

(No Model.)

E. C. BROADWELL.  
OIL BURNER.

No. 541,310.

Patented June 18, 1895.

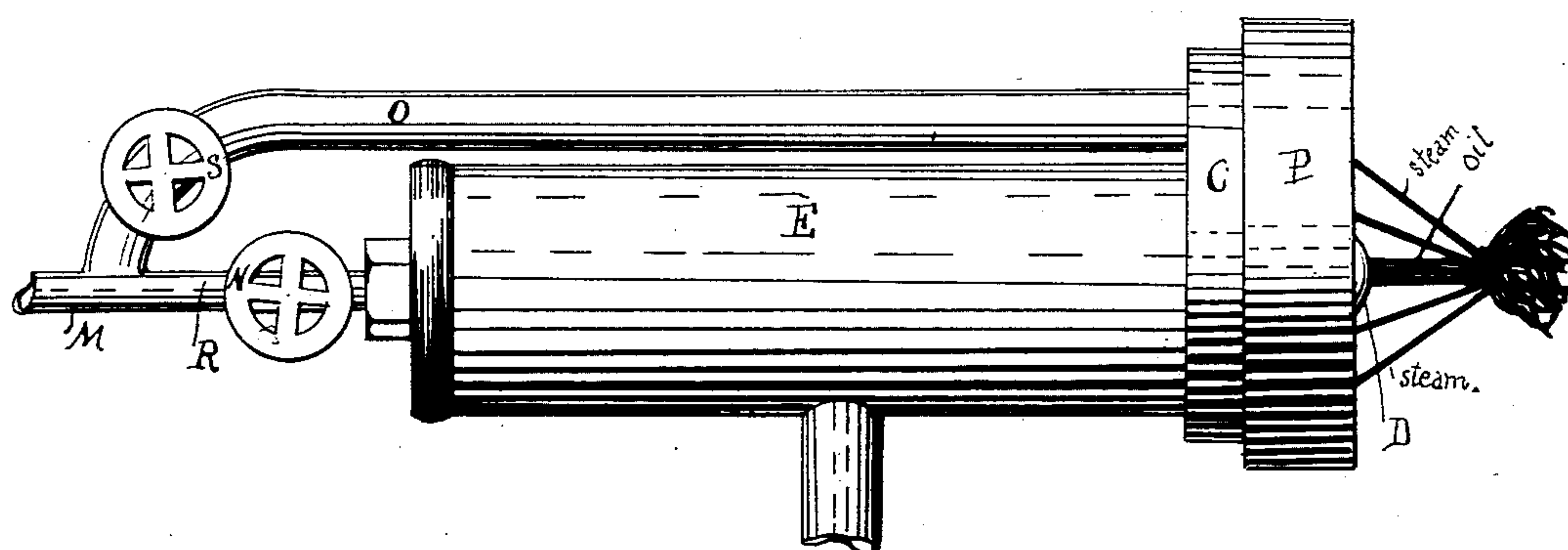
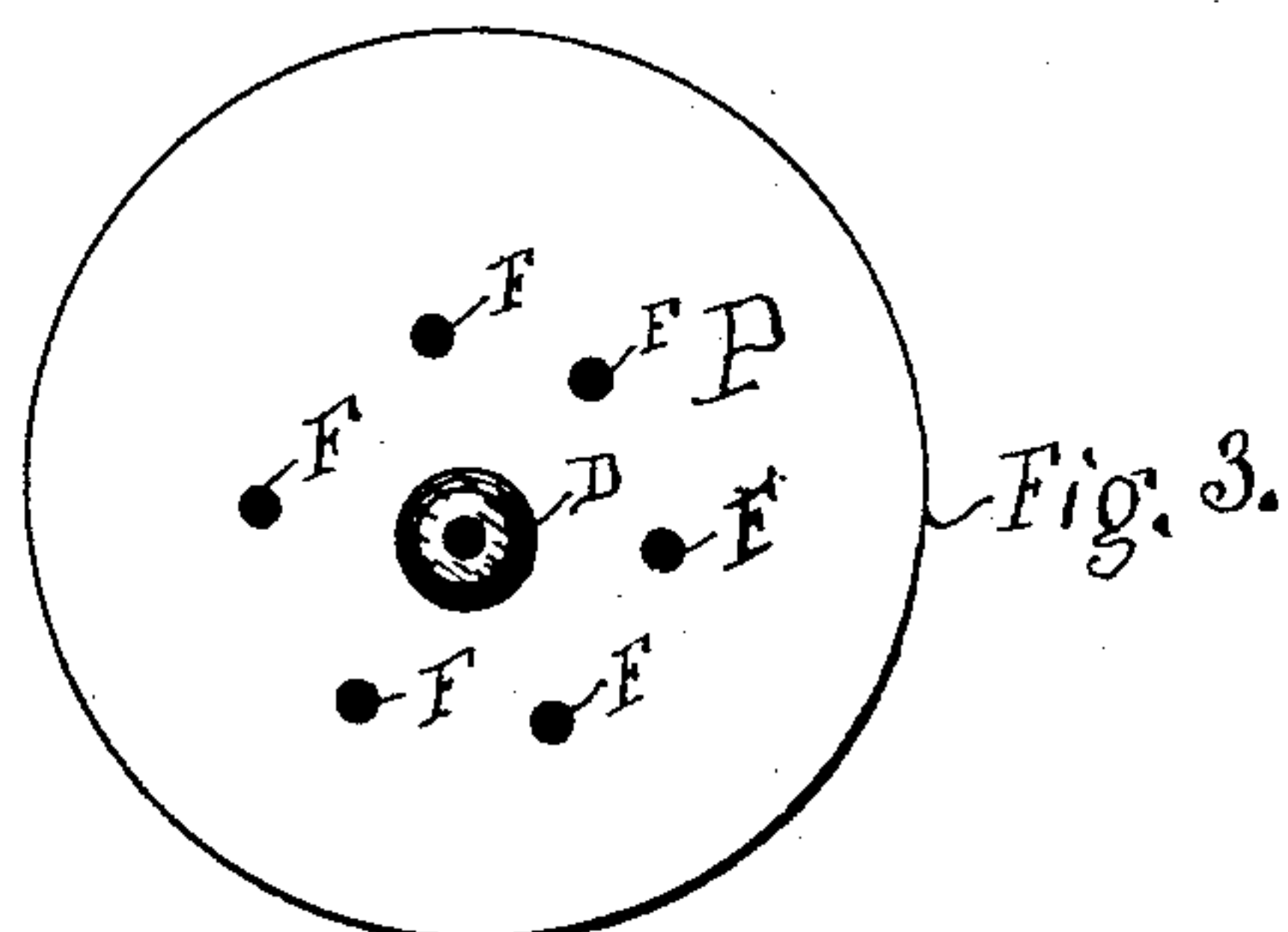
