No. 696,146. Patented Mar. 25, 1902.

# C. C. & E. A. RIOTTE.

## MIXING OR SPRAYING DEVICE.

(Application filed Nov. 29, 1899.)

(No Model.)

FIG. 1.

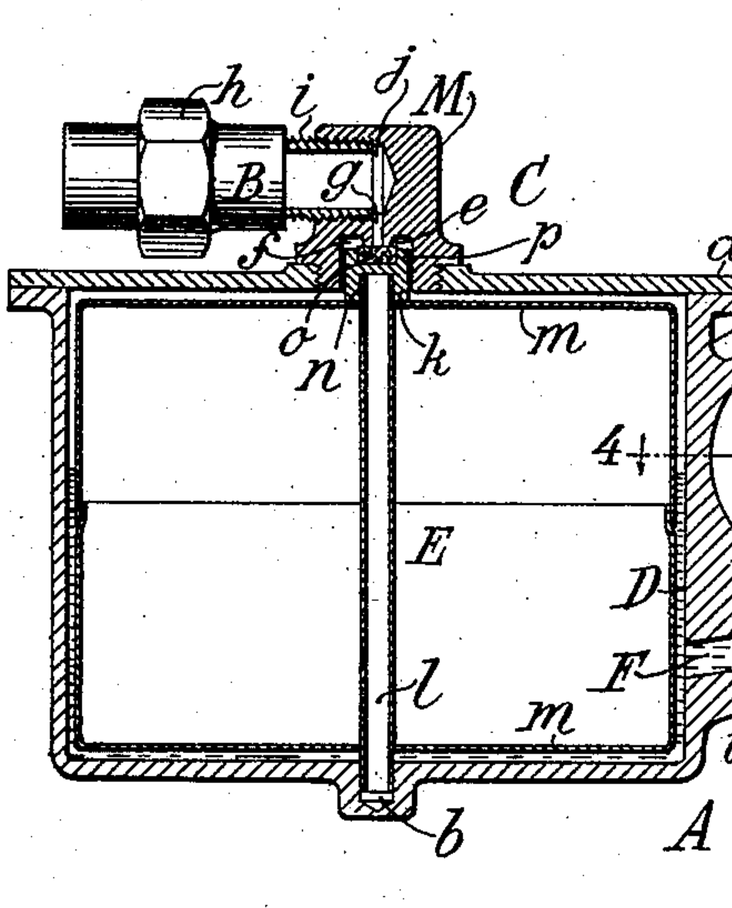



FIG. 3.

