

Dec. 26, 1961

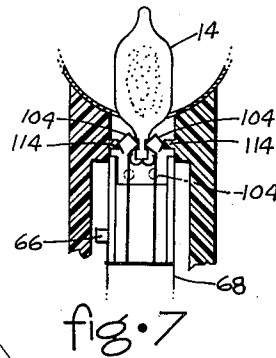
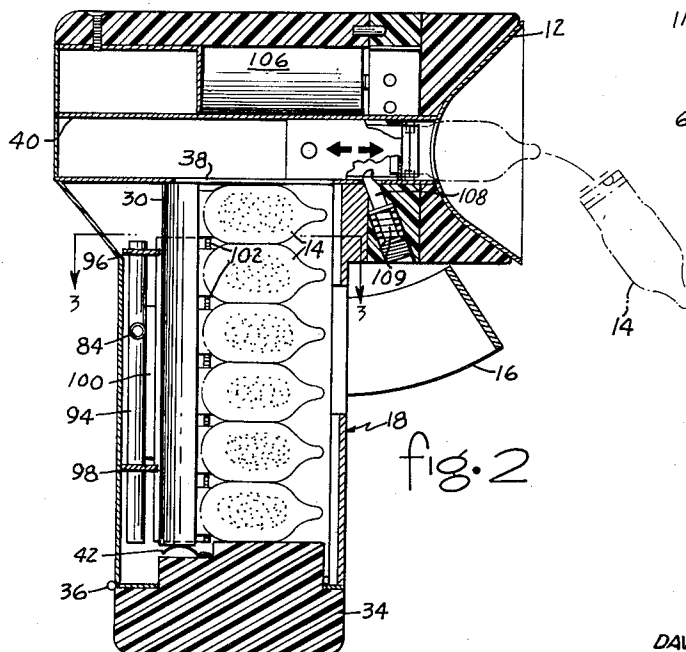
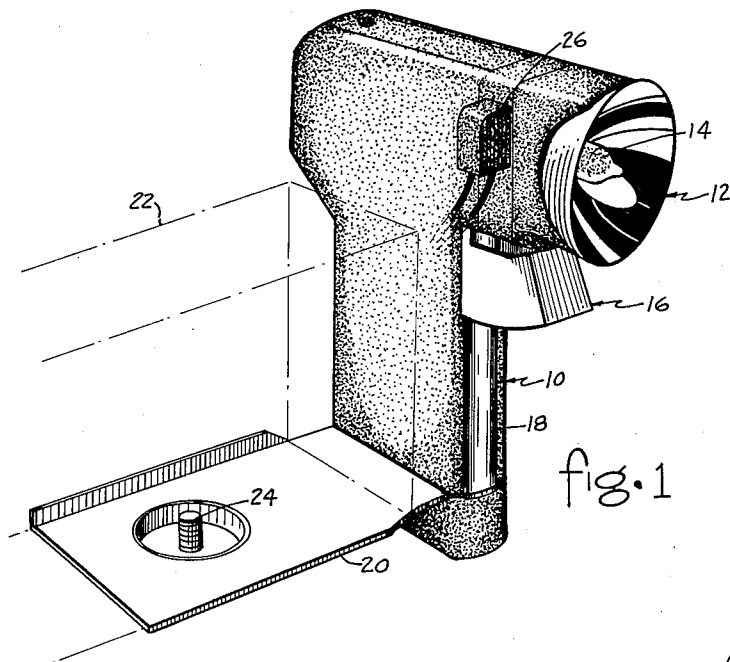
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3,015,023

TRIGGER TYPE AUTOMATIC FLASHGUN

Filed Nov. 27, 1959

2 Sheets-Sheet 1



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TRIGGER TYPE AUTOMATIC FLASHGUN

