

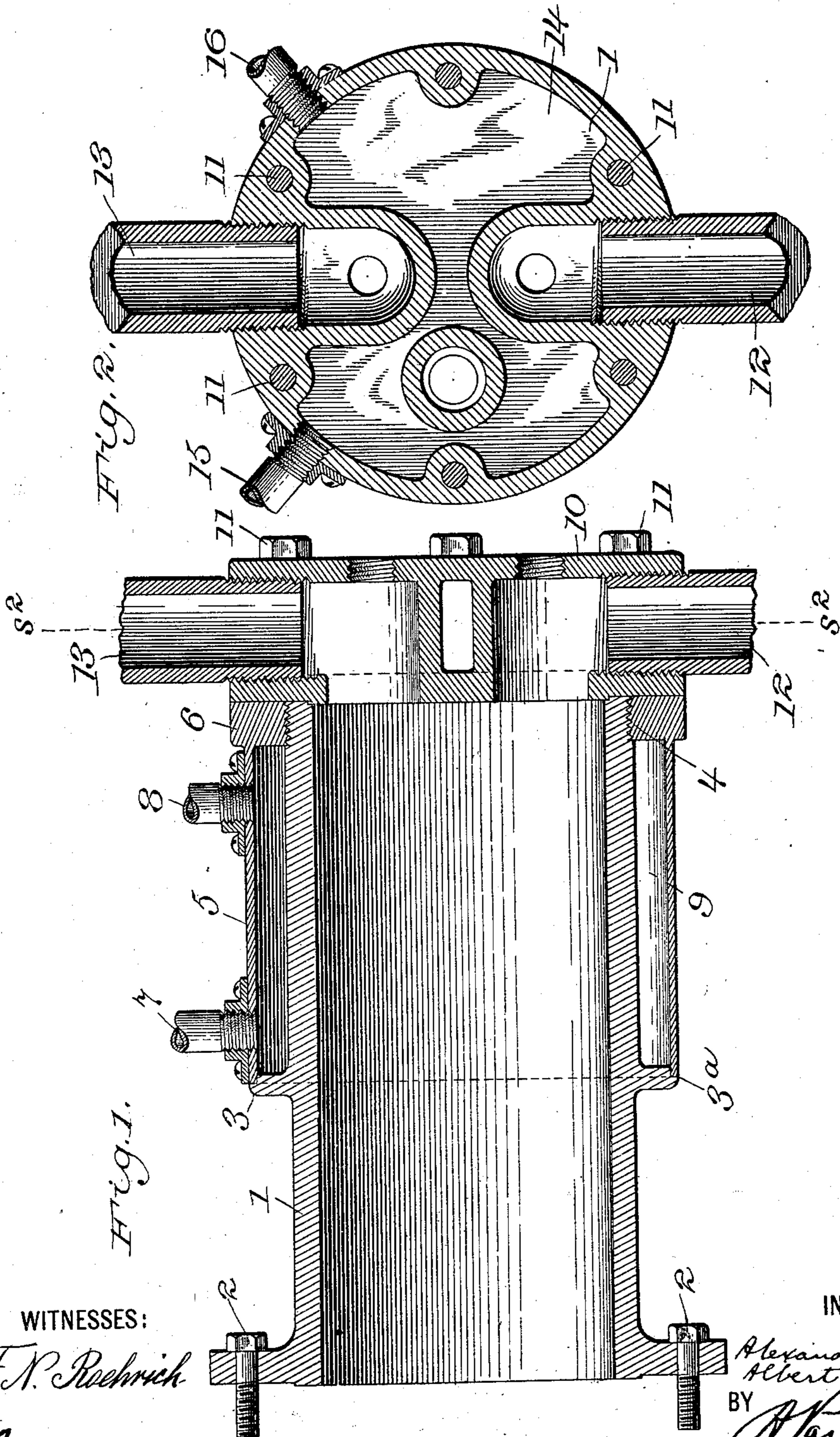
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Patented Apr. 2, 1901.

A. FISCHER & A. T. OTTO.  
JACKETED EXPLOSIVE ENGINE CYLINDER.

(Application filed Feb. 19, 1900.)

(No Model.)



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## JACKETED EXPLOSIVE-ENGINE CYLINDER.

SPECIFICATION forming part of Letters Patent No. 671,275, dated April 2, 1901.

Application filed February 19, 1900. Serial No. 5,759. (No model.)

*To all whom it may concern:*

Be it known that we, ALEXANDER FISCHER and ALBERT T. OTTO, citizens of the United States of America, and residents of New York city, county of New York, State of New York, have invented certain new and useful Improvements in Jacketed Engine-Cylinders, of which the following is a specification.

Our invention relates generally to engine-cylinders; and it more specifically consists of improved means for jacketing the cylinders of gas and oil engines, so as to keep the same cool and at the same time preserve tight joints between all the parts.

The preferred form of apparatus embodying our invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a longitudinal section of such an engine-cylinder with our invention applied, and Fig. 2 is a cross-section on line S<sup>2</sup> S<sup>2</sup> of Fig. 1.

Throughout the drawings like reference-figures refer to like parts.

