No. 847,086. PATENTED MAR. 12, 1907.

H. LENTZ.

COMBINED AIR AND GAS ADMISSION VALVE FOR EXPLOSIVE ENGINES.

APPLICATION FILED DEC. 22, 1906.

2 SHEETS—SHEET 1.

Fig. 1

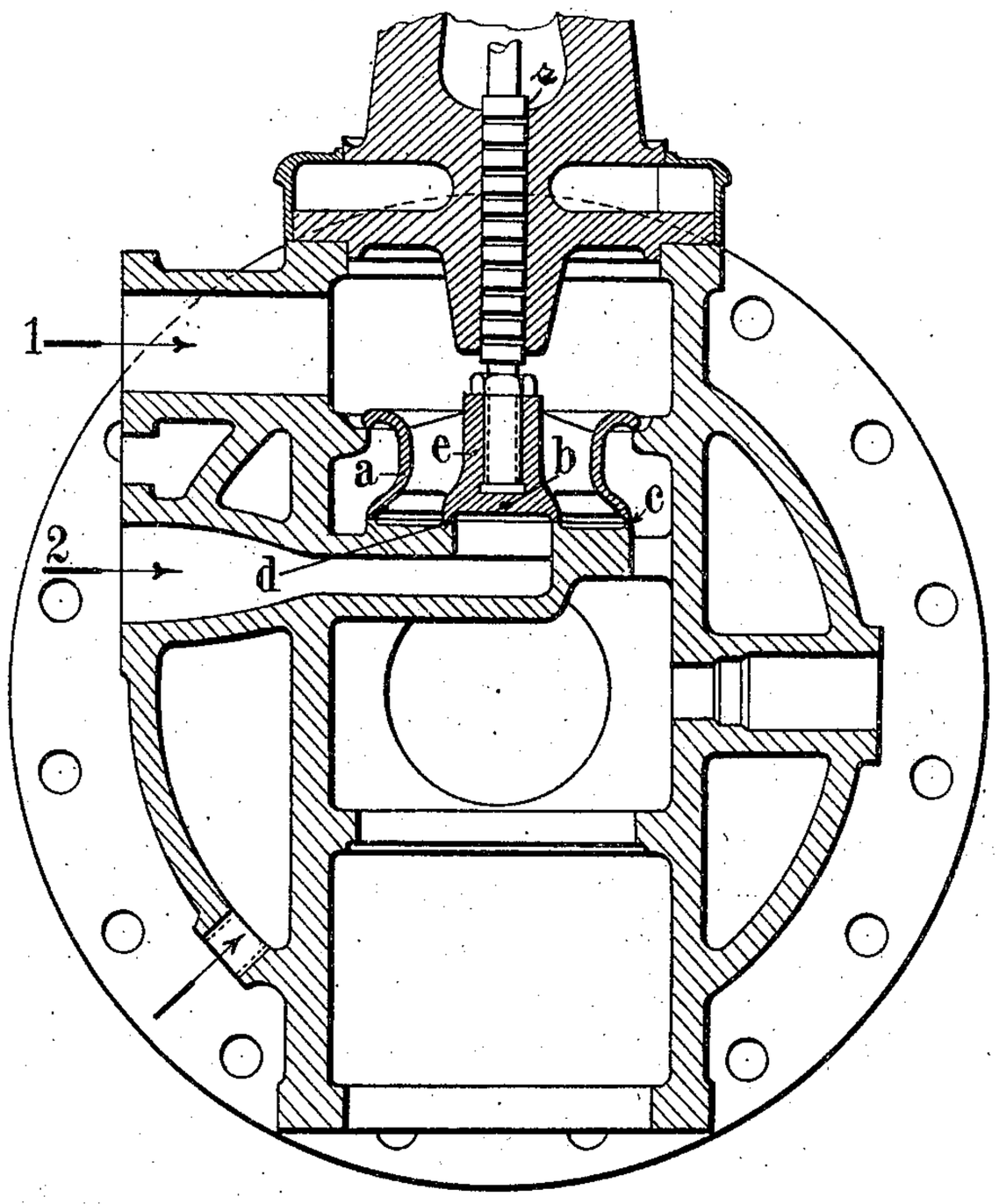

Fig. 2

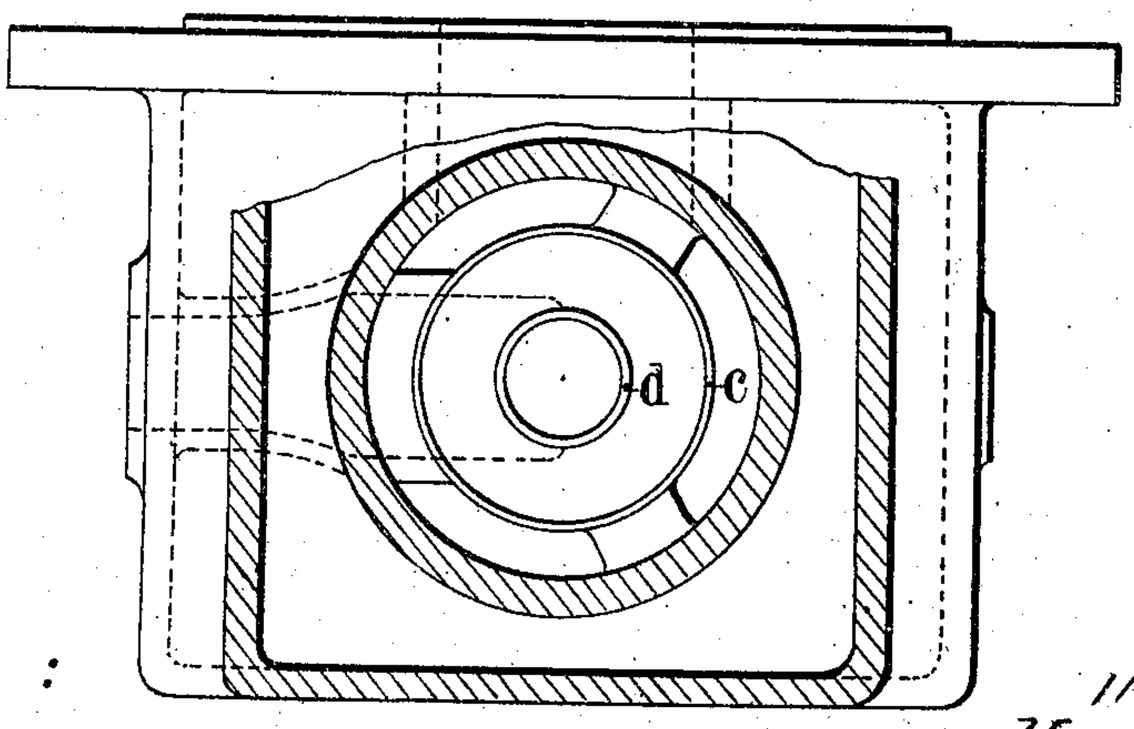

