J. CALLICOTT.

AUXILIARY INLET FOR COMBUSTION ENGINES.

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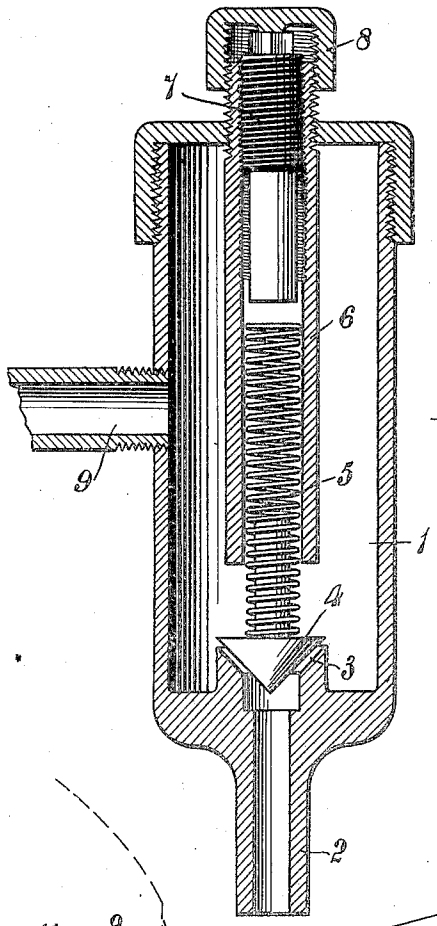


Fig. 1.

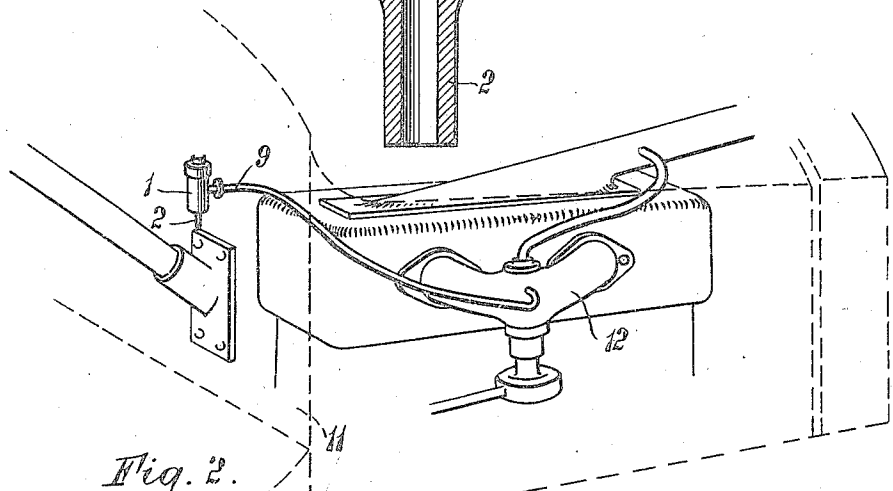


Fig. 2.

WITNESSES.

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AUXILIARY INLET FOR COMBUSTION-ENGINES.

1,202,965. Specification of Letters Patent. Patented Oct. 31, 1916.

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To all whom it may concern:

Be it known that I, JOHN CALLICOTT, of the township of Mount Dennis, in the county of York, in the Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Auxiliary Inlets for Combustion-Engines; and I hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to auxiliary inlets for internal combustion engines and has for its objects to provide an inlet whereby air at a higher temperature than the gaseous charge, may be admitted directly into the cylinder or manifold of the engine while running, for the purposes of improving the explosive effect of the gaseous charge; or to admit of the introduction of scouring fluid for the purpose of clearing and lubricating the cylinder and piston of the engine, the said inlet being adapted to be closed against operation, or the operation thereof regulated to a nicety and acting as a check valve thereby preventing leakage of gases from the cylinder therethrough.

The explosive charge as admitted to the cylinder of an engine is extremely cold, owing to the evaporation of the gasolene in the carbureter, and it having long been determined that an explosive charge in this state is not fully efficient, it is therefore desired to admit the auxiliary air into the cylinder at atmospheric temperature or at a higher temperature in order to increase the explosive efficiency of the charge.

It often occurs that owing to a defective carbureter and to lack of knowledge on the part of a driver of a car, an incorrect mixture is used which is not adapted to the varying degree of speed or load and as a result it often occurs that a degree of vacuum in the cylinder of the engine occurs which is to a certain extent power absorbing. It is therefore a further object of this invention to make the valve so sensitive and controllable that the speed and extent of opening and closing of said valve may be regulated both automatically and manually to relieve the vacuum to a predetermined extent.

Further objects subsidiary to or resulting from the hereinbefore mentioned objects will become apparent as the invention is further described.

In carrying the invention into effect, I prefer to construct the device in the form of a casing having an inlet orifice at its lower end, adapted to receive air of at least atmospheric temperature, and an outlet pipe leading from some other point in the casing, said outlet pipe being provided as a communication between the engine cylinder or manifold and said casing. A valve is provided which seats itself above the inlet orifice, normally closing the same and having an extended resilient stem in the form of a coil spring which is slidably accommodated in a tubular member secured to the upper part of said casing, said tubular member being provided with an adjustable stop, in its upper end, limiting the vertical movement of the valve spindle, and a threaded cap surmounting said tubular member to conceal said stop and adapted to be brought into binding contact therewith thereby preventing displacement of said stop; all of which is more particularly described and ascertained in and by the following specification with reference to the accompanying drawing, in which:—

Figure 1 is a sectional elevation of the auxiliary inlet, and Fig. 2 is a perspective diagram illustrating the device as applied to an automobile.

