No. 675,424. Patented June 4, 1901.

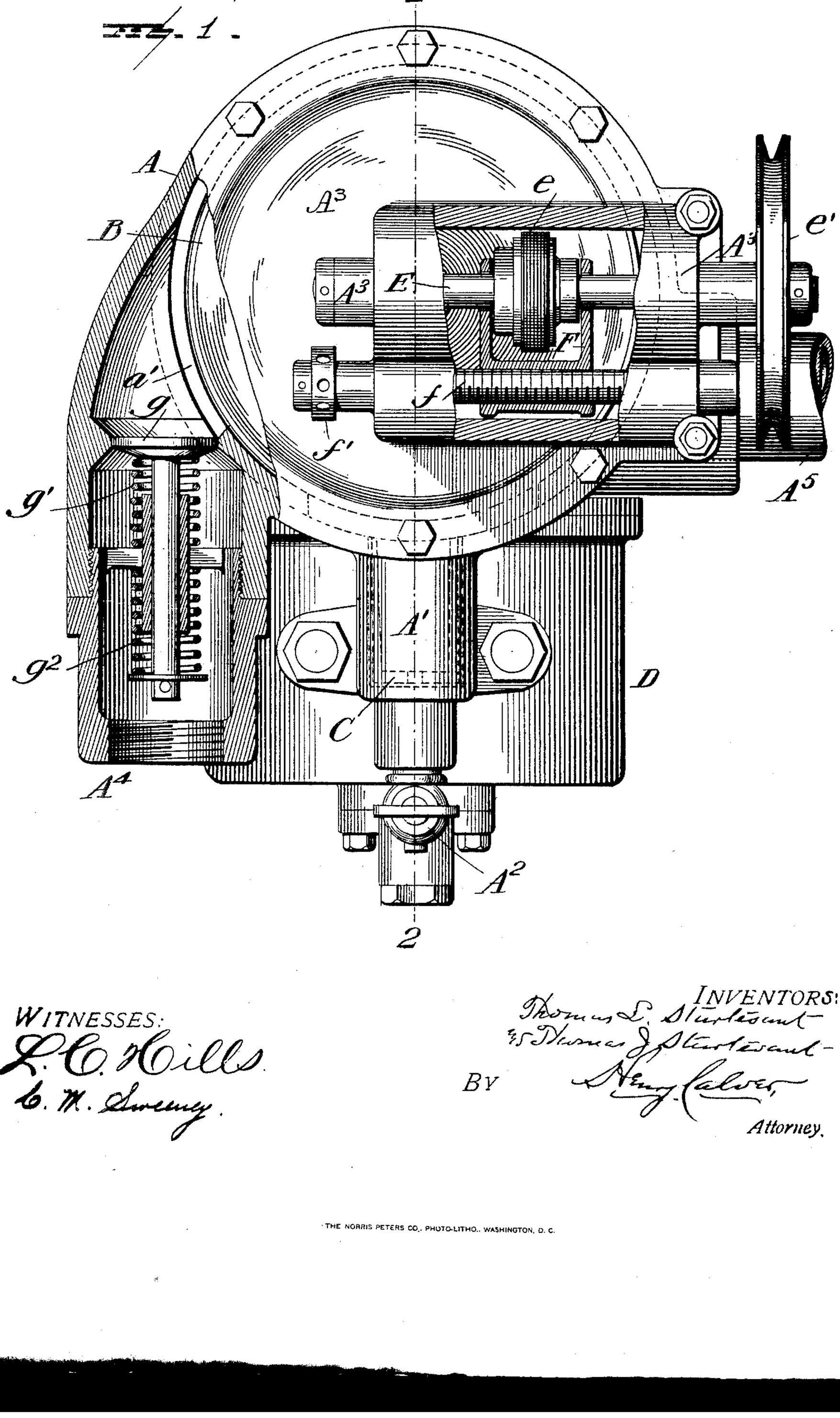
T. L. & T. J. STURTEVANT.

CARBURETER FOR EXPLOSIVE ENGINES.

