

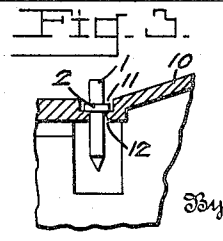
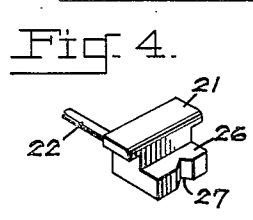
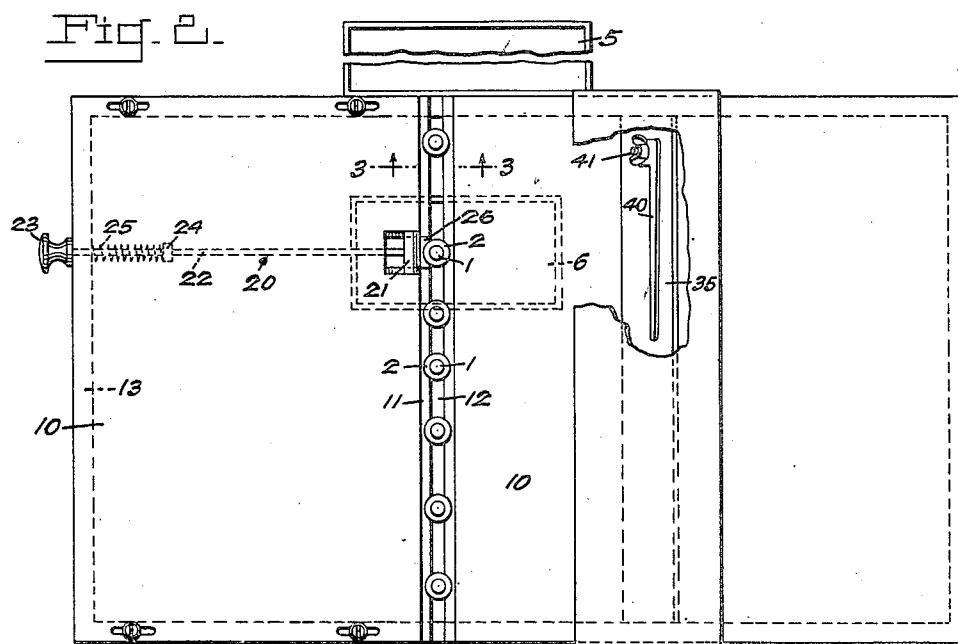
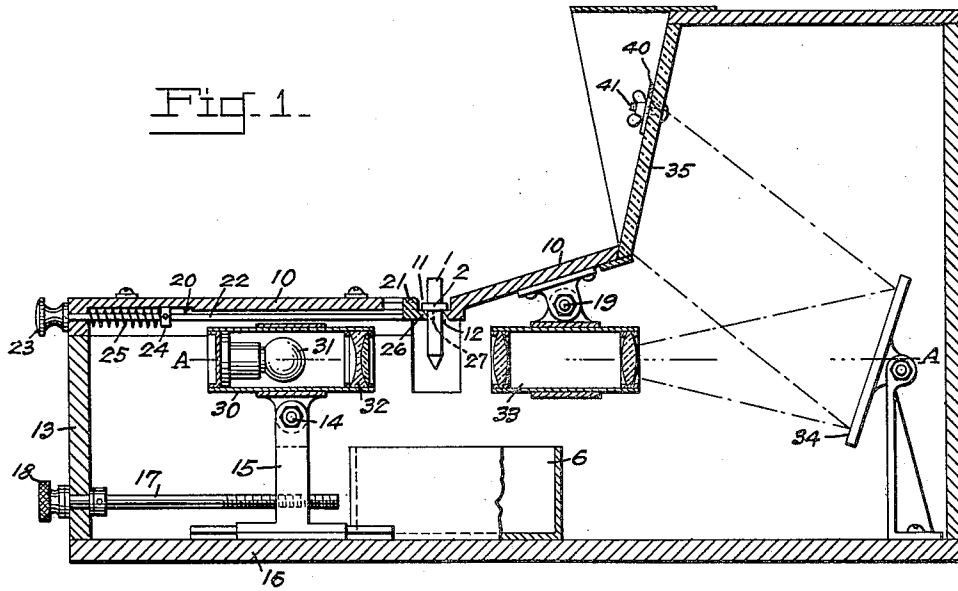
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L. MEISTER