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2 Sheets-Sheet 2

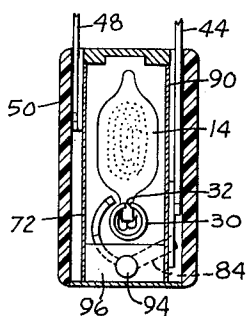


fig. 3

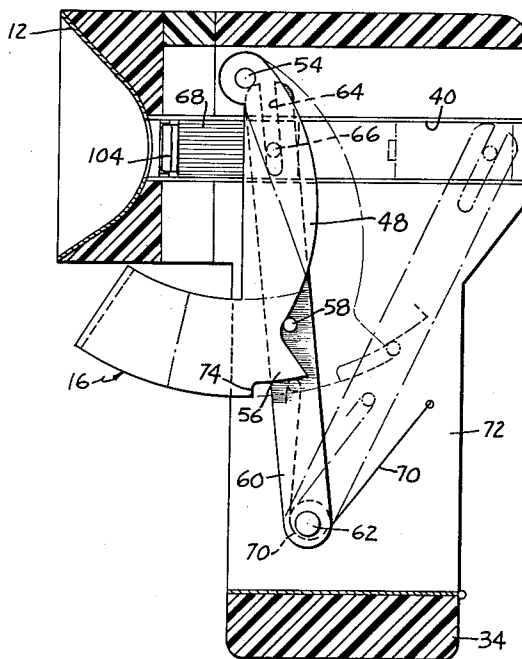


fig. 4

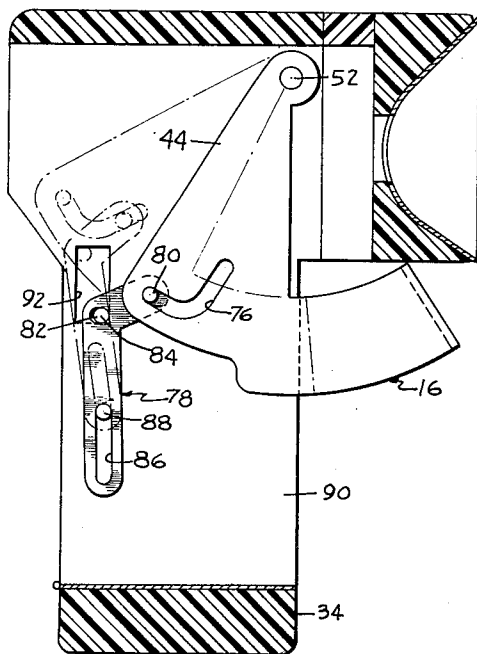


fig. 5

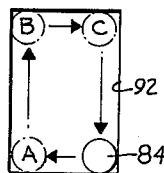


fig. 6

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1

3,015,023

TRIGGER TYPE AUTOMATIC FLASHGUN

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3 Claims. (Cl. 240—1.3)

This invention relates to photoflash lamps, often called bulbs for convenience, and to operating apparatus for such flashbulbs. In particular, it relates to flashbulb equipment in which several flashbulbs can be flashed successively without reloading, such equipment of this type being herein referred to for convenience as a flashgun.

In the usual flashgun, a bulb is inserted into a socket by hand, flashed and thereafter removed by hand or by a release trigger, and another flashbulb is inserted by hand. This is a time-consuming and awkward procedure, and can be avoided by the use of a repeating flashgun fed from a magazine into which several bulbs can be placed roughly in line and fed successively into a bulb holder, flashed and ejected.

The object of the present invention is to provide a repeating flashgun which will be especially adaptable to the use of miniature flashlamps especially those in which the bulb has a flat external press, generally of glass, at one end through which two contact prongs extend.

Such flashlamps generally have a filling of shredded metallic foil and oxygen, which react to produce a bright flash when electrically ignited. When the flashlamps are miniature in size, the shredded foil is generally of zirconium. The zirconium-foil lamps give more light per unit volume than the earlier aluminum-foil lamps, and differ from them also in another important respect: the radiation emitted by one zirconium-foil lamp will ignite or set off any other zirconium-foil lamps which are in the immediate vicinity. Because of that, the zirconium lamp cannot be flashed close to a supply of other zirconium lamps but must be flashed in a region somewhat removed therefrom. We have discovered that a distance of about one-half inch or more between the lamp to be flashed and the others is sufficient in our improved flashgun.

Accordingly, a feature of the invention is the spacing from the other lamps of the lamp to be flashed. Another feature is the placing of the contacts to insure that connection will not be made to the lamp until it is spaced sufficiently far from the other lamps to avoid flashing them by radiation.

A further object is to provide a flashgun which is more fully automatic in that it will load, fire and eject a bulb in one complete motion of a trigger action.

