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CARBURETER.

APPLICATION FILED DEC. 30, 1909.

976,344.

Patented Nov. 22, 1910.

2 SHEETS—SHEET 1.

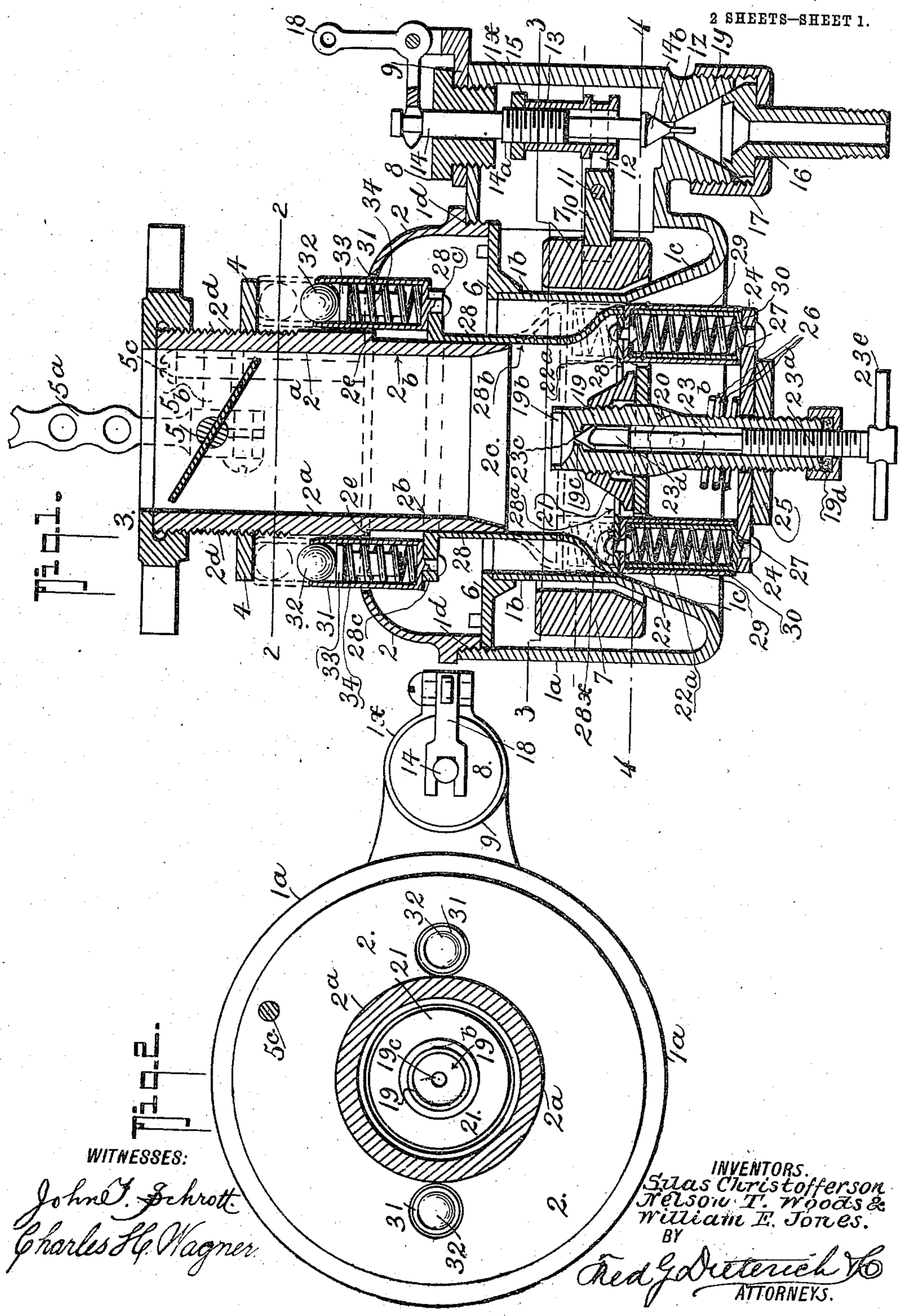

Fig. 1.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

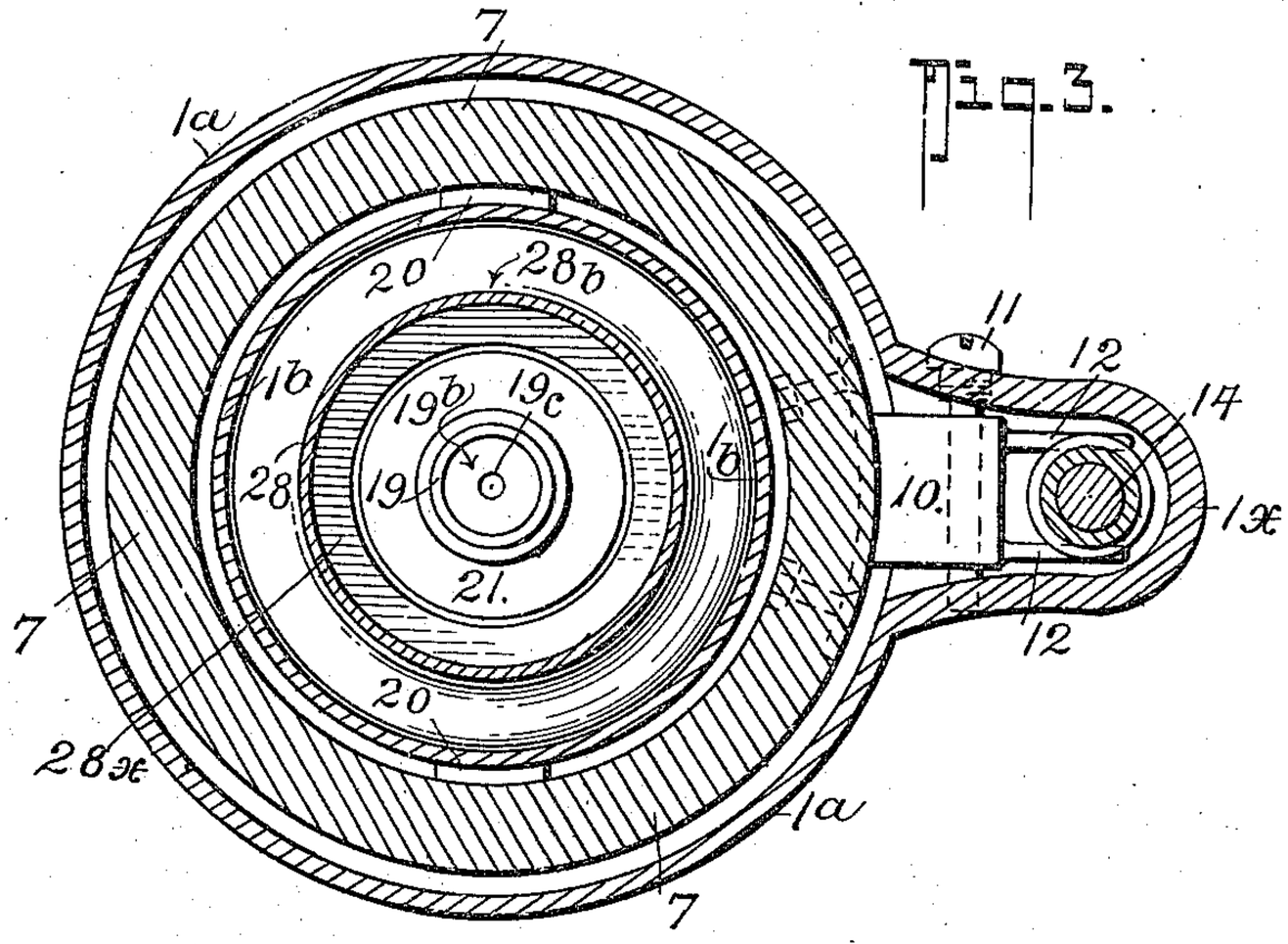
