

No. 710,108.

Patented Sept. 30, 1902.

A. A. LOW.
HYDROCARBON HEATER.

(Application filed June 17, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

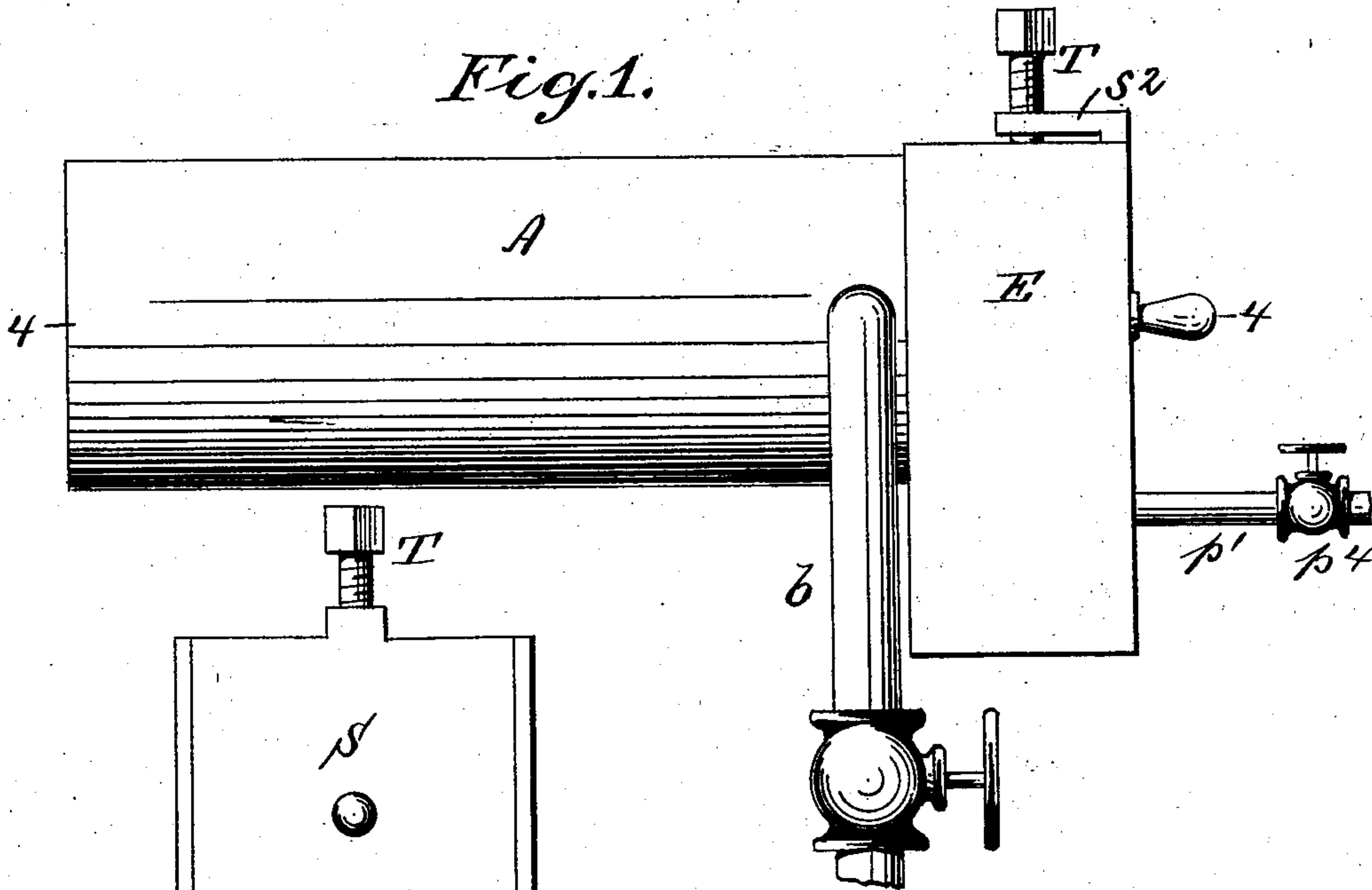


Fig. 2.

