May 20, 1941. H. M. SALMOND ET AL 2,242,679

FIRE EXTINGUISHING SYSTEM

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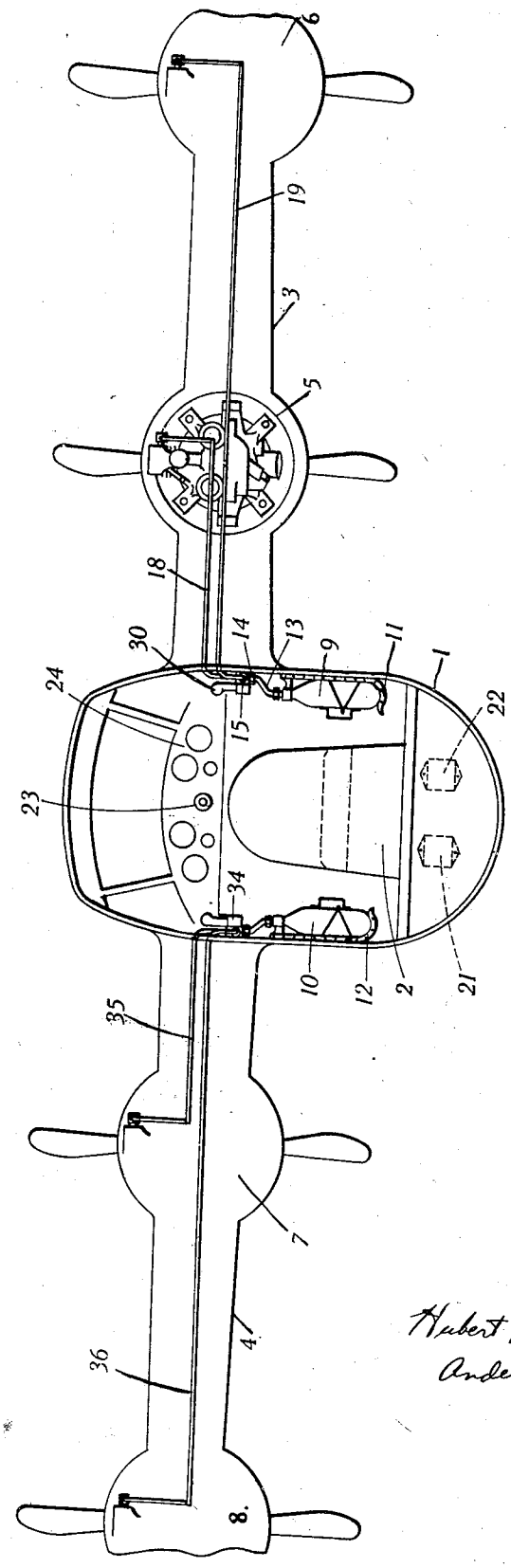


Fig. 1.

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Fig. 4.

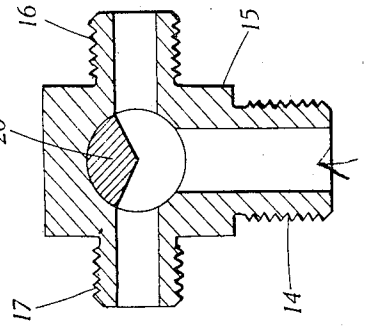


Fig. 3.