(Application filed Oct. 19, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:
L. C. Hills.
C. M. Sweeny.

INVENTORS:
Thomas L. Sturtevant
& Thomas J. Sturtevant
By Henry Calver,
Attorney.

No. 675,424. Patented June 4, 1901.

T. L. & T. J. STURTEVANT.

CARBURETER FOR EXPLOSIVE ENGINES.

(Application filed Oct. 19, 1900.)

(No Model.) 3 Sheets—Sheet 2.

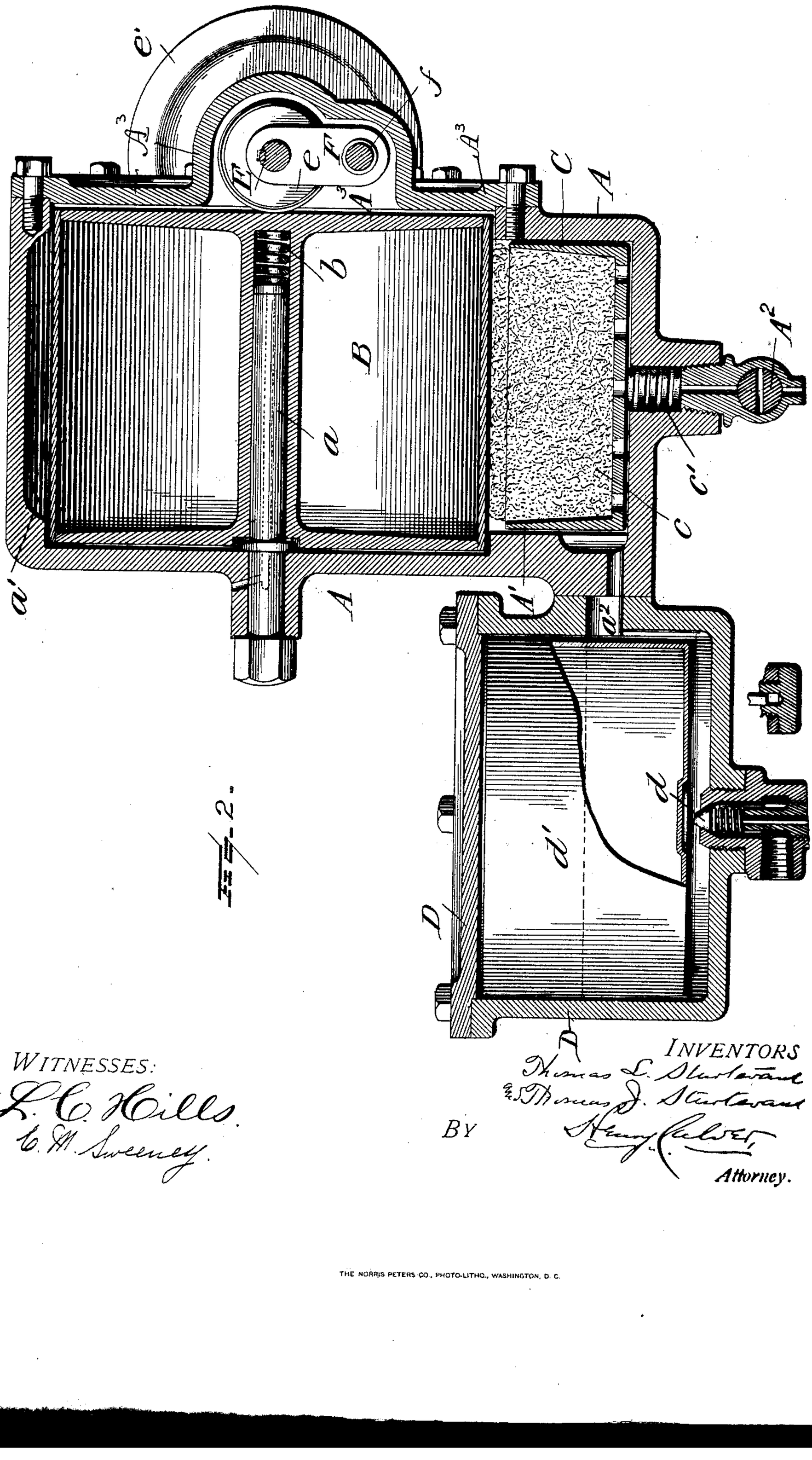


Fig. 2.

