C. L. KURTZ.

MEANS FOR SUPPLYING AIR TO GAS ENGINES.

APPLICATION FILED DEC. 20, 1917.

1,268,128.

Patented June 4, 1918.

2 SHEETS—SHEET 1.

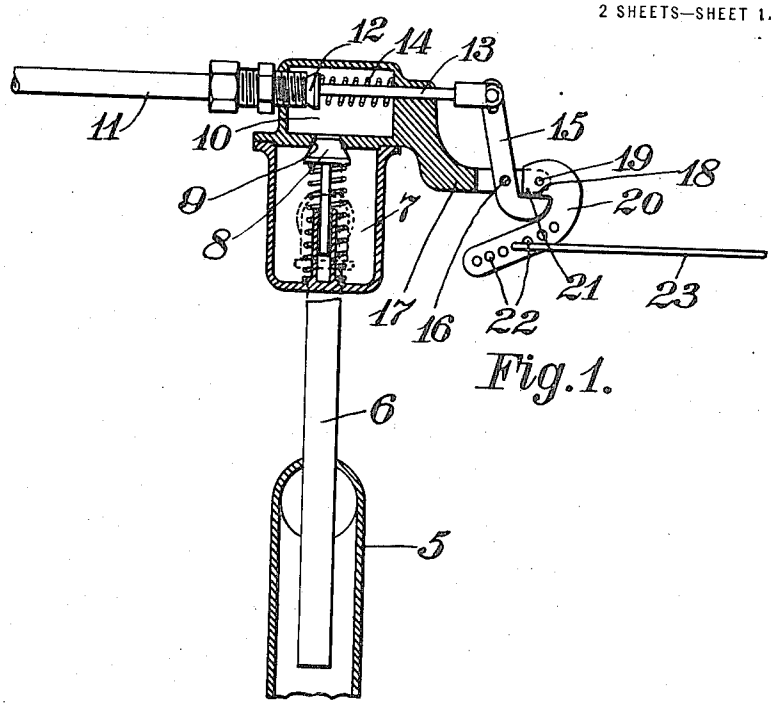

Fig. 1.

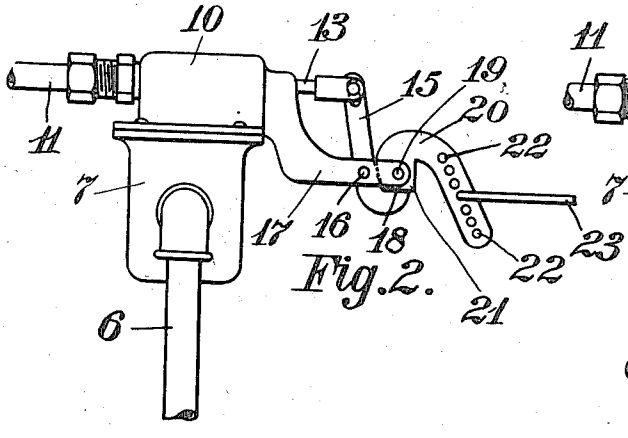

Fig. 2.

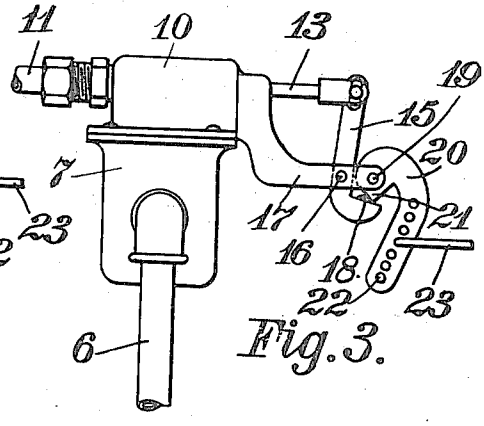

Fig. 3.

