W. H. McNUTT.

FUSIBLE TANK CLOSURE AND STRAINER.

APPLICATION FILED APR. 25, 1914.

1,114,166. Patented Oct. 20, 1914

Fig. 1.

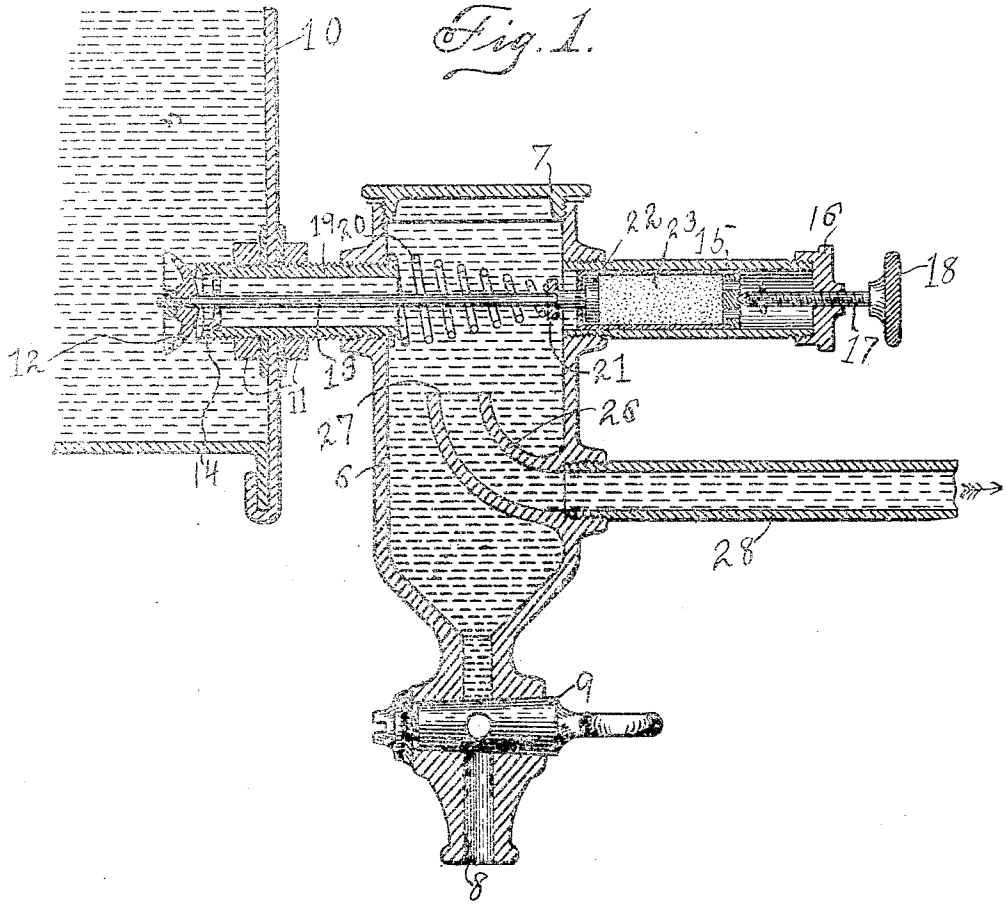


Fig. 3.



Fig 2.

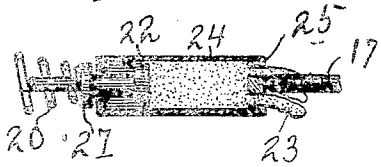


Fig. 4.



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FUSIBLE TANK-CLOSURE AND STRAINER.

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To all whom it may concern:

Be it known that I, WILLIAM H. McNUTT, citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Fusible Tank-Closures and Strainers, of which the following is a specification.

This invention has for its object to provide a safety device at the outlet portion of tanks used for containing inflammable and explosive fluids such as gasolene and the like, particularly tanks used on motor cars, motor boats or air craft; which device is provided with a member of a material that melts at a comparatively low point; and upon a fire occurring in the vicinity, the melting of this member will cause a valve at the outlet of the tank to close and thereby prevent further escape of the fluid, that would be ignited by such fire.

A further object of the invention is to provide in such a device, means that will also act as a strainer or separator, whereby water or other foreign fluids that may be present in the gasolene will be separated therefrom, and also any dirt or particles; whereby such foreign matter will collect by gravity in the lower portion of the device to be drawn off at certain times when advisable.

In the accompanying drawing illustrating one embodiment of my invention, Figure 1 is a vertical section through the device, showing it applied to the lower portion of a tank or container. Fig. 2 is a view of the shell for the fusible plug, showing adjacent parts. Fig. 3 shows the guide disk for the valve stem: and Fig. 4 shows the apertured end disk of the shell.

