May 3, 1932. H. H. CONOVER 1,856,466

FUEL FEED TIMING DEVICE

Filed April 29, 1929

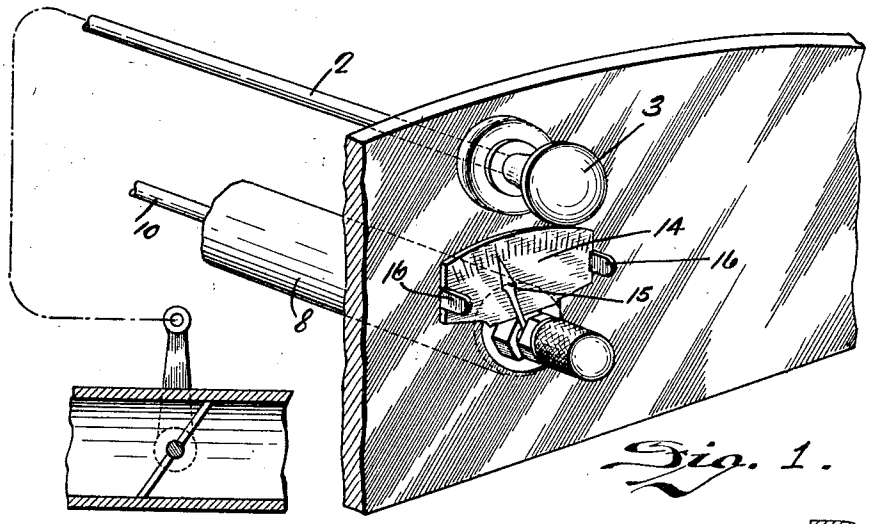

Fig. 1.

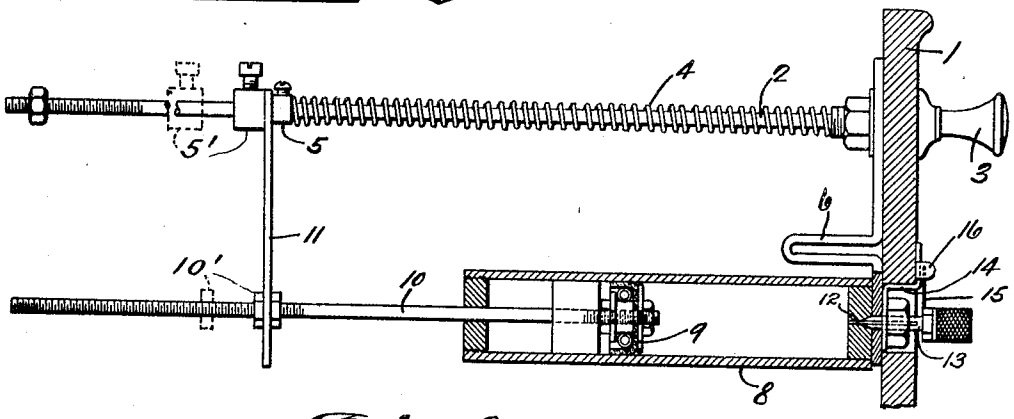

Fig. 2.

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FUEL FEED TIMING DEVICE

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My invention relates to explosive engines and more particularly to a fuel feed timer for effecting a gradual change of fuel supply condition, through a predetermined period of time, which period may be increased or shortened at will to meet varying climatic, temperature or atmospheric conditions.

In the present invention there is contemplated a fluid pressure controlled timer for governing the operation of a fuel control device which preferably though not necessarily may be the choke valve of the carburetor, but which might otherwise be a supplemental fuel supply valve or an auxiliary air valve or other device adapted for periodic operation, the time interval of which it may be desired to increase or diminish.

