No. 771,492. PATENTED OCT. 4, 1904.

C. F. PARMENTER.

CARBURETER FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAR. 12, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

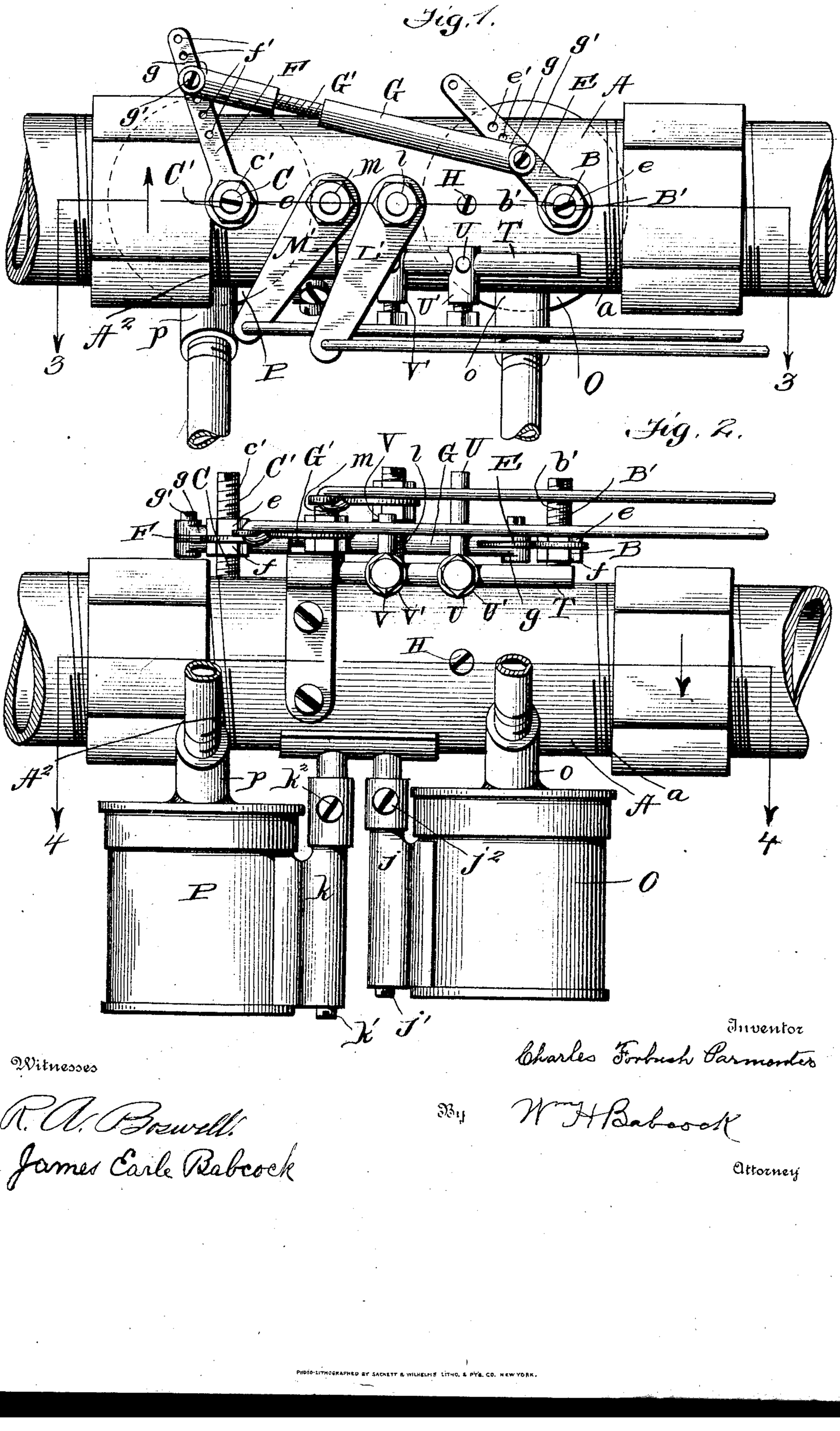

Fig. 2.