WITNESSES:
L. C. Hills.
C. H. Sweney.

INVENTORS
Thomas L. Sturtevant
& Thomas J. Sturtevant
By Henry Culver,
Attorney.

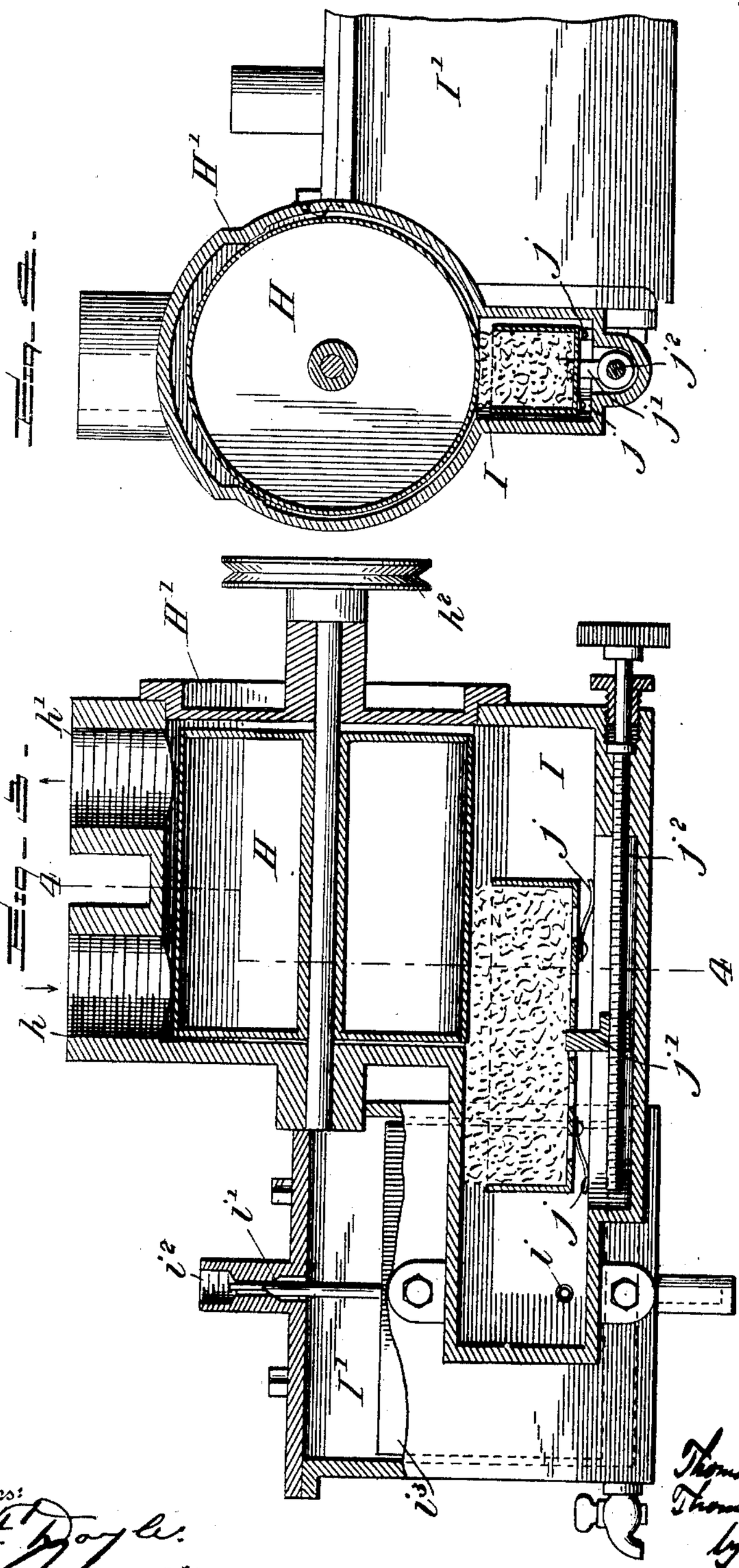
No. 675,424. Patented June 4, 1901.

