No. 862,574. PATENTED AUG. 6, 1907.

F. H. MESSINGER.

CARBURETER.

APPLICATION FILED JULY 21, 1905.

2 SHEETS—SHEET 1.

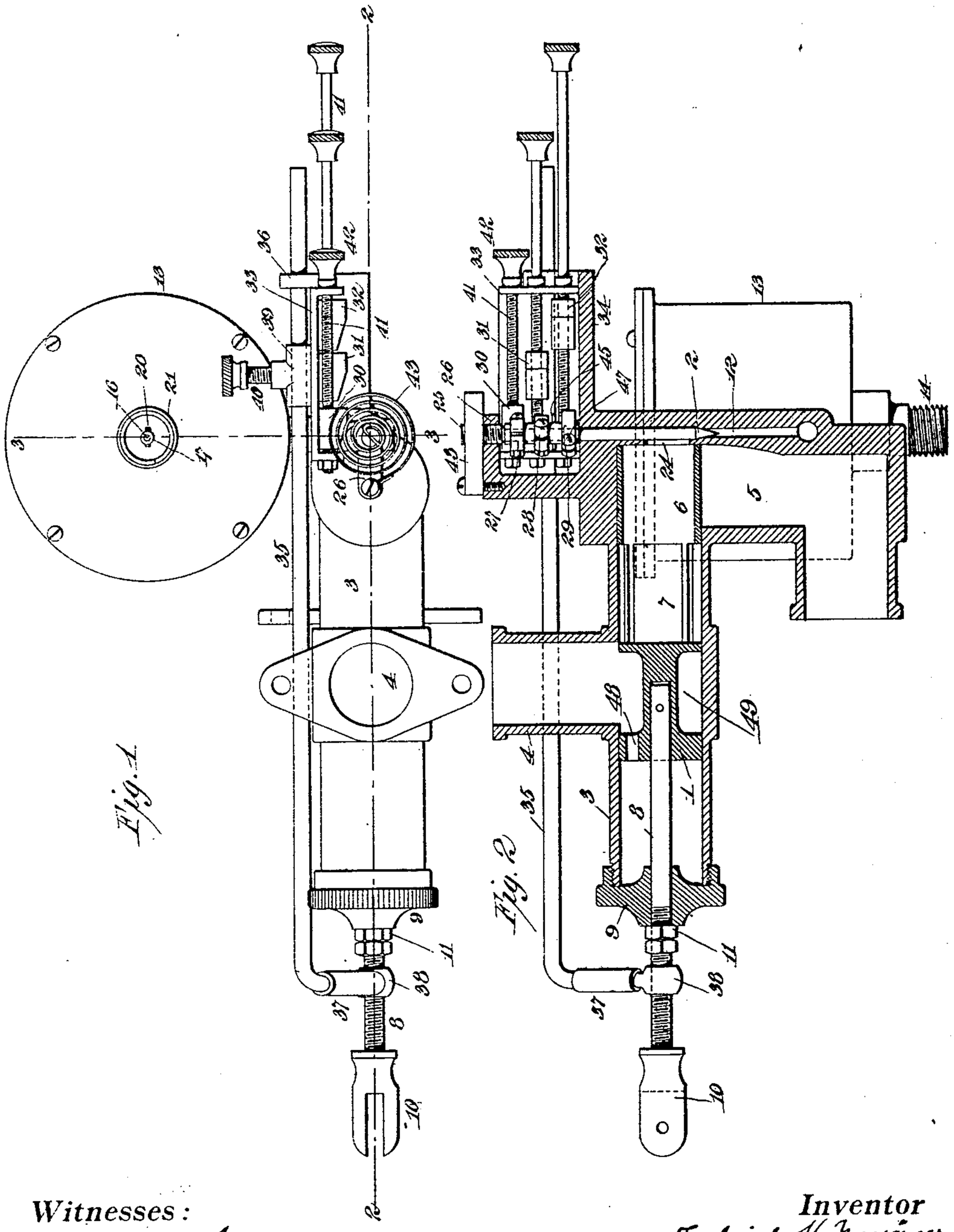

Fig. 1.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3

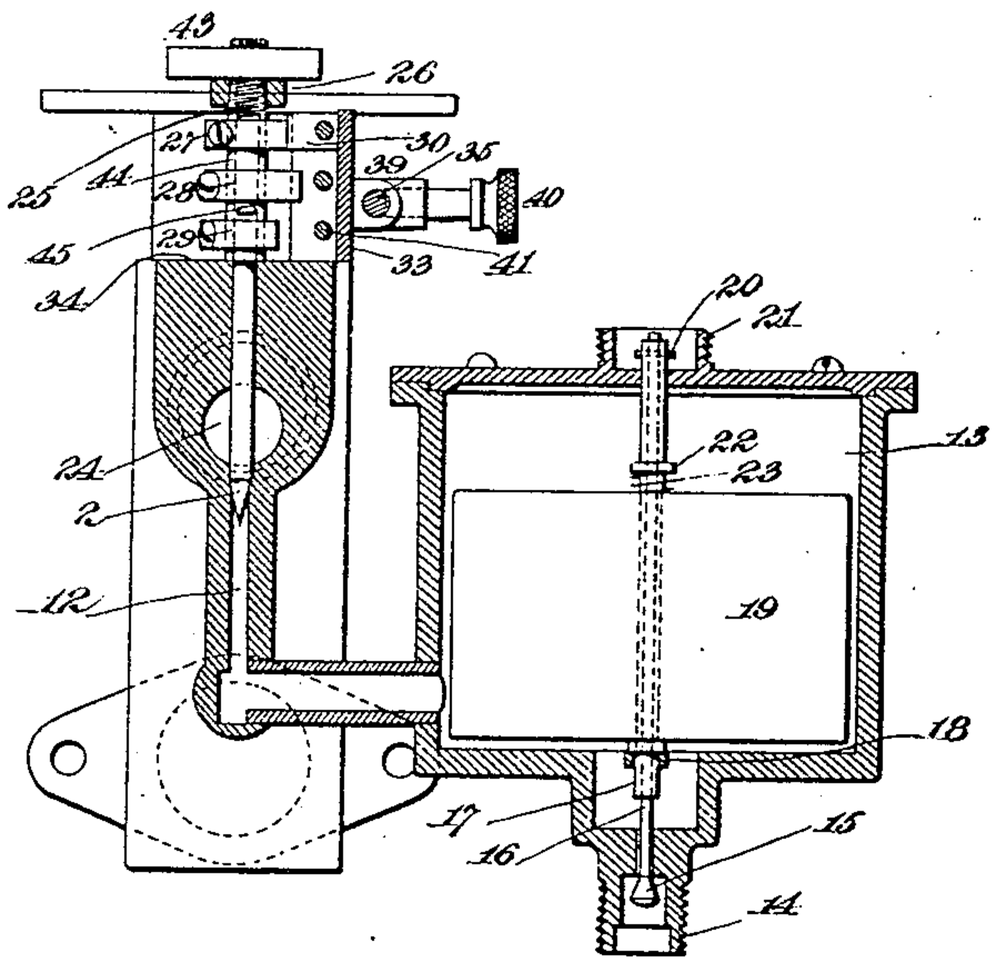


Fig. 4

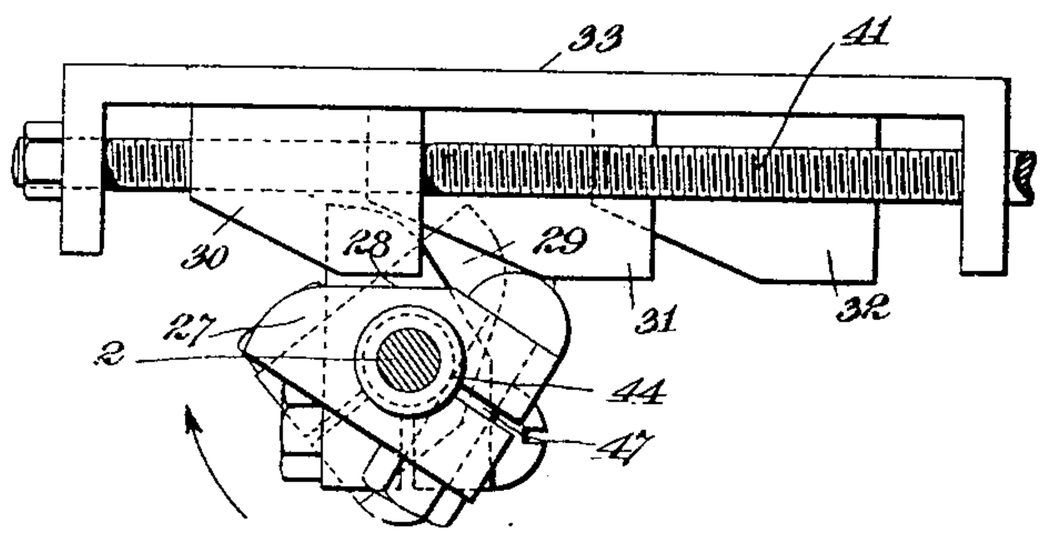


Fig. 5

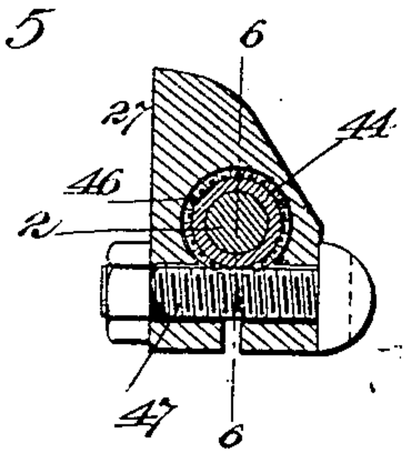
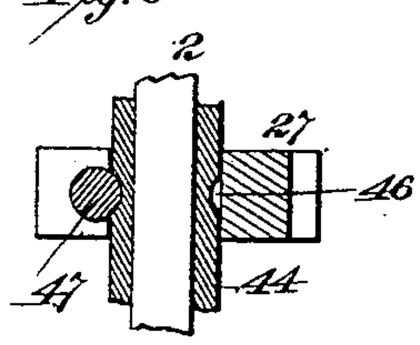


Fig. 6



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UNITED STATES PATENT OFFICE.

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CARBURETER.

No. 862,574. Specification of Letters Patent. Patented Aug. 6, 1907.

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To all whom it may concern:

Be it known that I, FREDERICK H. MESSINGER, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

The object I have in view is the production of a carbureter which will be particularly adapted for use with explosive engines of the internal combustion type, and especially in connection with automobiles or motor boats propelled by such engines.

A particular object of my invention is to produce means for regulating the richness or quality of the mixture to make it proper for different speeds or varying loads by varying the proportion of air and hydrocarbon in accordance with the amount of the mixture supplied.

Other objects are to provide means for securing a very delicate adjustment of the feed of the hydrocarbon, to render the entire apparatus simple and not easily gotten out of order, and make it very accessible.

Another object is to provide means whereby the feed valve controlled by the float will not be affected by vibrations or jars, occasioned in use with automobiles and motor boats.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which,

Figure 1 is a plan view of a device embodying my invention. Fig. 2 is a section thereof on the lines 2—2 of Fig. 1. Fig. 3 is a section on the lines 3—3 of Fig. 1. Fig. 4 is an enlarged plan view of a portion of the adjusting mechanism. Fig. 5 is a transverse sectional view of one of the adjusting cams; and Fig. 6 is a view taken on the lines 6—6 of Fig. 5.

In all the views like parts are designated by the same reference characters.