Witnesses

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

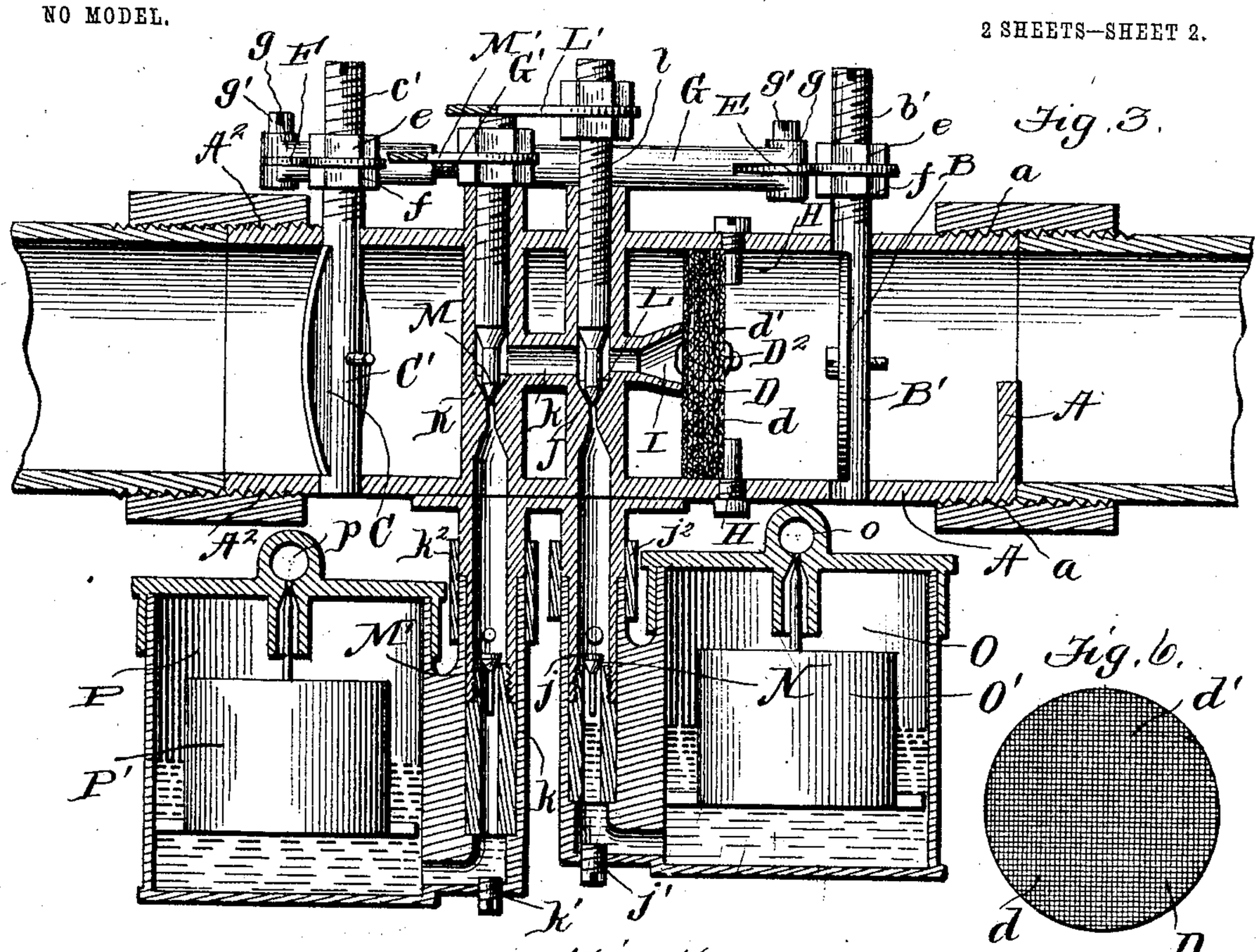

Fig. 4.

