June 24, 1930. W. J. RUFF 1,767,098

FIRE EXTINGUISHING DEVICE

Filed May 1, 1919 3 Sheets-Sheet 1

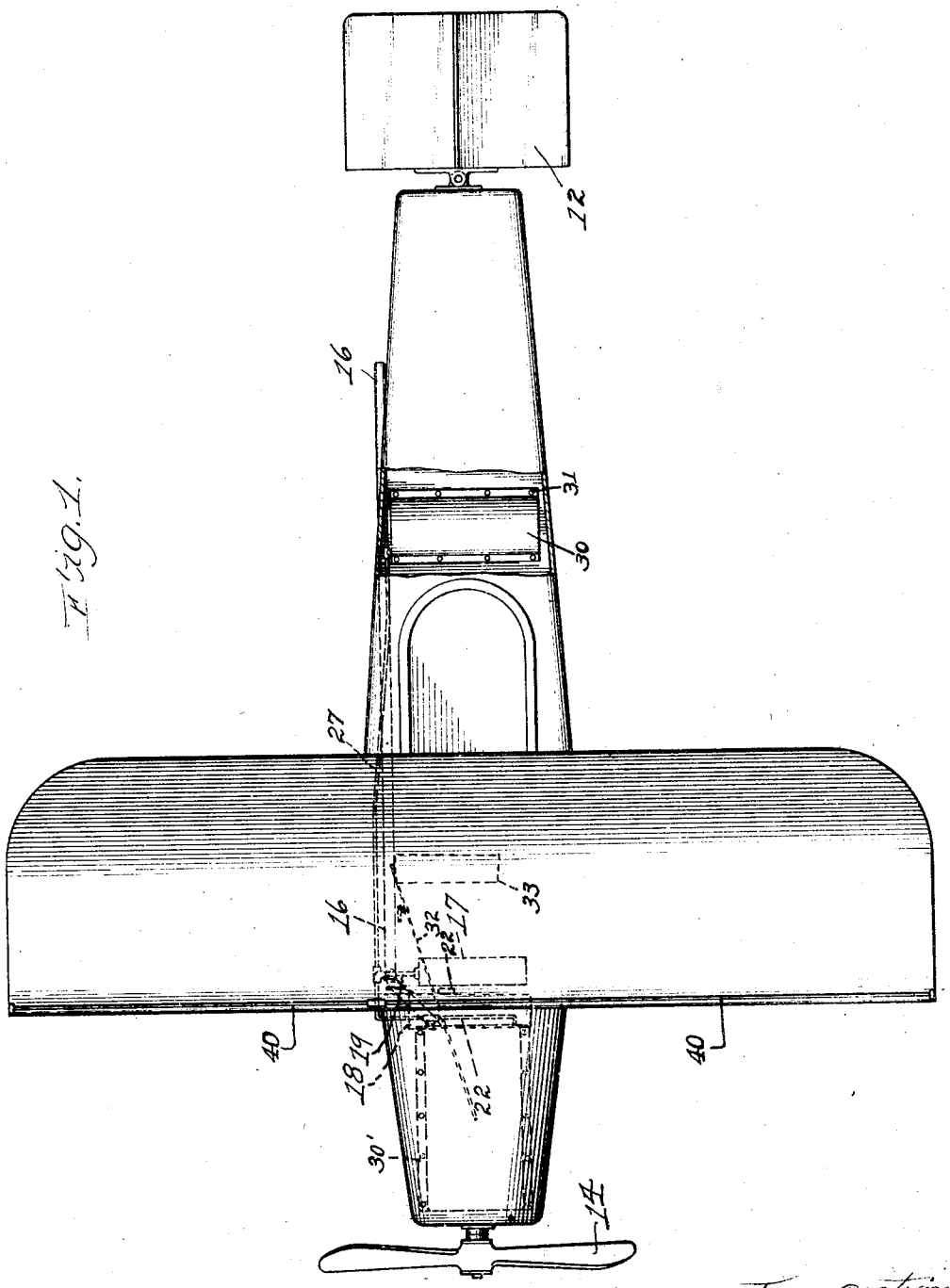

Fig. 1.

