

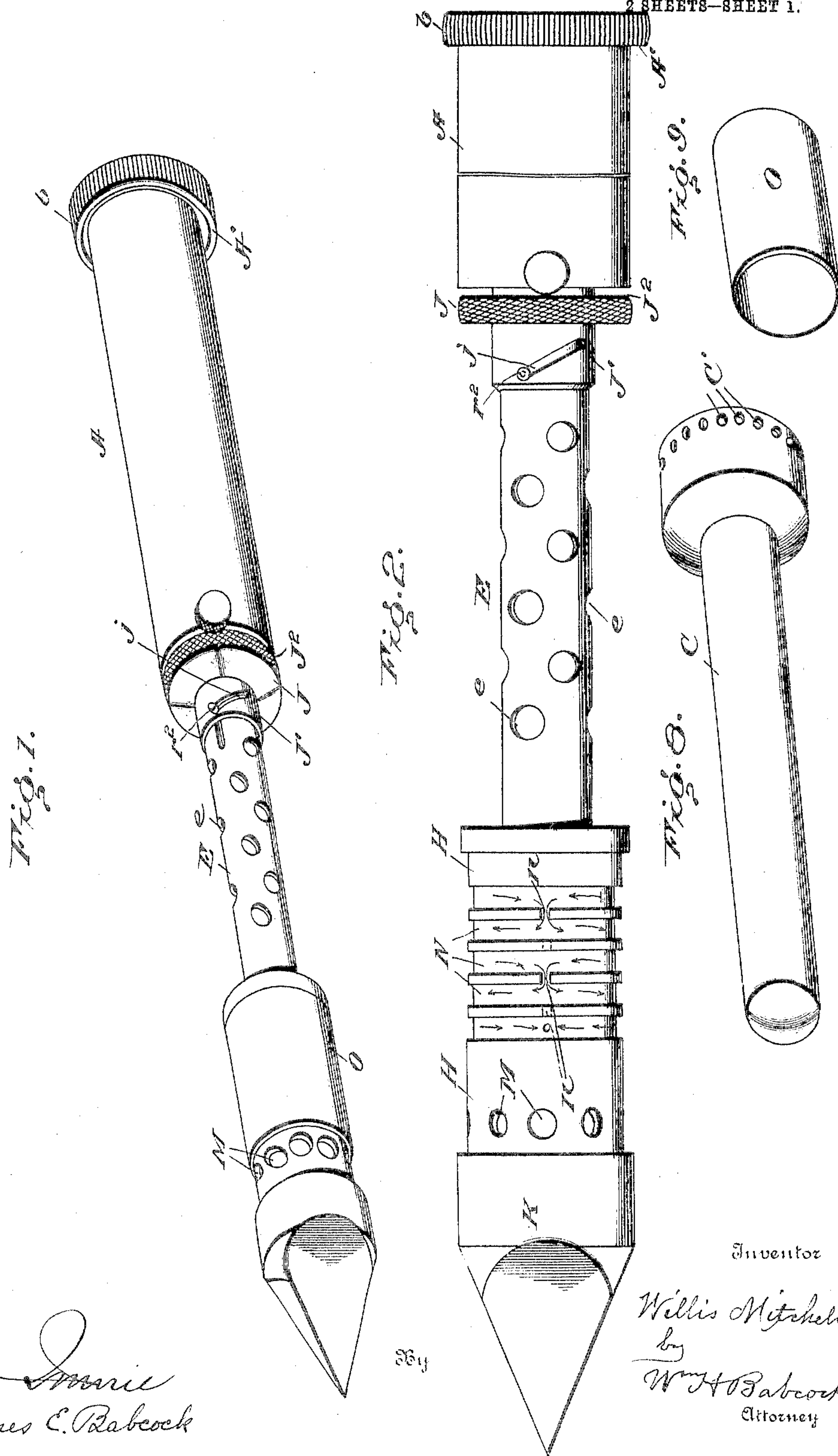
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W. MITCHELL.
VAPOR HEATED OR GAS HEATED IMPLEMENT.