In carrying out my invention, I provide an air valve 1 and a hydrocarbon valve 2 hereafter referred to as the naphtha valve. The air valve is preferably in the form of a piston valve sliding within a cylindrical extension 3 of the main casting or frame of the carbureter. The cylinder 3 communicates with a pipe 4, intermediate its ends, and a pipe 5, adjacent to one extremity. The pipe 5 is used for admission of air, the other pipe 4 carrying off the mixture, the current flowing upward. The other end of the air valve 1 is provided with a hollow extension 6, having ports 7, and a portion not provided with ports sufficiently large to entirely close the passage 5. The end of the extension 6, adjacent to the valve 2 is open, and in communication with the passage controlled by the naphtha valve 2. The air valve is controlled by a rod 8 passing through a head 9 on the cylinder 3, and is provided with a connection, such as the ears 10, for coupling to the moving element of a governor or a controlling lever (not shown), so that the air valve may be slid within the cylinder in order to vary the amount of mixture admitted to the engine and the speed of the latter thereby controlled. A nut 11 is threaded upon the stem 8 and serves to limit the inward movement of the valve 1, so that if desired, the parts may be so adjusted that the valve can never become closed. A locknut may be provided to hold the nut 11 in position.

The naphtha valve 2 is a needle valve as shown, and rests upon a seat within a passage 12. This passage communicates with the float tank 13 at the bottom of which is a nipple 14 for connection to the naphtha inlet pipe. The admission of naphtha to the feed tank is controlled by means of a valve 15, which is preferably formed integral with a stem 16. The stem 16 passes through a tube 17 which slides within a guide 18 located at the bottom of the tank. This tube 17 passes through the float 19, and extends upward through an opening in the top of the float tank. The stem 16 of the valve 15 also extends upward to the same point and the two are connected together by a pin 20, above the top of the tank. A threaded nipple 21 may be arranged at the top of the tank for securing a thimble (not shown) which will provide a covering for the upper ends of the rod 16 and tube 17. The tube 17 is provided above the float 19 with a flange 22 and between this flange and the float is arranged a spiral spring 23, the latter tending to force the tube 17 upward and with it the rod 16 and valve 15, closing the latter. The tension of this spring is so adjusted that it will normally close the valve 15, unless the float 19 descends a considerable distance owing to an actual drop in the level of the naphtha within the tank. Should the level descend a sufficient distance the float will be lowered and after the spring 23 expands to its fullest extent the sleeve 17 and valve 15 will be lowered and the valve opened admitting naphtha until the normal level within the tank is again reached. The spring 23, however, serves the purpose of permitting sudden and slight risings and fallings of the float 19 without affecting the position of the valve 15, such slight movements being caused by vibrations and jars and not by the actual lowering of the level of the naphtha within the tank. Such vibratory movements will merely tend to compress or expand the spring 23 without affecting the position of the valve 15. The rod 16 is made separate from the tube 17 in order to allow the parts to be assembled, the float with the tube being inserted from above and the valve and valve stem inserted from below. The above described mechanism constitutes a lost-motion connection, by means of which the valve will be irresponsive to vibrations of the float, but will be responsive to changes in level within the tank.

Above the seat of the naphtha valve 2 is a port 24 which communicates with the hollow extension 6 of the air valve. The naphtha will be drawn through the passage 12 around the valve 2 and into the port 24 and there vaporized in the manner well understood.

The upper part of the valve 2 is threaded at 25 and engages with a threaded standard 26 carried by the main frame of the carbureter. The threaded portion is for the purpose of adjusting the position of the valve, the valve being moved up and down or toward and away from its seat by being rotated. This movement it is well understood must be very slight, as the amount of opening required in efficient use is very little.

The naphtha valve 2 is controlled by the following mechanism: Upon its stem are arranged one or more cams, three being illustrated and designated by the numerals 27, 28 and 29. These cams are adapted to be engaged by the cam blocks 30, 31, 32. These cam blocks are carried by a frame 33, which slides upon a table 34. The frame is supported upon a rod 35, one end of which slides within a bearing 36 carried by the table 34 and is connected at the other end to the piston rod 8, by means of a suitable device, such for instance, as the coupling 37. This coupling is connected to a sleeve 38 which engages with the threads upon the piston rod 8 and by means of which the position of the rod 35 may be adjusted in relation to the piston rod 8. The frame 33 is preferably provided with a sleeve 39 through which the rod 35 passes and is secured thereto by a set screw 40, for the purpose of additional adjustment.

