No. 765,880. PATENTED JULY 26, 1904.

F. L. CHAMBERLIN.

MEANS FOR FEEDING THE INDUCTION PORTS OR FUEL INLETS OF INTERNAL COMBUSTION ENGINES.

APPLICATION FILED MAY 27, 1903.

NO MODEL.

Fig. 1.

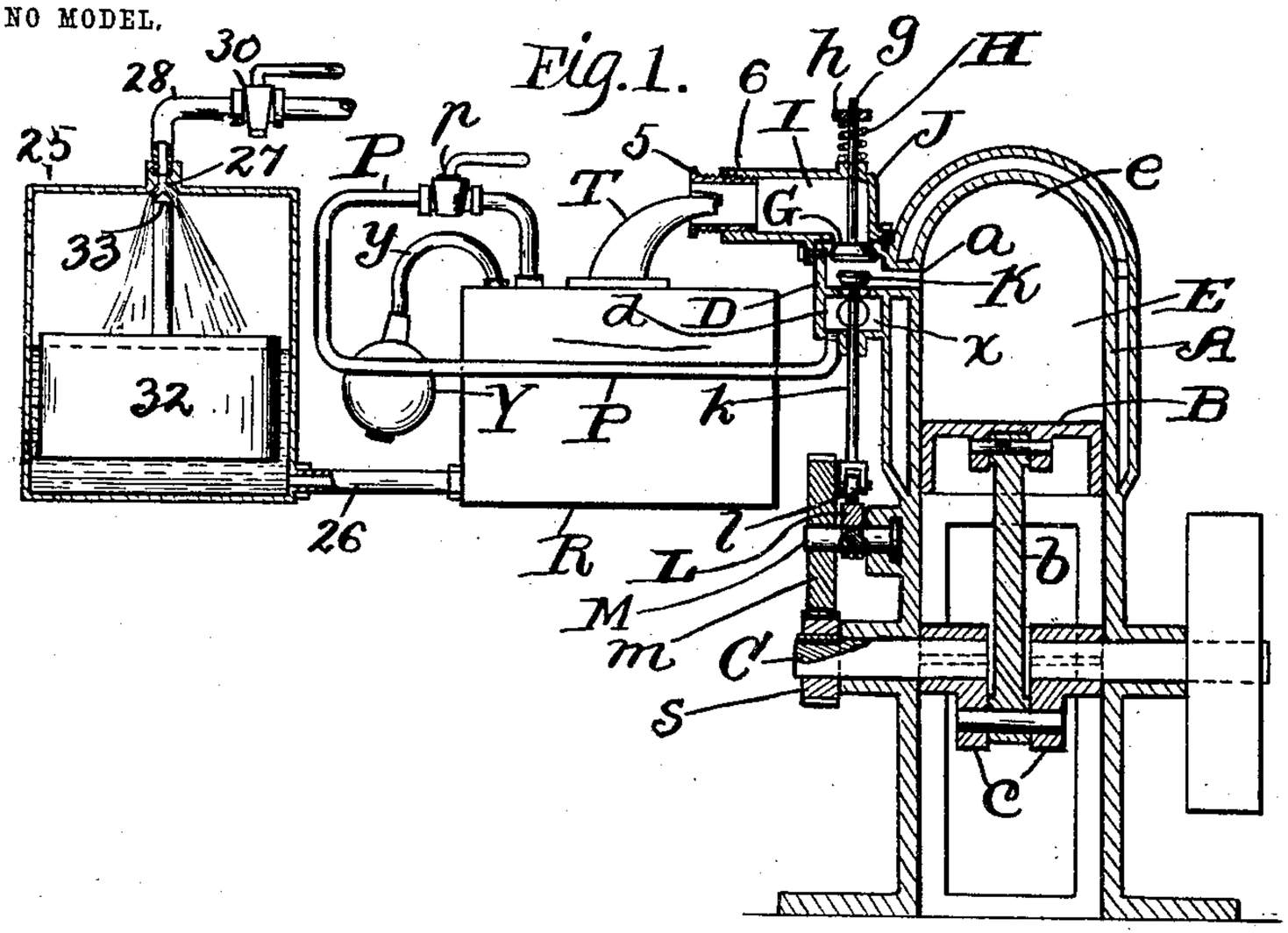
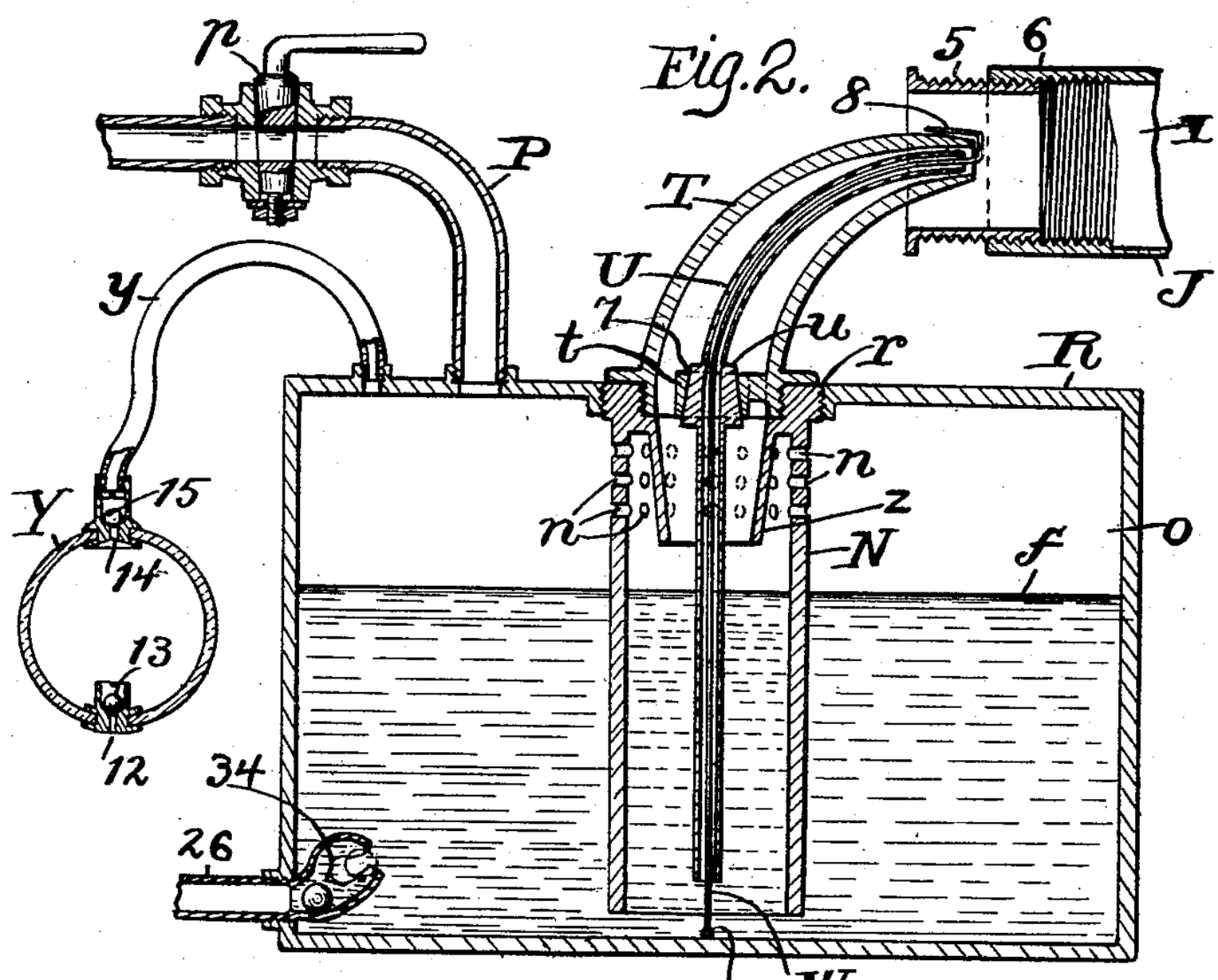


Fig. 2.



