R. J. C. TAMPIER.

MECHANICALLY DRIVEN FEED DEVICE FOR GASOLENE MOTORS.

APPLICATION FILED OCT. 31, 1918.

1,363,694. Patented Dec. 28, 1920.

4 SHEETS—SHEET 1.

Fig. 1.

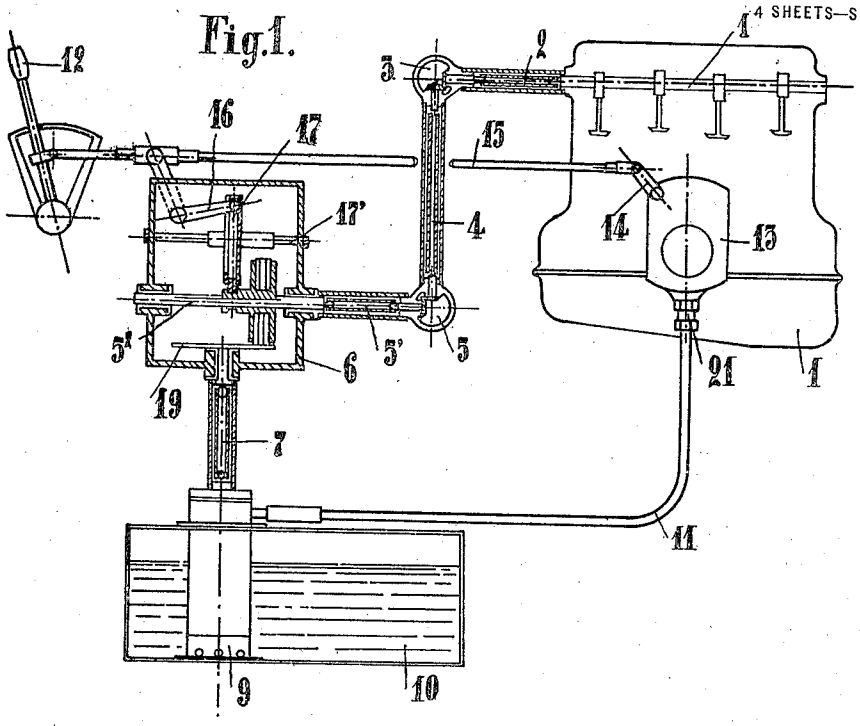
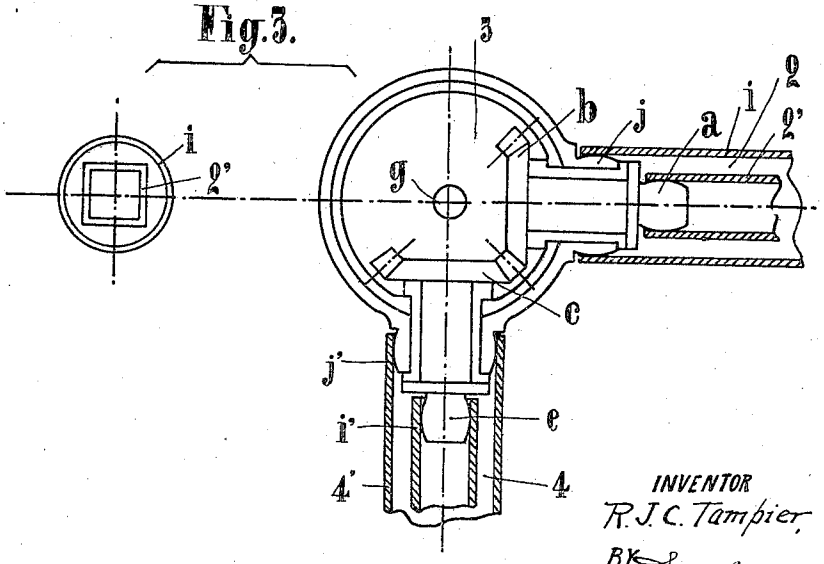



Fig. 3.




