

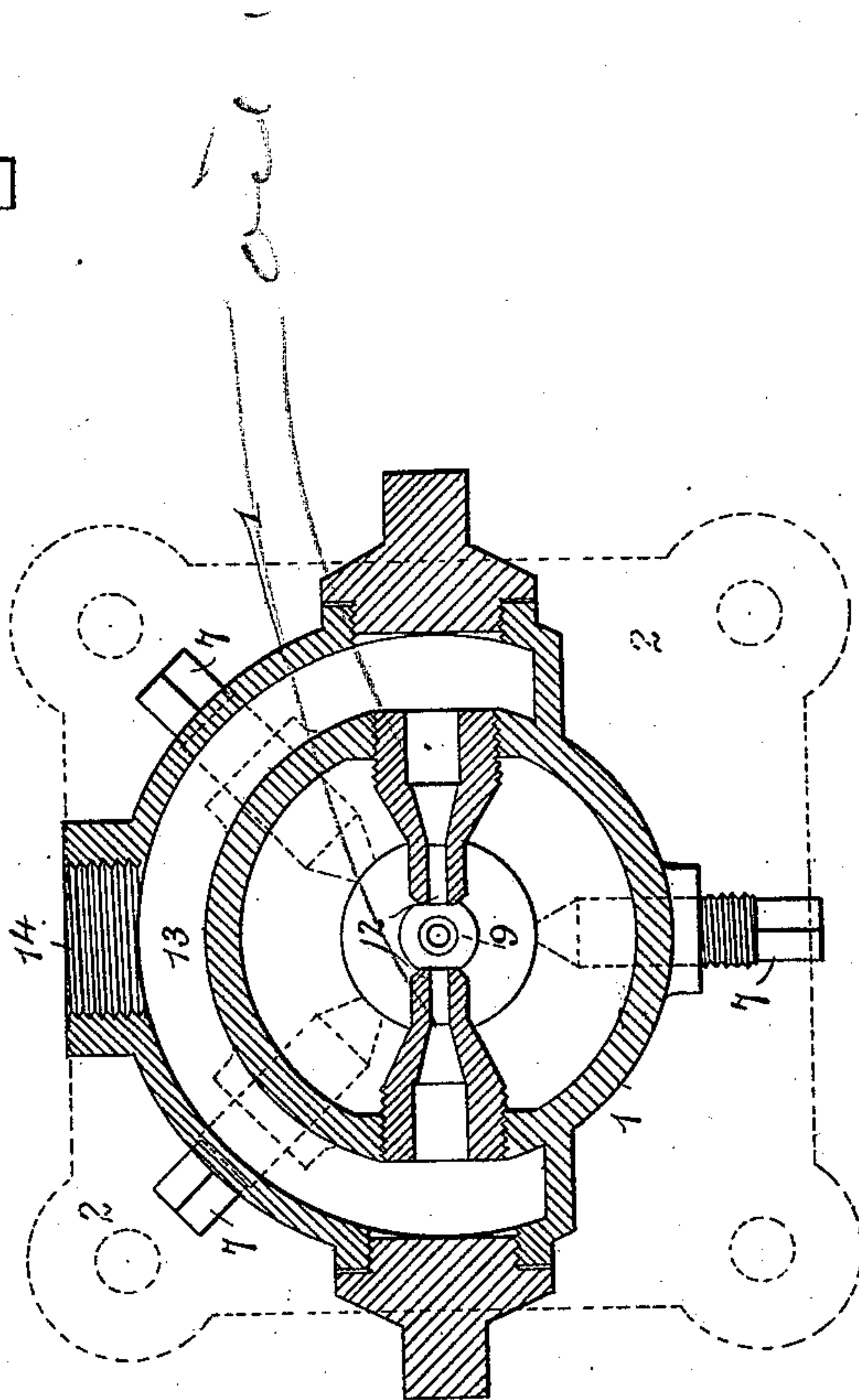
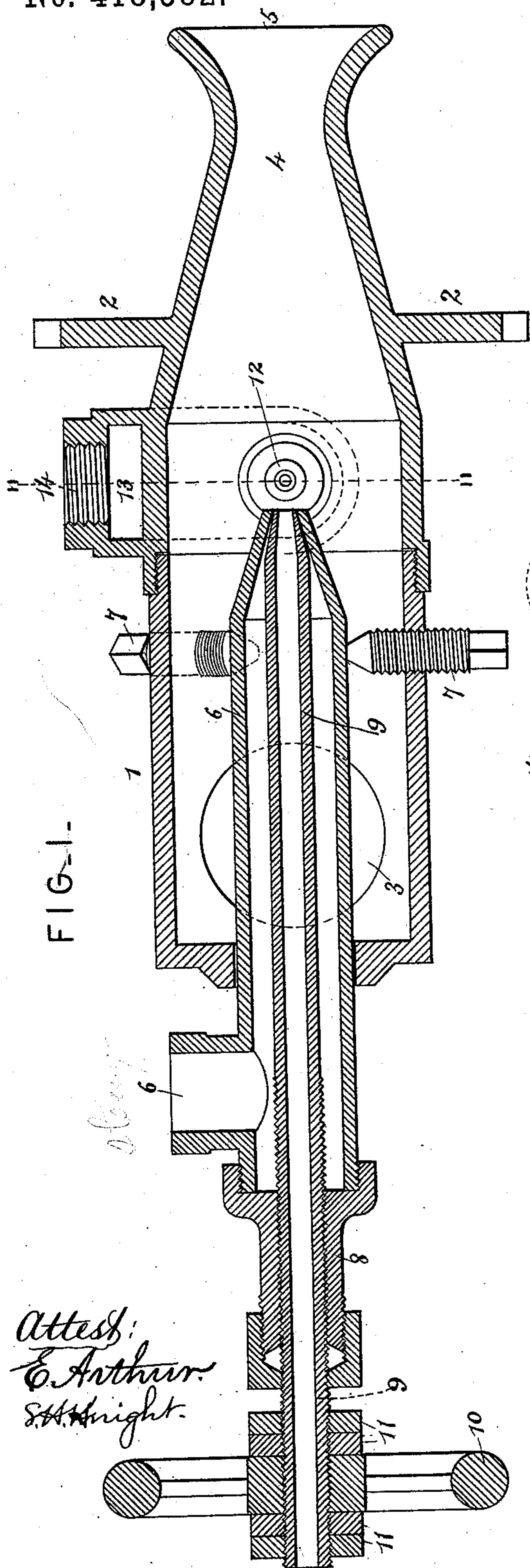
(No Model.)

