Dec. 13, 1927. 1,652,298

J. B. BURTON

GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 1

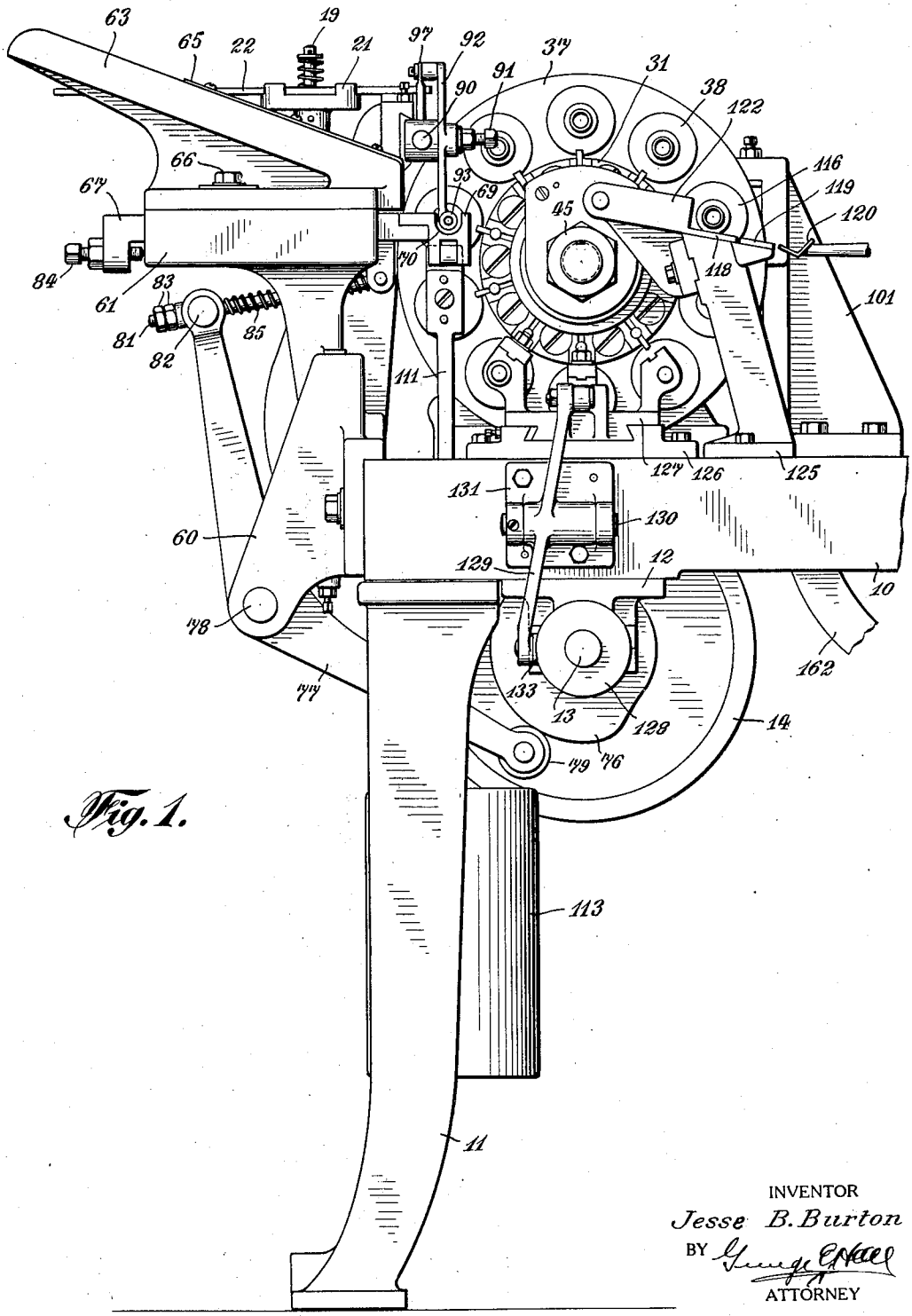


Fig. 1.

INVENTOR

Jesse B. Burton

BY

ATTORNEY

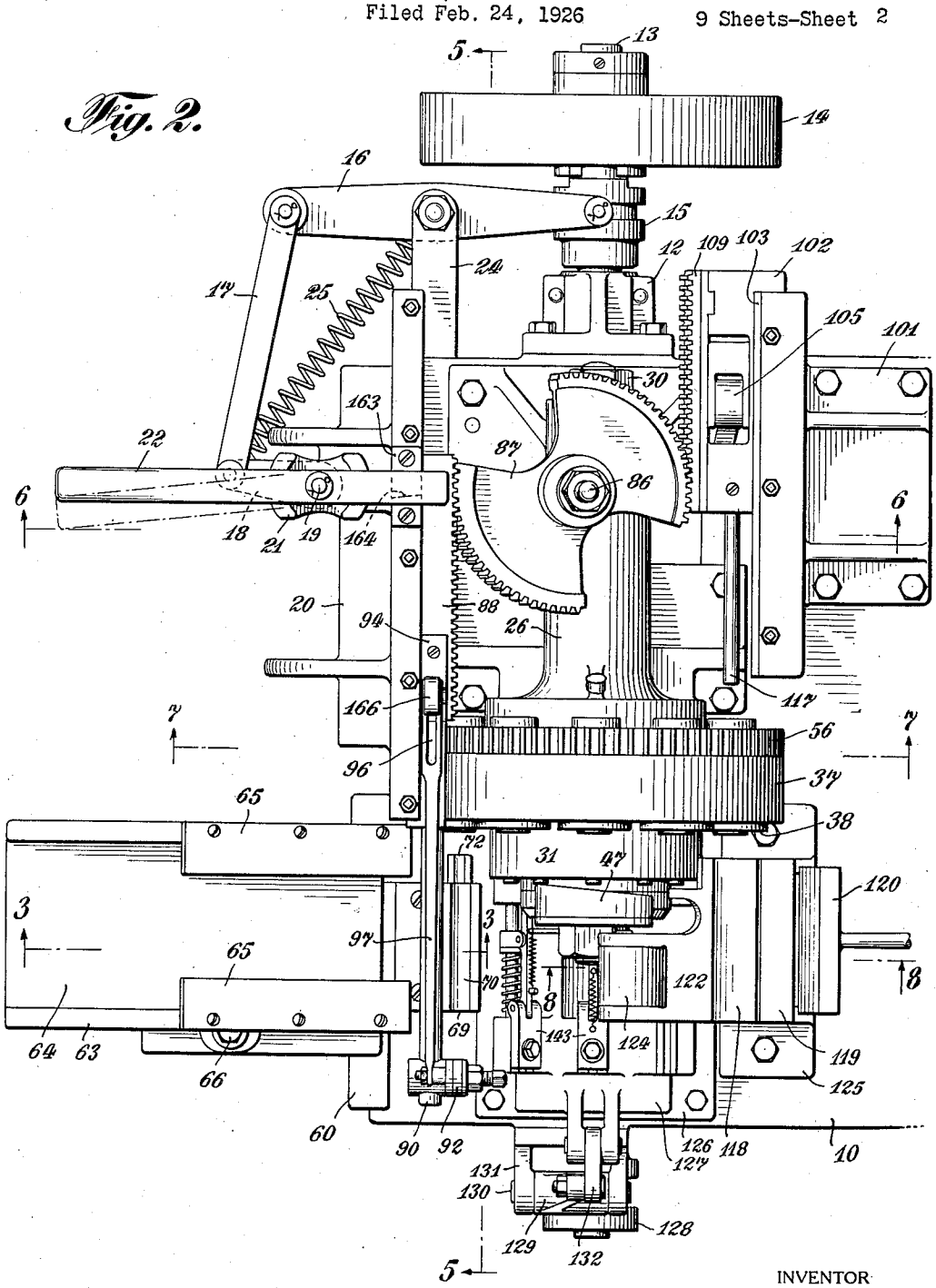
Dec. 13, 1927. 1,652,298

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GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 2

Fig. 2.



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GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 3

Fig. 3.