APPLICATION FILED DEC. 16, 1903.

2 SHEETS—SHEET 1.



Witnesses

James C. Babcock

Inventor

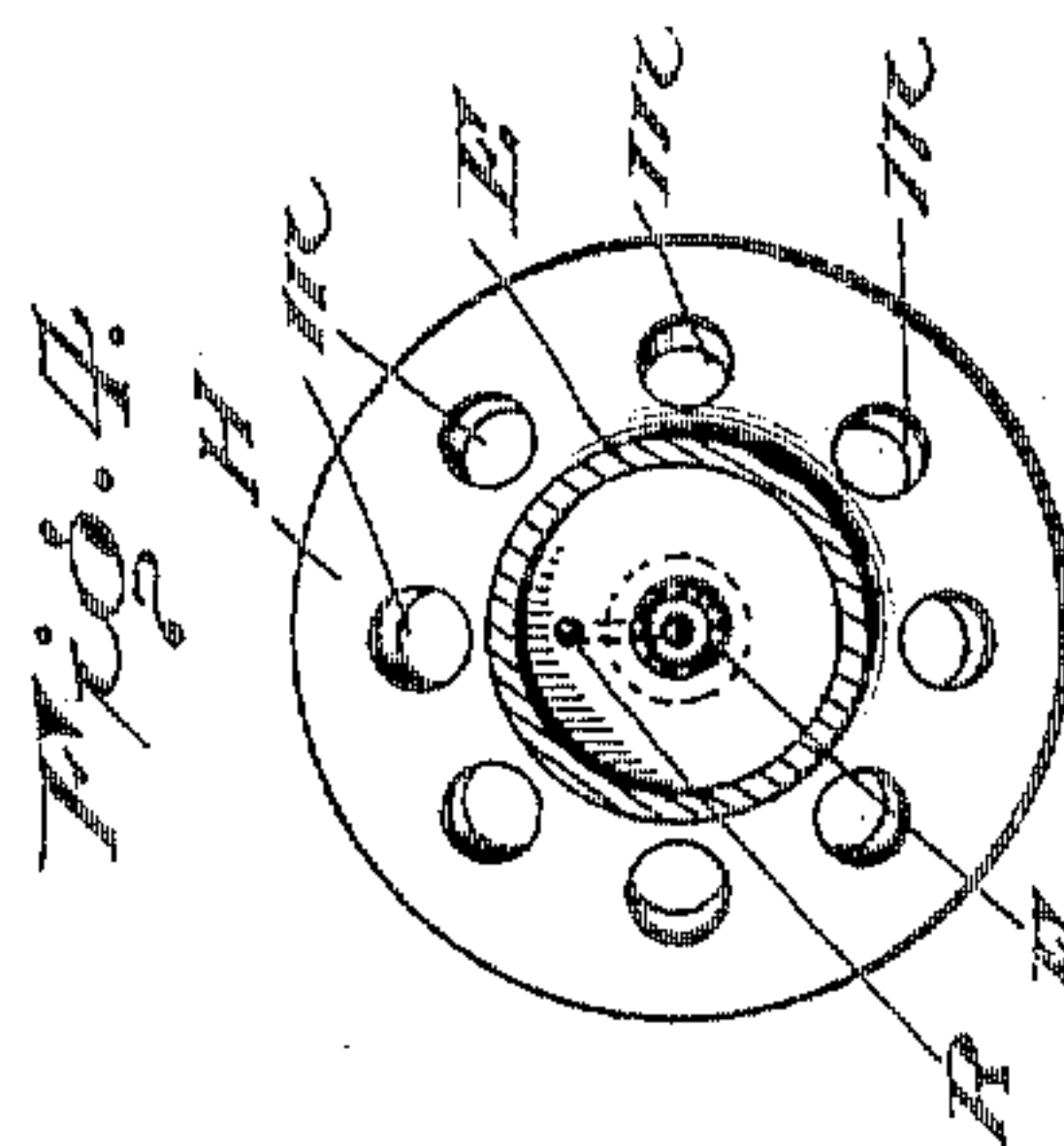
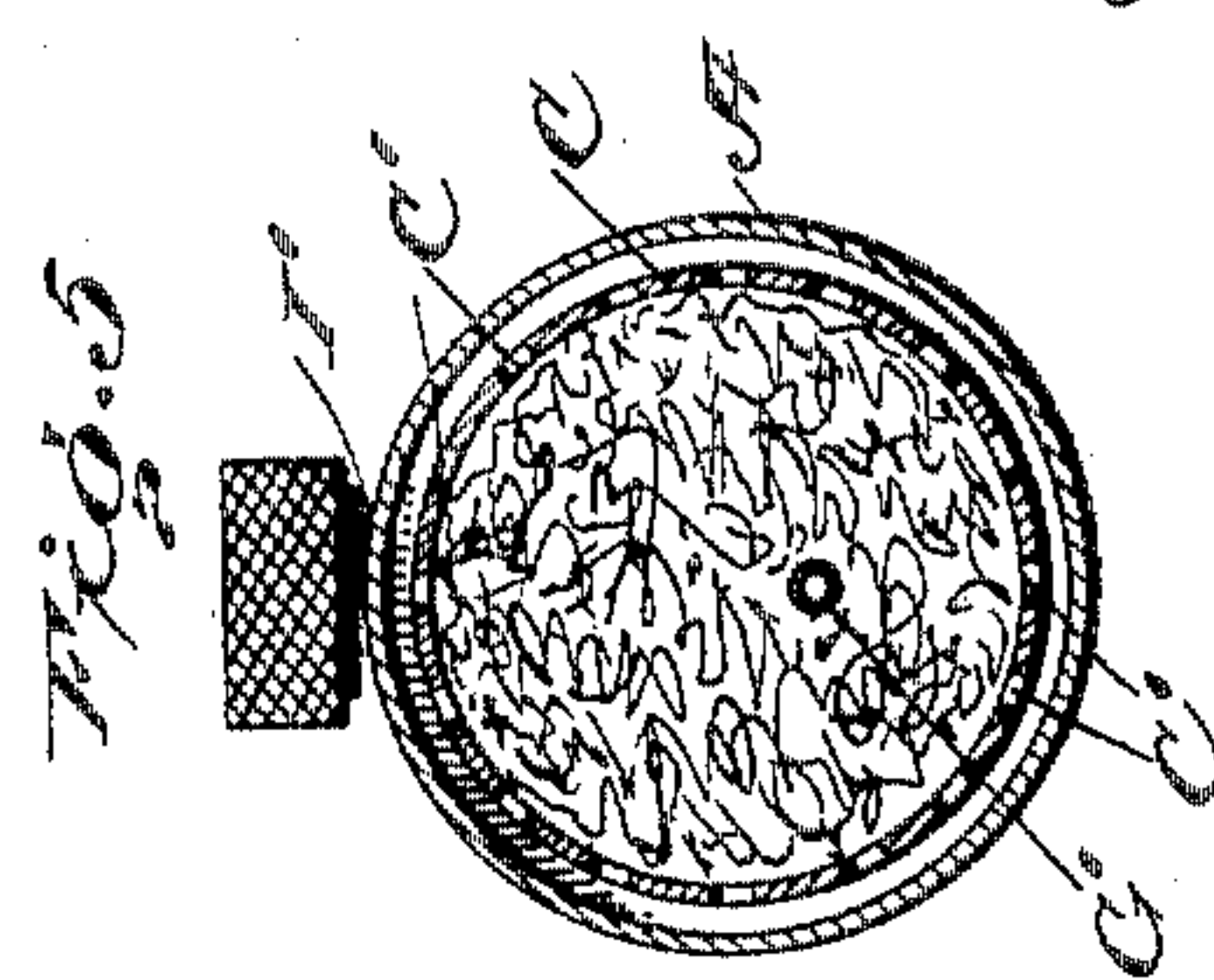