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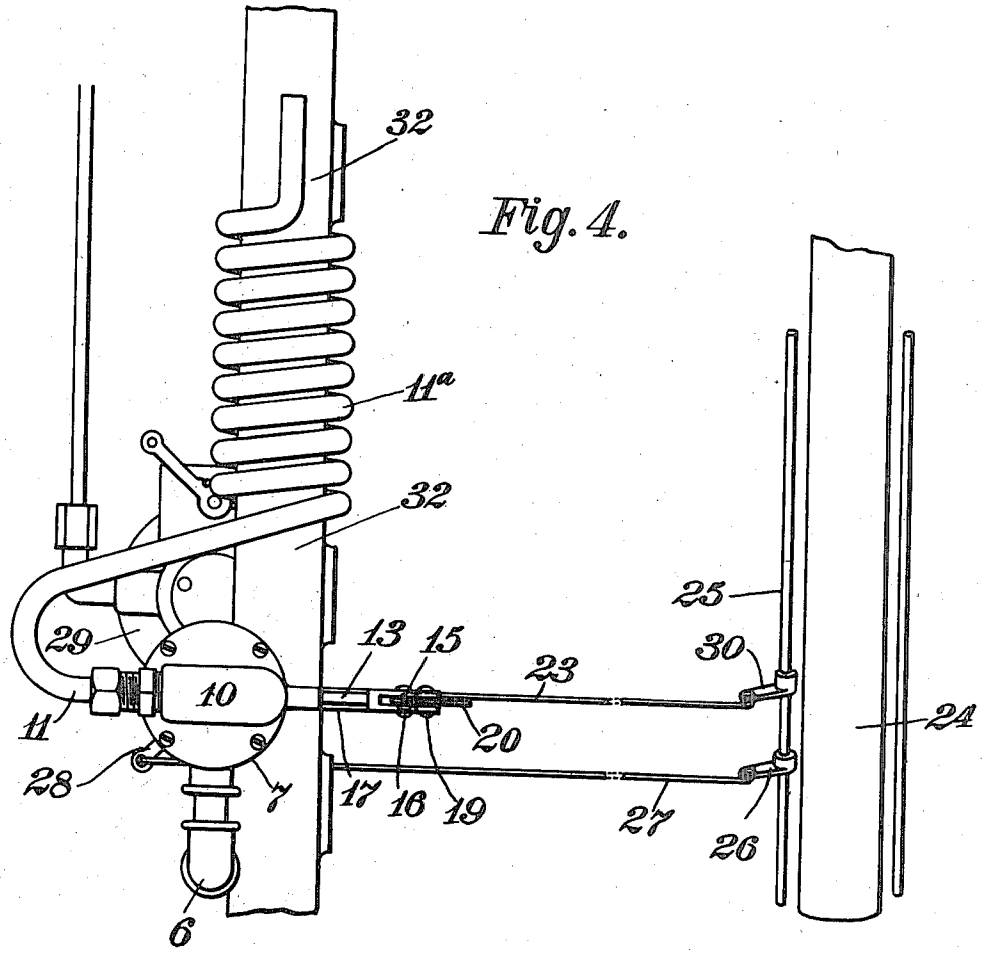
Fig. 4.



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UNITED STATES PATENT OFFICE.

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MEANS FOR SUPPLYING AIR TO GAS-ENGINES.

1,268,128. Specification of Letters Patent. Patented June 4, 1918.

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To all whom it may concern:

Be it known that I, CHARLES L. KURTZ, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Means for Supplying Air to Gas-Engines, of which the following is a specification.

In starting an ordinary automobile gas engine or in climbing steep grades with the automobile the supply of gas should be richer than for ordinary operation. When an engine has become warmed after starting it is important, in the interest of economy and smooth operation, that the gas be aerated by an auxiliary supply of air according to variations in the amount of fuel admitted, that is if the fuel be increased the air should be approximately proportionally increased and conversely.

The object of the present invention therefore is to provide improved means whereby an auxiliary air supply for the gas intake or manifold of an explosive engine can be automatically increased to conform to an increase in the volume of the gas supply up to a predetermined point which is about the limit used in ordinary work and beyond that automatically diminished or practically excluded with an increase in the gas supply.

The invention is embodied in the example herein shown and described, the features of novelty being finally claimed.

In the accompanying drawings—

Figure 1 is a detail chiefly in section showing the mechanism for regulating the air intake, the controlled valve being in its closed position when the gas throttle is completely retarded.

Fig. 2 is a side elevation of the air intake devices showing the position of the controlled valve operating levers in their positions when the valve is closed or when the gas throttle is advanced to beyond the limit of the ordinary running position.

Fig. 3 is a similar view showing the controlled valve operating levers in their positions when the valve is fully opened.

Fig. 4 is a plan view showing how the air valve operating levers are connected for operation with the gas throttle or control shaft.

