, engage the next tooth of the pinion at the beginning of the next movement of the sleeve 49 to the left. Thus as long as the sleeve 49 continues its reciprocations the pinion 98 will be given repeated impulses and will be turned step by step. The pinion 98 is prevented from turning backward, through the force exerted by the spring 107, during the time that the cut away portion of the rib 108 is moving past it, by means of a pawl 109 pivotally mounted upon the bracket C (Figs. 9 and 11) which is maintained in engagement with the teeth of the pinion by a loop-spring 110 having one end engaging the pawl and its other end mounted in the bracket C. It is obvious that if, after the pinion 98 has been rotated as described, the pawl 109 is moved from engagement with the pinion 98 the then tensioned spring 107 will operate to immediately turn the pinion backward the entire distance which it has been moved forward. To engage and disengage pawl 109 from the pinion 98 is one of the functions of the lever 93 heretofore referred to. To the end of lever 93 opposite that engaged by the crank arm 98 is pivoted a rod 111 which at its other end is provided with a pin 112 adapted to engage a pin 113 extending from the pawl 109. The pins 112 and 113 are normally maintained out of engagement, so that the spring 110 may act to keep the pawl 109 in engagement with the teeth of the pinion 98, by means of a coiled spring 114 surrounding the rod 111 having one end secured to the rod itself and its other end secured to a loose collar on the rod, which collar is prevented from movement in a direction toward the lever 93 by means of a stop lug 116 extending from the bracket C (Fig. 11). The end of the rod 111 extends across the face of the pinion 98 in such position that as the pinion rotates the end of the rod will be engaged by the end of the arm 101. Such engagement will force the rod 111 to the left (Fig. 11)

thereby causing the pin 112 to engage the pin 113 and carry the pawl 109 out of engagement with the teeth of pinion 98. When this occurs the tensioned spring 107 operates to rotate pinion 98 backward to its starting or zero position. This zero position is determined by the engagement of a lug 117 (Fig. 12) on the face of the pinion with the under side of the rod 111.

It should be noted that when the crank arm 92 on the rock shaft 91 is in engagement with the recess in the lever 93 the rod 111 has been moved to the left (Fig. 11) and the pawl 109 is then out of engagement with the pinion 98, the shaft 44 at this time being at rest with the clutch thrown out and the pinion 98 is at its zero position. As soon as the carrier 71, in its movement toward the nailing devices, has moved the crank arm 92 out of the recess in the lever 93 the then tensioned spring 114 on the rod 111 operates to move said rod to the right (Fig. 11) and to thereby move the lever 93 so that its outer face 93ª is placed in engagement with the inner face of the crank arm 92. Thus the crank arm 92, and with it the rock shaft 91, is maintained in such position that the stop arm 95 of the clutch is not in position to be engaged by the lug 96 to throw out the clutch. As soon, however, as the rod 111 is moved to the left (Fig. 11) by the engagement therewith of the revolving arm 101, the lever 93 is moved in a direction to bring its end 93ª out of engagement with the crank arm 92 and the spring 96 on the rock shaft 91 then operates to move the crank arm 92 inwardly into engagement with the recess in the lever 93 carrying with it the stop arm 95 into position to be engaged by the lug 96 to throw out the clutch and stop rotation of the shaft 44. With such a construction it is readily seen that if the movable arm 101 on the pin 100 be placed in the hole in the pinion 98 farthest to the right (Fig. 9) thirteen impulses will be given to the pinion 98 by the engagement therewith of the rib 108 before the end of said arm 101 comes into engagement with the end of the rod 111 to move the rod, and with it the lever 93, to a position where the stop arm 95 of the clutch is placed in a position to be engaged by the lug 96 and thus throw out the clutch and stop rotation of the shaft 44. If, however, the pin 102 on the arm 101 is placed in the hole farthest to the left (Fig. 9) in the pinion 98, only five impulses will be given to said pinion before the stop arm 95 is placed in position to be engaged by the lug 96 and thus throw out the clutch and stop rotation of the shaft 44. If the arm 101 is placed in engagement with any one of the remaining holes in the pinion 98 other numbers of impulses will be given to the pinion between the limits of five and thirteen, according to the angular distance of the hole from the end of the rod 111. The series of numbers on the face of disk 103 correspond to the number of impulses given to the pinion 98 when the crank arm 101 is located in any particular hole 99. Thus, in Fig. 11, the numeral "9" on the disk 103 is shown as being placed opposite the index 105 and, therefore, the arm 101 has been placed in such position that nine impulses will be given to the pinion 98 before rotation of the shaft 44 is stopped. As the pinion 98 is given an impulse, or is turned the distance of one tooth, for each complete rotation of the sleeve 49 on the shaft 44 and as each complete rotation of the sleeve 49 will turn the nail receiving cylinder 26 about its stud 38 a distance equal to the space between two of its nail receiving recesses 42, it is seen that for each impulse of the pinion 98 a nail is delivered to one of the recesses of the nail-receiving cylinder 26. As the number of impulses to be given to the pinion 98 is entirely within the control of the operative, the number of nails delivered to the nail-receiving cylinder 26 may be predetermined by the operative. If then, the nailing devices of the machine are to operate upon small sized heels the operative simply turns the disk 103 to a position with the numeral "5", say, beneath the index 105 and the nail-receiving cylinder 26 will, when the clutch is thrown in, be turned only far enough to pick off from the end of the raceway five nails. If, on the other hand, the operative is nailing large sized heels which require, say, thirteen nails it is simply necessary for him to place the numeral "13" on the disk 103 beneath the index 105 and the nail-receiving cylinder 26 will be operated to pick off exactly thirteen nails from the raceway. The machine is thus provided with means for predetermining the number of nails to be delivered as a group or gang from the nail-receiving cylinder and, in this instance, to the nail carrier of a heeling machine.