Still another object is to provide a more compact and efficient flashgun for use with such miniature bulbs with a positive cam action associated with the trigger means to insure unfailing operation.

Other objects, features and advantages of the invention will be apparent from the following specification, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of the flashgun, showing the arrangement whereby a suitable camera can be attached and operated simultaneously with the flashgun;

FIGURE 2 is a cross-sectional view through the flashgun showing the storing, feeding and ejection mechanism;

FIGURE 3 is a cross-sectional view taken on the line 3—3 of FIGURE 2 showing the claw feeding mechanism;

FIGURE 4 is a left-hand elevational view showing the means to reciprocate the bulb holder;

FIGURE 5 is a right-hand elevational view showing the means to activate the feed claw mechanism;

2

FIGURE 6 is a detailed enlarged view of the relief guide slot shown in FIGURE 5; and

FIGURE 7 is a detail of the bulb holder in its firing position.

Referring to FIGURE 1, the flashgun of this invention comprises a compact, pistol-sized gun 10 having a suitable reflector 12 capable of receiving flashbulbs 14 from within the gun. The gun 10 is provided with a U-shaped formed trigger 16 positioned forward of the gun handle 18, the handle 18 being a convenient size for gripping.

A bracket 20 projects from the lower part of the gun handle 18 and extends laterally away from the gun handle to provide a support for a camera 22. The camera 22, shown in phantom lines in FIGURE 1, is secured to the support bracket 20 by a screw lock 24. An insulated electrical contact plug 26 is plugged into electrical jacks 28 provided in the side of the gun 10 (see FIG. 2). The plug 26 is connected to a common flash synchronizer of any suitable type well known in the art.

A cartridge 30 containing six flashbulbs 14 is used in conjunction with this particular flashgun. The cartridge 30 comprises a tubular plastic piece, a segment of plastic material being cut from the length of the tubular piece to provide a groove 32 to receive the flashbulbs 14. The groove or slot 32 can be more clearly seen in FIGURE 3. The cartridge 30 holding the six bulbs 14 can be inserted in the flashgun 10 through a hinged bottom cover 34 pivoted on a suitable hinge 36 attached to the gun handle 18. Referring to FIGURE 2, the bulb cartridge 30 is seen in its loaded position with the top bulb 14 positioned directly below the loading breech 38 of the firing chamber 40. A leaf spring 42 is fastened to an intermediate step on the bottom cover 34 and bears against the tubular cartridge 30 to hold the cartridge rigid for operational purposes.

The trigger 16 is formed as a U-shaped member (see FIGS. 4 and 5) having two vertical arms, one arm 44 extending to the inside of the right side handle cover 46 and the other arm 48 extending to the inside of the left-hand handle cover 50. Each of the vertical arms 44 and 48 are pivoted at their upper extremity on pivot pins 52 and 54 respectively.

The right-hand vertical arm 44 is formed as a camming lever that functions to operate the feeding of the flashbulbs 14 to the firing chamber 40. The left-hand vertical arm 48 is also a camming member and utilizes the camming action to move a bulb holder 68 located in the firing chamber 40 to the loading and firing positions which will hereinafter be described.

The left-hand vertical arm 48 is provided with camming nose 56 at its lower end. The camming nose 56 is in register with a pin 58 fixed midway to a connecting link 60. The link 60 is pivoted at its lower end on a pivot stud 62, and at its upper end it is provided with a bifurcated slot 64 encompassing a pin 66 fixed to a movable bulb holder 68, slidably positioned in the firing chamber 40 of the flashgun. A wire spring 70 is wound about the pivot stud 62, one leg of the spring 70 is fixed to the link 60 while the other end of the spring 70 is fixed to the left-hand frame plate 72, urging the connecting link 60 and the bulb holder 68 to its forward limited position.

On depression of the trigger 16 to its half-way inward point of travel, shown in phantom lines in FIGURE 4, the camming nose 56 will move the bulb holder 68, by virtue of pin 58 and connecting link 60 to its most rearward position in the chamber 40. This is the loading position of the bulb holder. The bulb holder 68 is moved to its full rearward extent of travel at the half stroke depression of the trigger to insure adequate time for loading of a bulb at the loading station. The complete depression stroke of the trigger 16 will hold the

bulb holder 68 positively in its loading position. As can be seen in FIGURE 4, the pin 53 is positioned at the high point of the cam nose 56 on the half stroke. On further depression of the trigger the pin will ride on the lower part of the cam nose and will be held in its rearward position by the ledge 74 formed on the curved circumference of the trigger 16.