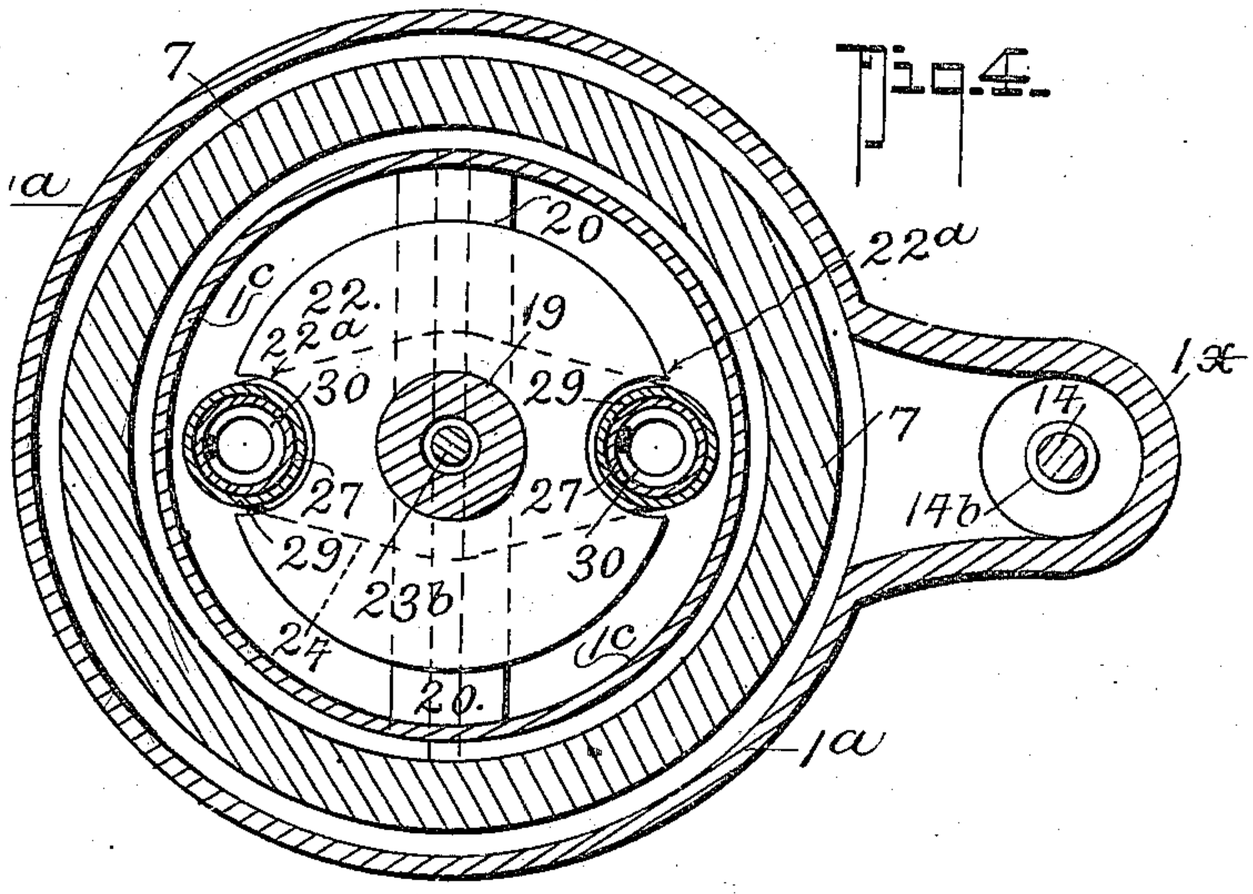


Fig. 4.



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UNITED STATES PATENT OFFICE.