In operating the nail delivery mechanism, when, say, five nails are to be delivered as a gang from the nail cylinder, a distributer block is inserted in its supporting bracket which has but five holes and only the first five of the thirteen distributing tubes 69 are used, counting to the left (Fig. 7) from the hole in the bottom plate 36 beneath the recess in the nail cylinder marked *r*. Each time, then, that the clutch on the shaft 44 is thrown into and out of operation, nails will be delivered to six of the recesses 42 which includes the recess remaining at the delivery end of the raceway 19. On movement of the cover plate 65, however, only the five nails beyond the raceway are delivered from the nail cylinder as heretofore explained. When the counting mechanism is again operated, the sixth nail of the previous delivery from

the raceway becomes the first of the new series of five. It is thus seen that each new series of nails starts from a different one of the recesses 42.

As the cover plate 65 rotates with the nail cylinder, each time a gang of nails has been received by the cylinder a new point on the circumference of the cover plate is in position for engagement by the trip lever 81—82. It is for this reason that a tooth 65^c is provided for each recess 42. With such a construction nails can be delivered to the distributer at the end of each forward movement of the nail receiving cylinder and it is unnecessary ever to reverse the rotation of said cylinder in order to bring any particular portion of its circumference into operative relation with a stationary trip device for the cover plate.

A brief description of the sequence of operations of the mechanism will now be given.

Nails having been supplied to the hopper 1 through the chute 13, and the gate 14 at the base of the chute having been adjusted so that the nails are maintained at the proper height within the hopper for the best delivery of the same to the raceway, the clutch of the main machine is thrown in and the rollers 4, 4 of the roller raceway within the hopper are constantly rotated and nails are constantly delivered to the table 3 for delivery from the hopper to the exterior raceway 19. If a medium sized heel is being operated upon by the nailing devices the disk 103 is set, for instance, with the numeral "9" opposite the index 105 (as shown in Fig. 11). It will be assumed that there are no nails in the nail-receiving cylinder 26 and that the nail carrier is in its position beneath the nailing devices. Then as the machine begins to operate the nail carrier 71 is moved about its stud 73 and brought beneath the nail distributer 70. In this movement the cover plate 65 is moved, but as there are no nails in the cylinder none are delivered from the cylinder to the distributer and from thence to the nail carrier. On the movement of the nail carrier away from the nail distributer, however, the bell crank lever 86—88 is moved in such manner as to throw the crank arm 92 and the stop arm 95 on the rock shaft 91 outwardly, which throws in the clutch and immediately starts rotation of shaft 44. This shaft in turn communicates rotary movement to the nail cylinder 26 and said cylinder is rotated sufficiently to pick off from the nail raceway nine nails, at the end of which time the clutch is again thrown out and rotation of the shaft 44 is stopped as hereinbefore described. On the next movement of the nail carrier to bring it beneath the nail distributer the bell crank lever 75—77 is moved in such direction that the lever 81—82 is moved about its pivot to engage one of the teeth 65^c on the cover plate 65 and move the cover plate so that the nine nails in the receiving cylinder are delivered therefrom as a gang. These nails drop through the distributing tubes 69 and through the distributer 70 into the holes arranged for their reception in the nail carrier 71. The nail carrier, immediately upon receiving its gang of nails, is moved forward to place these nails under the driving devices and as it moves forward the bell crank 86—88 is again rocked to move the parts to throw in the clutch and again rotate shaft 44 and the nail cylinder 26 to pick off nine more nails and hold them in the nail cylinder in readiness for delivery to the nail carrier on its next movement to a position beneath the nail distributer. This cycle of operations is of course kept up indefinitely until the main clutch of the machine with which the assorting and delivering mechanism is combined is thrown out and work thus stopped.