Referring to FIGURE 5, the right-hand vertical arm 44, that controls the feeding of the bulbs to the bulb holder 68 in firing chamber 40, has an angular slot 76 on its lower end. A bell-crank 78 has a pin 80 fixed to its upper offset arm, the pin 80 projecting into the angular slot 76 of the arm 44. The bellcrank 78 has an enlarged slot 82 at its knee, and a pin 84, smaller in diameter than the slot 82, is positioned in this slot. The lower arm of the bellcrank 78 is provided with an elongated slot 86. A stud 88 fixed to the right-hand frame plate 90 extends into the elongated slot 86 to pivot the bellcrank 78 in its movements of travel. As mentioned above the pin 84 that is guided in the enlarged slot 82 on the knee of the bellcrank 78 extends through a rectangular guide slot 92 cut in the right-hand frame plate 90. The full purpose of this pin will be described hereinafter.

With the depression of the trigger 16 as stated above, the angular slot 76 will move the bellcrank 78 guided by the pin 84 in the guide slot 92 in a rectangular motion, as viewed in FIGURE 6, which is an enlarged view of the rectangular slot 92 and the pin 84. In a full depression of trigger 16, the pin 84 in slot 82 of the bellcrank 78 will be first moved laterally to the "A" position and then up to the "B" position, the release of trigger 16 will by virtue of the angular slot 76 force the pin 84 and the bellcrank 78 to the "C" position and thereafter back to the position shown in full line in FIGURE 6. This will give a square or rectangular motion to the pin 84.

Pin 84, as seen in FIGURES 2 and 3, is fixed to a pivotal shaft 94, pivoted between two fixed brackets 96 and 98, fixed between the side plates 72 and 90. A semi-circular claw 100 extends forward from the pivotal shaft 94 to lay adjacent the spaces between the bulbs 14. The claw is provided with a series of teeth 102 adapted to fit in the spaces. As mentioned above when the trigger 16 is depressed, and the pin 84 moves in the guided slot 92 from its home position to the position marked "A" the first movement of the claw 100 will be in a clockwise direction, as viewed in FIGURE 3, positioning the teeth 102 of the claw 100 into the spaces between the bulbs 14. Thereafter with continued movement of the trigger 16 inward the pin will be lifted to the "B" position, this movement will lift the claw to its upper limited position. The claw teeth 102, being between the interdental spaces of the bulbs, will carry the bulbs a predetermined amount to place the top bulb, that is in line with the breech, into a firing chamber. As mentioned before, depression of the trigger 16 also moves the bulb carrier 68 to its rearward loading position, that shown in phantom lines in FIGURE 4. Therefore, with this arrangement a bulb 14 will be fed into the bulb holder in the full depression of the trigger.

Upon release of the trigger 16 the teeth 102 of the feed claw 100 will be first rocked back out of engagement between the teeth by virtue of the pin 84 guided in the rectangular slot 92 moving from its "B" to "C" position and then back to its home position. Simultaneously with the release of the teeth from the spaces between the bulbs 14, the cam action of trigger arm 48 will move the bulb holder 68 holding a bulb to its forward firing position where the bulb 14 is at the focal point of the reflector 12. At this point it is fired by current supplied to the contact clips 104 by way of two contact points emanating from the battery source. In this case the stationary contact points are so located in the firing chamber (see FIGS. 2 and 7), that a flash bulb can only be fired in a posi-

sion maintaining the required safe distance from the remaining bulbs as stated above, thus preventing premature flashing of the bulbs held in the cartridge 30. Such flashing can occur by radiation if the bulb being flashed is too close to the others. When the bulb holder 68 is in its forward position a circuit will be completed to fire the flashbulb in synchronism with the operation of the camera 22. An optional BC (battery-condenser) arrangement can be used in place of the above if desired.

