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Patented Dec. 24, 1901.

J. A. SECOR.

APPARATUS FOR COOLING CYLINDERS OF EXPLOSIVE ENGINES.

(Application filed Jan. 5, 1901.)

(No Model.)

Fig. 1.

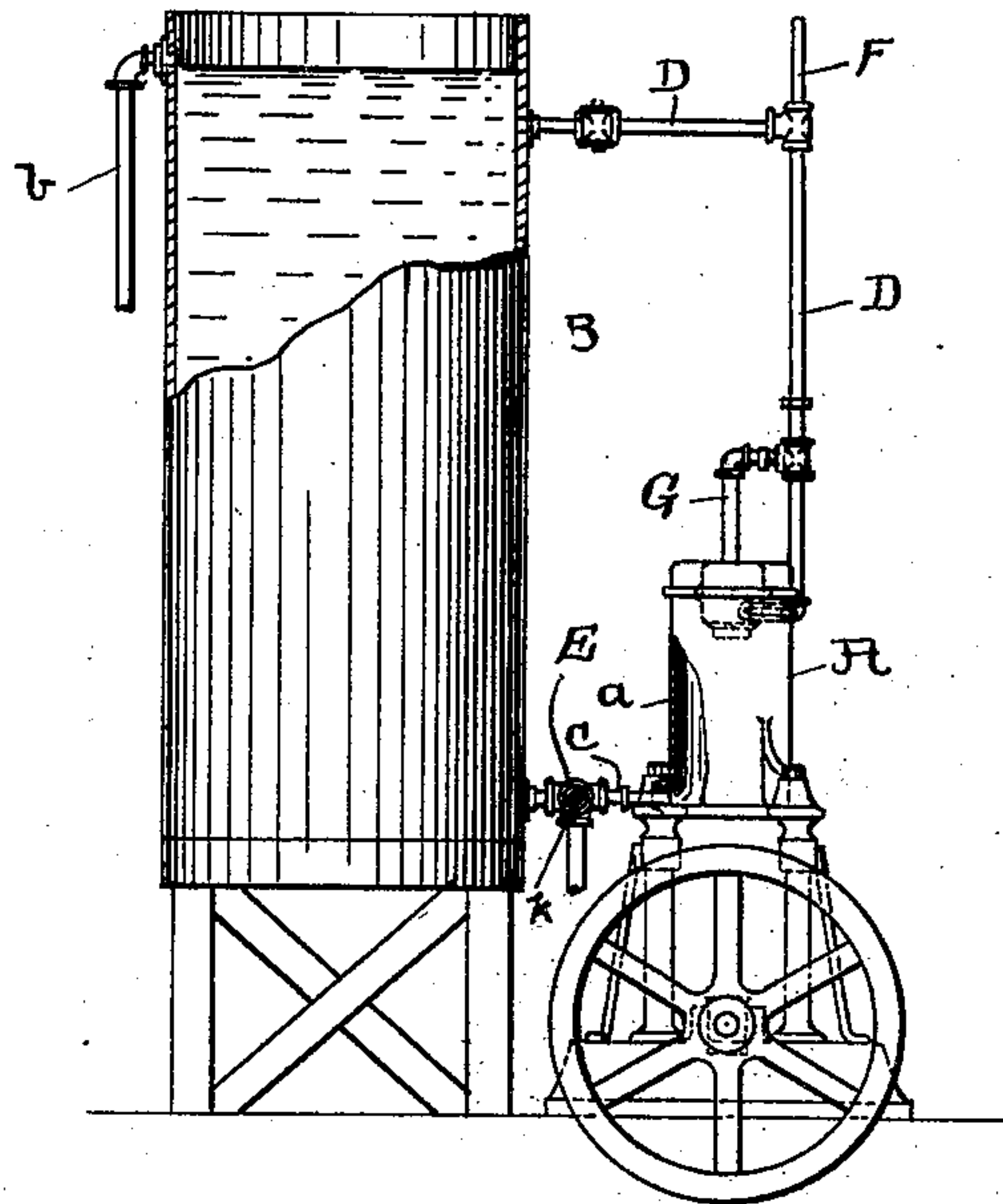


Fig. 2.

