G. E. COOK.

CARBURETER.

APPLICATION FILED JUNE 18, 1908.

958,476.

Patented May 17, 1910.

3 SHEETS—SHEET 1.

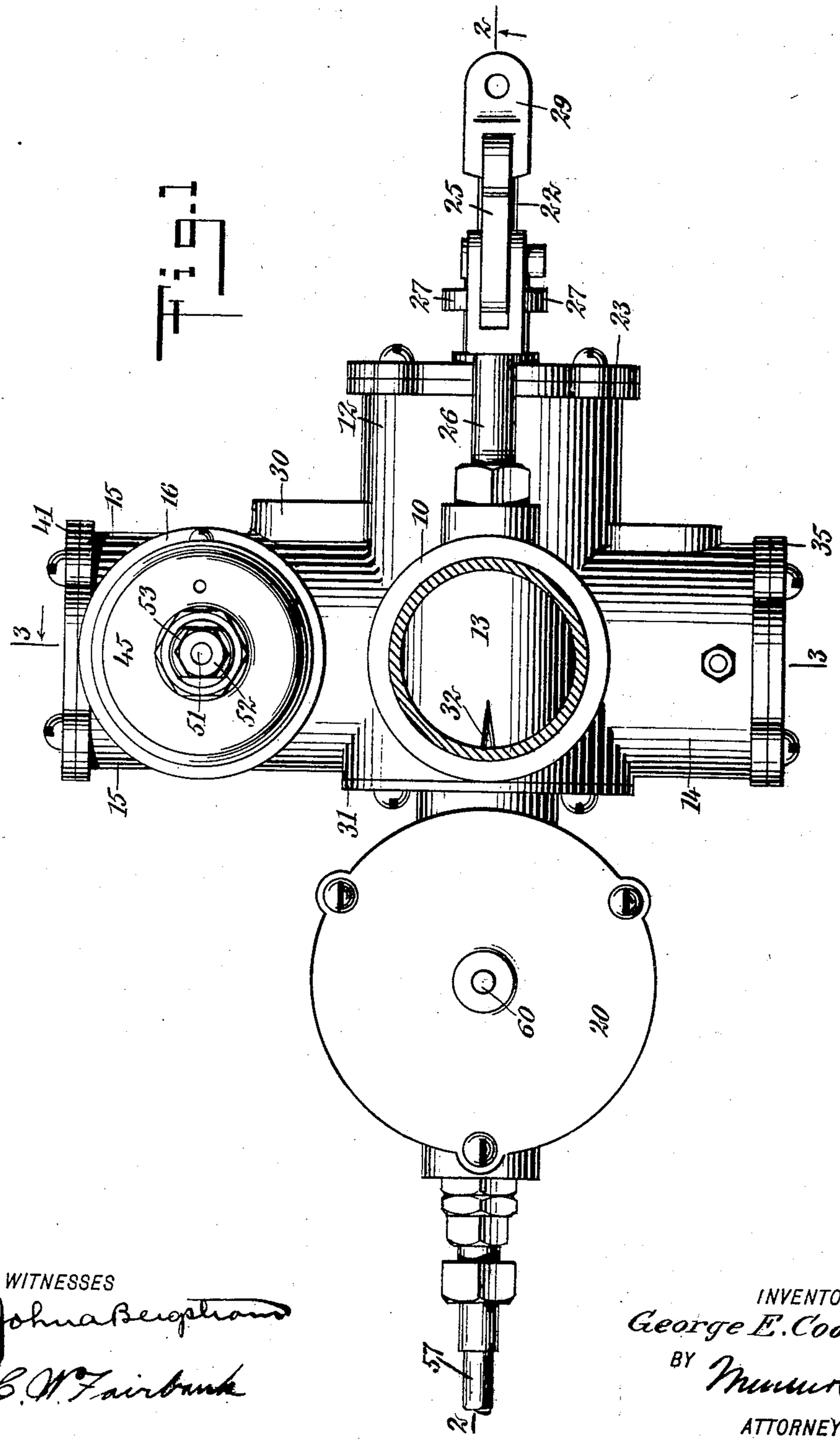

FIG. 1.

