No. 775,120. PATENTED NOV. 15, 1904.

F. HENRIOD-SCHWEIZER.

EXPLOSION MOTOR.

APPLICATION FILED DEC. 10, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

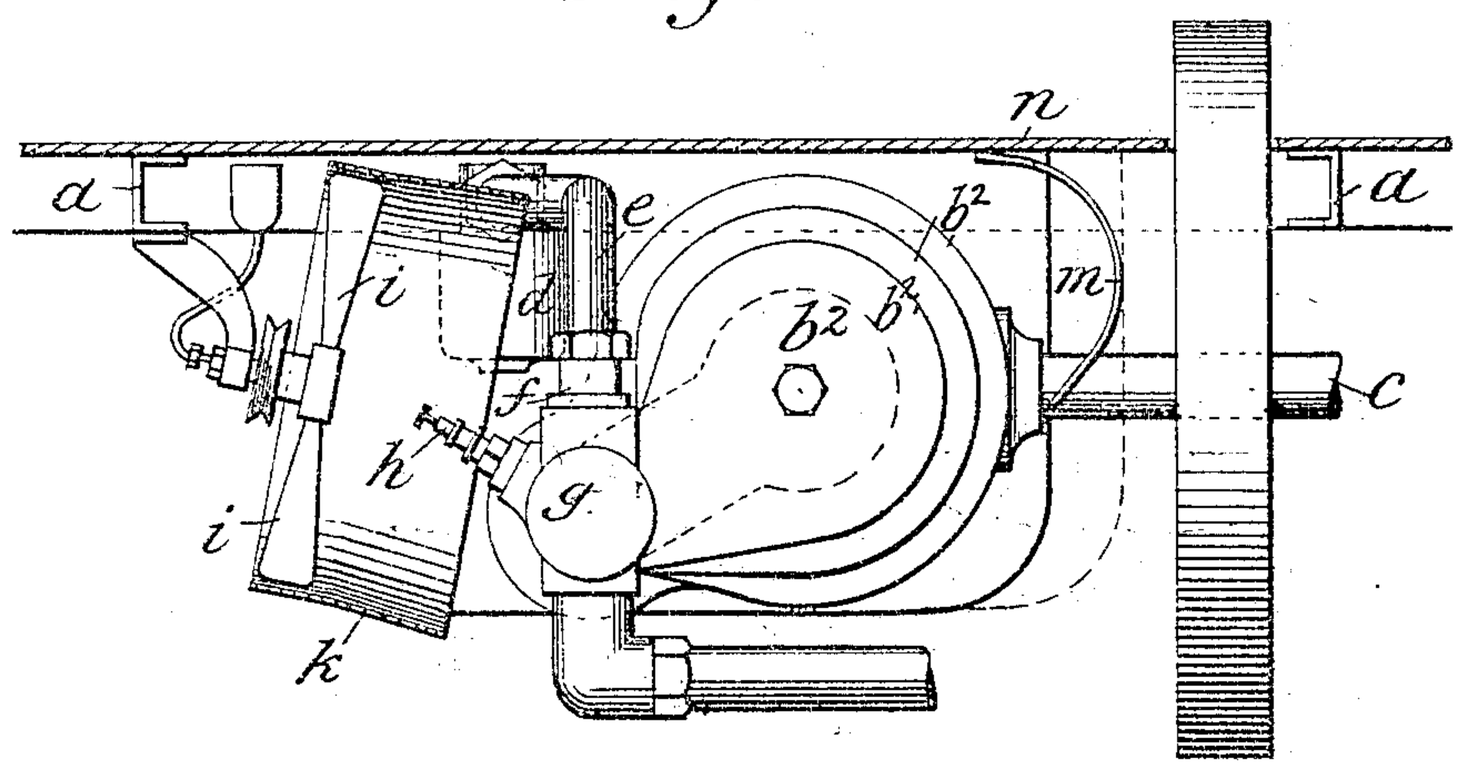
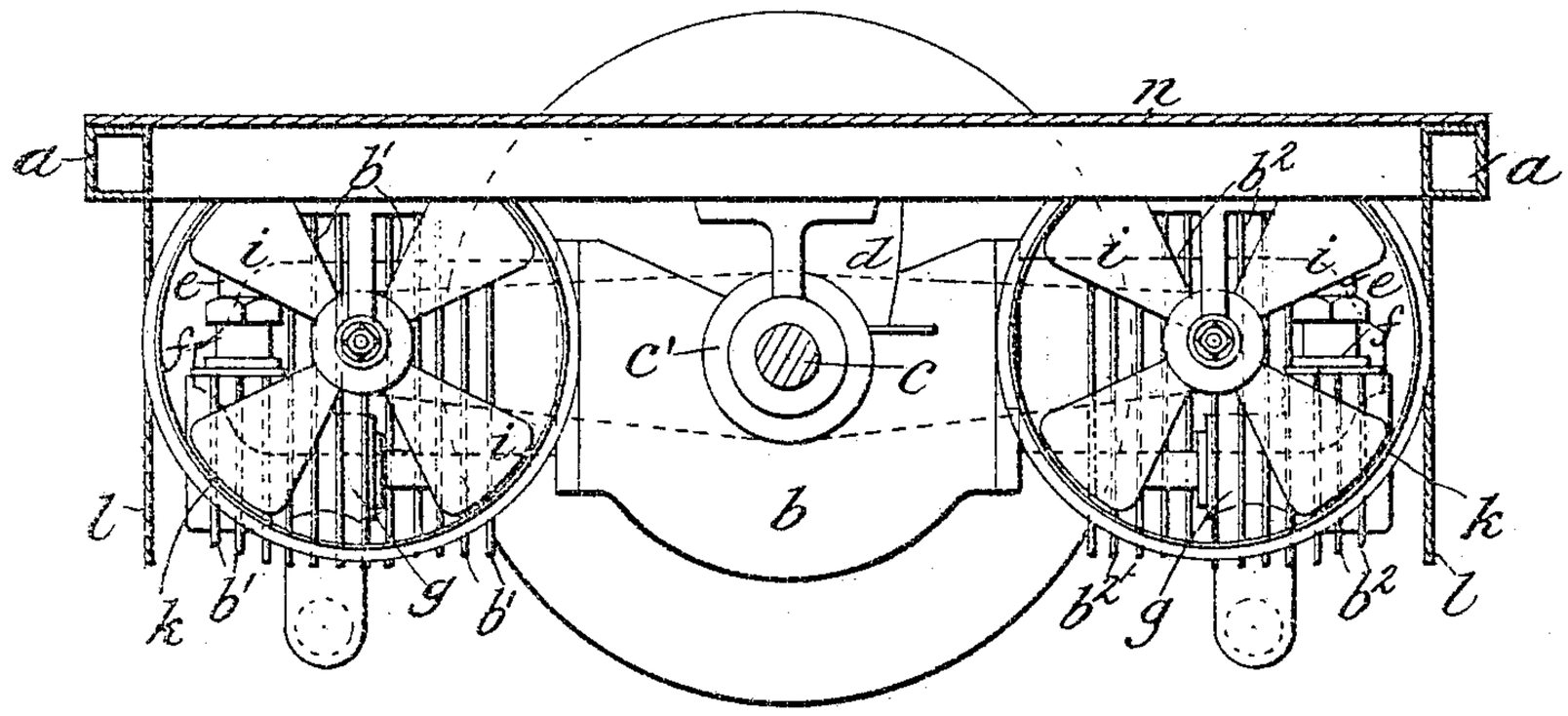