The device is shown as comprising a casing 6, in the form of an upright cylinder, whose top is closed by a removable cap 7 giving convenient access to the casing when desired; and the lower end of the casing is shown as converging to an outlet port 8 that is normally closed by a valve 9, that can be turned to give exit to the contents of the casing when desired.

At one side of the casing is an inlet, shown in the form of a tube 19 extending from an opening in the casing, and preferably arranged to be secured at the outlet of a tank such as 10, by suitable means such as nuts 11 engaging the threaded pipe; by which means the device is supported from the tank. The end of the tube 19 forms a valve seat that is engaged by a valve 12, secured to a stem 13 projecting through the tube 19 into the casing, and may be guided by a disk 14 in the form of a spider.

At a portion of the casing opposite the tube 19 is a threaded opening from which projects a cylinder 15, in alinement with the tube 19, the outer end of the cylinder 15, being closed by a screw cap 16 having a small threaded bore in which operates a plunger 17, that is conveniently turned by a knurled head 18.

The valve stem 13 is engaged by a coil spring 20, one end of which engages the casing, the other end of the spring pressing on a disk 21 fast on the valve stem, whereby this spring will tend to move the valve to closed position. The valve stem 13 is shown as projecting into the cylinder 15 a short distance and at its extremity is secured a head 22.

Between the head 22 of the valve member, and the plunger 17, in the cylinder is arranged a plug composed of a material of comparatively low melting point, and preferably of a non-metallic nature, such as paraffin, whose melting point is about 140° F. Since the spring will advance the stem to move the head 21 in the direction of the plunger until the valve is seated, the plunger 17 can be screwed into the cylinder to engage the plug and press it against the head, and thereupon the plunger and stem will be moved to cause the valve to open, against the tension of the spring. In its normal condition the plug will operate to retain the valve in the open position upon the plunger being so advanced; but upon a considerable increase in temperature of the casing, as by a fire occurring in the vicinity, the plug will soften or melt, and by providing an avenue of escape, it will cease to hold the head and plunger separated, and therefore, the head can advance toward the plunger, that it will be caused to do from the tension of the coil spring, and the valve 12 will be closed against the inlet tube 19, thereby at once preventing any further outflow from the tank. It will be understood that the turning of the plunger head, in the solid condition of the plug, will open or close the valve as may be desired: but after this plug has melted and no longer supports the head in the cylinder the valve cannot be opened

by the plunger, until the former condition of the plug has been restored.

Instead of having the plug 23 slidable in the bore of the cylinder 15, I provide a shell 24 of comparatively thin metal that is readily slidable in the cylinder 15, and the head 22 on the stem is formed of a size to fit slidably in the shell 24. The end of the shell adjacent the plunger stem 17 is closed by a screw disk or cap 25 having a number of apertures therein, as indicated in Fig. 4. This cap is removed to fill the shell with the plug 23, when the head 22 is at the inner end portion of the shell as indicated in Fig. 1, and the plug will engage the cap 25 when returned to the shell. It will thus be seen from Fig. 1 that the plug itself does not slide in the bore of the cylinder, but the shell will move back and forth in the cylinder; and the head 22 of the valve stem engaging the plug 23 in the shell, will cause the valve stem to be advanced when the plunger is screwed inwardly to open the valve against the pressure of the coil spring; while when the plunger is screwed outwardly, the valve will close, and the head on the stem will move the shell outwardly in the cylinder to follow the plunger until the valve is seated.

When the temperature of the casing or the cylinder becomes sufficiently elevated to liquefy the plug, if the valve is in the open position as shown in Fig. 1, the tension of the coil spring will exert a pressure on the head 22, causing it to force the now fluid contents of the shell outwardly through the apertures in the end 25 of the shell, as indicated in Fig. 2. And this movement of the valve stem will cause the valve to become seated, effectually preventing any further outflow from the tank.

The casing 6 is also arranged to operate as a strainer or separator for the gasolene or other fluid flowing through it from the tank 10, which is effected by causing such fluid to be withdrawn from the central portion of the casing, and by arranging the inlet tube 19 at the upper portion of the casing. As shown I provide an outlet pipe 26 in the casing whose open end or mouth 27 is located at the intermediate or central portion of the casing; this tube connecting with an outlet pipe 28. As the fluid flows through the inlet pipe into the casing, it will fill the casing, and the heavier fluids such as water will fall to the bottom of the casing by gravity, and dirt or particles will also be precipitated to the lower portion of the casing; while the gasolene or other fluid of lighter specific gravity will remain in the upper portion of the casing and pass out therefrom through the tube 26. From time to time the valve 9 at the bottom of the casing can be opened, and the water and sediment drawn off through the exit 8; for which operation the inlet valve 12 can preferably be previously closed.

