Aug. 21, 1945. L. B. PETERSEN 2,383,339

INVERTED PRIMER REMOVAL DEVICE

Filed Dec. 20, 1943 2 Sheets-Sheet 1

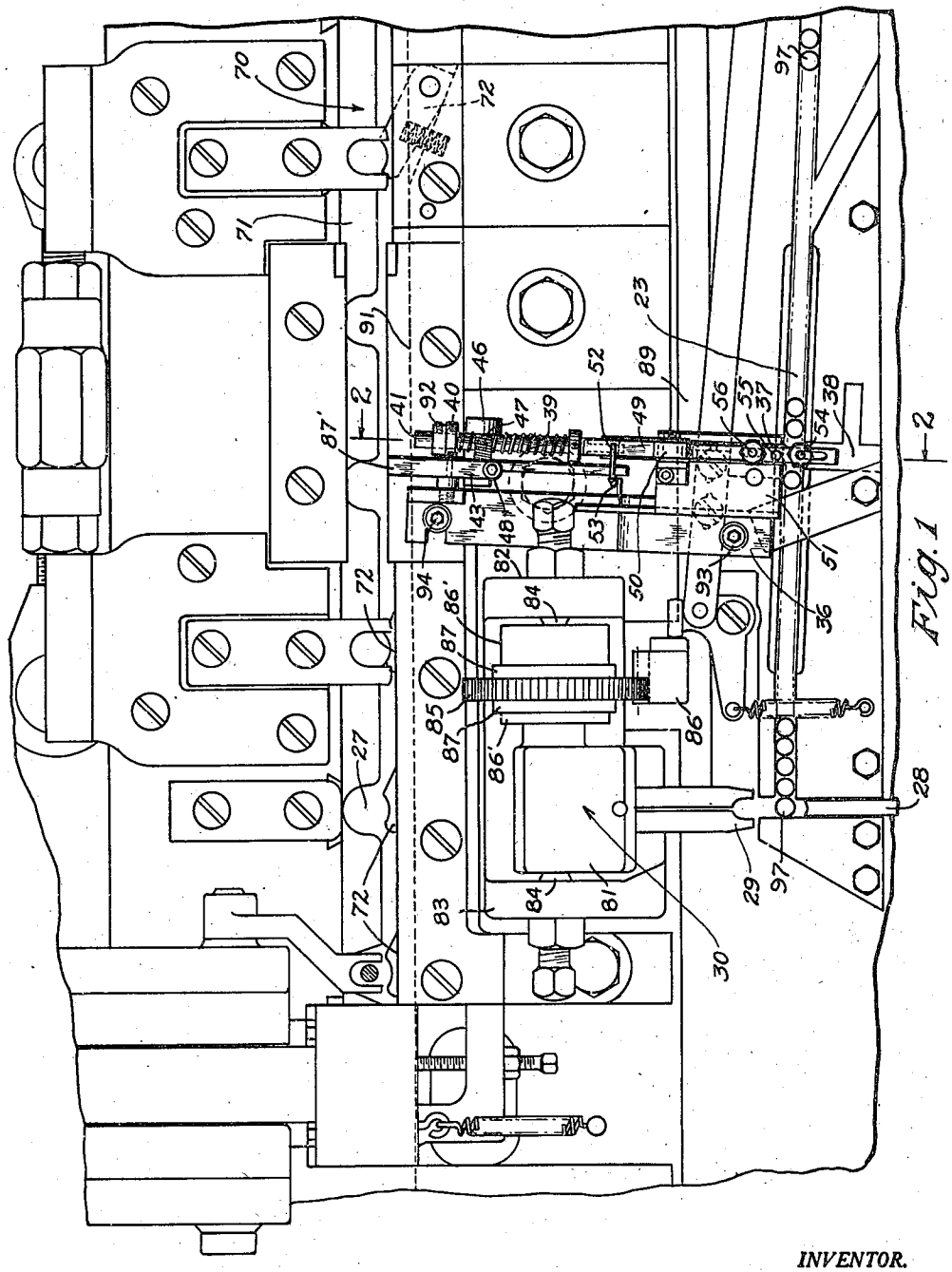


Fig. 1

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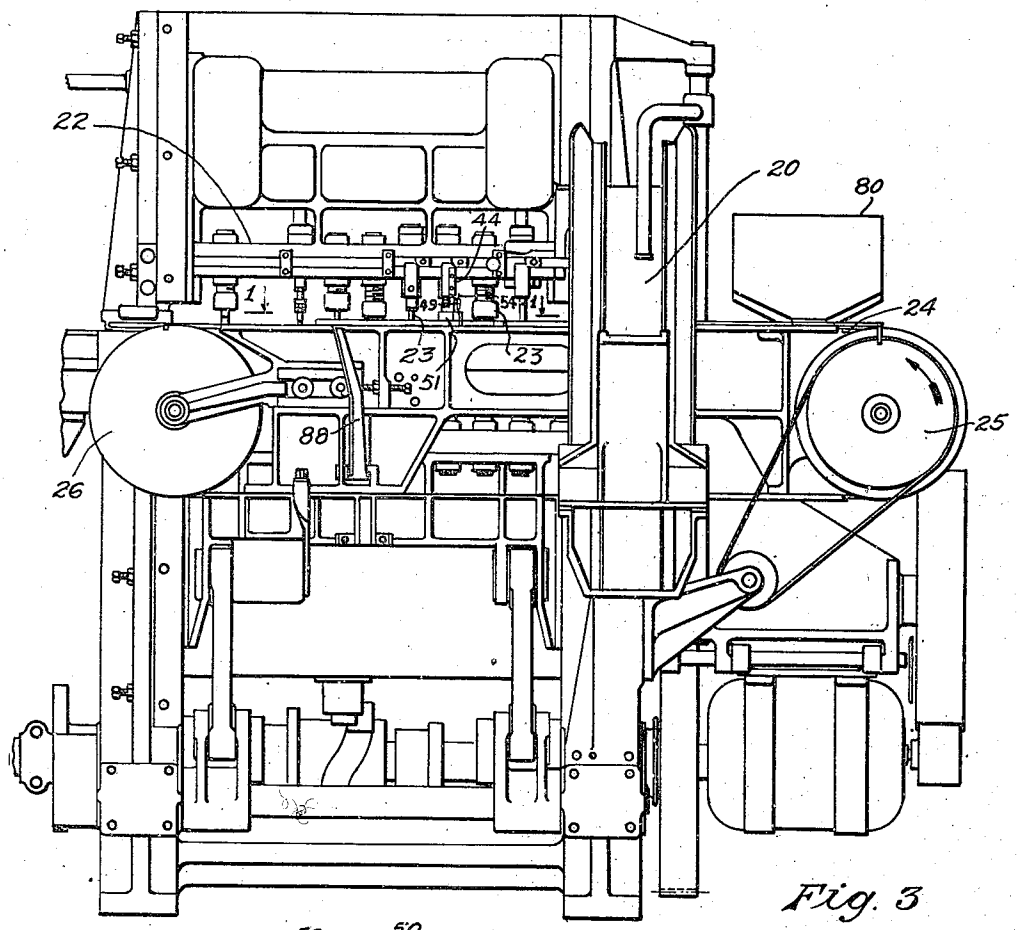


