

March 16, 1943.

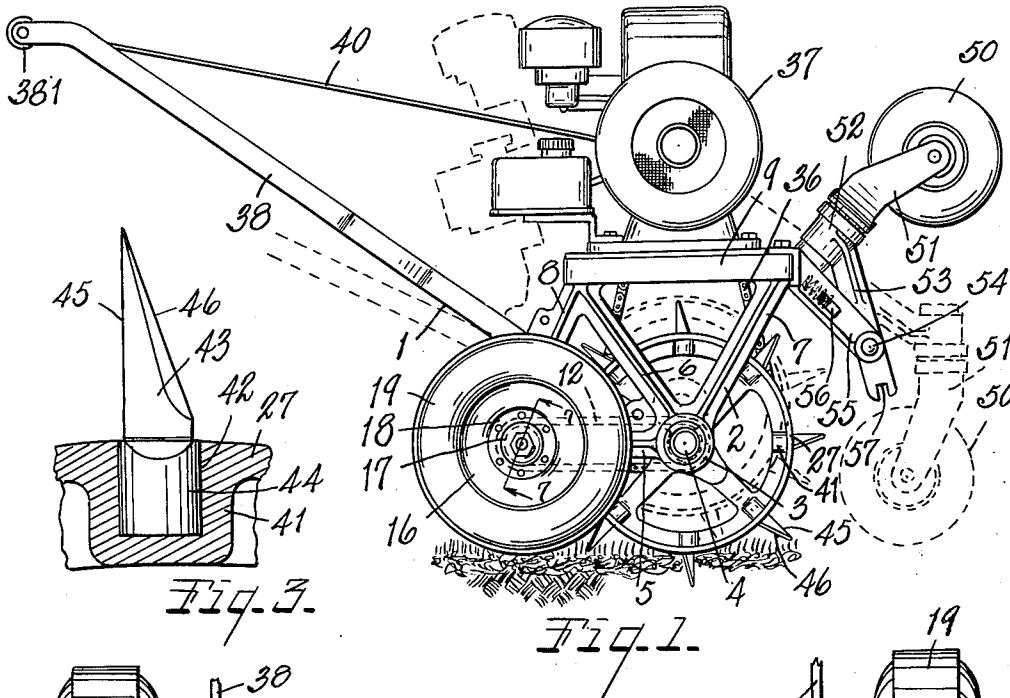
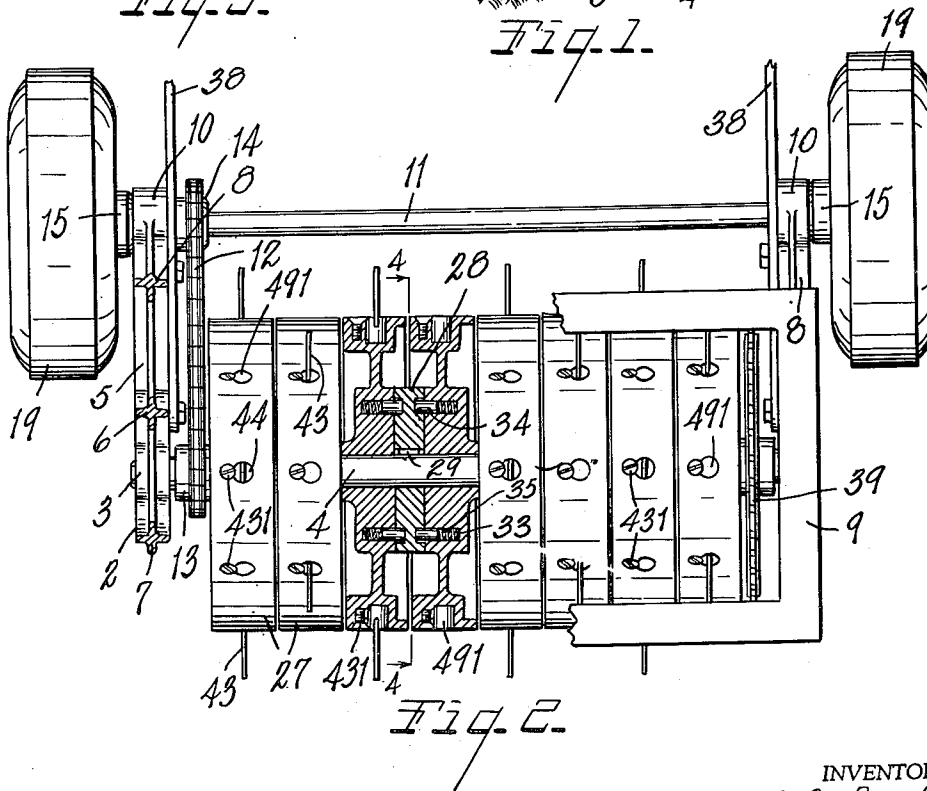
E. C. DONTJE