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No. 765,880. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

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MEANS FOR FEEDING THE INDUCTION-PORTS OR FUEL-INLETS OF INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 765,880, dated July 26, 1904.

Application filed May 27, 1903. Serial No. 158,957. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN L. CHAMBERLIN, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Means for Feeding the Induction-Ports or Fuel-Inlets of Internal-Combustion Engines; and I hereby 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 pertains to make and use the same.

This invention relates to improvements in means for feeding the induction-port or fuel-inlet of the cylinder of an internal-combustion engine with gasolene or hydrocarbon oil or other combustible fuel in the form of a mist.

One object of this invention is to force the liquid fuel from the interior chamber of a reservoir containing the said fuel under a pneumatic pressure and to conduct and introduce the fuel and accompanying air thus forced from the said chamber into the aforesaid port or inlet in the form of an exceedingly fine spray or impalpable mist.

Another object is to render the introduction of the aforesaid fluid into the aforesaid induction port or inlet reliable at all times without necessitating the employment of expensive and inconvenient mechanism and without requiring much attention.

Another object is to utilize the air or aeriform body escaping from the exhaust-port of the aforesaid cylinder during the operation of the engine to obtain an intermittent pneumatic pressure upon the body of liquid contained within the aforesaid reservoir.

Another object is to maintain a desirable level of the liquid fuel within the said reservoir and to prevent the displacement by pneumatic pressure created within the said reservoir of liquid from within the said reservoir into the pipe or passage-way which feeds the said liquid into the lower portion of the said reservoir.

With these objects in view and to the end of realizing other advantages hereinafter appearing this invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a side elevation, largely in section, of an explosive or internal-combustion engine embodying my invention. Fig. II is an enlarged side elevation, in vertical section, showing the induction-port or fuel-inlet of the cylinder of the engine and the apparatus employed for introducing the gasolene or other liquid into the said port or inlet in the form of a mist.

In the accompanying drawings, A designates the cylinder of an upright engine, and B the piston arranged to operate within the chamber E of said cylinder. The piston B is operatively connected by a pitman or rod *b* with a crank *c* of the engine-shaft C.

A valve-casing D is arranged next exteriorly of and rigid with the cylinder A. The valve-casing D is provided with an interior chamber *d*. The chamber E, in which the piston *b* operates, is extended upwardly, as at *e*, beyond the travel of the piston, and the said upward extension *e* of the said chamber forms the space wherein the explosion of the combustible gaseous or aeriform mixture which is conducted into the said chamber takes place. A port *a*, formed in the casing or shell of the cylinder A, establishes communication between the chamber E and the chamber *d* next above the travel of the piston.

The induction-port or fuel-inlet I and the exhaust-port *x* of the engine are arranged at the top and bottom, respectively, of and connected with the valve-casing chamber *d*. The induction-port or fuel-inlet I is formed by a tubular shell or casing J, which is rigid with the top of the valve-casing D and is open at its outer end, where it communicates with the external atmosphere.

The outer end portion of the shell J overhangs the reservoir R, containing the gasolene or other hydrocarbon oil or liquid fuel *f* and from which the induction port or inlet I of the engine is charged.

The induction-port or inlet I is normally closed at its discharging end by a valve G, which is provided with a stem *g*, extending upwardly through and outside of the shell J,

and a spiral spring H is mounted and confined upon the said stem externally of the said shell between the latter and the nut *h*, which engages with screw-threads formed on the upper end of the stem. The valve G is arranged to move downwardly in opening against the action of the spring H. The valve G is obviously opened by suction created within the engine-cylinder during the drawing stroke of the piston.