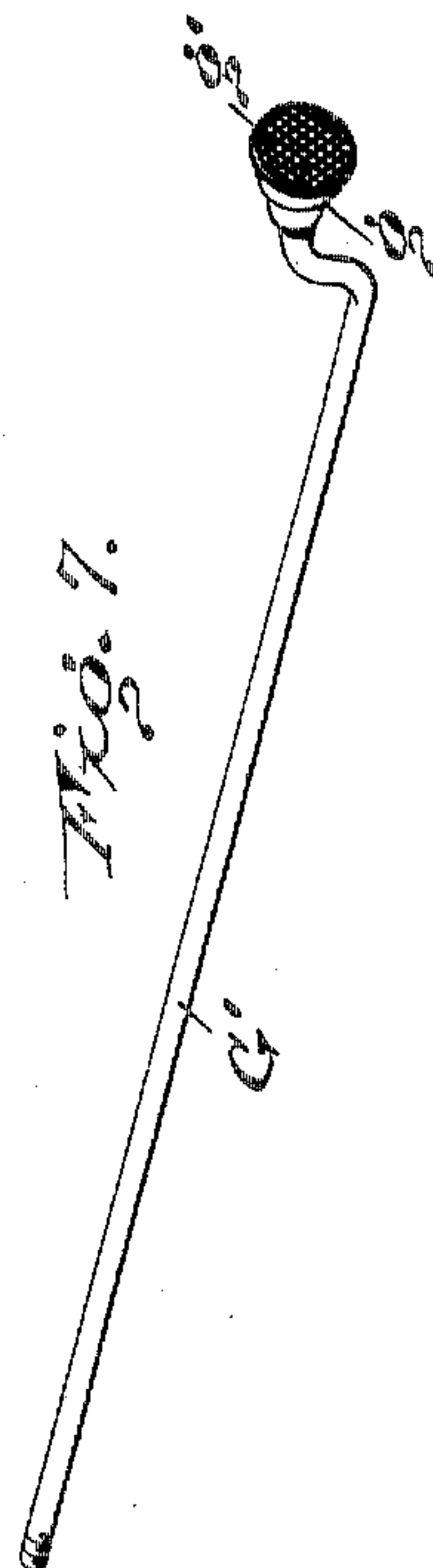
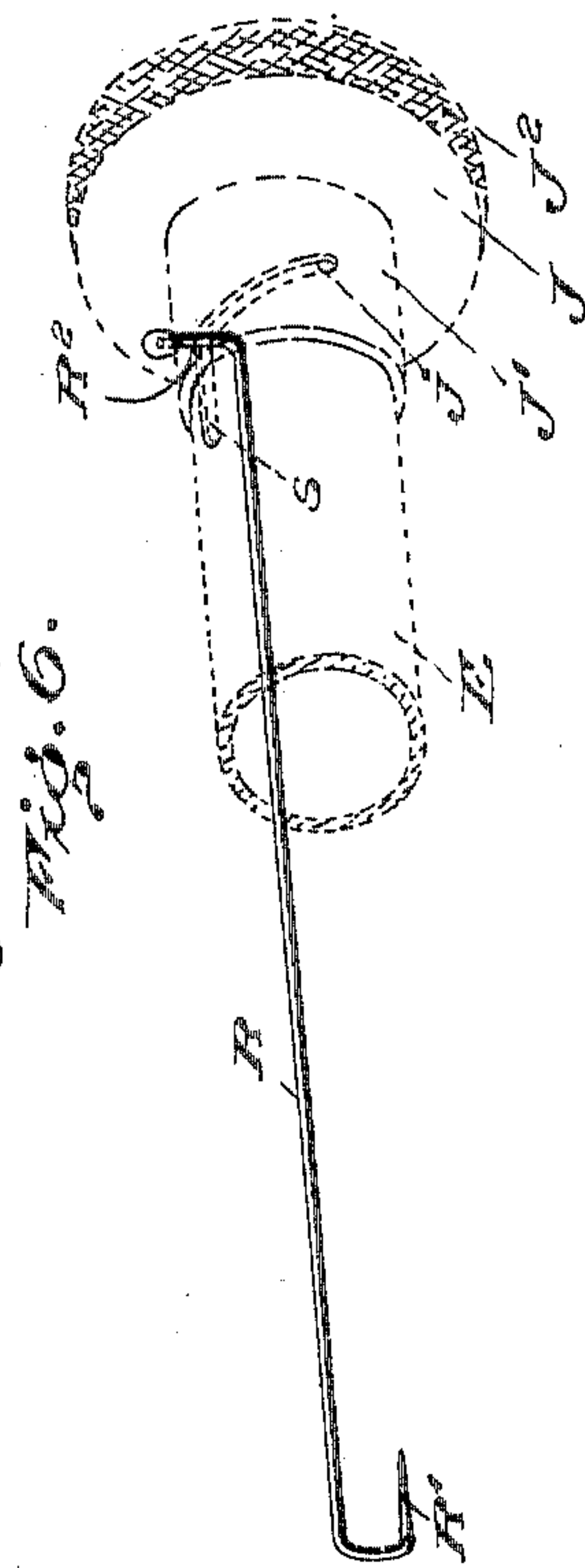
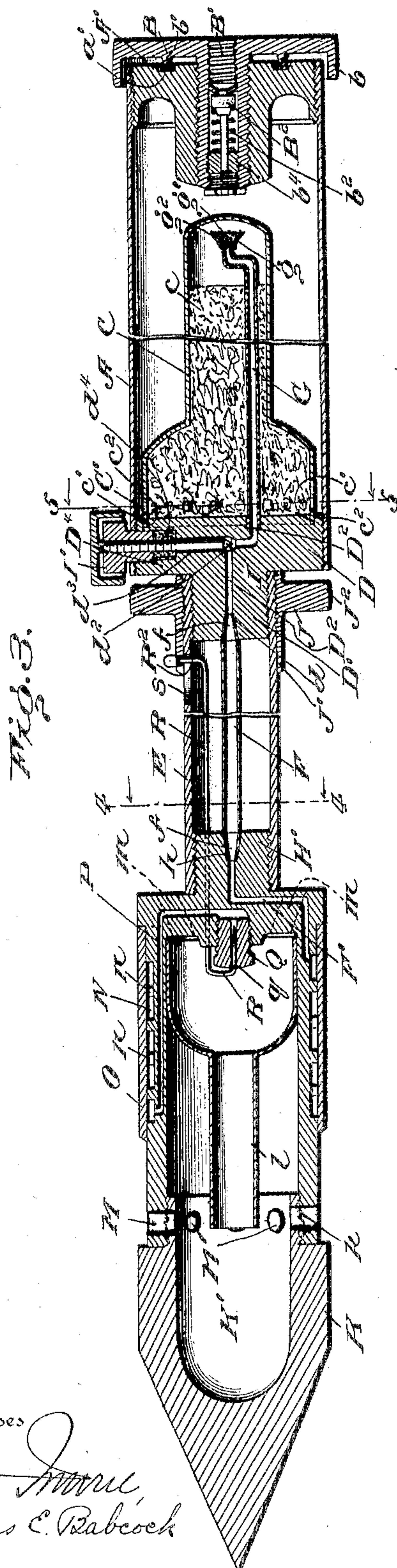
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2 SHEETS—SHEET 2.