The present device consists of a manually operable actuator rod having a retracting spring for returning the rod after each operation. Associated therewith is a cylinder having therein a reciprocatory piston fixedly connected with the actuator rod for unison movement in both directions. The piston moves freely in one direction under manual operation of the actuator rod and against the tension of the retracting spring. Its return movement under the influence of the retracting spring is more or less retarded by fluid pressure influence. Such fluid pressure regulation may be effected by "suction" or atmospheric pressure wherein air expelled from the cylinder during the movement of the piston under manual actuation of the rod is allowed to gradually re-enter the cylinder through a bleed hole or small port controlled by a needle valve adjustable to permit the air to enter in greater or less volume. As an alternative construction, air may be drawn into the cylinder during the free movement of the piston under influence of the manually actuated rod, the piston and rod being permitted to return under influence of the retracting spring only as the entrapped air escapes through the restricted orifice or bleed hole which, as before mentioned, may be controlled by an adjustable valve which determines the extent of the operative period. In lieu of air, other fluids may be employed, as for example, oil which may be drawn into and expelled from the cylinder by the alternating movements of the piston. As a further variation or modification, the cylinder may be subjected to suction by being connected to the intake manifold of an explosive engine whereby the suction effect of the engine will be exerted in opposition to the retracting spring thereby affording an adjustment of the fuel supply in accordance with the engine requirement.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they will not only be cheapened in construction but will be more efficient in use, positive in operation, uniform in action, capable of being readily and easily adjusted to vary the extent of the operative period, and unlikely to get out of repair.

A further object of the invention is to provide a fuel feed timer which may be set to effect the gradual adjustment of an operated member, whether it be the choke valve of a carburetor, an auxiliary air valve or a supplemental fuel valve, throughout a predetermined period of time, the duration of which may be lengthened or shortened at will.

A further object of the invention is to provide such fuel feed timer which is easily and readily applicable to automobiles of popular and conventional design.

A further object of the invention is to provide such a fuel feed timer with means within easy reach of the driver for effecting variation of the predetermined operation period.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof and the mode of operation or their equivalents as hereinafter described and set forth in the claims.

Referring to the accompanying drawings wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a perspective view of a portion of a motor vehicle dash illustrating the application thereto of the present fuel feed timer device and the relation of its parts extending forwardly of and concealed behind the vehicle dash with the time regulat-

ing adjustment means in full view and within easy reach of the driver.

Fig. 2 is a longitudinal sectional view of the assembled timer device arranged for "suction" or atmospheric pressure control. That is to say, in the construction shown in Fig. 2, the air is expelled from the cylinder by the manual operation of the actuator rod and piston which are permitted to return as the air gradually re-enters the cylinder.

Like parts are indicated by similar characters of reference throughout the several views.

In the drawings, 1 indicates the dash or cowl board of a motor vehicle through which projects a reciprocatory actuator rod 2. This rod 2 is operatively connected with the carburetor choke valve, with a supplemental fuel supply valve or other fuel regulating device. At its forward end beyond the dash 1, the actuator rod carries a knob 3 by which it may be manually operated to adjust such fuel regulating device through its maximum range of adjustment. This manual adjustment of the actuator rod 2 is effected against the tension of a retractive spring 4 surrounding the rod 2. In the drawings, this retracting spring 4 has been shown abutting at one end upon a collar 5 carried by the reciprocatory rod 2 and at its opposite end engaging with the mounting within which the rod has its bearing for longitudinal movement. Such mounting includes a bracket member 6 disposed behind the dash or cowl board 1 and supporting in spaced relation the guide bushing or bearing 7 for the reciprocatory rod 2 and a cylinder 8 disposed in parallel spaced relation with such rod 2. The cylinder 8 is fixedly secured to the supporting bracket 6 which is in turn secured to the rear side of the dash or cowl board 1. Mounted for reciprocatory motion within the cylinder 8 is a piston head 9 from which projects a stem 10 extending beyond the cylinder 8. The piston stem 10 is fixedly connected with the reciprocatory actuator rod 2 by a cross arm 11, whereby the piston and rod will move to and fro in unison through ranges of movement of like extent.

Referring particularly to Fig. 2, the movement of the piston 9 as the actuator rod 2 is withdrawn expels the entrapped air from the cylinder 8. This air may pass freely about the piston head 9 which is provided with a self-sealing cup leather. This cup leather will permit the escape of the air from the cylinder 8 but resists the re-entrance of such air about the piston head during the reverse travel of the piston. The spring 4 having been placed under compression by the withdrawal of the actuator rod 2 at the same time that the piston 9 is advanced toward the right hand end of the cylinder 8, such spring by its reaction tends to return the rod and piston when the rod has been released. This tendency of the spring to retract the piston 9 produces a moderate degree of vacuum within the cylinder 8. The cylinder head is provided with a small inlet port or bleed hole 12 controlled by a needle valve 13. The piston is permitted to travel and with it the actuator rod 2 under influence of the spring 4 only so fast as air is permitted to enter the cylinder 8 through the inlet port 12.