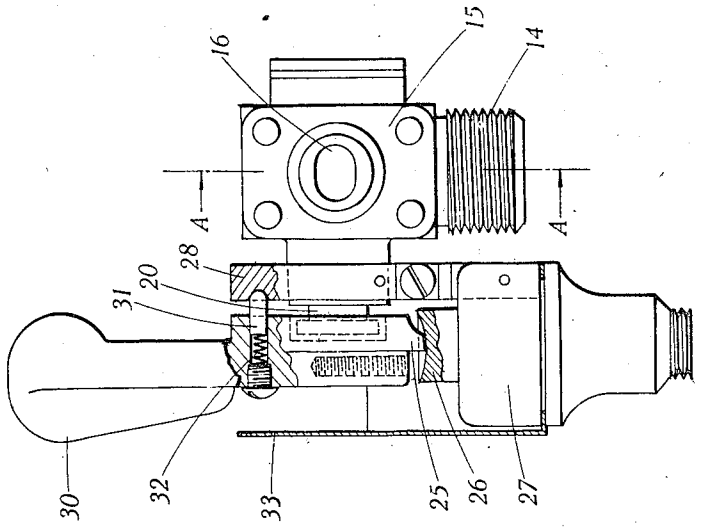
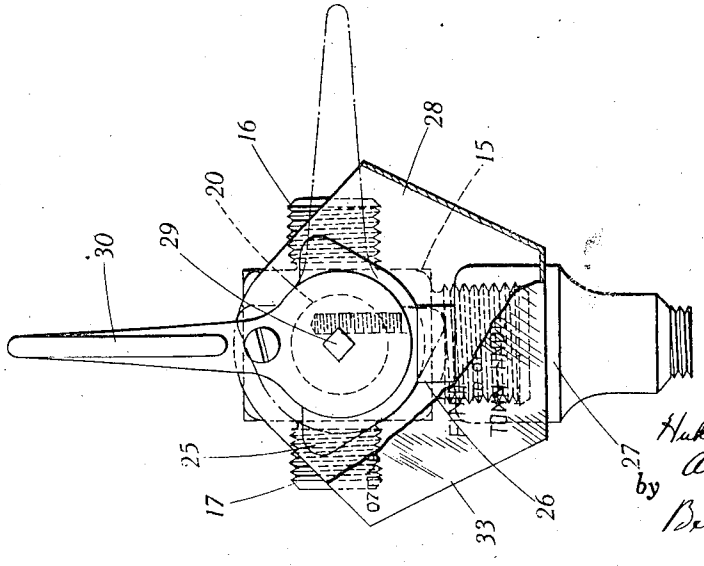


Fig. 2.



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Patented May 20, 1941

2,242,679

UNITED STATES PATENT OFFICE

2,242,679

FIRE EXTINGUISHING SYSTEM

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Application November 21, 1939, Serial No. 305,556
In Great Britain November 9, 1938

4 Claims. (Cl. 169—2)

The invention relates to fire extinguishing systems, and to apparatus or devices for use in such systems, more particularly when used on aircraft, vessels and the like.

The principal object of the invention is to provide means whereby fire extinguishing fluid may be discharged into the air intakes of all the engines of a multi-engined aircraft, or by a simple manipulation into any one selected engine.

Another object of the invention is to provide a cock for use in a fire extinguishing system in an aircraft, which cock normally establishes communication between a fire extinguishing liquid container and the air intakes of all the engines of a multi-engined aircraft, but which can be operated by a single movement to establish connection between the container and the air intake of any one selected engine.

A further object is to combine with such a cock, a switch or other means to operate the container to discharge fluid therefrom, said switch or other means being operated by the cock at the end of its movement to establish connection between the container and the air intake of any one selected engine.

The above and other objects of the invention will be apparent from a consideration of the following description of a system according to the invention for extinguishing fires in the engines and engine nacelles of multi-engined aircraft and of a cock for use in such systems, read in conjunction with the accompanying drawings.

In the drawings,

Figure 1 is a sectional view looking forward of part of a four-engined aircraft equipped with a fire extinguishing system according to the invention.

Figure 2 is a front elevation of a fluid distributing cock or valve according to the invention,

Figure 3 is a side view of the cock, partly in section and

Figure 4 is a sectional view taken on line A—A of Figure 3 showing the cock in the medial position.

Referring to Figure 1 of the drawings, the aircraft comprises a fuselage 1 in which is located a pilot's seat 2, a starboard wing 3 and a port wing at 4, supporting respectively an inboard starboard engine 5 and an outboard starboard engine 6, and an inboard port engine 7 and an outboard port engine 8.