Fig. 3

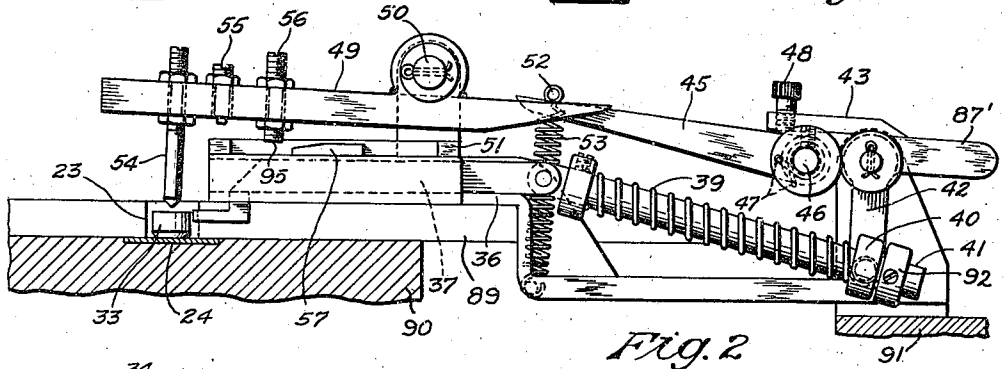


Fig. 2

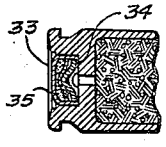


Fig. 6

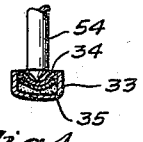


Fig. 4

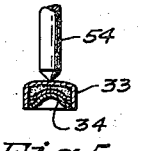


Fig. 5

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UNITED STATES PATENT OFFICE

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INVERTED PRIMER REMOVAL DEVICE

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Application December 20, 1943, Serial No. 514,886

5 Claims. (Cl. 209—88)

This invention relates to the manufacture of ammunition components, and, particularly, to a machine for assembling primers in a cartridge case.

A cartridge of the small arms variety includes a case, a primer, a projectile and propellant powder. The primer consists of a cup, primer ingredient, foil and anvil. The primer material is of a high explosive variety which is sensitive to the blow of a firing pin. One type of machine for assembling the primers and cartridge cases comprises a transfer means for moving the cartridge cases under selected tools. The primers are brought to a position where they can be transferred over the cartridge case at the aforementioned station ready for insertion therein. It is necessary that the primers be correctly aligned relative to a cartridge case so that they will be assembled in the proper relation. The present invention includes a means for removing primers which are not correctly positioned on the primer transfer mechanism. This and other objects of the invention will become apparent from the following drawings and description.

In the drawings:

Fig. 1 is a fragmentary plan view of a portion of the device taken in the direction 1—1 of Fig. 3 with the parts above the transfer table omitted.

Fig. 2 is a side elevation of a portion of Fig. 1 looking in the direction 2—2.

Fig. 3 is a fragmentary front view of one form of the machine.

Fig. 4 is a sectional view of a primer cup facing the desired direction.

Fig. 5 is a sectional view of a cup turned in the wrong direction.

Fig. 6 is a fragmentary sectional view of a cartridge case.

In Fig. 3, the frame of the machine is shown generally at 20 with an upper reciprocating gate 22 carrying tools 23. There is also a lower reciprocating gate carrying punches which cooperate with the tools of the upper gate, the lower gate not being shown inasmuch as the details thereof are immaterial. The tools can be arranged in various manners and one example is as follows:

1. Inspection for flash hole.
2. Inspection for presence of a case.
3. Punching of flash hole.
4. Second inspection for flash hole.
5. Primer insertion station.
6. Primer seating.

It is to be understod, however, that the tools do not have to follow this precise arrangement and can be chosen as desired. The inspection stations may be arranged to stop the case transfer mechanism or machine in any suitable manner. The case transfer mechanism is shown generally at 70 with a reciprocating bar 71. This bar has a reciprocatory motion in the longitudinal direction and a reciprocatory motion in direction transverse thereto giving a resultant quadrangular motion. The pivoted fingers 72 are located opposite the various stations for assisting in positioning the cartridge cases as they are transferred to said station. The cartridge cases may be fed from a hopper (not shown) or by hand to the transfer mechanism 70, the cases being held vertically, mouth downward, by an apertured member (not shown) located below the cases, in cooperation with the reciprocating transfer bar 71 having apertures 27 to grasp the cases. Spring pressed fingers 72 assist in holding and positioning the cases. The transfer bar is moved in a quadrangular motion in a well-known manner. The bar, when in the position shown in Fig. 1, after the upper and lower gates have separated to remove the upper tools and lower tools from the case, moves to the left, carrying each case to the next station, spring pressed fingers 72 yielding to allow passage of the cases. The gates then come together, holding the cases as the tools perform work thereon, at which time the bar 71 moves horizontally to the rear of the machine to clear the cases, then to the right, and then back toward the front of the machine to engage the next set of cases. The primers are fed from hopper 80 onto the belt 24, which carries the primer cups into the primer track 23, belt 24 being moved by pulleys 25 and 26.