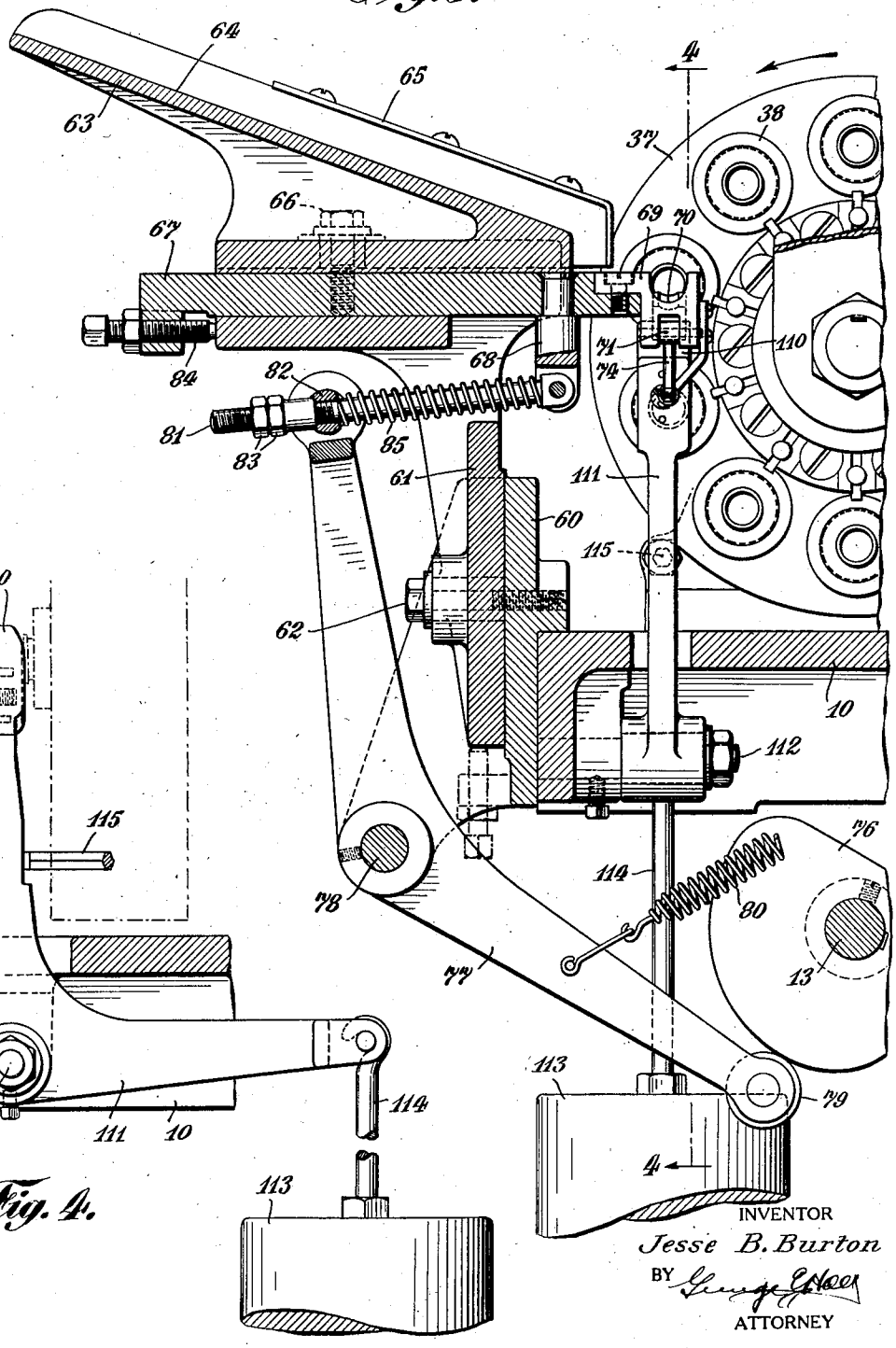


Fig. 4.

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Dec. 13, 1927. 1,652,298

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GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 4

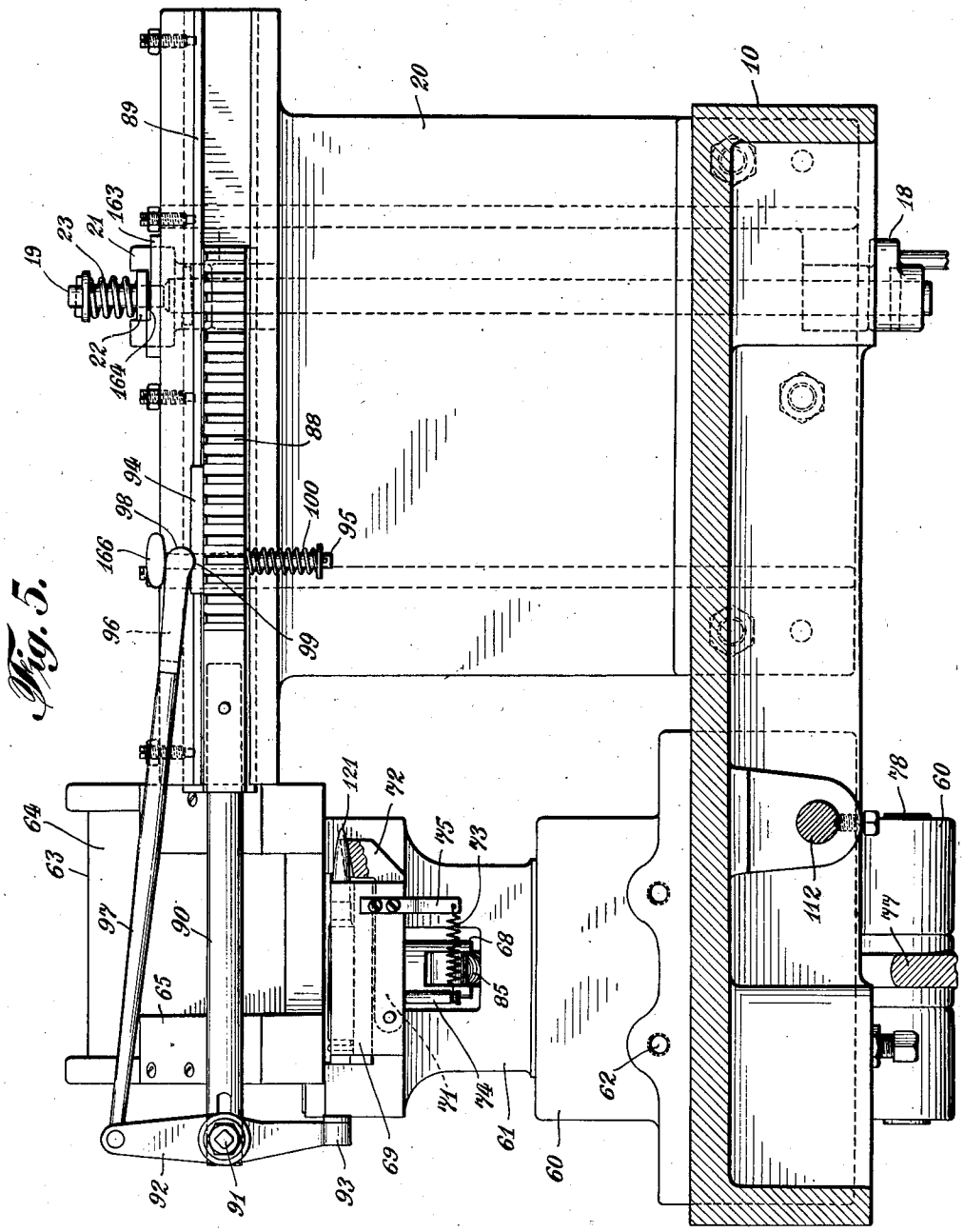


Fig. 5.

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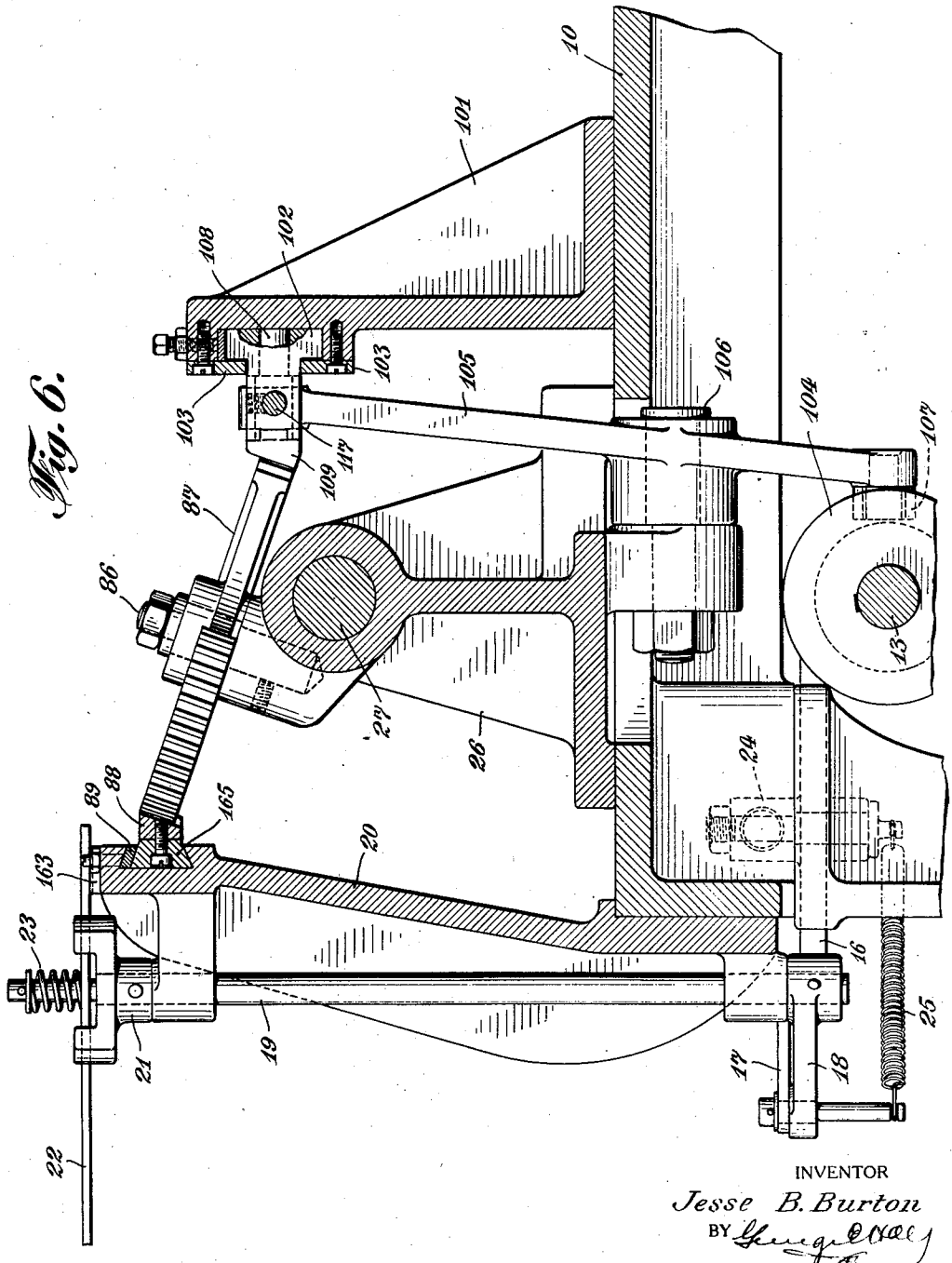
Dec. 13, 1927. 1,652,298

