April 18, 1933. W. J. SMITH 1,904,753

RADIATOR FILLING AND DRAINING DEVICE

Filed Oct. 9, 1931 4 Sheets-Sheet 1

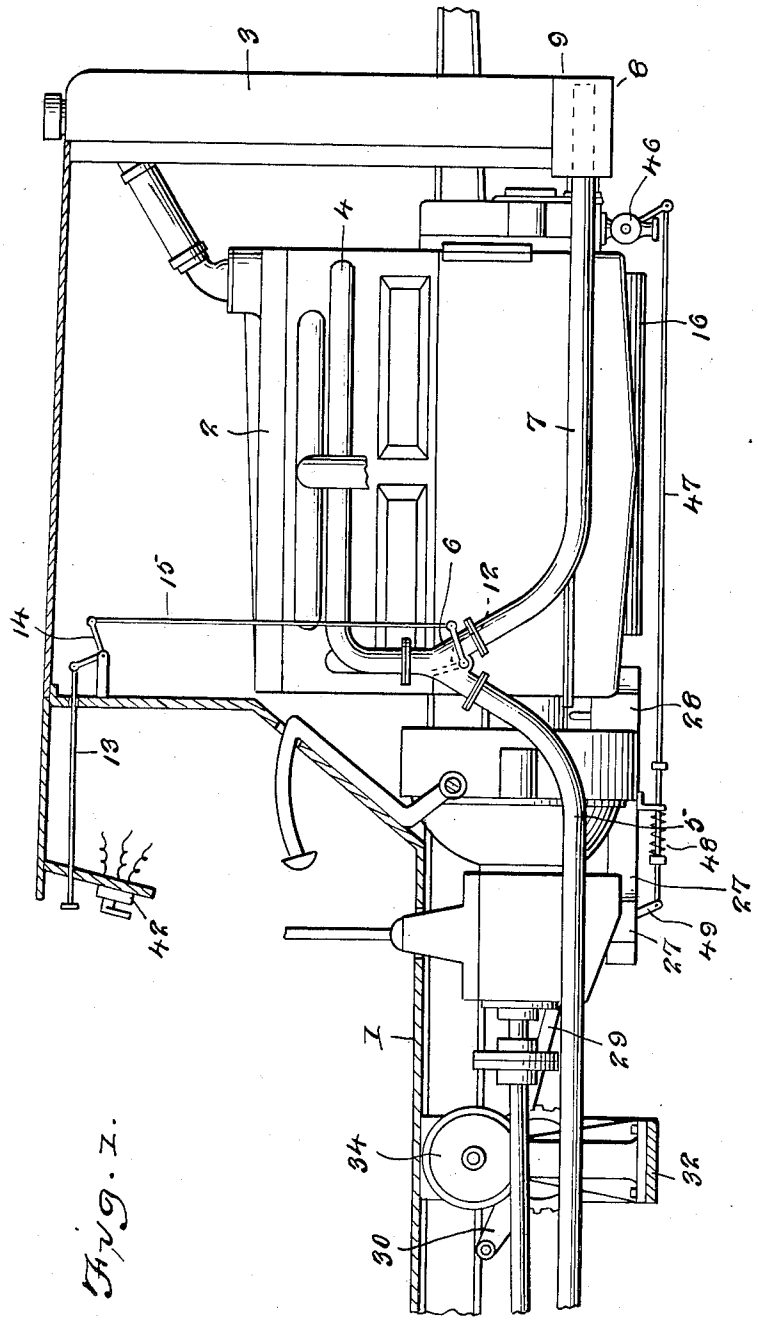

Fig. 1.

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RADIATOR FILLING AND DRAINING DEVICE

