

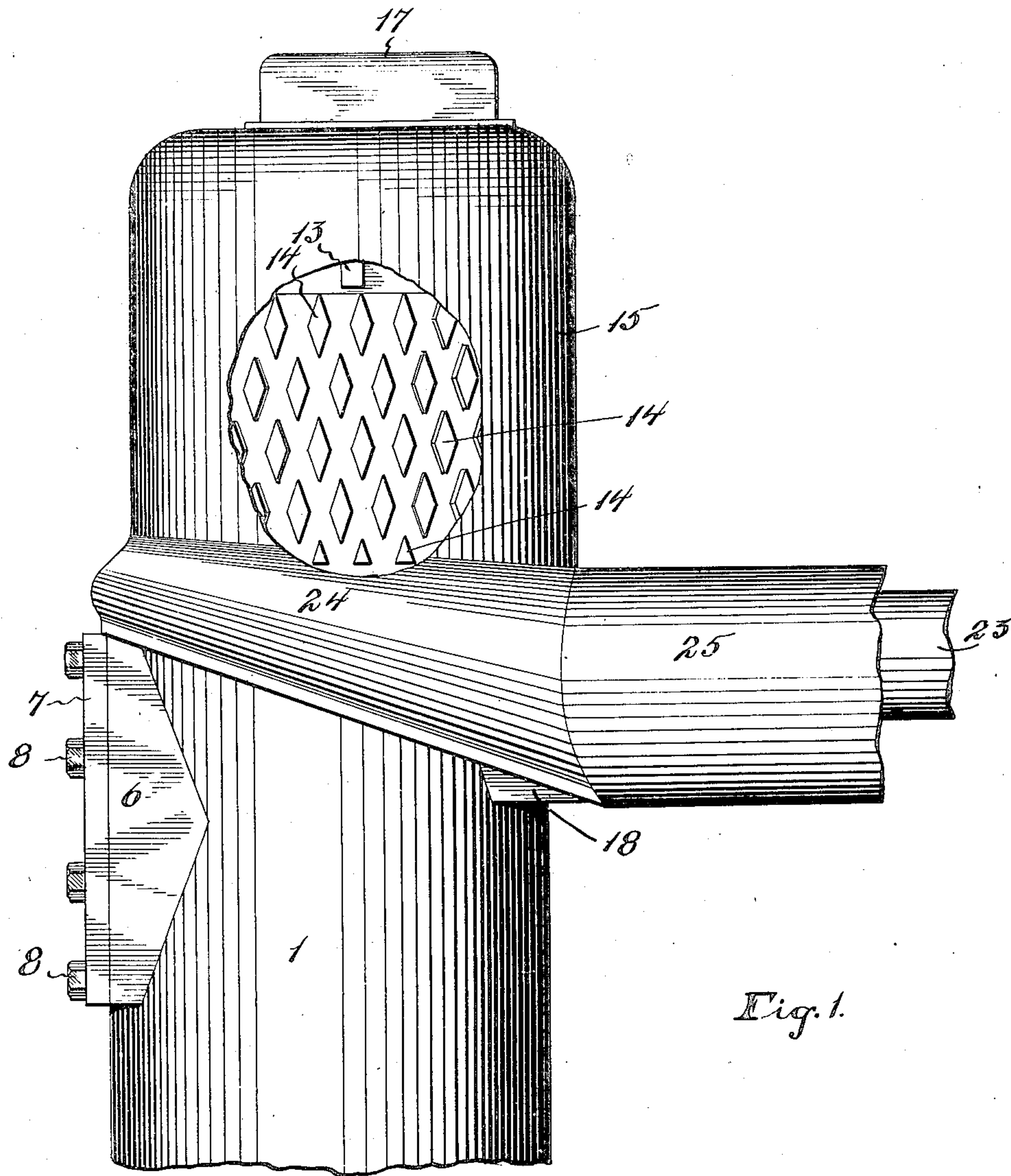
No. 875,077.

PATENTED DEC. 31, 1907.

J. B. HOOVER.
GAS ENGINE.

APPLICATION FILED FEB. 10, 1906.

3 SHEETS—SHEET 1.



WITNESSES

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3 SHEETS—SHEET 2.