INVENTOR
R. J. C. Tampier,
BY
Louis Pamelee
ATTORNEY

R. J. C. TAMPIER.

MECHANICALLY DRIVEN FEED DEVICE FOR GASOLENE MOTORS.

APPLICATION FILED OCT. 31, 1918.

1,363,694.

Patented Dec. 28, 1920.

4 SHEETS—SHEET 2.

Fig. 2.

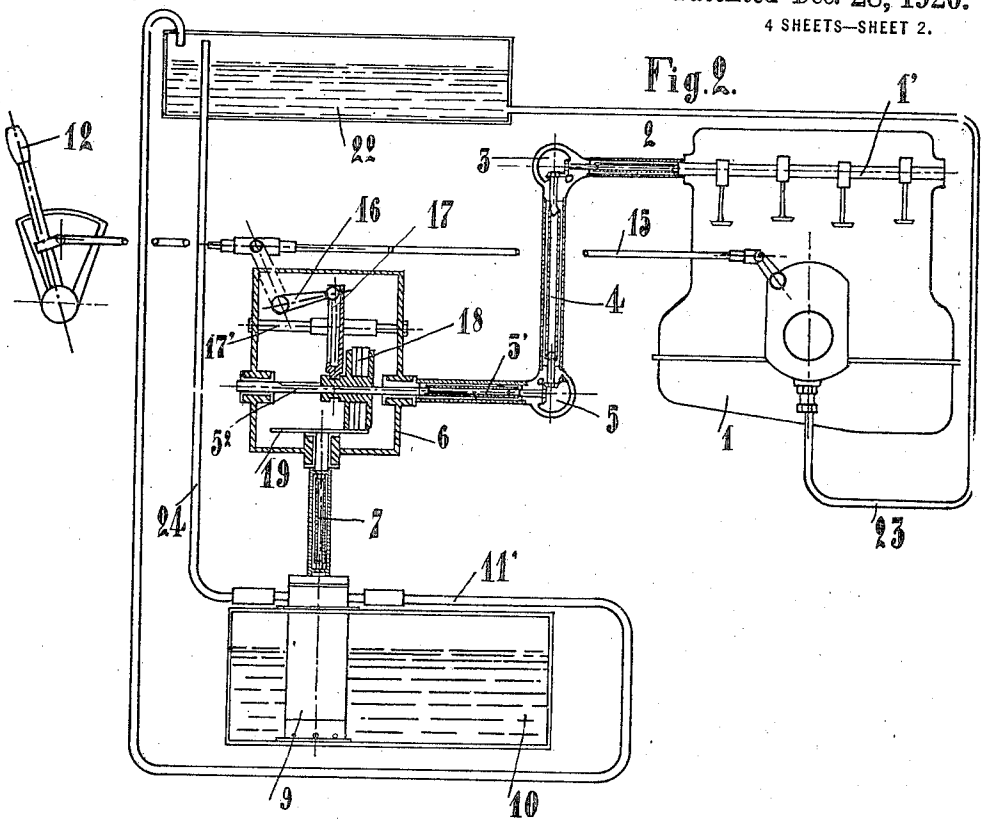
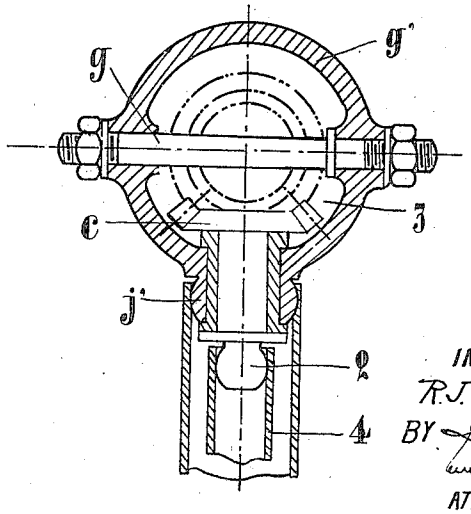



Fig. 4.




INVENTOR
R. J. C. Tampier,
BY
ATTORNEY

R. J. C. TAMPIER.

MECHANICALLY DRIVEN FEED DEVICE FOR GASOLENE MOTORS.