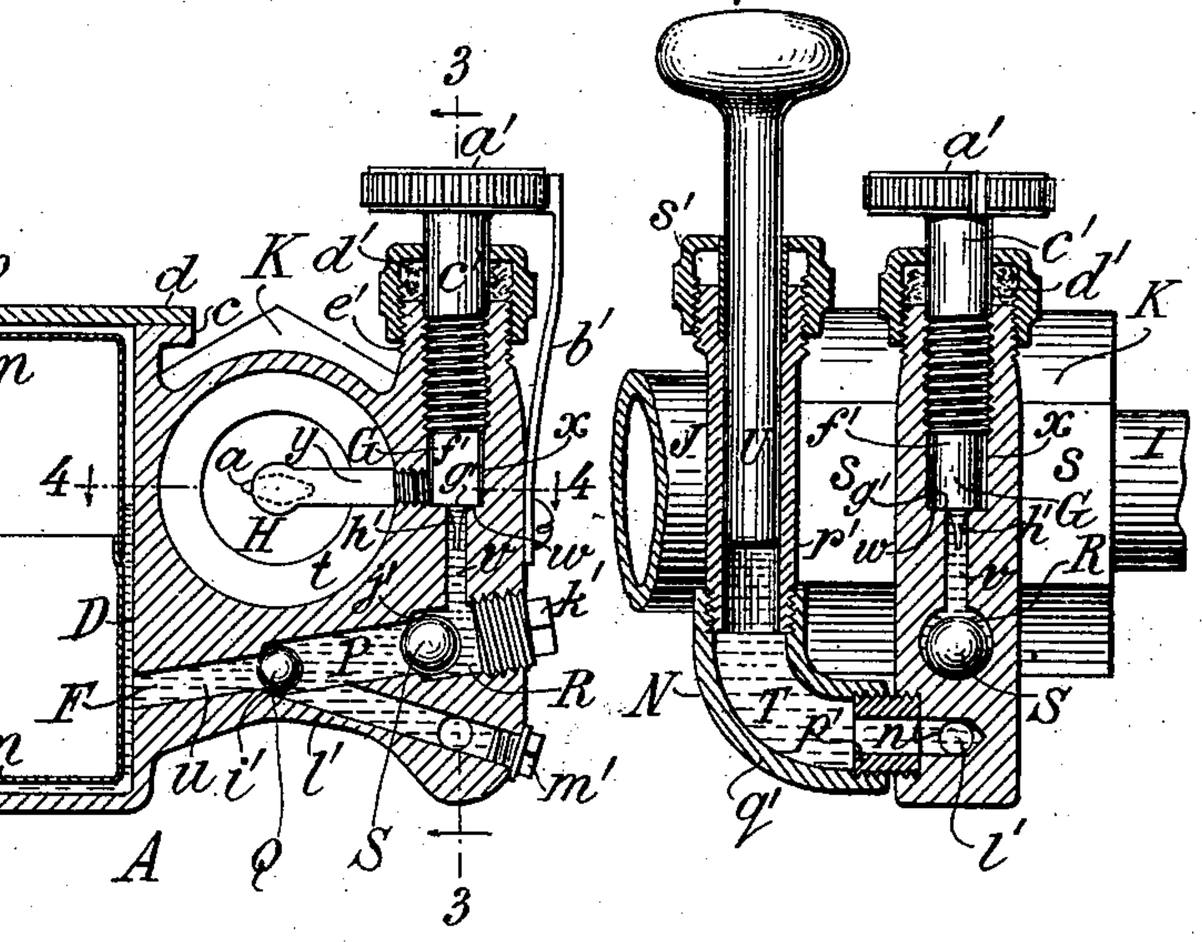



FIG. 2.