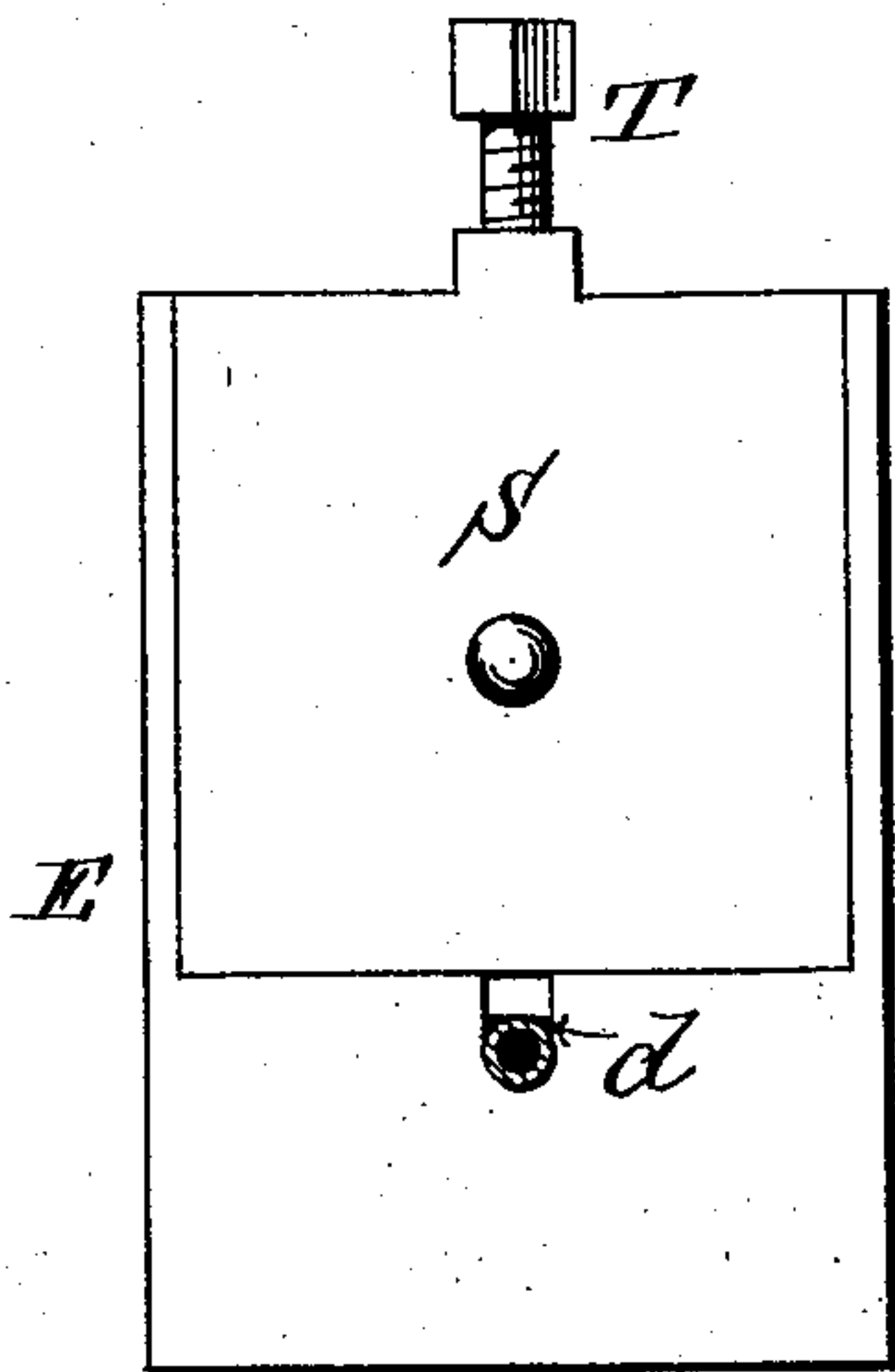