APPLICATION FILED OCT. 31, 1918.

1,363,694.

Patented Dec. 28, 1920.

4 SHEETS—SHEET 3.

Fig.5

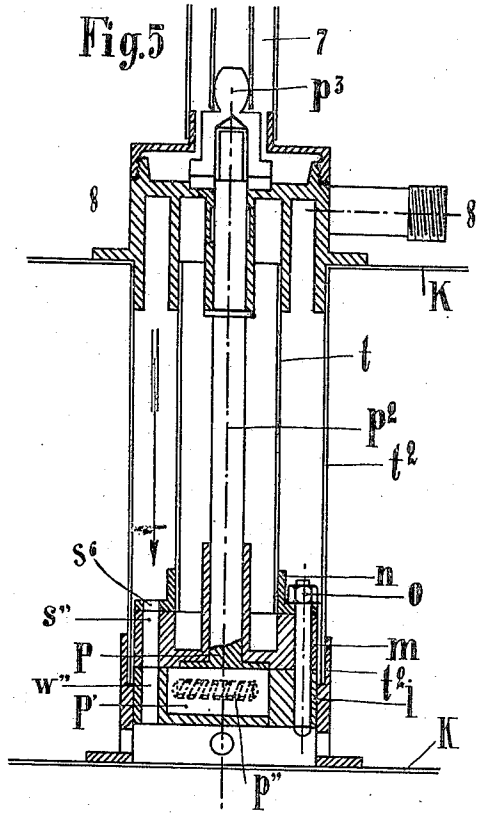



Fig.6.

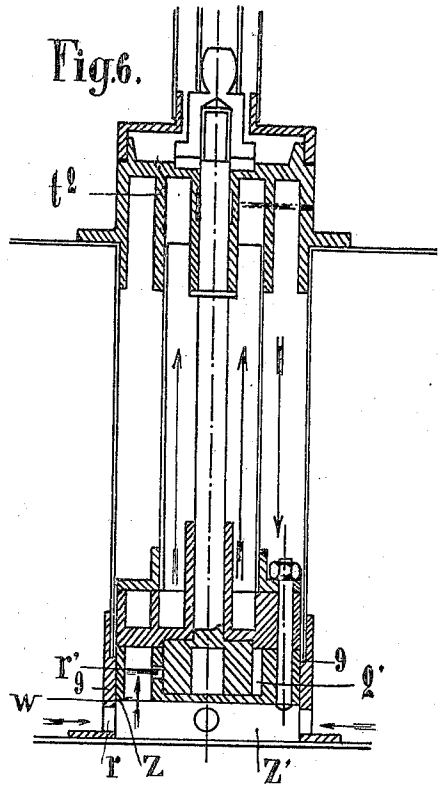



Fig.8

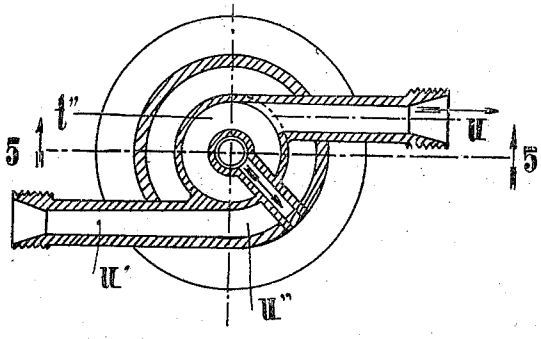
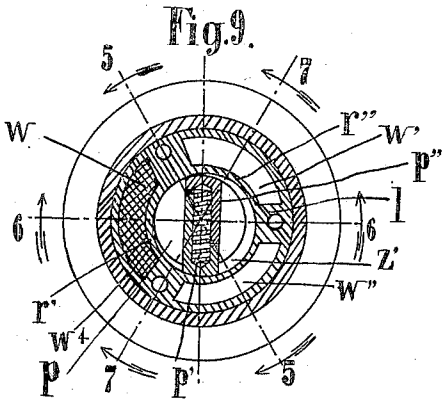



Fig.9.