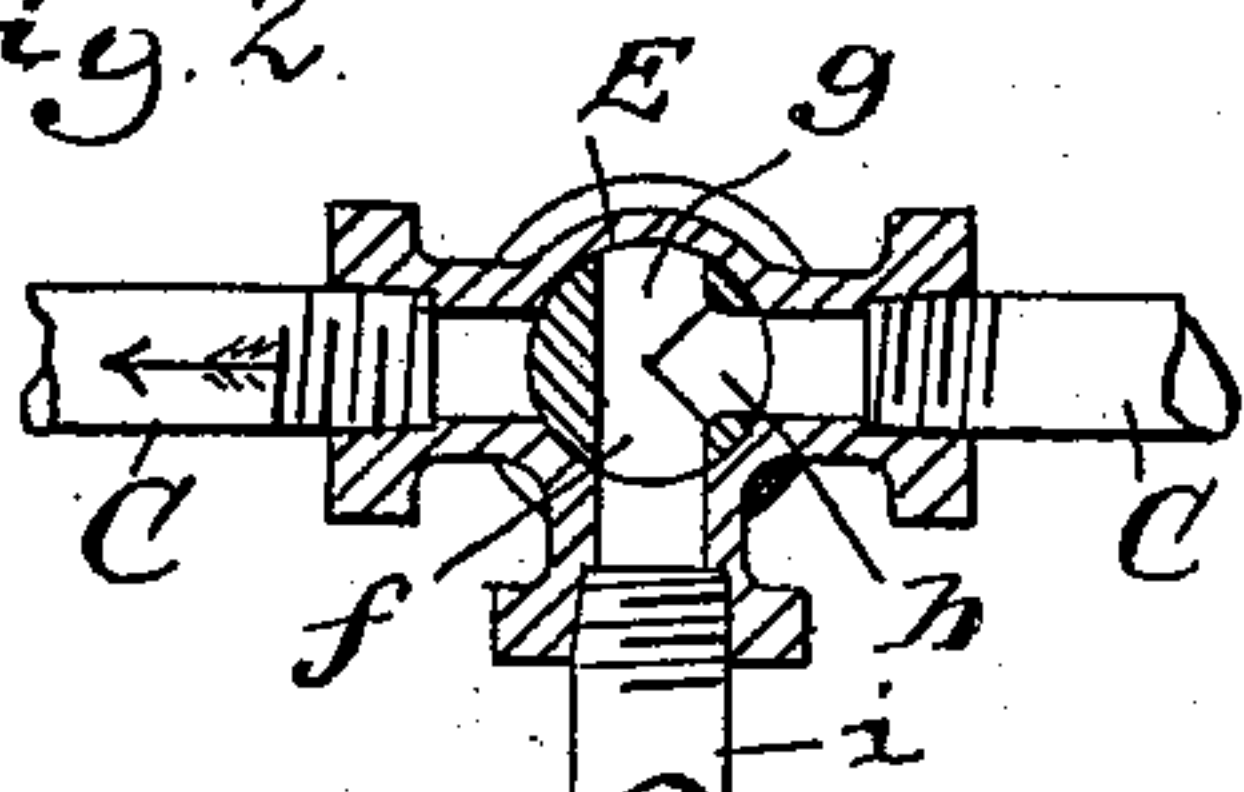


Fig. 3.