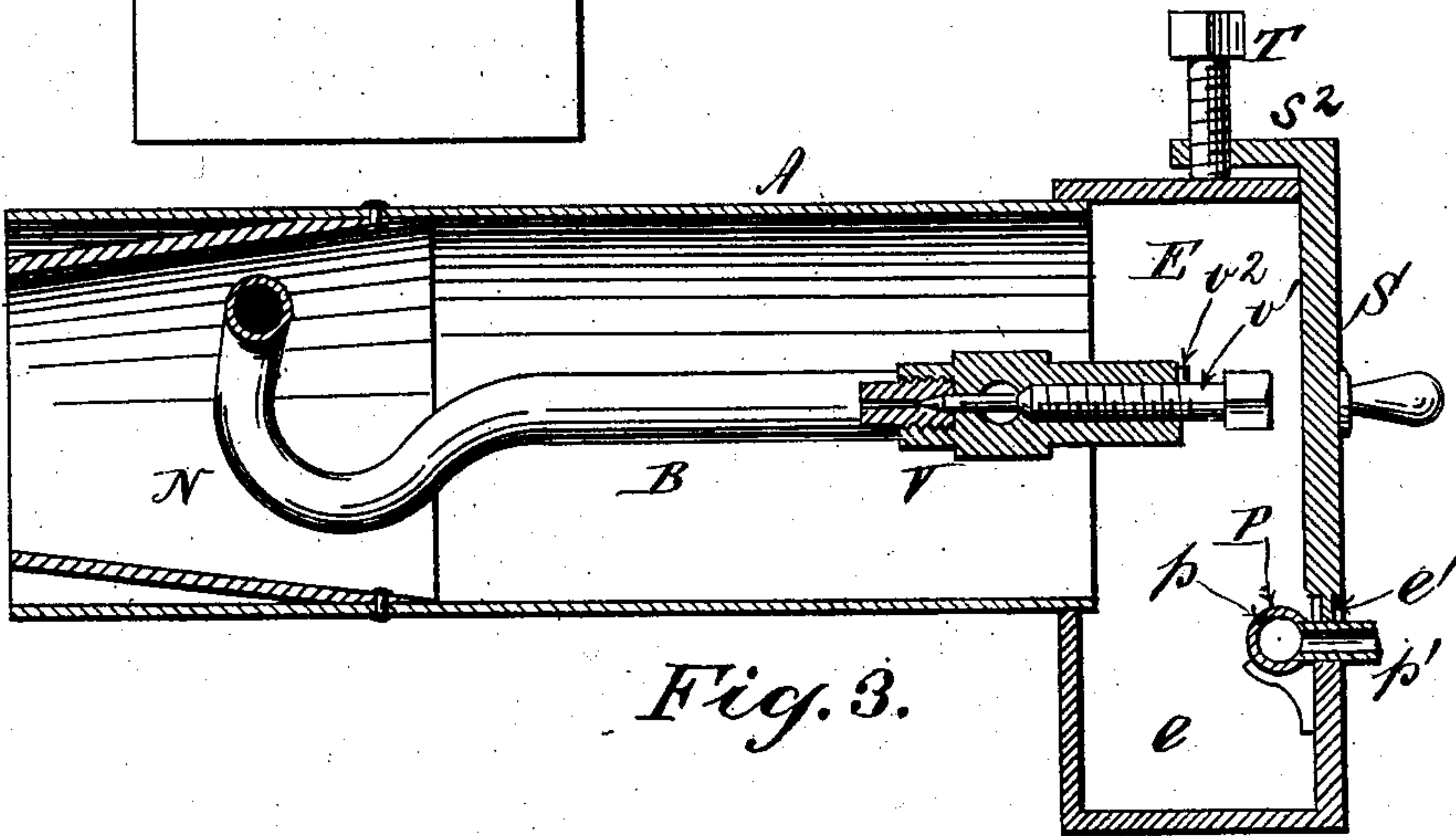