A valve K controls communication between the valve-casing chamber *d* and the exhaust-port *x* and is arranged to move upwardly in opening. The valve K is provided with a depending stem *k*, which extends downwardly through the exhaust-port and is provided at its lower end and externally of the said port with a roller *l*, which is arranged to be engaged by a cam L, operatively mounted on the cam-shaft M, which is supported in any approved manner and arranged above and parallel with the engine-shaft C. The cam-shaft M is operatively provided with a spur-gear *m*, which is twice the size of and meshes with a pinion *s*, operatively mounted on the engine-shaft C, and the arrangement of the parts is such and the parts are so timed that the cam of the cam-shaft shall during the exhaust-stroke of the piston open the valve K.

The reservoir R is a closed receptacle which is provided in the top thereof and centrally with a screw-threaded aperture *r*, which is engaged by the correspondingly externally-screw-threaded upper end of a splash-guard N, which is therefore removably secured to and depends from the top of the said reservoir. The guard N is arranged vertically and terminates at its lower end a short distance above the bottom of the interior chamber *o* of the reservoir R and communicates, therefore, at the said end with the lower and liquid-charged portion of the said chamber. The lower portion of the chamber *o* is charged with gasolene or other hydrocarbon oil or liquid fuel *f*, and the upper portion of the said chamber forms an air-space over the said body of liquid *f*. The guard N extends through the said air-space and has its upper end portion perforated, as at *n*, above the level of the body of liquid *f*, and consequently within the said air-space.

A nozzle T is removably attached to the upper end of the guard N, and consequently indirectly to the reservoir R. The nozzle T is arranged, therefore, centrally of the top of the reservoir R, being screw-threaded externally at its lower end and screwed into the correspondingly internally-screw-threaded upper end of the guard N. The nozzle T curves upwardly and laterally from the top of the reservoir R and discharges at its upper end into the outer end of the port I, extending normally into the said port. The tubular shell J, which forms the said port I, as already indicated, is extensible, comprising an outer tubular externally-screw-threaded section 5, which is screwed into the correspondingly internally-screw-threaded outer end portion of the inner and stationary section of the said shell. The shell J is therefore elongated or shortened, according as the section 5 is turned in the one or the other direction. The nozzle T is instrumental in conducting oil-vapor-laden air received thereby from within the air-space of the chamber *o* into the port I, and a deflector-forming tubular inverted-cone-shaped shell *z* is arranged within the perforated upper end portion of the guard N, being preferably integral with and depending from the upper end of the said guard. The deflector *z* is instrumental in causing any air displaced from within the air-space of the chamber *o* to pass on its way into the nozzle T over and in close proximity to the body of oil which fills the lower portion of the space within the guard N.

An oil-conducting tube U is arranged centrally of and extends longitudinally through the nozzle T. The tube U is enough smaller diametrically than the air-conducting passage-way formed by the nozzle T to avoid interruption of the said passage-way. The tube U extends from within the lower end of the guard N, and consequently from a point in suitable proximity to the bottom of the chamber *o*, upwardly into close proximity to the upper and discharging extremity of the nozzle T. The tube U is provided within the lower end of the nozzle T with a conical diametrical enlargement *u*, which is forced into and tightly fits a downwardly-enlarged hole 7, formed in and extending vertically through an arm *t*, with which the lower end of the nozzle T is interiorly provided.

A device for cleaning the tube U interiorly is provided and consists, preferably, of a piece of wire W, which extends through the tube U and is enough smaller in cross-section than the said tube to avoid interruption of the oil-conducting passage-way formed by the said tube. The tube U is uniform in cross-section from end to end. The wire W is provided at its lower end with a scraper-forming head *w*, which is small enough, however, to render it capable of entering the tube U during an endwise shifting of the said wire.