Similar characters of reference indicate similar parts in both figures of the drawings.

1, is the hollow casing provided at its lower end with a tubular extension 2 for a purpose hereinafter described, and 3 is a valve seat immediately above the tubular extension 2 upon which valve seat a valve 4 is normally accommodated.

The valve 4 has an extended resilient stem 5, in the form of a coil spring which is located in the bore of a tubular member 6 carried by the upper part of the casing 1, the tubular member acting as a guide for the said resilient stem and insuring the correct seating of the valve 4 when closed, sufficient clearance between the parts 5 and 6 being allowed to admit of such free self rotation of the valve as may occur, thereby insuring even wear between the said valve and its seat.

The upper end of the tubular member 6 projects beyond the top of the casing and is threaded both internally and externally, the internal pitch being preferably somewhat less than the external pitch, as would usually be the case. Within the said tubular member is a correspondingly threaded

plug or stop 7 having a square or other suitable head, the said stop being adjustable by the rotation of said head, in order to increase or decrease the distance between the base of the stop and the top of the valve stem 5, thereby determining the lift of the valve.

In order to prevent deviation of the stop 7 from its adjusted position, a cap 8 engages with the upper end of the tubular member 6 and may be brought into binding contact with the head of the stop, thus preventing its rotation, while at the same time the cap conceals the head of the stop and prevents it from being tampered with.

9, is the outlet pipe from the casing 1 and forming the communication between the said casing and the engine cylinder, or the manifold of the engine as the case may be.

In operation the device may be attached to the dash board 11 of an automobile as is indicated in Fig. 2 of the drawing, the pipe 9 entering the manifold 12 of the engine, and the tubular extension 2 adapted to receive air at atmospheric temperature. Where air at a higher temperature is desired this extension 2 may be extended through the dash board 11 and receive air from the proximity of the exhaust pipe of the engine or the outlet from the casing 1 may encircle the exhaust pipe of the engine. It will be understood that upon the rotation of the stop 7 in one or other direction, a varying amount of air may be admitted to the cylinder according to the excess of vacuum caused where a spark is advanced beyond the correct position relative to the opening of the throttle and to the load, and such excess vacuum more or less relieved according to the adjustment of the inlet valve while at the same time a somewhat weaker mixture is provided, with the consequent increase in speed of the engine, as is desirable. Moreover, as this air raises the temperature of the explosive mixture by its admixture therewith, the efficiency of the said mixture is accordingly increased.

The operation of valve may be regulated by increasing the distance between the top of the resilient stem 5 and the stop 7 or by bringing the stop 7 into compressive contact with said resilient stem 5, in the latter case the closing of the valve after each operation being accelerated, as would be necessary where the device was used upon an engine having a large number of cylinders. Further a vessel containing kerosene or other fluid, may be placed under the extension 2 and the kerosene, or the like drawn by suction into the cylinder even while the engine is running under its own power, thereby effecting a thorough scouring of the said cylinder. In the latter case the check valve arrangement is particularly valuable inasmuch as without such automatic closing of the valve the kerosene or the like would be scattered at each explosion in the engine.

The valve may be positively closed by the stop 7 being adjusted until the resilient stem is fully compressed, if so desired. When the inlet is operable it will be seen that the weight of the valve, due to the amount of metal, in the spindle, or in a valve head of substantial size, will to a certain extent control the amount of air passing thereunder according to the force and speed of suction.

It will also be seen that the action of the resilient stem 5 under ordinary conditions, that is, when the stop 7 is not normally in actual contact with the top of said stem, is to increase the retro-active quality of the valve inasmuch as when the valve is opened to its full extent owing to an increased speed of the engine, the resilient property of said stem is brought into action thereby automatically quickening the closing of said valve.

This invention may be developed within the scope of the following claims without departing from the essential features thereof and it is desired that the specification and drawing be read as being merely illustrative and not in a limiting sense, except as necessitated by the prior art.

What I claim as my invention is:

1. In an internal combustion engine, the combination with a casing communicating the cylinder of an engine, an air inlet opening through said casing, a valve seat surrounding said air inlet, a guide member within said casing and in alinement with said air inlet and said valve seat, a valve, means for resiliently supporting said valve in said guide member and arranged for slight free movement therein, and means for adjustably limiting the movement of said valve.

2. In an internal combustion engine, the combination with a casing open at one end and communicating the cylinder of an engine, an air inlet opening through the end wall of said casing, a valve seat surrounding said air inlet, a closure for the open end of said casing, a guide member depending from said closure and in alinement with said air inlet and said valve seat, a valve, means for resiliently supporting said valve in said guide member and arranged for slight free movement therein, and means adjustably limiting the movement of said valve.

3. In an internal combustion engine, the combination with a cylindrical casing open at one end and communicating the cylinder of an engine, an air inlet opening through the bottom wall of said casing, a valve seat surrounding said air inlet, a cap closure for the open end of said casing, a tubular guide depending from said closure and in aline-

ment with said air inlet and said valve seat, a valve, means for resiliently supporting said valve supported in the lower end of said guide and arranged for slight free movement therein, and means disposed within the upper end of said guide, and operable exteriorly of said closure for adjustably limiting the movement of said valve.

Signed at the city of Toronto, in the county of York, in the Province of Ontario, in the Dominion of Canada, this 29th day of July, 1915.

JOHN CALLICOTT.

Witnesses:
S. LIGHTFOOT,
H. M. CHRISTMAN.