J. B. BURTON

GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 5

Fig. 6.



INVENTOR

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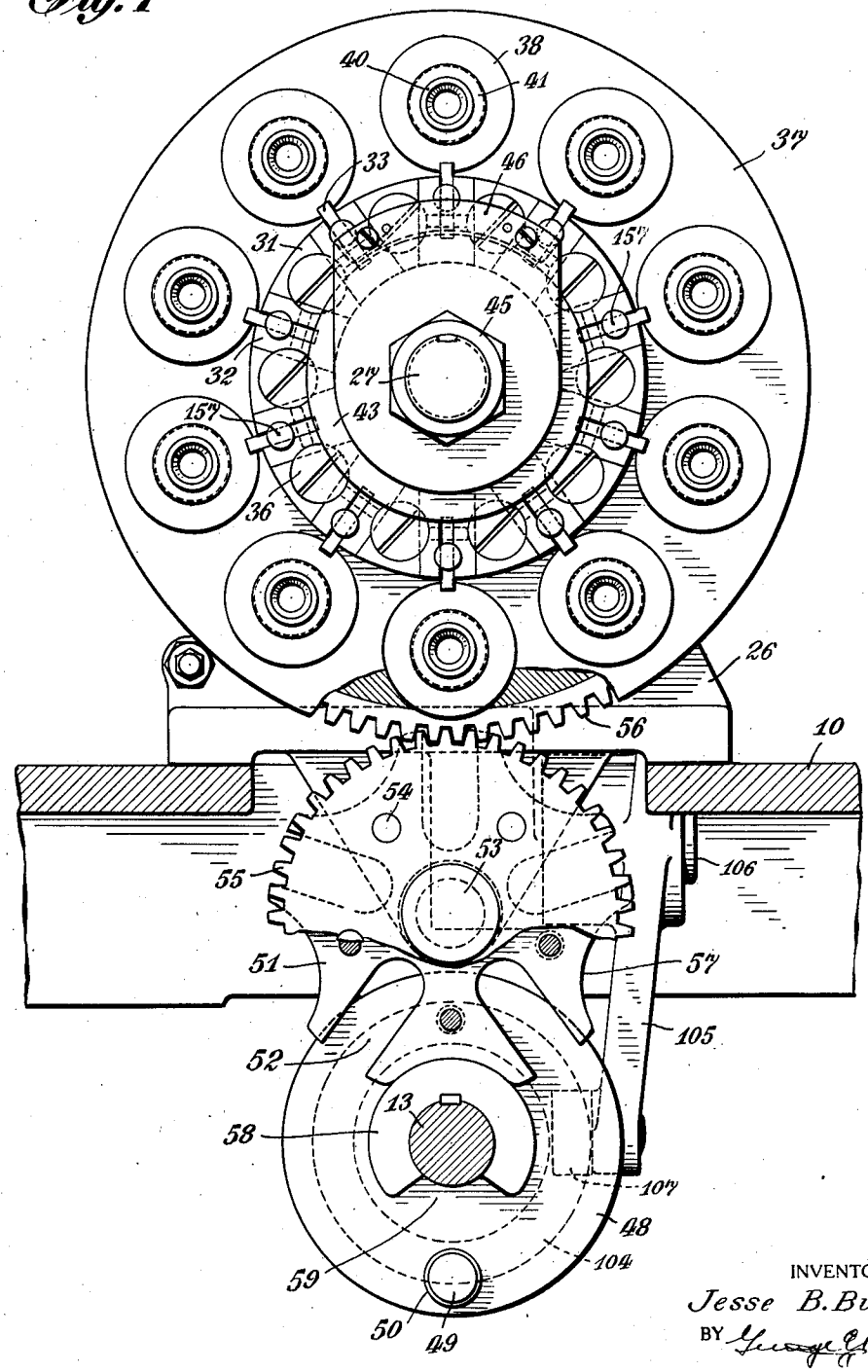
Dec. 13, 1927. 1,652,298

J. B. BURTON

GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 6

Fig. 7



INVENTOR

Jesse B. Burton

BY George E. Hall

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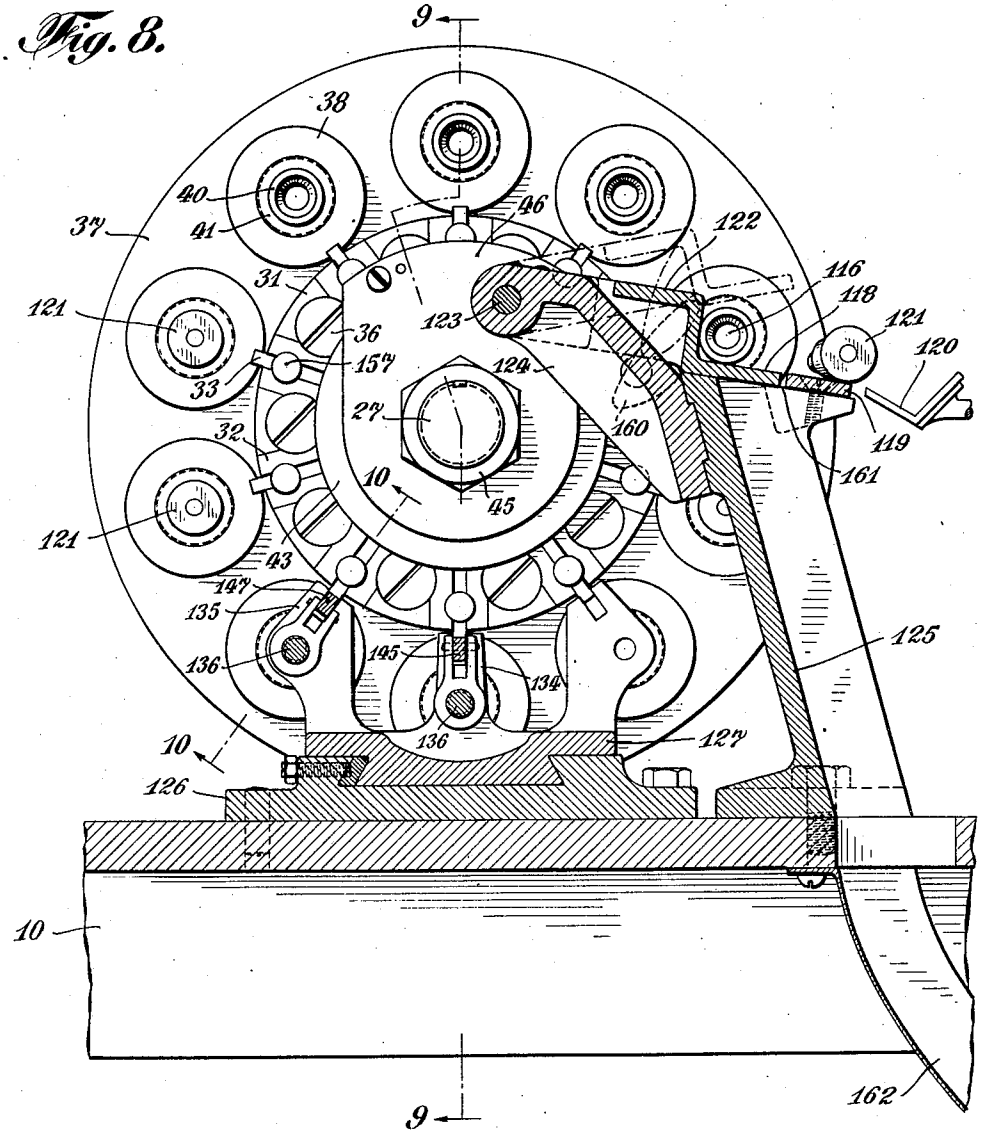
Dec. 13, 1927. 1,652,298

J. B. BURTON

GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 7

Fig. 8.