The cam blocks 30, 31 and 32 are each supported upon a threaded rod or shaft 41, carried by the frame 35, and provided with an adjusting milled head 42 by means of which they may be independently rotated. By this construction the position of each of the cam blocks 30, 31, 32 can be adjusted independently of the others. The valve stem of the valve 2 is normally rotated in the direction to close it by means of a spring 43 such direction being indicated by the arrow in Fig. 4. This spring will cause one of the cams 27, 28, or 29 to engage with its corresponding cam block 30, 31, or 32, as depends upon the adjustment of the latter. Upon the frame 33 being slid upon the table 34, the cam blocks will engage with the cams, in succession or simultaneously as depends upon their adjustment, the frame being moved in sequence with the piston rod. This action will occur simultaneously with the movement of the air valve. The engagement of the cam blocks with the cams will tend to rotate the shaft of the valve 2 against the tension of the spring 43 and to open the valve to a greater or less extent. At the same time the ports 7 in the air valve will communicate with the pipe 4, and the free and open extremity of the extension 6 will communicate with the pipe 5. The extent of opening of the valve will be followed by a simultaneously opening of the valve 2 but the amount of opening of the latter can be made to vary as desired by an adjustment of the cam blocks 30, 31, 32. By properly adjusting these blocks a greater or lesser proportion of naphtha can be admitted, and the richness or quality of the mixture controlled in accordance with the amount of mixture required by the engine. If the engine is found to require a more rich mixture with a higher speed or heavier load and consequent greater opening of the air valve, then the cam blocks 30, 31, 32 may be so adjusted as to cause a more rapid opening of the naphtha valve than the air valve. On the contrary should the engine require a less rich mixture with a higher speed or heavier load, the blocks can be so adjusted as to secure this result, in every case the amount of mixture will be supplied as the engine requires it.

In order to get a more delicate adjustment of the naphtha valve, the cams 27, 28 and 29 instead of being directly connected to the shaft of the valve 2 may be supported upon a sleeve 44, (see Figs. 5 and 6). This sleeve is secured to the valve stem and rotates therewith by means of a pin or cotter 45, (see Fig. 3). Adjacent to each of the cams, the sleeve 44 is milled, and provided with a screw thread 46. With this thread engages a screw 47 carried by the cam, and which locks the two together. This structure constitutes a worm and spur wheel connection. The screw 47 being rotated will engage its threads with the milled teeth 46 and rotate the cam to the extent desired, the screw securing the cam against independent movement. This more delicate adjustment can not be made while the engine is running, but the position of the cam blocks 30, 31, and 32 can be adjusted while the engine is running and the richness or quality of the mixture for different speeds accurately adjusted. This is a decided advantage, as the variation of the richness or quality of the mixture can best be secured by experiment.

In order to permit the ready operation of the air valve 1 with but little power, as, for instance, when connected to the operative part of a governor, it is important to balance the pressure on both of its sides. This may be readily accomplished by means of a port, as 48 made through a wall of the valve, and connecting the interior of the cylindrical extension 3 with a cored out portion 49 of the valve. This cored out portion serves as a means for preventing pressure of the valve against the upper face of the casing, and thereby reduces the power necessary to move the valve.

Having now described my invention what I claim and desire to secure by Letters Patent, is:—

1. In a carbureter, the combination with the air valve and the naphtha valve, of means for moving both valves simultaneously, such means being so constructed and arranged as to vary the extent of movement of the naphtha valve in relation to the movement of the air valve so that the quality of the mixture will be varied in accordance with the quantity of mixture supplied to the engine.