2,340,893

INSTRUMENT FOR FIRING PIN INSPECTION

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INSTRUMENT FOR FIRING PIN INSPECTION

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Application December 1, 1942, Serial No. 467,544

5 Claims. (Cl. 88—24)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to apparatus for inspecting and testing firing pins in the course of their production preparatory to being placed in the explosive shell or projectile, and more particularly, to the type of firing pin provided with a collar. The object of this invention is to devise apparatus for inspecting firing pins of the type described, more particularly, to inspect such pins with reference to the dimension between the conical point of the pin and the underside surface of its collar. It is of prime importance to the satisfactory performance of the firing pin that this dimension be maintained within close tolerance of standard. A further object of this invention is to provide an inspection apparatus of the character described which will be capable of high accuracy, simple to manipulate, of large productive capacity, and adapted to be readily adjusted to accommodate different kinds and sizes of firing pins.

For the attainment of these and such other objects of inventions as may herein appear or be pointed out, I have shown one embodiment of my invention in the accompanying drawing, wherein:

Fig. 1 is a side, sectional elevation of the machine.

Fig. 2 is a plan view thereof.

Fig. 3 is a partial sectional view taken on the line 3—3 of Fig. 2, and

Fig. 4 is an isometric view of the finger block of the rejecting manual.

The top surface 10 of the apparatus is provided with a long grooved passage 11 extending along the length thereof of sufficient width to accommodate the collar 2 of firing pins 1 and provided along its bottom with a long slotted passage 12; both the groove 11 and slot 12 are open at both ends of apparatus table 10, so that the firing pins may be inserted at one end (the end lowermost on the sheet, Fig. 2) and removed, at least, the ones passing inspection, at the other end (the end uppermost on the sheet, Fig. 2). Fresh pins, inserted as described, are moved along the grooved (11) slot 12 to be singly received in a rejecting manual 20, more particularly, in the finger 21 thereof. Rejecting finger or block 21 is secured to one end of a rod 22, the other end of which extends through the front wall 13 of the machine where it terminates in a knob 23. A collar 24 is fastened on rod 22; compression

spring 25 interposed between collar 24 and machine wall 13 normally maintains finger block 21 in its rightmost position (as viewed in Figs. 1 and 2).

Finger block 21 is provided with a ledge 26 which is flush with the top surface of the slotted (12) bottom of groove 11. In the rightmost, normal position of finger block 21, its ledge 26 is spaced from the opposite side of slot 12 a distance equal to the width of the slotted passage 12. Hence in the normal, right most position of rejector manual 20, particularly, its finger ledge 26, the ledge will provide a surface to support the collar 2 of firing pins 1 as they are moved up (as viewed in Fig. 2) to the rejector manual. For the purpose of aligning the single pins precisely on the center line of the rejector manual (rod 20) and for holding the pin thereat, the finger ledge 26 is provided with a V-shaped notch 27, see Fig. 4. The compression spring 25 together with notch 27 cooperate as a detent to accurately position the individual pin as it is moved to the rejector manual 20.

A firing pin, properly positioned at, and held by, the rejector manual 20 as shown in Fig. 1, has its conical (lower) point substantially in the center line A—A of an optical system now to be described. An incandescent lamp 31 and condenser lenses 32 are contained in a collimating tube 30, the centers of the lamp, condenser and tube being substantially on the said optical center line A—A. Collimating tube 30 is supported, preferably by the adjustable pivot connection 14, at the upper end of a standard 15 resting on the floor 16 of the machine for an extent of sliding movement. Rod 17, screwed into standard 15, may be turned, as by its knob 18 at the front of the machine, to adjust the position of the collimating tube relative to the suspended pin 1, Fig. 1.