INVENTOR

R. J. C. Tampier

BY Louis Dannelke

ATTORNEY

R. J. C. TAMPIER.

MECHANICALLY DRIVEN FEED DEVICE FOR GASOLENE MOTORS.

APPLICATION FILED OCT. 31, 1918.

1,363,694. Patented Dec. 28, 1920.

4 SHEETS—SHEET 4.

Fig.7.

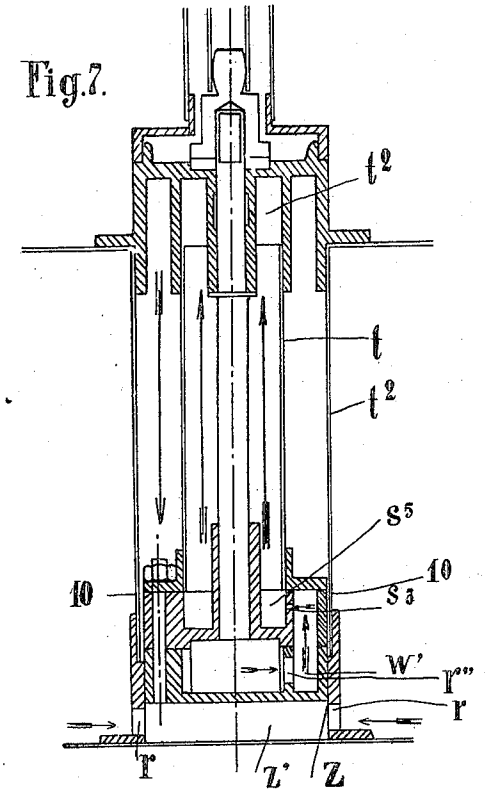
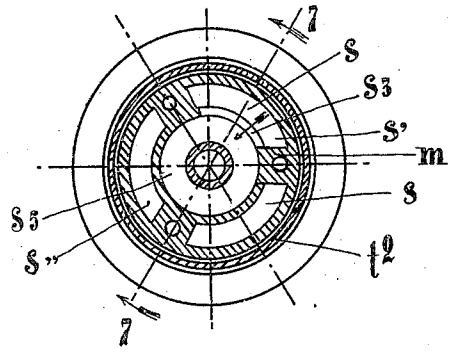



Fig.10.




INVENTOR
R. J. C. Tampier,
BY
ATTORNEY

# UNITED STATES PATENT OFFICE.

RENÉ JEAN CAMILLE TAMPIER, OF BOULOGNE-SUR-SEINE, FRANCE.

## MECHANICALLY-DRIVEN FEED DEVICE FOR GASOLENE-MOTORS.

1,363,694. Specification of Letters Patent. Patented Dec. 28, 1920.

Application filed October 31, 1918. Serial No. 260,623.

*To all whom it may concern:*

Be it known that I, RENÉ JEAN CAMILLE TAMPIER, citizen of the Republic of France, and resident of Boulogne-sur-Seine, France, (post-office address 1 rue de Bellevue), have invented new and useful Mechanically-Driven Feed Devices for Gasolene-Motors, which improvements are fully set forth in the following specification.

This invention relates to gasolene feeding systems for internal combustion engines; and it comprises, broadly speaking, an improved feeding system in which the delivery of the gasolene to the engine is effected by means of a pump whose component parts are so constructed and arranged that the quantity of gasolene which it supplies will remain constant irrespective of the speed of the engine.

The accompanying drawings show, by way of example, one form which the mechanically-driven system may take in practice.

Figure 1 of the drawings is a diagrammatic, part-sectional side elevation of the complete system;

Fig. 2 is a modification or development thereof;

Figs. 3 and 4 are enlarged detail sectional views of the driving gearing;

Fig. 5 is a vertical section of the feed pump, taken on line 5—5, Figs. 8 and 9;

Figs. 6 and 7 are similar views taken respectively on line 6—6 of Fig. 9 and line 7—7 of Figs. 9 and 10;

Fig. 8 is a horizontal section taken on line 8—8, Fig. 5; and

Figs. 9 and 10 are horizontal sections taken, respectively, on line 9—9 of Fig. 6 and line 10—10 of Fig. 7.