The cartridge cases are transferred, as indicated, from station to station and the various operations performed thereon prior to assembly of a primer in the case. The primers indicated diagrammatically at 97, are fed along the groove 23 to a transfer mechanism. This mechanism carries a primer from the groove 23 to a position over a case at station 27 where a suitable punch will remove the primer from the transfer mechanism to the primer pocket of a case at this station.

It is undesirable to transfer an inverted primer from the primer conveyor feed groove 23 to a position over the primer pocket at station 27 (Fig. 1). The primers are fed by a suitable finger 28, shown fragmentarily in Fig. 1, into flipper fingers 29. Finger 28 is oscillated by lever 88, which is moved by a suitable cam (not

shown). Flipper fingers 29 are oscillated in time with the transfer mechanism by the means shown generally at 30 so as to carry a primer to a position at 27 over a primer pocket of a case located thereunder. In this oscillatory motion, the primer is inverted as it is transferred from its position in groove 23 to a position over the case. It is necessary for the primer to have the open portion of the cup face upwardly, as shown in Fig. 4, when in the primer conveyor groove. If the cup is inverted as seen in Fig. 5, it will be facing the wrong way when it arrives at 27, which is undesirable. The egress of primers from groove 23 is regulated by reciprocating finger 28.

The primer transfer means is conventional and may be seen in plan in Fig. 1. It comprises a pair of flipper fingers 29 attached to block 81, which is pivotally mounted between pointed adjustable pivots 84 which are carried by spaced upright supports 82 and 83. Gear wheel 85 is loosely mounted on the pivoted shaft extending from block 81 toward support 82. A vertically reciprocating rack 86 operates to oscillate gear 85 in timed relation to the transfer means so as to bring a primer over a cartridge case at station 27 in time for a downwardly moving punch to carry the primer from the flipper fingers into the primer pocket of a cartridge case. The gear 85 is frictionally connected to discs 86', discs 86' being connected to block 81 by friction members 87 so that gear 85 will oscillatingly drive block 81 and yet allow yielding in the event of a stoppage.

The inverted primer removal mechanism of the present invention is for the purpose of removing a primer, which is turned as shown in Fig. 5, from the groove and thus prevent transfer by the flipper fingers 29. The primer cup 33 has an anvil 34 and a suitable primer ingredient 35 therein, all of which is conventional. The frame 36 has a reciprocating primer removal pusher 37 operable to push an inverted primer out of feed groove 23 into the removal groove 38 in a manner about to be described. Frame 36 is fastened to plate 89 carried by bed 90 by bolt 93 and portion 91 by bolt 94 of the bed of the machine. Pusher 37 is reciprocable when spring 39 is compressed by collar 40 mounted on guide rod 41, 92 serving as a stop for collar 40. Collar 40 is reciprocated by arm 42 of bell crank lever 43, the end of 87' of bell crank lever 43 being contacted and oscillated by a suitable projection, or operator, such as 44 (Fig. 3) mounted on gate 21 as the gate moves up and down. Lever 43 has an arm 45 pivotally mounted thereon at 46, there being a coiled spring 47 tending to move arm 45 in a counterclockwise direction (Fig. 2) against the adjustable stop 48. The lever 49 is pivotally mounted on frame 36 at 50. Frame 36 may have a cover plate 51 mounted thereon. Lever 49 has a projection 52 or element attached thereto in some suitable manner which overlies arm 45, and has spring 53 tending to move the same downwardly. As bell crank lever 43 is oscillated by projection 44, arm 45 turns to move lever 49 in a counter-clockwise direction by raising 52 against spring 53, so that the primer detector screw 54 will contact a primer thereunder, and be limited in its movement by the position of the primer. If the primer is facing in the desired direction, as seen in Fig. 4, the point of the detector will enter and impinge on the anvil, and the lower point 95 and 56 will engage abutment 57 and prevent movement of pusher 37 under the urgence of spring 39. If the primer is turned, as shown in Fig. 5, the detector will be prevented from moving as far downwardly as when the primer is turned in the correct direction and 95 will not engage 57. A stop 55 is arranged to limit movement downwardly beyond that necessary for the device to function properly. The adjustable stud 56 is arranged to cooperate with the upstanding lug 57 on reciprocable pusher bar 37.