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Dec. 13, 1927. 1,652,298

J. B. BURTON

GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 8

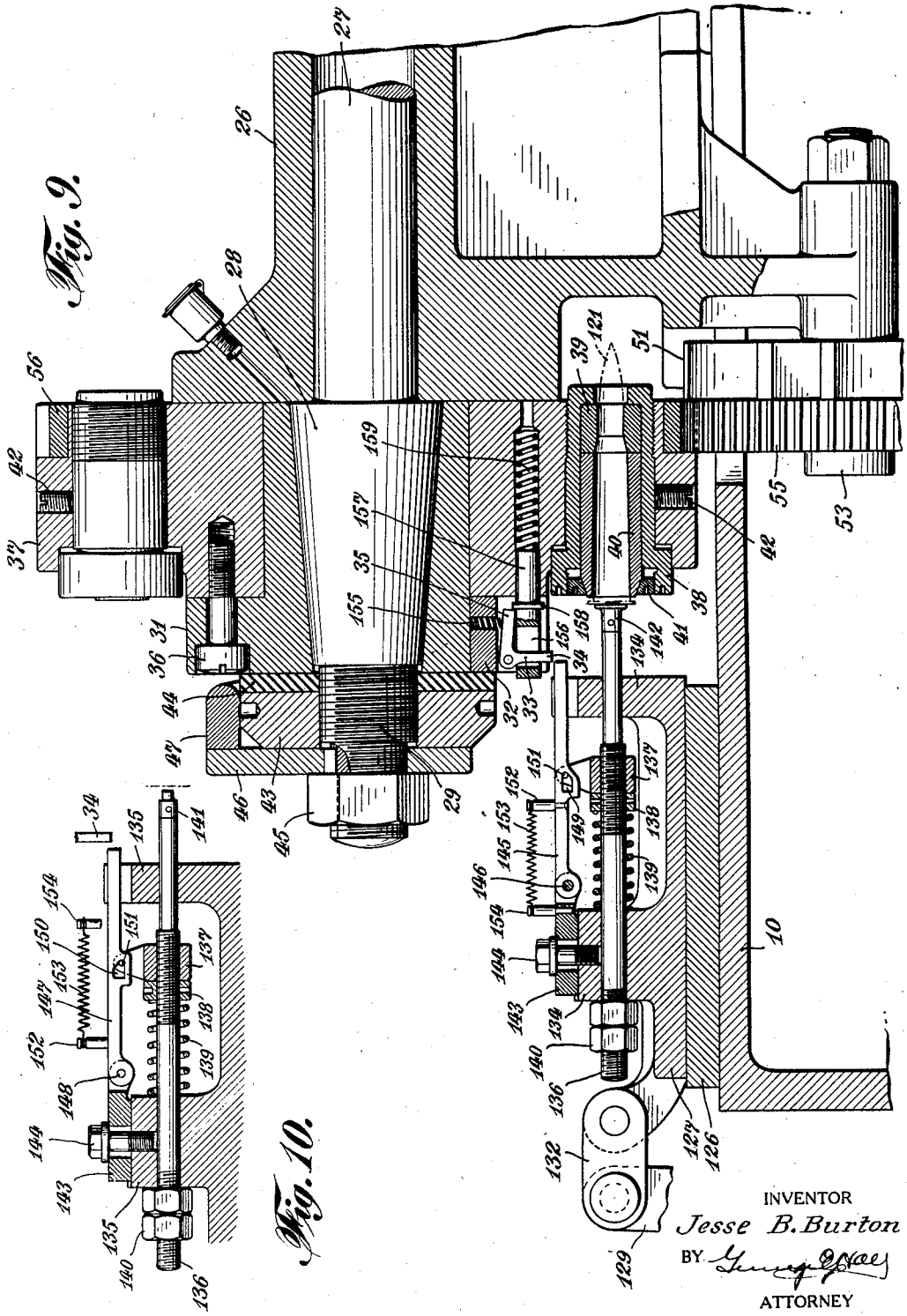


Fig. 9.

Fig. 10.

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GAUGING MACHINE

Filed Feb. 24, 1926 9 Sheets-Sheet 9

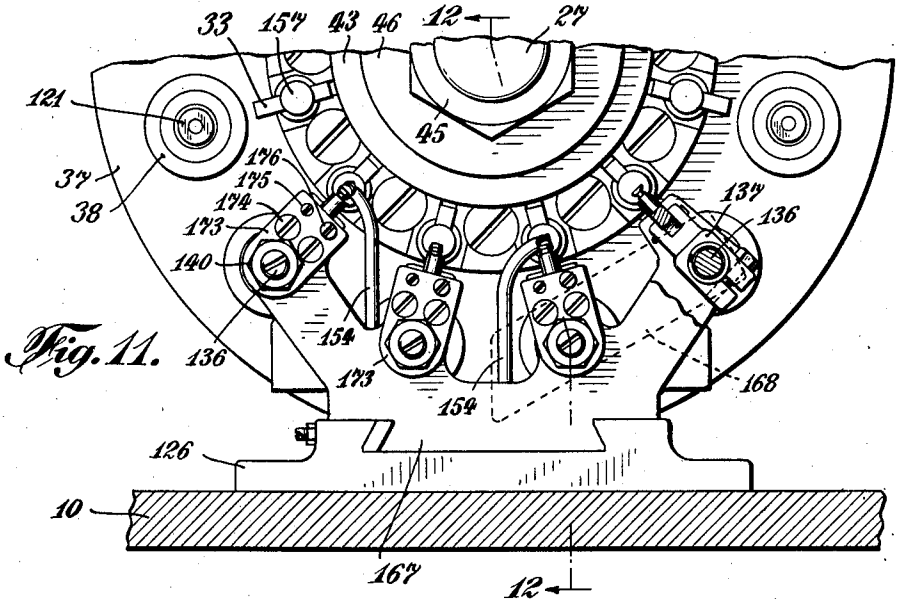


Fig. 11.

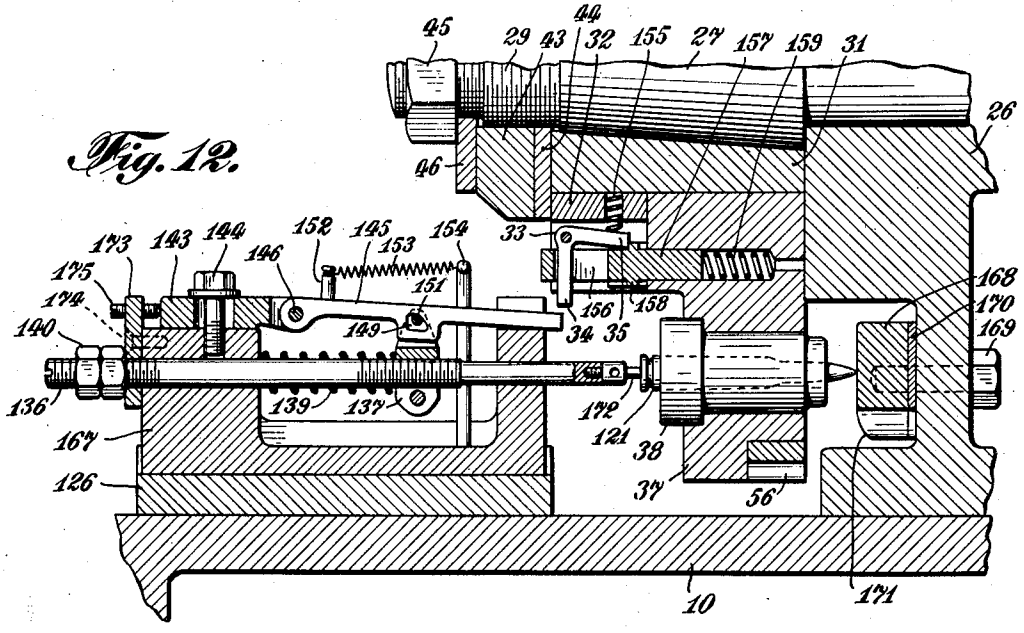


Fig. 12.

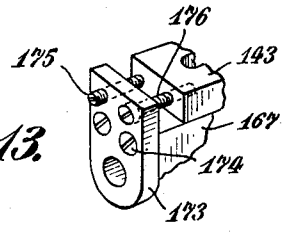


Fig. 13.

INVENTOR

Jesse B. Burton

BY

ATTORNEY

Patented Dec. 13, 1927. 1,652,298

UNITED STATES PATENT OFFICE.

JESSE B. BURTON, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

GAUGING MACHINE.

Application filed February 24, 1926. Serial No. 90,420.

My invention relates to a new and improved gauging machine, more particularly of the type for gauging cartridges, although not limited to such use.