Figs. 1 and 2 show general views of the mechanism comprised in the system. The gasolene engine or motor is indicated at 1; and its cam shaft 1′, which is assumed to be mounted on the cylinder heads, transmits its rotary movement through a horizontal driving connection 2 and bevel gearing 3 to a vertically-arranged driving connection 4, and thence through bevel gearing 5 and a second horizontal driving connection 5′ to a horizontal shaft $5^2$ journaled in bearings in a case 6, said shaft $5^2$ and its driving connection 5′ being disposed co-axially. Shaft $5^2$ carries a sliding friction gear 18, which is in driving engagement with a horizontal friction disk 19 coupled to the rotary piston of the pump 9 by a vertical driving connection 7.

The friction gear 18 has connected to its hub an operating device by means of which it is shifted toward or from the center of the disk 19 to increase or decrease the speed at which the latter is driven thereby; said device being here shown as comprising a vertical, longitudinally slotted sleeve 17 having a hub which is slidably fitted on a horizontal shaft 17′ mounted in case 6 above shaft $5^2$. Sleeve 17 has loosely engaged in it the spherical extremity of one arm of a bell crank lever 16, or its equivalent, said arm being disposed interiorly of case 6 while the other arm is disposed exteriorly and is connected to a horizontal rod 15. The latter is attached at one end to an operating lever 12 and at the other end to a lever arm or crank 14 which, in turn, is fixed to the throttle valve (not shown) of the carbureter 13, so that a movement of the operating lever 12 will effect at the same time both the shifting of the friction gear 18 and the manipulation of the throttle valve.

The several driving connections 2, 4, $5^1$ and 7 are substantially identical, and work as follows, reference being made to Figs. 3 and 4 which represent the connection 2 and the bevel transmission gearing 3: The part immediately indicated at 2′ consists of an open-ended hollow shaft or sleeve which is of square section at its ends or, if preferred, may be of square section throughout its entire length; and in each of such ends there is fitted the squared terminal *a* of a part which in one instance is the cam shaft 1′ and in the other instance the stem or axle of the gear *b*, the latter being one of the two bevel gears comprised in the gearing 3 and being arranged to mesh with and drive the other bevel gear *c*. Gear *c* has a similar driving terminal or nipple *e* provided on its stem or axle to fit in the square end of the hollow vertical shaft 4′ which is comprised in and forms the main element of the driving connection 4. The terminals or nipples *a* and *e* have their side faces made convex so as to enable a slight angular displacement between the gears and their respective carrier shafts. The shafts 2 and 4′ are inclosed in tubular casings *i* and *i′*, and the gears *b* and *c* by a spherical two-part case *g′*, the members of which are secured together by the bolt *g* (Fig. 4), the case *g′* having a pair of

convex-faced nipples $j$ and $j'$ which fit with a slight angular play in the adjacent ends of the tubes $i$ and $i'$.

The pump 9 above referred to is disposed in a gasolene tank 10, and is designed to draw in the gasolene, while in operation, and expel it through a suitable outlet pipe which, in the construction illustrated in Fig. 1, leads to the jet nozzle 21 of the carbureter 13. In the construction represented in Fig. 2, however, the outlet pipe, which is there designated 11', leads to an auxiliary tank 22 located above the carbureter and connected therewith by a pipe 23. An overflow pipe, 24 is also provided in this construction, and leads from tank 22 back to the pump. The tank 10 in both constructions and the tank 22 in the Fig. 2 construction are open to the atmosphere.