2. In a carbureter, the combination with the air valve and the naphtha valve, of mechanism moving in time with the air valve for controlling the amount of movement of the naphtha valve, the said mechanism being so constructed and arranged as to move the naphtha valve at a rate which varies in accordance with the movement of the air valve so that the quality of the mixture will be varied in accordance with the extent of movement of the air valve.

3. In a carbureter, the combination with the air valve and the naphtha valve, of mechanism moving in time with the air valve and connected to and moving with the naphtha valve, the said mechanism comprising adjustable means for moving the naphtha valve, the said means causing the naphtha valve to move at a variable rate in relation to the movement of the air valve, so that the quality of the mixture will vary in accordance with the extent of movement of the air valve.

4. In a carbureter, the combination of the air valve and the naphtha valve, of means for moving both valves simultaneously, and means for varying the extent of movement of the naphtha valve in relation to the extent of movement of the air valve, such means being capable of adjustment while the engine is running.

5. In a carbureter, the combination of the air valve and the naphtha valve, of means for moving both valves simultaneously, and means for varying the extent of movement of the naphtha valve in relation to the extent of

movement of the air valve, such means being adjustable so as to vary the relative movement of the naphtha valve.

6. In a carbureter, the combination with the air valve, and the naphtha valve, a frame, a series of cam blocks carried by the frame, connections between the frame and the air valve, and a series of cams carried by the naphtha valve, the said cam blocks successively engaging with the cams.

7. In a carbureter, the combination with the air valve, and the naphtha valve, a frame, a series of cam blocks carried by the frame, connections between the frame and the air valve, and a series of cams carried by the naphtha valve, the said cam blocks successively engaging with the cams, and means for adjusting the position of the stops upon the frame.

8. In a carbureter, the combination with the air valve, and the naphtha valve, a frame, a series of cam blocks carried by the frame, connections between the frame and the air valve, and a series of cams carried by the naphtha valve, the said cam blocks successively engaging with the cams, and means for adjusting the position of the cam blocks upon the frame, the said means comprising threaded rods, carrying means by which they may be rotated.

9. In a carbureter, the combination with the air valve, and the naphtha valve, a sleeve carried by the naphtha valve, cams carried upon the sleeve, means controlled by the movements of the air valve for engaging with the cams, and means for adjusting the cams upon the sleeve.

10. In a carbureter, the combination with the air valve, and the naphtha valve, a sleeve carried by the naphtha valve, cams carried upon the sleeve, means controlled by the movements of the air valve for engaging with the cams, and means for adjusting the cams upon the sleeve, the said means comprising worm and spur wheel connections.

11. In a carbureter, the combination with the air valve, and the naphtha valve, a sleeve carried by the naphtha valve, cams carried upon the sleeve, means controlled by the movements of the air valve for engaging with the cams, and means for adjusting the cams upon the sleeve, the said means comprising screws carried by the cams, engaging with milled surfaces formed upon the sleeve.

12. In a carbureter, the combination with a sliding air valve, and a rotary naphtha valve, of means for rotating the naphtha valve, controlled by movements of the slide valve.

13. In a carbureter, the combination with a rotary naphtha valve, of means for positively rotating the valve in one direction, and a spring for rotating it in the other direction.

14. In a carbureter, the combination with the air valve, and the naphtha valve, of a rod moved by the air valve, a frame adjustably mounted thereon, threaded shafts carried by the frame, cam blocks carried thereon, a series of cams carried by the naphtha valve, and adapted to be engaged by the cam blocks, and a spring for engaging the cams against the blocks.

15. In a carbureter, the combination with the air valve, and the naphtha valve, of a rod moved by the air valve a frame adjustably mounted thereon, threaded shafts carried by the frame, cam blocks carried thereon, a series of cams carried by a sleeve mounted upon the stem of the naphtha valve, and adapted to be engaged by the cam blocks and means for adjusting the cams upon the sleeve, and a spring for engaging the cams against the blocks.

This specification signed and witnessed this 31st day of May, 1905.

FREDERICK H. MESSINGER.

Witnesses:
LEONARD HARPER,
JNO. ROBT. TAYLOR.