Feb. 6, 1940. E. OLSON 2,189,219

CARBURETOR

Filed Jan. 13, 1933

Fig. 1

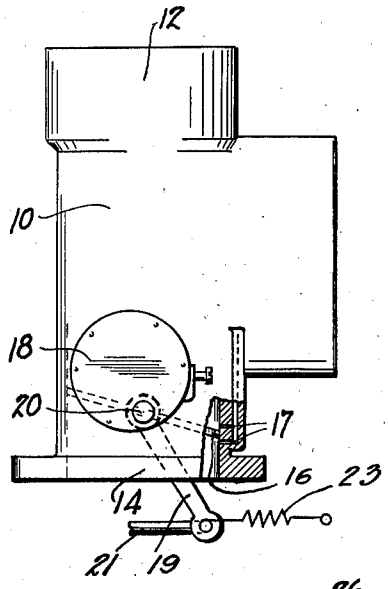


Fig. 4

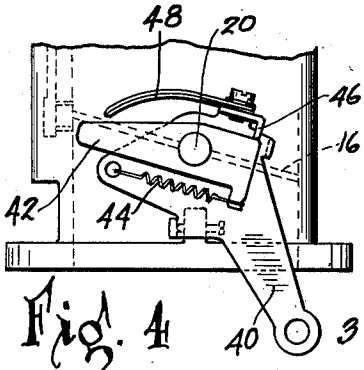


Fig. 2

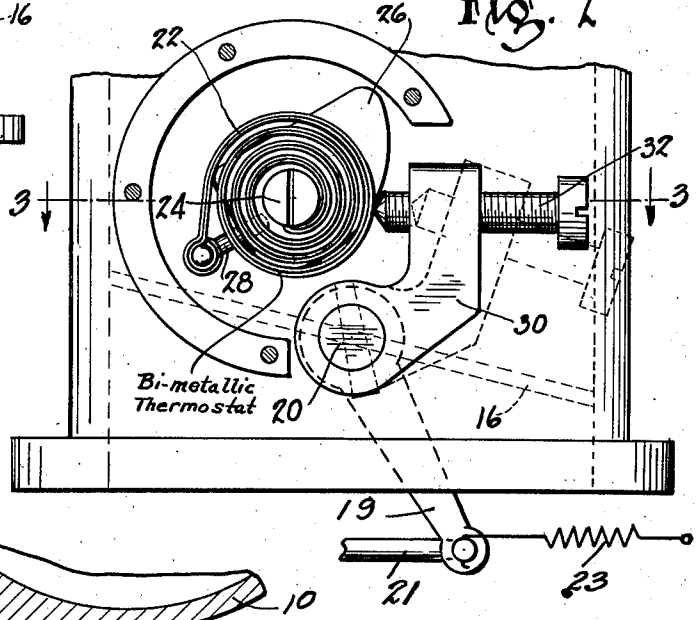
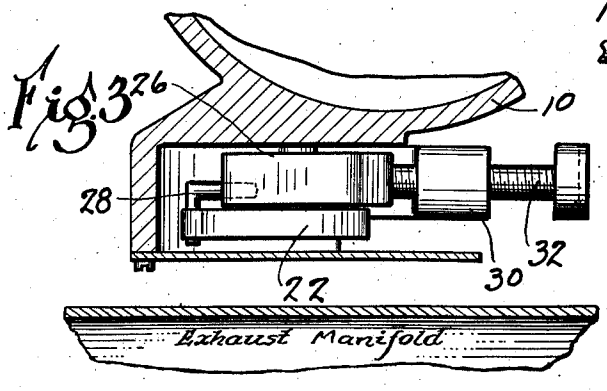


Fig. 3



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Patented Feb. 6, 1940 2,189,219

UNITED STATES PATENT OFFICE

2,189,219

CARBURETOR

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Application January 13, 1933, Serial No. 651,589

4 Claims. (Cl. 123—119)

This invention relates to carburetors for internal combustion engines and has for its principal object to prevent stalling of the engine, when it is cold, by providing a thermostatic control of the throttle to set it for a fast idle when the engine is cold and to reset it to gradually reduce the idling speed as the temperature increases.

Internal combustion engines using a mixture of liquid fuel and air require a very fine adjustment of the ratio of fuel to air in the mixture when the engine is cold, and if this ratio is not maintained the engine is apt to stall, particularly when the throttle is suddenly closed to bring the engine to idling speed. A fast idling speed will generally prevent stalling the engine if the mixture ratio is maintained within reasonable limits, and will at the same time shorten the time necessary to warm up the engine. In the prior art of which I am aware, the copending application of Hunt, Serial No. 630,274, filed August 24, 1932, and Hunt Patent 2,015,753 being examples, stalling of a cold engine is prevented by providing for a fast idle so long as the engine remains below a predetermined temperature and providing for a slow idle when the engine reaches and exceeds this temperature.

The present invention, broadly speaking, improves upon the devices of the prior art by providing a thermostatically controlled stop member arranged to idle the engine fast when it is cold and to decrease the idling speed proportionally to temperature rise of the engine.

My invention will be best understood from the detailed description and claims which follow, reference being had to the accompanying drawing in which a preferred embodiment of the invention is shown by way of example and in which:

Figure 1 is an elevational view of a carburetor with the device of the invention attached thereto;

Figure 2 is a fragmentary view drawn to an enlarged scale and showing the control mechanism with the cover removed;

Figure 3 is a cross sectional view taken along the line 3—3 of Figure 2 looking in the direction of the arrows; and

Figure 4 is a fragmentary elevational view of a modified form of apparatus.