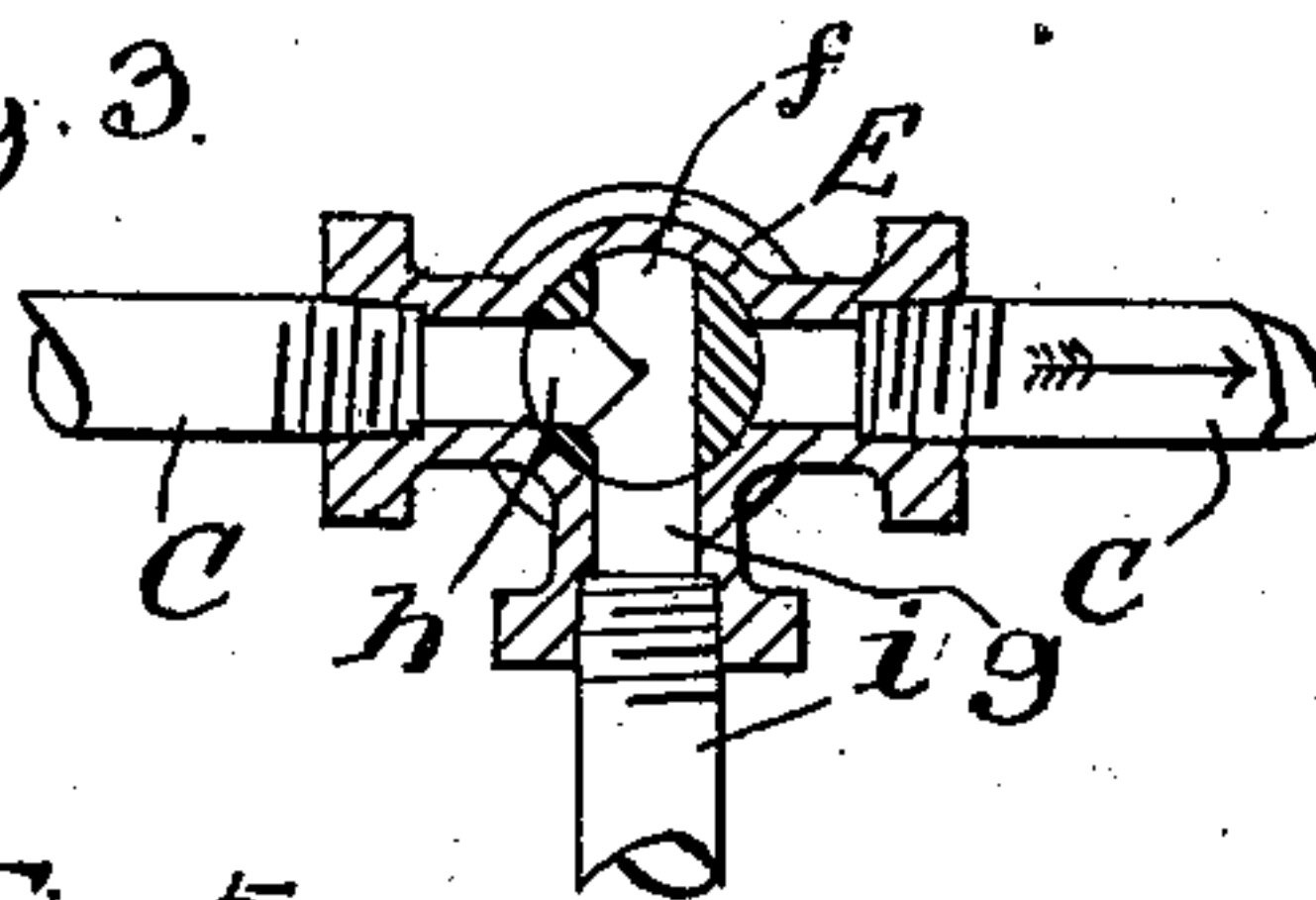


Fig. 4.