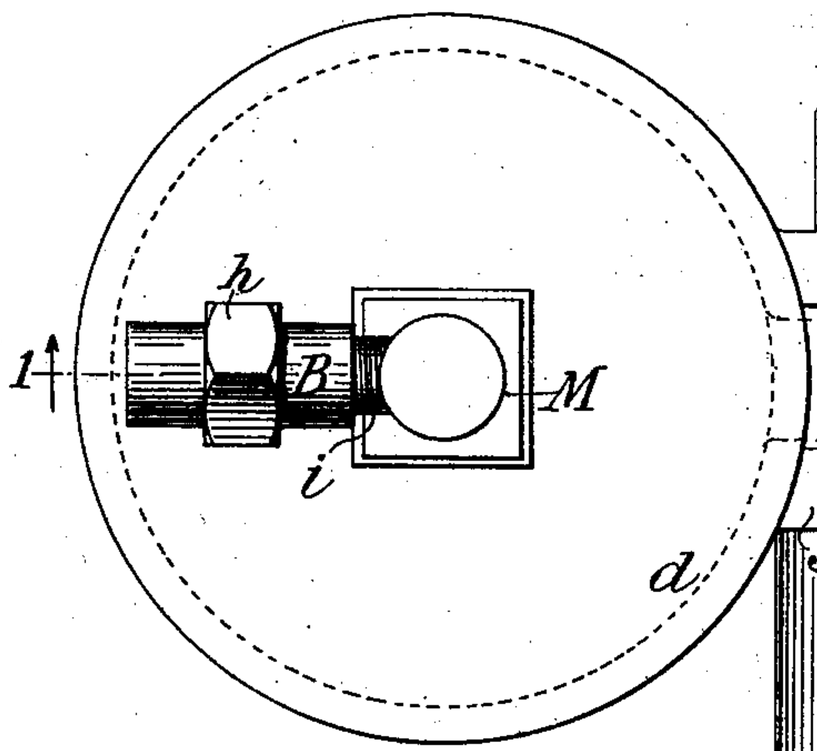
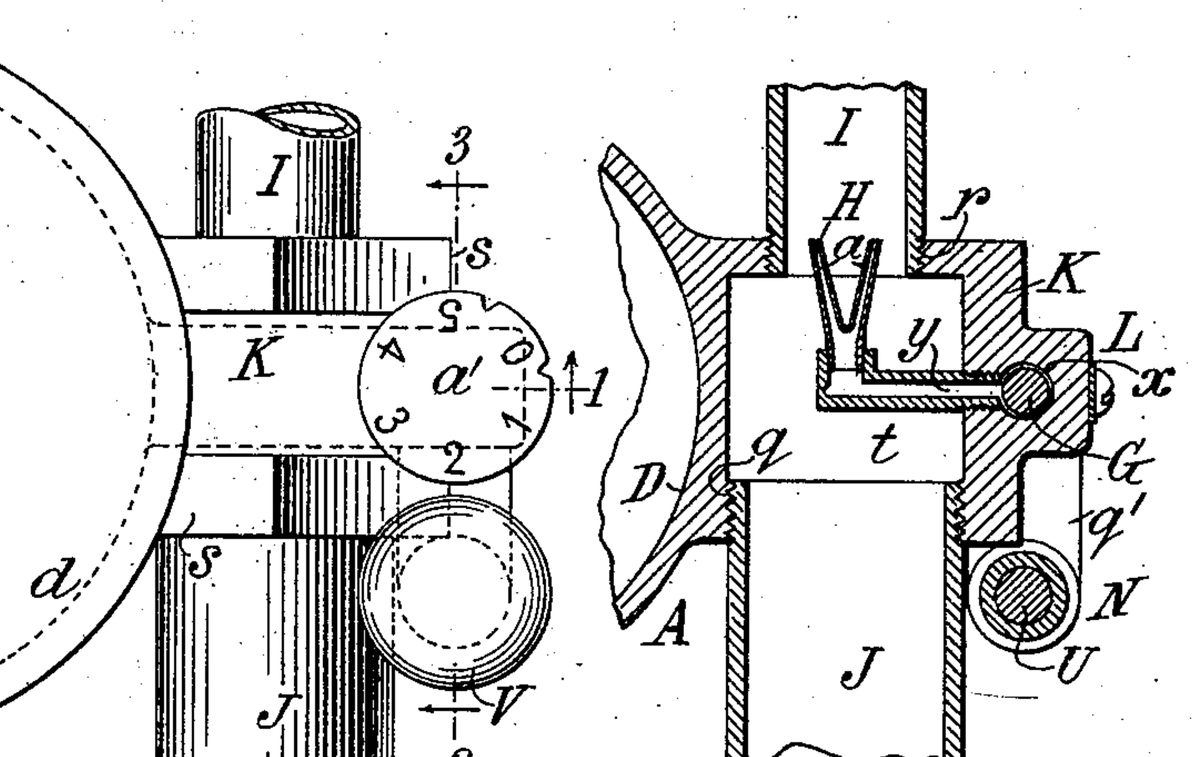



FIG. 4.

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# UNITED STATES PATENT OFFICE.

CARL C. RIOTTE AND EUGENE A. RIOTTE, OF NEW YORK, N. Y., ASSIGNORS, BY MESNE ASSIGNMENTS, TO U. S. LONG DISTANCE AUTOMOBILE COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## MIXING OR SPRAYING DEVICE.

SPECIFICATION forming part of Letters Patent No. 696,146, dated March 25, 1902.

Application filed November 29, 1899. Serial No. 738,674. (No model.)

*To all whom it may concern:*

Be it known that we, CARL C. RIOTTE and EUGENE A. RIOTTE, citizens of the United States, and residents of the city, county, and State of New York, have invented certain new and useful Improvements in Mixing or Spraying Devices, of which the following is a specification.

