H. MERCIER.

AUTOMATIC THROTTLE FOR HIGH COMPRESSION MOTORS.

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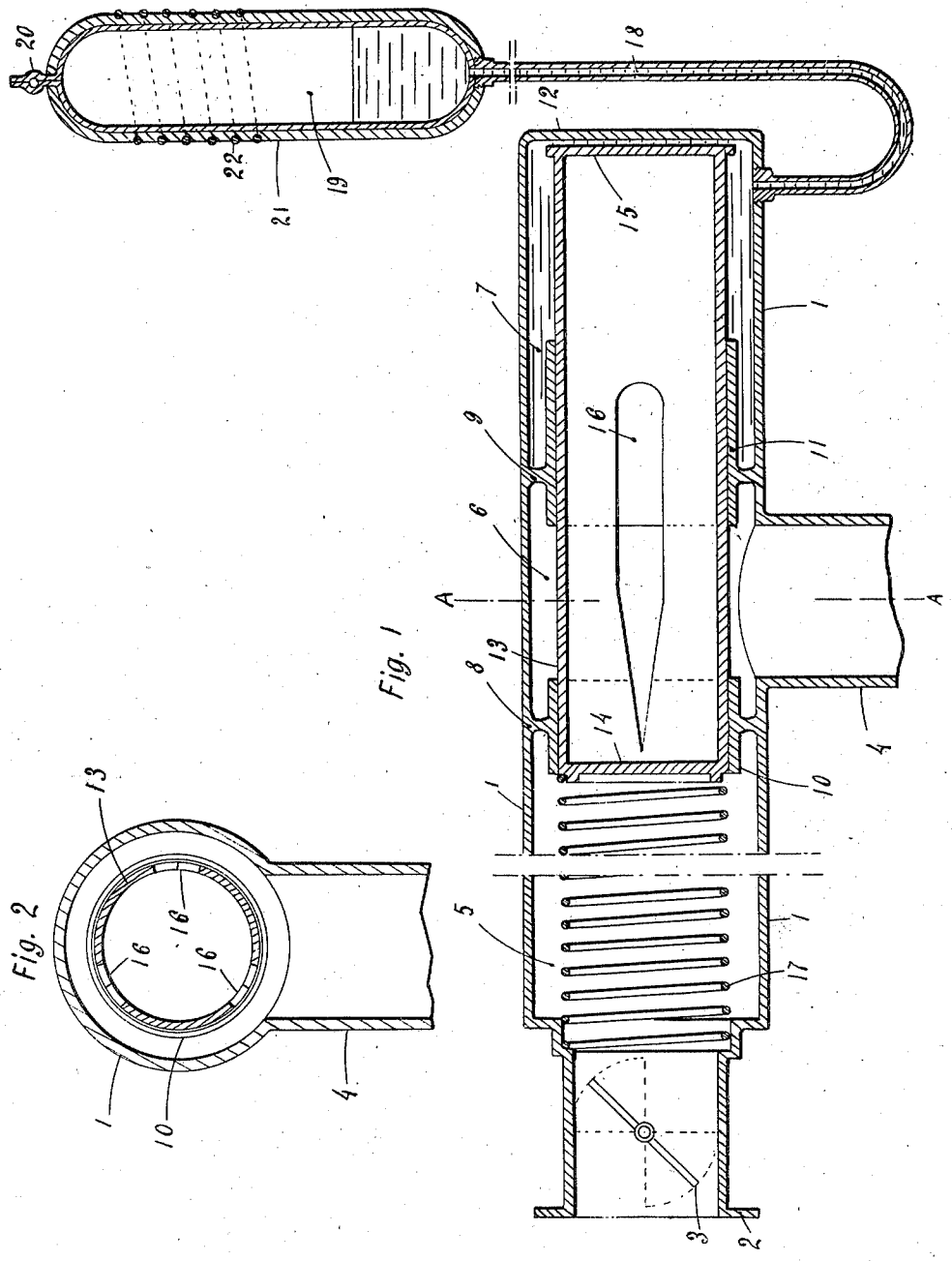


Fig. 1

Fig. 2

Inventor.