Witness:
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Inventor,
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FIRE EXTINGUISHING DEVICE

Filed May 1, 1919 3 Sheets-Sheet 2

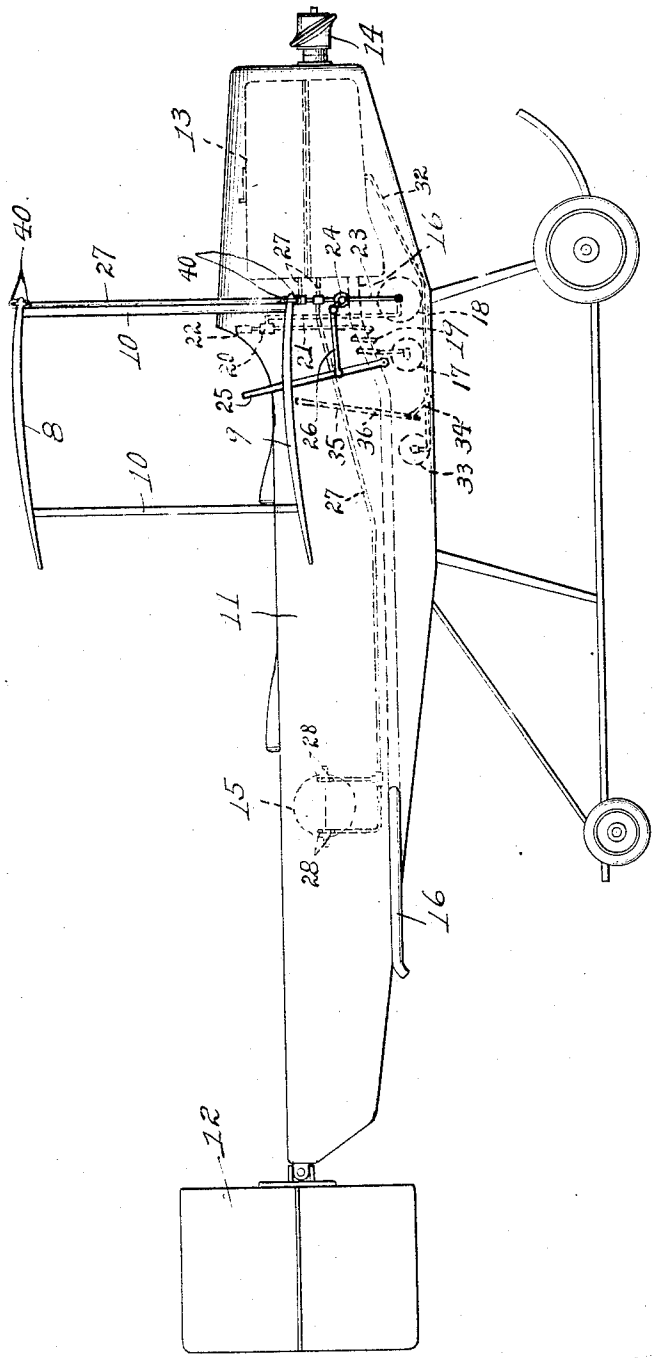

Fig. 2.

Witness:
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FIRE EXTINGUISHING DEVICE

Filed May 1, 1919 3 Sheets-Sheet 3

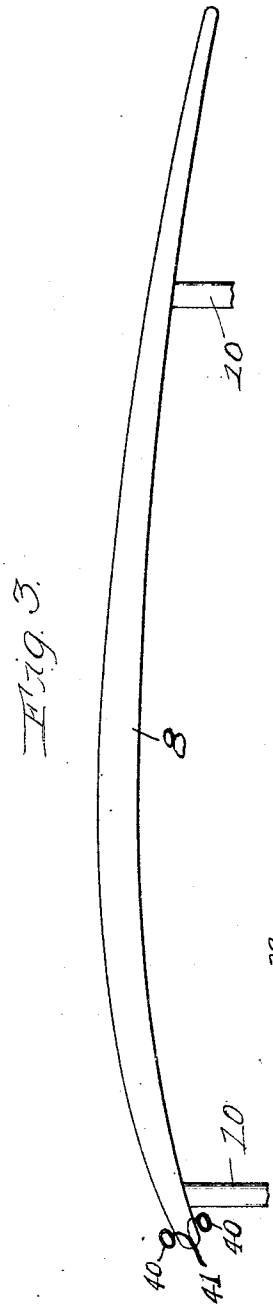

Fig. 3.

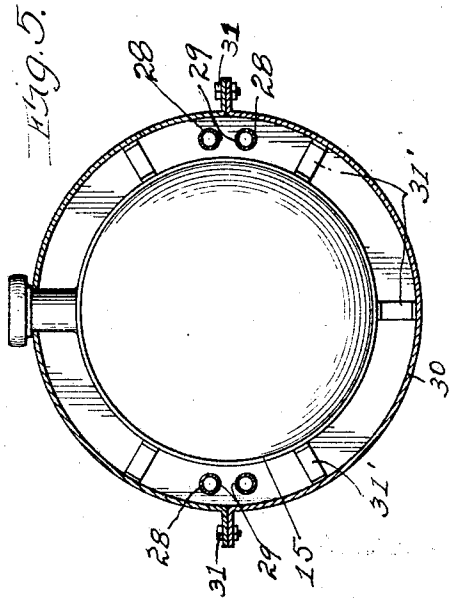

Fig. 5.