As a primer is fed to feeler point 54 in the correct position, the point of the feeler will enter therein and allow projection 56 to contact 57, and prevent movement of the pusher bar by spring 39, collar 40 and bell crank lever 43, to remove the primer from the feed groove. In the event a primer is inverted, as seen in Fig. 5, stud 56 will not contact lug 57 and the oscillation of bell crank lever 43 will cause pusher bar 37 to move and push an inverted primer into the removal groove 38.

What is claimed is:

1. An inverted primer removal device comprising a conveyor for primers; a feeler operable to contact primers on said conveyor at an inverted primer removal station; a pusher member for removing primers from said conveyor at said station; and means mounted directly on and actuated by said feeler to move in front of said pusher and block movement of said pusher when a primer is located in the correct direction under said feeler.

2. An inverted primer removal device comprising a conveyor for the primers; a reciprocable feeler operable to contact primers on said conveyor at an inverted primer removal station; a reciprocable pusher member for removing inverted primers from said conveyor at said station; yieldable means to operate said pusher; oscillatable means to operate said yieldable means and said feeler; and means mounted directly on and actuated by said feeler to move in front of said pusher and to block movement of said pusher when a primer is turned in the desired direction under said feeler.

3. An inverted primer removal device comprising a conveyor for the primers; a reciprocable feeler operable to contact primers on said conveyor at an inverted primer removal station; a reciprocable pusher member for removing inverted primers from said conveyor at said station; yieldable means to operate said pusher; lever means for operating said yieldable means; an arm carried by said lever for actuating said feeler; and means mounted directly on and actuated by said feeler to move in front of and block movement of said pusher when a primer is in the correct position under said feeler.

4. An inverted primer removal device comprising a conveyor for the primers; an oscillatable feeler arm operable to contact primers on said conveyor at an inverted primer removal station; a reciprocable pusher member for removing inverted primers from said conveyor at said station, said pusher being substantially aligned with said feeler; yieldable means to operate said pusher; an oscillatable lever means for actuating said yieldable means; a lever yieldably mounted on said oscillatable lever, said last mentioned lever engaging said oscillatable feeler arm for actuating the same; and means actuated by said feeler for blocking movement of said pusher by said first mentioned yieldable means when a primer is in the desired direction under said feeler.

5. An inverted primer cup removal device com-

prising a conveyor for the primers including a belt and guide track, said guide track having an aperture for inverted primer removal; an oscillatable feeler arm operable to contact primers on said conveyor at an inverted primer removal station, the feeler being adapted to enter the open end of a primer cup; a reciprocable pusher member for removing inverted primers from said conveyor at said station, said pusher being substantially aligned with said feeler; an oscillatable lever means; a spring connecting said oscillatable lever and said pusher member; an arm yieldably mounted on said oscillatable lever and operable to move said feeler arm toward primer contacting position as the spring is compressed to operate the pusher member; and means on said feeler arm to block movement of the pusher arm when the feeler enters the open end of a primer cup, said pusher operating to contact and move an inverted primer from said belt into said inverted primer removal aperture.

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