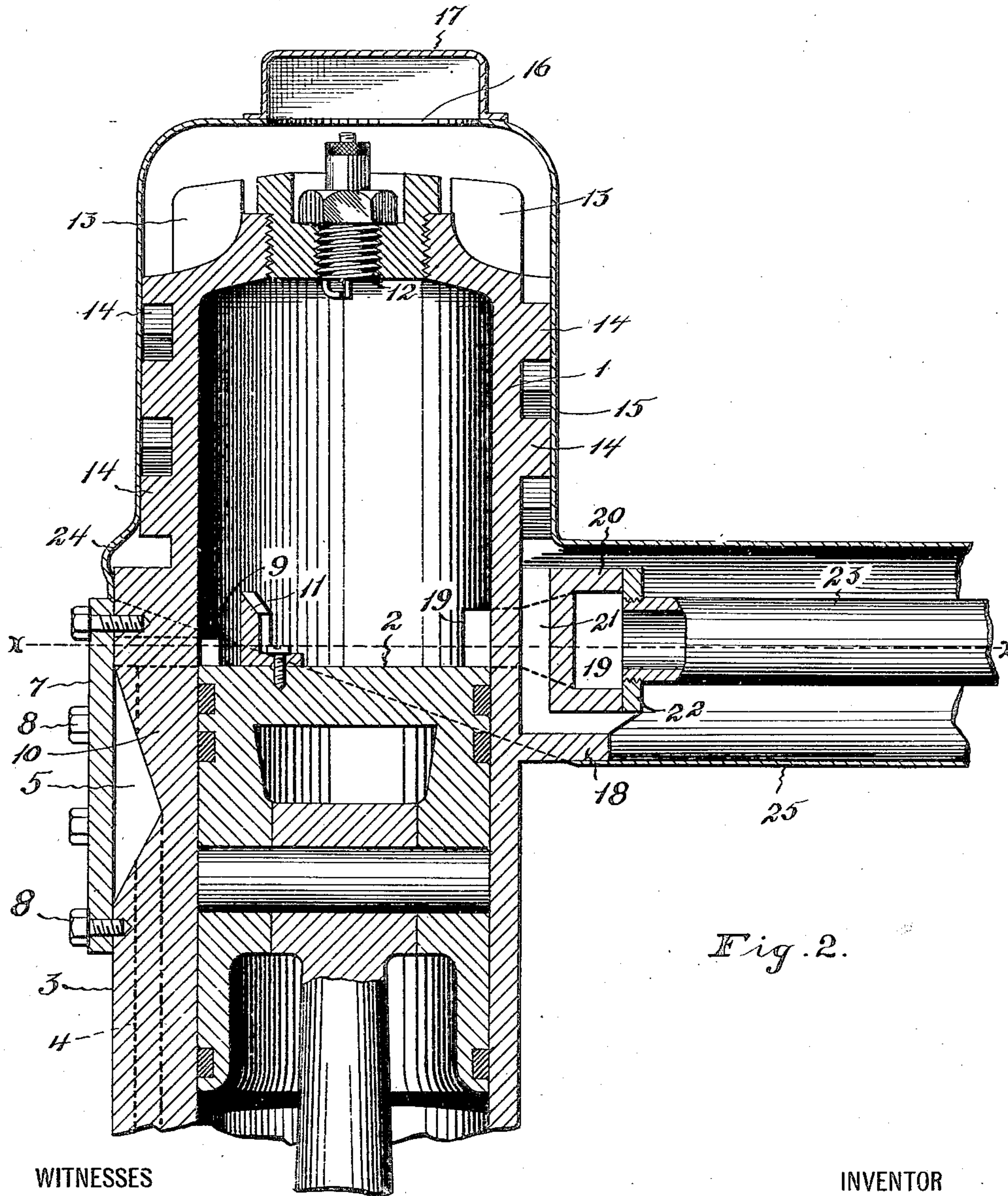


Fig. 2.

