Feb. 25, 1936. J. E. WILD ET AL 2,031,625

REGULATING DEVICE FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 28, 1933 2 Sheets-Sheet 1

Fig. 1.

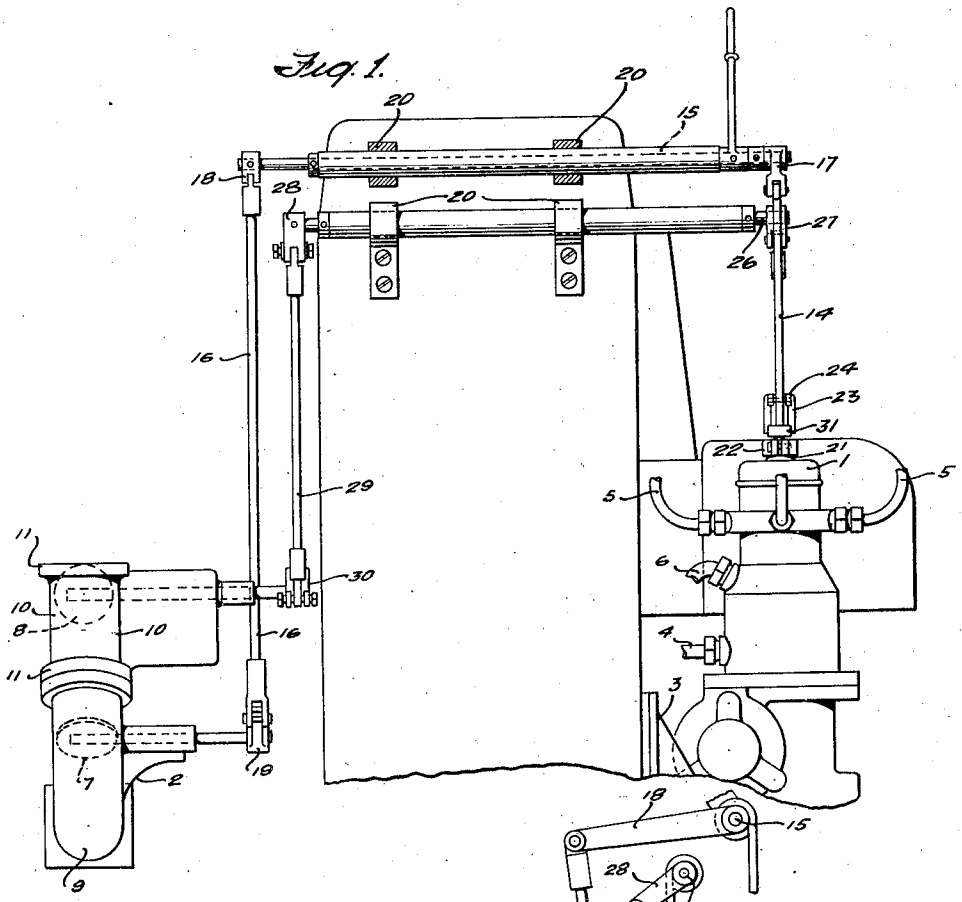


Fig. 3.

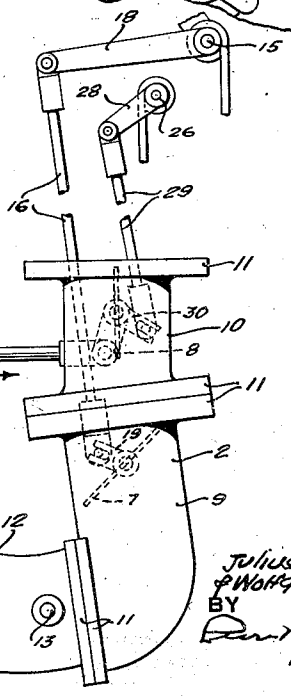
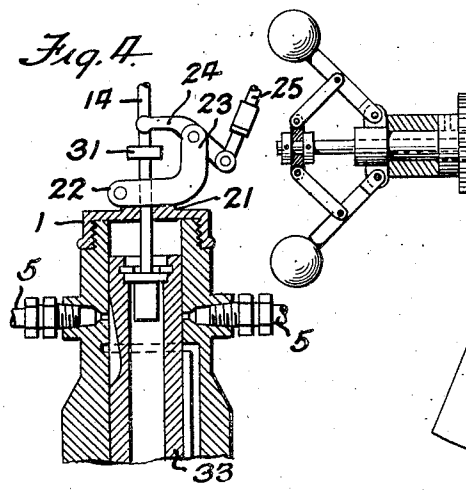


Fig. 4.