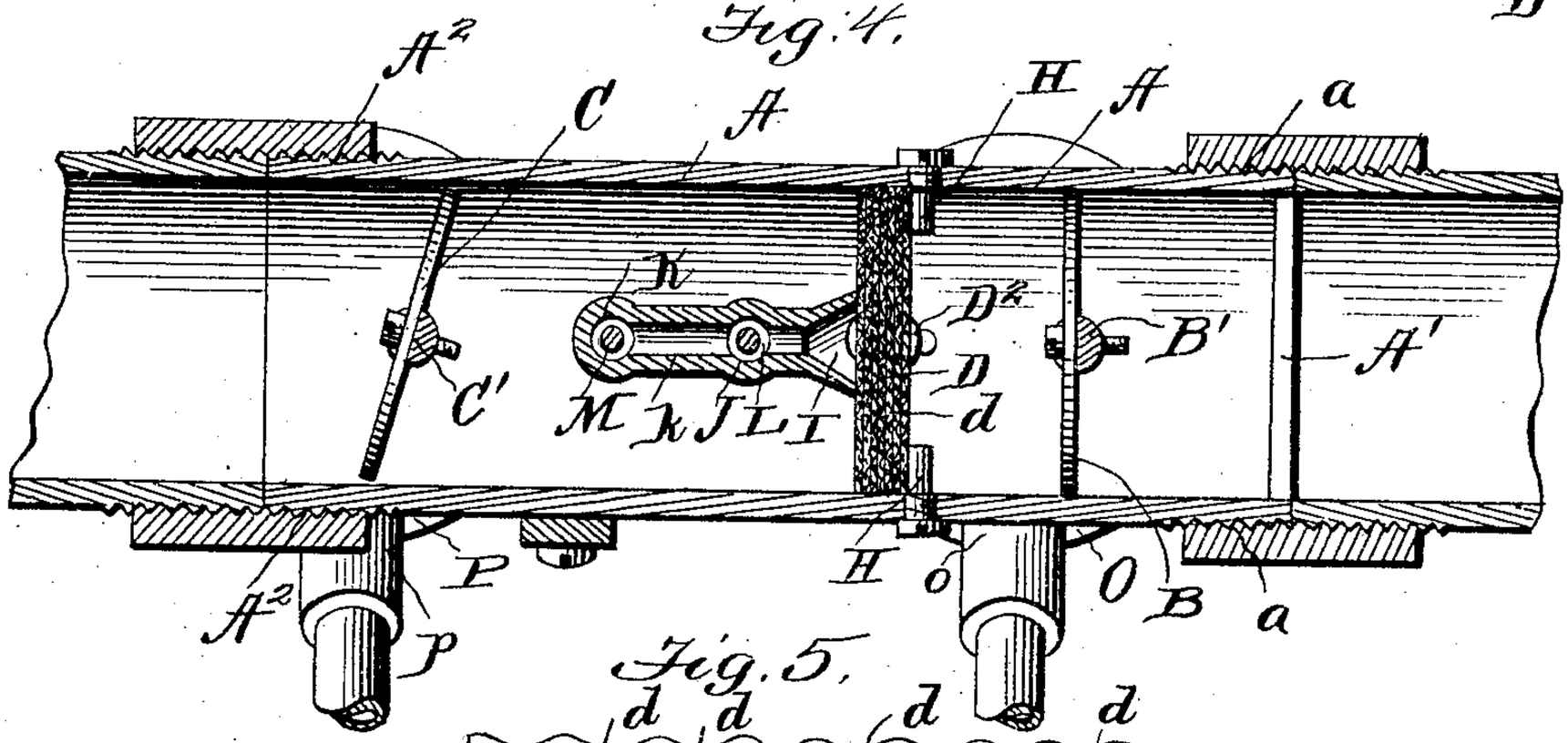

Fig. 5.

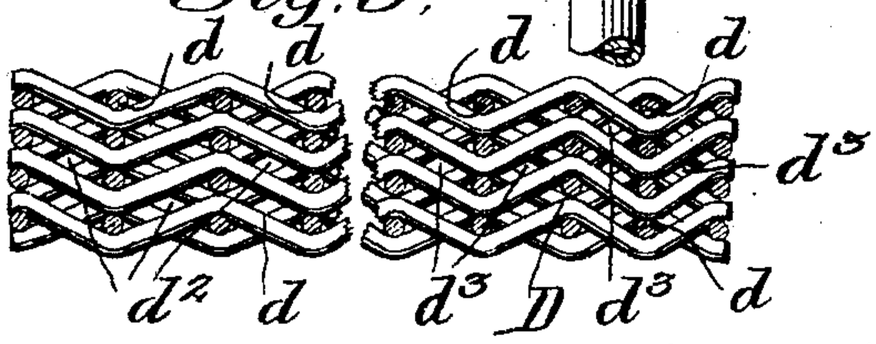

Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

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CARBURETER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 771,492, dated October 4, 1904.

Application filed March 12, 1904. Serial No. 197,791. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FORBUSH PARMENTER, a citizen of the United States, residing at Portlandville, in the county of Otsego and State of New York, have invented certain new and useful Improvements in Carbureters for Explosive-Engines; and I do 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 appertains to make and use the same.