WITNESSES

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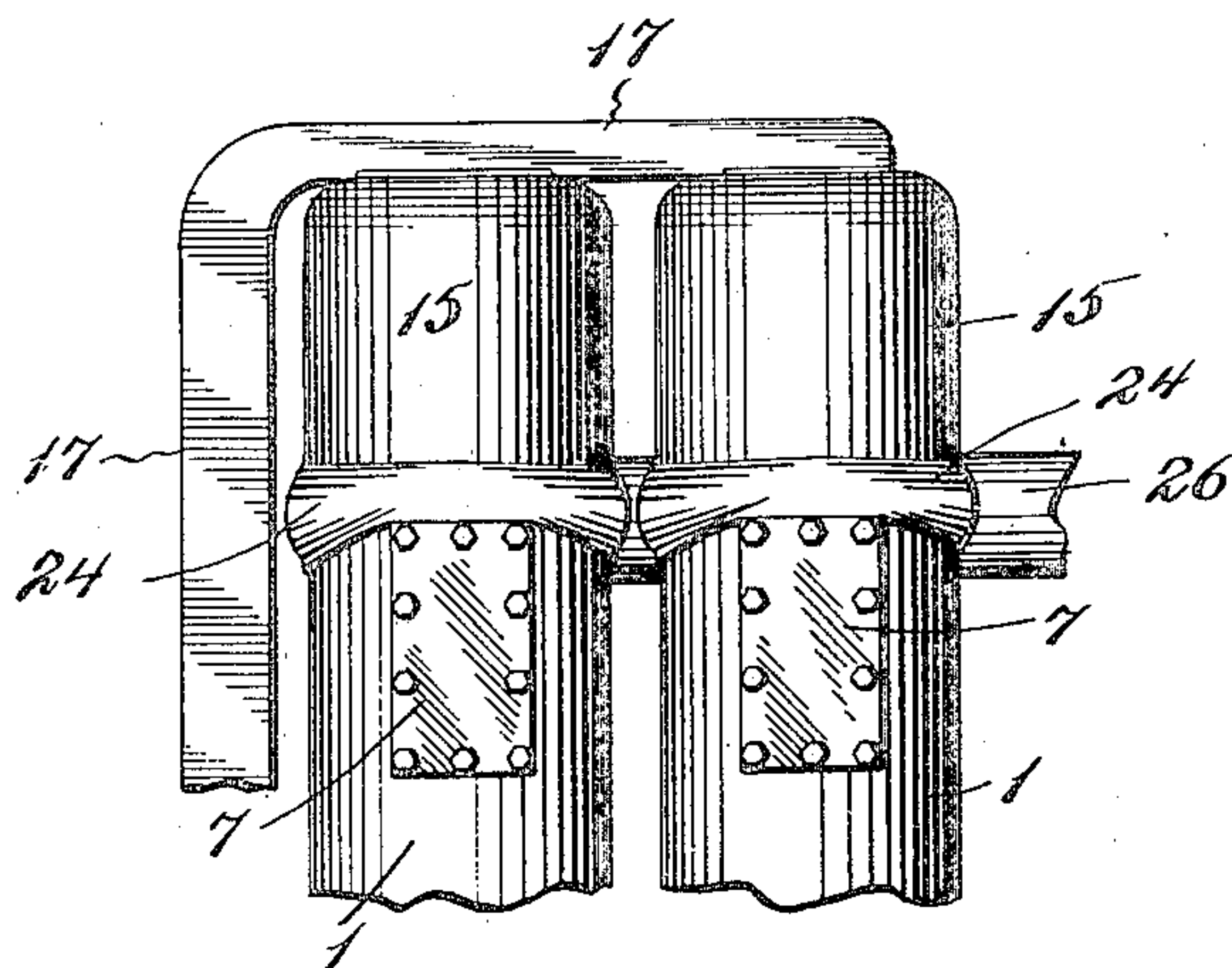
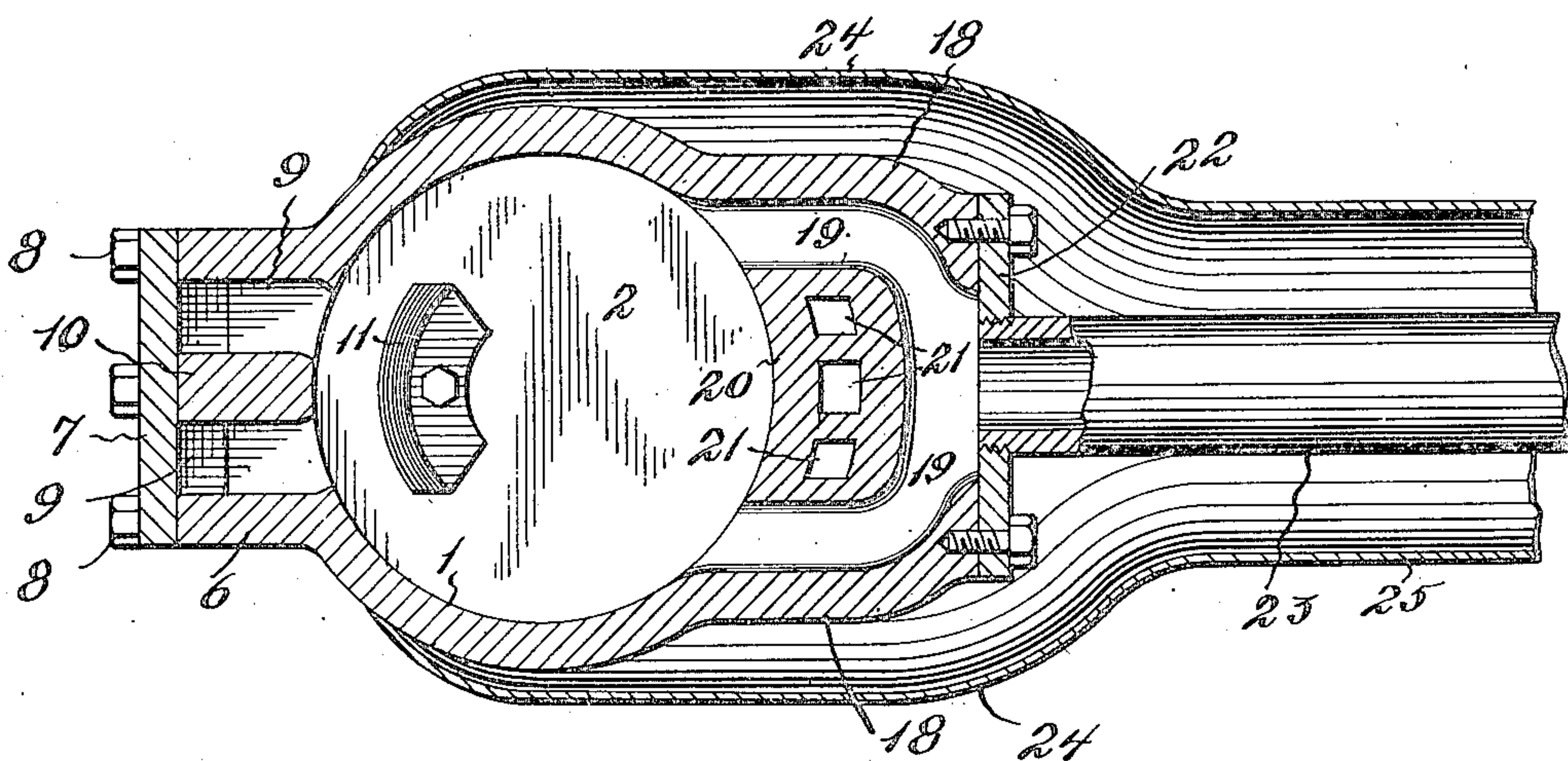
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3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