Having thus described my invention, what I claim is:

1. The combination of a casing, an inlet at one side of the casing, a valve arranged to close the inlet, a cylinder projecting from the casing opposite the said inlet, a plug of a non-metallic material of comparatively low melting point that is slidable in the cylinder, a plunger in the cylinder at the outer portion and provided with controlling means projecting from the cylinder at its outer end and arranged to advance the plug toward the inlet valve, a stem on said valve provided with a head, and a spring on said stem arranged to move the valve to closed position and to press the head against said plug, whereby when the plug and plunger are positioned to hold the valve in open position, the melting of the plug will permit the spring to advance the head and cause the valve to close the inlet.

2. The combination of a casing, an inlet at one side of the casing, a valve arranged to close the inlet, a cylinder projecting from the casing opposite the said inlet, a plug of non-metallic material of comparatively low melting point that is slidable in the cylinder, a perforated plunger in the cylinder at the outer portion and provided with controlling means projecting from the cylinder at its outer end and arranged to advance the plug toward the inlet valve, a stem on said valve provided with a head, and a spring on said stem arranged to move the valve to closed position and to press the head against said plug, whereby when the plug and plunger are positioned to hold the valve in open position, the melting of the plug will permit the spring to advance the head and force the material of the plug through the perforated plunger, and also cause the valve to close the inlet.

3. The combination of a casing, an inlet at one side of the casing, a valve arranged to close the inlet, a cylinder projecting from the casing opposite the said inlet, a plug of a material of comparatively low melting point that is slidable in the cylinder, a plunger in the cylinder at the outer portion and provided with controlling means projecting from the cylinder at its outer end and arranged to advance the plug toward the inlet valve, a stem on said valve provided with a head, and a spring on said stem arranged to move the valve to closed position and to press the head against said plug, whereby when the plug and plunger are positioned to hold the valve in open position, the melting of the plug will permit the spring to advance the head and cause the valve to close the inlet.

4. The combination of a casing, an inlet at one side of the casing, a valve arranged to

close the inlet, a cylinder projecting from the casing opposite the inlet, a shell slidable in said cylinder, a plunger projecting into the outer closed end of the cylinder to engage said shell, a stem on said valve projecting into said shell and carrying a head slidable in the shell, said shell being filled with a non-metallic material of comparatively low melting point, the end of the shell engaged by said plunger being perforated, and a spring in the casing engaging said stem to advance it and the shell to engage said plunger, whereby when the plunger is advanced to shift the shell and stem to hold the valve in open position with said spring under tension, the melting of the material in the shell will result in the spring advancing the head to force the said material through the perforated end of the shell and close the inlet valve.

5. The combination of a casing, an inlet at one side of the casing, a valve arranged to close the inlet, a cylinder projecting from the casing opposite the inlet, a shell slidable in said cylinder, a cap closing the outer end of the cylinder and having a threaded bore, a threaded plunger operating in said bore and engaging one end of said shell, said shell end being apertured, a stem on said valve projecting into said shell and carrying a head slidable in the shell, said shell being filled with a non-metallic material of comparatively low melting point, and a spring in the casing engaging said stem to advance it and the shell to engage said plunger, whereby when the plunger is advanced to shift the shell and stem to hold the valve in open position with said spring under tension, the melting of the material in the shell will result in the spring advancing the head to force the said material through the apertured end of the shell and close the inlet valve.

6. The combination of a casing, an inlet for the casing, a valve arranged to close the inlet and provided with a stem, a spring connected with said stem to close the valve when free to move, a plug of a material of comparatively low melting point connected with the valve stem to normally hold the valve in open position with the spring under tension, and arranged to be displaced when melted by heat to thereby permit the spring to close the valve, and a controlling member connected with the plug to shift its position and thereby move the valve to open or closed position at will.

7. The combination of a casing, an inlet at one side of the casing, a valve arranged to close the inlet, a cylinder connected with the casing, a shell slidable in said cylinder, a stem on said valve projecting into said shell and carrying a head slidable in the shell, said shell being filled with a material of comparatively low melting point, one end of the shell being perforated, and a spring in the casing engaging said stem to advance it and the shell in the cylinder to hold the valve in open position with said spring under tension whereby the melting of the material in the shell will result in the spring advancing the head to force the said material through the perforated end of the shell and close the inlet valve.

8. The combination of a casing, an inlet at one side of the casing, a valve arranged to close the inlet, a cylinder projecting from the casing opposite the inlet, a shell slidable in said cylinder, a cap closing the outer end of the cylinder and having a threaded bore, a threaded plunger operating in said bore and engaging one end of said shell, said shell end being apertured, a stem on said valve projecting into said shell and carrying a head slidable in the shell, said shell being filled with a material of comparatively low melting point, and a spring in the casing engaging said stem to advance it and the shell to engage said plunger, whereby when the plunger is advanced to shift the shell and stem to hold the valve in open position with said spring under tension, the melting of the material in the shell will result in the spring advancing the head to force the said material through the apertured end of the shell and close the inlet valve.

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