This invention can obviously be changed in many of its details of construction without altering its scope and, therefore, it is to be distinctly understood that the invention as defined in the following claims is not limited to the particular embodiment of the mechanism herein shown in the drawings and used for illustrative purposes.

With respect to the nail hopper and loading wheel which delivers nails from the hopper to a roller raceway having projecting portions to act upon the nails; the nail supplying and carrying means; and the loading wheel and distributer; the present application is a development from the broad matter in these respects which is set forth and claimed in application Ser. No. 269,668. filed July 14, 1905.

What is claimed is:—

1. In a mechanism of the character described, the combination, with a raceway and means for supplying loose nails to said raceway, of a rotatable cylinder at the delivery end of said raceway having nail receiving recesses in its periphery and arranged to pick off nails singly on its movement past said raceway end, means for rotating said cylinder, means for predetermining the number of nails to be picked off from the raceway, means for holding all of said nails in said cylinder until the last has been picked off, and means for thereafter delivering said nails from said cylinder as a gang.

2. In a mechanism of the character described, the combination, with a nail receiver, means for supplying it with loose nails singly and in numbers that may be predeterminately varied and means for retaining said nails in the receiver, of means for discontinuing the supply of nails after the receiver has received the predetermined number, and means mounted on the machine independent of said nail supply discontinuing means for automatically delivering said

nails from said receiver at a predetermined time as a gang.

3. In a mechanism of the character described, a nail receiver and a nail carrier movable by the machine from nail receiving to nail delivering position, means for supplying the receiver with a varying predetermined number of nails, and provision for starting the operation of said nail supplying means by the movement of said carrier to nail delivering position.

4. In a mechanism of the character described, the combination, with a nail receiver and means for supplying it with nails, of provision for predetermining the number of nails to be supplied thereto in accordance with the varying requirements of the work including a start and stop mechanism, a nail carrier movable by the machine toward and from the nail receiver, means controlled by the carrier movement from the receiver to start the nail supplying means in operation, and means controlled by the carrier movement toward the receiver to deliver the predetermined supply of nails in the receiver to the carrier as a gang.

5. In a mechanism of the character described, a raceway, means to deliver loose nails thereto, means to assort said nails and arrange them point down in the raceway, a nail receiver at the delivery end of the raceway having peripheral nail receiving recesses, means to supply said receiver with varying predetermined numbers of nails while maintaining their points down, and provision thereafter to deliver said nails from the receiver, point down, as a gang.

6. In a mechanism of the character described, an inclined nail raceway, an inclined nail receiver constructed and arranged to support the nails in the same position as they rest in the raceway, means to supply said receiver with nails from the raceway, a horizontally arranged nail carrier, and means to deliver nails as a gang from the receiver to the carrier.

7. In a mechanism of the character described, an inclined raceway, a rotatable nail receiver at the delivery end of said raceway having its axis perpendicular to the line of direction of the raceway and constructed to maintain its supply of nails in substantial parallelism with the body of nails in the raceway, means to rotate said receiver until its has been supplied with a predetermined number of nails, and provision thereafter to deliver said nails as a gang to a carrier mounted for movement toward and from the receiver in a substantially horizontal plane.

8. In a mechanism of the character described, a raceway, means for supplying said raceway with loose nails, a rotatable nail receiver, and provision for delivering nails singly from said raceway to said receiver including an actuating train constantly in operative driving engagement and ready at all times when properly actuated to positively rotate said receiver by an even step-by-step movement.