Fig. 2.



Witnesses

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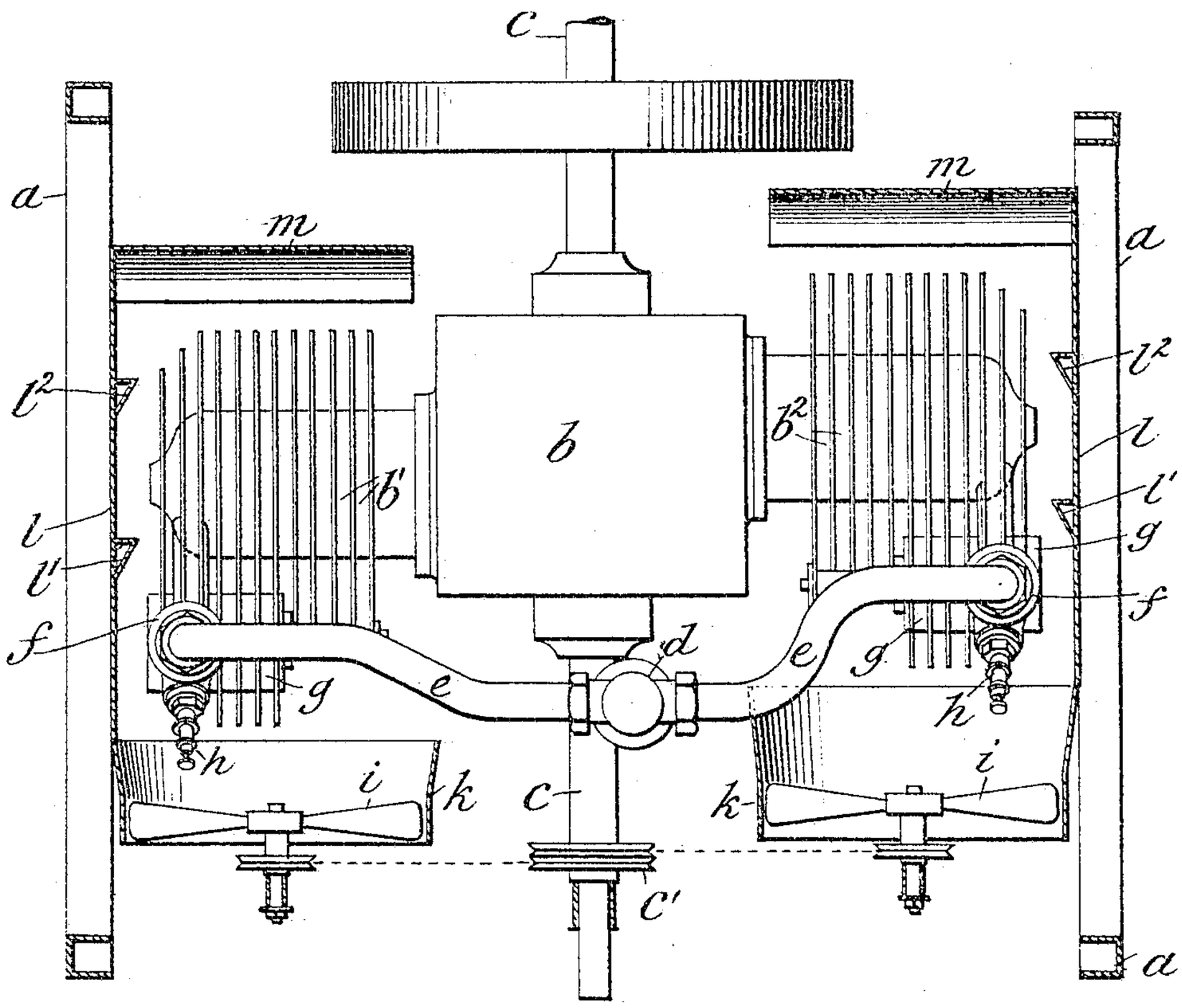
NO MODEL. 2 SHEETS—SHEET 2

Fig. 3.



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No. 775,120. Patented November 15, 1904.

UNITED STATES PATENT OFFICE.

FRITZ HENRIOD-SCHWEIZER, OF MARIN, SWITZERLAND.

EXPLOSION-MOTOR.

SPECIFICATION forming part of Letters Patent No. 775,120, dated November 15, 1904.

Application filed December 10, 1902. Serial No. 134,807. (No model.)

To all whom it may concern:

Be it known that I, FRITZ HENRIOD-SCHWEIZER, a citizen of the Republic of Switzerland, residing at Marin, canton of Neuchâtel, Switzerland, have invented certain new and useful Improvements in Explosion-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.

Explosion-motors are already known in which the valves, the igniters, and the explosion-chamber are cooled from the outside by means of an air-current produced by a ventilator. Explosion-motors are also known in which the ribbed cylinder is surrounded by a casing for cooling purposes, through the interior of which casing the external air is forced to flow into a suction-chamber. The present device differs from all these, inasmuch as the cooling of the valves, the igniters, and the explosion-chamber is effected with an air-current by means of which also the gas mixture introduced into the explosion-chamber is considerably cooled before entering the said chamber, whereby not only is the actual efficiency of the motor increased, but the mean temperature within the same kept lower than if the superfluous part of the heat set free by the explosion were only carried off at the time by the external cooling of the parts of the motor. By the intense cooling of the explosive mixture in its passage to the inlet-valve the latter is kept absolutely cool and the disadvantage connected with existing devices—viz., that with a continuous vigorous working of the motor the density (in other words, the quantity) of the gas mixture sucked in is diminished in consequence of the considerable quantity of heat coming from the cylinder and the explosive mixture entering the explosion-chamber under a constant increase of temperature—is avoided. As in the present device the quantity of the gas mixture drawn in enters the explosion-chamber at a nearly-uniform temperature, its density when entering the chamber is likewise nearly uniform, and in consequence of this the power of the motor will not be diminished just when the greatest demand is made upon it.