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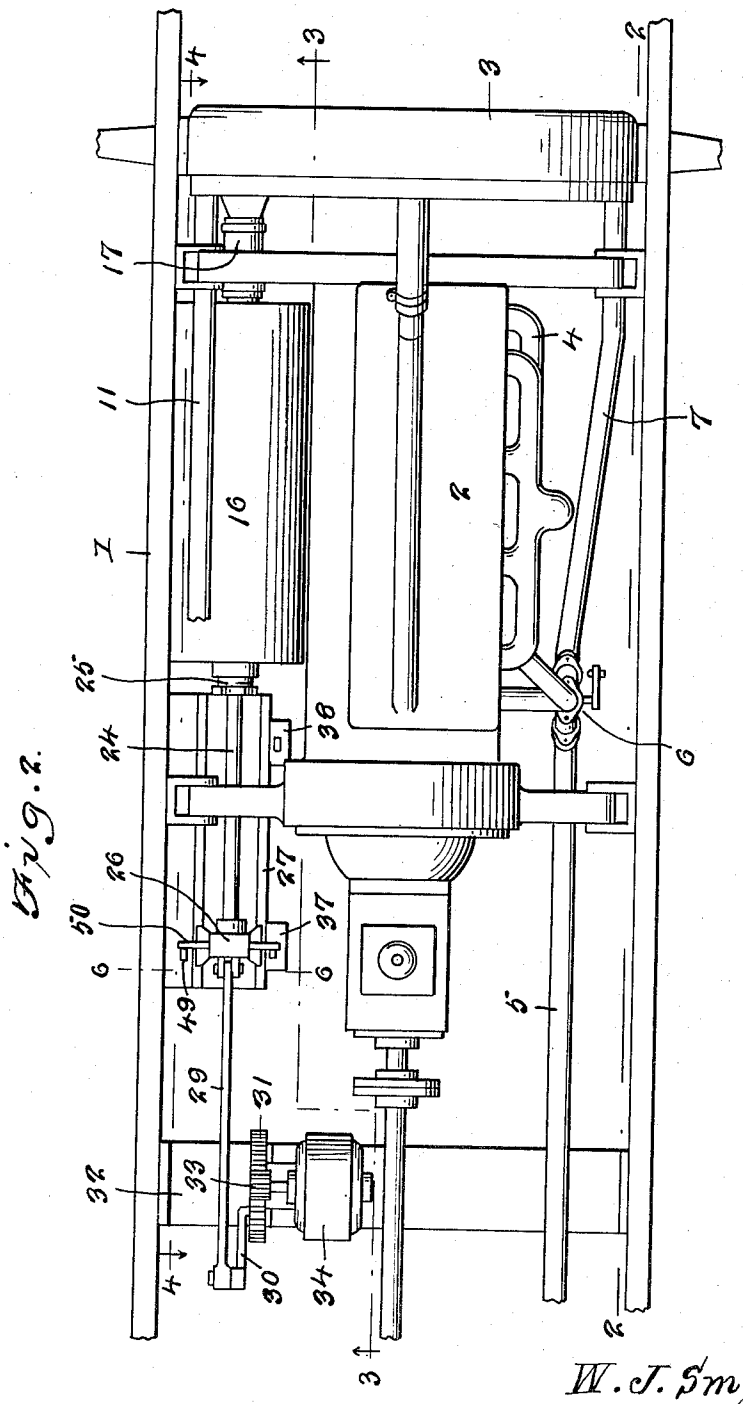

Fig. 2.

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RADIATOR FILLING AND DRAINING DEVICE

Filed Oct. 9, 1931 4 Sheets-Sheet 3

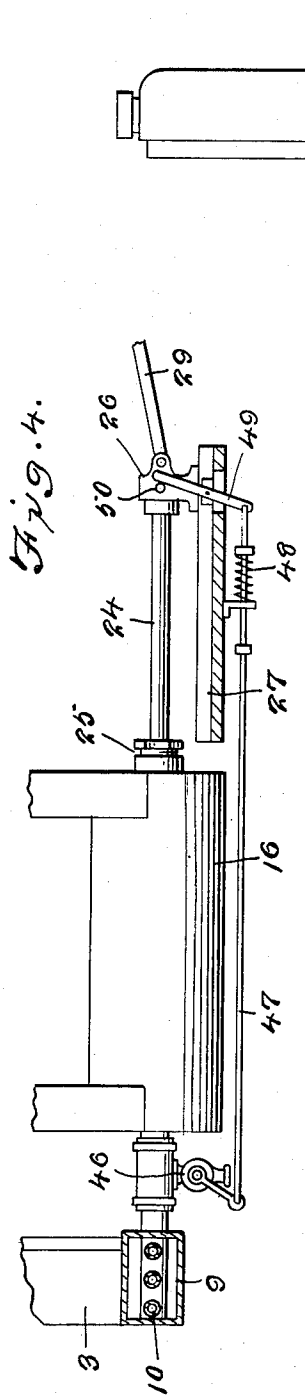

Fig. 4.