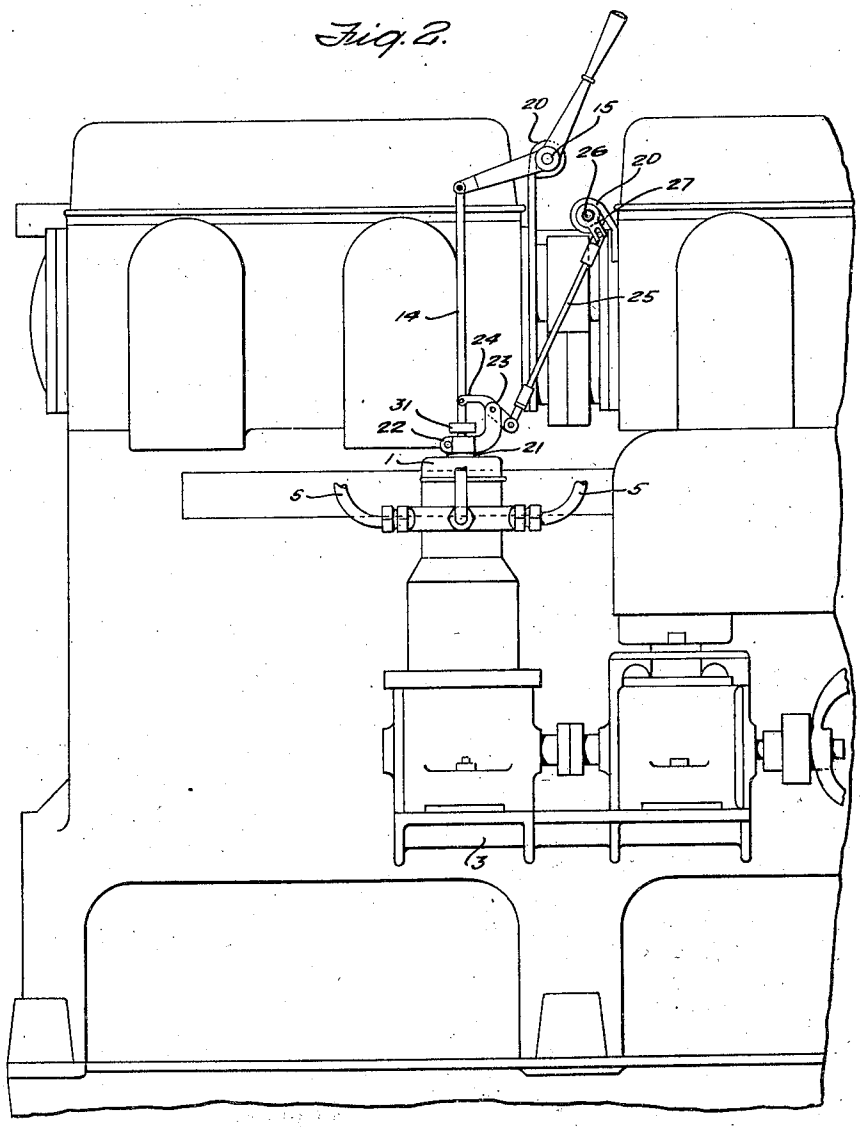
INVENTORS
Julius E. Wild
& Wolfgang E. Schwarzler
BY
ATTORNEY

Feb. 25, 1936. J. E. WILD ET AL 2,031,625

REGULATING DEVICE FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 28, 1933 2 Sheets-Sheet 2

Fig. 2.