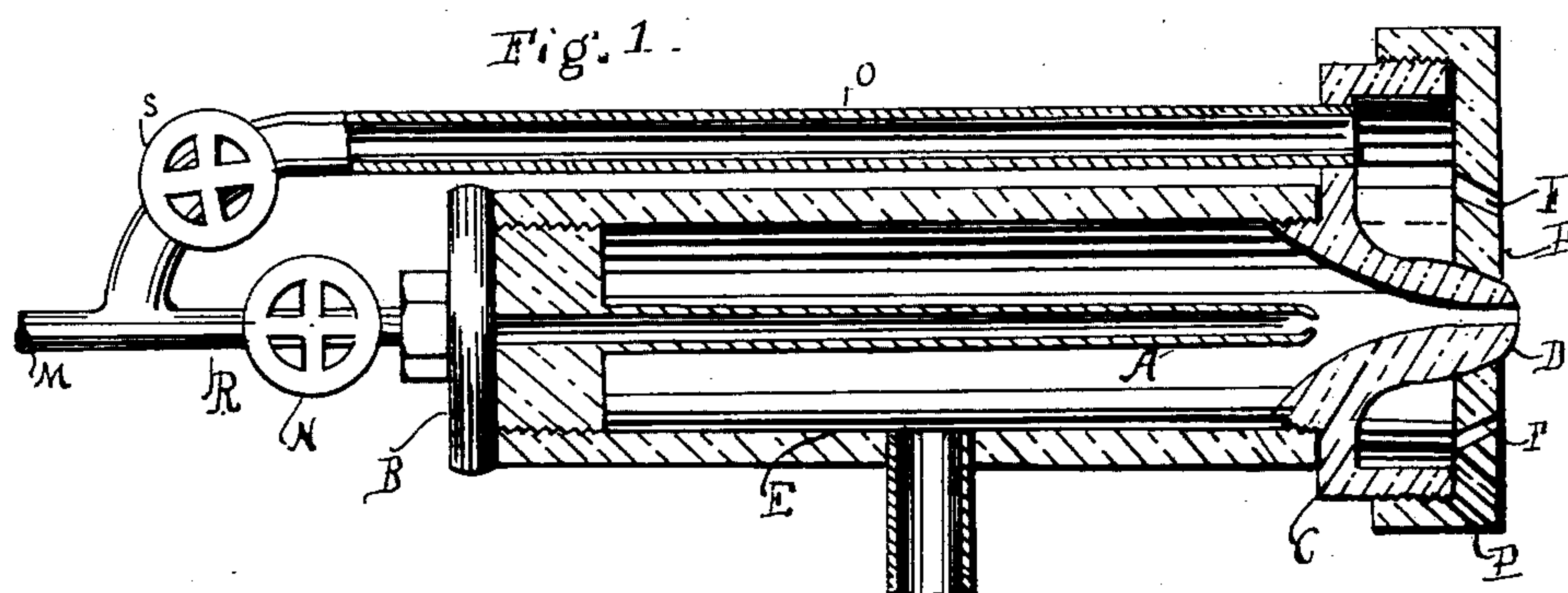
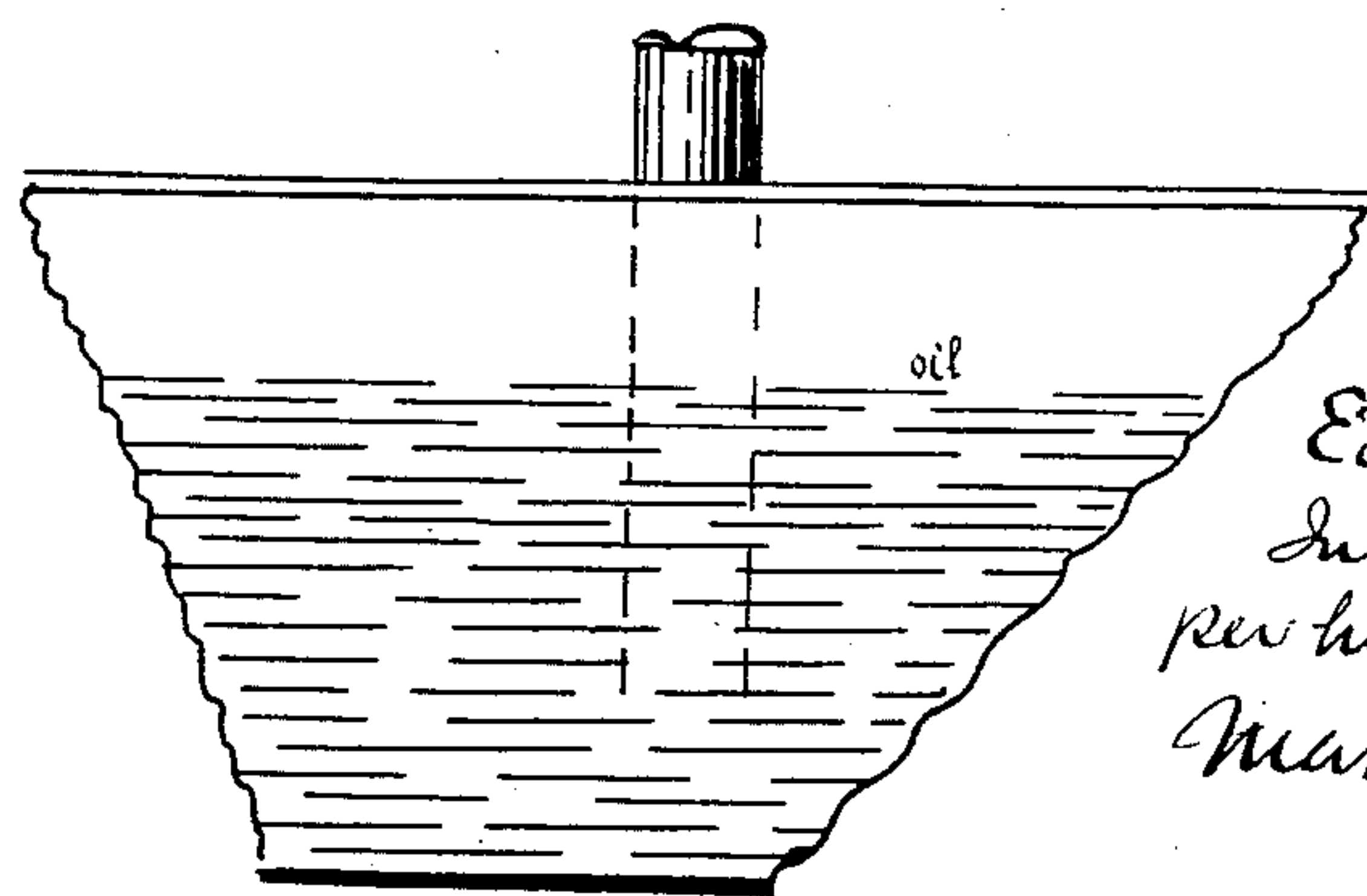