SILAS CHRISTOFFERSON, NELSON T. WOODS, AND WILLIAM E. JONES, OF PORTLAND, OREGON, ASSIGNORS TO CHRISTOFFERSON-WOODS CARBURETOR CO., OF PORTLAND, OREGON, A CORPORATION OF OREGON.

CARBURETER.

976,344. Specification of Letters Patent. **Patented Nov. 22, 1910.**

Application filed December 30, 1909. Serial No. 535,617.

To all whom it may concern:

Be it known that we, SILAS CHRISTOFFERSON, NELSON T. WOODS, and WILLIAM E. JONES, all of Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

Our invention has for its object to provide a carbureter of an improved construction wherein the parts are designed and cooperate to automatically regulate the supply of air and gasolene according to the running speed of the engine.

The invention also provides a carbureter which will operate under a maximum efficiency, both at high, low and intermediate speeds, and which will operate with less throttling resistance than with other types of carbureters.

The invention also has for its object to provide an improved air controlling valve and mixing chamber including means to assist said valve in starting, and means to prevent pounding of the valve during rapid regulation.

The invention also resides in those novel details of construction, combination and arrangement of parts, all of which will be first fully described, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1, is a central vertical longitudinal section of the invention, the parts being in their non-running position in full lines and in their fastest running position with the air valve giving maximum air supply in dotted lines. Figs. 2, 3 and 4, are horizontal sections respectively on the lines 2—2, 3—3 and 4—4 of Fig. 1.

Referring now to the accompanying drawings, in which like letters and numerals indicate like parts in all of the figures the carbureter casing consists of an outer wall 1^a an inner wall 1^b concentric therewith, and an inner wall 1^c of frustoconical form that joins the walls 1^a—1^b at the bottom. The walls 1^a—1^b—1^c form a float chamber which is open at the top but closed by an annular ring 6 to leave a central passage through the casing.

The ring 6 is held in place by a cap 2 that is threaded into the casing 1 at 1^d and bears on the ring 6. The cap 2 is formed with a pipe section 2^a that projects through the cap 2 into the central passage of the casing 1 and is formed with an upwardly projecting threaded portion 2^d, to receive the high speed adjustment nut 4 and the union member 3, as clearly shown in the drawings. The pipe section 2^a has its lower end internally coned or beveled as at 2^c and is also provided with shoulders 2^e for a purpose hereinafter to appear. That part of the pipe 2^a that projects through the cap 2 has its walls of less thickness as at 2^b than the remaining portion that projects above the cap 2, so as to provide the shoulder 2^e above referred to and form a guide for the air valve 28 hereinafter again referred to.

5 is the throttle valve which operates in the pipe 2^a and is held in its normal position by a screw 5^c that projects through an arm 5^b on the valve stem and the manual movement of the valve 5 is effected through a lever 5^a that is moved in any desired manner.

Within the float chamber of the casing 1 a float 7 is held, the float 7 being connected to a lever 10 that is pivoted on a pin 11 that passes through the side walls of a projection 1^x of the casing, the projection 1^x forming a chamber for the needle valve 14^b. The valve 14^b is carried on a stem 14 that is threaded at 14^a to receive a sleeve 13 and a jam nut 15, the sleeve 13 connecting with the arms 12 of the lever 10 that carries the float 7 as shown in the drawings. The valve 14^b has a guide pin that projects through the aperture 1^z in the nipple 1^y of the casing 1. A nipple 16 is connected to the nipple 1^y by a collar 17, as shown in Figs. 1 and 2, of the drawings.

18 is the priming lever that is pivoted on a bracket 9 which is held in place by a bearing nut 8 that threads into the projection 1^x of the casing and has a bearing for the stem 14 of the valve 14^b, the priming lever 18 having operative engagement with the stem 14, as shown so that in starting, the valve 14^b may be manually opened, if necessary.