Fig. 3.



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2 Sheets—Sheet 2.

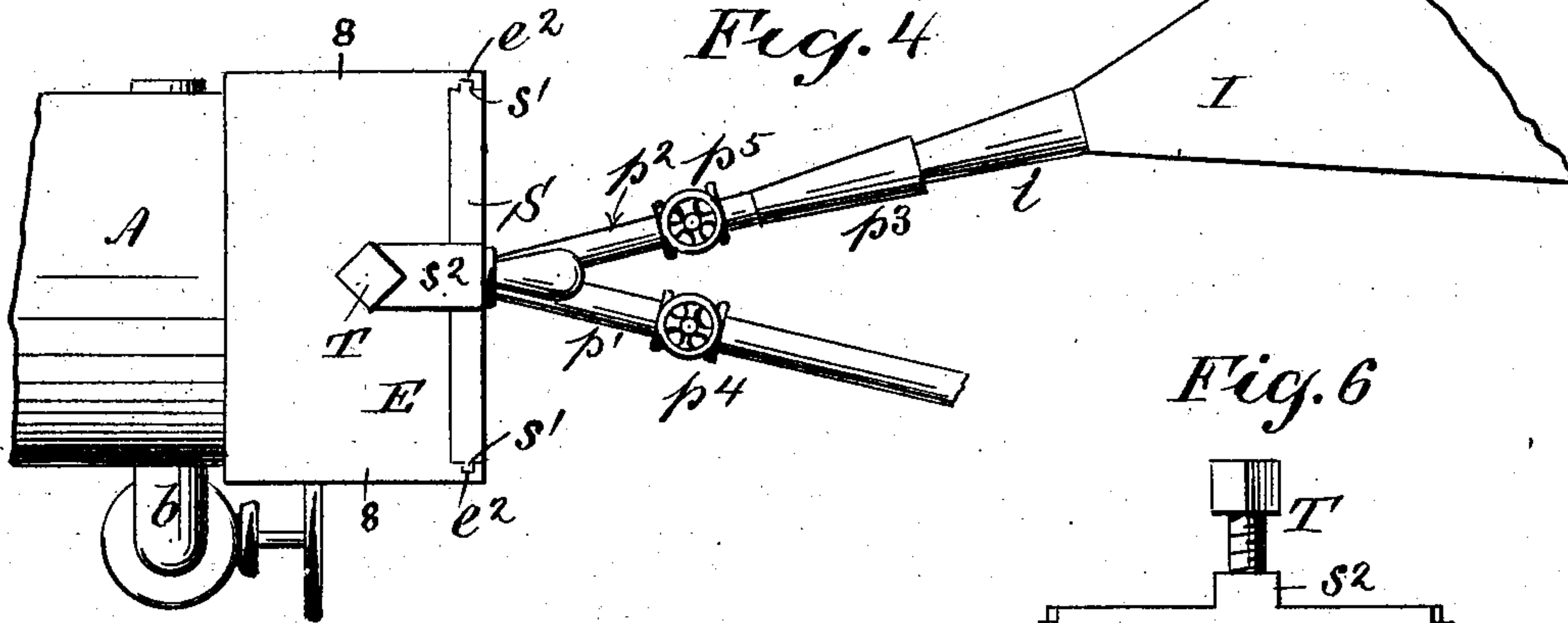


Fig. 5

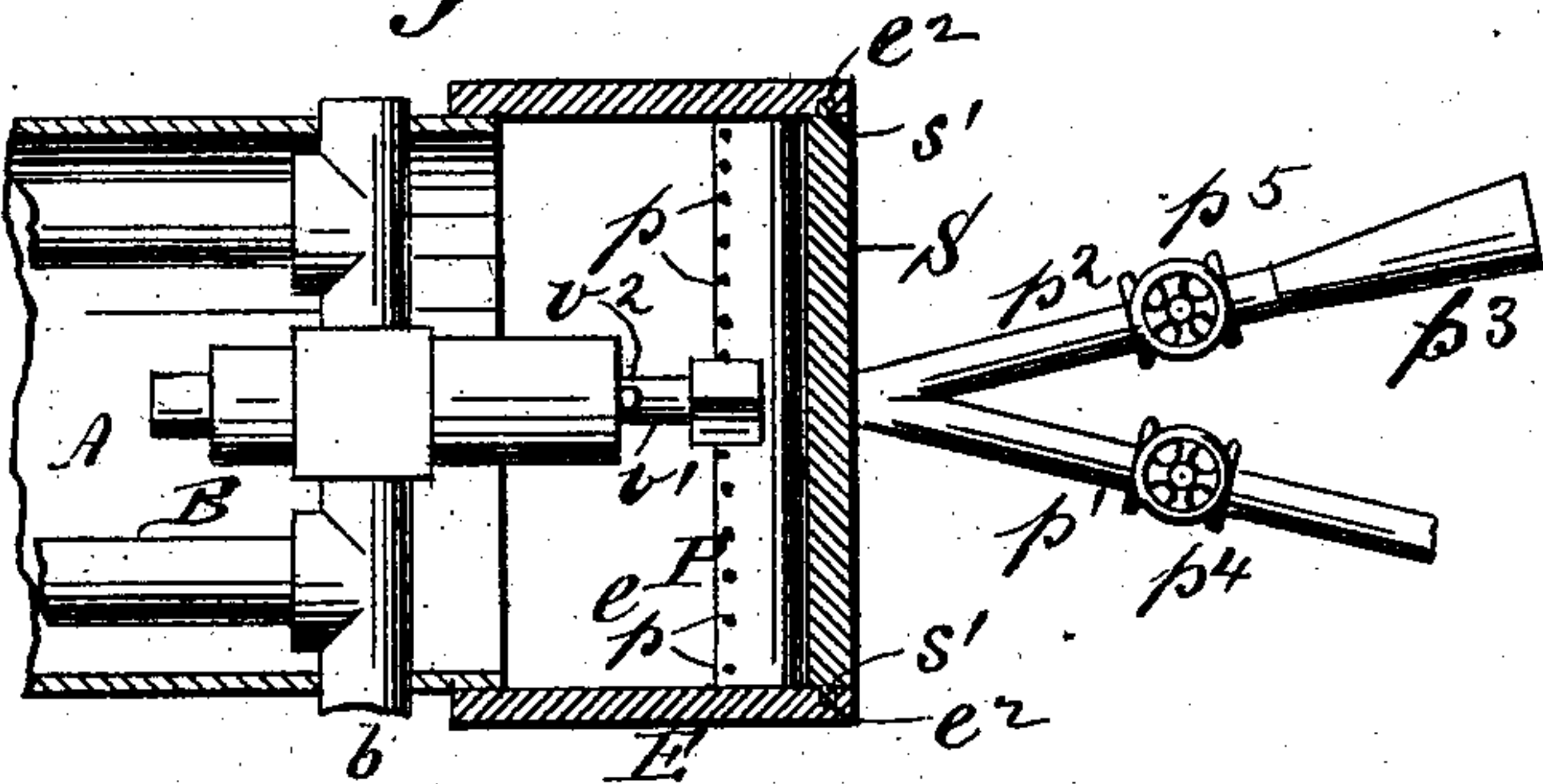


Fig. 7.