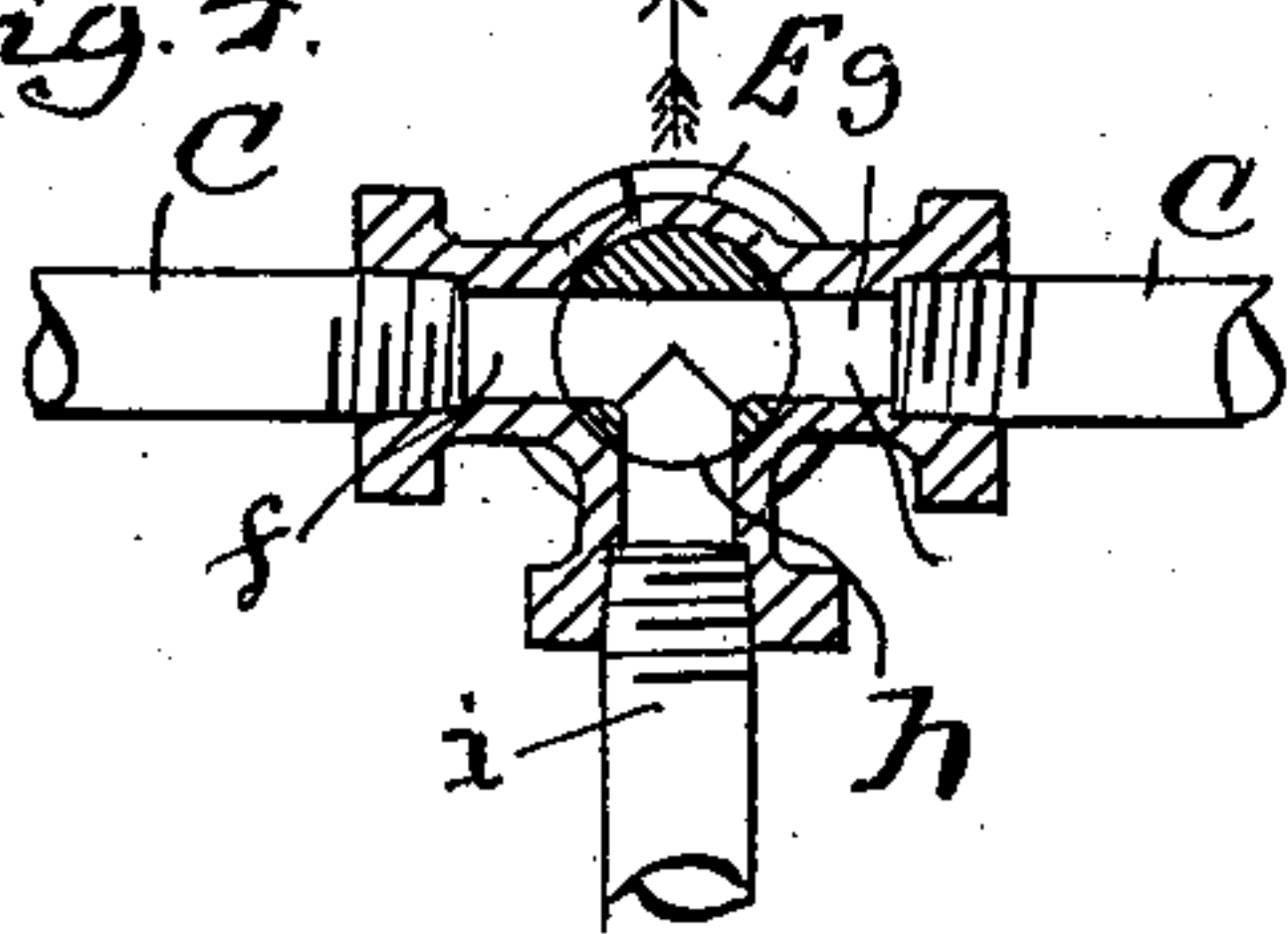
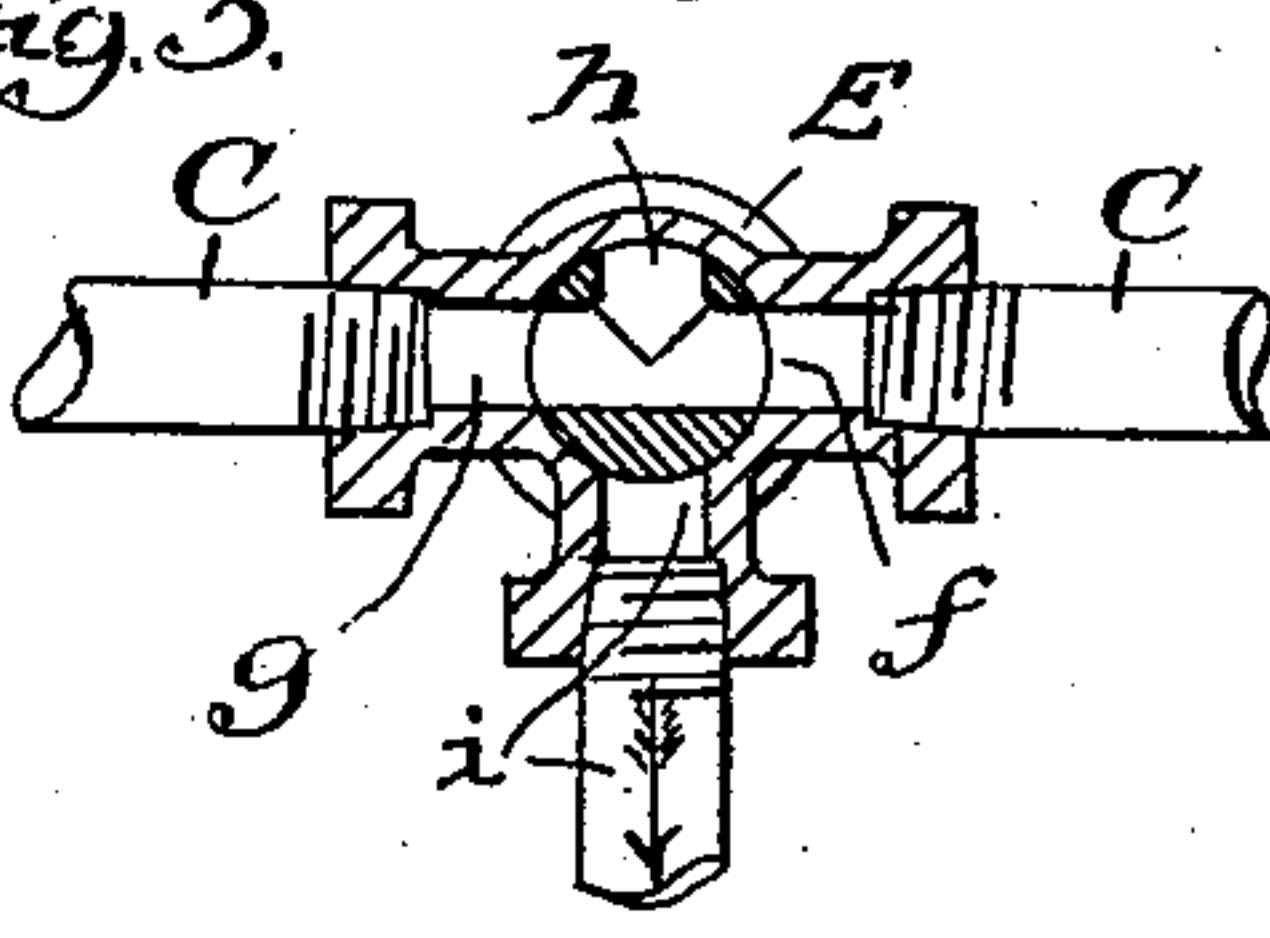