19 is the gasolene supply valve casing which has an internal bore, partly closed near its upper end by a web having a valve passage 19^c, the upper end of the valve casing 19 being cupped at 19^b to form a reservoir for the gasolene. Within the valve cas-

ing 19 the gasolene valve 23^c operates, the valve 23^c having longitudinal channels 23^d to provide passage of the gasolene and a reduced stem portion 23^b that joins with the threaded stem portion 23^a that threads into the casing 19, the passage of the stem 23 through the casing 19 being made through a gland 19^d to effect a fluid tight joint, the valve stem 23 and its attached parts being operated by the finger engagement 23^e.

Gasolene is conveyed from the float chamber 7 to the valve casing 19 by pipes 20 that are formed, in practice, preferably integral with the casing 19 and which have an aperture for conveying the gasolene from the float chamber to the interior of the valve casing 19, as clearly shown in Fig. 4 of the drawings, the pipes 20 also serving as a support for the valve casing 19 and its carried parts.

Threaded on the valve casing 19 is an arm 24 that is held in place by a check nut 25, the arm 24 having upwardly projecting cups 27 secured thereto to receive the coil springs 30, the cups 27 being surrounded by other cups 29 carried by the air valve 28, the cups 27—29 and springs 30 forming buffer devices. A coil spring 26 is interposed between the arm 24 and the pipes 20 to hold such arm in engagement with the adjusting nut 25, it being understood that the arm 24 is not threaded on the casing 19, as is the nut 25. A valve seat 22 rests on the pipes 20 and is supported by the stem 19 as well, the valve seat 22 having cut-away portions 22^a to permit passage of the cups 27 and 29, and said valve seat 22 is held in place by a cone 21 threaded on the casing 19 and engaging the seat 22.

The air valve 28 has an annular flange 28^x which has an air passage 28^a coöperating with the cone 21 and a tubular portion 28^b that receives the projecting part 2^b of the pipe 2^a and the valve 28 is further provided with projections 28^c that carry spring cups 31 in which balls 32 are held, the balls 32 being pressed to the open end of the cups 31 by a plunger 33 and a coil spring 34, as shown in drawings, the balls 32 are adapted to engage the high speed adjusting nut 4 when the valve 28 has opened to its greatest limit. Ordinarily the valve 28 does not rest on the seat 22 in practice, as it is advisable always to have the air passage partly open. However, when desired, the nut 25 (see Fig. 1) may be unscrewed or lowered until the flange 28^x will rest on the seat 22.

Operation: The manner in which our invention operates is best explained as follows: Assume the parts to be positioned as shown in Fig. 1, with the gasolene at its normal level, as shown, and it is desired to start up the engine. The operator opens the valve 23^c the desired amount to permit the gasolene to flow into the cup 19^b. He then opens the valve 14^b at the priming lever 18 to permit the gasolene to flow into the cup 19^b. Upon cranking up the engine the air will be sucked through the valve passage 28^a and pipe 2^a into the engine cylinder the air causing the gasolene in the cup 19^b to be vaporized and commingled with the air to form the working mixture. The conical formation of the member 21 and its relation to the passage 28^a insures the air to pass on all sides around the gasolene cup 19^b and form, as it were, a sheave or inclosure of air around the gasolene cup, thus insuring an abundant supply of air to the gasolene at all times. As the engine starts up the suction caused by the engine in drawing in its charges will cause the valve 28 to rise from the full line position shown in Fig. 1, toward the dotted line position shown in Fig. 1, it being understood that at the commencement of the rising movement of the valve 28 the springs 30 will assist such movement as they are intended to balance the valve 28 in the position shown in Fig. 1. As the engine starts up the valve 28 will rise more and more, opening the passage 28^a to a greater degree. Owing to the cone member 21 the opening of the valve port 28^a will be steadily and gradually increased as the valve 28 rises. As the engine reaches its maximum speed the balls 32 will engage the ring 4 and stop the upward movement of the valve 28 after the balls 32 have been depressed until the upper rims of the members 31 engage the ring 4, it being understood that the balls 32, piston 33 and spring 34 serve as shock absorbers or buffer devices to prevent pounding of the valve 28 when the engine is running at maximum speed. Upon the engine slowing down the reverse of the foregoing operations will take place until the parts are restored to the full line position shown in Fig. 1 of the drawings.