INVENTORS
Julius E. Wild
& Wolfgang E. Schwarzmann
BY
ATTORNEY

Patented Feb. 25, 1936 2,031,625

UNITED STATES PATENT OFFICE

2,031,625

REGULATING DEVICE FOR INTERNAL COMBUSTION ENGINES

Julius E. Wild, Springfield, and Wolfgang E. Schwarzmann, Longmeadow, Mass., assignors to United American Bosch Corporation, Springfield, Mass., a corporation of New York

Application November 28, 1933, Serial No. 700,062

4 Claims. (Cl. 123—138)

Our invention relates to improvements in controlling devices for internal combustion engines.

An object of the invention is to provide a controlling device for regulating both the fuel and air valves of the engine preferably in unison.

Another object of the invention is to provide a controlling device which includes both manual and mechanical operating members, the latter of which is preferably actuated at a predetermined speed of the engine and supersedes the manual actuation.

On the drawings:

Fig. 1 is a front view of our controlling device mounted upon an internal combustion engine one portion of which is shown in outline, other portions having been removed for the sake of clearness;

Fig. 2 is a side view of parts of the device as seen from one side of the engine;

Fig. 3 is a view of parts of the controlling device in the relative position they occupy when mounted upon the opposite side of the engine shown in Fig. 2; and

Fig. 4 shows a section, with parts in side elevation, of a portion of the distributor.

The casing 1 of a liquid fuel distributor may be mounted at the right of the engine, and housing 2, through which air flows, at the left of the engine. The casing 1 is held in place by a bracket 3 adapted to be affixed to the body of the engine. Liquid fuel is received in the casing 1 through supply pipe 4 and discharged therefrom through delivery pipes 5 leading to the separate cylinders of the engine, the rotor 33 of the fuel distributor being driven by an appropriate engine shaft and permitting fuel to flow to the delivery pipes in succession at the required intervals. Excess fuel is returned to the supply tank (not shown) through an overflow pipe 6.

The bore of the housing 2 is controlled by a pair of damper valves 7 and 8 which by their positions determine the amount of air drawn in by the engine to vaporize the fuel. It is made in sections, of which 9 contains the pivoted valve 7 and 10 contains the pivoted valve 8. The section 10 is secured to the upper end of the section 9 by flanges 11 and suitable means, such as bolts and nuts, (not shown), which hold the flanges 11 together. The upper end of the section 10 may have another flange 11 for bolting it to the intake manifold. To the lower end of the section 9 is attached a section 12 by means of additional flanges 11 and this section may contain a choke valve pivoted at 13. Valve 7 is controlled by hand. Valve 8 is controlled by a governor and remains in fully open position until the engine attains the predetermined speed at which the governor acts.

The rod 14 enters the top of the casing 1 and is connected to the upper end of the rotor of the fuel distributor so as to allow the rotor to turn freely but to be raised and lowered with it to vary the amount of fuel passing to pipes 5. A fuel distributor of this type is shown in Fig. 4 from which it will be seen that longitudinal movements of the rod 14 are transmitted to the rotor of the distributor bringing greater or lesser areas or depths of a fuel metering groove into registry with delivery pipes 5. The details of the distributor form no part of the present invention and need not be further described. The spindle 15 is arranged to raise and lower the rods 14 and 16 in unison, being provided with a rigid arm 17 pinned to the rod 14 and a second rigid arm 18 pinned to the rod 16. The lower end of the rod 16 is pinned to an arm 19 on the outside of housing 2 and rigid with valve 7. The bearings 20 are secured to the framework of the engine to rotatably support the spindle 15. A suitable kind of hand lever is attached to spindle 15 to turn it to reduce or increase as required both the amount of air flowing past the valve 7 and the amount of fuel discharged into pipes 5.

To enable both the air and the fuel to be shut off by a governor we provide additional connections to operate valve 8. As shown in Fig. 2, the top of casing 1 has a boss 21 through which the rod 14 passes. Around this boss is secured a clamp 22 which is angle-shaped and has a pair of separate lugs 23 forming a yoke at its upper end. Pivotally secured between these lugs is a lever 24 pivoted to rod 25, and actuated by spindle 26 mounted in bearings 20 like those for spindle 15. At one end spindle 26 carries a rigid arm 27 pinned to the upper end of the rod 25, and at the other end it carries a similar rigid arm 28 connected by rod 29 to a bell-crank lever 30 on the outside of housing 2 and rigid with the rotatable valve 8. On the rod 14 between lever 24 and clamp 22 is a fixed collar 31. The end of the lever 24 above this collar is forked so that when lowered it engages the collar 31 and depresses the rod 14. A suitable type of governor is connected to the other arm of the bell-crank lever 30.

