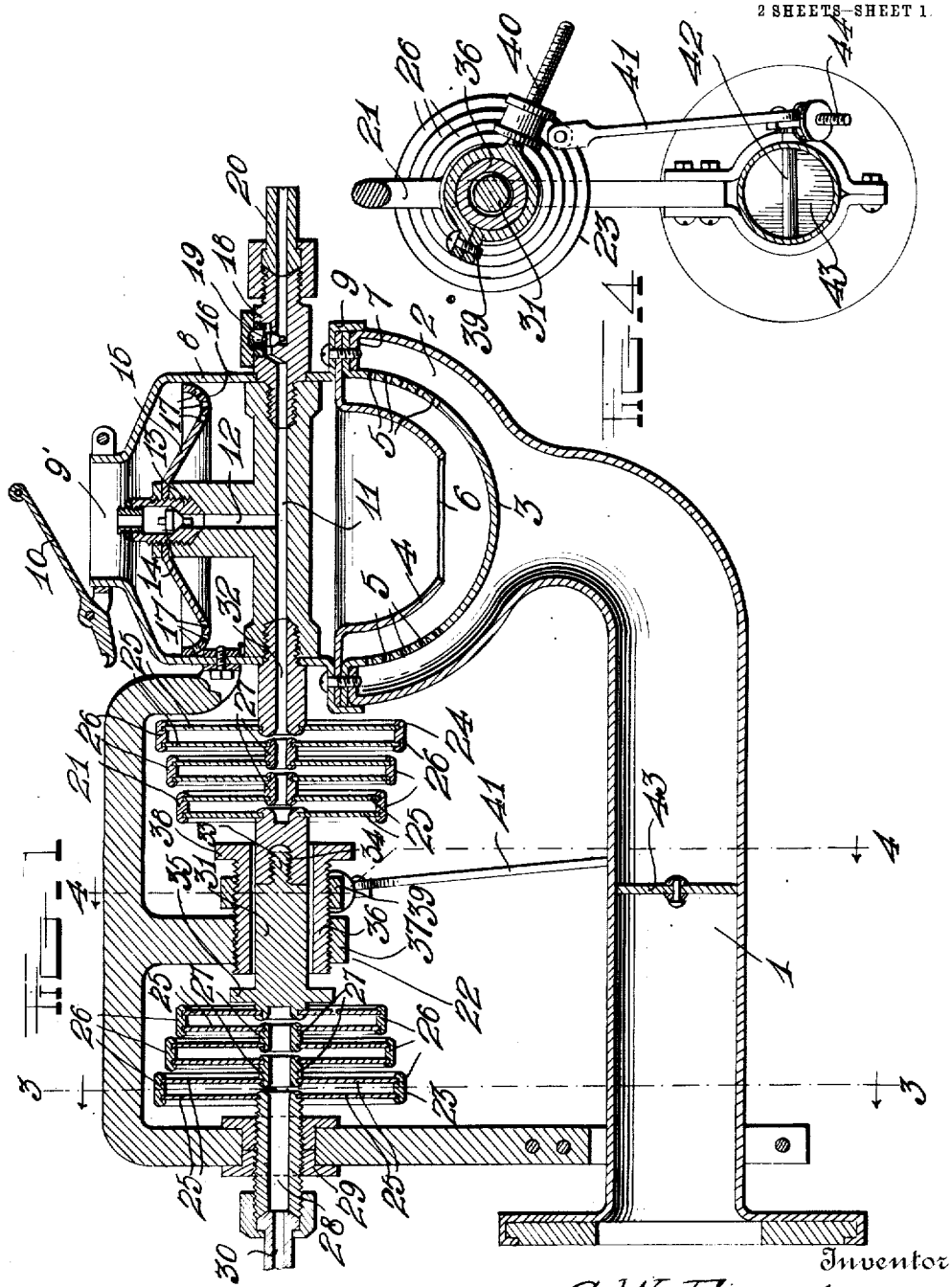
C. W. FARQUHARSON.

FORCE FEED CARBURETER.

APPLICATION FILED OCT. 13, 1910. RENEWED NOV. 8, 1911.