It should be understood, in operation the throttle valve 5 is controlled in the usual manner to control the passage through the pipe 2^a.

From the foregoing description taken in connection with the accompanying drawings it is thought the complete construction, operation and many advantages of our invention will be understood by those skilled in the art to which it appertains.

What we claim is:—

1. A carbureter comprising a casing having a central passage and inclosing a float chamber, a float within said float chamber, said casing having an extension and a float lever pivoted in said extension, a valve in said extension coöperatively connected with said float lever, means for admitting gasolene through said valve into the float chamber, a cap for said casing having a central pipe member projecting into said central passage, a tubular air valve carried on said

pipe member, a gasolene valve mounted within the central passage of said casing, pipes connecting the casing of said gasolene valve with said float chamber, said air valve having a passage to permit projection of said gasolene valve casing, and means carried by said gasolene valve casing coöperating with said air valve to vary the area of said air valve passage as said air valve moves.

2. A carbureter comprising a casing having a central passage and inclosing a float chamber, a float within said float chamber, said casing having an extension, and a float lever pivoted in said extension, a valve in said extension operatively connected with said float lever, means for admitting gasolene through said valve into the float chamber, a cap for said casing having a central pipe member, a tubular air valve carried on said pipe member, a gasolene valve mounted within the central passage of said casing, pipes connecting the casing of said gasolene valve with said float chamber, said air valve having a passage to permit projection of said gasolene valve casing means carried by said gasolene valve casing coöperating with said air valve to vary the area of said air valve passage as said air valve moves, a seat for said air valve carried by the casing of said gasolene valve, and resilient members for supporting said air valve when in its inoperative position.

3. A carbureter comprising a casing having a central passage and inclosing a float chamber, a float within said float chamber, said casing having an extension and a float lever pivoted in said extension, a valve in said extension coöperatively connected with said float lever, means for admitting gasolene through said valve into the float chamber, a cap for said casing having a central pipe member, a tubular air valve carried on said pipe member, a gasolene valve mounted within the central passage of said casing, pipes connecting the casing of said gasolene valve with said float chamber, said air valve having a passage to permit projection of said throttle valve casing, means carried by said gasolene valve casing coöperating with said air valve to vary the area of said air valve passage as said air valve moves, and means for resiliently supporting said air valve and limiting its movement in one direction.

4. A carbureter comprising a casing having a central passage inclosing a float chamber, a float within said float chamber, said casing having an extension and a float lever pivoted in said extension, a valve in said extension coöperatively connected with said float lever, means for admitting gasolene through said valve into the float chamber, a cap for said casing having a central pipe member, a tubular air valve carried on said pipe member, a gasolene valve mounted within the central passage of said casing, pipes connecting the casing of said gasolene valve with said float chamber, said air valve having a passage to permit projection of said gasolene valve casing, and means carried by said gasolene valve casing coöperating with said air valve to vary the area of said air valve passage as said air valve moves, and means for resiliently supporting said air valve and limiting its movement in one direction together with means for limiting the movement of said air valve in an opposite direction.

5. A carbureter comprising a casing having a central passage inclosing a float chamber, a float within said float chamber, said casing having an extension and a float lever pivoted in said extension, a valve in said extension coöperatively connected with said float lever, means for admitting gasolene through said valve into the float chamber, a cap for said gasolene having a central pipe member, a tubular air valve carried on said pipe member, a gasolene valve mounted within the central passage of said casing, pipes connecting the casing of said gasolene valve with said float chamber, said air valve having a passage to permit projection of said gasolene valve casing, means carried by said gasolene valve casing coöperating with said air valve to vary the area of said air valve passage as said air valve moves, means for resiliently supporting said air valve and limiting its movement in one direction together with means for limiting the movement of said air valve in an opposite direction, said last named limiting means including buffer devices.