T. L. & T. J. STURTEVANT.

CARBURETER FOR EXPLOSIVE ENGINES.

(Application filed Oct. 19, 1900.)

(No Model.) 3 Sheets—Sheet 3.



Witnesses:
Wm. A. Doyle.

Inventors:
Thomas L. Sturtevant,
Thomas J. Sturtevant,
by Henry Orton
Attorney

UNITED STATES PATENT OFFICE.

THOMAS L. STURTEVANT, OF QUINCY, AND THOMAS J. STURTEVANT, OF NEWTON CENTER, MASSACHUSETTS.

CARBURETER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 675,424, dated June 4, 1901.

Application filed October 19, 1900. Serial No. 33,555. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. STURTEVANT, residing at Quincy, in the county of Norfolk, and THOMAS J. STURTEVANT, residing at Newton Center, in the county of Middlesex, State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has for its object to produce a carbureter for gas-engines of such construction as to insure a uniform mixture of air and gas at all times and regardless of the speed at which the engines may be running. To this end the improved carbureter comprises in its preferred form a rotating drum, to the surface of which the gasolene or other volatile liquid hydrocarbon is applied and which drum is partly surrounded by a chamber into which the air to be carbureted is admitted and from which the carbureted air is exhausted at each stroke of the engine, means being preferably provided for regulating the rotation of the carbureting drum so that it will perform a predetermined extent of movement at each stroke of the engine, this movement of the carbureting-drum being uniform for each stroke of the engine whether the latter be running fast or slow. In order to control the amount of liquid hydrocarbon applied to the surface of the drum as the latter rotates, the liquid hydrocarbon is preferably evenly spread upon the surface of the drum by rotating the latter in contact with a spreader or wiper of felt or other suitable material saturated with the liquid hydrocarbon. Instead of regulating the extent of the area of the moistened carbureting-surface to be exposed to the incoming air at each stroke of the engine (and thereby varying the degree of richness of carburization of the air) by varying the speed of rotation of the drum or cylinder this result may be secured by adjusting the saturated wiper or the cylinder, the one relative to the other, so that the area of surface moistened by the volatile hydrocarbon within a given time relative to the speed of the engine, may be varied.

In the accompanying drawings, Figure 1 is an end view, partly in section, of the improved carbureter, and Fig. 2 is a section thereof on line 2 2 of Fig. 1. Fig. 3 is a vertical section of a slightly different form of carbureter from that shown in Figs. 1 and 2, and Fig. 4 is a sectional view on line 4 4 of Fig. 3.

Referring to the drawings, A denotes a suitable casing, which is provided with a pin or stud *a*, which serves as a bearing for the carbureting drum or cylinder B, inclosed by the casing A, and between the periphery of which and the said casing is provided an air-chamber *a'*. The casing A is provided at its lower part with a chamber A', within which is a pan or receptacle C, filled with felt or other suitable absorbent material *c* to be saturated with the liquid hydrocarbon, the bottom of said pan or receptacle being preferably perforated for the admission of the liquid hydrocarbon thereto. The said pan or receptacle preferably rests upon one or more springs *c'*, which will press the saturated material or wicking yieldingly against the lower surface of the rotating drum B. The chamber A' is preferably provided at its bottom with a faucet A^2 for withdrawing the gasolene therefrom or for admitting it thereto, if desired.

D denotes a reservoir suitably attached to the casing A, said reservoir having at its bottom an inlet provided with a spring-pressed valve *d*, on which may rest a float *d'*. The liquid hydrocarbon admitted by the inlet at the bottom of the reservoir D passes from said reservoir through the passage a^2 into the chamber A' in the lower part of the casing A and through the perforations in the bottom of the pan or receptacle C into the absorbent material within said pan or receptacle. When the liquid in the reservoir D rises to a proper height to lift the float *d'*, the valve *d* will be automatically closed by its spring, and when the liquid falls so as to let the float rest on the said valve the latter will be automatically opened.