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Fig. 3

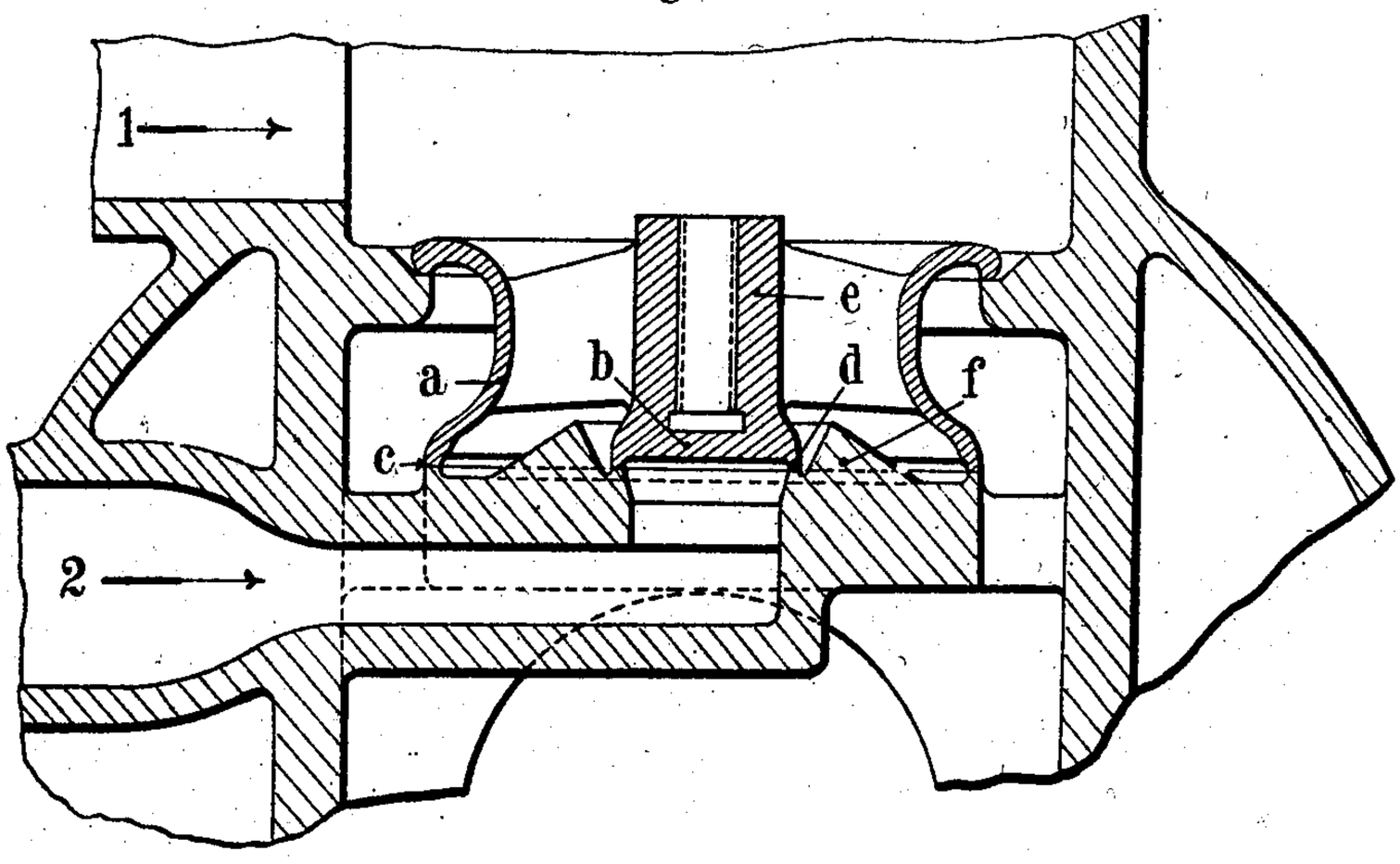
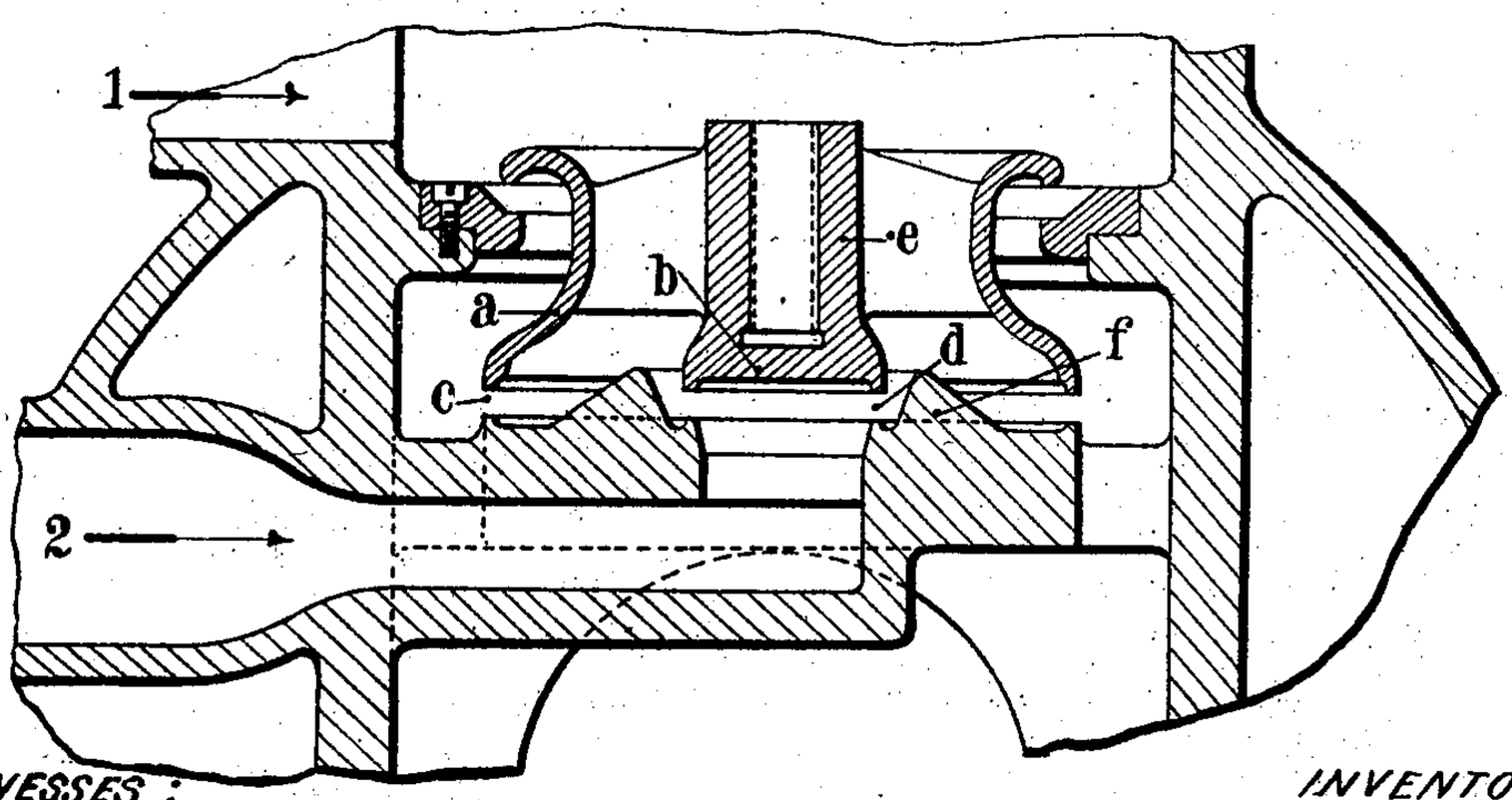