2,314,035

TURF SPIKING MACHINE

Filed April 7, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

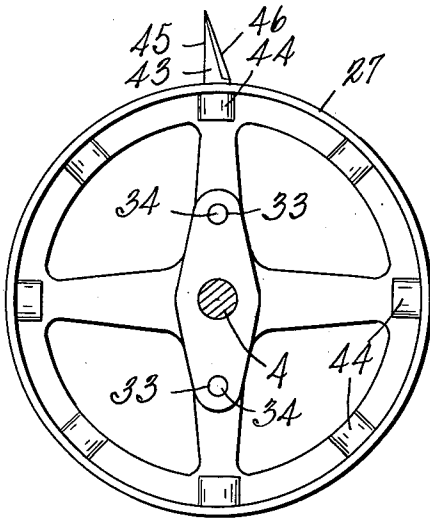


Fig. 4.

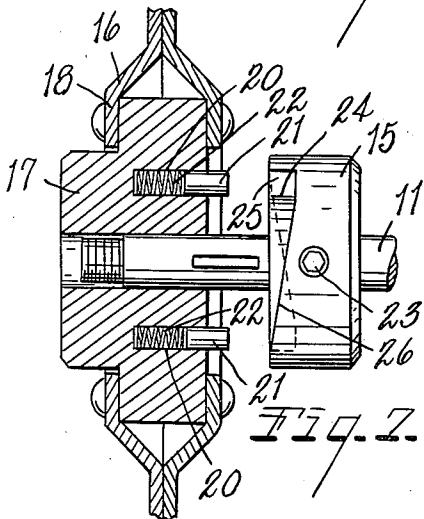


Fig. 7.

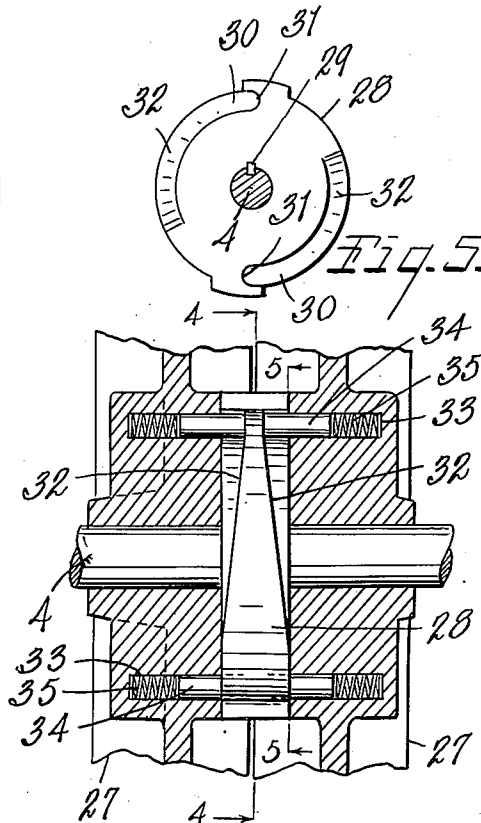


Fig. 5.

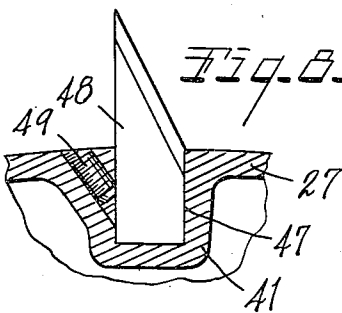


Fig. 8.

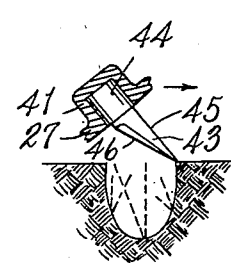


Fig. 9.

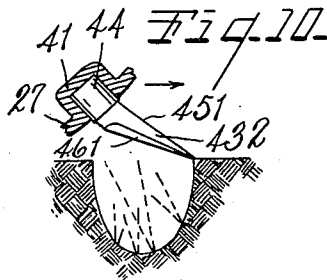


Fig. 10.