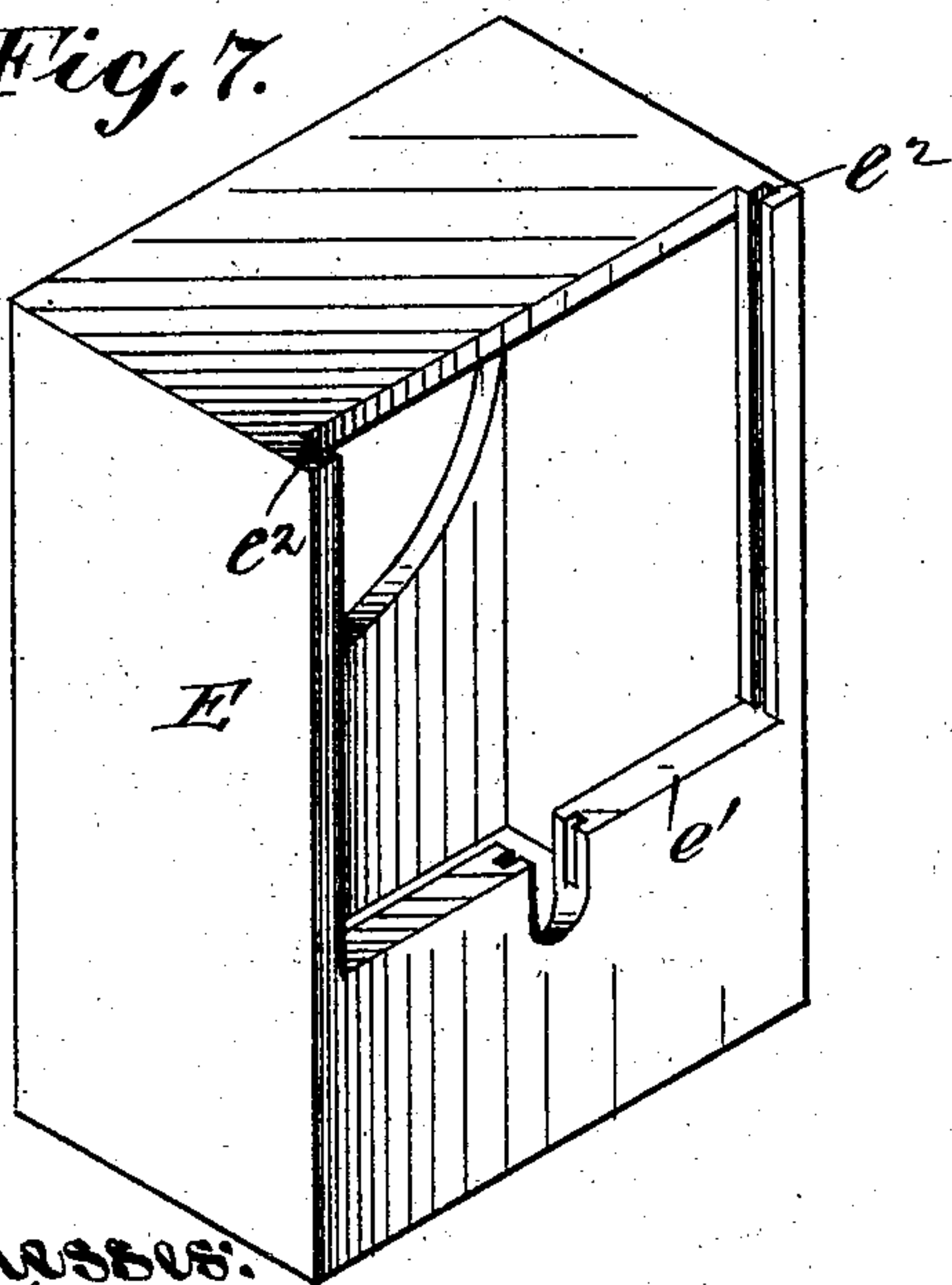


Fig. 6

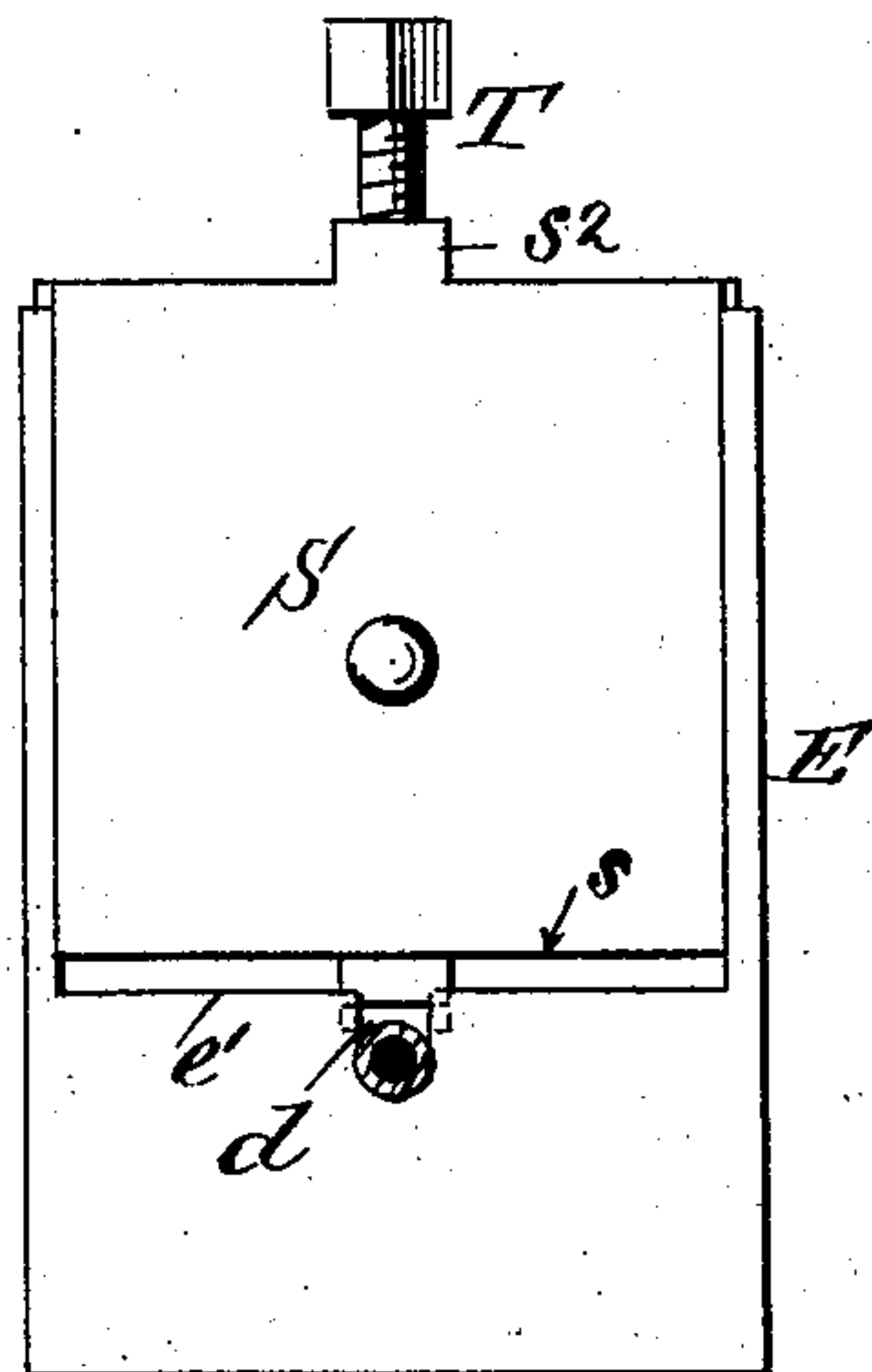
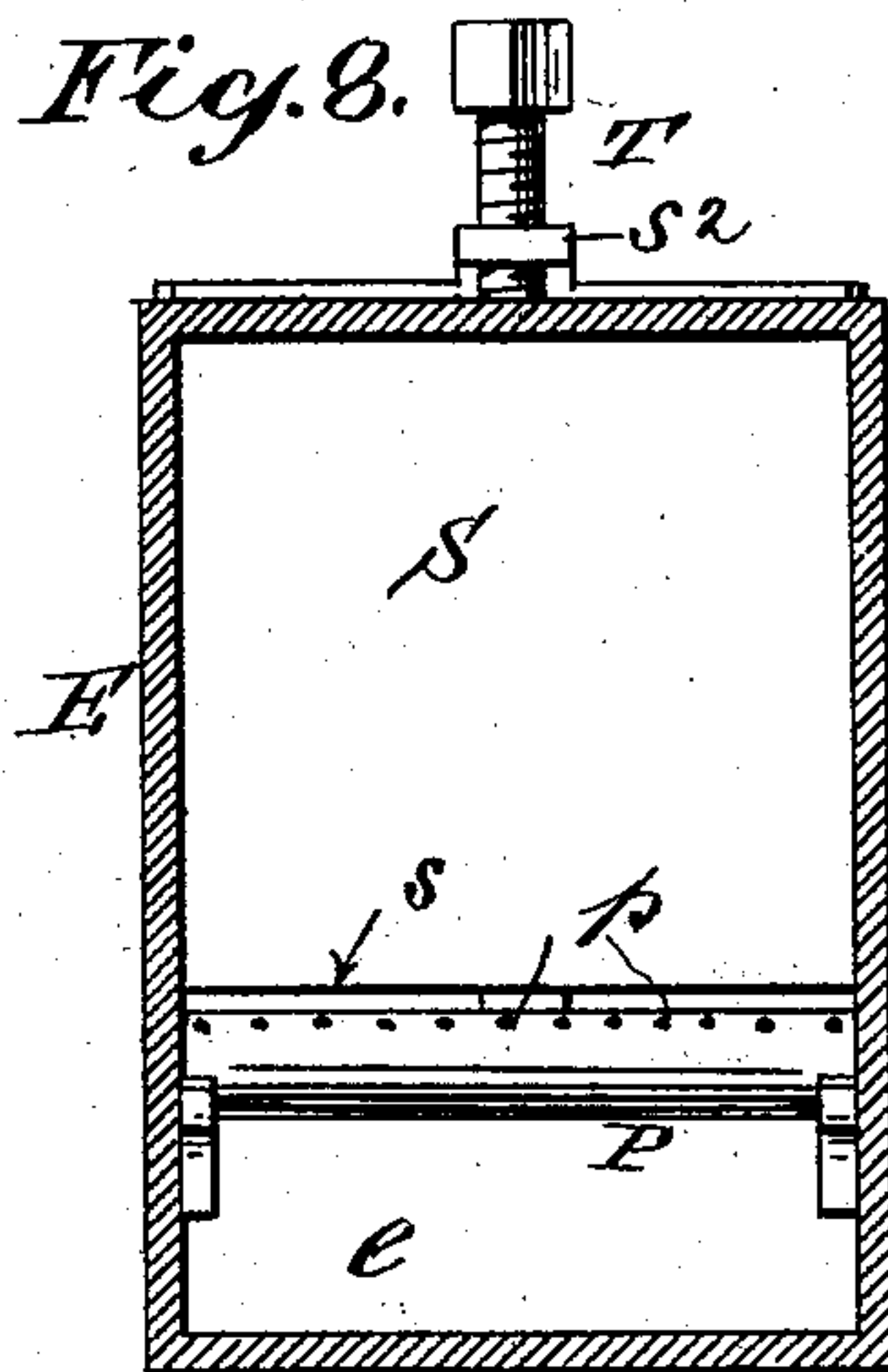


Fig. 8.



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UNITED STATES PATENT OFFICE.

ABBOT AUGUSTUS LOW, OF BROOKLYN, NEW YORK.

