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IMPELLER

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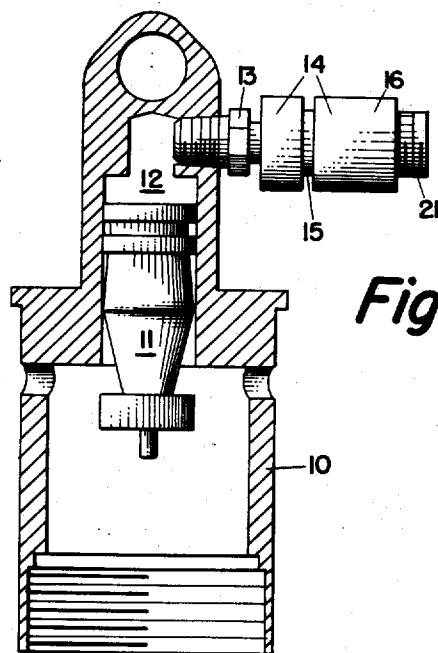
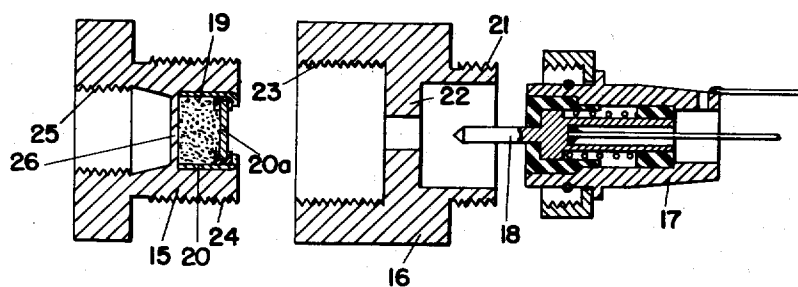


Fig. 1

Fig. 2



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IMPELLER

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1 Claim. (Cl. 102—70.2)

(Granted under Title 35, U.S. Code (1952), sec. 266)

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

This invention relates to an impeller, that is, an electrically fired device capable of generating enough gas pressure for driving a firing pin and actuating a cartridge responsive device especially such as are used on aircraft and elsewhere. Heretofore, it has been a common practice to eject a pilot's seat by a catapult after opening a canopy on high-speed planes in response to one or more fired cartridges as a source of gas pressure. One explosive may provide gas pressure for driving a firing pin to set off a cartridge actuated thruster for opening a canopy and another firing pin for actuating a cartridge responsive catapult. The first explosive to be fired may have its gas pressure transmitted through a flexible hose/or tubing to a subsequent cartridge actuated device. A substantial length of hose may lower the temperature as well as consume time for firing subsequent devices from a first. The desirability of electrically firing cartridges for actuation of many such devices is known. However, when a change is to be made, eliminating flexible tubing or hoses in transmitting gas pressure for initiating actuation of a cartridge responsive device, it has been thought necessary to dismantle some of the catapults or thrusters or other devices and send them back to the factory for installation of the individually electrically fired equipment.

An object of this invention is to reduce the cost and save valuable time in making such conversion from gas pressure fired to electrically fired equipment for planes and enable the changeover to be accomplished economically and expeditiously in the field without having to send any equipment back to the factory. Another object is to effect a slight saving in time of response and enable remote control of cartridge actuated devices to be performed from a greater distance.

According to this invention, the same nipple to which a hose has been connected is still used for the admission of gas under pressure generated in response to the passage of an electric current. More specifically, an electrical connector leads into the main housing of a two-part impeller for generation of gas pressure. A conductor leads to a second part of this invention called a primer housing in which is located a conductive charge, which generates sufficient pressure to move the same firing pin used under the gas pressure system for setting off the cartridge for actuation of the catapult or the thruster for removal of the canopy or for other purposes.

Referring to the drawing, Fig. 1 discloses the impeller of this invention connected to the nipple for propelling the firing pin there disclosed.

Fig. 2 shows the impeller of Fig. 1 in cross sectional and exploded view.

Referring to Fig. 1, a block 10 contains a firing pin 11

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which is actuated by gas pressure within the space 12, such gas pressure being supplied through the nipple 13. Under the prior art gas pressure has been supplied to the nipple 13 through hoses and the like. Under the present invention it is no longer necessary to send the apparatus illustrated back to a factory for conversion of this apparatus from gas fired to electrically fired equipment. Instead, the impeller 14 of the present invention is attached to the nipple 13.

As shown in Fig. 2, the impeller of Fig. 1 includes a primer housing 15, a main housing 16, and a connector 17. The wires illustrated leading to the connector 17, one of them is grounded and the other leads to a conductor 18 as illustrated. When the parts are assembled the conductor 18 leads through the main housing and makes contact with a primer 19 inclosed within a conductive housing 20 around it. As is known in the art, the primer material is of the sort constituting sufficient resistance so that upon passage of a current through it, it becomes heated and ignited. Gas pressure from this ignited primer then enters the space 12 through the nipple 13 and actuates the firing pin 11 in the same manner that was accomplished previously by connected hose line. The right side of the main housing 16 is provided with outside threads 21 which cooperate with inside threads illustrated on the connector 17. The conductor 18 is long enough to extend through the hole in the wall 22 of the main housing 16 and yieldably engage the conductive housing 20 around the primer 19. This conductor 18 is yieldably mounted by means of the spring illustrated so that its pressure is more nearly uniform than would be the case if no such spring were used. Inside threads 23 on the main housing engage outside threads 24 on the primer housing. Inside threads 25 on the primer housing 15 engage the threads on the outside of the nipple 13.

In operation current is supplied to the insulated conductor 18 within the connector 17. On contact with the wall 20^a of the primer housing, current passes through the primer material 19 heating and igniting it. Gas pressure breaks down the frangible wall 26 allowing such pressure to actuate the firing pin 11. In heating the primer material current flows through such material 19 to the side walls 20 of the conductive housing. Such walls 20 are insulated from the wall 20^a as shown. The side walls 20 are grounded to the primer housing 15, main housing 16, and the metallic connector 17 through which current flows in heating the conductive primer material 19.

Among the advantages of this invention may be mentioned the saving of time and cost of returning parts of a catapult or other cartridge actuated device to a factory for conversion from gas pressure to electric firing. The same nipple 13 is used and does not require changing from gas to electric firing. Electric firing is better adapted for remote control of devices which are substantially separated in distance.

I claim:

In combination with means forming a cylinder and a firing pin movable in said cylinder upon the application of a gas pressure, a primer housing communicating with said cylinder, a gas generating primer mounted within said housing and having adjacent to one of its sides a frangible wall and adjacent to its other side a conductive wall which is insulated from said housing, a main housing threaded onto said primer housing and having a central opening, a connector threaded onto said main housing, a conductor reciprocative in and electrically insulated from said connector and extending through

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said opening, and a spring yieldably urging said conductor into contact with said electrically insulated wall.

References Cited in the file of this patent

UNITED STATES PATENTS

1,858,969 Ruhlemann ----- May 17, 1932

5

1,933,694
2,561,670
2,575,071
2,869,825

521,654

4

Allen et al. ----- Nov. 7, 1933
Miller et al. ----- July 24, 1951
Rockwell ----- Nov. 13, 1951
Crawford ----- Jan. 20, 1959

FOREIGN PATENTS

France ----- Mar. 11, 1921