This invention relates especially to carbureters used with automobiles or with stationary, marine, or other explosive-engines operated by gasolene or other vaporizable hydrocarbons.

The said invention consists partly in a capillary disk or partition therefor, permitting air to pass through it and provided in all parts with fine passages transverse to said flow of air, said disk preferably being formed of superposed layers of wire-netting woven to the proper size of mesh and having grooves formed across it in series at right angles to each other by the normal operation of weaving for maintaining proper capillary action.

The said invention also consists in a pair of oil-supplying pipes, one for light hydrocarbon, the other for heavier hydrocarbon, these pipes being connected together and provided with independent valves and a common discharge-nozzle, preferably of flaring form, for directing the oil against the aforesaid disk, said valves being in close proximity to said nozzle in order that the fuel may be instantly changed at will.

The said invention further consists in certain means for controlling the supply of oil to said pipes from below and maintaining a constant amount in contact with the oil-supplying nozzle, also in certain means for preventing any liquid oil from passing from the carbureter to the engine, also in certain means for conveniently holding the disk in place, also in certain devices for regulating the valves of said oil-pipes, and in additional details of invention hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a top plan view of a carbureter embodying my invention. Fig. 2 represents a side elevation of the same. Fig. 3 represents a longitudinal sectional view on the line 3 3 of Fig. 1; Fig. 4, a longitudinal sectional view on line 4 4 of Fig. 2. Fig. 5 represents two broken sectional views of the capillary disks, enlarged, at right angles to each other; and Fig. 6 represents a detail view of the capillary disk.

A designates the shell of the carbureter, which is preferably a horizontal cylinder in form adapted to have a current of air forced through it and provided with a forward throttle-valve B and a rear throttle-valve C for regulating the same. The forward end of the said shell is externally threaded at *a* to be screwed into an engine-cylinder and provided internally on the under side with a dam A′ to prevent any liquid oil which may travel thus far or condense in this end of the carbureter-shell from passing into the engine. The rear end of the said shell is also externally threaded at A^2 for attachment to a tubular connection with the exhaust of said engine when hot air may be desired. Each of the said throttle-valves is provided with a post B′ or C′, extending up through the top of the said shell and screw-threaded at *b′* and *c′* to receive nuts *e* and *f*, which are integral with arms E and F, provided with holes *e′ f′*, arranged in series for the attachment of the bifurcated ends *g* of a connecting-rod G by means of screws or bolts *g′* passing down through screw-tapped holes in said ends. The connecting-rod G is in two sections screwed together at G′ to allow for longitudinal adjustment. By lengthening or shortening the said connecting-rod and shifting one or both of the bolts from hole to hole of the said series the relative position of the valves for opening the passage through the said shell may be varied at will to suit the particular kind of engine with which the carbureter will be used, since some engines will require both throttle-valves to be wide open to get the best results, whereas others will require one valve to be more open than the other. The current of air is caused by the suction of the engine.

In the space between the valves B and C,

but preferably nearer the former, a capillary partition or disk D is arranged across the interior of the said shell, being held in place by screws or studs H, extending in through the said shell at equal circumferential distances in front of the outer part of the said disk, and by the bell-shaped oil-discharging nozzle I, which bears against the rear face of said disk a little above its center, this position being found practically the most efficacious. This discharge-nozzle connects at its inner end with kerosene-pipe J, the latter being connected by a branch pipe *k* to a parallel gasolene-pipe K, these pipes extending upward through the bottom of the said shell and being individually governed by needle-valves L M, the stems of which, screw-threaded at *l m* and engaging the walls of screw-tapped holes in the top of the said shell, are provided with detachable arms L′ M′, having perforations near their outer ends for the attachment of wires or rods running to some point in proximity to the operator of the automobile or wherever may be practically convenient. By closing either one of the valves L M and opening the other it is easy to insure at will the supply of kerosene alone or gasolene alone to the carbureter, and of course the same choice is practicable between any other hydrocarbons of different quality which may be supplied through the said pipes J K. By opening both of the said valves it is feasible to mix both hydrocarbons, and their proportion may be varied by opening either valve more or less than the other.