Fig. 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 541,310, dated June 18, 1895.

Application filed June 8, 1894. Serial No. 513,963. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD C. BROADWELL, a citizen of the United States, and a resident of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Oil-Burners, of which the following is a clear and sufficient specification, reference being had to the drawings annexed.

My invented burner is designed to use steam to suck up and eject the oil and, independently of the use to suck up the oil, to use jets of steam, which, acting on the oil outside of the burner, thus atomize thoroughly the jet of mixed oil and steam thrown out from the burner and thus to produce a quicker flame. By the regulating of the proportions of steam used to suck up and eject, and to break up and atomize, a perfect control of the length and heat of the flame may be secured. It has, besides these main features, various details of construction which will be described and claimed.

Figure 1 is a sectional elevation, and Fig. 2 an elevation of my invented device, the latter showing also a part of the oil-tank; and Fig. 3 is an end elevation showing the steam-jet construction.

E is a casing forming part of the walls of a reservoir for the oil which is sucked from a storage tank,—which, with a properly constructed burner, of my invented kind, may be from ten to fourteen feet below the burner, and thus allow the pipes to clear themselves every time the burner is stopped thoroughly and quickly,—through the aperture *e* to which the pipe leading to the storage tank can be attached.

The reservoir is closed at one end by the cap B, into which or forming part of which is the steam ejector pipe A, and at the other end, by the cap C, which contains the nipple D, and also is provided with outwardly projecting flanges to which may be attached the plate P. The channel P I form in its sectional contour an arc of an ellipse, whereby a very considerable increase in suctional power is secured, drip obviated and other advantages secured.

An objection which is of considerable moment with ejector burner from which the stream of burning fluid is thrown with force is that this stream is much too dense, near

the nozzle of the burner, for the complete combustion of the oil near the burner nipple, which wastes the fuel, causes smoke and is otherwise objectionable. Another objection is that the stream does not spread widely enough to fill the fire box at places therein near the burner nipple. The oil also will spread widely and be thoroughly atomized, if at all, only when at a considerable distance from the burner nipple.

The above mentioned objections I obviate by directing against the stream preferably at a point near the burner nipple a series of substantially focusing jets of steam which will comminute the large globules of oil in the stream into smaller globules and scatter and disperse them and therefore cause them to burn with complete combustion so that the entire length of the burning flame—which may vary in burners of ordinary size up to ten feet or more in length,—will be in complete combustion throughout its length and consequently will heat all parts of the furnace or boiler substantially equally. What I consider the best construction for directing these jets against the stream I will now describe. An annular chamber P, is formed at the nozzle end of the burner into which is fed the steam by the pipe O. This chamber P is provided with the apertures F, F, formed to direct the steam against the stream of mingled oil and steam from the nipple C. Several of these jets may unite.

The impact of the steam jets upon the stream will atomize the globules and spread the stream. The advantages of thus atomizing the steam outside of the burner with reference to its effectiveness in sucking up and expelling the oil, are manifest; as by so doing an absolutely clear passage can be given to the oil, no obstruction need be placed in the way of the out passing stream and the utilization of the ejection jet can be considered solely with reference to its sucking and ejecting capabilities.

To regulate the flow of steam to the ejector pipe A, and the focusing jets F, F, I place in the pipes O, and R, the cocks N, and S, by which I can regulate the proportionate supply of steam to each. The pipes O, and R, may each be connected to the main pipe M.

I start the burner by turning the steam on

through the pipe R, then, when the oil is raised turn on the cock N, and light. If it is desired to shorten and intensify the flame I let more steam flow through this pipe O.

5 Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination of the cylindrical casing E, the cap B, containing the injector pipe A, the cap C containing the nozzle D, provided with the contracted outlet said cap C, being also provided with the outwardly projecting flanges and said caps and casing forming the oil chamber, the injector pipe A, running  
15 through the oil chamber, to the base of the

outlet of the nozzle D, substantially parallel to the walls of the casing E, the plate P, secured to the flanges of the cap C, and provided with an opening for the nozzle D, and with the inwardly inclined steam apertures F, F, 20 the plate P, and cap C, forming an auxiliary steam chamber, the steam pipe, the steam supply pipe O, the fuel reservoir and the fuel supply pipe leading from said reservoir to the bottom of the oil chamber substantially as 25 described.

EDWARD C. BROADWELL.

Witnesses:

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FRANK HARROLD.