Referring now to the drawing in more detail, the carburetor 10 has an air intake horn 12, and a mixture outlet horn 14 which is controlled by throttle 16, and the control mechanism, indicated generally at 18, is mounted upon the casing of the latter horn adjacent to the throttle shaft 20. The throttle valve 16 may be manually actuated by an arm 19 fixed to the throttle shaft 20. The arm 19 is adapted to be rotated in the clockwise direction to open the throttle by a rod 21 and is yieldingly urged in the opposite direction to close the throttle by a spring 23. As shown, the carburetor is of the plain tube down draft type, this type being shown by way of example only as the invention is applicable to any preferred type of carburetor.

The control mechanism comprises a thermostat 22, preferably a bimetallic element of the type shown in the application of Hunt, Serial No. 647,641, filed December 16, 1932, which is fixed at one end to a stationary shaft 24. A rotatable stop member 26 floats upon shaft 24 and carries a pin 28 to which the free end of the thermostat element is attached. The thermostat is enclosed in a suitable casing 18 which is mounted on the carburetor so as to be in juxtaposition to the engine, preferably to the exhaust manifold thereof. Throttle shaft 20 carries an arm 30, keyed thereto, and through which is threaded an adjustable stop screw 32. The end of this screw engages the eccentric surface of member 26, to limit the counterclockwise rotation of the shaft as the throttle is closed.

When the engine is cold, thermostat 22 rotates member 26 in the clockwise direction so that movement of the throttle towards closed position is arrested by the engagement of screw 32 with the hill or projecting portion of member 26, before the throttle is fully closed, the arm 30 being arrested when it is in some intermediate position such as that shown in dotted lines in Figure 2. Sufficient mixture is admitted to the engine to cause it to idle at a sufficiently rapid rate to insure that it will not stall. As the engine heats up, thermostat 22 rotates stop member 26 counterclockwise on shaft 24, bringing that portion of the stop member which is nearer to the center of the shaft into engagement with the screw. This permits the throttle to close more nearly completely. When the engine reaches normal operating temperature, arm 30 is positioned as shown in full lines, and the throttle is fully closed. At this time fuel mixture is drawn into the engine through idling ports 17 which by-pass the closed throttle, and the engine idles at a slow speed. The movement of member 26, during the warming up period of the engine, is directly proportional to temperature and the advance of the throttle towards closed position is directly proportional to the position of the member 26, so that the arrangement functions to grade down the speed of

the engine as the temperature increases. By adjusting screw 32 the speed of the fast idle may be regulated.

In the modification shown in Figure 4 throttle control lever 40 floats upon throttle shaft 20, which is located to one side of the center of the throttle 16 to unbalance the same. Arm 42 is keyed to the shaft 20 and coupled to lever 40 by a spring 44. Lever 40 carries a stop 46 against which arm 42 is forced by the high vacuum on the posterior face of the throttle, when the throttle is closed, against the tension of spring 44. When the engine begins to stall, the vacuum on the posterior face of the throttle falls and spring 44 rotates arm 42 to open the throttle. A thermostat element 48 is fixed to lever 40 and arranged to bend when warm towards arm 42 and to straighten out away from the arm when the engine is cold. Movement of the arm by spring 44 to open the throttle is arrested by the thermostat, and the throttle will be open widest when the thermostat is straight and consequently farthest from the arm. As the engine heats up, thermostat 48 approaches the normal position of arm 42, and the amount that the throttle is opened is reduced as a function of temperature.

While I have chosen to illustrate my invention by describing a preferred embodiment of it, I have done so by way of example only and am not to be limited by the precise details shown in the example.

What is claimed is:

1. A control mechanism for an internal combustion engine carburetor having a throttle, comprising a shaft, a thermostat element fixed to the shaft, a rotatable stop member floating on the shaft, means connecting the thermostat to the stop member to rotate the same proportionally to temperature, and means associated with the throttle and engaging the stop member to prevent closing the throttle.

2. In a carburetor having a main induction passage, a throttle shaft rotatably mounted in the induction passage, a throttle valve fixed to the throttle shaft and controlling the outlet of the induction passage, an adjustable stop member fixed to the throttle shaft, manual means to actuate the throttle valve, a rotatable member adapted to coact with the stop member to limit the closing movement of the throttle valve, and thermostatic means to vary the relation between the rotatable member and the stop member in accordance with temperature.

3. A control mechanism for an internal combustion engine carburetor having a throttle adapted to control the flow of fuel mixture to the engine, manual means to actuate the throttle, means to prevent the throttle from completely closing comprising a thermostat, a cam rotated by said thermostat independently of said manual means, an arm fixed with respect to said throttle, and adjustable means on the arm engaging the cam to limit the closing movement of the throttle in a degree inversely proportional to the temperature.

4. Control mechanism for an internal combustion engine carburetor having a throttle, comprising a shaft, a stop member oscillatably floating on the shaft and eccentric with respect thereto, a temperature responsive member positioned in heat exchange relation to a portion of the engine and connected to the stop member to actuate the same, and an adjustable stop member associated with the throttle and cooperating with the oscillatable stop member to limit closing movement of the throttle in a degree varying inversely with the temperature.

ELMER OLSON.

DISCLAIMER

2,189,219.—*Elmer Olson*, South Bend, Ind. CARBURETOR. Patent dated February 6, 1940. Disclaimer filed January 22, 1942, by the assignee, *Bendix Aviation Corporation*.

Hereby enters this disclaimer to claims 1 and 4 of said patent.

[*Official Gazette February 17, 1942.*]