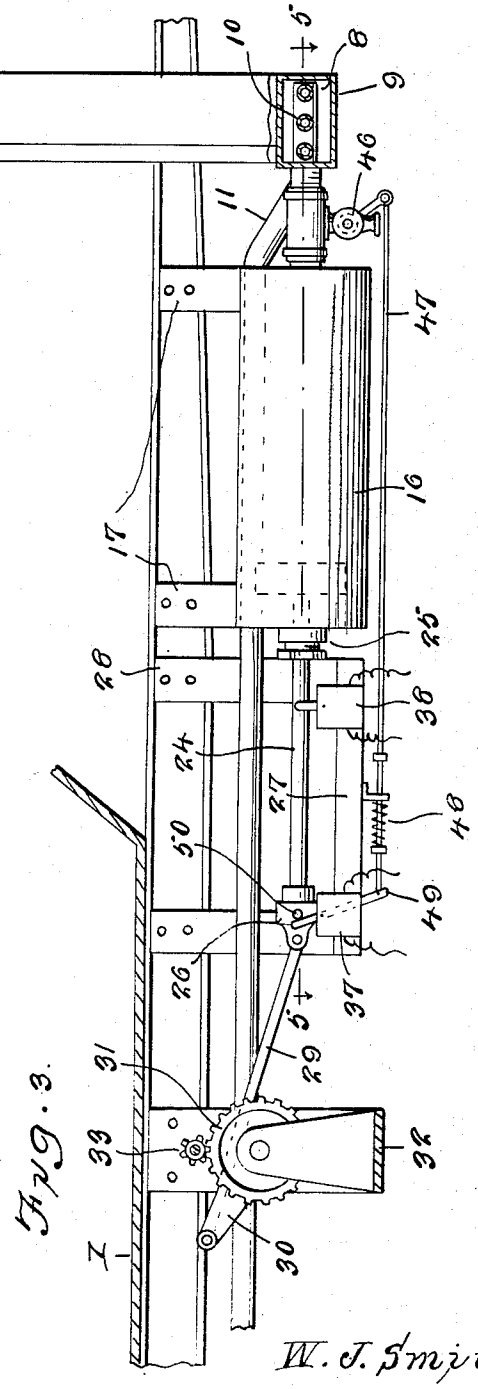

Fig. 3.

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RADIATOR FILLING AND DRAINING DEVICE

Filed Oct. 9, 1931 4 Sheets-Sheet 4

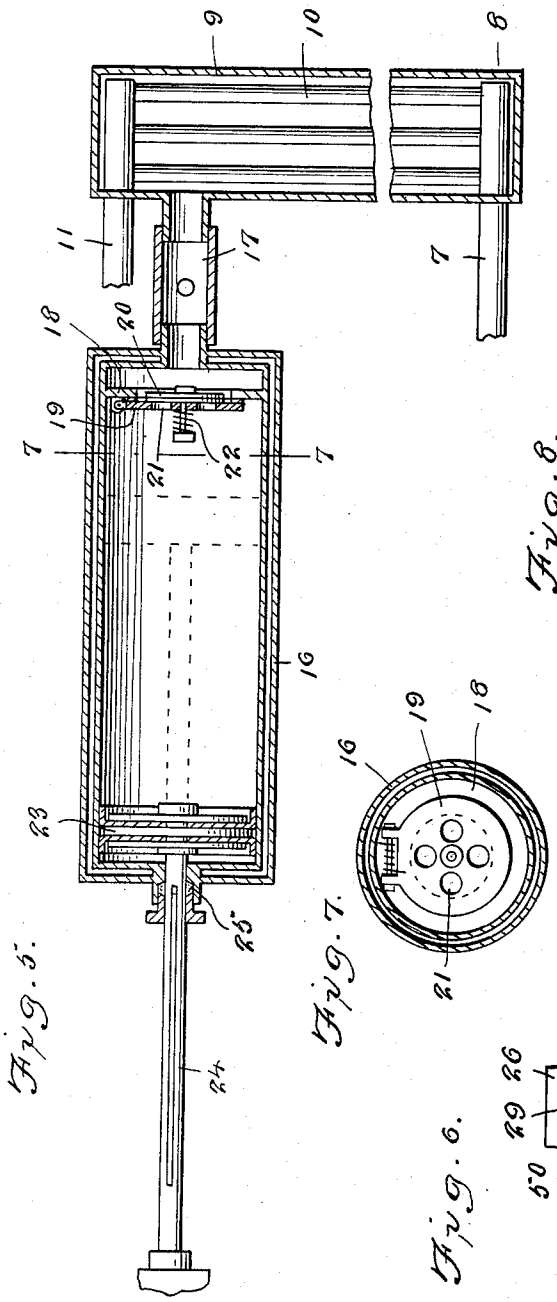

Fig. 5.