HYDROCARBON-HEATER.

SPECIFICATION forming part of Letters Patent No. 710,108, dated September 30, 1902.

Application filed June 17, 1901. Serial No. 64,789. (No model.)

To all whom it may concern:

Be it known that I, ABBOT AUGUSTUS LOW, a citizen of the United States, residing in the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Hydrocarbon-Heaters, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My improvements relate to what are known as "hydrocarbon heaters or torches," used for effecting the preliminary heating of the ignition-chambers of gas-motors and for similar purposes where heat is to be applied temporarily and superficially, as set forth in my concurrent application for patent filed November 26, 1900, Serial No. 37,709, my present invention being an improvement on the structure therein shown, and consisting in the combination and arrangement of parts hereinafter described and claimed specifically.

It will be seen by reference to my concurrent application above referred to that the rear end of the cylindrical shell inclosing the vaporizing-tube has heretofore been made open to allow air under atmospheric pressure to enter the shell for the purpose of aiding in the combustion of the hydrocarbon-vapor injected by the needle-valve into the shell, the current of air under atmospheric pressure being induced by the blast of compressed air escaping from the nozzle of the pressure-pipe behind the alcohol-lamp, the flame from which latter is driven against the vaporizing-tube. Under these conditions the air under atmospheric pressure cannot be controlled and applied to the best advantage, since it rushes in freely on all sides and under varying degrees of tension, an excess of atmospheric air, over that essential for the maintenance of perfect combustion being undesirable, since it tends to cool the parts, as well as the gases generally, and to render the blast of the products of combustion through the nozzle of the cylinder less effective.

I have found by investigation and experiment that in order to attain the best and most perfect results air under atmospheric pressure must be admitted in proximity to the blast of compressed air and so proportioned and regulated with relation thereto as to effect

the perfect combustion of the hydrocarbon-vapor discharged by the vaporizing-tube within the cylindrical shell without danger of cooling the same by excess, and this I accomplish by inclosing my alcohol-lamp and the air-blast nozzle within an extension-chamber forming a continuation of the cylindrical shell and by providing for the admission of more or less air under atmospheric pressure in proximity to the compressed-air-blast nozzle and in a plane above and parallel thereto by means of an adjustable rear door or slide, by which the admixture of air under atmospheric pressure with the compressed-air blast may be regulated with accuracy to effect the desired result. Furthermore, by my present construction I effectually obviate all danger arising from back pressure exerted by excessive wind-pressure at the front or nozzle of the torch, since by practically closing the rear of the combustion-shell the only outlet under back pressure adjoins the compressed-air nozzle, the blast from which is sufficient to counteract the back pressure and protect the inlet-opening adjusted for the admission of air under atmospheric pressure.

In the accompanying drawings, Figure 1 is an elevation of my improved heater; Fig. 2, a view of the rear of the extension-box; Fig. 3, a central vertical longitudinal section of the heater; Fig. 4, a plan of the rear of the heater; Fig. 5, a horizontal sectional elevation upon plane of line 4 4, Fig. 1; Fig. 6, a view similar to Fig. 2, showing the slide raised for the admission of air under atmospheric pressure; Fig. 7, an isometrical view of the rear extension-box with the air gate or slide removed; Fig. 8, a transverse section upon plane of line 8 8, Fig. 4.

A is the cylindrical shell in which the ordinary vaporizing-tube B is situated, said tube being fed through the supply-tube *b* and being provided with the usual needle-valve V, through which the vaporized hydrocarbon escapes under pressure to combine chemically with the air injected into the rear of the cylinder A, from which latter the products of combustion are ejected through the nozzle N. The supply-pipe *b*, vaporizing-tube B, and needle-valve are similar to those heretofore used, excepting that the screw-shank *v'* of the needle-valve V is formed with a shoulder

or abutment v^2 to guard against the breaking or jamming of the needle-point by reason of undue pressure exerted in closing the valve, as frequently occurs under the conditions of ordinary use. My gage or abutment v^2 not only limits the extent of motion inward, but also affords visual evidence of the closing of the valve, so that the operator is warned against the exercise of further pressure upon the head of the screw-shank.

My extension-box E fits the rear end of the cylindrical shell, and its lower part e is adapted to hold a wick of asbestos or other suitable material to act as a vehicle for alcohol or other volatile and inflammable fluid, the flames from which are to be driven by the air-blast against the vaporizing-tube B and valve V.

The blast nozzle-pipe is secured in position at the rear of the starting-cup e , just below the edge e' of the extension-box, and is formed with a series of openings p , inclined toward the said vaporizing-tube B and valve V. The nozzle-pipe P is supplied with air under pressure by means of one or more inlet-pipes p' , the air under pressure being obtained from any convenient source, as from a tank or compression-pump, as set forth in my concurrent application hereinbefore referred to. I prefer, however, to provide means whereby an ordinary hand-bellows may be utilized in lieu of the hand-pump mentioned in said concurrent application, and for this reason provide the nozzle-pipe P with a supply-pipe p^2 , formed with a funnel-shaped coupler p^3 for the reception of the nose i of a hand-bellows I, a portion only of which is shown in the drawings. The other pipe p' may extend to any other source of compressed-air supply, valve p^4 p^5 being interposed in the pipes to enable one to be shut off while the other is in use, or vice versa. By adapting the heater for connection with an ordinary hand-bellows I am enabled to dispense with the bulk and weight of a compressed-air tank or air-force pump or to provide for an emergency in which either of the said sources of compressed air are not available.