In the accompanying drawings one form of the new device is illustrated by way of example, in which—

Figure 1 is a side view, Fig. 2 a front view, and Fig. 3 a plan, showing the parts in connection with a motor constructed according to the present invention.

In the drawings the motor is shown as arranged in an automobile-vehicle, to the frame *a* of which it is fixed.

b is the casing inclosing the cranks of the shaft *c*, while *b'* and *b²* are two cylinders arranged horizontally and transversely to the longitudinal axis of the vehicle. The motor-pistons are coupled in the interior of the casing *b* with the shaft *c*. The explosive mixture is conveyed to each of the two cylinders *b' b²* from a spraying and mixing chamber *d* through two feed-pipes *e*, each of which terminates in a casing *f*, containing the inlet-valve of the corresponding cylinder. Each of the outlet-valves is arranged in a casing *g*. The casings *f* and *g*, as also the explosive-chamber of each cylinder, form a single body with the latter, which is furnished with ribs or plates running parallel to the longitudinal axis of the vehicle. On the explosion-chamber of each cylinder an igniter *h* is arranged. In front of each of the ribbed cylindrical bodies *b' b²* is a rotary fan, the delivery side of which is turned to the cylindrical body. Directly within the effective reach of this side of the ventilator is the corresponding feed-pipe *e* for the explosive mixture, so that before entering the explosion-chamber the mixture is intensely cooled by the air-current. Hereby not only is greater efficiency of the motor insured in accordance with the known principles of thermodynamics, but a lower mean temperature in the interior of the motor than if the superfluous part of the heat set free by the explosion were only carried off at the time by external cooling of the parts of the motor through the air-current from the fan. Each of the fans *i* is seated in an open-ended casing *k* and is operated by a grooved pulley *c'*, keyed to the driving-shaft. Behind each of the casings *k*,

along each side of the frame *a*, a plate *l*, furnished with diverting-ribs *l' l²*, is fixed. This plate *l*, with one of the screens *m* arranged behind the cylindrical bodies *b' b²*, and the bottom *n* of the carriage form a casing around each of these cylindrical bodies, through which the air-current produced by the particular fan is caused to circulate between the ribs around the cylinder after first cooling the pipe *e* as well as the valve-casings *f* and *g* and the igniters *h*. This circulation of the air-current around the cylinder is a consequence of the peculiar form of the casing and causes the cooling action of the air-current to be effectively utilized.

Instead of the rotary fans *i* any other kind of ventilating apparatus can obviously be employed, and each of the casings surrounding the cylinder can likewise be formed of other parts than those mentioned above. The essential point is that the explosive mixture should be cooled before entering the explosion-chamber, so that it cools the parts of the motor itself from the inside, or, in other words, causes the mean temperature in the interior of the motor to be greatly reduced by drawing off heat when the temperature is low.

While the attempts hitherto made for effecting the cooling of explosion-motors without water have produced such unsatisfactory results that the motor-builders have been compelled to return to water-cooling, notwithstanding the trouble and disadvantages connected therewith, experiments made with the improved device which forms the object of the present invention prove that the cooling is so effectual that directly after the fully-loaded motor has been put in action not only do the valves not burn, but the springs of the outlet-valves, which hitherto became very hot whatever cooling device might be employed, remain so cool that they can be touched with the hand.

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

1. In an engine, the combination with the cylinder, the explosion-chamber, and the feed-pipe, of means for forcing a current of air over and in contact therewith, and side plates provided with deflecting-ribs adapted to prevent the diffusion of the air-current and to direct the same upon the parts subject to heating.

2. In an engine, the combination, with the cylinder, the explosion-chamber and the feed-pipe, of a rotary fan so arranged as to force a current of air over and in contact therewith, an open-ended casing surrounding the fan and pointing in the direction of the parts subject to heating, spaced plates or ribs arranged in line with the air-current and serving to distribute the same, side plates provided with deflecting-ribs, and a shield upon the opposite side from the fan and so disposed as to cause a return circulation of the air-current over the parts subject to heating.

In testimony whereof I affix my signature in presence of two witnesses.

FRITZ HENRIOD-SCHWEIZER.

Witnesses:
ADOLF FEDERER,
FRITZ NAEGELI.