The wire W, and especially the head *w* of the said wire, scrapes the tube U interiorly upon shifting the said wire endwise and withdrawing the wire upwardly from the said tube. The wire W is sufficiently flexible to render it capable of being introduced into, shifted endwise of, and withdrawn from the tube U. The wire W is provided at its upper end with a handle 8, which is arranged outside of the nozzle T.

In the normal position of the parts the nozzle T extends into the outer section 5 of the shell J, and the side walls of the said section 5 prevent turning of the said nozzle laterally outside of the said shell; but when the tube

U is to be cleaned interiorly the shell 5 is turned in the direction required to shift it inwardly until the nozzle T is free to be swung laterally to accommodate convenient access to the handle 8 for the purpose of operating the scraping device formed, as already indicated, by the wire W and its head *w*.

I would here remark that in order to clearly illustrate the construction and arrangement of the parts I have shown the nozzle T, the tube U, and the wire W somewhat exaggerated in size in the drawings.

A flexible air-conducting tube *y* is suitably attached to the top of the reservoir R and communicates at its discharging end with the air-space of the chamber *o* of the said reservoir. A compressible or elastic bulb Y, composed of rubber or other elastic and compressible material, is suitably attached to the air-receiving end of the tube *y*. The bulb Y has an air-inlet 12 and an air-outlet 14, arranged diametrically opposite, with the outlet 14 arranged to discharge into the air-receiving end of the tube *y* and with the inlet 12 communicating with the external atmosphere. A valve 13 is arranged to control the passage of air through the air-inlet 12, and a valve 15 is arranged to control the passage of air from within the bulb Y, through the air-outlet 14, to the tube *y*, and the arrangement of parts is such that by compressing the bulb air is displaced from within the bulb, through the tube *y*, into the air-space of the chamber *o*, and when the bulb after displacement of air therefrom returns into its normal condition a new supply of air enters the interior chamber of the bulb. Obviously the operation of the bulb Y will result in the creation of a pneumatic pressure upon the body of oil *f* in the reservoir R and force oil from the said body, through the tube U, into the induction-port I, and simultaneously air will be displaced from within the air-space of the reservoir R, through the nozzle T, into the said port.

A pipe P communicates at one end with the exhaust-port *x* and leads to the reservoir R, where it communicates at its opposite end with the air-space of the chamber *o* of the said reservoir at the top of the reservoir. The pipe P is provided with a valve *p* for controlling the passage of fluid through the said pipe.

The operation of the apparatus hereinbefore described is as follows: Preparatory to starting the engine the valve *p* is opened, whereupon the bulb Y is operated to force vapor-laden air from within the air-space of the chamber *o* of the reservoir R, through the nozzle T, into the induction-port I and to create upon the body of oil *f* within the said chamber enough pneumatic pressure to force or displace oil from the said chamber, through the tube U, into the said port. The oil forced into the port I enters the said port in the form of a mist or exceedingly fine spray, and very little pneumatic pressure is required to displace liquid or fluid from within the reservoir R into the said port, and a few compressions of the bulb Y will amply supply the said port with the necessary combustible fluid for the first charge of the engine. Air also enters the outer end of the port I and mixes with the oil forced into the said port from the reservoir R. The engine is then started to effect a drawing stroke of the piston, during which stroke the valve G opens and permits the combustible mixture to pass into the chamber *d* of the valve-casing and through the port *a* into the cylinder-chamber E. The valve G closes during the next succeeding or fluid-compressing stroke of the piston, upon the completion of which stroke the combustible mixture will then be compressed within the upward extension *e* of the cylinder-chamber E, where the said mixture is ignited in any approved manner. Means for igniting explosive mixtures in gas-engines are too well known to require description or illustration in this application. The explosion of the combustible mixture upon the ignition of the said mixture within the cylinder results in an impact upon the piston and causes the latter to make the third stroke of the cycle of the engine, and the dilatation of gases or fluid in the cylinder-chamber E and in the connected valve-casing chamber *d* causes the valve K to remain closed during the said stroke of the piston, and the arrangement of the parts is such that during the fourth or exhaust stroke of the piston the cam of the cam-shaft operates to open the exhaust-valve, so as to permit the said air and spent gases to exhaust. Obviously a portion of the fluid exhausted from the cylinder is caused to pass through the pipe P into the reservoir R, wherein it creates enough pneumatic pressure to force from within the said reservoir into the induction-port I vapor-laden air through the nozzle T and oil through the tube U, and the oil and air thus received by the said port passes into the cylinder-chamber during the first or drawing stroke of the piston during the next succeeding cycle of the engine.