Light from the collimating tube 30 is directed to flood the suspended pin (1) held in position at the rejector manual, and to pass through a lens tube 33 containing one or more enlarging lenses. As clearly shown in Fig. 1, lens tube 33 is suspended as by means of a pivot connection 19 from the top surface 10 of the apparatus. The enlarged image or shadow of the firing pin under inspection, emerging from lens tube 33, is directed to mirror or reflecting surface 34, from which it is reflected onto ground glass screen 35 set in the front panel of the apparatus. Reflector 34 is mounted, as by a pivot connection, Fig. 1, for adjustment to reflect the enlarged pin shadow upon the ground glass 35.

The enlarged shadow of a firing pin held at (and by) rejector manual 20, is observed in ground glass 35, to determine whether the aforementioned dimension between its conical point and its collar 2 is accurate within the prescribed tolerances. To make this determination precisely, a gauge 40 (see especially Fig. 2) is pivotally mounted, as by wing screw 41, on ground glass 35. Gauge 40 is made adjustable to accommodate different lengths or types of firing pins.

If the enlarged pin shadow on the ground glass screen is of the proper height (as determined by gauge 40), the pin under observation is continued along the slotted passage 12 to emerge from the uppermost end (as viewed in the sheet, Fig. 2) of the slotted passage for deposit in a box or container 5 reserved for pins which had passed the inspection test. If the pin shadow is above or below the gauge 40, rejector manual 20 is pulled outwardly, to withdraw ledge 26 from underlying relation to pin collar 2, thus causing the rejected pin to fall through slot 12 for deposit in discard or reject box 6.

In the operation of the apparatus, the operator uses both hands, one hand for pushing the fresh firing pins to the rejector manual 20 and for pushing the good pins beyond the rejector manual and into the collecting box 5; the other hand is held on the knob 23 of the rejector manual ready to pull out the manual whenever an unsatisfactory pin is encountered, to drop the pin into discard box 6. The firing pins may be conveniently and rapidly assembled in the grooved passage 10 by being placed on the sloped top surface 10, see Fig. 1, and permitted to roll down to seat themselves in the grooved passage.

I claim:

1. In apparatus for inspecting firing pins of the type provided with a collar with reference to the dimension between its point and the underside of its collar, a table surface provided with a passage sufficiently wide for the pins to clear and grooved to accommodate their collars, the said grooved passage being open at both ends of the said table for receiving fresh pins at one end and for removing approved pins at the other end, a recess in one side of the said grooved passage and enlarged at one point sufficiently wide for the firing pin collar to drop through, a block disposed in the said recess and rabbetted to conform to the said groove and to present a ledge spaced from the opposite edge of the said passage a sufficient distance for pin clearance, a rod extending from the said block to an accessible point at the front of the apparatus and terminating in a knob, spring means urging the said block rearwardly to position its ledge in supporting relation to the pin collars, whereby in the normal position of the said block the firing pins in being moved along the said grooved passage will pass the enlarged point, a V-notch provided in the said block ledge for centering the pins, an optical system including a light source, an enlarging objective, a condenser for collimating light beams past the suspended point of a firing pin held at the said enlarged point of the grooved passage into the said objective, a reflecting surface positioned in said light beam and a ground glass screen to receive an enlarged image of the pin, a gauge associated with the said screen for measuring the said inspected dimension on the enlarged image, and a box underlying the said grooved passage at its said enlarged point for receiving disapproved pins falling through the said enlargement upon pulling the knob of the

said block according to the inspected dimension as shown by the said gauge.

2. In apparatus for inspecting firing pins of the type provided with a collar with reference to the dimension between its point and the underside of its collar, a table surface provided with a passage sufficiently wide for the pins to clear and grooved to accommodate their collars, the said grooved passage being open at both ends of the said table for receiving fresh pins at one end and for removing approved pins at the other end, a recess in one side of the said grooved passage and enlarged at one point sufficiently wide for the firing pin collar to drop through, a block disposed in the said recess and rabbetted to conform to the said groove and to present a ledge spaced from the opposite edge of the said passage a sufficient distance for pin clearance, a rod extending from the said block to an accessible point at the front of the apparatus and terminating in a knob, spring means urging the said block rearwardly to position its ledge in supporting relation to the pin collars, whereby in the normal position of the said block the firing pins in being moved along the said grooved passage will pass the enlarged point, an optical system including a light source, an enlarging objective, a condenser for collimating light beams past the suspended point of a firing pin held at the said enlarged point of the passage into the said objective, a reflecting surface positioned in said light beam and a ground glass screen to receive an enlarged image of the pin, and a gauge associated with the said screen for measuring the said inspected dimension on the enlarged image.