Fig. 4



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UNITED STATES PATENT OFFICE.

HUGO LENTZ, OF BERLIN, GERMANY.

COMBINED AIR AND GAS ADMISSION VALVE FOR EXPLOSIVE-ENGINES.

No. 847,086. Specification of Letters Patent. Patented March 12, 1907.

Application filed December 22, 1905. Serial No. 292,954.

To all whom it may concern:

Be it known that I, HUGO LENTZ, engineer, a subject of the German Empire, residing at Berlin, Germany, have invented new and useful Improvements in and Relating to Distributing Members for Explosion-Motors, of which the following is a full, clear, and exact description.

This invention relates to admission-valves of explosion or internal-combustion engines supplied with a mixture of air and gas or hydrocarbon vapors; and the object of the invention is to provide an admission-valve consisting of a single member combining in one part the air and gas admission valves.

One of the special features of the invention also consists in giving to the combined admission-valve and to its seats forms which insure the constancy of the mixture under the best conditions whatever the lift of this valve may be.

In the accompanying drawing, Figures 1 and 2 are two sections, in elevation and in plan, respectively, of a constructional form of the admission member in accordance with this invention. Fig. 3 shows another constructional form of this part. Fig. 4 is identical with Fig. 3, except that in it the valve is shown lifted from its seat.

The admission member according to this invention is characterized by the fact that, on the one hand, in order to permit of the operation of this part with an exceedingly small lift the air-valve is given a tubular form with double seat by combining it with the gas-admission valve, and, on the other hand, for the purpose of obviating the harmful effect of unequal expansions upon the tightness of the joints the seat of the gas-valve is arranged approximately in the plane of the lower seat of the air-valve.

An exceedingly simple means for combining the air and gas valves consists in casting them together, the hub of the double tubular air-valve then serving as a plate-valve for the gas.

In Fig. 1, *a* designates the tubular double-seated air-valve, and *b* the gas-valve, and by way of example these two valves are here united in a single casting. The lower seat *c* of the air-valve is situated in the same plane as the seat *d* of the gas-valve. The boss or hub *e* of this combined double-seated valve, which hub serves for its attachment to the valve-rod *s*, at the same time serves as the gas-valve.