Witnesses

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIS MITCHELL, OF MALDEN, MASSACHUSETTS.

VAPOR-HEATED OR GAS-HEATED IMPLEMENT.

SPECIFICATION forming part of Letters Patent No. 793,894, dated July 4, 1905.

Application filed December 16, 1903. Serial No. 185,362.

To all whom it may concern:

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Vapor-Heated or Gas-Heated Implements; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to vapor-heated implements for soldering, brazing, and similar work; and it consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of a soldering-iron embodying my invention. Fig. 2 represents an enlarged side elevation of the same without the shell O. Fig. 3 represents a longitudinal central section of the same. Fig. 4 represents a cross-section on the line 4 4 of Fig. 3 looking toward the point of the tool. Fig. 5 represents a similar cross-section on the line 5 5 of Fig. 3. Fig. 6 represents a detail perspective view of the valve-rod, the adjusting-screw and part of the tubular shank appearing in dotted lines. Fig. 7 represents a detail perspective view of the gasolene-tube. Fig. 8 represents a detail perspective view of the pocket for absorbent material in reversed position, and Fig. 9 represents a detail perspective view of the removable shell of the generator.

A designates the handle of my tube, which is also the tank or reservoir for gasolene or other inflammable and easily-vaporizable liquid. A' designates a plate or casting closing the rear end of the same and centrally screw-tapped to receive the screw-threaded stem of a plug or cap B, which covers this end of the tool and is provided with a central bore B' and a milled head b. The said plate or casting and the said plug or cap are respectively provided with an annular groove a' and an annular rib b', which fit together, having packing between them to prevent leakage. The said bore B' is screw-threaded at its outer end for convenience of coupling an air-pump

or other air-forcing device and is provided with an air-inlet valve B², having a spring b², which bears against a block or plug b⁴, screwed into the inner end of said bore B'. This block is provided with a central air-passage, connecting the space about said spring to the interior of the reservoir, and thus completing the passage for compressed air entering the latter.

C designates an elongated pocket or shell containing capillary absorbent material and having its forward end of considerably greater diameter than the remainder of said pocket. This forward end is provided with a series of holes arranged all around it and designated C'. The absorbent material is designated c and fills the said pocket, except a small space at the closed rear end. D designates a plate or casting screwed into the forward end of the reservoir or handle A and having the broad forward end of the said pocket or shell fastened thereto.

E designates the hollow cylindrical shank of the tool, having air-holes e through its side and internally screw-threaded at its rear end to engage a correspondingly-threaded hub or forward extension D' integral with the plate or casting D. A gasolene-conduit F, having tapering ends f, fits into correspondingly-tapered recesses d and h, respectively, made in said hub or extension and in a similar hub or extension H', which closes in like manner the forward end of shank E. The casting D and its extension D' are provided with an approximately central bore D², connecting the rear end of conduit F with the forward end of a gasolene-tube G, which extends straight back through the pocket or shell C for nearly the whole of its length to the terminal open space within said shell beyond the absorbent material c, where it is provided with an inlet-mouth g of bell form, having a screen g' across it to prevent the ingress of fine particles of such absorbent material. This flaring inlet-mouth may be provided with any suitable filtering material g², held in place by said screen. The gasolene-tube G is held rigidly within the said pocket, preferably having its forward end securely fitted into the rear end of bore D². This bore is bent at right angles at d², form-

ing an elbow for the convenient reception of the point of a radially - operating valve I, which governs the flow of gasolene from the tank to the generator. This valve works back
5 and forth in a corresponding bore d^3 of plate or casting D, communicating with the bore D^2 at the elbow or angle d^2 , being screw-threaded to engage a screw-tapped follower I', which is screwed into a packing-box D',
10 containing packing d^4 , said box being a recess in casting D in outward continuation of bore d^3 . The said pocket is removable from the said tank at will.