1,011,931. Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 2

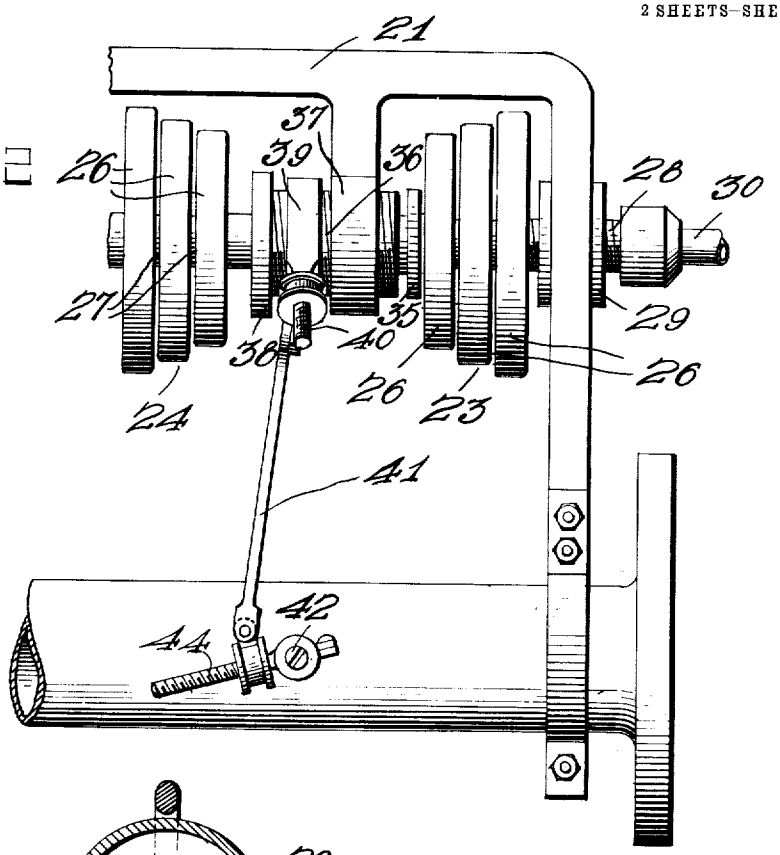
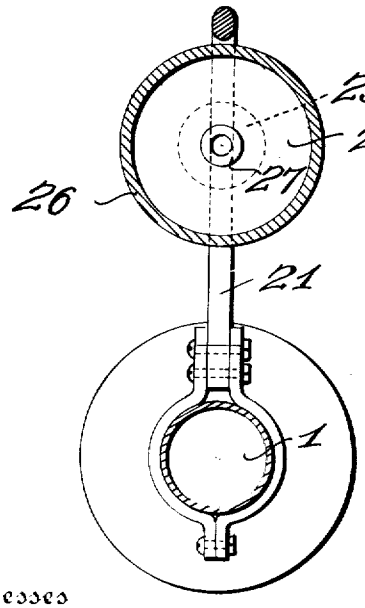


FIG. 3



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FORCE-FEED CARBURETER.

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Application filed October 13, 1910, Serial No. 586,924. Renewed November 8, 1911. Serial No. 659,247.

To all whom it may concern:

Be it known that I, CHARLES W. FARQUHARSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Force-Feed Carbureters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in force feed carbureters.

One object of the invention is to provide a force feed carbureter having an improved construction of pump, the parts of which operate without friction and are consequently not subjected to material wear.

Another object is to provide a carbureter of this character which will be comparatively simple in construction, efficient and reliable in operation and which may be connected with and operated by any explosive engine.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a vertical longitudinal section of a carbureter constructed in accordance with the invention; Fig. 2 is a side view of a portion of the same; Fig. 3 is a vertical cross section on the line 3—3 of Fig. 1; Fig. 4 is a similar view on the line 4—4 of Fig. 1.

Referring more particularly to the drawings, 1 denotes the charge tube of the engine, said tube having a flared upwardly projecting end 2 in which is arranged concaved deflecting plates 3 and 4. The plates 3 and 4 are spaced a suitable distance apart and in the upper portion of the plate 3 is formed a series of perforations 5, while in the center or bottom of the plate 4 is formed an opening 6. The upper edge of the flared upper end of the charge tube is provided with an inwardly projecting annular flange 7 to which is secured the flanged upper edges of the plates 3 and 4, said parts being secured by screws or similar fastening devices.