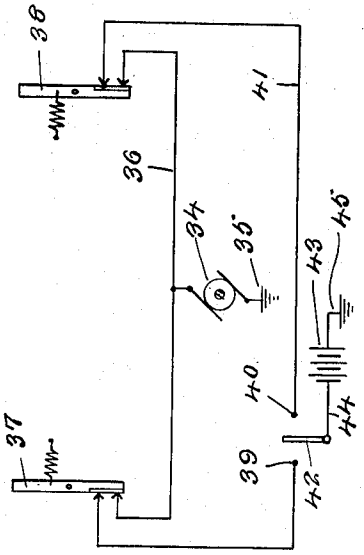

Fig. 8.

Fig. 7.

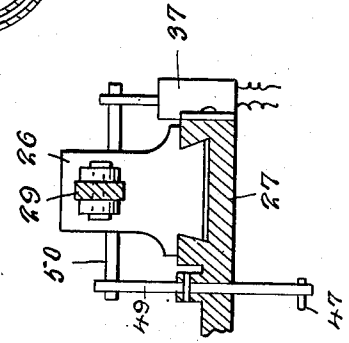

Fig. 6.

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Patented Apr. 18, 1933

1,904,753

UNITED STATES PATENT OFFICE

WILLIAM JEROME SMITH, OF WEST PALM BEACH, FLORIDA

RADIATOR FILLING AND DRAINING DEVICE

Application filed October 9, 1931. Serial No. 567,973.

This invention relates to radiator filling and draining devices and is especially adaptable for use on land or air vehicles employing fluid cooled engines and has for the primary object, the provision of a device of the above stated character, whereby the fluid may be removed from the radiator and the engine and kept at a warm temperature for a considerable length of time during winter use of the engine to prevent freezing of the fluid in cold weather and is capable of returning the fluid to the radiator when desiring to use the engine and which will aid in starting the engine in cold weather due to the fluid remaining at substantially the same temperature as when first removed from the radiator.

Another object of this invention is the provision of means whereby the fluid may be heated to a desired temperature prior to being removed from the radiator and which means also may be employed after starting of the engine so that the temperature of the fluid may be easily and quickly raised to a degree of temperature which will permit the engine to quickly operate at its highest point of efficiency.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a fragmentary sectional view of a vehicle showing its engine and cooling radiator therefor and to which my invention is applied.

Figure 2 is a fragmentary plan view illustrating the same.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary side elevation partly in section taken on the line 4—4 of Figure 2.

Figure 5 is a sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a sectional view taken on the line 6—6 of Figure 2.

Figure 7 is a sectional view taken on the line 7—7 of Figure 5.

Figure 8 is a diagrammatical view illustrating the wiring diagram.

Referring in detail to the drawings, the numeral 1 indicates the fragmentary portion of a vehicle and the internal combustion engine thereof is indicated by the character 2 and has associated therewith the usual radiator 3 for containing fluid for the purpose of cooling the engine. The exhaust manifold of the engine is indicated by the character 4 and is connected to an exhaust pipe 5 by a coupling 6, the manifold 7 leading to a heating medium 8 located at the base of the radiator. The heating medium consists of a casing 9 in which is mounted a series of flues 10 underlying the core of the radiator and connected to the manifold 7 and also to an outlet manifold 11. Located within the coupling 6 is a control valve 12 adapted to direct exhaust from the engine into the exhaust pipe 5 or into the manifold 7. The valve 12 is operated by a hand controlled lever 13 slidably mounted on the instrument board of the vehicle. The lever 13 is pivoted to a bell crank lever 14 which is in turn connected to the arm of the valve by a rod 15. Thus it will be seen that the operator may either direct the exhaust to the heating medium 8 or to the exhaust manifold 5. A cylinder or container 16 is mounted upon a support 17′ carried by the frame of the vehicle and is of the thermos type consisting of inner and outer walls with a dead air space therebetween, or if desired, the container 16 between its walls may be suitably insulated to resist heat and cold. One end of the cylinder or container 16 is connected to the radiator by a coupling 17. A partition 18 is mounted in the cylinder or container 16 and has a passage therethrough controlled by valves 19 and 20. The valve 19 is hinged to the partition and normally urged to overlie the opening in the partition by a spring. The valve 20 is slidably mounted in the valve 19 and the latter is provided with ports 21 controlled by the valve 20. The valve 20 is normally held in a seated position against the valve 19 by a spring 22. One of the

valves will permit fluid to be drawn into the container or cylinder 20 while the other valve is adapted to permit the fluid within the cylinder or container to be forced into the radiator.