In operation, and assuming that the motor is running at top speed, the position of the parts will be as illustrated in Fig. 1, with the lever 12 at the limit of its movement in one direction, the throttle arm 14 in wide-open position and the sliding friction gear 18 adjacent the periphery of disk 19. The gear 18 here reaches its maximum speed, and the disk 19 and, hence, the pump-operating connection 7 are driven at a certain definite speed. If now the lever 12 is pushed forward, the throttle will be correspondingly closed and the speed of the engine will be proportionately decreased, as also that of the gear 18. The latter, however, will be shifted nearer the center of disk 19 the result being that the speed of the disk remains virtually constant during the changes in engine speed and that the pump 9 continues to operate at a virtually uniform speed. Hence there will be a steady supply of gasolene from the pump to the spraying nozzle during the time the engine is running. It will be noted that during the operation of the lever 12 there will be a period when the gear 18 is only slightly displaced, this resulting from the fact that in certain engines acceleration is reached almost fully at the beginning of the gas admission.

The construction of the pump is illustrated in Figs. 5 to 10 in which $k'$ and $k$ indicate, respectively, the top and bottom walls of the tank; and it will be seen therefrom that the structure inclosed in the lower portion of the outer barrel $t^2$ comprises a cylindrical case or body $l$, a cylindrical cap $m$ thereon, and a cover plate $n$ for said cap, the three parts $l$, $m$ and $n$ being secured together by bolts $o$. The body $l$ is provided with an interior eccentric space or chamber $l'$ which is continued for a slight distance into the cap $m$ (Figs. 6, 7, 9 and 10), and in this chamber there is arranged the rotating cylindrical piston $p$, the stem $p^2$ of which projects axially upward through the inner barrel $t$ and carries at its terminal a driving nipple $p^3$ which is similar to the nipples $e$ and $a$ previously described and which forms part of the driving connection 7. Piston $p$ is equipped with relatively movable blades $p'$ which normally tend to move away from each other under the influence of an interposed spring $p''$ (Figs. 5 and 9), the free outer edges of the blades contacting with the wall of chamber $l'$ so that the blades are thus caused to move inwardly and outwardly during the rotation of the piston.

The bottom of the pump body $l$ is spaced from the bottom wall of the tank as indicated at $z'$, and in the lower end of the outer barrel $t^2$ there is formed a series of ports $r$, through which the gasolene is drawn into the pump when the latter is working. The pump body $l$ has formed in it between its outer wall and the piston chamber $l'$ three arcuate slots or passages $w$, $w'$ and $w''$ (Fig. 9), the passage $w$ opening at one end through the bottom wall of the body $l$ into the space or chamber $z'$ and containing a suitable grid or filter $w^4$ (shown in Fig. 9, but omitted from Fig. 6 to avoid obscurity). This passage $w$ communicates with the piston chamber through a port $r'$, and said chamber communicates in turn, with the second passage $w'$ through a port $r''$. The third passage $w''$ is open at its top and bottom, and is utilized in connection with the return of the excess gasolene to the tank, as subsequently explained.

The cap $m$ is formed with internal arcuate passages $s$, $s'$ $s''$ (Fig. 10) which overlie the passages $w$, $w'$, $w''$, respectively. Passage $s'$ opens at its inner side through port $s^3$ into an annular outlet chamber $s^5$ in the cap; and this chamber $s^5$ opens, in turn, into the lower end of the inner barrel $t$, the upper end of which opens into a similar chamber $t''$ (Fig. 8) formed in the upper end or head of the pump. A tangential discharge nipple $u$ (Fig. 8) extends from chamber $t''$ and is connected to the delivery pipe 11 (or 11'). Passage $s$ (Fig. 10) plays no special part in the circulation of the gasolene through the pump and may be provided merely to lighten the weight of the cap and for the sake of symmetry; but passage $s''$ opens at its top through a port $s^6$ (Fig. 5) in the cover $n$ into the lower end of the outer barrel $t^2$, which has connected to its upper end at $u''$ a tangential inlet nipple $u'$ to which the lower end of the waste pipe 24, (Fig. 2) is connected. Passage $s'$ registers with the underlying passage $w'$ (Fig. 7) and in like manner passage $s''$ registers with the passage $w''$ beneath it (Fig. 5).