Fig. 5.



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APPARATUS FOR COOLING CYLINDERS OF EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 689,568, dated December 24, 1901.

Application filed January 5, 1901. Serial No. 42,155. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. SECOR, a citizen of the United States, residing in the borough of Brooklyn, in the city of New York, in the State of New York, have invented certain new and useful Improvements in Apparatus for Cooling the Cylinders of Explosive-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation and partial sectional view of an apparatus comprising my invention. Figs. 2, 3, 4, and 5 are sectional views of the three-way cock which is one of the elements in the mechanical combinations embraced in my invention, said views illustrating different positions of the cock in the use and operation of the invention.

My invention relates to explosive-engines in which the explosion-cylinder is kept cool to the requisite degree by a circulation of water through a chamber or chambers provided to the cylinder.

It comprises certain combinations of parts whereby provision is made for the automatic flow of the cooling liquid continuously from a supply-tank to and through the cooling-chamber of the engine-cylinder back to and through the supply-tank and so on continuously and whereby also provision is made for the easy and convenient withdrawal of the cooling liquid from the tank alone, from the cooling-chamber alone, or from both tank and chamber, as occasion may require.

A is the cylinder of an explosive-engine, which may be of any preferred type and construction so long as the cylinder is provided with a cooling chamber or chambers to receive a liquid of comparatively low temperature to keep down the temperature of the cylinder to a proper degree when subjected to the heating action incident to the operation of the motor. In Fig. 1 of the drawings the cooling-chamber is indicated at *a*, the surrounding outer portion of the cylinder being shown as broken away to reveal said chamber. Any preferred structure of the chamber and any desired relation thereof to the bore or walls of the cylinder may be employed so long as it is adapted to cool the cylinder by a cooling liquid

in the chamber. As the construction of explosive-engine cylinders with cooling-chambers is well known in the art special description thereof is here unnecessary.