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Fig. 4. Jacob B. Hoover

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UNITED STATES PATENT OFFICE.

JACOB B. HOOVER, OF COLUMBUS, OHIO.

GAS-ENGINE.

No. 875,077.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed February 10, 1906. Serial No. 300,360.

To all whom it may concern:

Be it known that I, JACOB B. HOOVER, citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention relates to new and useful improvements in gas engines and more particularly to two cycle air cooled gas engines.

The object of the invention is to provide an engine of the character described comprising one or more cylinders, each constructed so as to be cooled to the proper degree. In carrying out this feature, peculiarly formed projections are provided on each cylinder and act in consequence of their particular formation, to effectually cool the cylinder.

Another feature resides in the provision of means for circulating air about the exhaust outlet whereby the same is maintained at a proper temperature and the liability of detrimental effects obviated.

Finally the object of the invention is to provide an engine that will be strong, durable, efficient and simple and comparatively inexpensive to produce and one in which the several parts will not be likely to get out of working order.

With the above and other objects in view, the invention consists of the novel details of construction and operation, a preferable embodiment of which is described in the specification and illustrated in the accompanying drawings, wherein—

Figure 1 is an elevation of one of the cylinders, a portion of the casing being broken away to show the diamond shaped studs, Fig. 2 is a vertical sectional view, Fig. 3 is a horizontal sectional view taken on the line *xx* of Fig. 2, and, Fig. 4 is a side elevation of two cylinders embodying my invention and connected by an air conductor.

In the drawings the numeral 1 designates the cylinder and 2 the usual piston head. At one side the cylinder is formed with an enlargement 3 through which a vertical passage 4, shown in dotted lines in Fig. 2, extends. This passage terminates at its upper end in a chamber 5 formed by a boss 6 provided on the side of the cylinder, the said boss thus receiving a plate 7, which is removably secured thereto by screw bolts 8. The passage 4 is provided for conducting the charge to the cylinder, which charge enters the chamber

and passes from the same into the cylinder through a double port 9 and about each side of a bridge 10, the latter being provided to strengthen the cylinder at this point, as will be apparent. By means of the removable plate 7 access may be readily had to the chamber 5, the port 9 and the passage 4.

