No. 693,529. Patented Feb. 18, 1902.

T. MYERS.

COOLING EXPLOSIVE MOTORS.

(Application filed Feb. 14, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

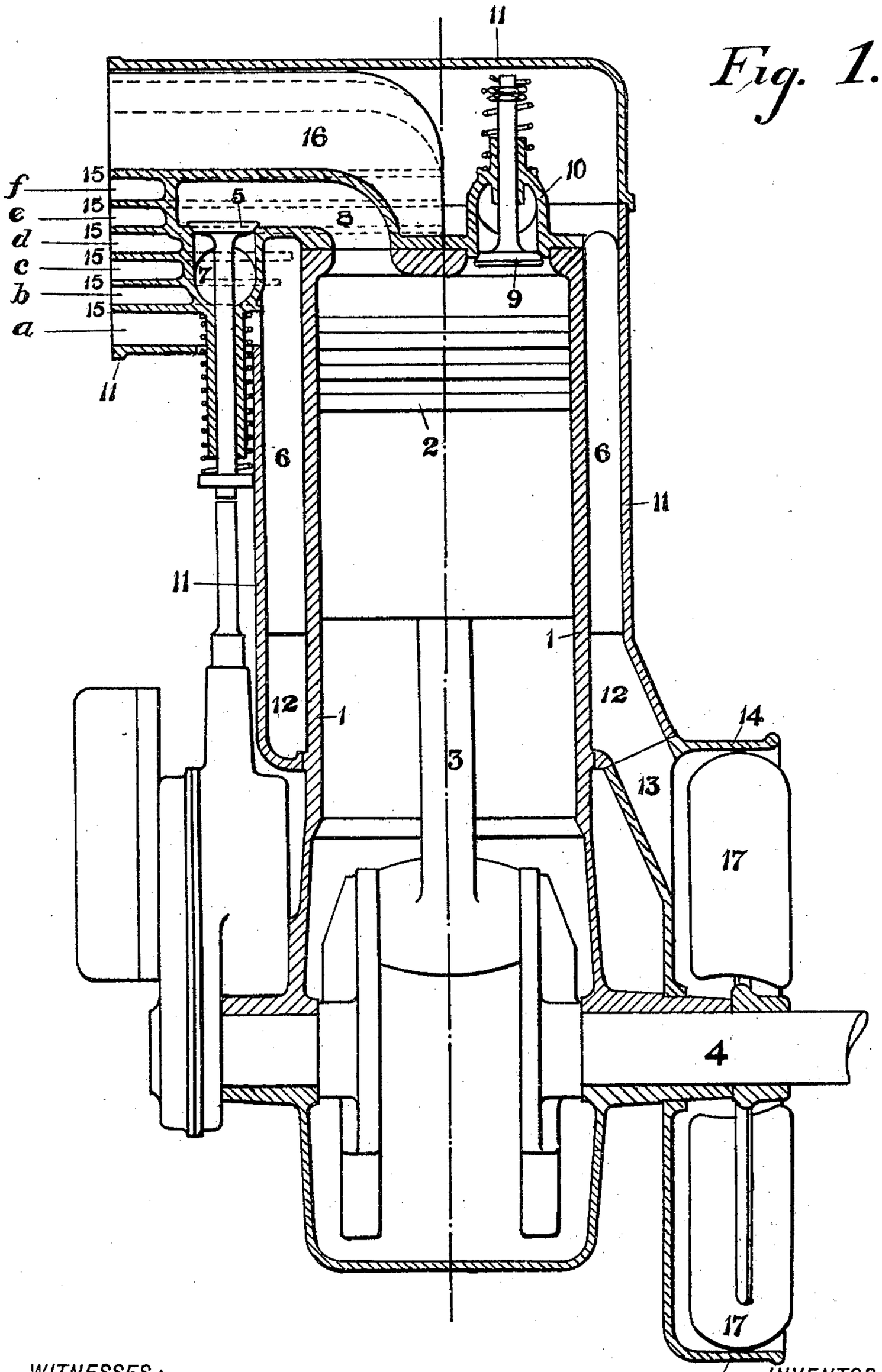

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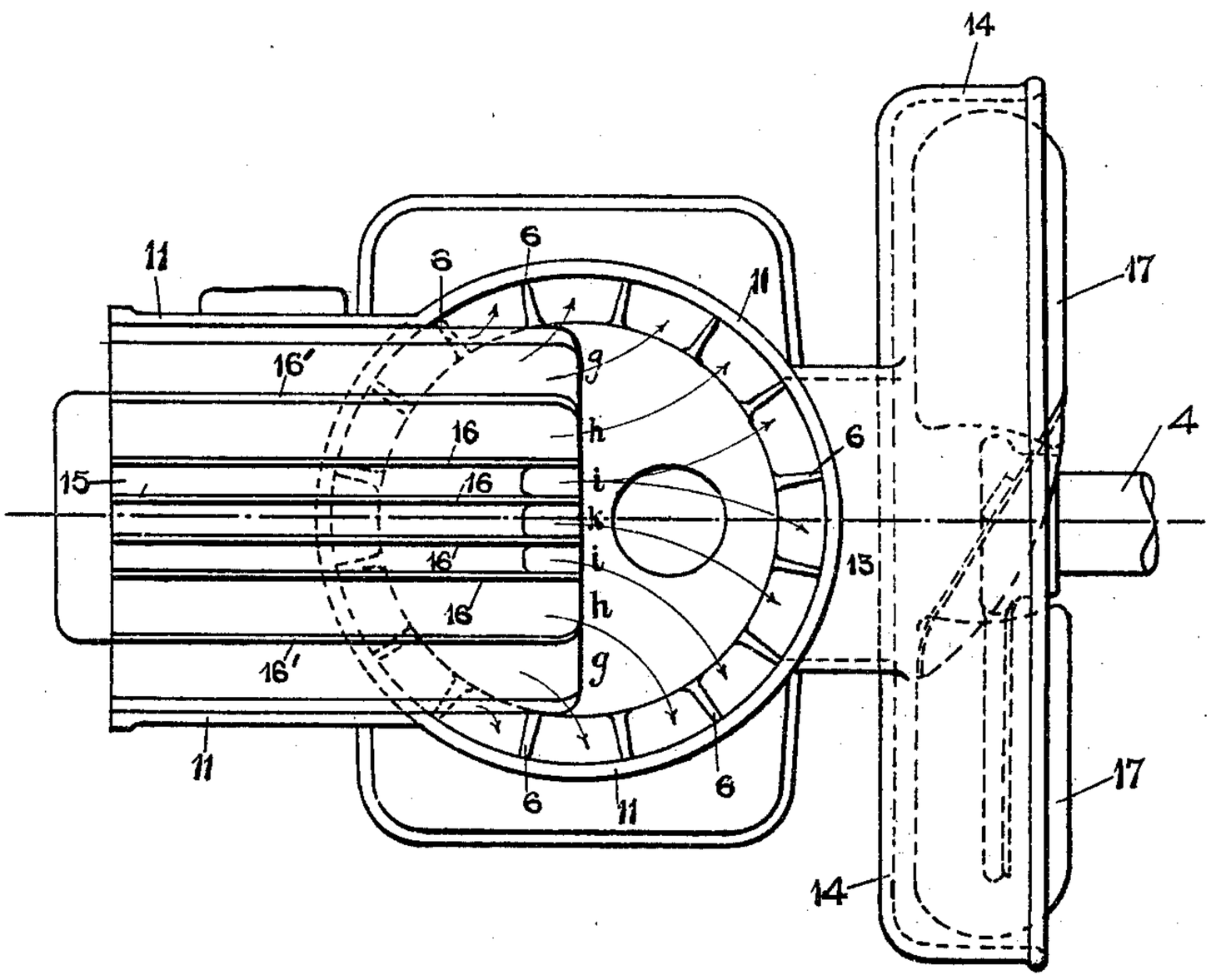
Fig. 2.