A principal object of the invention is to provide means whereby a cartridge may be automatically gauged by inspecting mechanism and if it does not meet the inspecting requirements the same will be automatically separated from those cartridges that do in fact meet such requirements, this automatic selection being accomplished without the aid of alarm or visual signals or by stopping the machine, except in rare cases of an abnormal shell.

Other features of the invention include the accomplishment of the results above outlined by mechanism that is simple in structure, easy to assemble, efficient in operation and accessible for alterations, repairs and adjustments, as will be obvious from the specification and accompanying drawings.

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

My invention as shown herein forms part of a gauging and weighing machine, wherein the cartridges are automatically delivered into a carrier and while therewith are inspected as to length, the presence and position of a primer, whether above or below its correct position, or otherwise.

This present invention does not relate to the weighing mechanism, which operates independently, and therefore, is not shown or disclosed in detail herein.

The arrangement of parts is such that the cartridges are first automatically placed one at a time, in a rotary carrier. If, for any reason, one is not positioned approximately correctly, the machine is automatically stopped. Such conditions happen very rarely and are abnormal. The machine stops automatically only because of an abnormal shell or when for some other cause the delicate seating or gauging mechanisms or some other parts of the machine are likely to become damaged in motion. The operator then removes the abnormal cartridge or otherwise corrects the trouble. If the cartridge does position approximately, it is next carried by the rotation of the carrier before a mechanism which seats it in the carrier under a known pressure, uniform for all cartridges. In the next succeeding position of the carrier the cartridge is inspected to determine the presence of primer, whether it is low relatively to its position or inverted, and if either of these defects exists, the trip mechanism is actuated. Thereafter, the cartridge, at subsequent stations, is inspected by similar mechanism to determine whether the primer is high relatively to its correct position, and if in fact found to be high, trip mechanism is actuated. At other stations the cartridge may be inspected for its length, and if not of a predetermined length, similar trip mechanism is released. Subsequently, during later movements of the carrier, the cartridge is presented at a station where it is ejected from the carrier. If the cartridge has withstood all of the inspection tests, the same is delivered onto the platform, from which it is transferred to the weighing mechanism. If, however, it has failed in any such inspection tests, the said trip mechanisms will move the platform so that when the cartridge is ejected from the carrier, it will drop into a receptacle conveniently arranged to receive it instead of onto the platform. Inspecting as used herein may also be defined as testing or calipering.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures;

Figure 1 is an end elevation of that portion of a gauging and weighing machine that particularly relates to the present invention;

Figure 2 is a plan view thereof;

Figure 3 is an enlarged sectional elevation of a portion of the apparatus, the parts in section being taken generally upon line 3—3 of Figure 2;

Figure 4 is a detail side elevation of the mechanism for insuring the correct relative position of the cartridge within the carrier;

Figure 5 is a sectional elevation of a portion of my improved mechanism, the parts in section being taken generally upon line 5—5 of Figure 2;

Figure 6 is a transverse sectional elevation of a portion of the machine, the parts in section being taken generally upon line 6—6 of Figure 2;

Figure 7 is an enlarged end elevation of

the carrier and adjacent parts, the parts in section being taken generally upon line 7—7 of Figure 2;

Figure 8 is an enlarged end elevation of the carrier and adjacent mechanism, the parts in section being taken generally upon line 8—8 of Figure 2;

Figure 9 is an enlarged longitudinal sectional elevation of the carrier and adjacent parts, those in section being taken generally upon line 9—9 of Figure 8;

Figure 10 is a detail sectional elevation of one of the inspecting mechanisms, the parts in section being taken upon line 10—10 of Figure 8;

Figure 11 is a fragmentary end view similar to Figure 8, illustrating particularly the form of mechanism used when inspection is made of the length of the cartridge;

Figure 12 is a sectional elevation, taken generally upon line 12—12 of Figure 11; and

Figure 13 is a detail view of the plate and adjacent parts used to obtain a fine adjustment of the inspection finger.

In the embodiment of this invention there is provided a bed 10 supported upon suitable legs 11—11, to which are fixed the bearing boxes 12, within which is journaled the driving shaft 13. Upon this shaft is a loose pulley 14 and a slidably mounted clutch collar 15, which is moved along the shaft, to provide an intermeshing engagement with the clutch on the hub of the loose pulley 14 by a rock lever 16, supported in the bracket 24, and connected by a link 17 with a rock arm 18 fixed upon a shipper rod 19 that is journaled in the standard 20 secured to the bed 10 and having a cradle 21 fixed thereon.

A handle 22 is supported by the rod 19 and is held down by a spring 23. The movement of this handle about the axis of the shipper rod 19 imparts a rotary movement to the latter, and through the rock arm 18, link 17 and rock lever 16, to the clutch on the pulley 14. Thus, rotation may be given to the shaft 13 or brought to a full stop according to the direction of movement of the clutch collar. The spring 25 always exerts its tension so as to maintain the clutch collar 15 in a position out of engagement with the pulley 14.

On the top of the standard is a stop plate 163 having a shoulder 164 thereon. When the machine is running, one edge of the handle 22 engages this shoulder, as shown by broken lines in Figure 2, and holds the clutch 15 in engagement with the pulley 14.

A standard 26 is secured to the bed 10 and within which is journaled the shaft 27, having a conical head 28 at one end which terminates in a shank 29, and a nut 30 upon the opposite end holds the same against endwise movement.

Journaled on the conical head 28 is a head member 31, having mounted in the outer edge thereof a plurality of blocks 32, within which is journaled a trip lever 33 having radially projecting arms 34 and 35 at substantially a right angle to each other. This head member is held against movement by the nut 43 and washer 44 of fiber or the like.

Fixed on the shank 29 of the shaft, and held against endwise movement by the nut 45, is a plate 46 having a cam plate 47 fixed thereto.

Connected with the head member 31 by screws 36 or the like is a dial 37. Threadedly secured in this dial, substantially parallel with the axis thereof, are a plurality of barrels 38, these being equally spaced about the axis of the dial. Within each of these barrels are two bushings 39 and 40 that are held therein by a nut 41. The bore of these bushings corresponds with the outside diameter and shape of the cartridge substantially as shown in Figure 9 and conforms as nearly as possible with the cartridge chamber in the breech of the rifle.

Economy of manufacture prompts utilization of two of these bushings, but one or more may be used as seems most desirable or convenient.

Threaded engagement of each of the barrels 38 with the dial 37 permits variation of the axial position relatively thereto, a screw 42 being provided to lock the barrel against movement when in any of its adjusted positions.

Rotary movement is imparted to the dial 37 from the driving shaft 13 by means of the plate 48 having a stud 49 therein, upon which is mounted a roller 50, a star wheel 51 having a plurality of radial grooves 52, and journaled upon a stud 53 in the standard 26, and a gear 55 fixed to the star wheel 51, by pins 54 or the like, the teeth of which mesh into those of a gear ring 56 fixed on the dial 37. In the periphery of the star wheel 51, between each of the notches 52, is a curved recess 57, which partially encircles the segmental collar 58 when the dial is at rest, substantially as shown in Figure 7, and locks the dial against movement about its axis. A recess 59 in one side of this collar permits the star wheel 51 to rotate about its axis when the roller 50 is in any of the notches 52 to impart rotary movement thereto. By rotating the dial about a horizontal axis, the cartridges may be positioned therein by a known and predetermined pressure and remain in such position. Thus, it is not essential to consider the action of gravity which interferes with the control of a cartridge in a vertical axis dial, and for other reasons, I have found a horizontal axis dial most efficient.

At one edge of the bed 10 is a bracket 60,

upon which the feed bracket 61 is vertically adjustable, being held in any of its adjusted positions by the bolt 62, which passes through an enlarged opening therethrough and threaded into the bracket. Adjustably secured to the top of the feed bracket 61 so as to be moved toward and away from the axis of the dial, is a chute member 63 having an inclined upper surface 64. Guide plates 65 are connected with this bracket and are turned at an angle at their inner ends so that thereunder is provided a path for cartridges to slide down the inclined face 64 at an angle to the horizontal and then before being delivered from the chute member travel in a substantially vertical path.

Screws 66 or the like, which pass through enlarged openings in the chute member 63 and threaded into the feed bracket 61, provide a convenient means for securing this chute member in any of its adjusted positions. Movably mounted within the bracket 61 is a carrier slide 67, having fixed therein, a stud 68 and a carrier block 69 with a recess 70 in its upper surface. Pivotally mounted in the underside of the carrier block 69 is a shell holder 71, having a head portion 72 at one end which supports the cartridge at the inner end and prevents premature endwise movement thereof, as well as guides the cartridge into the bushing 40. This shell holder is yieldingly held in its up position by a spring 73 fixed to a stud 74 in the shell holder 71 and to a post 75 in the carrier block 69. Reciprocatory movement is imparted to the slide 67 from the shaft 13 through the cam 76, rock lever 77 on a shaft 78 journaled in arms connected with the bracket 60 carrying a cam roll 79 that is held in contact with the periphery of the cam by a spring 80, a rod 81 encircled by a spring 85 pivotally connected to a stud 68 projecting through a swivel block 82 in the rock lever 77, held against endwise movement and adjustable therein by the nuts 83 threaded thereon.