6. A carbureter comprising a casing having an outer wall and an inner wall inclosing a float chamber and providing a central passage through said casing, said casing being open at the top, a ring closing the opening to said float chamber at the top, a valve, a float in said float chamber coöperatively connected with and controlling said valve, a gasolene valve and its casing mounted in said central passage, pipes connecting said gasolene valve casing with said gasolene chamber, a cap for said casing, a pipe projecting through said cap, a cylindrical air valve embracing said pipe and having an annular flange at one end, said flange having a passage, a valve seat for said air valve supported on said gasolene valve casing, and buffer devices beneath said air valve to hold it in its inactive position.

7. A carbureter comprising a casing having an outer wall and an inner wall inclosing a float chamber and providing a central passage through said casing, said casing being open at the top, a ring closing the opening to said float chamber at the top, a valve, a float in said float chamber coöperatively connected with and controlling said valve,

a gasolene valve and its casing mounted in said central passage, pipes connecting said gasolene valve casing with said gasolene chamber, a cap for said casing, a pipe projecting through said cap, a cylindrical air valve embracing said pipe and having an annular flange at one end to leave a passage, a valve seat for said air valve supported on said gasolene valve casing, and means for assisting said air valve to move at the commencement of its movement.

8. A carbureter comprising a casing having an outer wall and an inner wall inclosing a float chamber and providing a central passage through said casing, said casing being open at the top, a ring closing the opening to said float chamber at the top, a valve, a float in said float chamber coöperatively connected with and controlling said valve, a gasolene valve and its casing mounted in said central passage, pipes connecting said gasolene valve casing with said gasolene chamber, a cap for said casing, a pipe projecting through said cap, a cylindrical air valve embracing said pipe and having an annular flange at one end to leave a passage, a valve seat for said air valve supported on said gasolene valve casing, means for assisting said air valve to move at the commencement of its movement, said last named means comprising a plate mounted on said gasolene valve casing, telescopic members joining said plate with said air valve and means within said telescopic members continuously tending to separate the same.

9. A carbureter comprising a casing having an outer wall and an inner wall inclosing a float chamber and providing a central passage through said casing, said casing being open at the top, a ring closing the opening to said float chamber at the top, a valve, a float in said float chamber coöperatively connected with and controlling said valve, a gasolene valve and its casing mounted in said central passage, pipes connecting said gasolene valve casing with said gasolene chamber, a cap for said casing, a pipe projecting through said cap, a cylindrical air valve embracing said pipe and having an annular flange at one end to leave a passage, a valve seat for said air valve supported in said gasolene valve casing, means for assisting said air valve to move at the commencement of its movement, said last named means comprising a plate mounted on said gasolene valve casing, telescopic members joining said plate with said air valve, means within said telescopic members continuously tending to separate the same, and means for limiting the movement of said air valve in one direction.

10. A carbureter comprising a casing having an outer wall and an inner wall inclosing a float chamber and providing a central passage through said casing, said casing being open at the top, a ring closing the opening to said float chamber at the top, a valve, a float in said float chamber coöperatively connected with and controlling said valve, a gasolene valve and its casing mounted in said central passage, pipes connecting said gasolene valve casing with said gasolene chamber, a cap for said casing, a pipe projecting through said cap, a cylindrical air valve embracing said pipe and having an annular flange at one end to leave a passage, a valve seat for said air valve supported on said gasolene valve casing, means for assisting said air valve to move at the commencement of its movement, said last named means comprising a plate mounted on said gasolene valve casing, telescopic members joining said plate with said air valve, means within said telescopic members continuously tending to separate the same, and means for limiting the movement of said air valve in one direction together with buffer devices carried by said air valve to engage said limiting means.