2 Sheets—Sheet 1.

M. M. MONSANTO.  
HYDROCARBON BURNER.

No. 418,582.

Patented Dec. 31, 1889.



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E. Arthur.  
S. H. Knight.

Inventor:  
M. M. Monsanto  
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His Attorneys.

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**Fig. III**

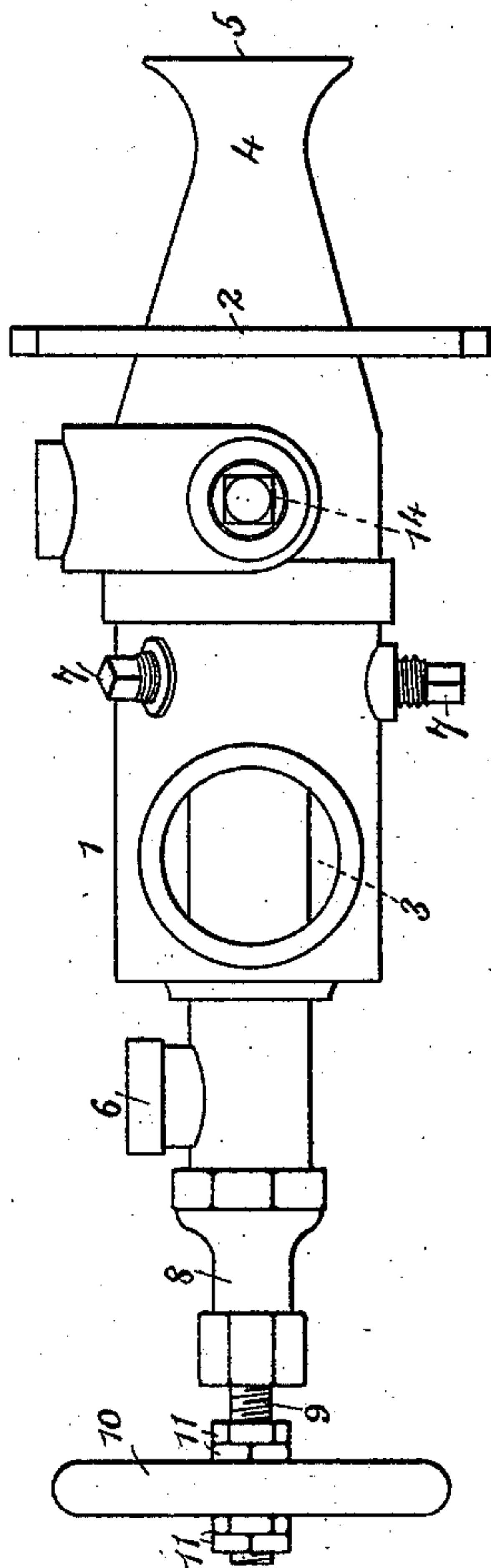
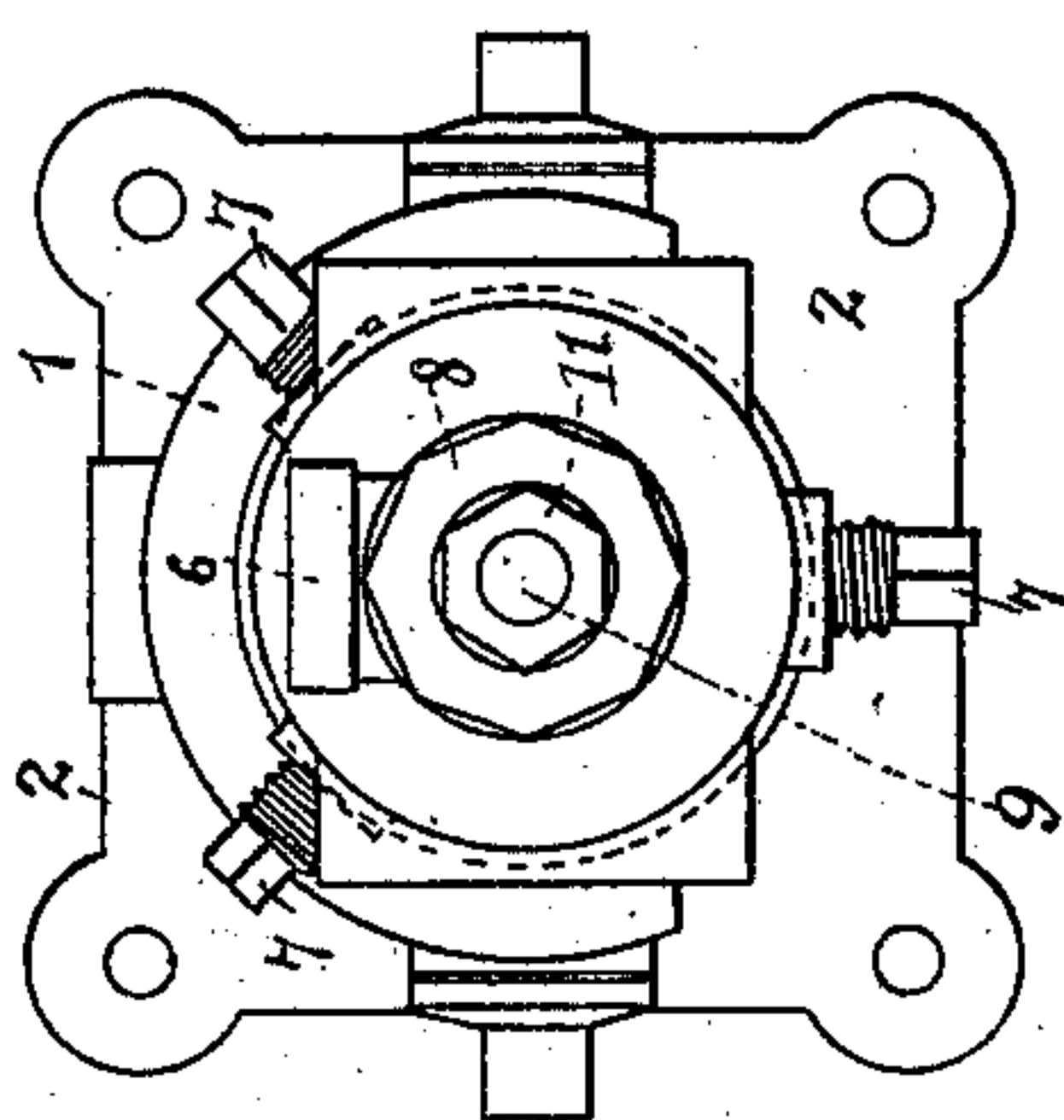
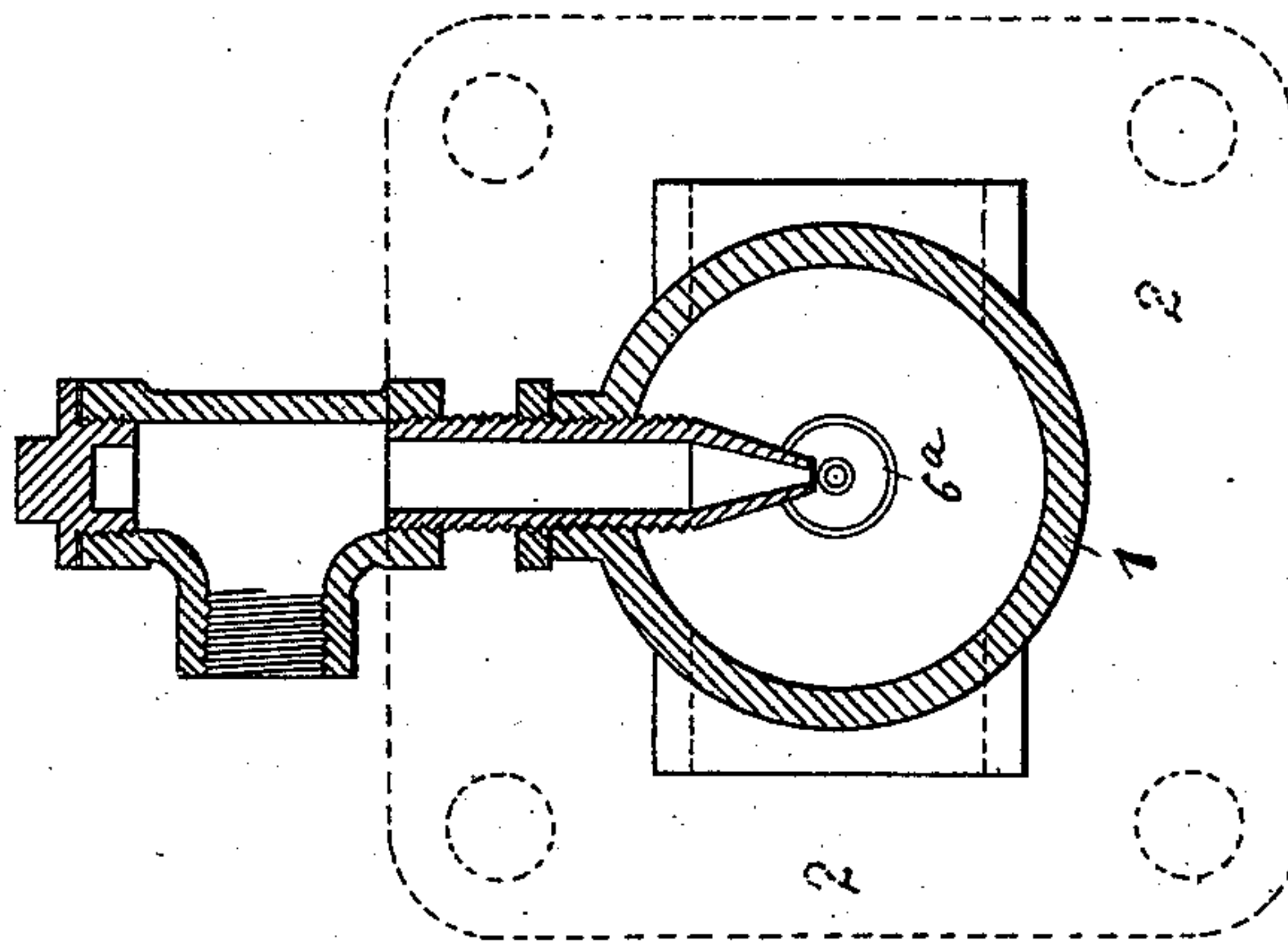