The flexible contact points 104 situated in the bulb holder 68 are constructed of copper that has sufficient gripping quality to hold the bulb but lacks enough strength to keep the bulb rigid in the reflector. As seen in FIGURE 7, the contact points 104, when in the firing position, will encounter projection 114 formed on either side of the plastic inner casing. The projections 114 will compress the spring contact points 104 giving the clips added rigidity in holding of the bulbs. After the firing of a flashbulb 14, a new cycle will begin with the depression of the trigger 16. This will, as mentioned above, carry the bulb holder 68 rearward to its bulb loading position. A spring-loaded ejection pin 108 is located to the rear of the bulb when the bulb is in firing position. The ejection pin 108 is so constructed that when the bulb holder 68 carrying a bulb 14 is traveling forward to the firing position, it will contact the round cam nose on the rear side of the ejection pin 108. The surface of the bulb 14 will compress the pin against the action of its spring 109. But on the return travel of the bulb and holder on the beginning of a new cycle, the fired bulb held in the bulb holder will contact a vertical face formed on the front edge of the ejection pin 108, thereby preventing the bulb from entering the firing chamber. The fired bulb 14 will be released from the grip of the bulb clips 104 and will be ejected through the orifice of the reflector 12 as seen in phantom line in FIGURE 2, thus permitting a new bulb in a new cycle to be inserted into the reflector preparatory to firing.

What we claim is:

1. In combination, a repeating photoflash gun having a hollow handle and a reflector; a cartridge positioned within said handle for biasing the ends of several bulbs in a stationary position; a firing chamber in register with an opening in said reflector; said cartridge having an open top communicating with an opening in the bottom of said firing chamber; a reciprocating bulb holder in said firing chamber for retaining a single bulb transferred from said cartridge; a feed claw mechanism mounted in said handle adjacent said cartridge for feeding a bulb from said cartridge to said bulb holder, said feed claw mechanism having a series of teeth projecting from a pivotal shaft, said pivotal shaft being rotatable to place said teeth into interdental spaces between said bulbs biased in said cartridge; a trigger extending through said handle and associated with a trigger cam means which, upon actuation is adapted to rotate said shaft and move said teeth to a position in said interdental spaces between said bulbs and to move said feed claw mechanism in a direction such as to transfer the top bulb in said cartridge through said opening in the bottom of the firing chamber and simultaneously advance the remaining bulbs in said cartridge one step, so as to be in position to be fed singularly on the next cycle of said trigger cam means, pin means extending into said firing chamber adjacent said reflector for ejecting a fired bulb.

2. The repeating photoflash gun according to claim 1 wherein electrical contact points for firing said bulb are associated with said bulb holder and are positioned so as to allow firing of said bulb only when said bulb is in focal relation with said reflector, thereby insuring that the firing of a flashbulb takes place only when a bulb held by said bulb holder is a safe distance from the remaining bulbs in said cartridge.

3. A repeating photoflash gun comprising: a hollow handle; a removable cartridge positioned within said

5

hollow handle, said cartridge being adapted to hold several flashbulbs in stationary position; a firing chamber positioned over said handle, the interior of which is in communication with the interior of said handle; a reciprocating bulb holder slidably mounted within said firing chamber and adapted to retain a single bulb fed from said cartridge and transfer said bulb through said firing chamber and thence into an opening in a reflector mounted on the end of said firing chamber; means positioned within said firing chamber adjacent said reflector for ejecting a fired bulb; a feed claw positioned within said handle for feeding a single bulb from said cartridge to said bulb holder and for moving other bulbs in said cartridge towards said bulb holder, said feed claw comprising, a pivotal and reciprocable shaft longitudinally extending within said handle, a series of teeth transversally extending from said pivotal shaft and adapted to be positioned within interdental spaces between said bulbs held by said cartridge; a trigger extending outside said handle and a cam means on the inner end of said trigger within

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said handle, said cam means being arranged so that in a motion of said trigger said bulb holder is retracted into said firing chamber to receive a bulb and said teeth are simultaneously rotated into said interdental spaces between said bulbs and thence said teeth and shaft are moved upwardly to advance all bulbs thus positioning the top bulb from said cartridge within said firing chamber into register with said bulb holder, and on further motion of said trigger said bulb holder is returned through said firing chamber to position said bulb within said reflector and simultaneously, said teeth are disengaged from said interdental spaces.

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