WITNESSES

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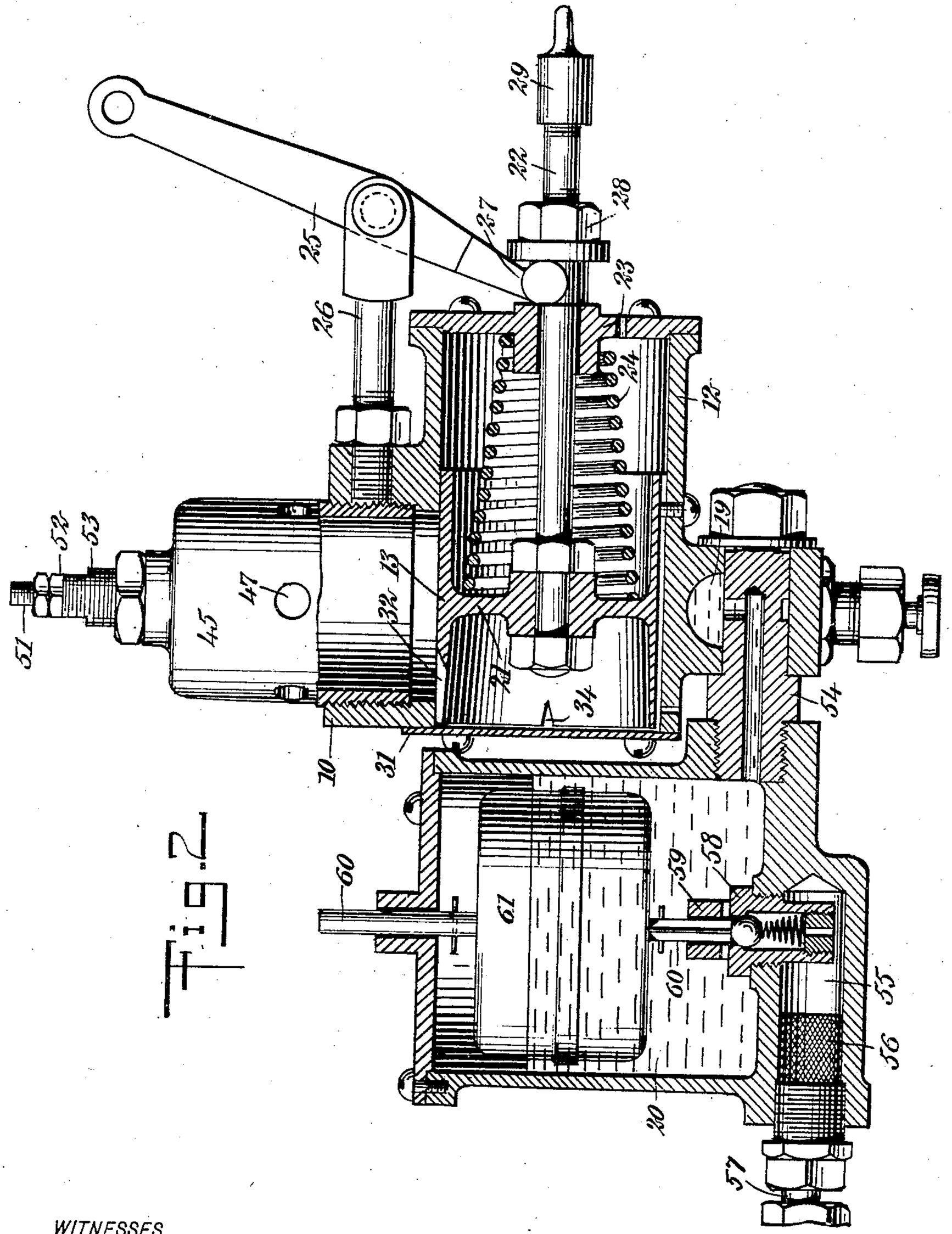

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 5.