The engine-cylinder 1, being designed for gas or oil engines, is a single-acting cylinder and is therefore left open at the left-hand end. It is to be attached to the other parts of the engine by bolts 2 2 or other convenient means. On the exterior of the cylinder and preferably intermediate of the ends thereof is the external flange 3, so located as to come approximately opposite the extreme outer end of the stroke of the piston. The other end of the cylinder has a screw-thread 4 cut on it, preferably exteriorly of the cylinder, though other means of interlocking the end of the engine-cylinder and jacketing-cylinder might be substituted. The jacketing-cylinder 5, which may be made of any suitable metal, has an annular head 6, which is interiorly threaded to mesh with thread 4 on the end of the engine-cylinder. The jacketing-cylinder 5 is made of such a length and diameter as to have its other end abut against the flange 3 when screwed onto the cylinder far enough so that the annular head comes flush with the right-hand end of the said engine-cylinder. The flange 3 may have a circular recess cut in it, as shown at 3<sup>a</sup>, or be otherwise so shaped as to form a water-tight joint with the abutting end of the jacketing-cylinder 5. Any convenient number of inlet and outlet ports

7 and 8 may be provided through which water or other cooling liquid may be supplied to the annular jacketing-space 9 left between the cylinder 1 and said jacketing-cylinder, the fluid entering at one point, as at 7, and passing out through another, as at 8.

The cylinder-head 10 preferably contains valve-chambers and passage-ways and such other connections as are necessary and is preferably fastened to the cylinder end by being rigidly attached to the annular head 6 of the jacketing-cylinder. This attachment may be made in any one of a number of ways, but preferably by means of the screw-bolts 11 11, which pass through openings in the cylinder-head and screw into threaded recesses (not shown in the drawings) tapped into the annular head 6. There is of course an inlet connection, as at 12, and an exhaust connection, as at 13, for the cylinder-head. A jacketing-space 14 is also formed in the cylinder-head, and cooling fluid may be circulated through the same by means of the connections 15 and 16.

The method of operating our invention is as follows: The parts being properly designed and finished, the jacketing-cylinder 5 is screwed onto the engine-cylinder or otherwise caused to interlock therewith and forced down against the external flange 3, so as to form a tight joint. The cylinder-head 10 is then placed in position and held there by screwing in the bolts 11 11. Proper connections being made, the current of cooling liquid can be kept circulating through the jacketing-space 9 during the operation of the engine and all destructive heating of the cylinder thereby prevented.

When the jacketing-cylinder is made of some metal, such as brass, having a higher coefficient of expansion under heat than the material, such as iron, of which the engine-cylinder is composed, the said jacketing-cylinder will tend to expand more rapidly for approximately equal degrees of heat than does the engine-cylinder, and consequently the butt-joint between said jacketing-cylinder and the flange 3 will always remain tight when the engine is in operation. All the force of expansion being confined between the flange 3 or other projection at one point and the screw-thread 4 or other projection at an-

other point of the same cylinder 1, there is no tendency to open any seams or tear apart any joints.

The advantages of our invention consist in the fewness of parts and the light weight of the completed apparatus. Fewer complicated castings are required than is usually the case. The cylinder-head being fastened to the jacketing-cylinder, the necessity of forming the usual heavy flange at the end of the engine-cylinder is avoided.

Of course various changes could be made in the details of construction illustrated in the drawings without departing from the spirit and scope of our invention so long as the relative arrangement of parts or the principle of operation described is preserved. Other forms of cylinder-head might be substituted and different means of fastening said cylinder-head to the other parts of the apparatus might be employed. Such modifications, however, we should still consider within the scope of our invention.

Having therefore described our invention, what we claim as new, and desire to protect by Letters Patent, is—

1. The combination of the cylinder having an external flange and a screw-threaded end, with a jacketing-cylinder formed of a material having a higher coefficient of expansion than that of which the main cylinder is formed provided with inlet and outlet connections, and an internally-screw-threaded annular head at one end adapted to mesh with the thread on the end of the cylinder, the other end of the jacketing-cylinder abutting against the first-mentioned external flange.

2. The combination of the cylinder having an external flange and a screw-threaded end, with a jacketing-cylinder provided with inlet and outlet connections, and an internally-screw-threaded annular head at one end adapted to mesh with the thread on the end of the cylinder, the other end of the jacketing-cylinder abutting against the first-mentioned external flange, together with the cylinder-head and means for fastening said cyl-

inder-head to the annular head of the jacketing-cylinder.

3. The combination of the cylinder having an external flange intermediate of its ends and a screw-threaded end, with a jacketing-cylinder provided with inlet and outlet connections, and an internally-screw-threaded annular head at one end adapted to mesh with the thread on the end of the cylinder, the other end of the jacketing-cylinder abutting against the first-mentioned external flange, together with the cylinder-head and means for fastening said cylinder-head to the annular head of the jacketing-cylinder, said means consisting of screw-bolts passing through the cylinder-head and into the jacket-head.

4. The combination of the cylinder having an external flange and a screw-threaded end, with a jacketing-cylinder provided with inlet and outlet connections, and an internally-screw-threaded annular head at one end adapted to mesh with the thread on the end of the cylinder, the other end of the jacketing-cylinder abutting against the first-mentioned external flange, together with the cylinder-head and means for fastening said cylinder-head to the annular head of the jacketing-cylinder, said cylinder-head being cast with valve passage-ways and jacketing-cavities therein.

5. The combination of an engine-cylinder and a surrounding jacketing-cylinder composed of a metal having a higher coefficient of expansion than the engine-cylinder, said jacketing-cylinder interlocking at either end with projections on the engine-cylinder, said projections being formed integrally with the engine-cylinder.

Signed by me at Jersey City, New Jersey, this 14th day of February, 1900.

ALEXANDER FISCHER.

Signed by me at New York city, New York, this 14th day of February, 1900.

ALBERT T. OTTO.

Witnesses:

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