In the outward position of the slide 67, the recess 70 is just below the open end of the chute so that the cartridges successively drop from the chute, one at a time, into this recess. In timed relation with other parts, this slide moves inwardly until the center of the recess is substantially coincident with one of the barrels 38. This inward position being limited by a stop screw 84. After the recess 70 has passed from under the chute exit, the carrier slide 67 prevents exit of the next succeeding cartridge from the chute. The inward movement of this slide is accomplished through pressure upon the spring 85 which is strong enough for this purpose but will yield when the stop screw 84 abuts against a wall of the feed bracket 61 or the slide or a connected part meets any obstruction.

Slidably mounted in the standard 20 is a rack slide 165, being held therein by the gib 89 or the like. Fixed to this rack slide is a rack 88 and a push rod 90, in the latter of which is a stud 91, on which is journaled the push lever 92, having a contact head 93 at the outer end of one arm thereof which is preferably made of leather or other soft material. This contact head 93 is operative substantially opposite the outer end of the recess 70 in the carrier block 69. A trip rod 97 is pivotally connected with the push lever 92 and through a slot 96 at the inner rounded end 98 projects the shank of a release plug 95, which shank also passes through an opening in a trip plate 94 on the rack 88. This rounded end 98 of the trip rod is held in a groove 99 in the trip plate by the spring plug 95, through the action of a spring 100, substantially as shown in Figure 5. Journaled upon a stud 86 in the standard 26 is a gear 87.

In the bracket 101 is the slide 102, which is held against lateral movement by plates 103 or the like. Reciprocatory movement is given this slide from the shaft 13 by a cam 104, rock lever 105 journaled on a stud 106 in the standard 26, having a cam roll 107 thereon, which enters the groove in the cam 104 and the other end of which is journaled on a stud 108 in the slide. Attached to this slide is a rack 109, the teeth of which mesh into those of the gear 87. Thus, a parallel reciprocatory movement is given to both of the slides 102 and 165 and the parts associated therewith.

Each cartridge, after delivery into the recess 70 of the carrier block 69, is presented in register with one of the barrels 38, is then engaged by the contact head 93 on the push lever 92 and moved axially through said recess over and guided by the shell holder 71, into the bushings 40 and 39. A premature movement of this cartridge by accidental means, or otherwise, into the dial, is impossible while the shell holder 71 is in such position that its head 72 projects above and in front of one end of the recess 70, as shown in Figure 5, and only when the same yields by reason of pressure applied thereto in the manner above described can the cartridge be moved out of the carrier block 69. If, perchance, by reason of a gross defect in the cartridge, such as indentation, nick, crushed shell or some other cause, conditions are abnormal, and it is impossible to push the cartridge to approximately the predetermined distance into the dial 37, the push lever 92 will rock upon stud 91 while tie rod 90 continues its movement. This will push the rounded end 98 of the trip rod 97 out of the groove 99 in the trip plate 94 against the tension of the spring 100 and raise the head 166 of the release plug 95 which then engages the inner end of the handle 22, which

is then released from its engagement with the stop plate 163 and the spring 25 actuates the clutch mechanism in the manner above described and brings the machine to a full stop. If, however, conditions are normal, the cartridge will be projected into the bushings the required distance, after which the rod 90 is returned to its original position, the slide 67 returned for another cartridge, and the dial is given an intermediate rotary movement so as to advance the cartridge to the next station. During this first portion of the rotation of the dial the outer end of the cartridge is brought into contact with the face of a shoe 110 on the upper end of one of the arms of the rock lever 111 (Figure 4), which shoe is so shaped that it does not contact with the primer but has a cam face thereon that gradually moves the cartridge into its exact position in the bushings. This rock lever 111 is mounted upon a stud 112 fixed in the bed 10 and moved in one direction by a weight 113 connected therewith by a rod 114. Inward position of this lever is limited by a stop rod 115 which may be adjustably secured to a fixed part in any well known manner. Thus, the cartridge is correctly positioned within the bushings 40 and 39 by an endwise yielding pressure and without shock or jar thereto, this pressure approximating that applied to the cartridge while being forced home. Thereafter, the dial, with the cartridge, moves through successive intermediate rotary paths until it is presented to the station 116, which is opposite the ejecting rod 117, connected with the slide 102. When the dial comes to rest, the ejecting rod 117 moves forwardly, engages the end of the cartridge and pushes it from the bushings 39 and 40 onto a shelf 118, from which it rolls over an inclined guide plate 119 onto a carrier 120 connected with the weighing apparatus. In Figure 8, a cartridge, designated 121, is shown, after being ejected from the dial mechanism, and just about to fall off the guide plate 119 into the carrier 120. This shelf 118 is part of a movable platform 122, which is journaled on a rod 123 in the bracket 124 adjustably mounted upon the standard 125 fixed to the bed 10. If the cartridge is normal and has met all inspection tests it travels through the successive stages and is ejected substantially in the manner above described.

Secured on the bed 10 is a slide plate 126, within which is movably mounted the inspecting slide 127. This slide derives its motion from a cam 128 upon the shaft 13 through a rock lever 129 journaled upon a stud 130 in a bracket 131, the upper end of which is connected with the slide by a link 132 and the other end of which carries a cam roll 133 that is within the groove in the cam 128.

Mounted within each pair of the companion standards 134—134 135—135, on the slide 127 is an inspection rod 136 having threadably connected therewith a guide block 137, positioned by a jamb nut 138. A spring 139 on the rod 136 between the jamb nut 138 and adjacent standard, exerts its tension so as to move the inspection rod 136 toward the dial, this movement being limited by the jamb nuts 140. To the inner end of the rod 136 is connected in any suitable manner, an inspecting point of the desired shape or design, two of such points being severally designated by the numerals 141 and 142.

Adjustably secured by bolts 144 upon each of the standards 134 is a finger plate 143. To one of these finger plates a finger 145 is hinged by a pin 146, and to the other finger plate a similar finger 147 by the pin 148. In the finger 145 is an opening 149 and in the finger 147 is a similar opening 150. Through each of these openings projects a pin 151 between the ears on the guide block 137. In each of these fingers is a pin 152 which is connected by a spring 153 with a similar pin 154 in a fixed part. In Figure 9 this pin 154 is shown as connected with the finger plate 143, so that the tendency of the spring 153 is to swing the outer end of the finger 145 upwardly, while in Figure 10 the pin 154 is connected with another fixed part so that the tendency of the spring 153 is to move the outer end of the finger 147 downwardly.

As the slide 127 moves toward the dial the inner end of each of the fingers 145 and 147, are adjacent to the lower end of the trip lever 33, and if the inspecting points 141 and 142 move to their normal predetermined position, these fingers pass under the adjacent lever without actuating the same. If, however, either inspecting point discloses abnormal conditions, then the movement of the inspecting rod 136, with which such point is connected, is stopped, while the inspecting slide 127 continues its movement. This relative movement of the rod 136 changes the position of the pin 151 in the openings 149 or 150, so that instead of being in the end of the opening, as shown in Figures 9 and 10, they are closer to the opposite end thereof. When thus positioned, the spring 153 moves the finger with which it is connected upon its pivot mounting, in the case of the finger 145 upwardly, so that the continued movement of the slide, the end thereof engages the arm 34 on the trip lever 33, and in the case of the finger 147 downwardly.

The upper corner of the end of the finger 147 travels in a path that is in a higher horizontal plane than the lower edge of the arm 34 of the trip lever in front thereof, and the inspection point 141, when conditions are normal, comes to a rest after the inner

end of the finger 147 is moved downwardly, just in time to pass under the end of the arm 34 without moving the same. If, however, the cartridge at this station does not withstand the inspection test, the point 141 does not begin to operate as quickly as under normal conditions, because it moves farther. Therefore, the end of the finger 147 is not moved downwardly as quickly and does not get out of the path of the arm 34 of the trip lever 33 adjacent thereto but engages and trips it. One arm of the trip lever 33 passes through an opening 156 in a plunger 157 and the other arm 35 in one of its positions engages a collar 158 thereon. As a trip lever is actuated by a finger 145—147 it is lifted out of engagement with the collar 158 and the spring 159 moves the plunger outwardly. The outer end thereof now occupies a more advanced position than under normal conditions, and during the rotation of the dial contacts with a lug 160 on the movable platform 122 and moves the same from the position shown by full lines in Figure 8 to that shown by broken lines. As the bushings 40 and 39 containing the defective cartridge, disclosed by either of the inspecting mechanisms, arrives at station 116, the shelf 118 is lifted above the cartridge and as the same is ejected from the dial mechanism drops through the opening between the guide plate 119 and the rear of the standard 125 into a tube 162 or similar device, which conducts it to a receptacle conveniently arranged to receive it. During the next intermediate movement of the dial the plunger passes beyond the lug 160 and the platform is returned to its former position ready to receive the next cartridge if inspection proof, but to be moved upon its pivot mounting if the cartridge is defective. The outwardly projecting plunger during the successive intermittent rotations of the dial contacts with and is returned to its inner position by the cam 47. When so returned one arm of the trip lever 33, actuated by the spring 150, drops in front of the collar 158, substantially as shown in Figure 9, and holds the plunger against outward movement until released in the manner described.