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UNITED STATES PATENT OFFICE

2,400,035

CARBURETOR ACCELERATING PUMP

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Original application March 13, 1942, Serial No. 434,485, now Patent No. 2,355,346, dated August 8, 1944. Divided and this application January 24, 1944, Serial No. 519,417

4 Claims. (Cl. 261—34)

This invention relates to new and useful improvements in carburetor pumps for supplying supplemental fuel to an internal combustion engine and, more particularly, to thermostatic means for controlling the quantity of supplemental fuel.

An object of the invention is to provide thermostatic means which will positively limit the quantity of supplemental fuel discharged by the pump.

The invention consists in the improved construction and combination of parts to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing to be taken as a part of this specification there is fully and clearly illustrated a preferred embodiment of the invention, in which drawing:

The figure is a diagrammatic view in vertical section of a carburetor and supplemental fuel supply pump embodying the invention.

Referring to the drawing, the carburetor has a casing 40 with a mixture passageway 41 there-through leading from a main air inlet 42 and having a fuel air mixture outlet 43 for connection to the engine cylinders. In the passageway 41 there is a converging diverging throat 44 such as a Venturi tube and discharging substantially at the throat there is a main fuel nozzle 45 fed with fuel from a constant level float chamber 46. Within the float chamber 46 there is a float operated inlet valve 47 controlling the admission of liquid fuel to the float chamber 46 and actuated by the float member 48 to maintain a substantially constant fuel liquid level, say at the line L—L.

Positioned within the float chamber 46 there is a fuel pump 49 having a tubular cylindrical casing 50 in which there is slidably fitted a reciprocable fluid displacement member 51 in the form of a hollow downward open piston. Positioned within the pump chamber 52 between the piston 51 and casing 50 there is a helical coil spring 53 which tends to move the piston 51 through its suction stroke. Through the end wall 53^a of the casing 50 there is a check valve controlled inlet 53^b leading from the float chamber 46 to the pump chamber 52. A piston rod 54 extends upward from the upper end of piston 51 and has a longitudinally extending discharge conduit 55 therethrough leading from the pump chamber 52. The upper end portion 56 is reciprocally guided and suitably packed in the bore

of a fitting 57 which is carried by the casing 40. An outlet check valve 58 is provided in the conduit 55 to prevent back flow through conduit 55 into the pump chamber 52. The fitting 57 has its bore 59 discharging through a calibrated jet 60 into the passageway 41, an air bleed 61 being provided to supply atmospheric air to the bore 59 to break the suction effect from passageway 41 on the pump chamber 52. The air admitted by this bleed 61 also aids in discharging the fuel from bore 59 into the passageway 41. The piston rod 54 extends through an opening in a cover plate 62 on the float chamber 46 and has an operating arm 63 extending laterally therefrom.

In the mixture passageway 41 there is a throttle valve 64 with an operating arm 65 extending from its shaft and connected by lost-motion linkage 66 to the rod arm 63. The linkage 66 includes a pair of lever arms 67, 68 pivotally connected to each other and to a supporting arm 69 by a common pivot pin 70, the arm 69 extending from the casing 40. The free ends of the levers 67, 68 are connected by a tension spring 71 so that free ends of the levers may move away from each other. A stop 72 on the lever 67 is in the path of movement of lever 68 so that the movement of the levers toward each other by the spring 71 is limited. The free end of lever 67 is connected by a link 73 to the throttle arm 65. A link or thrust member 74 connects the free end of lever 68 to the rod arm 63.

Extending downward from the bottom wall 75 of the float chamber 46 there is a tubular supporting member 76 having an aperture through its upper end wall 77 aligned with an aperture through the bottom wall 75, which apertures are aligned with the piston rod 54 extending through and slidably fitting the aligned apertures and sealed therein against leakage of liquid by packing material there is a rigid thrust rod 78 having one end extending into the float chamber 46 and supporting the casing 50 by engagement with the end wall 53^a. The other end of the rod 78 extends into the supporting member 76 and has, at its lower end, a head 79. Interposed between the end wall 77 and the head 79 there is a helical coil spring 80 tending to move the rod 78 downward. Carried by the lower end of the supporting member 76 there is a temperature responsive member or thermostat 81, having a rigid cup member 82 with its open side facing the bore of the supporting member 76. The open side of the member 82 is sealed by a pres-

sure responsive member or diaphragm 83 on which the rod or thrust member 78 seats. Within the expansible collapsible chamber formed by the cup member 82 and the diaphragm 83 there is a crystalline temperature responsive material 84 and a force conveying liquid 85. The material 84 may be of any of the known crystalline materials which undergoes a change of state in the desired operating range, such that it exerts a large positive force and has a high degree of expansion and contraction, such for example as is described in the patent to Vernay 2,115,501 dated April 26, 1938.