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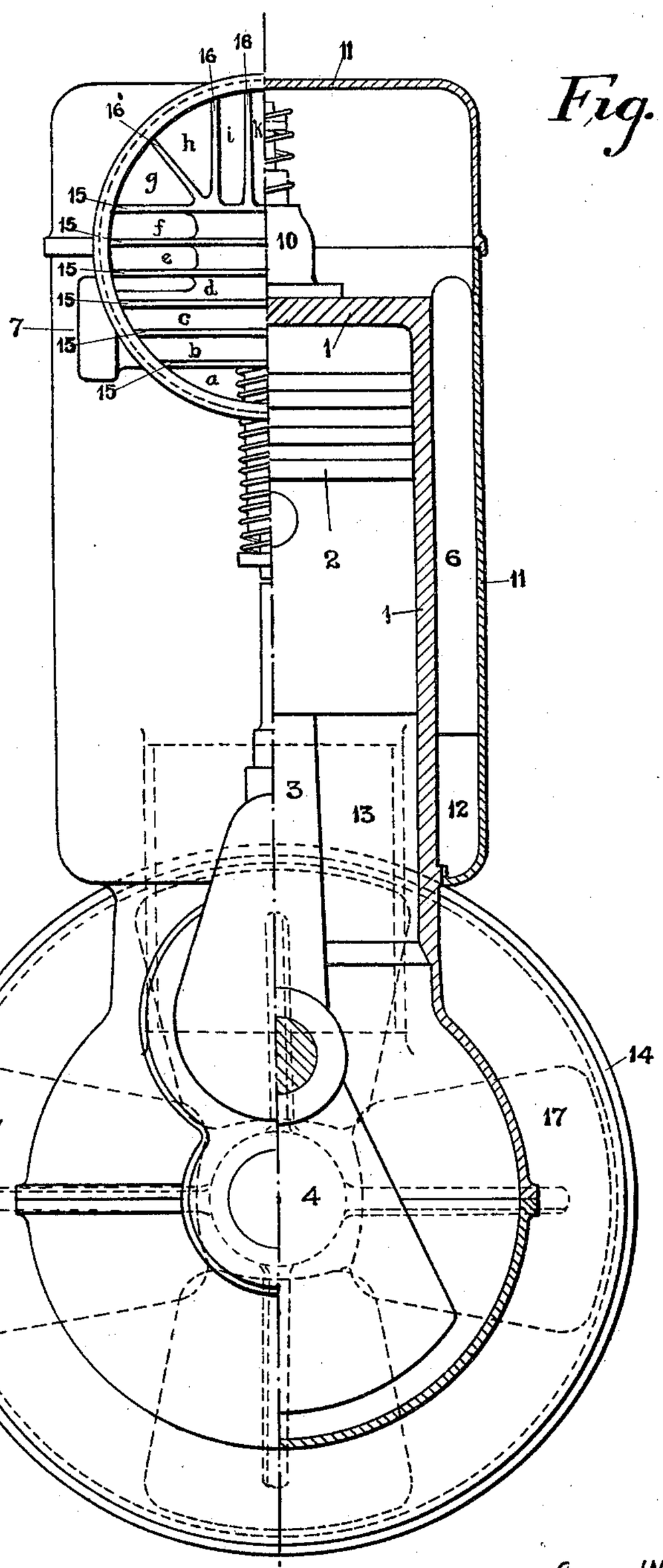
(No Model.) 3 Sheets—Sheet 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS MYERS, OF NEW YORK, N. Y.

COOLING EXPLOSIVE-MOTORS.

SPECIFICATION forming part of Letters Patent No. 693,529, dated February 18, 1902.

Application filed February 14, 1901. Serial No. 47,972. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MYERS, a subject of the King of Great Britain, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Cooling Explosive-Motors, of which the following is a specification.

My invention relates to motors, and especially that class of motors known as "explosive-motors," in which hydrocarbons are employed to generate the power.

My invention relates particularly to the means for and the method of cooling the cylinder and exterior of the explosive-chamber and the exhaust valve and passages.

The objects of my invention are, first, to secure adequate cooling of the walls of the cylinder and exhaust parts and exterior of the explosion-chamber and related parts; second, to simplify the process of and the means for accomplishing this end; third, to reduce the number of parts and their weight; fourth, to reduce the cost of construction; fifth, to increase the efficiency and durability of the motor, and, sixth, to facilitate the operation and manipulation of the motor. I attain these objects by the methods and means described and illustrated in the following specification and the accompanying drawings, in which similar numerals refer to similar parts throughout the several views.

Prior to my invention it has been found necessary to cool the cylinders and exterior of the explosion-chambers, the exhaust-valves, and other portions of hydrocarbon-motors either by circulating water about the same or by providing the cylinder with external ribs or vanes, presenting a comparatively large surface to the cooling effect of the surrounding air. Some efforts have been also made to force air in the place of water through portions of the surrounding jackets; but none of these methods or means have been proved effective or satisfactory for the following reasons: First, in the case of water-cooled cylinders it is necessary to provide a reservoir for the water, a pump to circulate the latter, a radiating device to cool the water after it has absorbed the heat from the cylinder, and the necessary piping between these various parts. It will be evident that this necessitates great weight, complication and crowding of the various parts, besides the danger of leaks, of freezing of the water, obstruction and deterioration of the parts, and a very materially great expense therefor. The air-cooled motors have heretofore proved even less satisfactory than those cooled by water, for while they avoid many of the objections inherent in the latter and while some of them when limited to small dimensions may operate successfully for a limited time and under favorable conditions they have heretofore either proved at once entirely inadequate and unsuccessful or else have failed in continued and serious test, due to the fact that they cool but a limited portion of the heated parts and that only when passing through the air very rapidly. By my invention, however, I am enabled not only to avoid all the objections above alleged against both the air-cooled and the water-cooled motors, but am enabled to effectively and continuously produce the desired effect and attain the objects sought and above mentioned.