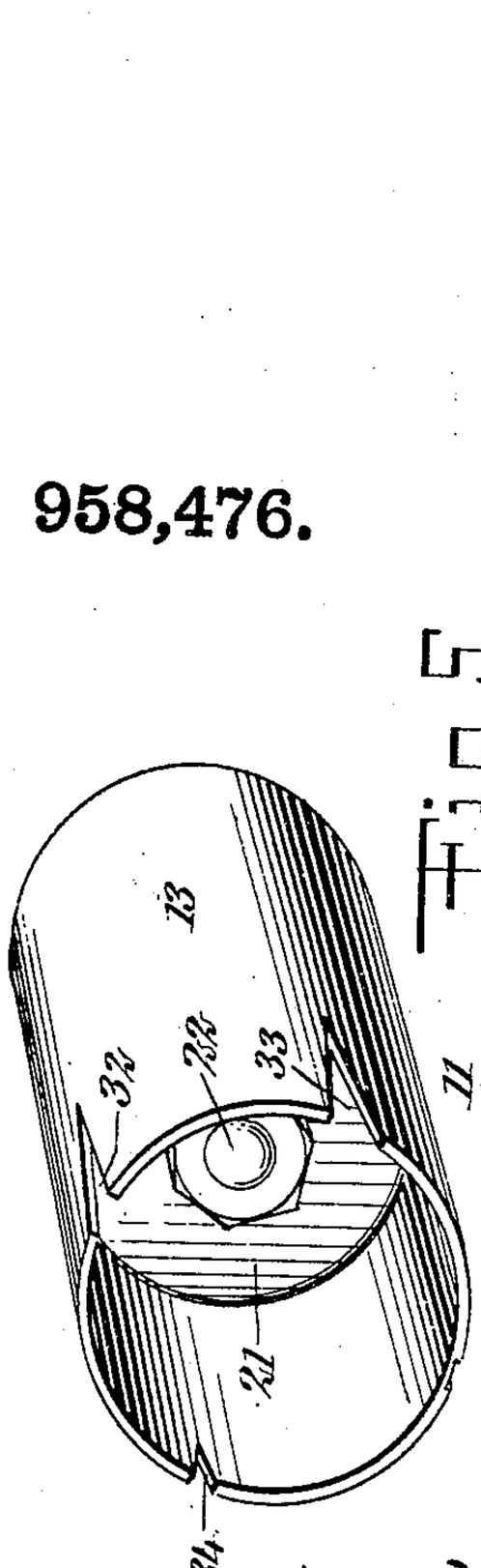


Fig. 4.