J designates valve-adjusting collar, which is
15 internally screw-threaded to engage external screw-threads in the rear end of shank E and provided with a milled periphery J^2 , an integral annular forward extension or hub J' , concentric with the said shank and contiguous
20 thereto, being of considerably less diameter than the said milled rim. This hub is smooth on its inner face and need not exactly touch the said shank. It is provided with a long curved slot j , extending obliquely from front
25 to rear in direction, though more nearly transverse than longitudinal. This overlies a shorter slot s , formed in the rear part of tubular shank e .

The solid hub or extension H' aforesaid is
30 in one piece with a cylindrical casting H, constituting both the body of the soldering-iron and also the body of its generator. The forward end of this casting is internally screw-threaded to receive a correspondingly-screw-
35 threaded cylindrical rear extension k of the point or head K. When this head is screwed in place, the tool is a soldering-iron. When it is unscrewed and removed, the tool becomes
40 a torch for use in burning off paint, soldering by blaze, or as needed. This head or point is provided with a deep recess K' , to receive the discharge of flame from the chimney l of a mixing-chamber L within the rear part of
45 the said body or casting H. Oblique air-holes m extend through the rear part of this casting into said mixing-chamber. Outlet-holes M extend through the sides of said casting near its forward end in proximity to the discharge end of said chimney. The gener-
50 ator consists of a series of annular grooves or retorts N, formed in the said body H and covered by a cylindrical shell O, they being connected together by short passages n and supplied from the conduit F, through a bore
55 F' , formed in the parts H' H. The generator discharges from its forward retort through an outlet-passage P, running back through the said body H nearer to the mixing-chamber than are the said retorts and discharging
60 into the said mixing-chamber through a jet-hole q and a jet-block Q, screwed centrally into the forward face of the rear end or base of casting or body H. This jet-block constitutes a jet-nozzle for vapor or gas and need
65 not be in the form of a block at all. The gen-

erator-body may be wrought instead of cast and need not be absolutely in a single piece, since it would be practicable to fasten several sections together in making it if found more
70 convenient. Its shape is not necessarily that of a true cylinder, since many prismatic and other hollow forms would be practical equivalents. The jet-nozzle will not usually discharge vapor, but a fixed gas. The rearmost
75 retort, which is nearest the point or head and last to receive the flow of gasolene, is generally referred to as the "last," while that at the outer or forward end of the series is called the "first" retort.

R designates a long valve-rod which passes
80 through a bore in extension H' and the rear part of body H, also longitudinally through the interior of tubular shank E as far as the slots s, j , being provided at its rear end with a lateral arm or handle R^2 , which extends ra-
85 dially outward through the said slots. The forward end of rod R is provided with a hook R' , which bends around in front of the jet-hole q and is presented rearwardly thereto, so as to close the same or open it more or
90 less, according to its position of longitudinal adjustment. This adjustment is effected by turning the adjusting-collar to the right or the left, as needed, its screw-threaded connec-
95 tion to the shank E causing it to move forward or backward as thus turned and moving correspondingly the rod R and valve R' by reason of the engagement of the arm or handle R^2 with the oblique walls of said slot. This obliquity is arranged to prevent bind-
100 ing, while insuring such forward and backward movement. For the same purpose the slot j is curved.

The operation is as follows: The gasolene flows from the tank into the pocket contain-
105 ing the absorbent material, which becomes saturated therewith and supplies the excess to the space at the end of said pocket, where the gasolene-pipe receives it through its screen. This gasolene is under pressure from the air
110 first pumped into the tank, and such pressure, with the capillary action of the absorbent material, insures a sufficient supply. The said material when once saturated acts as a receptacle or accumulator for storing the gasolene
115 and yielding it up to the gasolene-tube irrespective of the position of the tube. As the holes in said pocket are close to the shell of the tank all around the latter, the supply of gasolene to said pocket will be continuous, ex-
120 cept when the tool is used with the point uppermost. Such use will not often last long, and the supply in the absorbent material is relied upon in such contingencies, as it will drain down under the influence of gravity into
125 the closed end of the pocket, the pressure of the absorbent material itself tending to produce this result. When the tool is laid down or turned into any other than an upright position, the gasolene will be caused to pass
130