9. A nail assorting and delivering mechanism comprising a laterally stationary raceway having side rails and a central nail receiving opening, means for supplying said raceway with nails, a receiver movable with relation to and to receive nails from the raceway, means at the raceway end constructed and arranged to prohibit direct delivery of the nails to the receiver but permit sidewise delivery thereof, and nail delivering means also at the raceway end and in alinement with the nail receiving opening.

10. A nail assorting and delivering mechanism comprising a raceway having side rails and a central nail receiving opening, means for supplying said raceway with nails, a rotatable nail cylinder at the delivery end of the raceway having nail receiving recesses constructed and arranged to pick off nails from the raceway singly, and means on the raceway for prohibiting direct delivery of nails to the nail cylinder and guiding the nails to one side for delivery in the direction of movement of the nail receiving recesses.

11. A nail assorting and delivering mechanism comprising a nail hopper, a removable raceway exteriorly of the hopper, means for supplying said raceway with nails from the hopper, an accelerator-finger for engaging the lowermost nails in the raceway, and an actuator in front of the raceway for reciprocating said finger, said actuator being mounted for removal from actuating position to permit removal of the raceway.

12. A nail assorting and delivering mechanism comprising a raceway having side rails and an opening in one side rail near the delivery end of said raceway, means for supplying said raceway with nails, an accelerator-finger arranged to project into said opening and engage behind the lowermost nails, a lever pivoted on the raceway to one end of which the finger is connected, an actuator to engage the other end of said lever to impart reciprocatory movements to the finger longitudinally of the raceway, and means to guide said finger in its movements.

13. A nail assorting and delivering mechanism comprising a roller raceway and means to deliver headed nails thereto, the rollers of said raceway being provided with longitudinally extending depressions forming between them longitudinally extending projections to engage the nail heads and agitate the nails in the direction of their length during their passage along the raceway.

14. A nail assorting and delivering mechanism comprising a roller raceway adapted to receive headed nails with their shanks

extending downwardly between the rollers, means to deliver nails thereto, means to agitate said nails in the direction of their length during their passage along the raceway, and means to control the amount of lengthwise movement imparted to the nails.

15. A nail assorting and delivering mechanism comprising a roller raceway, nail agitating means on the rollers of said raceway, and a yieldable cover plate for said rollers above the said agitating means.

16. A nail assorting and delivering mechanism comprising an inclined roller raceway, means to deliver headed nails thereto, a longitudinally corrugated portion in the rollers, and a longitudinally arranged spring cover plate above said corrugated portion terminating short of its upper end and spaced from the upper surface of the rollers a distance less than the height of the nail heads.

17. In a mechanism of the character described, the combination with a nail receiver of means for supplying said receiver with a predetermined number of loose nails, said means including an independently mounted counting wheel, means for rotating said wheel in one direction while nails are being supplied to said receiver and automatic means for rotating said wheel backwardly to zero position when the last nail of the predetermined number has been supplied.

18. In a mechanism of the character described, the combination with a nail receiver, of means for supplying said receiver with varying predetermined numbers of nails comprising a clutch, a controlling device for said clutch, a rotatable counting wheel adjacent said controlling device, an adjustable stop mounted to rotate with said wheel, means acting to rotate said wheel in one direction, a locking device to prevent such rotation, and provision for rotating said wheel in the opposite direction to bring said stop into engagement with said controlling device to disengage the clutch and to simultaneously disengage said locking device whereby the wheel is permitted to return to zero position.

19. In a mechanism of the character described, a nail receiver, and an independently mounted counting mechanism for controlling the supply of nails to said receiver, comprising a rotatable counting wheel, a stop adjustably mounted thereon, an indexing device connected to said stop, and means for normally maintaining said stop in zero position.

20. A nail assorting and delivering mechanism comprising a nail hopper, a raceway within the hopper and leading therefrom, a partition within the hopper arranged parallel to the raceway means to convey nails from the mass in the bottom of the hopper above and onto the raceway, a second partition in front of the nail conveying means and forming with the other partition and the wall of the hopper a nail supply chute, and an adjustable opening at the base of said chute to control the supply of nails to the conveying means.