The drum or cylinder B is rotated by a friction-wheel *e*, splined to a shaft E, mounted in suitable bearings in the end plate A^3, suitably bolted to the casing A, the said shaft E being provided with a driving-pulley *e'*, which is belted to the engine. The drum B is pressed

into frictional contact with the driving-pulley *e* by a spring *b*, interposed between the end of the stud or pin *a* and one end of the said drum or cylinder. To provide for regulating the speed of rotation of the drum or cylinder B, the friction-wheel *e* is embraced by the arms of a yoke F, tapped for the reception of an adjusting-screw *f*, which is suitably mounted in the end plate A^3, so that it can readily turn, but which is held from endwise movement as it is rotated to adjust the friction-wheel *e* toward and from the center of the disk-like end of the rotating drum B. The adjusting-screw *f* is preferably provided with a hand-wheel *f'*, by which it may be turned to adjust the yoke F and the friction-wheel *e*, movable therewith.

The casing A is provided at one side with an air-inlet A^4, the chamber of which communicates with the air-chamber *a* through an opening normally closed by a balanced valve *g*, the stem of which is provided with balancing-springs *g' g²*, which normally hold the valve in position to close the air-inlet to the chamber of the casing. The casing A is provided on its side opposite the air-inlet with an outlet A^5 for the carbureted air or gases. The suction of the engine in exhausting the carbureted air from the chamber *a* of the casing A will move the valve *g* inward to admit a fresh charge of air to the said chamber, and the said valve will then resume its normal position to close the inlet to the said chamber of the casing A. When in this normal position, the valve prevents the heavy saturated gases or carbureted air from escaping from the chamber of the casing when the engine is at rest, and when the cylinder is in action if the gases in the chamber of the carbureter should accidentally become ignited by back-flashing the balanced valve *g* would act as a safety-valve by yielding to the abnormal pressure of such accidental explosion, and would thereby relieve the excessive pressure and permit the escape of the exploding gases without injury to the carbureter.

The operation of the invention will be readily understood from the foregoing. When the engine is in operation, the drum or cylinder B will be rotated in contact with the saturated absorbent substance in the pan or receptacle C, and which saturated substance serves as a spreader or wiper to evenly distribute a thin film of the liquid hydrocarbon over the surface of the rotating drum or cylinder. At each suction-stroke of the engine the carbureted air will be exhausted from the air-chamber *a* of the casing A through the outlet A^5, and a fresh supply of air will be drawn into the said air-chamber by the suction of the engine. As the speed of rotation of the drum or cylinder B is capable of regulation by means of the adjustable driving-wheel *e*, so that the said cylinder will perform any desired amount of rotation at each stroke of the engine, said wheel may be so adjusted that any desired extent or area of surface moistened with the liquid hydrocarbon may be exposed to a given amount or charge of incoming air, thereby providing for any desired variation or regulation of the degree or richness of the carbureted air supplied at each stroke of the engine. As the degree of carburization of the air can be perfectly controlled by the means which we provide for applying the liquid hydrocarbon to the surface of the revolving drum or cylinder by a spreader or wiper, as also by varying the speed of rotation of the drum or cylinder B, it will be understood that the richness or degree of saturation of the carbureted air may be regulated to a nicety.