11. In a carbureter, a casing inclosing a fluid chamber, means for controlling the admission of fluid to said chamber, said casing having a central passage, a pipe member projected into said central passage and forming an outlet therefor, a gasolene valve mechanism projected into said central passage to discharge into said pipe member, and an air valve having a tubular portion to form a continuation of said pipe member and control the passage of air therethrough.

12. In a carbureter, a casing inclosing a fluid chamber, means for controlling the admission of fluid to said chamber, said casing having a central passage, a pipe member projected into said central passage and forming an outlet therefor, a gasolene valve mechanism projected into said central passage to discharge into said pipe member, an air valve having a tubular portion to form a continuation of said pipe member and control the passage of air therethrough, and means carried by said gasolene valve mechanism and coöperating with said air valve to vary the area of the air passage therethrough.

13. In a carbureter, a casing inclosing a fluid chamber, means for controlling the admission of fluid to said chamber, said casing having a central passage, a pipe member projected into said central passage and forming an outlet therefor, a gasolene valve mechanism projected into said central passage to discharge into said pipe member, an air valve having a tubular portion to form a continuation of said pipe member and control the passage of air therethrough, said air valve being movable on said pipe member, and buffer devices for arresting the movement of said air valve.

14. In a carbureter, a casing inclosing a fluid chamber, means for controlling the ad-

mission of fluid to said chamber, said casing having a central passage, a pipe member projected into said central passage and forming an outlet therefor, a gasolene valve mechanism projected into said central passage, to discharge into said pipe member, an air valve having a tubular portion to form a continuation of said pipe member and control the passage of air therethrough, means carried by said gasolene valve mechanism and coöperating with said air valve to vary the area of the air passage therethrough, said air valve being movable on said pipe member, and buffer devices for arresting the movement of said air valve.

15. In a carbureter, a casing inclosing a fluid chamber, means for controlling the admission of fluid to said chamber, said casing having a central passage, a pipe member projected into said central passage and forming an outlet therefor, a gasolene valve mechanism projected into said central passage to discharge into said pipe member, an air valve having a tubular portion to form a continuation of said pipe member and control the passage of air therethrough, said air valve being movable on said pipe member, buffer devices for arresting the movement of said air valve, and means varying the action of said buffer devices and limiting the movement of said air valve.

16. In a carbureter, a casing inclosing a fluid chamber, means for controlling the admission of fluid to said chamber, said casing having a central passage, a pipe member projected into said central passage, and forming an outlet therefor, a gasolene valve mechanism projected into said central passage to discharge into said pipe member, an air valve having a tubular portion to form a continuation of said pipe member and control the passage of air therethrough, means carried by said gasolene valve mechanism and coöperating with said air valve to vary the area of the air passage therethrough, said air valve being movable on said pipe member, buffer devices for arresting the movement of said air valve, and means varying the action of said buffer devices and limiting the movement of said air valve.

17. A carbureter comprising a casing having a pair of annular walls inclosing an open ended float chamber, means for admitting fluid into said float chamber, and means for governing the admission of said fluid into said float chamber, a cap for said casing, said casing having a central passage through the same, an outlet pipe member for said central passage, a tubular air valve within said central passage and having a portion forming a cut-off for said central passage, said cut-off portion having an air pass, a gasolene valve projected into said central passage and through said air pass, said air valve being longitudinally movable, and means carried on said gasolene valve for varying the area of said air pass as said air valve is moved.

18. A carbureter comprising a casing having a pair of annular walls inclosing an open ended float chamber, means for admitting fluid into said float chamber, means for governing the admission of said fluid into said float chamber, a cap for said casing, said casing having a central passage through the same, an outlet pipe member for said central passage, a tubular air valve within said central passage and having a portion forming a cut-off for said central passage, said cut-off portion having an air pass, a gasolene valve projected into said central passage and through said air pass, said air valve being longitudinally movable, means carried on said gasolene valve for varying the area of said air pass as said air valve is moved, and adjustable buffer devices beneath said air valve for arresting the movement of said air valve in one direction and assisting its movement in an opposite direction.

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