In order that it may be possible to obtain with any lift of the valve an explosive mixture of invariable composition, it is advantageous to depart from the rule generally adopted, consisting in giving to the horizontal passage-sections of the valve surfaces proportionate to the volumes of the components of the mixture and to give to the valve dimensions such that the sum of the contours of the two seats of the air-valve are to the contour of the gas-valve in the same ratio as the volume of air is to the volume of gas in the mixture. The various magnitudes of the lifts of the valve do not in this case in any way vary the proportions of the mixture. They merely alter the quantity of the mixture admitted. If, however, circumstances render it necessary to give to the horizontal passage-sections values corresponding to the proportions of the mixture, the same ratio of the sections of the ports would be obtained by reducing the lift of one of the valves. This condition is realized in the most simple manner by surrounding the gas-valve with a flange or collar *f*, the section of which is such that the section of the port giving access to the gas remains, for all possible lifts of the valve, proportionate to the total section of the port of the air-valve, Fig. 3. The flange or collar *f*, shown in Figs. 3 and 4 as being cast in one piece with the valve-seat, may also be made as an interchangeable conical ring.

It is possible to largely diminish the effort required by the distributing-gear by adopting for the admission-seat of the valve the constructional form represented in Fig. 4. The connected seat cast with the valve then turned in the lathe permits of introducing a valve the two seats of which present the same diameter perfectly balanced, or else with the inner seat larger than the outer seat. In these figures the air and gas admission sockets are designated by 1 and 2, respectively. The advantages of these methods of constructing the admission member are as follows: This double member in a single piece operates with small lifts, and all its parts are acted upon in the same manner by the governor; the employment of the slide-valve with ports and combined with the admission-valve, which is but ill-adapted for this purpose, is dispensed with; all the variations of the admission-sections are formed by the variation of the lift of the valve; again, with different lifts of the valve—re-

sulting, for example, from the action of the governor—the admission-sections for the gas and air remain proportionate to the constituents of the mixture; expansions produced by heat exert no influence upon the tightness of the gas-valve, and, finally, the pressure of the gas which is produced during the explosion invariably tends to close the valve, whereby the initial load of the valve-closing springs is reduced and the safety of working is increased.

In the case of a motor with suction gas-generator for the purpose of permitting of the regulation of the ratios of the admission-sections in proportion to the variations of the composition of the mixture the device may be arranged in such a manner that the flange or conical ring *f*, Figs. 3 and 4, may be replaced by another of different conicity.

Having now particularly described and ascertained the nature of my invention and in what manner it may be performed, I declare that what I claim is—

1. An admission member for explosion-motors consisting of a tubular double-seated valve, serving as air-valve, in combination with the gas-valve in such a manner that the seat of the latter is approximately or completely in the corresponding plane of the seat of the air-valve.

2. An admission member for explosion-motors consisting of a tubular double-seated valve, serving as air-valve, in combination with and cast in one piece with the gas-valve, in such a manner that the hub of the double-seated valve serves at the same time as gas-valve.

3. An admission member for explosion-motors consisting of a tubular double-seated valve, serving as air-valve, in combination with and cast in one piece with the gas-valve, in such a manner that the ratio between the contour of the gas-valve, and the sum of the contours of the seats of the air-valve, corresponds to the ratio of the volumes of the constituents of the explosive mixture.

4. An admission member for explosion-motors consisting of a tubular double-seated valve, serving as air-valve, in combination with and cast in one piece with the gas-valve, in such a manner that the surfaces of the horizontal passage-sections of the air and gas valves are proportional to the ratio of the volumes of the constituents of the explosive mixture.

5. An admission member for explosion-motors consisting of a tubular double-seated valve, serving as air-valve, in combination with and cast in one piece with the gas-valve, in such a manner that the surfaces of the horizontal passage-sections of the air and gas valve are proportional to the ratio of the volumes of the constituents of the explosive mixture, the gas-valve being surrounded by a collar of appropriate cross-section in order to maintain constant the ratio of the passages to the ports.

6. In a gas-engine, the combination of a tubular double-seated air-inlet valve, a gas-valve coacting therewith, and seats for the valves lying in approximately the same plane.

7. In a gas-engine, the combination of a tubular inlet-valve, two annular seats with which the ends of said valve respectively coact, a gas-valve supported within and centrally coincident to the air-inlet valve, and a seat with which the gas-valve coacts, the gas-valve seat and one seat of the air-inlet valve being in approximately the same plane.

In testimony whereof I have hereunto placed my hand, at Berlin, this 7th day of December, 1905.

HUGO LENTZ.

In presence of—
HENRY HASPER,
WOLDEMAR HAUPT.