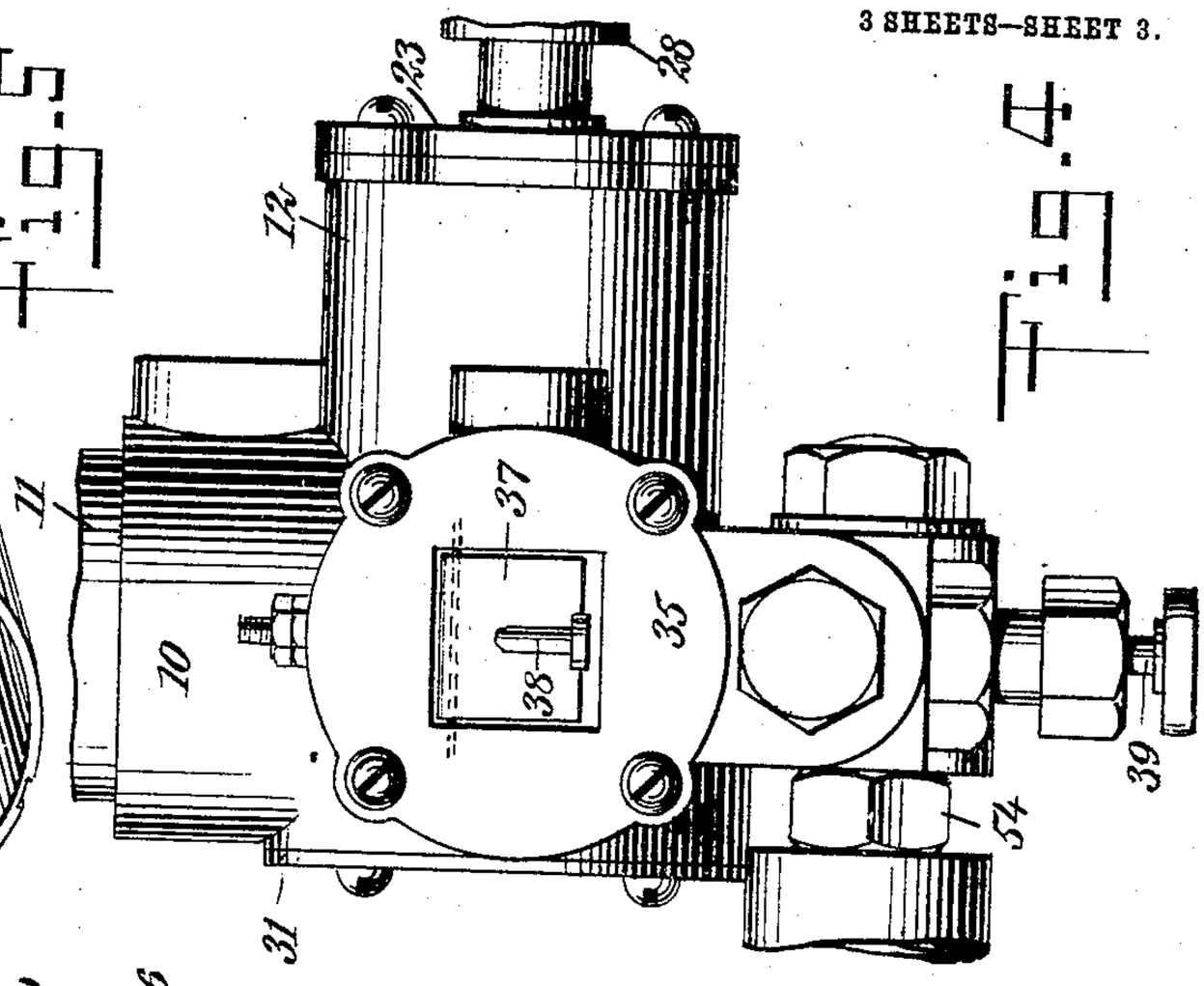
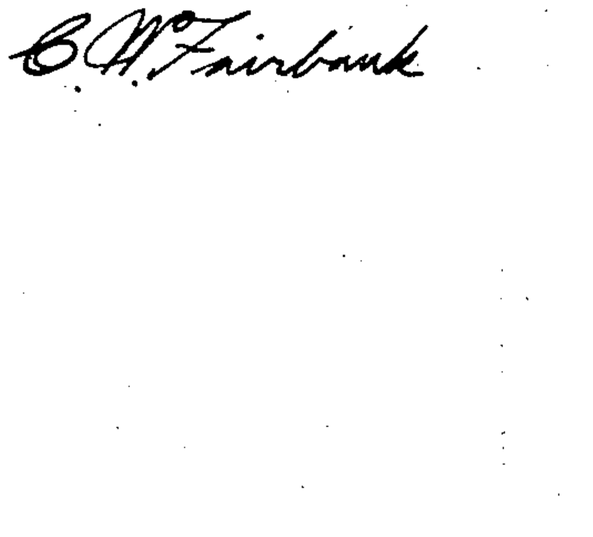


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE E. COOK, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO PHILIP SCHLOSSER, OF NEW YORK, N. Y.

CARBURETER.

958,476. Specification of Letters Patent. Patented May 17, 1910.

Application filed June 18, 1908. Serial No. 439,107.

To all whom it may concern:

Be it known that I, GEORGE E. COOK, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Carbureter, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in carbureters for use in forming the explosive charge for internal combustion engines, and relates more particularly to that type known as the jet carbureter in which the combustible liquid is delivered through a nozzle into a current of air passing said nozzle.

One object of the invention is to provide means whereby the opening of the throttle valve to bring an increased number of jets into operation, also operates to permit of an automatic dilution of the explosive charge in accordance with the suction pressure and speed of the engine.

A further object of the invention is to provide certain improvements in the means for automatically and mechanically controlling the auxiliary air intake, so that the composition of the charge may be varied.

Other objects and advantages will be set forth hereinafter.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a top plan view of a carbureter constructed in accordance with my invention, the suction pipe leading to the engine being shown in section; Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1; Fig. 3 is a transverse section on the line 3—3 of Fig. 1; Fig. 4 is a view of the left-hand end of the parts shown in Fig. 3; and Fig. 5 is a perspective view of the throttle valve.