The more important features of my invention, however, consist in providing the extension-box E with an air gate or slide S, adapted to be withdrawn bodily to give access to the needle-valve V or to be adjusted with relation to the compressed-air nozzle P, so as to let more or less air under atmospheric pressure into the box above said compressed-air nozzle P in a plane substantially parallel thereto, as will be understood by reference to Figs. 6 and 8 more particularly. Thus a sheet or layer of air under atmospheric pressure may be drawn in between the lower edge s of the gate and the edge e' of the extension-box, just sufficient to meet the requirements of the compressed-air blast by which the current of external air is induced and just sufficient to effect therewith the perfect combination of the hydrocarbon-vapor ejected through the

needle-valve V and to force the products of combustion out of the nozzle N to perform the work desired. The gate S may be used as a means of modifying the effective force of the compressed-air blast for the purpose of regulating the discharge pressure through the nozzle N as necessary, thus performing the double function of admitting air for combustion and of regulating the excess of internal pressure over that of the atmosphere. In fact, it performs a third function in that it prevents back draft that might otherwise occur by reason of excess of air-pressure (as wind) at the outer end of the nozzle N, since it to all intents and purposes closes the rear end of the cylindrical shell A excepting in so far as the comparatively narrow opening between the lower end s of the gate S and the upper rear edge e' of the extension-box E is concerned, and as this space d is protected by the compressed-air blast immediately in front of and below it there can be no reversal of the flame.

It is obvious that the slide-gate S may be mounted adjustably upon the rear of the extension-box E by various well-known mechanical expedients with like results. By way of illustration I show it in the accompanying drawings as formed with tongues s' s' , resting in grooves e^2 e^2 in the rear edges of the box E, and as formed with a lug s^2 , through which an adjusting-screw T passes to bear against the upper side of the box, and thereby support the gate-slide S, with its lower edge s more or less removed from the edge e' of the box E, as hereinbefore set forth. It is obvious that under certain conditions it may not be necessary to admit external air to the extension-box E, as where the air-blast is suitable in volume and pressure to effect the complete combustion of the hydrocarbon-vapor and the forcible discharge of the products of combustion, in which case the slide S may be advantageously kept closed and will then act simply to seal the rear of the cylindrical shell and the extension-box E and maintain the excess of pressure therein.

It is obvious that by admitting air under atmospheric pressure in proximity to and substantially parallel to the compressed-air blast I avoid irregularity in circulation and tension of air-currents within the heater and insure an even admixture of atmospheric and compressed air, the compressed-air jets just inside the edge e' of the extension-box E sucking in a more or less thin even sheet or layer of the atmosphere and projecting it directly against the vaporizing-tube B and needle-valve V in such manner as to positively effect the perfect combustion of the hydrocarbon-vapor and the expulsion of the products of combustion through the nozzle N.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the cylindrical shell, the vaporizing-tube, needle-valve, and hydro-

carbon-supply pipe, the extension-box fitting on the end of the cylindrical shell, the starting-cup formed in the lower part of the extension-box, the compressed-air nozzle situated inside the extension-box and at the back of the starting-cup, means for supplying compressed air to said nozzle, and an adjustable gate-slide having a lug extending over the top of the box and a screw passed through said lug and engaging the top of the box for regulating the amount of air under atmospheric pressure admitted to the extension-box in proximity to the compressed-air nozzle, substantially as and for the purpose herein set forth.

2. The combination of the cylindrical shell, the vaporizing-pipe, needle-valve, and pipe for supplying hydrocarbon thereto, the extension-box fitting on the rear end of the cylindrical shell, the starting-cup formed in the lower part of the extension-box, the compressed-air nozzle situated below the rear edge of the starting-cup, a gate-slide situated at the rear side of the extension-box and having a horizontal lug extending over the top of the box, and means engaging said lug and the top of the box for adjusting said gate-slide with relation to the rear edge of the starting-cup for the purpose of regulating the admission of air under atmospheric pressure

to the extension-box, substantially as described.

3. The combination of the cylindrical shell A, the vaporizing-tube B, the needle-valve V, the hydrocarbon supply-pipe *b*, the extension-box E, fitting the end of the cylindrical shell A, the starting-cup *e*, the compressed-air nozzle P, formed with the inclined passages *p*, means for supplying compressed air to the said nozzle P, the bodily-removable gate-slide S, and means for adjusting it with relation to the rear edge *e'*, of the starting-cup *e*, substantially in the manner and for the purpose set forth.

4. The combination with the cylindrical shell A, vaporizing-tube B extending lengthwise within said shell, needle-valve V in the end of said tube, supply-pipe *b*, the extension-box E, formed with the starting-cup, the compressed-air nozzle P disposed within said box and extending transversely along the edge thereof, and the supply-pipe connected therewith and formed with the funnel-shaped coupling *p*³, for the reception of the nose of a hand-bellows, substantially in the manner and for the purpose described.

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