We do not wish to be understood as limiting our invention to all the details herein shown and described, as these may be varied widely without departing from the spirit of our invention. Also instead of supplying the liquid hydrocarbon to the rotating drum or cylinder through the spreader or wiper the liquid might be caused to drip upon the drum or cylinder, or the latter might dip at its lower portion into a receptacle containing the liquid hydrocarbon and the surplus liquid be then removed from the surface of the drum or cylinder by a spreader or wiper suitably arranged for this purpose and which will insure an even thinly-spread film upon the surface of the rotating drum or cylinder. Also the pan or receptacle containing the spreader or wiper or the carbureting-cylinder might be mounted in a chamber which would permit one or the other of these parts to be adjusted relative to the other by a screw or otherwise in a direction parallel with the axis of the carbureting drum or cylinder, so that, if desired, a portion only of the surface of the said drum or cylinder could be coated by the saturated spreader or wiper, and in this manner the amount of the surface of the drum or cylinder coated by the saturated spreader or wiper could be varied to regulate the richness or degree of carburization of the air. With such an adjustable spreader or wiper the air-inlet and carbureted-air outlet of the drum would preferably be arranged opposite each other in the direction of the length of the drum, so that the air would be drawn across the carbureting-surface transversely to the direction of rotation of the drum. Also instead of arranging the valve controlling the admission of the hydrocarbon liquid to the reservoir D at the bottom of said reservoir said valve might be arranged at the top thereof and connected with the float in such a manner as to be closed by said float instead of by a spring.

The construction just above described is illustrated in Figs. 3 and 4 of the drawings. In these figures a rotating drum H is shown mounted in a casing H', having an air-inlet *h* and an outlet *h'* for the carbureted air, said inlet and outlet being preferably arranged opposite each other in the direction of the length of the said carbureting-drum H, so

that the air will pass lengthwise of the drum-surface, the said drum H being driven from any moving part of the engine by means of the drive-pulley h^2. Beneath the said drum H is a fuel-chamber I, which connects with the reservoir I' by means of an inlet i, the fuel in the reservoir I' being regulated by a needle-valve i', controlling the inlet-pipe i^2, as in the form of invention shown in Figs. 1 and 2, said valve being in this modified form of the invention connected with a float i^3. The pan or receptacle in said fuel-chamber I for holding the absorbent material or wiper to be saturated with liquid hydrocarbon is similar in construction to the one shown in Fig. 1, said receptacle or box having a perforated bottom provided with springs j, which press said receptacle upwardly against the surface of the drum H. Said receptacle is, however, connected with a carrier-block j'. which is threaded upon an adjusting screw or shaft j^2, so that the said receptacle or box may be moved lengthwise of the drum H and the area of the drum-surface in contact with the saturated wiper in said box may be varied. The result of this construction is that the degree of richness of the air may be varied by increasing or diminishing the saturated surface of the drum which is exposed to the air in its passage from the inlet h to the outlet h' by merely moving the box lengthwise of the drum by means of the adjusting screw or shaft j^2.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a movable carbureting-surface, a source of supply of liquid hydrocarbon, and a spreader or wiper communicating with said source of supply and in contact with said movable carbureting-surface and by means of which the hydrocarbon may be spread upon the said carbureting-surface in a thin, evenly-distributed film.

2. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a rotating carbureting-surface, a source of supply of liquid hydrocarbon, and a spreader or wiper in contact with said rotating carbureting-surface and by means of which the hydrocarbon may be spread upon the said rotating carbureting-surface in a thin, evenly-distributed film.

3. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a movable carbureting-surface, a wiper for applying a liquid hydrocarbon to said movable carbureting-surface in a thin evenly-distributed film, and means for varying the area of carbureting-surface with which a given volume of air is brought into contact, in order to produce carbureted air of any desired richness.

4. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a rotating carbureting-surface, a wiper for applying a liquid hydrocarbon to said rotating carbureting-surface in a thin, evenly-distributed film, and means for varying the area of carbureting-surface with which a given volume of air is brought into contact, in order to produce carbureted air of any desired richness.

5. In a carbureter, the combination with a rotating drum or cylinder having a carbureting-surface, of a wiper for applying a liquid hydrocarbon to the said carbureting-surface in a thin, evenly-distributed film, means for supplying, at intervals, a measured quantity of air to said carbureter, means for rotating said drum or cylinder, and means for increasing or diminishing the area of carbureting-surface with which each charge of air is brought in contact, in order to vary the richness of the carbureted air.