In the specific form illustrated in the accompanying drawings, my carbureter includes a body portion formed of a plurality of intersecting open-ended tubular branches, one of which, 10, serves for the attachment of the device to the suction pipe 11 leading to the engine or other mechanism in which the explosive charge is to be utilized. A second branch 12, receives the tubular throttle valve 13 and the mechanism for operating the same. A third branch 14 serves as an air inlet and mixing chamber when the engine is running at its lowest speed, a fourth branch 15 serves as an air inlet and mixing chamber when the throttle valve is opened for a higher engine speed, and a fifth branch 16 intersects the last-mentioned branch and serves as an auxiliary air intake when the engine is operating at its highest speed. Within the two branches or sections 14 and 15, are provided liquid fuel nozzles or jets 17 and 18, both of which communicate with a transverse passage 19, also formed within the body of the carbureter and communicating with a float-controlled feed chamber 20 adjacent said body but detachable therefrom.

The throttle valve 13 is in the form of an open-ended tube or sleeve subdivided by a diaphragm or partition 21 and having a valve-operating rod 22 rigidly secured to said diaphragm or partition. The valve rod extends through a plate 23 closing one end of the branch 12 of the body, and between this end plate and the diaphragm is mounted a spring 24 serving to force the valve longitudinally to its limiting position. Outside of the end plate 23, I mount any suitable mechanism for moving the rod longitudinally to open the valve against the action of the spring. As shown, this means includes a lever 25 pivoted upon a stud 26 and having one end terminating in yoke arms 27 engaging with a nut 28 on the valve rod. If desired, the valve may be operated by connecting any suitable mechanism directly to an apertured nut 29 on the end of the valve rod. As illustrated, the stud 26 is threaded into the side of the branch 10, but the branch 15 may also be provided with a lug 30 to which the stud may be secured, whereby the lever 25 may operate in either a horizontal or a vertical plane.

The interior of the branch 12, which receives the coil spring 24, is open to the atmosphere through an aperture in the plate 23. The opposite end of the branch constitutes the valve chamber and is closed at one end by a suitable plate 31. The end of the throttle valve 13 when in its closed position comes closely adjacent the plate 31, and save for apertures in the valve, shuts off all communication between the branches 10, 14 and 15. In the upper side of the valve is a V-shaped notch or aperture 32, which is partially closed at

its base when the valve is in its innermost position, so that only a small passage remains open, as is indicated in Figs. 1 and 2. Upon one side of the throttle valve is a second and similar V-shaped notch 33, which permits a slight flow of gas from the mixing chamber of the branch 14 to the interior of the throttle valve. Opposite to the notch or opening 33 is a smaller V-shaped notch or aperture 34, which is normally closed when the valve is in the position indicated, thus separating the branch 15 and its mixing chamber from the interior of the valve and the suction pipe of the engine. The apertures 32 and 33 are of such size that the engine may run at its minimum speed with the throttle in its innermost position. As the throttle is opened by the movement of the valve against the action of the spring, the size of the openings 32 and 33 is increased to increase the flow of explosive mixture. A still further opening of the throttle uncovers the aperture 34 and permits a flow of explosive mixture from the second mixing chamber, that is, the one in the branch 15. A still further movement of the throttle valve brings the end thereof beyond the intersection of the several branches and gas may readily flow from both mixing chambers independently of the openings 32, 33 and 34.

The branch 14 carries an end plate 35, having integral therewith, an inwardly-extending conduit 36 terminating adjacent the side of the throttle valve. This conduit is normally partially closed by a flap valve 37 hinged adjacent the upper side of the conduit and having a slot therein through which extends a rod 38. On the rod above the flap valve is mounted a spring normally tending to hold the valve in its lowered or closed position. A suction on the interior of the carbureter tends to lift the valve 37 and permit a flow of air in through the conduit 36. The liqiud fuel nozzle 17 extends upwardly from the liquid passage 19 and terminates within the conduit 36. The lower end of the nozzle may be closed by a needle valve 39, the latter having its stem extending through a stuffing box 40 in the under side of the passage 19. The end of the nozzle or jet 17 is adjacent the lower side of the conduit 36 and adjacent the free edge of the flap valve 37, so that the latter serves not only to partially close the air inlet but to also deflect the air toward the jet or nozzle.