The flared upper end 2 of the charge tube and the plates 3 and 4 form the lower portion of a carbureter. The upper portion or mixing chamber of the carbureter comprises a casing 8, the lower open end of which is provided with an outwardly and downwardly projecting radial flange 9 which fits over and is secured to the flanged edge of the upper portion 2 of the charge tube 1 by the same fastening screws which secure the plates 3 and 4 thereto. The upper end of the casing 8 is contracted and has formed therein an air inlet opening or mouth 9′ which is provided with a cover 10 whereby the same may be closed when desired. In the casing 8 is arranged a transversely disposed oil conducting pipe 11 having formed thereon an upwardly projecting branch discharge pipe 12 in the upper end of which is arranged a valve casing 13 provided with a check valve 14 which is adapted to open under pressure to permit the fuel to be discharged from the pipe 12 and into the connecting chamber of the carbureter.

The oil or fuel when discharged through the valve falls onto a cone shaped deflecting plate 15 which is secured to the upper end of the branch pipe 12 and has its outer edge curved upwardly to provide a gutter 16 in which is formed a series of oil discharging passages 17. The outer edge of the plate 15 is in close engagement with the inner wall of the casing 8 so that said plate practically forms a partition in said casing. Connected with the outer end of the oil conducting pipe 11 is a valve casing 18 in which is arranged a check valve 19. With the valve casing 18 is connected the adjacent end of a fuel conducting tube 20 which leads to and is connected with the fuel supply tank (not shown).

Connected to the casing 8 and to the charge tube 1 is a pump supporting frame 21 in which is arranged my improved fuel pump 22. The pump 22 is formed in two members 23 and 24 each of which consists of a series of hollow annular sections, said sections being formed from pairs of thin metal disks 25 provided with centrally disposed circular passages. The outer edges of each pair of disks 25 are connected by annular rings or bands 26, while the disks of adjacent sections are connected at the edges of the openings therein by coupling rings 27. The outer disk of the outer section of the member 23 of the pump is connected around the edge of the opening therein to a tubular exteriorly threaded cou-

pling 28 which has a screw threaded engagement with a bushing 29 arranged in the adjacent end of the pump supporting frame 21. The coupling member 28 is connected in any suitable manner to a pipe 30 which connects with the exhaust port of the engine. The outer disk of the inner section of the pump member 23 is secured to a sectional connecting rod 31 hereinafter more fully described.

The member 24 of the pump is constructed in the same manner as the member 23 and the outer disk of the outer section of said member is connected to the fuel conducting pipe 11 by a tubular coupling 32. The outer disk of the inner section of the member 24 is connected to the opposite end of the sectional connecting rod 31, said rod thus operatively connecting the two members 23 and 24 of the pump together.

The connecting rod 31 is formed in two sections the inner end of one of which is provided with a reduced threaded extension 33, while the inner end of the opposite section is formed with a threaded socket 34 in which is screwed the reduced threaded end 33 of the first mentioned section thus detachably connecting said sections of the rod together. On the rod, adjacent the pump member 25, is formed an annular stop flange 35 the purpose of which will be hereinafter described. The connecting rod 31 is loosely engaged with and is adapted to slide through an exteriorly threaded bushing 36 which is adjustably mounted in a threaded aperture in the lower end of a supporting arm or bracket 37 formed on the pump supporting frame 21 as shown.

Formed on the end of the bushing 36 remote from the flange 35 on the connecting rod 31, is an annular flange 38 and between the flange 38 and the bracket 37 is clamped a bushing adjusting collar 39, said collar having formed on one side a laterally projecting lever 40 which is connected by an operating rod 41 to the laterally projecting stem 42 of a charge regulating valve 43 arranged in the charge supply pipe 1, said stem 42 being provided with a crank handle 44 to which the lower end of the operating rod 42 is connected in any suitable manner.