6. In a carbureter, the combination with a rotating drum or cylinder and means for applying a liquid hydrocarbon to the surface thereof, of means for supplying air to be carbureted to the surface of the said drum or cylinder, means for rotating said drum or cylinder, and means for regulating the speed of rotation of the said drum or cylinder relative to its driving mechanism.

7. In a carbureter, the combination with a suitable casing provided with an air-inlet, of a carbureting drum or cylinder rotating in said casing, a spring-balanced valve located in the said air-inlet and capable of moving in one direction from the seating-surface to allow air to enter the chamber of said casing and capable of moving in the opposite direction to relieve excessive pressure in said chamber, and normally held in position to close said inlet, and means for driving the said drum or cylinder.

8. In a carbureter, the combination with a suitable casing having an air-inlet and an outlet for the carbureted air and being provided at its lower portion with a chamber, of a rotating drum or cylinder in said casing, a pan or receptacle located in said chamber and provided with suitable absorbent material or wicking, means for supplying a liquid hydrocarbon to said chamber and to the said pan or receptacle, and means for pressing the saturated material against the surface of the said rotating drum or cylinder.

9. In a carbureter, the combination with a casing, having an air-inlet and an outlet for the carbureted air, of a rotating drum or cylinder, a reservoir into which the liquid hydrocarbon is introduced and which is provided with a spring-pressed valve, a float in said reservoir which rises when the liquid has reached a certain depth in the said reservoir and thereby permits the said valve to automatically close, and a spreader or wiper communicating with said reservoir and by means of which the hydrocarbon is spread on the surface of said drum in a thin, evenly-distributed film.

10. In a carbureter, the combination with a casing A having an air-inlet and an outlet for the carbureted air, of a rotating carbureting drum or cylinder in said casing and to the surface of which the liquid hydrocarbon is to be applied, a driving-shaft provided with a friction-wheel rotating in contact with one end of said drum or cylinder, and means for adjusting said friction-wheel toward and from the center of the said drum or cylinder to regulate the speed of rotation of the latter.

11. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a rotating drum or cylinder, a spreader or wiper for applying a thin, evenly-distributed film of liquid hydrocarbon to the surface of said drum or cylinder, and means for supplying the liquid hydrocarbon to the said spreader or wiper.

12. In a carbureter, the combination with a casing forming a chamber, said casing being provided with an air-inlet at one side and with an outlet for the carbureted air at its opposite side, of a carbureting drum or cylinder rotating in said chamber and a spreader or wiper in contact with the surface of said drum or cylinder and by means of which a liquid hydrocarbon may be applied to the carbureting-surface of said cylinder in a thin, evenly-distributed film.

13. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a movable carbureting-surface, a saturated spreader or wiper for applying a liquid hydrocarbon to said surface, a receptacle for said spreader or wiper, and means for yieldingly pressing the wiper-holding receptacle toward said carbureting-surface.

14. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a rotating drum or cylinder, a spreader or wiper for causing a thin, evenly-distributed film of liquid hydrocarbon to be applied to the surface thereof, a reservoir into which the said liquid hydrocarbon is introduced and which is provided with a valve, and a float in said reservoir for controlling said valve.

15. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a rotating drum or cylinder, a yieldingly-mounted spreader or wiper for applying a thin, evenly-distributed film of liquid hydrocarbon to the surface thereof, a reservoir into which said liquid hydrocarbon is introduced and which is provided with a valve, and a float in said reservoir for controlling said valve.

16. In a carbureter, the combination with a casing having an air-inlet and an outlet for the carbureted air, of a traveling carbureting-surface, a spreader or wiper for depositing a thin, evenly-distributed film of liquid hydrocarbon upon said traveling carbureting-surface, means for supplying a liquid hydrocarbon to said spreader or wiper, and means for varying the speed of travel of said carbureting-surface, whereby the degree of richness or carburization of the air may be regulated.

In testimony whereof we affix our signatures in the presence of two witnesses.

THOMAS L. STURTEVANT.
THOMAS J. STURTEVANT.

Witnesses:
W. H. ELLIS,
M. F. FOURNIER.