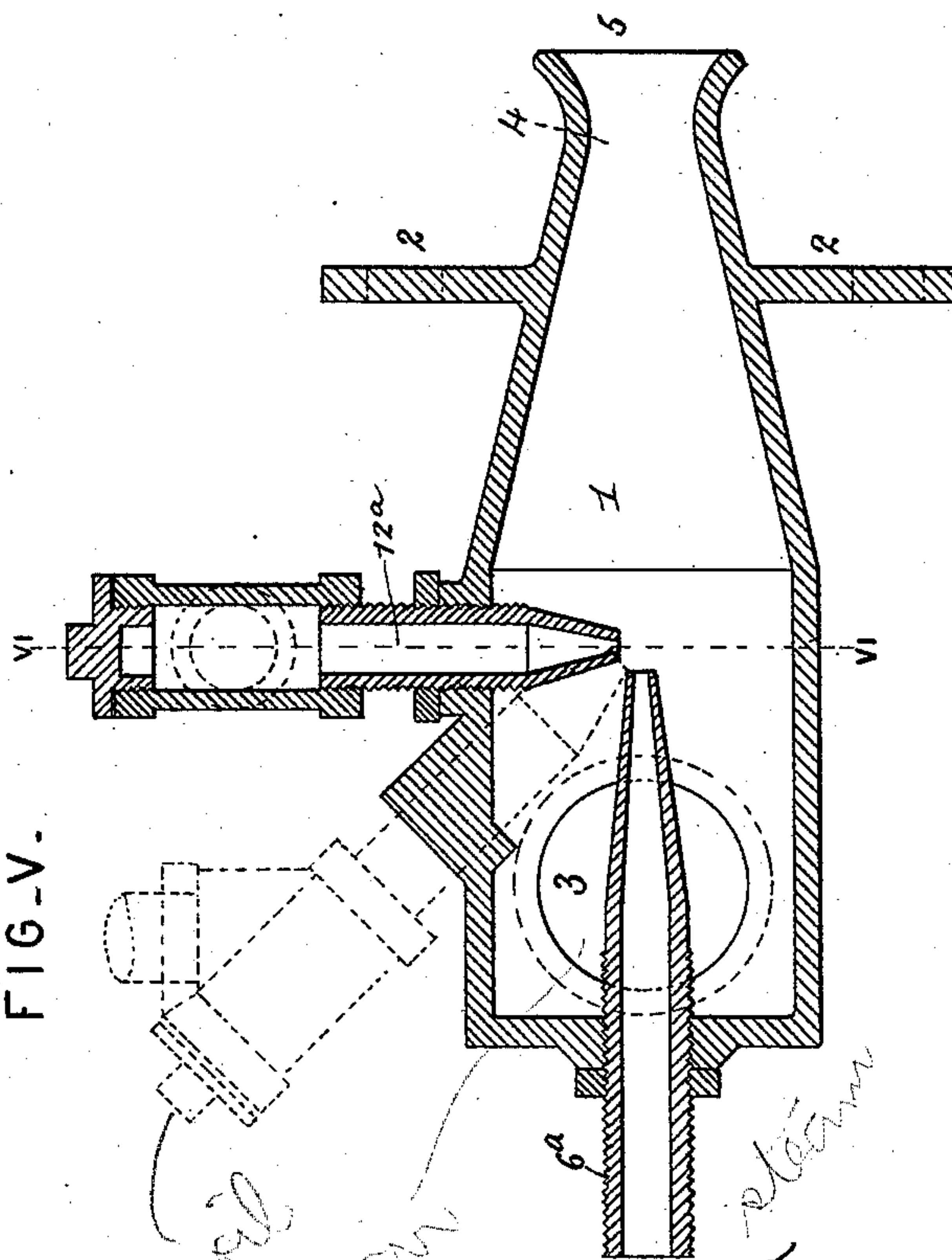
FIG-IV-



**FIG-VI.**



**FIG-V:**



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# UNITED STATES PATENT OFFICE.

MAURICIO M. MONSANTO, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO ERNEST T. FELLOWES, OF NEW YORK, N. Y.

## HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 418,582, dated December 31, 1889.

Application filed October 7, 1889. Serial No. 326,179. (No model.)

*To all whom it may concern:*

Be it known that I, MAURICIO M. MONSANTO, a citizen of the United States of Colombia, residing at Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Hydrocarbon-Burners, of which the following is a full, clear, and exact specification.

My invention relates to a hydrocarbon-burner in which a forcible jet of steam, coming in contact with oil introduced through contracted nozzles, atomizes and vaporizes the said oil, and at the same time causes a strong induction of air, which, mingling with the vaporized oil and steam, produces an explosive mixture within the burner, ready to flash into flame instantly on emerging therefrom.

In the preferred form of my invention I employ concentric steam and air inlet pipes, a central air-pipe being surrounded by the steam and screwed within an adjusting-cap at the heel of the burner, so that the said air-pipe, being fitted in front to the contracted nozzle of the steam-inlet pipe, forms a needle-valve therefor to accurately regulate the inflow of steam. The oil is admitted through a cored passage partly surrounding the burner and provided with inwardly-projecting radial nozzles terminating just in front of the concentric steam and air pipes. The burner-chamber extends to a considerable