This invention relates to devices for mixing a hydrocarbon and air for such purposes as the production of explosive charges for explosion-engines, and is especially applicable as a sprayer or vaporizer for liquid hydrocarbons for use in gasolene-engines and the like.

Our invention aims to provide an improved sprayer especially adapted for mixing liquid hydrocarbon with air, one which can be generally used and easily regulated and one in which a uniform feed can be obtained in any character of engine and a large initial feed or when desired a temporary accelerated feed of gasolene can readily be had. To this end in carrying out the preferred form of our present improvements as applied to a sprayer having a supply-valve, a float-valve-regulating supply, a mixing-chamber or feed-conduit, a spraying-nozzle, and a regulating-valve we provide certain features of improvement which will be hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical axial section showing the preferred form of our improved sprayer cut on the line 1 1 of Fig. 2. Fig. 2 is a plan view thereof. Fig. 3 is a vertical section thereof cut on the line 3 3 in Figs. 1 and 2 and looking in the direction of the arrow, and Fig. 4 is a fragmentary horizontal section thereof cut on the lines 4 4 in Fig. 1.

Referring to the drawings, let A indicate the casing, B the supply-pipe, C the inlet-valve, D the float-tank, E the float, F the outlet-pipe, G the regulating-valve, H the discharge-nozzle, I the feed-pipe or mixing-chamber, and J the air-pipe, of the sprayer. These parts are common to sprayers as now made and may be of any usual or suitable construction in their general features without materially affecting the present invention. The gasolene is fed from any source of supply to the valve C, through which it passes to the tank D under the control of the float E within the tank. The gasolene passes from the tank through the regulating-valve to the nozzle, being sucked out of the outlet-orifices *a*, of which a plurality may be used, by the current of air through the feed-pipe I, which current is induced by the vacuum formed in the cylinder of a gas-engine during each alternate or charging stroke. When an engine is running rapidly, this current is strong enough to constitute an efficient ejector for the gasolene, readily drawing enough thereof from the nozzle to insure proper vaporization in the mixing or feed pipe to produce an efficient explosive charge by the time the mixture reaches the cylinder. In starting an engine, however, the pistons are moved by hand, and consequently so slowly that the air-current is too feeble to efficiently feed the gasolene, it sometimes requiring several revolutions or some delay before the engine can be started. To obviate this it has been common to open the regulating-valve when starting and readjust it to the proper feed after the engine is under headway.

Having now made clear the general features and operation of the character of sprayer illustrated, we will describe in detail the preferred form of our improved sprayer.

We prefer to construct the shell A of a single integral piece of casting, with the tank D at one side and the nozzle-casing at the other side, having a nozzle-chamber extending at right angles to the axis of the tank and between the tank and the valve-chamber L, and we form the tank as a cylindrical chamber, with a concentric guiding provision *b* on its lower end and with a finished top or flange *c*, on which is fastened a flat cover *d*, which cover carries the seat *e* of the inlet-valve, this seat being formed as an annular lip, located in the upper part of a cavity *f* in a nipple M, which is screwed into the top of the cover, so that the seat and cavity are concentric with the vertical axis of the tank. The inlet-duct *g* opens through the seat, and the inlet-pipe B is connected by a union *h* and nipple *i* with the laterally-extending socket *j* in the nipple M. Thus by unscrewing the union and freeing the top *d* the top can be removed with the valve-seat and access can be had to the latter, as well as to the float and the interior of the tank. We prefer also to provide a cylindrical hollow body for the float C, which

closely approximates in diameter the diameter of the tank, leaving only a minute clearance-space between the cylindrical walls of these parts, which float is guided centrally at top and bottom in direction parallel to its axis, at top by a guide-block *k*, loosely fitting the socket *f*, and at bottom by a tube *l*, snugly fitting the guiding provision or socket *b* in the bottom of the shell. The top and bottom walls *m* of the float are flat and in close proximity to the top and bottom walls of the tank, and the tube *l* penetrates the top and bottom walls of the float and is joined at its exterior thereto with a leak-tight joint, the interior of the tube being open at its lower end. At its upper end the tube extends through the top wall and upwardly into a socket *n* in the block *k*, the block being fastened to the protruding end of the tube and being thereby connected to the float.