21. A nail assorting and delivering mechanism comprising a nail hopper, a raceway within the hopper and leading therefrom, a rotatable bucket wheel to convey nails from the mass in the bottom of the hopper above and onto the raceway, and an inclosed nail chute extending downwardly past the front of said wheel and having a delivery opening at its bottom arranged to direct nails, flowing from the chute, into the bucket wheel.

22. A nail assorting and delivering mechanism, comprising a roller raceway and means to deliver nails thereto, the rollers of said raceway forming between them a straight passageway for the nails and having on their surfaces a series of longitudinally extending alternating portions disposed circumferentially of the rolls at different radial distances from the axis thereof to engage the nails and agitate them in their passage along the raceway.

23. A nail assorting and delivering mechanism, comprising a roller raceway and means to deliver nails thereto, the rollers of said raceway forming between them a straight passageway for the nails and having on their surfaces a series of longitudinally extending alternating portions disposed circumferentially of the rolls at different radial distances from the axis thereof to engage the nails and agitate them in their passage along the raceway, and a cover plate disposed above said series of alternating portions.

24. A nail assorting and delivering mechanism, comprising a raceway for loose nails having a side opening, means for supplying said raceway with nails, an accelerator finger extending into said opening and formed of yieldable material to directly engage the lowermost nails only and adapted to yield backwardly during its nail accelerating movement, and actuating means for said accelerator.

25. A nail assorting and delivering mechanism, comprising a nail raceway, nail supplying means therefor, a movable accelerator comprising a leaf spring formed and arranged to engage behind the lowermost nails and to yield during its nail accelerating movement while still maintaining its engagement with the nails.

26. In a machine of the character described, the combination of a raceway for delivery of nails singly, a rotatable nail receiver to receive nails from said raceway, a worm wheel connected to and to rotate said receiver, a worm operatively connected to said worm wheel, a shaft carrying said

worm, means for rotating said shaft, means for moving the worm longitudinally back and forth as the latter is rotated to impart a step-by-step rotative movement to said nail receiver.

27. In a machine of the character described, the combination of a raceway for delivering nails, a rotatable receiver to receive nails singly from said raceway, a worm wheel connected to said rotatable receiver, a worm engaging said worm wheel, a shaft carrying said worm, means for rotating said shaft and worm, and a cam for moving the worm longitudinally back and forth as the latter is rotated to impart a step-by-step rotative movement to said nail receiver.

28. In a machine of the character described, the combination of a raceway for delivering nails, a rotatable receiver for receiving nails from said raceway singly, a shaft, means for operating it, worm and worm wheel connections between the shaft and rotatable receiver, means for moving the worm longitudinally back and forth as the shaft is rotated, and means for stopping the operation when a predetermined number of nails have been delivered to the receiver.

29. In a machine of the character described, the combination of a raceway, a rotatable receiver for taking nails from said raceway to be delivered as a gang, a counter mechanism for determining the number of nails to be delivered to the receiver from the raceway to form the gang, a worm and worm wheel for rotating the receiver step-by-step to take the determined number of nails from the raceway, and means operated by the counter mechanism to stop the operation of the worm and worm-wheel when the desired number of nails has been delivered to the receiver.

30. In a machine of the character described, the combination of a raceway to deliver nails, a receiver to receive nails from said raceway, a worm-wheel connected to said receiver, a worm for operating said worm-wheel, a shaft for carrying said worm, a cam connected to the worm to move it back and forth longitudinally as the worm rotates, and means to stop the operations of the worm when a predetermined number of nails have been delivered from the raceway to the receiver.

31. In a machine of the character described, the combination of a raceway for delivering nails, a rotatable receiver for receiving nails from said raceway, and means for preventing radial delivery of nails to the receiver direct from the raceway, said receiver having a surrounding member to prevent radial release of the nails from the receiver after they have been delivered from the raceway.

32. In a machine of the character described, the combination of a cylindrical nail receiver provided with a series of nail receiving chambers extending through the peripheral wall of said receiver, a raceway for delivering nails to said receiver, means for rotating the receiver step-by-step to receive nails singly from said raceway, an adjustable counter mechanism to determine the number of nails to be delivered to the receiver, and means controlled by the counter mechanism to stop the receiver actuating means when the determined number of nails has been delivered to the receiver.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM C. STEWART.

Witnesses:

WILLIAM J. BRENNAN,

REDFIELD H. ALLEN.