T designates a fixed horizontal bar having two vertical stop-pins U and V of different lengths adjustable thereon by means of clamping-screws *u* and *v*, which pass through the sleeved bases *u′* and *v′* of said stop-pins, respectively, and bind against the said bar. The longer stop-pin U extends up into the path of the arm L′, which is in a higher plane than arm M′, while the stop-pin V extends up only far enough to limit the motion of arm M′, although the arm L′ moves freely over it. By adjusting either one or the other, or both, of these stops U V the movement of one or both of these arms may be limited as desired, correspondingly limiting the opening of either one or both of the said valves L M.

It is possible though not desirable to use the said pipes and bell-shaped discharge-nozzle without the disk D, in which case the hydrocarbon discharged and dispersed by said nozzle will be struck, further comminuted, and carried along by the air-current in a more or less perfectly vaporized condition.

The value of the disk is to insure complete vaporization by exposing the hydrocarbon to the current of air in finely-divided condition. Its chief requisites are to permit the free passage of air, to expose the liquid equally at all points of it and in the most favorable condition, and to prevent any particles of its own substance or foreign matter from passing through it or from it into the engine. The first requisite practically excludes the use of wood, the third excludes felt, sponge, pumice-stone, and cotton, with many other soft or comminuted materials, while the second requisite is answered by none of these and by no other construction except one having series of capillary passages regularly and evenly reaching every part. To attain this construction and fulfil these requisites, I form my disk of layers of material fitting face to face against each other and provided not only with capillary passages extending through it in line with the flow of air, but also with grooves across the face of each layer, so as to reach approximately all points of the periphery, the juxtaposition of each two layers forming series of capillary passages transverse to the carbureter. This may be effected in divers ways; but that shown in the said drawings is the simplest, cheapest, and best.

Each layer *d* of my disk or partition D is of wire fabric of suitable mesh to let the air pass through its fine openings *d′* and provided necessarily in the weaving with two series of fine grooves d^2 and d^3 at right angles to each other extending across its face. By putting these layers together each contiguous pair will thus provide two series of capillary passages transverse to the carbureter-shell, one of which series will be horizontal when the other is vertical. These are necessarily repeated with every layer of material, so that the disk is provided with them in all parts of its thickness. Therefore when the nozzle discharges the oil against the said disk it quickly reaches every point and is presented evenly everywhere, the air blowing through it at every hole or passage *d′* and carrying it forward as vapor or gas proper for combustion. Of course no part of the wire disk will be carried away, and it will not permit foreign matter to pass through it. The layers of which it is composed may be cut to the peripheral form fitting the interior of any carbureter; but this would usually be cylindrical, making my capillary partition a true disk, as shown.

I have sometimes constructed this of foraminous plates having grooves in series crossing each other instead of woven wire; but this is obviously more troublesome to manufacture and less perfect in conforming to the above requirements than the latter construction. Also it would probably be possible to bore the various capillary passages in a solid disk, but only by such trouble and at such expense as would make it unprofitable. The layers may be fastened together by a central bolt or rivet D^2; but this will not usually be necessary when they are held as before stated and shown.

Any oil which may run down from the nozzle over the rear face of the disk or otherwise collect in the bottom of the carbureter-shell will readily be drawn up and distributed by capillary action throughout the said disk.

O designates a kerosene float-feed receptacle, and P a gasolene float-feed receptacle, arranged under the carbureter and provided with the usual feed-regulating floats O′ P′, which control through the inflow through pipes *o p* from any sources of supply. These float-feeds respectively supply the pipes J K aforesaid by means of vertical tubular wells *j k*, opening into said receptacles and receiving said pipes, the lower ends of the latter being open. The lower ends of said wells are provided with screw-plugs *j′ k′* for drawing off sediment. Screw-clamps j^2 k^2 hold said pipes and wells detachably together.

In each of the pipes J and K a check-valve N or N′ is provided below the needle-valve, which serves to insure the presence of sufficient oil at all times between it and the nozzle that supplies the disk. These check-valves permit me to suspend the two float-feeds below the carbureter without leaving the nozzle at any time unsupplied, thus insuring the better operation of the engine. Heretofore the float-feed has usually been arranged on a level with the carbureter-shell, and this will obviate the above difficulty; but in passing over hills and around curves the tilting of the engine and carbureter will so far vary the level of the liquid as to splash the interior of the engine. My construction thus enables me to get the benefit of a suspended reservoir with that of an elevated one.

Another advantage in placing the float-feed receptacles below the carbureter-shell is that I am enabled to get the center of the liquid-surface in each more nearly under the nozzle, and thereby diminish the variation in the tilt of said surface while the engine is running on uneven ground, so that the work and strain of the engine will be approximately constant.