Inspection point 141 inspects for an inverted primer or a low primer, that is, one that is nearer the open end of the cartridge shell than it should be. Inspection point 142 inspects for a high primer, that is, one that is farther from the open end of the cartridge shell than it should be, and also for a high shell, that is, a cartridge shell that is not seated properly in the bushings 40 and 39. Such failure to seat properly may be due to an enlargement of the diameter of the shell through improper construction or on reloaded shells through firing, or slight bruises, dents in its walls or to other reasons rendering defective its external surface.

The machine, as above described, does not include in its functions that of inspecting the over-all length of the cartridge. If such inspection is desired, two additional inspecting mechanisms are provided, one to determine whether the cartridge is too short and the other whether too long. Such inspecting mechanism is particularly shown in Figures 11 and 12. Instead of the inspecting slide 127, above described, a slide 167, having four inspecting mechanisms mounted therein instead of two, is substituted therefor. The first two inspecting mechanisms being the same as is in the machine above set forth, and the last two, those to the right in Figure 11, are for the over-all inspection, which operate substantially the same as the other inspecting mechanisms.

Secured to the standard 26 by one or more bolts 169 is the cam 168 and the plate 170, of fibre or the like. This cam has a rounded nose 171, against which the point of the cartridge rides during the rotation of the carrier, and thereby moves the cartridge a limited distance within the bushings 39 and 40, and into the path of the inspection point 172.

The operation of the inspecting mechanism for short over-all lengths, which is the first over-all station where inspection is made, is as shown in Figure 12, and its operation in connection with the trip mechanism is the same as for that of the inverted primer inspection mechanism, above described, and as shown in Figure 10. The inspection mechanism for the long over-all length is the same as for the high primer inspection mechanism, as shown in Figure 9.

I have illustrated in Figure 12 means for obtaining a fine adjustment of the fingers 145 and 147, which comprises a plate 173 secured to a standard 134, by the screws 174, and through which is threaded a screw 175, which abuts against the end of the finger plate 143 and a screw 176, which rotates freely in the plate 173 and is threaded into the finger plate 143. By manipulation of these screws 175 and 176, the finger plate 143, and the finger attached thereto, can be given a very fine adjustment toward and away from the carrier.

There are minor changes and alterations that may be made within my invention, aside from those herein suggested, and I would therefore have it understood, that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a

cartridge in one of the openings in the dial at one station wherein they are held against disengagement by centrifugal force; independently actuated means movable toward and away from the dial in a path substantially parallel with the axis of the cartridge for automatically testing the cartridge at one or more of the stops between said intermittent movements; means, independent of the dial, for successively ejecting in said substantially parallel path, all of the cartridges from the dial at another station irrespective of the result of said tests; and means for receiving the ejected cartridges.

2. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for automatically placing a cartridge in one of the openings in the dial at one station; means, independent of the dial, for successively ejecting all of the cartridges at another station; and means movable toward and away from the dial for automatically testing the cartridge at an intermediate station to determine if the primer therein is too high.

3. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for automatically placing a cartridge in one of the openings in the dial at one station; means independent of the dial for successively ejecting the cartridges at another station; and means movable toward and away from the dial for automatically testing the cartridge at an intermediate station to determine if the primer therein is too low.

4. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for automatically placing a cartridge in one of the openings in the dial at one station; means independent of the dial for successively ejecting the cartridges at another station; and means movable toward and away from the dial for automatically testing the cartridge at an intermediate station to determine if the shell therein is too high.

5. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for automatically placing a cartridge in one of the openings in the dial at one station; means independent of the dial for successively ejecting the cartridges at another station; and means movable toward and away from the dial for automatically testing the cartridge at an intermediate station to determine if the primer therein is either too high or too low or if the shell is too high.

6. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; means for automatically placing a cartridge in one of the openings in the dial at one station; slip joint means for automatically stopping the rotation of the dial if such cartridge is not placed in a predetermined position in the dial.

7. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a reciprocating member for automatically placing a cartridge in one of the openings in the dial; and slip joint means connected with the reciprocating member for stopping the rotation of the dial if the cartridge is not placed in a predetermined position in the dial.

8. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; a movable carrier for conveying a cartridge from the chute to a station wherein the axis thereof will be substantially coincident with the axis of an opening in the dial; and a reciprocating member for transferring the cartridge from the carrier into said opening.

9. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; a movable carrier for conveying a cartridge from the chute to a station wherein the axis thereof will be substantially coincident with the axis of an opening in the dial; a reciprocating member for transferring the cartridge from the carrier into said opening; and slip joint means connected with the reciprocating member for stopping the rotation of the dial if the cartridge is not placed in a predetermined position in the dial.

10. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; a carrier for conveying a cartridge from the chute to a station wherein the axis thereof will be substantially coincident with the axis of an opening in the dial; a reciprocating member for transferring the cartridge from the carrier into said opening; and means connected with this reciprocating member for stopping the rotation of the dial if the cartridge is not placed in a predetermined position in the dial, comprising a rock member journaled upon and having a slip joint connection with the reciprocating member.

11. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; a carrier for conveying a cartridge from the chute to a station wherein the axis thereof will be substantially coincident with the axis of an opening in the dial; a reciprocating member for transferring the cartridge from the car-

rier into said opening; means connected with this reciprocating member for stopping the rotation of the dial if the cartridge is not placed in a predetermined position in the dial, comprising a rock member journaled upon and having a slip joint connection with the reciprocating member; a shaft; a clutch for a make and break connection therewith; means for positively actuating the reciprocating member from the shaft; and a clutch lever for actuating the clutch in the path of the slip joint connection.

12. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; a carrier for conveying a cartridge from the chute to a station wherein the axis thereof will be substantially coincident with the axis of an opening in the dial; a reciprocating member for transferring the cartridge from the carrier into said opening; means connected with this reciprocating member for stopping the rotation of the dial if the cartridge is not placed in a predetermined position in the dial, comprising a rock member journaled upon and having a slip joint connection with the reciprocating member; a shaft; a clutch for a make and break connection therewith; means for positively actuating the reciprocating member from the shaft; a clutch lever for actuating the clutch in the path of the slip joint connection, said slip joint connection comprising a release member; a trip rod joined to the rock lever and engaging the release member; and yielding means for holding the free end of the trip rod in a detent in the reciprocating member.

13. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; a carrier for conveying a cartridge from the chute to a station wherein the axis thereof will be substantially coincident with the axis of an opening in the dial; a reciprocating member for transferring the cartridge from the carrier into said opening; means connected with this reciprocating member for stopping the rotation of the dial if the cartridge is not placed in a predetermined position in the dial, comprising a rock member journaled upon and having a slip joint connection with the reciprocating member; a shaft; a clutch for a make and break connection therewith; means for positively actuating the reciprocating member from the shaft; a clutch lever for actuating the clutch in the path of the slip joint connection, said slip joint connection comprising a release member; a trip rod joined to the rock lever and engaging the release member; yielding means for holding the free end of the trip rod in a detent in the reciprocating member; and means for holding the clutch lever in such position that the clutch will transmit motion to the shaft but will be disengaged from its holding means by the release member if the cartridge is not placed in a predetermined position on the dial whereby the clutch will be actuated and stop rotation of the shaft.

14. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; means for placing a cartridge in one of the openings in the dial at one station; a part having an opening therein opposite another station; a movable member forming a closure for said opening and a support for a cartridge thereon; means for ejecting a cartridge from the dial onto the movable member; and means for testing the cartridge at one or more intermediate stations.

15. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; means for automatically placing a cartridge in one of the openings in the dial at one station; a part having an opening therein opposite another station; a movable member forming a closure for said opening and a support for a cartridge thereon; means for ejecting a cartridge from the dial onto the movable member; means for testing the cartridge at one or more intermediate stations; and means actuated by the testing mechanism for causing the movable member to travel out of the path of the cartridge as it is ejected from the dial and uncover said opening if the same has failed to meet any one of the testing operations.

16. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; means for automatically placing a cartridge in one of the openings in the dial at one station; a part having an opening therein opposite another station; a movable member forming a closure for said opening and a support for a cartridge thereon; means for ejecting a cartridge from the dial onto the movable member; means for testing the cartridge at one or more intermediate stations; and means actuated by the testing means for moving the movable member out of the path of the cartridge as it is ejected from the dial and uncover said opening if the same has failed to meet any one of the testing operations, said means comprising a member connected with the dial, trip means for holding the member in one of its positions, an inspecting point, and a finger associated with

the inspecting point that engages the trip means if the cartridge does not withstand the testing operations, and actuates the movable member.