distance back of the point where the steam, air, and oil pipes are thus admitted, and is provided back of this point with free inlet-openings, by which an additional supply of air is introduced within the burner-chamber, acting, in conjunction with the current induced by the steam in the central air-pipe, to "sandwich" the oil within the air at the moment it is subjected to the atomizing and vaporizing effect of the forced jet of steam. The discharge-orifice of the burner is formed with a contracted throat and a flaring mouth, whereby the flow of the carbureted air is greatly facilitated, and by effecting an easy flow of the gas the noise resulting from the flow in ordinary converging cones is greatly diminished or entirely avoided. Furthermore, the flow of the gas through the contracted throat

is much increased, thus producing greater vacuum effect and resulting in a much larger supply of air through the central air-pipe, and also through the outer inlets. The oil-supply pipes are preferably arranged in radial planes around the steam-inlet, and may be either at right angles to the concentric steam and air pipes or at forty-five degrees or other oblique angle, as preferred.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure I is a longitudinal section of the burner in its preferred and complete form. Fig. II is a transverse section of the same on the line II II, Fig. I. Fig. III is a plan view of the same on a smaller scale. Fig. IV is a rear view, also on a smaller scale. Fig. V is vertical section of a burner embodying the invention, illustrating a modification especially adapted for atomizers or burners of small capacity. Fig. VI is a transverse section on the line VI VI, Fig. V.