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

1. In a carbureter, a capillary disk or partition, in combination with a pair of connected tubes for conducting liquid hydrocarbon of different qualities, a discharge-nozzle supplied by said tubes and valves in close proximity to said nozzle for controlling said tubes individually and changing the fuel instantly at any moment substantially as set forth.

2. In a carbureter, a capillary disk or partition, in combination with a nozzle discharging liquid hydrocarbon against the same, the said disk being adapted to allow the passage of a currrent of air through it substantially as set forth.

3. In a carbureter adapted to be attached to an engine at one end and adapted to receive air at the other end, a pair of connected pipes supplying liquid hydrocarbons of different quality to the interior thereof, a discharge-nozzle supplied by said pipes, and valves for controlling them individually at will substantially as set forth.

4. In a carbureter, the combination of a cylindrical shell open at both ends for permitting the passage of a current of air, with a capillary partition extending across the interior of said shell and adapted to permit the said current of air to pass through it, means for supplying liquid hydrocarbon to the said partition, a pair of valves arranged respectively before and behind the said partition, for opening and closing the passage through the said shell, and operative connections between the stems of the said valves, which are adjustable to regulate their relative degrees of opening substantially as and for the purpose set forth.

5. In a carbureter, a shell open at both ends, in combination with means for supplying liquid hydrocarbon to the interior thereof, a capillary partition arranged across the interior thereof and adapted to permit the passage of a current of air through the same, and a dam raised in the interior of the said shell before the said capillary partition, to turn back liquid to the latter and prevent such liquid from passing into the engine.

6. In a carbureter, a tubular shell adapted to be attached to an engine, in combination with a capillary partition, arranged across the interior thereof and adapted to permit the passage of a current of air through it, a fixed nozzle discharging liquid hydrocarbon against one side of the said partition, and parts connected with the said shell and arranged to be in contact with the other face of the said partition, the said nozzle and the said parts co-operating to hold the said partition in place substantially as set forth.

7. In a carbureter, a tubular shell adapted to be attached to an engine, in combination with a capillary partition arranged across the interior thereof, a fixed part bearing against one face of the said partition, and removable studs inserted through the wall of the said shell, to be in contact with the other face of the said partition, the latter being supplied with oil, substantially as set forth.

8. In combination with a carbureter adapted to be attached to an engine, a pair of connected pipes for supplying hydrocarbons of different kinds from below to the interior of said carbureter, hand-operated valves for controlling independently the flow through each of said pipes and check-valves arranged below the said hand-operated valves in close proximity to the point of discharge into said carbureter to retain a quantity of hydrocarbon constantly between each check-valve and the outlet substantially as set forth.

9. In combination with a carbureter adapted to be attached to an engine, a pair of float-feeds arranged below the same and supplied with different hydrocarbons from suitable sources, pipes leading from said float-feeds to the interior of the said carbureter, valves controlling the flow through said pipes individually in proximity to the point of discharge into said carbureter, in order that a change of fuel may be instantly effected, and check-valves in the said pipes above the said float-feeds but sufficiently below the point of discharge of the said pipes to insure a constant supply of hydrocarbon liquid at the said point the said pipes being connected together and discharging through the same nozzle substantially as set forth.

10. In a carbureter, a pair of connected pipes supplying the same with different liquid hydrocarbons, a discharge in common for said pipes, a pair of valves controlling the said pipes and having screw-threaded stems engaging a fixed part, arms on said stems adapted to be operated at will, and independently-adjustable stops for limiting the movement of either or both of said arms as desired substantially as set forth.

11. In a carbureter, a hydrocarbon-supply pipe, a valve for controlling the same having a screw-threaded stem engaging a fixed part, an arm on said stem, an attachment of said arm whereby it may be conveniently operated by an automobilist and an adjustable stop arranged to limit the movement of said arm and valve as desired substantially as set forth.

12. In a carbureter, the combination of a tubular shell open at both ends, for permitting the passage of a current of air, with a pair of tubes adapted to supply liquid hydrocarbons of different qualities within the said shell, a pair of valves arranged respectively before and behind the said tubes for opening and closing the passage through the said shell and operative connections between the said valves which are adjustable to regulate their relative degrees of opening substantially as set forth.

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

CHARLES FORBUSH PARMENTER.

Witnesses:

PAUL HOSIER,

ABBOTT PORTER.