Secured to the supporting bracket 6 and disposed over the face of the dash or cowl board 1 is a dial plate 14 having thereon a series of graduations with which cooperates an indicator hand or pointer 15 carried by the needle valve 13. The dial plate 14 is provided at each side with a stop ear 16 which limits the movement of the indicator hand or pointer 15 and thereby limits the adjustment of the needle valve 13 in either direction. The plate or dial 14 is graduated to represent intervals of time which may vary from a few seconds to several minutes. The indicator hand or pointer 15 is so positioned relative to the needle valve 13 that when adjusted to the maximum period it will not completely close the port 12 but will so nearly close such port that it will require a considerable period of time, that is, perhaps several minutes of time for sufficient air to slowly leak into the cylinder 8 to permit the piston 9 and with it the actuator rod 2 to complete their full return stroke under influence of the retracting spring 4. By adjusting the needle valve 13 toward the opposite extremity of the range of movement of the indicator hand or pointer 15, the port 12 will be more widely opened, permitting the air to enter more rapidly and hence decreasing the period of operation.

This device is particularly useful in starting the motor of an automobile. During a time of low temperature or under certain barometric conditions, more or less difficulty is experienced in starting the motor and it is desirable to supply a rich mixture over a greater or less interval of time. To the contrary, when the weather is warm or under different atmospheric conditions, such preliminary or priming charge will not be required through so long an interval. The present device enables the driver by adjustment of the needle valve 13 which is within easy reach, to adjust the timer so that a gradual tapered priming charge will be admitted to the engine. That is to say, whereas the usual carburetor choke device when operated will continue to afford a maximum charge of fuel until it is again manually readjusted, the present device is manually operated to give the maximum charge from which point the charge is gradually and uniformly reduced by the action of the present timer mechanism throughout a predetermined period of time.

By adjustment of the valve 13, the initial priming charge may be either quickly but

uniformly reduced or such reduction may be continued through a considerable interval of time. Thus the priming charge may be proportioned to the temperature and atmospheric conditions but in any event there is uniform reduction of the priming charge from its maximum to the normal fuel supply capacity.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect and the invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In a fuel feed timing apparatus, the combination with a dash or cowl board, of a reciprocatory manually operable actuating rod for a fuel regulator extending therethrough and behind the dash or cowl board in a substantially horizontal direction, a retracting spring therefor, a cylinder behind the dash, the end of the cylinder being secured to the dash so that the cylinder will extend in a substantially horizontal position parallel with the actuating rod, a piston within the cylinder operatively connected with the actuating rod for movement in unison therewith, an adjustable valve mounted on the dash opposite said cylinder for controlling a fluid passage communicating with the cylinder, a graduated dial plate on the dash, an indicator operatively connected with the valve and coacting with the dial to indicate the relative adjustment of the valve and thereby the time period required for the return to normal of the operated parts.

2. In a fuel feed timing apparatus, a supporting bracket for attachment to a vehicle dash or cowl board, a manually operable actuating rod for a fuel regulator mounted for reciprocation in said bracket, a cylinder also mounted on said bracket in substantially parallel spaced relation with the actuating rod, a reciprocatory piston within said cylinder, an interconnection between the piston and actuating rod, a retracting spring common to the piston and actuating rod, a control valve located in the end of the cylinder contiguous to the vehicle dash and accessible through the dash for governing the movement of the piston under influence of the spring, and indicating means mounted on the dash for visually indicating the adjustment of the governing means by which is determined approximate time interval required for the return to normal of said parts after manual operation.

3. In a fuel feed timing apparatus, a cylinder mounted in substantially horizontal position behind a vehicle dash, a manually operable actuator rod for a fuel regulator extending through the dash in substantially parallel relation with the cylinder, a reciprocatory piston within the cylinder, an operative connection between the piston and actuator rod for transmitting motion from one to the other, a retracting spring common to the rod and piston, a variable valved port located in the end of the cylinder contiguous to the dash, and an adjustable valve therefor, the stem of which extends through the dash for governing the flow of fluid under pressure and thereby governing the movement of the piston within the cylinder, a graduated indicator dial located upon the vehicle dash and a pointer relatively adjusted by the variation of the valve to visually indicate the approximate time interval required for the return to normal of the operated parts under the influence of the retracting spring.

In testimony whereof, I have hereunto set my hand this 22d day of April, A. D. 1929.

HARRY H. CONOVER.