By observing Fig. 2, it will be seen that the piston at the lower end of its downward stroke, just clears the double inlet port 9 so as to permit the charge to freely enter the cylinder. On the piston head the usual deflector 11 is positioned so as to stand in front of the inlet port 9 and direct the charge upward. At its upper end the cylinder is provided with a suitable sparking plug 12, the latter being connected and operated by any suitable means, while on the head of the cylinder and about the sparking plug, a plurality of short vertical blades 13 are arranged for the purpose of cooling, as will be hereinafter described. On the upper portion of the sides of the cylinder, I form a plurality of staggered diamond shaped projections or cooling studs 14. These studs are produced preferably by milling out the surface of the cylinder, so that their edges may be ground sharp and their extreme ends made extremely thin. By such a procedure a much better cooling action may be had, for the reason that the heat from the cylinder will be drawn to the thin edges and rapidly cooled. In carrying out the cooling operation, I provide a cylindrical casing 15 which fits snugly about the said studs and extends a short distance above the head of the cylinder. At its upper end the casing is provided with an opening 16 which is covered and admits air from a conductor 17. The air thus admitted is forced downward and caused by the casing 15 to pass in and about the sides of the studs, thereby coming in direct contact with the sharp edges of the same, with the effect that a perfect cooling action is had. I have found that even better results are obtained where the studs and the cylinder are coated with copper.

The cylinder 1 is provided opposite the inlet port 9 with a boss 18, in which exhaust passages 19 merging together about a vertical bridge 20, are provided. Extending through the bridge and also the walls of the boss are air passages 21. The boss is closed at its open end by a plate 22, which receives an exhaust pipe 23. The exhaust products passing out of the cylinder 1 by way of the

exhaust passages 19 meet and escape through the exhaust pipe 23. For the purpose of cooling the exhaust and particularly that part of the cylinder adjacent the exhaust passages, the casing 15 is bulged outwardly near its lower end as indicated at 24, the extreme lower edge of the said bulged portion being bent inward and fitting snugly about the cylinder as indicated in the drawings. This lower edge of the casing is securely fastened so as to hold it in position and prevent leakage. The bulged portion 24 is flared and inclined from the inlet side to the exhaust side and merges into a tube 25, which latter is also partially formed by a continuation of the casing 15. This pipe 25 surrounds the exhaust pipe 23 and the boss 18 engaging with the underside of the latter. From the foregoing it would be apparent that the air forced into the casing 15 after passing down and about the studs 14 passes into the tube 25 and at the same time also passes through the passages 21, thus cooling the exhaust ports and pipe to the proper degree. The air is conveyed through the pipe 25 to a suitable outlet.

It is to be noted that the plate 22 is removably secured, permitting the exhaust pipe 23 to be easily disconnected and access to the exhaust passages 19 and their parts thereabout, easily had. By observing Figs. 2 and 3, it will be seen that the air forced down through the casing is permitted to freely circulate in and about the exhaust boss 18 and the liability of the same becoming overheated, is reduced to a minimum.

It is to be understood that any number of cylinders desirable may be used and in Fig. 4, I have shown two cylinders connected with the conductor 17 passing across the tops of their casings. This conductor is car-

ried down and connected with a suitable fan or the like, which forces air through the conductor to the casings. When two or more of the cylinders are connected, the tubes 25 are let into a common air conducting tube 26 which extends along the sides of the cylinders.

What I claim, is:

1. The combination with the cylinder of an explosive engine, of a plurality of diamond shaped projections formed upon the exterior face of the cylinder, a casing surrounding the cylinder and in contact with the projections, means for conducting air to one end of said casing, means for conducting air from the other end of said casing, and an exhaust pipe leading from the engine, the last named air conducting means surrounding said exhaust pipe.

2. In a device of the character described, the combination with the cylinder of an explosive engine, of a plurality of diamond shaped projections extending from the outer face of the cylinder, a casing extending around the cylinder the inner wall of which lies in contact with the projections, means for conducting air to the upper portion of the casing, said casing being bulged outwardly at its lower portion to form an enlargement of said casing that extends around the cylinder, an exhaust passage leading from the cylinder, and an air conduit leading from the bulging portion of the casing which surrounds said exhaust pipe.

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

JACOB B. HOOVER.

Witnesses:

A. L. PHELPS,
M. B. SCHLEY.