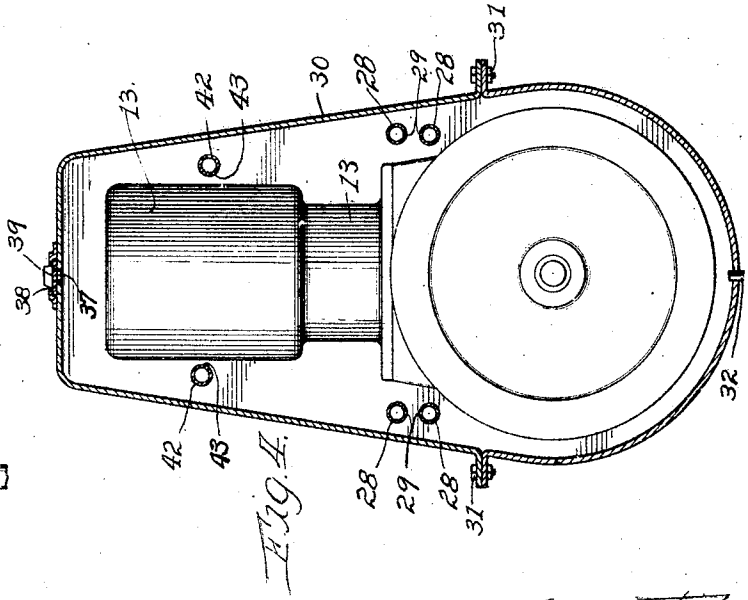

Fig. 4.

Witness:
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Patented June 24, 1930 1,767,098

UNITED STATES PATENT OFFICE

WILLIAM J. RUFF, OF QUINCY, ILLINOIS

FIRE-EXTINGUISHING DEVICE

Application filed May 1, 1919. Serial No. 294,105.

My invention relates to fire extinguishing devices, and more particularly to such devices capable of application to aeroplanes, and the like.

One of the objects of my improvement is the provision of a simple and efficient fire extinguishing apparatus adapted for use on aeroplanes, and the like.

Another object of this invention is to provide a cleaning means for cleaning the fire extinguishing fluid off the parts of an aeroplane after the fire extinguishing fluid has been sprayed thereon.

Another object of this invention is to provide a casing for suitably enclosing desired parts of an aeroplane and providing within this casing suitable conduits for conveying a cleaning fluid to the enclosed parts for cleaning the same.

Other objects will appear hereinafter.

An embodiment of my invention is shown in the accompanying drawings, forming a part of this specification, and in which—

Fig. 1 is a plan view of an aeroplane equipped with fire extinguishing devices embodying my invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is an end view of one of the planes of the aeroplane;

Fig. 4 is an end view of a motor used in the construction equipped with my device; and

Fig. 5 is an end view of a fuel tank equipped with fire extinguishing means embodying my invention.

In the drawings I have indicated more or less diagrammatically an aeroplane having upper and lower supporting planes 8 and 9 connected together by struts 10. Adjacent the lower plane 9 is a body 11 having a steering and elevation rudder 12. In the forward part of the body 11 is a motor 13 having a propellor 14 connected therewith and disposed in front of the body as is usual in the ordinary tractor planes. In the body also is mounted a fuel tank 15. Extending from the motor 13 is an exhaust pipe 16. All of the parts before mentioned may represent any of the ordinary or preferred forms of aeroplanes, or the like. My device is capable of application to all forms of aeroplanes.

I preferably carry the fire extinguishing fluids in tanks under considerable pressure so that upon opening a valve the fluids may be directed to parts of the aeroplane for extinguishing fires. In the present embodiment I have indicated a tank 17 adapted to contain a fluid under very high pressure. An example of such fluid may be carbonic acid gas in containers such as now common on the market. I also provide a tank indicated at 18 for containing a fire extinguishing fluid which may be any liquid used in hand extinguishers, and the like, now on the open market. In the tank 18 I preferably carry only a light pressure as compared with the pressure in tank 17, sufficient to spray the fire extinguishing fluid on desirable parts of the aeroplane.

Connected with the tank 17 I provide a pipe 19 which preferably connects with a reducing valve 20. The reducing valve 20 may be any of the ordinary gas or fluid reducing valves now on the market, such for instance, as a reducing valve used in bottle-filling devices for carbonated beverages and the like. A pipe 21 extends from the reducing valve 20 to the tank 18 so that after the pressure is reduced on the fluid in pipe 19 it passes through the pipe 21 to the tank 18 containing the fire extinguishing liquid. As a matter of convenience a gauge 22 may be provided adjacent the reducing valve 20, or in any other desirable position to indicate the pressure on the tank 18.