By the construction hereinbefore described it is obvious that the engine is automatically supplied with the combustible mixture or fluid during the operation of the engine. The level of the oil within the reservoir R can materially vary without materially interfering with the displacement of oil from the said reservoir to the induction-port I. The oil is introduced into the said port I in the form of an impalpable mist. The apparatus is simple and reliable in its operation and not liable to get out of order, and the guard N prevents splashing of the oil into the nozzle T. To maintain a desirable level of oil within the reservoir R, another reservoir 25 is arranged externally of and a short distance from the reservoir R and is charged with gasolene or

hydrocarbon oil which is to be supplied to the reservoir R. A pipe 26 is arranged to conduct oil from the lower end of the interior chamber of the reservoir 25 into the chamber *o* of the reservoir R. The reservoir 25 is provided at the top and centrally with an oil-inlet 27. An oil-supply pipe 28, which is provided with a valve 30, conducts oil to the said inlet. A float 32 is contained within the reservoir 25 and provided with a valve 33, arranged to close the inlet 27 in the upper position of the float. The valve 33 is opened by the descent of the float, as illustrated in Fig. 1, which shows oil passing into the said reservoir. Obviously as soon as the desired level of oil again obtains within the reservoir 25 the float will have risen the distance required to close the valve 33 and interrupt the flow of oil into the said reservoir and will again lower to open the said valve when the said level descends. Obviously, therefore, the reservoir R is kept supplied with the desired body of oil *f*.

To prevent the forcing of oil from within the reservoir R back into the float-containing reservoir 25 during a pneumatic pressure upon the body of oil *f* within the reservoir R, the pipe 26 is provided at its discharging end with a suitably-applied check-valve 34, which is normally open, but closed by said pneumatic pressure.

What I claim is—

1. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, which port or inlet is formed by an extensible shell or casing which is normally extended, of a reservoir arranged externally of the cylinder; a movable nozzle normally extending and discharging into the outer end of the aforesaid inlet and being in communication with the interior chamber of the reservoir; means for forcing fluid from within the reservoir through the nozzle, and the aforesaid shell or casing normally preventing the movement of the nozzle out of the said shell or casing.

2. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, which port or inlet is formed by a shell or casing comprising an inner section and an outer section shiftable endwise of the inner section, of a reservoir arranged externally of the cylinder, a laterally-turnable nozzle discharging and normally extending into the aforesaid outer section and in communication with the interior chamber of the reservoir, and means for forcing fluid from within the reservoir through the nozzle, and the nozzle being rendered free to be actuated laterally out of line with the aforesaid inlet upon actuating the aforesaid outer section inwardly.

3. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, which reservoir has its interior chamber forming an air-space over the lower and liquid-receiving portion of the chamber, of a nozzle arranged to receive air from the aforesaid air-space and discharging into the aforesaid port or inlet, a tube arranged within and longitudinally of the said nozzle and discharging into the said port or inlet and in communication with the liquid-holding portion of the aforesaid chamber, and means for placing a pneumatic pressure upon a body of liquid in the said chamber.

4. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir having its interior chamber forming an air-space over the lower and liquid-receiving portion of the chamber, of a nozzle arranged to receive air from the aforesaid air-space and discharging into the aforesaid port or inlet, a tube arranged within and longitudinally of the said nozzle and discharging into the said port or inlet and in communication with the liquid-holding portion of the aforesaid chamber in suitable proximity to the bottom of the said chamber, and means for creating pressure upon a body of liquid in the said chamber.

5. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the aforesaid chamber, a tube arranged within and extending longitudinally of the passage-way formed by the said nozzle and arranged to discharge into the aforesaid port or inlet, which tube is arranged to conduct liquid from within the lower portion of the aforesaid chamber; means for scraping the said tube internally, and means for forcing liquid from within the said chamber through the said tube.

6. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the aforesaid chamber, a tube arranged within and extending longitudinally of the said nozzle and discharging into the aforesaid port or inlet, which tube is arranged to conduct liquid from within the lower portion of the aforesaid chamber, and a piece of wire arranged within and extending longitudinally of the said tube and projecting beyond the discharging end and outside of the aforesaid nozzle, which wire is enough smaller in cross-section than the passage-way formed by the tube to avoid interruption of continuity in the said passage-way, and means for forcing liquid from within the aforesaid chamber through the said tube.

7. The combination, with the induction-port

or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder and below the said port or inlet, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the aforesaid chamber; a tube arranged within and extending longitudinally of the said nozzle and discharging into the aforesaid port or inlet, which tube is arranged to conduct liquid from within the lower portion of the aforesaid chamber, and a piece of wire arranged within and extending longitudinally of and through the said tube and provided with a head and a handle arranged outside of the tube and formed upon the lower end and upper end respectively of the wire, which wire, between the said handle and head, is enough smaller in cross-section than the passage-way formed by the tube to avoid interruption of continuity in the said passage-way, and means for forcing liquid from within the aforesaid chamber through the said tube.

8. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the aforesaid chamber and removably secured to the casing of the reservoir; a tube arranged within and extending longitudinally of the passage-way formed by and interiorly of the nozzle and arranged to discharge into the aforesaid port or inlet, which tube is supported from the nozzle and extends into suitable proximity to the bottom of and communicates with the aforesaid chamber, and means for forcing liquid from within the said chamber through the tube.

9. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the aforesaid chamber, which nozzle is removably secured to the casing of the reservoir and provided interiorly with an arm; a tube arranged within and extending longitudinally of the passage-way formed by and within the nozzle, which tube is arranged to discharge into the aforesaid port or inlet and is supported from the aforesaid arm and extends into suitable proximity to the bottom of and communicates with the aforesaid chamber, and means whereby air and liquid may be forced through the nozzle and tube respectively from within the aforesaid chamber and simultaneously.

10. The combination, with the induction-port or inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the cylinder and at an elevation below the aforesaid port or inlet, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the aforesaid chamber, which nozzle is removably secured to the top of the casing of the reservoir; a tube arranged within and extending longitudinally of the nozzle and discharging into the aforesaid port or inlet and supported from the nozzle, which tube extends into suitable proximity to the bottom of and is there in communication with the aforesaid chamber, and means for placing a pneumatic pressure upon a body of liquid within the said chamber.

11. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the cylinder, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the interior chamber of the reservoir; a tube arranged within and extending longitudinally of the aforesaid nozzle and discharging into the aforesaid port or inlet, which tube extends into suitable proximity to the bottom of and is there in communication with the aforesaid chamber; a splash-guard arranged within the said chamber and extending around the aforesaid tube and arranged to prevent the splashing of liquid into the aforesaid nozzle, and means for introducing air under pressure into the aforesaid chamber.

12. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine and a reservoir arranged externally of the said cylinder, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the interior chamber of the reservoir; a tube arranged within and extending longitudinally of the passage-way formed by the aforesaid nozzle, which tube discharges into the aforesaid port or inlet and is arranged to receive liquid from the aforesaid chamber, and a splash-guard arranged within the said chamber and surrounding the aforesaid tube and extending from within the upper portion to within the lower portion of the said chamber, which guard has its upper end portion perforated.

13. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, of a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the upper portion of the interior chamber of the reservoir; a tube arranged within and extending longitudinally of the passage-way formed by the aforesaid nozzle, which tube discharges into the aforesaid port or inlet and is arranged to receive liquid from the aforesaid chamber; a splash-guard arranged within the said chamber and surrounding the aforesaid tube, which guard extends from within the upper portion to within the lower portion of the said chamber and has its upper end portion perforated, and a tubular deflector surrounding the aforesaid

tube and arranged within the upper perforated portion of the guard, and means for placing a pneumatic pressure upon a body of liquid supplied to the aforesaid chamber.

14. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, of a tubular splash-guard arranged within the said chamber and depending from and removably secured to the top of the reservoir, which guard has its upper end portion perforated; a nozzle arranged to discharge into the aforesaid port or inlet and communicating with the passage-way formed by and interiorly of the perforated portion of the splash-guard; a tube arranged within and longitudinally of the passage-way formed by and within the nozzle, which tube discharges at one end into the aforesaid port or inlet and extends into suitable proximity to the bottom of and communicates with the aforesaid chamber, and means for placing a pneumatic pressure upon a body of liquid supplied to the said chamber.

15. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, of a tubular splash-guard arranged within the said chamber and supported and depending from the top of the reservoir, which guard has its upper portion perforated and provided, interiorly of its said perforated end portion, with a depending tubular deflector; a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the passage-way formed by and within the perforated portion of the splash-guard, and a tube arranged within and longitudinally of the passage-way formed by and within the nozzle, which tube discharges into the aforesaid port or inlet and extends into suitable proximity to the bottom of and is in communication with the aforesaid chamber.

16. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder, of a tubular splash-guard screw-threaded externally and internally of its upper end and screwed into and depending from the top of the reservoir; which guard has its upper end portion perforated; a nozzle arranged to discharge into the aforesaid port or inlet and screwed into the upper end of the splash-guard; a tube arranged within and longitudinally of the passage-way formed by and within the nozzle, which tube discharges into the aforesaid port or inlet and extends into suitable proximity to the bottom of and is in communication with the aforesaid chamber, and means for placing a pneumatic pressure upon a body of liquid within the said chamber.

17. The combination, with the induction-port or fuel-inlet of the cylinder of an internal-combustion engine, and a reservoir arranged externally of the said cylinder and provided interiorly with a chamber which forms an air-space over the liquid-holding portion of the chamber; a nozzle arranged to discharge into the aforesaid port or inlet and in communication with the aforesaid air-space; a tube arranged within and longitudinally of the passage-way formed by and within the nozzle, which tube discharges into the aforesaid port or inlet and extends into suitable proximity to the bottom of and is in communication with the liquid-holding portion of the aforesaid chamber; means for placing a pneumatic pressure upon a body of liquid supplied to the said chamber; another reservoir provided with a liquid-inlet in the top thereof; a liquid-supply pipe communicating with the said last-mentioned inlet; a float contained within the last-mentioned reservoir and provided with a valve arranged to close the last-mentioned inlet in the upper position of the float; a passage-way arranged to conduct liquid from the lower portion of the chamber of the float-containing reservoir into the chamber of the first-mentioned reservoir, and a check-valve for obstructing communication through the said passage-way, which check-valve is normally open and adapted to be operated by pressure upon the aforesaid body of liquid.

In testimony whereof I sign the foregoing specification, in the pressence of two witnesses, this 12th day of May, 1903, at Cleveland, Ohio.

FRANKLIN L. CHAMBERLIN.

Witnesses:

C. H. DORER,

TELSA SCHWARTZ.