Henri Mercier

By Chas. J. Wells Atty.

UNITED STATES PATENT OFFICE.

HENRI MERCIER, OF PARIS, FRANCE.

AUTOMATIC THROTTLE FOR HIGH-COMPRESSION MOTORS.

1,312,040. Specification of Letters Patent. Patented Aug. 5, 1919.

Application filed March 28, 1919. Serial No. 285,924.

To all whom it may concern:

Be it known that I, HENRI MERCIER, citizen of the French Republic, residing at Paris, Department of the Seine, in France, and whose post-office address is 6 Rue Foucault, in the said city, have invented certain new and useful Improvements in Automatic Throttles for High-Compression Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to explosion motors known as high compression motors, intended to work at different altitudes, and particularly to the motors of aircraft and to certain automobile motors.

The object of the invention is to permit the construction of high compression motors possessing the maximum output at the same altitude at which it is considered that they ought to work most ordinarily, while obviating the disadvantages of high compression when these motors have to work at lower altitudes.

It is known that in order to mitigate these disadvantages, it suffices to create a loss of charge which reduces the tension of the gases supplying the motor. This result is obtained by operating, for example, a butterfly valve placed in the suction pipe of the motor, and it is thus, generally, that the flying pilots proceed, in order to ease down, on the ground, their high compression motors. Such operation is however, not very accurate, it demands a certain amount of attention on the part of the pilots, and if it be not done correctly, the explosions become shattering and dangerous. In consequence of these disadvantages, the designers of motors are unable, for the sake of safety, to provide for as great compression of the charge as would be desirable in order to insure the maximum of their output at high altitudes.

By the use of the throttle device, constructed according to the present invention, the flying pilots do not have to concern themselves with anything during flight, and the designers are able to provide for as great a compression of the charge within the motors as is desirable.

The invention consists in placing an automatic throttle in the direction of the suction pipe of the motor, this throttle being such that its operation remains, within certain limits, independent of the variations of the atmospheric density.

The accompanying drawings represent, diagrammatically and by way of example, one of the forms of the invention.

Figure 1 shows in longitudinal section, the automatic throttle.

Fig. 2 is a section on the line A—A of the same throttle.

In these figures, 1 represents the body of the throttle, 2 is the pipe connecting it to the suction pipe of the motor, 3 is an auxiliary butterfly valve adapted to be operated by hand, 4 is the pipe for connection to the carbureter, which is, in this case, preferably an automatic one.

The body of the throttle is divided into three chambers 5, 6, 7, by two division walls 8 and 9 which are perforated, provided with guide sockets 10 and 11 and it is closed at its end by a bottom 12.

A cylindrical slide valve or piston 13 is adapted to slide with slight friction in the sockets 10 and 11 and is terminated at both ends by covers 14 and 15 and its cylindrical walls are pierced with openings 16 of a special form.

A spring 17 suitably tensioned, holds the slide valve 13 up against the bottom 12.

The chamber 5 communicates with the motor, the chamber 6 communicates with the carbureter and the chamber 7 is filled with oil and communicates by a narrow pipe 18 with a reservoir 19 partly full of oil and partly full of air. The oil may be replaced by glycerin or by any other suitable liquid.

The reservoir 19 is provided with a cock 20 opening into the outer atmosphere. The reservoir 19 may be surrounded by a heat retaining jacket 21 and an electrical heating circuit 22.

The working of the throttle applied, for example, to an airship motor, is as follows: Let the throttle be supposed to be in the position shown in the drawing and the airship resting on the ground. The cock 20 is opened, and then if it has not already been so the spring 17 is tensioned to exert upon the bottom 14 a force equal to the difference of the pressures which the surrounding atmosphere exerts upon this same bottom and which the less dense atmosphere would exert at the altitude considered.

The motor is then started up. Under these conditions, and under the action of the suction of the motor, the slide valve 13 thrust forward by the atmospheric pressure moves toward the left of the figure. The openings 16 put the chamber 6 into throttled communication with the chamber 5, and the restriction of the gaseous current passing through the openings 16, which is controlled by the spring 17, is such that the high compression motor has its compression reduced and works normally notwithstanding the excess of surrounding atmospheric density.