The block *k* not only serves as a top guide for the float, but it also carries the valve proper, *o*, which is a disk of packing or other suitable material fixed in a socket *p* in the top of the block and engaging the depending valve-seat *e*. In this way the full buoyancy of the float is directed against the valve-seat, and the inflowing gasolene when the valve is open insures a clean seat. The float is efficiently guided with the minimum of friction, and the float may be made of two half-shells soldered together at the middle. The snug fit between the lower end of the tube and the guiding-socket *b* of the shell prevents the falling of sediment into the socket, and the hollow lower end of the tube insures that any foreign matter which may originally have accidentally become lodged in the socket may be received in the end of the tube when the float descends, while the great internal area of the tube provides an expansion-chamber of such capacity that the movements of the float will not be materially affected by the variations in pressure within the closed chamber formed when the lower end of the tube is inserted in the guiding-socket. The inflowing gasolene will wash off the seat and wash down the side walls of the guiding-socket *f* and guiding-block *k* at top, as well as insuring that no sediment shall accumulate on the top of the float to prevent its rising to a position for seating the valve.

The nozzle-shell K is of sufficient capacity for convenient insertion and removal of the nozzle and has concentric screw-threaded inlet and egress apertures *q* and *r*, into which the air and feed pipes are screwed at opposite sides. Surrounding these it is formed with wrench-faces *s*, by either of which it may be held during connection of these pipes. The discharge-pipe F leaves the tank at a material distance above the bottom as a small oblique duct *u*, so that no sediment will be carried out with the outflow, and extends laterally and obliquely beneath the chamber *t* and then upwardly parallel with the axis of the tank in a duct *v* to the valve-seat *w*, which opens into the valve-chamber *x*, from which a lateral duct *y* leads to the nozzle H.

The level of the valve-seat *w* is flush with the oil-level in the tank D, so that the total lift to be overcome by the suction on the nozzle will be the elevation of the center of the nozzle above the face of the valve-seat, which in practice may advantageously be an eighth of an inch, thus reducing the resistance to the outflow of gasolene to the minimum. In a marine engine the motion of the vessel will temporarily vary this level; but owing to the small area of the tank and its reduced effective oil-holding capacity, by reason of the great size and close fit of the float, these variations in level will not materially affect the feed, and temporary departures from the mean level will be unnoticeable. This reduced capacity of the tank also avoids disadvantage during these changes of level, due to the motion of the vessel, since the quantity of gasolene in the tank is so limited as to be unable to materially interfere with the normal operation of the float.

The duct *y* is formed of a screw-threaded tube screwing into the valve-chamber *x* from within the air-chamber *t*, which tube has a lateral branch, into which the nipples *a* of the nozzle are screwed. By removing the pipe I the nipples may be unscrewed and by removing the pipe J the duct *y* may be unscrewed.

The regulating-valve G has the usual notched and indicated handle *a'*, engaged by the spring *b'* to hold it as adjusted, and below this it has a screw-threaded stem *c'*, passing through a stuffing-box *d'* and screwing into the projection *e'* of the shell, with its lower cylindrical end *f'* in the valve-chamber *x*. The end of the stem has a square face *g'* seating on the square wall *w* of the valve-seat, and a tapering point *h'*, passing through this seat into the duct *v*. The point *h'* constitutes the valve proper for the valve G and exactly fits the duct *v* when the wall *g'* is tight on the flat wall of the seat. As the stem is screwed out the point determines the area of outlet from the duct *v*, thus affording an accurate means for regulation of the outflow of gasolene, and as the stem is screwed in the flat wall *g'* engages the flat wall of the seat at the moment the pin closes the duct, thus preventing further inscrewing of the stem, which might injure either the point or the valve-seat. In this way the valve proper is prevented from injury and can always be relied on for accurate regulation, an important matter when soft metals are used for these parts, as is generally the case.