17. In an apparatus of the character described; a dial having openings therein and an intermittent rotary movement; a chute, the delivery end of which is adjacent to one of the openings in the dial when at rest; means for automatically placing a cartridge in one of the openings in the dial at one station; a part having an opening therein opposite another station; a movable member forming a closure for said opening and a support for a cartridge thereon; means for ejecting the cartridge from the dial onto the movable member; means for testing the cartridge at one or more stations; and means actuated by the testing means for causing the movable member to travel out of the path of the cartridge as it is ejected from the dial and uncover said opening if the same has failed to meet any one of the testing operations, said means comprising a member connected with the dial, trip means for holding the member in one of its positions, an inspecting point, and a finger associated with the inspecting point that engages the trip means if the cartridge does not withstand the testing operation and actuates the last named member which is thereupon projected into the path of the movable member and engages the same during its rotation.

18. In an apparatus of the character described; a dial having an intermittent rotary movement and a plurality of cartridge openings therein substantially parallel with its axis; means for placing cartridges successively into each of these openings at one station; means for automatically ejecting the same at another station; means for testing the cartridge at one or more intermediate stations; a part having an opening therein opposite another station where the cartridge is ejected from the dial; a movable member forming a closure for said opening and a support for a cartridge thereon; and means, the movement of which is initiated by the testing mechanism for causing the movable member to travel out of the path of the ejected cartridge and uncover said opening if the same has failed to meet any one of the testing operations.

19. In an apparatus of the character described, the combination with a rotary dial having a plurality of openings therein; a plunger in the dial adjacent to each of the openings; a trip lever connected with the dial and holding the plunger in its retracted position within the dial; a reciprocating slide having a finger movably mounted thereon, which in one of its positions engages and releases the trip lever; a member independent of the dial; and means for moving the plunger, when released, into the path of said member and by its engagement therewith imparts movement thereto.

20. In an apparatus of the character described; means for presenting and supporting an article at a testing station; means for testing such article while held rigidly at such station, comprising a slide movable toward and away from the article when positioned as aforesaid, a rod connected with the slide which before the completion of the stroke of the slide will engage the article if it is not in the position it should occupy at said station to pass the test, and by reason of such engagement derives an independent movement on the slide, a finger on the slide, and a connection between the rod and finger whereby the movement of the former will actuate the latter; and a trip mechanism, independent of the slide and adjacent to the article, in the path of movement of the finger, said trip mechanism being movable with the article after it has passed said station and in part determining the movement of such of the articles as have not passed the test and after they have been released from the supporting means.

21. In an apparatus of the character described; an intermittently rotated dial having openings therein; means for automatically placing a cartridge in one of the openings in the dial at one station; means engaging the cartridge at another station for applying yielding pressure thereto; means for ejecting the cartridge at another station; and means comprising in part an independently and positively actuated member movable toward and away from the cartridge for testing the cartridge at one or more intermediate stations.

22. In an apparatus of the character described; an intermittently rotated dial having openings therein; means for automatically placing a cartridge in one of the openings in the dial at one station; means engaging the cartridge at another station for applying yielding pressure thereto; means for ejecting the cartridge at another station; means comprising in part an independently and positively actuated member movable toward and away from the cartridge for testing the cartridge at one or more intermediate stations; said pressure means comprising a lever, one arm of which is in the path of movement of the end of the cartridge; and a weight connected with another arm of the lever, whereby a pressure is applied to the cartridge that substantially corresponds with the pressure applied thereto when the cartridge is pushed into the breech of a gun.

23. In combination with an intermittently rotatable dial having a plurality of openings therein of substantially the same size and shape as the exterior of a cartridge; a plunger mounted in the dial adjacent to each of

the openings and out of the path of the cartridge; means for holding each of the plungers in their retracted positions; means for testing a cartridge in one of the openings; and means, the movement of which is initiated by the testing means, to actuate the holding means and thereby release the plunger, if the cartridge in the adjacent opening does not meet the testing requirements.

24. In combination with a rotary dial having a plurality of cartridge openings therein; a plunger mounted in the dial adjacent to each of the openings and out of the path of the cartridge; a trip mechanism to hold the plunger in its retracted position; a slide movable toward and away from the dial; an inspecting rod movable thereon; a finger connected with the slide and movable relatively thereto; an operative connection between the finger and inspection rod, whereby movement of the inspection rod within the slide will permit the finger to be moved into the path of and actuate the trip mechanism, thereby releasing the plunger.

25. In an apparatus of the character described; a dial having openings therein; means for imparting movement to the dial; means for automatically placing a cartridge in one of the openings in the dial at one station; means for successively ejecting the cartridges at another station; means for testing the cartridge at one or more intermediate stations; a trip device associated with the dial and movable therewith; a movable member to receive such cartridges, ejected from the dial, as have passed the test, said member being in the path of the trip device and actuated thereby if the ejected cartridge has failed to pass the test, whereby the member is moved out of the path of such ejected cartridges as have not passed the test, and thereby separate those cartridges that have passed the test from those that have not.

26. In combination with a dial; of a plurality of bushings secured therein, each of the bushings having an opening therein of substantially the same size and shape as the outside of a cartridge shell; means for testing a cartridge while in one of the bushings; a movable member; means for ejecting the cartridge from the bushing at a single predetermined station; a movable member to receive the cartridge at such station if the same has successfully passed the test; and means for actuating the movable member so that it will be out of the path of the ejected cartridge if it has not passed the said test.

27. In combination with a dial; of a plurality of barrels fixed in the dial with their axes substantially parallel with the axis of the dial; a bushing secured within each of the barrels against movement and having an opening therein substantially the same size and shape as the outside of a cartridge shell; means for testing a cartridge while in one of the bushings; means for ejecting the cartridge from the bushing at a single predetermined station; a movable member to receive the cartridge at such station if the same has successfully passed the test; and means for actuating the movable member so that it will be out of the path of the ejected cartridge if it has not passed the said test.

28. The combination with an intermittently movable dial having cartridge receiving openings therein; of a movable member adjacent to each of the openings; means independent of the dial for successively testing the cartridges in each of the openings, said means initiating the movement of the movable member if the cartridge adjacent thereto has failed in such test; means for ejecting the cartridge from the dial; and a platform to receive such ejected cartridge, said platform being out of the path of such ejected cartridge if the cartridge has failed to pass the test.

29. In an apparatus of the character described; a dial having openings therein; means for automatically placing a cartridge in one of the openings in the dial at one station; means for ejecting them successively at another station; means for testing the cartridge at one or more intermediate stations; a movable member to receive the cartridge at such station if the same has successfully passed the test; and means for actuating the movable member so that it will be out of the path of the ejected cartridge and such cartridges as have not successfully passed the test may be segregated from those that have.

30. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; and means for testing a cartridge between said stations to determine if the same is of a predetermined length; said means including a part, the position of which is changed by a cartridge of incorrect length, and so remains until the cartridge is ejected when it is automatically returned to its former position.

31. In an apparatus of the character described; a dial having openings therein; means for automatically placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; means for inspecting the cartridge at one or more intermediate stations; means for controlling the movement of the cartridge after it has been ejected from the dial so that such cartridges as have not met the inspection test may be segregated from those that have, said latter means comprising in part a standard, a plate fixed thereto with an opening therebetween and an adjacent

wall of the standard, and a platform covering the last mentioned opening, and with the said plate forming a shelf; and means controlled by the inspecting mechanism for moving the platform to uncover the opening.

32. In an apparatus of the character described; a dial having openings therein; means for automatically placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; means for inspecting the cartridge at one of more intermediate stations; means for controlling the movement of the cartridge after it has been ejected from the dial so that such cartridges as have not met the inspection test may be segregated from those that have, said latter means comprising in part a standard, a plate fixed thereto with an opening therebetween and an adjacent wall of the standard, and a platform covering the last mentioned opening, and with the said plate forming a shelf; and means controlled by the inspecting mechanism for moving the platform to uncover the opening, the said shelf being in an inclined plane, whereby a cartridge on the platform will roll by gravity over the said plate to the outer edge thereof.

33. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; and means, as a reciprocating inspection point, movable toward and away from the cartridge for inspecting the cartridge at an intermediate station to determine if the same is shorter than a predetermined length.

34. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; and means, as a reciprocating inspection point, movable toward and away from the cartridge for inspecting the cartridge at an intermediate station to determine if the same is longer than a predetermined length.

35. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; and means for inspecting a cartridge at an intermediate station to determine if the same is a predetermined length, comprising in part a reciprocating inspection point movable toward and away from the cartridge, and a member for moving the cartridge lengthwise in the dial.

36. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a cartridge in one of the openings in the dial at one station; and means for testing a cartridge at an intermediate station to determine if the same is a predetermined length, comprising in part a cam member for moving the cartridge lengthwise in the dial and an inspection point movable toward and away from the cartridge upon that side thereof opposite to the cam.

37. In an apparatus of the character described; a dial having openings therein and intermittently rotated; means for placing a cartridge in one of the openings in the dial at one station; means for ejecting the same at another station; and means for testing a cartridge at an intermediate station to determine if the same is a predetermined length, comprising in part a fixed cam in the path of movement of the cartridge near one end of the cartridge to move the cartridge within the dial a limited distance, a reciprocating inspection point movable toward and away from the opposite end of the cartridge and trip mechanism actuated by the relative position of the inspection point, if the cartridge does not meet the required test.

In testimony whereof, I have hereunto affixed my signature.

JESSE B. BURTON.