The operation is as follows: When the engine is operating in a cold condition, the thermostat and pump casing 50 will be in the positions shown so that upon opening movement of the throttle valve 64, discharge of fuel from the chamber 52 will occur. When the temperature to which the thermostat 81 is subjected reaches the desired operating temperature for the engine; the crystalline material 84 will undergo its change of state, thereby moving the thrust rod 78 upward so as to position the casing end wall 53 for abutting relation with the end of the pump piston 51 so as to positively obstruct its complete discharge stroke. The throttle valve 64 is permitted its full travel by reason of the lost-motion linkage 66 due to the stretching of spring 71 as the stop 72 moves away from lever 68.

Although the carburetor as shown is of the plain tube posterior throttle type, it will be apparent that the invention is equally applicable to the anterior throttle type of carburetor or to the air-fuel proportioned type of carburetor.

This application is a division of my copending application Serial No. 434,485, filed March 13, 1942, for Carburetor accelerating pump, now Patent 2,355,346.

What is claimed and is desired to be secured by Letters Patent of the United States is:

1. In a carburetor, a throttle valve, a supplemental fuel supply pump having cooperable longitudinally reciprocal piston and cylinder members, temperature responsive means operable to move one of said members upon temperature increase into position within the discharge stroke of and for longitudinal abutment by the other member to stop movement of the other member, and lost-motion linkage operatively connecting said other member to said throttle valve and operable to permit continued throttle valve opening movement when said other member is stopped by said one member.

2. A supplemental fuel supplying means for a carburetor, comprising a constant level fuel chamber, a movable pump casing in said chamber, a movable piston fitting said casing and operable to discharge fuel therefrom, said casing being movable into the path of piston movement on its discharge stroke, lost-motion throttle operated means for actuating said piston, supporting means extending from an exterior wall of said chamber in line with said casing, a thermostat carried by said supporting means, the wall of

said chamber having an aperture therethrough in line with said casing, and a thrust rod carried by said supporting means and movable by said thermostat, said thermostat including a pressure operated member concentric with and acting on said thrust rod, said thrust rod extending through said aperture and supporting said casing and being operable by said thermostat to position said casing for engagement by said piston thereby to determine the quantity of fuel discharged from said casing on the discharge stroke of said piston.

3. A supplemental fuel supplying means for a carburetor, comprising a constant level fuel chamber, a movable pump casing in said chamber, a movable piston fitting said casing and operable to discharge fuel therefrom, said casing and piston being engageable with each other to limit the discharge stroke of said piston, throttle operated means for actuating said piston and including a lost-motion connection so that the throttle can have continued movement upon stopping of said piston by said casing, supporting means extending from an exterior wall of said chamber in line with said casing, a rigid cup member carried by said supporting means and having an open side facing said casing, means movable by pressure and sealing said open side, thermostatic material contained in said cup member and operable upon expansion to move said sealing means, the wall of said fuel chamber having an aperture therethrough in line with said casing, and a thrust rod carried by said supporting means and movable by said sealing means, said thrust rod extending through said aperture and supporting said casing, said thermostatic material acting on temperature increase to move and position said pump casing for engagement by said piston thereby to determine the quantity of fuel discharged from said casing on the discharge stroke of said piston.

4. In a carburetor, a main casing having a mixture passageway and a constant level fuel chamber, a throttle valve controlling flow through said passageway, a pump casing in said chamber and having a pump chamber, a tubular piston in said pump chamber engageable with the end wall of said pump casing to limit the discharge stroke of said piston, a piston rod extending from said piston and having a discharge conduit leading from said pump chamber, said main casing having a bore discharging into said passageway and slidably receiving said rod, lost-motion linkage operatively connecting said throttle valve to said piston rod, a tubular supporting member extending externally from the bottom wall of said fuel chamber and aligned with said piston rod, a crystalline material thermostat carried by said supporting member and having a movable wall, said bottom wall having an aperture therethrough and a thrust rod extending from said movable wall through said aperture and supporting said pump casing to position the end wall of said casing for abutment by said piston to limit the piston discharge stroke.

WALTER H. WEBER.