Within the pilot's or other personnel compartment, and within convenient reach of the pilot's or personnel members seat 2 are mounted two fire extinguishing liquid containers, one of which 9, is mounted on the starboard side of the aircraft, and is intended for extinguishing fires within the nacelles of the starboard engines 5 and 6, while the other container 10 is mounted on the port side of the aircraft and is intended for extinguishing fires within the nacelles of the port engines 7 and 8. The containers 9 and 10 are mounted in brackets 11 and 12 respectively so as to put them into communication with respective pipe distribution systems, at the same time enabling the containers to be readily removed for manual use within the compartments in the aircraft if necessary.

The outlet of the container 9 is automatically put into communication with one end of a delivery pipe 13 when located within its securing bracket 11, and the other end of the pipe 13 is connected to an inlet passageway 14 of a cock 15 secured on the side of the fuselage within easy reach of the pilot's seat 2.

The cock is shown in detail in Figures 2, 3 and 4 and is provided with two outlet passageways 16 and 17, which are connected by pipes 19 and 18 respectively to the air intake connections of the outboard and inboard starboard engines respectively.

The plug 20 of the cock which is rotatably mounted in the cock body 15, is provided with passageways therethrough so that in the medial position of the plug as shown in Figures 2, 3 and 4, the inlet passageway 14 of the cock is in communication through the passageways in the plug with both of the outlet passageways 16 and 17, and thus also with both fluid distributing pipes 18 and 19. The passageways in the plug are also arranged so that when the plug 20 is rotated in a clockwise direction, as by handle 30 as seen in Figure 2 in dotted lines, the passageway 14 is put into communication with the passageway 17 and the pipe 18, where as when the plug is rotated in an anti-clockwise direction, the passageway 14 is put into communication with the passageway 16 and the pipe 19.

Normally the plug 20 is left in its medial position as shown in Figure 4 so that fluid may be discharged from the container 9 to the air intake connections and engine compartments of both starboard engines 5 and 6.

The automatic operation of the container 9 may be effected either by an inertia operated switch 21 on the occurrence of a crash, or by a gravity operated switch 22 if the aircraft overturns on landing, or by a manually operable switch 23 on the instrument board 24 of the aircraft if the pilot desires to effect discharge of

the container, as for example, in anticipation of a crash. In the event of discharge of the container by the operation of either of these switches, it is desired that the fluid should be distributed to both engines, and this is assured if the cock is in its normal medial position.

If it should be desired to supply extinguishing fluid to only one engine, as for example due to a fire during flight, the cock could be turned to the appropriate position to put the passageway 14 into communication with the appropriate outlet passageway 16 or 17, and discharge from the container effected by operation of the switch 23. This however involves two separate operations, which is very undesirable in connection with aircraft, and the cock 15 is therefore in the preferred form of the present invention arranged to embody an electric switch for operating the container 9, the switch being operated by the cock at the end of its operative movement on either side of its normal medial position.

For this purpose, the cock plug 20 has secured thereto a cam 25 of the shape shown in Figure 2, and this cam bears on the upper end of a button 26 of a push button type switch 27, which is supported on the cock casing by means of a clamping bracket 28. The switch is electrically connected to the container 9 so as to operate the discharge device thereof when the button 26 is depressed to close the electric circuit.

In order to rotate the cock plug 20 and the cam 25, the spindle 29 of the plug is squared and has secured thereto a handle 30. The handle is provided with a transversely arranged pin 31 which is loaded by a spring 32 to bias the pin against the outer surface of the clamping bracket 28. The bracket 28 is provided with three shallow depressions in which the pin 31 can engage to retain the cock in any of its three positions, the depressions being suitably spaced for this purpose.

In order to indicate the connections which are established for the different positions of the handle 30, a dial 33 suitably marked is secured to the bracket 28 so as to be located in front of the handle 30.