In Fig. 2 I have indicated the pipe 19 as being turned around the exhaust pipe 16 a number of times in order to heat the fluid passing through said pipe. Reducing the pressures on all kinds of fluids tends to lower their temperatures and by heating the pipe 19, such as by heat from the exhaust pipe 16, the temperature of the fluid is maintained sufficiently high to prevent it freezing in and about the reducing valve 20. Should the fluid freeze in any of the pipes or valve the system would be stopped up and rendered ineffective.

Extending from the tank 18 I have indi-

cated a pipe 23 which has a control valve 24 in it. The valve 24 is connected to a lever 25 by a connecting link 26, so that when the operator desires to put out a fire he simply pushes forward of the aeroplane on lever 25 to open the valve 24. As soon as the valve 24 is opened the fluid from tank 17 passes through the pipe 19, reducing valve 20 and pipe 21 to the tank 18, where it becomes mixed with the liquid in the latter tank and passes out through the pipe 23 in valve 24 into the distributing system.

The distributing system comprises a pipe 27 leading to any part of the aeroplane which it is desired to protect against fire. In the embodiment shown I have indicated the pipe 27 as being branched with branches leading to the planes 8 and 9, gas tank 15 and engine 13. It will be apparent that any other part of the aeroplane may be supplied with a distributing pipe and nozzles, as desired.

Any preferred or desired form of nozzles may be used. I have indicated one form in Figs. 4 and 5 as being two pipes 28 which are connected to a feed pipe 27 and disposed substantially parallel with each other with openings 29 in one pipe directed toward the openings of the other pipe, so that as the fluids come from the openings 29 they will impinge against each other and form a very fine spray. I have indicated two of these nozzles in Fig. 4 adjacent the engine and two in Fig. 5 adjacent the fuel tank, but it will be understood that as many or as few of these nozzle sets may be provided, as desired. As a means for economically using the fluid extinguishers I have shown the engine and fuel tank as being enclosed in housings 30 and 30′ respectively each made up of two parts and connected together by bolts 31. Any form of housing may be provided when desired, and mounted on any part of the aeroplane in any desirable manner.

After the housing around the engine has been filled with fire extinguishing fluids to extinguish a fire, this fire extinguishing fluid may interfere with the operation of the engine, due to its getting into the cylinders. As a means for cleaning out the casing, especially the engine casing, I have shown a pipe 32 as entering the bottom of the casing 30 around the engine. This pipe 32 leads from a storage tank 33 which may be filled with air, oxygen, or other fluid to clean out the casing 30 around the engine. As a means for controlling the fluid from tank 33, I provide a valve 34 adapted to be operated by a lever 35. The lever 35 is pivoted as at 36 and connected with the valve 34 by a slot and pin connection, or in any other desirable manner. By simply moving the lever rearwardly of the aeroplane, the valve 34 will be opened to permit the fluid from tank 33 to pass into the casing around the engine. At the top of the engine I have indicated an opening 37 closed by a plate 38 which has an opening 39 therein adapted to register with the opening 37 upon sliding of the plate 38. Therefore, by opening the opening 37 and forcing air or other cleansing fluid around the engine, all of the fire extinguishing fluid will be driven out.

It is impractical to encase the supporting planes 8 and 9, and many other parts of the aeroplane. Where it is impractical to encase a part of the aeroplane in a casing 30, I preferably mount pipes or other nozzles 40 along such parts to distribute the fire extinguishing fluid to such parts. In the case of the planes 8 and 9, I position the pipes 40 along the front edges with openings 41 in the pipes directed angularly toward the plane, substantially as indicated in Fig. 3, so that as the plane passes along, the air tends to move the fire extinguishing fluid over the surfaces of the plane.

With an aeroplane equipped with my device when a fire breaks out, the operator has to simply move lever 25 to cause the fire extinguishing fluid to distribute to the burning parts. I have indicated one controlling valve 24 in the main distributing pipe 23, but it will be apparent that other valves may be placed in any of the branch pipes 27, when so desired, thereby causing the fluid to pass to only such parts as have the valves open in their lead pipes.

I claim:—

1. The combination with an aeroplane, of a casing completely enclosing a part of the aeroplane; means for admitting a fire extinguishing medium to said casing; and a cleaning fluid tank connected with said casing for removing said fire extinguishing medium from said casing.

2. The combination with an aeroplane of a casing enclosing a part of said aeroplane, there being an opening in the top of said casing; a closure in and controlling said opening; a cleaning fluid tank connected with said casing; and means for controlling flow of cleaning fluid from said cleaning fluid tank to said casing.

In testimony whereof I have signed my name to this specification on this 28th day of April, A. D. 1919.

WILLIAM J. RUFF.