B is a tank which receives the water or cooling liquid. This tank should have an overflow-pipe *b*. Its top may be open or closed and provided with an inlet through which it may be supplied with the cooling liquid as occasion may require. The lower part of the supply-tank connects with the lower part of the cooling-chamber of the cylinder by a pipe C, and the upper part of the cooling-chamber of the cylinder communicates with the upper part of the tank by a pipe D. Assuming the cock, hereinafter described, to be in such position (shown in Fig. 5) as to permit an uninterrupted passage through the pipe C from the tank to the cylinder and the tank being supplied with a suitable quantity of the cooling liquid, the latter passes through the pipe C into the cooling-chamber of the cylinder. As the latter is heated in the normal and well-known manner by the operation of the explosive-engine, of which the cylinder forms a part, it ascends in the chamber and passes out at the top thereof through the pipe D, by which it is conducted into the upper part of the tank, so that a continuous flow of the liquid from the tank through the chamber and back again to the tank is established to carry away from the cylinder the too abundant heat thereof. Extended vertically from the pipe D is a vertical branch pipe F, which at its upper end is open to the atmosphere. The water rises in this pipe to the same level as in the tank and being open at top permits the escape of any steam which may form in the cooling-chamber by reason of the heat to which it is subjected in said chamber. To facilitate the free passage of the liquid from the cooling-chamber to the pipe D, a secondary pipe G is extended from the top of the cooling-chamber and joins the pipe D at a greater or less distance above, as shown in Fig. 1. This secondary pipe provides against the presence of dead or sluggish water in the upper part of the cooling-chamber and more or less out of the direct draft of the pipe D.

Provided in the pipe C is a three-way cock E, which is so constructed and arranged that when in the position shown in Fig. 5 its pas-

sages *fg* are coincident with the bore of said pipe C to afford, as just mentioned, an uninterrupted passage to the liquid from the bottom of the tank to the corresponding part of the cooling-chamber, that when in the position shown in Fig. 2 it will close the pipe against the tank and through its passages *fh* open communication between the outlet *i* to the external atmosphere from the cooling-chamber to permit the escape or withdrawal of the liquid from the latter, that when turned to the position shown in Fig. 3 it will close communication against the cooling-chamber and simultaneously through its passages *hg* open communication between the outlet *i* and the bottom of the tank, thereby permitting the outflow of the contents of the latter, and that by turning it to the position shown in Fig. 4 its passages *fgh* will open from both cooling-chamber and tank to the outlet *i* to permit outflow from both simultaneously.

The requisite axial movement of the cock in bringing it to the several positions above set forth may be given to it by means of a rectangular knob *k*, to which a wrench may be applied to turn the cock.

By the relative arrangement of the specified parts, as herein described, the tank and the cooling-chamber of the cylinder, either or both, may be emptied of the water or cooling liquid by simple manipulations of the cock. This emptying of the tank and of the chamber is frequently desirable as a precaution against freezing when the engine is idle in cold weather and when for any reason access to or examination of the said parts is desirable. By the use of the vertical branch pipe F any steam which may form from the cooling liquid during the operation of the engine

is permitted to escape from the liquid prior to the passage of the liquid back to the tank, as set forth.

What I claim as my invention is—

1. The combination with a cooling-chamber of an explosive-engine cylinder and a tank for supplying a cooling liquid thereto, of a pipe connecting the upper part of the cooling-chamber with the upper part of the tank, a lower pipe connecting the lower part of the tank with the corresponding part of the cooling-chamber and having in it an outlet-opening, and a three-way cock provided in the said lower pipe and arranged as described to permit in one position the drainage of the tank, in another that of the jacket, in another that of both tank and jacket, and in a fourth the free circulation of the cooling water, in the manner specified for the purposes set forth.

2. The combination with a cooling-chamber of an explosive-engine cylinder and a tank for supplying a cooling liquid thereto, of a pipe connecting the upper part of the cooling-chamber with the upper part of the tank and having a vertical branch pipe for the escape of steam, a lower pipe connecting the lower part of the tank with the corresponding part of the cooling-chamber, and having in it an outlet-opening, and a three-way cock arranged as described to permit in one position the drainage of the tank, in another that of the jacket, in another that of both tank and jacket, and in a fourth the free circulation of the cooling water, in the manner specified for the purposes set forth.

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Witnesses:

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