In operation, when the pilot wishes to supply fire extinguishing fluid to either one of the starboard engines it is only necessary for him to rotate the handle 30 in a clockwise or anti-clockwise direction through a right angle, when the engine compartment and air intake connection of the chosen engine will be put into communication with the fluid container and thereafter the container will be operated to effect discharge of fluid into the said compartment and air intake. Due to the shape of the cam 25, the push button 26 is not depressed until the end portion of the rotation of the handle 30, in which position communication between the inlet passageway 14 and the outlet passageway to the supply pipe not selected is completely cut off.

The arrangement above described is duplicated for supplying fluid to either of the port engines 7 or 8, the fluid being supplied in this case from the container 10 through a cock 34 corresponding to the cock 15 and thence through pipe 35 and/or pipe 36 to the engine compartment and air intake connections of the inboard and/or outboard port engines 7 and 8 respectively.

It will be evident that the arrangement hereinbefore described by way of example, may be modified within the scope of the invention, and that if desired, the two cocks 15 and 34 may be combined in a single unit operated by a single lever. Also in the case of a twin engined aircraft, only one cock such as 15 is necessary, one pipe, such as 18 being arranged to extend to the port engine while the other pipe, such as 19, extends to the starboard engine.

Having thus fully described our invention, what we claim as new and desire to protect by Letters Patent is:

1. In a fire extinguishing system, a fluid container, a multiple position cock including an inlet passage and a plurality of output passages, an inlet pipe connecting said inlet passage to said container, a plurality of conduits respectively connecting said output passages to a plurality of points of discharge, said cock being constructed to in a first normal master position connect said inlet passage to all of said output passages and in each of its other positions to connect said inlet passage to a selected one of said output passages, electric switch means actuatable into closed position by actuation of said cock into a connecting position other than said normal master position, and electrically actuatable discharge means for said container connected to said switch means for discharging said container when said switch means is closed.

2. In a fire extinguishing system, a fluid container, a multiple position cock including an inlet passage and a plurality of output passages, an inlet pipe connecting said inlet passage to said container, a plurality of conduits respectively connecting said output passages to a plurality of points of discharge, said cock being constructed to in a first normal master position connect said inlet passage to all of said output passages and in each of its other positions to connect said inlet passage to a selected one of said output passages, electric switch means actuatable into closed position by actuation of said cock throughout the complete movement required to fully connect a selected one of said output passages to said inlet passage and to fully disconnect the others of said output passages from said inlet passage, and electrically actuatable discharge means for said container connected to said switch means for discharging said container when said switch means is closed.

3. In a fire extinguishing system, a fluid container, discharge means for said container, a multiple position cock including an inlet passage and a plurality of output passages, an inlet pipe connecting said inlet passage to said container, a plurality of conduits respectively connecting said output passages to a plurality of points of discharge, said cock being constructed to in a first normal master position connect said inlet passage to all of said output passages, said cock further comprising means actuatable by movement of said cock into one of its operating connecting positions other than said first master position for simultaneously connecting said inlet passage to a selected one of said output passages and disconnecting said inlet passage from all others of said output passages and actuating said discharge means.

4. In a fire extinguishing system, a fluid container, a multiple position cock including an inlet passage and a plurality of output passages, an inlet pipe connecting said inlet passage to said container, a plurality of conduits respectively connecting said output passages to a plurality of points of discharge, said cock being constructed to in a first normal master position connect said inlet passage to all of said output passages and

in each of its other positions to connect said inlet passage to a selected one of said output passages, said cock comprising cam means mounted for displacement with changes in the connecting positions of said cock, electric switch means comprising an actuating member engageable with said cam means, said cam means and said switch means being constructed and arranged to actuate said switch means into circuit closing position when said cock is actuated into a connecting position other than said normal master position, but to leave said switch means in normal open circuit position when said cock is in said normal master position, and electrically actuatable discharge means for said container connected to said switch means for discharging said container when said switch means is in circuit closing position.

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