3. In apparatus for inspecting firing pins of the type provided with a collar with reference to the dimension between its point and the underside of its collar, a table surface provided with a passage sufficiently wide for the pins to clear but not for their collars, the said passage being open at both ends of the said table for receiving fresh pins at one end and for removing approved pins at the other end, a recess in one side of the said passage and enlarged at one point sufficiently wide for the firing pin collar to drop through, a block disposed in the said recess and normally spaced from the opposite edge of the said passage a sufficient distance for pin clearance, a rod extending from the said block to an accessible point at the front of the apparatus and terminating in a knob, spring means urging the said block rearwardly to position its ledge in supporting relation to the pin collars, whereby in the normal position of the said block the firing pins in being moved along the said passage will pass the enlarged point, an optical system including a light source, an enlarging objective, a condenser for collimating light beams past the suspended point of a firing pin held at the said enlarged point of the passage into the said objective, a reflecting surface positioned in said light beam and a ground glass screen to receive an enlarged image of the pin, a gauge associated with the said screen for measuring the said inspected dimension on the enlarged image, and a box underlying the said passage at its said enlarged point for receiving disapproved pins falling through the said enlargement upon pulling the knob of the said block according to the inspected dimension as shown by the said gauge.

4. In apparatus for inspecting firing pins of the type provided with a collar with reference to

the dimension between its point and the under-
 side of its collar, a table surface provided with
 a passage sufficiently wide for the pins to clear
 but not for their collars, the said passage being
 open at both ends of the said table for receiv-
 ing fresh pins at one end and for removing
 approved pins at the other end, a recess in one
 side of the said passage and enlarged at one
 point sufficiently wide for the firing pin collar
 to drop through, a slidable block disposed in the
 said recess and normally spaced from the oppo-
 site edge of the said passage a sufficient distance
 for pin clearance, whereby in the normal position
 of the said block the firing pins in being moved
 along the said passage will pass the enlarged
 point, means for retracting said block, an optical
 system including a light source, an enlarging ob-
 jective, a condenser for collimating light beams
 past the suspended point of a firing pin held at
 the said enlarged point of the passage into the
 said objective, and a ground glass screen to re-
 ceive an enlarged image of the pin, a gauge asso-
 ciated with the said screen for measuring the said
 inspected dimension on the enlarged image, a box
 underlying the said grooved passage at its said
 enlarged point for receiving disapproved pins, and
 manual means for withdrawing the said block to
 cause a disapproved pin to drop through the said
 passage into the said box.

the type provided with a collar with reference to
 the dimension between its point and the under-
 side of its collar, a table surface provided with
 a passage sufficiently wide for the pins to clear,
 the said passage being open at both ends of the
 said table for receiving fresh pins at one end and
 for removing approved pins at the other end, a
 recess in one side of the said passage and enlarged
 at one point sufficiently wide for the firing pin
 collar to drop through, a slidable block disposed
 in the said recess and normally spaced from the
 opposite edge of the said passage a sufficient dis-
 tance for pin clearance, whereby in the normal
 position of the said block the firing pins in being
 moved along the said passage will pass the en-
 larged point, means for retracting said block, an
 optical system including a screen, for collimat-
 ing light beams past the suspended point of a
 firing pin held at the said recessed point of the
 said passage and for casting an enlarged image
 of the pin on the said screen, a gauge associated
 with the said screen for measuring the said in-
 spected dimension on the enlarged image, and a
 box underlying the said passage at its said en-
 larged point for receiving disapproved pins fall-
 ing through the said enlargement upon with-
 drawing the said block according to the inspected
 dimension as shown by the said gauge.

5. In apparatus for inspecting firing pins of

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