The operation, so far as concerns the delivery of gasolene from the pump to the carbureter, is the same for the constructions

shown in Figs. 1 and 2, and is substantially as follows:—The piston, on being set in rotation by the engine through the gearing above described, draws in gasolene from the tank through the inlets $r$ into the chamber $z'$ thence into the open-bottomed passage $w$ and thence through port $r'$ into the piston chamber $l'$. From the latter it is expelled through port $r''$ into passage $w'$, from which it passes into the upper registering passage $s'$, and thence through port $s^3$ into and through chamber $s^5$, barrel $t$, chamber $t''$ and nipple $u$ to the delivery pipe 11 (or 11'). On entering the passage $w$, the gasolene is screened to some extent by the grid $w^4$. The pipe 11 (Fig. 1) supplies the gasolene directly to the carbureter; but where the auxiliary tank 22 and supply pipe 23 are utilized (Fig. 2), the corresponding pipe 11' feeds the gasolene to the aforesaid tank 22, whence it is delivered gravitally to the carbureter by pipe 23.

In the latter construction, it will be recalled, an overflow pipe 24 is utilized, this pipe leading from the auxiliary tank 22 to the tangential nipple $u'$ on the upper end of the pump. When the level of the gasolene in tank 22 rises beyond the end of pipe 24, the excess gasolene will flow into and through that pipe, and thence through nipple $u'$ and opening $u''$ into the top of the outer barrel $t^2$, through which it descends. On reaching the bottom of the barrel $t^2$, it passes successively through port $s^6$ and registering passages $s''$ and $w''$ into the space or chamber $z'$ at the bottom of the pump, returning therefrom through ports $r$ to the tank. Any gasolene which may enter between the piston stem $p^2$ and its bearing in the upper portion of the pump is permitted to flow through an auxiliary outlet $z''$ (Figs. 6 and 8) into the top of the outer barrel $t^2$, whence it returns to the tank in the manner just described. Flap valves $z$ (Figs. 6 and 7) may be provided in connection with the ports $r$ to prevent any liquid in the bottom chamber $z'$ to escape therefrom if under a higher pressure than the liquid in the tank.

I claim as my invention:

1. A mechanically-driven feeding system for internal combustion engines, comprising in combination with the engine, its carbureter and throttle, and an operating lever for said throttle; a liquid fuel tank; a pump having its inlet side in communication with said tank and its outlet side in communication with said carbureter; a change speed gear for driving the pump and including a shiftable driving element; a driving connection leading from the engine to the change feed gear; and a connection between the shiftable driving element and said lever for adjusting said driving element in unison with the throttle. so as to feed the fuel, in substantially constant quantity to the carbureter irrespective of the speed of the engine.

2. A mechanically-driven feeding system for internal combustion engines, comprising in combination with the engine, its carbureter and throttle, and an operating lever for said throttle; a liquid fuel tank; a pump having its inlet side in communication with said tank and its outlet side in communication with said carbureter; a change speed gear for driving the pump and including a driving element and a shaft whereon it is shiftably mounted; a transmission connection leading from the engine to said shaft and including a plurality of hollow shafts and intermeshing gears fitted in the confronting ends thereof; and a connection between the shiftable driving element and the operating lever for adjusting the former in unison with the throttle so as to feed the fuel in substantially constant quantity to the carbureter irrespective of the speed of the engine.

3. A mechanically-driven feeding system for internal combustion engines, comprising in combination with the engine, its carbureter and throttle, and an operating lever for said throttle; a liquid fuel tank; a pump having its inlet side in communication with said tank and its outlet side in communication with said carbureter, a change speed gear for driving the pump and including a friction gear, a shaft whereon it is shiftably mounted and a friction disk connected to the piston of the pump to rotate the same and engaged by the friction gear to be driven thereby; a driving connection leading from the engine to said shaft; and a fork for shifting the friction gear operatively connected to said lever for adjusting said friction gear in unison with the throttle, so as to feed the fuel in substantially constant quantity to the carbureter irrespective of the speed of the engine.

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

RENÉ JEAN CAMILLE TAMPIER.

Witnesses:
B. M. Giotty,
John F. Simons.