Figure 1 is a vertical section of a motor embodying my invention in the plane passing through the center of the cylinder and the crank-shaft in the direction of its length. Fig. 2 is a plan view with top of jacket-casing removed and omitting certain parts not constituting my invention. Fig. 3 is a front elevation of the motor half in section and showing the disposition of the vanes and ribs. The fan is shown in dotted lines.

Referring now to the figures, in Fig. 1, 1 is the cylinder; 2, the piston; 3, the connecting-rod; 4, the main or crank shaft; 5, the exhaust-valve; 6, ribs preferably cast on the outside of the cylinder radially and longitudinally; 7, the exhaust-opening; 8, the passage from cylinder to exhaust-valve; 9, the inlet or valve; 10, the case of the latter. 11 is a jacket covering substantially the whole cylinder. 12 is an annular space between the cylinder and the jacket below the ribs 6. 13 is a passage connecting 12 with the fan-case 14, and 17 is a fan mounted on shaft 4. 15 and 16 (see also Figs. 2 and 3) are ribs preferably cast upon and surrounding the exhaust valve and passage, 15 15 being horizontal, 16′ 16′ inclined, and 16 vertically disposed and all so arranged that the air-spaces *a b c*

d e f g h i k between them communicate with the various air-spaces between the longitudinal ribs 6, cast upon the cylinder, and it will be particularly noticed that the inclined and vertical vanes 16′ 16′ lead over the top of the exhaust valve and passage and over the top of the cylinder-head, communicating particularly with the longitudinal air-spaces at the back of the cylinder.

In Fig. 2 especially the arrows indicate the flow of air between the vanes and into the respective air-passages.

The operation of my invention is as follows: As the exhaust-valve 5 and adjacent parts, as 7 8, &c., are the hottest, it is especially needful to produce the greatest cooling effect at the place where they are located. Therefore I preferably make this point the inlet for my air, since the air is of course coolest at the inlet. The ribs 15 15 besides acting as a radiating-surface to dissipate the heat, also serve to deflect or guide the air as it passes in through the spaces indicated by the letters *a b c d e f g h i k*. (See Fig. 1, and especially Figs. 2 and 3.) After passing over and about the hot passages 7 8 of the exhaust mechanism and some of it over the hot cylinder-head, the exterior of which it cools in so doing, the air passes down through the spaces surrounding the cylinder between the ribs 6 and into the annular ring 12, from which latter it is forced out by fan 17 into the atmosphere, thus having cooled every part of the exterior of the cylinder and valves and not, as has heretofore been the case with air-cooled motors, only a portion thereof. It should be understood that this process may be reversed and the air drawn in at the fan and after surrounding the cylinder be expelled through *a b c d e f g h i k;* but I consider the other method preferable, because when the air is drawn in at the fan it becomes heated in passing up along the cylinder-walls and over the cylinder-head and is hottest as it passes out over the exhaust passages and valve, where it should be coolest.

While I do not claim, broadly, the method or means for cooling explosive-motor cylinders by the circulation of air about the same,

What I do claim, and desire to secure by Letters Patent, is—

In an explosive-motor, the combination of a cylinder, a plurality of ribs extending longitudinally upon the same, a jacket surrounding the cylinder and provided with an air-inlet near the exhaust, an annular space arranged between the jacket and the cylinder surrounding the lower part of the latter below the ribs, a fan mounted upon the crank-shaft to rotate therewith, a casing for said fan, and a passage communicating from the aforesaid annular space to said fan-casing; together with ribs upon the head of the cylinder surrounding the exhaust-passage, said ribs being arranged to deflect a current of air into the passage existing between the various longitudinal ribs.

Signed at New York, in the county of New York and State of New York, this 11th day of February, A. D. 1901.

THOMAS MYERS.

Witnesses:
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