A piston 23 is slidably mounted in the container or cylinder 16 and has a stem 24 extending through a stuffing gland 25 and connected to a cross head 26. The cross head 26 is mounted for sliding movement in a guide 27 carried by a support 28 on the frame of the vehicle. A link 29 is pivoted to the cross head and to an arm 30 carried by a driving gear 31. The driving gear 31 is rotatably supported by a bracket 32 on the frame of the vehicle and is in mesh with a pinion 33 secured to the armature shaft of an electric motor 34, so that by setting the motor in operation the piston will be reciprocated within the cylinder or container 16.

The motor 34 is connected to a ground 35 and to a conductor 36. The conductor 36 is connected to circuit breakers 37 and 38. The circuit breakers 37 and 38 are connected to contacts 39 and 40 by conductors 41. A switch 42 is operable between the contacts 39 and 40 and is connected to a battery or other electrical source 43 by a conductor 44. The battery 43 is connected to the ground by a conductor 45. The contacts 39 and 40 and the switch 42 are located upon the instrument board. The circuit breakers 37 and 38 are located upon the support 28 and are relatively spaced or are located at opposite ends of the support 28 and a distance apart equal to the movement of the cross head 26.

In operation, the operator engages the switch with one of the contacts, which sets the electric motor in operation and the latter reciprocates the piston 23 in a direction to draw the fluid from the radiator into the cylinder or container and as the piston reaches the limit of its movement in the stated direction, one of the circuit breakers stops the motor by being engaged by the cross head. The fluid drawn within the container 16 will be maintained at substantially the same temperature as when received from the radiator, consequently preventing freezing of the fluid over a considerable length of time in cold weather. When it is desired to return the fluid from the container 16 to the radiator the switch is moved into engagement with the other contact and the piston is reciprocated in an opposite direction by the electric motor forcing the fluid into the radiator. As the piston reaches the limit of its movement in the last named direction, the other circuit breaker stops the electric motor.

Should the liquid within the radiator not be heated to a desired temperature on the stopping of the motor, the operator prior to the stopping of the motor may direct the exhaust through the heater 8 to raise the temperature of the fluid. This same operation also may be carried out when the fluid has been returned to the radiator so that the fluid in the radiator will be raised to a temperature desirable for bringing about an efficient operation of the engine in a comparatively short time.

The coupling 17 is provided with a drain valve 46 connected to a rod 47 slidably mounted in the bracket 28 and is spring pressed in one direction by a spring 48 for the purpose of positioning the valve in a closed position. The rod 47 is connected to a pivoted lever 49 located in the path of movement of the cross head 26. The cross head 26 being provided with a pin 50 adapted to engage the lever 49 for opening the valve when the piston reaches the limit of its suction stroke. The piston when in this position has drawn the fluid into the container 16 from the radiator and any fluid which may remain in the radiator is allowed to drain therefrom. It is to be understood that the capacity of the container 16 is equal to the capacity of the radiator and the water jacket of the engine.

From the foregoing description taken in connection with the accompanying drawings, it will be noted that a device has been provided which can be easily and quickly installed on a vehicle and will provide a very efficient means of retaining the water employed for cooling the engine of the vehicle at a temperature above freezing while the engine is idle. The device also being capable of returning the fluid to the radiator when desiring to start the engine and an additional means being provided for heating the fluid of the radiator to a desired temperature by the employment of the exhaust of the engine.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of my invention, as claimed.

Having thus described my invention, what I claim is:—

A device for filling and draining radiators comprising a cylinder insulated against heat or cold, a support for said cylinder, means connecting said cylinder to a radiator, a piston in said cylinder, a slidable cross head connected to the piston, a support for the cross head, electrical means for actuating the cross head and manually set in operation and automatically stopped by the cross head reaching the limit of its movement in each direction, a self-closing drain means between the cylinder and the radiator, and means between said drain means and the cross head for opening the drain means when said cross head reaches the limit of its movement in one direction.

In testimony whereof I affix my signature.

WILLIAM JEROME SMITH.