As hereinbefore stated the pump 22 is connected to the exhaust of the engine so that when the latter exhausts it exerts a pressure in the end or member 23 of the pump. As the disks 25 are of very thin material, they spread apart under the pressure at their inner ends and this action pushes the connecting rod 31 through the coupling and thereby closes the other member 24 of the pump by forcing the inner edges of the disks thereof toward each other. The connecting rod 31 serves as a piston and the members 23—24 constitute flexible connections between the same and the fixed tubular supports 28 and 32 respectively. The exhaust from the engine exerts a pressure against the end of the rod 31 appearing at the left in Fig. 1 and the rod or piston is thereby pushed to the right through the sleeve 36. The inner edges of the member 24 yield to this movement of the piston 31 and an increased back pressure is applied through the pipe 11 upon the inwardly opening check valve 19 so as to close said valve and open outwardly opening check valve 14, thereby forcing a charge of fuel out of the pipe 12 to the casing 15, whence it passes through the perforations 16 mixing with the air admitted through the air intake 9′ and being dashed against the deflecting plates 4 and 3 the charge passes through the discharge perforations 5 in the latter, by means of which it is split or broken up into fine particles, thus causing a thorough mixing of the gasolene and the air which enters the charge tube 1 and is conducted thereby to the engine. Between the exhausts of the engine the pressure is relieved in the member 23 of the pump, thus permitting it to retract or assume its normal position and the rod 31 to move from the pipe 11. The partial vacuum thus created will relieve the pressure on the inner sides of the valves 14 and 19 so that the valve 14 will close and the valve 19 will open, permitting a fresh charge of fuel to be drawn into the pipe 11 which will be forced into the carbureter casing in the manner described.

In starting the device the cover 10 is closed tightly on the carbureter casing and the engine is then cranked in the usual manner which causes a vacuum in the carbureter chamber. The vacuum thus formed will draw in a sufficient quantity of gasolene to cause an explosion in the engine which will start the latter after which the pump will be automatically operated by the successive exhausts of the engine in the manner described. It will be understood that the cover 10 of the carbureter is kept continuously open except when the engine is started whereupon the cover is tightly closed to permit the vacuum to be formed by the pump in the carbureter chamber.

The length of the stroke of the pump is determined by the adjustment of the sleeve 36 to and from the flange 35, so that the sleeve, at the end of its stroke, will strike said flange sooner or later. This adjustment of the sleeves is governed automatically by the opening or closing movement of the valve 43 which is governed by the operator in any usual manner. When the stem 42 of the valve is turned to adjust the valve to a more or less open position to admit more or less fuel, the crank arm 44 will move the rod 41 longitudinally which will thus move the crank arm 40 and through it and the collar 39 will rotate the sleeve 36

in the proper direction to shorten or lengthen the stroke of the pump, as may be necessary according to the speed of the engine.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as defined in the appended claims.

Having thus described my invention, what I claim is:

1. A force feed carbureter comprising a charge supply tube a carbureter casing arranged thereon and connected thereto, an oil conducting pipe extending through said casing and having inlet and discharge valves, a reciprocating member alined with said oil pipe, a pipe for admitting fluid pressure to said member, a hollow flexible connection between said pipe and said member, a hollow flexible connection between said member and the oil conducting pipe, a fixed support for said member between the flexible connections, a flange on said member, and a sleeve adjustably mounted in said support in the path of the flange.

2. A force feed carbureter comprising a charge supply tube, a carbureter casing arranged thereon, an oil conducting pipe extending through said carbureter casing and discharging thereinto, inlet and delivery valves in said pipe, a cover to close the casing, a reciprocatory member, a hollow flexible connection between one end of said member and said oil conducting pipe, a fluid pressure pipe, a hollow flexible connection between said pipe and the opposite end of said member, an adjustably mounted bushing surrounding the reciprocatory member, a stop flange on said member adapted to engage the end of the bushing whereby to limit the stroke of the member, a collar secured around said bushing, a throttle valve in said charge supply tube, and connections between the stem of said valve and the said collar whereby the bushing and the valve may be simultaneously adjusted.

3. A force feed carbureter comprising a charge supply tube, a carbureter casing arranged thereon, an oil conducting pipe extending through said carbureter casing and discharging thereinto and provided with inlet and outlet valves, a reciprocatory member, a hollow flexible connection between one end of said member and the oil conducting pipe, an engine exhaust pipe, a hollow flexible connection between said pipe and the opposite end of the reciprocatory member, a bushing surrounding the reciprocatory member and having a threaded mounting whereby it will move longitudinally when rotated, a stop flange on said member adapted to engage the end of the bushing whereby to limit the stroke of the member, a collar secured around said bushing, a throttle valve arranged in the charge supply tube and having its stem projecting laterally through the stem, a crank arm on said collar, a crank arm on said valved stem, and a connecting rod secured to and extending between said crank arms.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES W. FARQUHARSON.

Witnesses:

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