Until the engine reaches a predetermined high speed, the governor does not act and valve 8 remains fully open. Under these conditions, spindle 15 can be turned by the hand connections to adjust both the valve 7 and the distributor

rotor in casing 1 in unison, the rod 14 being free to move the rotor up and down for a distance equal to that between lever 24 and collar 31. When, however, the predetermined speed is reached, the governor pulls upon bell-crank 30 and turns valve 8 to closed position. At the same time spindle 26 is turned and lifts rod 25 to cause lever 24 to depress the collar 31. Then the rod 14 will be lowered and the rotor in the casing 1 will be so adjusted as to reduce the fuel discharge from the distributor 1 through the conduits 5. When the engine speed drops, the spindle 26 will of course be turned in reverse direction and the lever 24 will lift so as to liberate the rod 14 to be again regulated by hand as required. The hand controlling means for the device is thus independent of the governor at all times until the limiting speed of the engine is reached.

The body of the engine, as shown, will be between the fuel distributor casing 1 and the housing 2 and the governor connected to the lever 30 will be driven from the engine by any suitable connection.

Having described the invention, what is claimed is:

1. A controlling device for an internal combustion engine having a fuel distributor and means providing a passage for the supply of combustion supporting air to the engine, a valve in said passage, a lever and a rod connected to actuate said valve, a spindle having an arm thereon also connected to said rod, a fuel control rod entering said distributor, another arm on said spindle, elements providing a lost motion connection between the last named arm and the rod entering the distributor, a governor responsive to the speed of the engine, and connecting means between the valve and the governor so that as the speed of the engine increases the governor first actuates the valve toward closed position and subsequently adjusts the distributor through said lost motion connection to decrease the quantity of fuel supplied to the engine.

2. A controlling device for an internal combustion engine comprising a fuel distributor, a fuel control rod entering said distributor, a collar on said rod, means providing a passage for the supply of combustion supporting air to the engine, a device responsive to the speed of the engine, a valve in said air passage connected to said device, and connections between the valve and said rod including a forked lever to actuate the rod by engaging the collar, whereby as the speed of the engine increases said speed responsive device first actuates the valve toward closed position and subsequently adjusts the distributor through the lost motion connection provided by said forked lever and collar to decrease the quantity of fuel supply to the engine, said rod under other conditions being free to move independently with respect to the distributor.

3. A controlling device for an internal combustion engine comprising a fuel distributor, means providing an air passage for the supply of combustion supporting air to the engine, a rod entering the distributor and having a collar thereon, a rotatably mounted spindle connected to reciprocate said rod, a valve in said air passage, a second rod connected to enable said spindle to actuate said valve, a device responsive to the speed of the engine, a second valve in said air passage connected to said device, a second rotatable spindle, a rod also connecting said second spindle to said second valve, a lever having a forked end mounted adjacent the rod entering the distributor in position to engage the collar thereon and an additional rod connecting the second-named spindle to said lever, said collar and lever providing lost motion between said distributor and said device whereby said device is effective to control the latter at high speeds only.

4. A controlling device for an internal combustion engine comprising means for supplying metered charges of liquid fuel to said engine, a passage for the supply of combustion supporting air to said engine, a valve in said passage, manually controlled means to simultaneously regulate the fuel metering means and said valve whereby the quality of air supplied to the engine and the quantity of fuel supplied thereto may be simultaneously increased or decreased, a second valve in said passage, a device responsive to the speed of said engine for controlling said second valve and tending to close the same as the speed increases, and connections including a lost motion means between said second valve and said fuel metering means acting to transmit movement of said speed responsive device to control said fuel metering device to effect a decrease in the fuel supplied by said metering device to a predetermined maximum for given engine speed while permitting a further control of the fuel supply by the manual control means for all charges below said predetermined maximum.

JULIUS E. WILD.
WOLFGANG E. SCHWARZMANN.