Directly opposite to the branch 14 and its air inlet liquid nozzle and mixing chamber, is the branch 15. The branch 15 at its outer end carries a plate 41 formed integral with a conduit 42 extending into the carbureter toward the throttle valve. This conduit is preferably open and extending up into it from the under side, is the nozzle or jet 18. The jet 18 is substantially identical with the jet 17, and its lower end communicates with the liquid passage 19 and serves as a seat for a needle valve 43. The valve stem of the valve extends through a packing box 44 similar to the packing box 40, as indicated in Fig. 3.

The branch 16 extends upwardly from the branch 15 and substantially parallel to the main outlet branch 10. This branch serves as an auxiliary air intake, whereby when the engine speed and the consequent suction pressure exceeds a predetermined limit, additional air may be taken in to vary the composition of the explosive charge. This branch carries at its upper end a hood or cap 45, having a cylindrical bore within which is mounted a plunger or piston 46. The cap is provided with a plurality of apertures 47, which register with apertures 48 in the plunger or piston when the latter is in a predetermined position. The plunger is held from rotation in any suitable manner, as, for instance, by a screw 49 extending through the cap into a slot in the plunger, and the plunger is supported by a coil spring 50 engaging with the inner surface of the plunger and with a head on a rod 51. The rod extends through the plunger and cap to the exterior thereof, and is provided with a suitable nut 52 for limiting the movement of the rod in one direction and varying the tension of the spring 50. The rod is preferably slidable through an exteriorly threaded sleeve 53, the inner end of which serves as an abutment for the piston or plunger. By rotating the sleeve 53, the normal position of the plunger and therefore the normal relationship of the apertures 47 and 48, may be varied at will, independently of any variation in the tension of the spring 50, while by means of the nut 52, the tension of the spring may be varied independently of the normal position of the plunger. Thus, the apertures may be brought into registry by any desired suction pressure, and the size of the openings may be varied at any desired rate in respect to the rate of variation in the suction pressure.

For delivering the liquid fuel to the jets, I preferably mount a float chamber adjacent the body of the carbureter and communicating with the liquid chamber 19 of the latter through an apertured coupling 54. The float chamber is provided at its lower end with a separate compartment 55 adapted to receive a screen 56 and connects with a suitable liquid delivery conduit 57. The compartment of chamber 55 is separated from the main float chamber by an apertured plug 58, having a ball valve seated in the upper end thereof and held upwardly against its seat by a suitable coil spring. The plug extends above the ball to form a guide 59 for the spindle 60 of a float 61. The spindle

is of such size that it may pass the valve seat into engagement with the ball to force the latter away from its seat and permit the flow of liquid from the chamber 55 into contact with the float. When the float rises to lift the spindle away from the ball, the latter is seated by the action of the spring and the flow of liquid ceases.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A carbureter having a plurality of mixing chambers, each having an air inlet and a spray nozzle, an auxiliary air inlet for one only of said mixing chambers, means for automatically controlling said auxiliary air inlet, and a throttle valve for controlling said mixing chambers, said throttle valve when in its closed position, permitting a limited flow through one of said chambers and serving to bring all of said chambers into operation and simultaneously varying the flow through all of them upon an opening movement.

2. A carbureter having three substantially tubular branches, one of said branches having an air inlet and a spray nozzle and serving as a mixing chamber, and another of said branches having an air inlet and a spray nozzle and serving as a second mixing chamber, and also having an automatically controlled auxiliary air inlet port, and a throttle valve adjacent the intersection of said branches and controlling the communication between the two branches above referred to and the third branch, which latter constitutes the outlet port of the carbureter, said throttle valve, when in its closed position, permitting a limited flow from said first-mentioned branch to said outlet branch, and serving to simultaneously control all three of the branches upon an opening movement.

3. A carbureter having three substantially tubular branches, all having their axes substantially in the same plane, one of said branches having an air inlet and a spray nozzle and serving as a mixing chamber, and another of said branches having an air inlet and a spray nozzle and serving as a second mixing chamber and also having an automatically controlled auxiliary air inlet port, and a tubular throttle valve adjacent the intersection of said branches and movable longitudinally in a direction at right angles to the plane of the branches and serving to simultaneously control all three of said branches.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE E. COOK.

Witnesses:
CLAIR W. FAIRBANK,
EVERARD B. MARSHALL.