If, at this moment, the airship is to leave the earth to rise to the considered altitude, the slide valve, thrust forward less and less by the decreasing atmospheric pressure, will return gradually toward the right under the action of the spring 17, the motor, the pressure of which is reduced, slows down more and more and ends even by ceasing to work. But it will no longer be the same if, before leaving the earth, the flying pilot closes the cock 20. By this simple operation, he renders the working of the throttle and at the same time that of the motor, independent of the atmospheric density from the earth up to the considered altitude. In reality the volume of air, which is relatively important, thus inclosed in the reservoir 19, and incapable of escaping, exerts upon the bottom 15, through the medium of the oil the pressure necessary to the correct working of the throttle and this pressure remains invariable when the airship attains high altitudes.

In order to take into account variations of temperatures which would have the effect of causing the tension of the volume of air inclosed in the reservoir 19 to vary in a certain measure, a heat retaining jacket 21 may be provided and even a heating circuit 22 worked by the lighting dynamo of the airship, the intensity of the current being controlled by a temperature regulator.

The object of providing a butterfly valve 3 worked by hand is to enable the motor to have its compression reduced by creating a supplementary loss of charge and, consequently, to enable the motor to be rotated at a lower speed. This butterfly valve serves likewise in case of the failure of the automatic system.

The provision of a volume of oil transmitting to the slide valve or piston 13, through a narrow pipe 18, the pressure exerted by the air in the reservoir 19, has for its object to avoid leakages of air and also to stop the oscillatory movements of an alternating kind which the slide valve or piston 13 might acquire under the action of the intermittent suctions of the motor.

The invention is not limited to the constructional forms described, and in particular the spring may be so arranged that the pressure in the reservoir is capable of assuming all values greater or less than the pressure indicated by way of example in the present specification. A partial or total vacuum may be created and maintained in the reservoir 19 by any method, or on the contrary, the reservoir may be supplied under pressure. The necessary thrust upon the volume of oil may be obtained, independently of the atmospheric density, by any suitable means, other than the pressure of a gas, as for example by mechanical means such as centrifugal force.

I claim:

1. An automatic throttle for high compression motors, interposed between the motor and its carbureter, comprising a slide valve controlling the admission of gas from the carbureter to the motor, a spring acting on one side of said valve and tending to maintain the same closed, an air confiner communicating with the other side of the valve, whereby the air pressure tends to move the valve in the opposite direction against the tension of the spring and to open the same.

2. An automatic throttle for high compression motors, interposed between the motor and its carbureter, comprising a slide valve controlling the admission of gas from the carbureter to the motor, a spring acting on one side of said valve and tending to maintain the same closed, an air confiner communicating with the other side of the valve, whereby the pressure tends to move the valve in the opposite direction against the tension of the spring and open the same, and means for controlling the pressure in said confiner.

3. An automatic throttle for high compression motors, interposed between the motor and its carbureter, comprising a slide valve controlling the admission of gas from the carbureter to the motor, a spring acting on one side of said valve and tending to maintain the same closed, an air confiner communicating with the other side of the valve, whereby the pressure tends to move the valve in the opposite direction against the tension of the spring and open the same, and means for regulating the temperature in the confiner.

4. An automatic throttle for high compression motors interposed between the motor and carbureter, comprising a slide valve controlling the admission of gas from the carbureter to the motor, means tending to maintain said valve closed, said means acting on one end of the valve, an air confiner, and a fluid interposed between the air confiner and the oppsite end of the valve, whereby the pressure of the air is transmitted through the fluid to move the valve in the opposite direction.

5. An automatic throttle for high compression motors interposed between the

motor and carbureter, comprising a slide valve controlling the admission of gas from the carbureter to the motor, means tending to maintain said valve closed, said means acting on one end of the valve, an air confiner, and a fluid interposed between the air confiner and the opposite end of the valve, whereby the pressure of the air is transmitted through the fluid to move the valve in the opposite direction, and means for establishing and destroying communication between the air confiner and the atmosphere.

In testimony whereof I affix my signature.

HENRI MERCIER.