In the views 5 designates a fraction of the manifold of the gas engine of the "Ford" car. Tapping into the manifold 5 is the auxiliary air supply pipe 6. This pipe 6 extends deeply, as shown, into the manifold so as to cause a more thorough aeration of the gas before it is introduced in the explosive chamber. The pipe 6 communicates with a chamber 7 containing a spring actuated check valve 8 seating on a suitable seat at an inlet 9 to said chamber 7. The wall containing the seat of the said check valve 8 forms the bottom of another chamber 10 with one end of which is connected an air inlet pipe 11. The end of the pipe 11 within the chamber 10 or the union connecting said pipe with said chamber forms a seat for a valve 12, the stem 13 of which projects through the other end of the chamber 10. On the stem 13 within the chamber 10 is a coil spring 14 tending to hold the valve 12 on its seat in position to close the air inlet. 15 designates a lever fulcrumed at 16 in a bracket 17 projecting from the end of the chamber 10 the upper arm of said lever being hinged by a pin and slot connection to the exposed end of the valve stem 13 and having its lower arm formed with an angularly extending seat 18. Fulcrumed at 19 in the aforesaid bracket 17 is a second lever 20 of fish-hook form having an angular point or cam 21 to act on the seat 18 of the lever 15 to rock the latter. The longer arm of this lever 20 is provided with a row of holes 22 to permit the connection of the operating rod 23 therewith according to the throw to be given the lever 20 by the movement imparted to the rod because in some automobiles the extent of the throw of the gas throttle rod differs from that in others hence it becomes important for this or other practical reasons to adapt the throw of the lever 20 to the movement of the rod 23.

24 designates the usual steering shaft of the automobile. Alongside this shaft is the usual gas control shaft 25 having connected with it by a crank arm 26 the usual gas control rod 27 the latter being connected to the usual gas control lever 28 at the usual carbureter 29.

The rod 23 connected with the fish-hook lever 20 is also connected with the gas control shaft 25 by a crank arm 30 parallel to the crank arm 26 (see Fig. 4) so that when said gas control shaft is turned the rod 23 and lever 20 are similarly actuated. The angular cam 21 is of such form that a full stroke of the rod 23 in one direction results

in a double or reciprocatory movement of the valve stem 13. In such a single stroke of the rod 23 the depression of the apex of the cam 21 on the seat 18 of the lever 15 moves lever 15 and therefore the valve 12 in one direction and the coil spring 14 causes the movement of valve 12 in the opposite direction after the apex of the cam has passed the point of greatest depression. In Fig. 1 is illustrated the closed position of the valve 12 and the corresponding position of the actuating levers. These are the positions of the parts when the gas control lever at the steering wheel is at full "retarded" position. In Fig. 2 is illustrated the position of said actuating levers at the full advanced position of the gas lever at the steering wheel or at such other position as may be desirable beyond a point of ordinary working position. In Fig. 3 is illustrated the position of the said valve actuating levers when the apex of the cam 11 is at its point of greatest depression. This point and position marks according to my practice the extreme for ordinary or average operation. To advance the gas control lever (at the steering wheel) farther or so as to bring the lever 20 to or near the position shown in Fig. 2 causes a closing or near closing of the valve 12 and excludes auxiliary air but this is accompanied by an increase in the proportion and richness of the gas. To throw the lever 20 to or toward the position indicated in Fig. 2 is therefore desirable in starting the engine or in climbing a heavy grade.

From the foregoing it will be observed that the regulation and control of the auxiliary air supply to suit the described varying conditions is rendered automatic and by the manipulation of only the usual and ordinary gas control lever.

To heat the auxiliary air the intake pipe 11 can be formed as a coil 11^a to encircle the engine exhaust 32 as illustrated in Fig. 4.

The forms and arrangement of the parts can be varied without departing from the gist of the invention as claimed.

What I claim is—

1. The combination with a gas engine and a gas supply control therefor, of an auxiliary air supply means including a valve, and means actuated concomitantly with the actuation of the gas supply control for increasing the supply of auxiliary air within a predetermined limit and beyond said limit reducing the said air supply.

2. The combination with a gas engine and a gas supply control therefor, of an auxiliary air supply means including a valve, and means actuated by the gas supply control for increasing the supply of auxiliary air within a predetermined limit and beyond said limit reducing the said air supply.

3. The combination with a gas engine and a gas supply control therefor, of an auxiliary air supply means including a valve, and means actuated concomitantly with the actuation of the gas supply control for increasing the supply of auxiliary air within a predetermined limit and beyond said limit excluding the said air supply.

4. The combination with a gas engine and a gas supply control therefor, of an auxiliary air supply means including a valve, and means actuated in one direction by the gas supply control for increasing the supply of auxiliary air within a predetermined limit and beyond said limit reducing the said air supply.

5. The combination with a gas engine and gas supply control therefor, of an air supply for the gas, means including a valve, means for reciprocating said valve including a spring and a cam, said cam movable in one direction for causing the movement of the valve in opposite directions and means connecting the cam with the gas supply control for actuating the cam, substantially as described.

6. The combination with a gas engine and gas supply control therefor, of an air supply for the gas, means including a valve, means for reciprocating said valve including a spring and a cam, said cam movable in one direction by the gas supply control for increasing the supply of air within a predetermined limit and beyond said limit reducing said air supply, substantially as described.

CHARLES L. KURTZ.