1 represents the outer shell of the burner, the interior of which constitutes the atomizing and mixing chamber, which is constructed, as shown, with a perpendicular flange 2, by which it is mounted and fixed in position. At its rear end are one or more free inlets for air. The said shell of the burner contracts, as represented, toward the forward end, and at a short distance from the front is formed with a contracted throat or vein, beyond which is a flaring mouth 5. The steam-inlet pipe 6 is introduced concentrically in the rear of the burner-shell 1, extending some distance in front of the air-inlet 3, and is fixed in concentric or axial position by three or more radial set-screws 7. The said steam-pipe is formed with a contracted nozzle, and within it, mounted in the rear screw-cap 8 of the steam-pipe, is a central air-pipe 9, open at back, and with a tapering forward end accurately fitted to the interior of the converging forward end of the steam-pipe 6, so that by the longitudinal adjustment of the said concentric air-pipe 9 within the steam-pipe 6 it is made to act as a needle-valve to accurately regulate the annular orifice through



which the steam is forced into the burner. This longitudinal adjustment of the central air-pipe 9 is effected by a hand-wheel 10, fixed thereon by jam-nuts 11, in the usual manner. The central air-pipe 9 is open at both ends.

Directly in front of the contracted nozzle of the concentric steam-pipe 6 and air-pipe 9 are the inwardly-projecting radial nozzles 12 for the inlet of oil, connecting at their heels with the cored passage 13, open at its top 14, and surrounding the shell 1 of the burner.

In operation the central air-pipe 9, being adjusted within the steam-pipe 6 to produce the required limited capacity of annular orifice at the forward end, the effect of the above-described construction and combination of parts is to produce a forcible annular jet of steam in contact with the incoming oil, and by the force of the steam-current to induce a strong flow of air within the central air-pipe 9, which, mingling with the steam, and in connection with the air surrounding the annular steam-jet, sandwiches the atomized and vaporized oil, producing an explosive mixture in the most effective manner. The capacity of the burner-shell around the nozzle, through which the steam and air are thus admitted in contact with the oil, provides an ample and effective mixing-chamber for the gases thus produced. The contracted throat 4 and flaring outlet-nozzle 5 of the burner under the effect of the steam-jet produces a strong exhaust within the mixing-chamber, resulting in the free and ample induction of air through the free inlets 3, thus supplying a full volume of air to the mixing-chamber.

The modification shown in Figs. V and VI is designed for comparatively small power. The steam-ejection pipe 6<sup>a</sup> is open and uncontrolled at the outlet. The oil-supply pipe 12<sup>a</sup> is on top, either vertical, as shown in full lines, or at an angle of forty-five degrees, as illustrated in dotted lines, or at any other

oblique angle to the steam-pipe. The shell 1, forming an ample mixing-chamber with its contracted throat 4 and flaring mouth 5, are the same as in the other form of the invention, also the free air-inlet 3, which provides a full supply of air to the mixing-chamber by the induced current produced by the force of the steam-jet, driving the mingled gases out through the discharge-nozzle of the burner.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a hydrocarbon-burner, the combination, with the shell 1, forming the mixing-chamber and having air-induction ports 3, and oil-jets projecting transversely into said shell, of a steam-pipe arranged axially within said shell and terminating between said air-ports and oil-jets, and a central air-pipe arranged axially within said steam-pipe, said air-ports 3 being arranged between the heel of the burner and said oil-jets, substantially as and for the purposes set forth.

2. In a hydrocarbon-burner, the combination, with the shell 1, forming a mixing-chamber provided with a contracted throat and a flaring mouth and having the air-induction ports 3, and oil-jets projecting transversely into said shell, of a steam-pipe having a contracted nozzle arranged axially within said shell and terminating in advance of said air-ports and between the latter and said oil-jets, and a central adjustable air-pipe arranged axially within said steam-pipe and forming a needle-valve, said air-inlets 3 being located between the heel of the burner and said oil-jets, said pipes and oil-jets being arranged to discharge within the mixing-chamber between its contracted throat and the inlets 3, substantially as set forth.

MAURICIO M. MONSANTO.

Witnesses:

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C. DELEFEBORE.