We prefer also to provide means for accelerating the flow when desired independently of the regulating-valve. This preferably is effected by providing a force-pump N between the inlet and the nozzle, although any auxiliary flow producing or permitting means may be employed. In the simple construction shown we provide for the pump an inlet-

chamber P, an inlet-valve Q, and an outlet-chamber R and outlet-valve S, a pump-chamber T, a piston U, and a handle V. The chamber P consists of an enlarged concentric portion of the bore or duct *u*, the end of which serves as a seat *i'* for the valve Q, which latter is shown as a loose ball or sphere. The chamber R consists of a large concentric bore in continuation of the chamber P, the end *j'* of which bore constitutes the seat for the valve S, which is also a loose ball or sphere. The plug *k'* closes the chamber R outwardly of the duct *v*, which rises from such chamber. The pump-chamber T consists of a duct *l'*, extending diagonally upward into the bottom side of the chamber P at the lowermost extremity thereof, so as to drain off any sediment, which duct is closed at its lower end by a plug *m'*, in advance of which it meets a transverse duct *n'*, in which is screwed a nipple *p'*, on which is screwed an elbow *q'*, into the upwardly-turned end of which is screwed a pipe length *r'*, the interior of which receives the end of the piston U and on the top of which is screwed a stuffing-box *s'*. The piston is raised and lowered by the handle V, and when raised draws into the pump-chamber a quantity of gasolene, which is drawn past the valve Q, and when the piston is lowered it discharges this charge past the valve S and the regulating-valve, if open, ejecting the charge through the nozzle H into the feed-pipe I. In this manner the regulating-valve may be set at the ordinary position for regulating and the pump may be used as a force-pump to spray oil into the feed-pipe whether or not there is sufficient suction to start the feed of oil, no unusual regulation of the regulating-valve being necessary to permit this, or, if a temporary extra feed is necessary while an engine is running, the force-pump may be used to cause this by simply adding its pressure to the oil passing the regulating-valve.

In use the improved sprayer can be operated as would any ordinary sprayer. It can be conveniently connected and disconnected and can be operated automatically or manually or in both ways simultaneously.

It will be seen that our invention provides improvements in sprayers which can be readily and advantageously availed of, and it will be understood that our improvements are not limited to the particular details of construction, arrangement, and combination set forth as constituting their preferred form, since they can be employed in whole or in part, according to such modifications as circumstances or the judgment of those skilled in the art may dictate, without departing from the spirit of our invention.

What we claim is—

1. For sprayers and other devices, the combination with a tank having an inlet and an outlet, and a float in said tank, of a guide for said float consisting of a tubular part fixed thereto and open at the bottom, and a guiding provision on said tank engaging and closing such tubular part, whereby the internal area of such tubular part affords sufficient capacity to prevent compression of its contents from materially interfering with relative movement between said float and tank.

2. For sprayers and other devices, the combination with a tank having an inlet and an outlet, and a float in said tank, of a guide for said float consisting of a tubular part fixed thereto open at the bottom and extending upward as high as said float, and a guiding provision on said tank engaging and closing such tubular part, whereby the internal area of such tubular part affords sufficient capacity to prevent compression of its contents from materially interfering with relative movement between said float and tank.

3. For sprayers and other devices, the combination with inlet and outlet passages, of a tank communicating therewith and having internal sockets *b* and *f* at its opposite sides, a float in said tank having an externally-projecting hollow tube *l* open at the bottom closely fitting said socket *b* and extending up through said float, and a projection *n* loosely fitting said socket *f*, said projections movably engaging said sockets for guiding the float in the tank, and a valve operated by said float.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

CARL C. RIOTTE.
EUGENE A. RIOTTE.

Witnesses:
GEORGE H. FRASER,
THOMAS F. WALLACE.