through the holes again into the interior of the pocket so long as there is any liquid remaining in the tank. This flow through the hole will continue even when the tool is up-
 5 right so long as the pressure of compressed air is strong. After the tank has been charged with compressed air and the absorbent material with liquid fuel the valve I is opened to allow the liquid to flow from the gasoline-pipe
 10 through the conduit F and the passage before described to the series of retorts of the generator, whence it returns as far as the jet-block, escaping through the jet-hole into the mixing-chamber. It is there mixed with air,
 15 as stated, and discharged through the chimney of said chamber. The last retort of the generator is the one nearest to this point of discharge and will receive the greatest amount of heat from the flames, turned back by the
 20 point or head before they finally escape through the holes in the side of the body H. The other retorts of the series are successively less and less exposed to such heat. Consequently the gasoline entering the rearmost re-
 25 tort as a liquid is there moderately heated and partly vaporized and passes thence to the second retort, where a higher degree of heat is applied to it, and so to the third retort and the remainder of the series, the heat continuing
 30 to increase as it advances, so that it issues from the last retort as a fixed gas. The jet-hole may be so regulated by the valve R' as to prevent the full volume of this gas from issuing through the same, or the jet-hole may be made
 35 small enough to insure this result when left open. In either case the excess of gas will go back through the generator, conduit, and gasoline-tube to the said pocket, passing thence into the tank and keeping up the pressure.
 40 The same result may, however, be attained by a sufficient charge of air, and this will in practice usually be found the more certain and satisfactory way.

The parts of the tool are easily separated
 45 for cleaning, both the pocket and the mixing-chamber being removably fastened to the parts which contain them, and the conduit F being also merely clamped to the parts D' and H' by the screw-threaded engagement therewith of
 50 shank E, which of course may be tightened or loosened at will, although the wedge-like contact of the tapering ends of said conduit with the proximate surfaces insures securely hold-
 ing it in place.

55 The course of the gasoline through the generator is indicated by arrows in Fig. 1, the short connecting-passages between the retorts being on opposite sides of the tool alternately. The valve R' cleans the jet-hole, beside con-
 60 trolling the flow.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a vapor-heated or gas-heated imple-
 65 ment for soldering and similar purposes, pro-

vided with a tank constituting the handle, a metal pocket attached to the forward end of the tank and extending rearwardly therefrom, absorbent material substantially filling the forward end of the pocket allowing a space for
 70 liquid fuel in its rear end, a tube having its open end in this space and extending forward through said absorbent material and the forward end of the tank to convey liquid for the
 75 generation of gas, the forward end of said pocket being arranged to leave a narrow space between the wall of the tank and provided around its periphery with unobstructed per-
 forations for the inlet of liquid fuel substan-
 80 tially as set forth.

2. In an implement of the character de-
 scribed, the combination of a source of fluid fuel, a vapor-generator consisting of a hollow
 body provided in its wall with a series of an-
 85 nular retorts and passages leading from one retort to another, a passage leading from the source of fuel to the retort nearest thereto and
 a passage leading from the retort nearest the burner to a jet-nozzle which discharges into a
 90 mixing-chamber within the generator, and a head or point to receive the discharge of flame from the mixing-chamber and turn the same
 back toward the generator.

3. In an implement of the character de-
 scribed, the combination of a fluid-fuel supply,
 95 a generator consisting of an outer shell fitting over a hollow body provided with annular grooves in its exterior and grooves connecting the said annular grooves so as to form a series
 100 of connected closed retorts, the groove nearest the source of fuel-supply being connected thereto, the groove nearest the burner being
 connected by a passage to a jet-nozzle, and a mixing-chamber within the hollow body, the
 105 generator being arranged so that the retort nearest the burner receives the greatest amount of heat from the flame, the others being heated to a decreasing extent in succession, substan-
 tially as described.

4. In an implement of the character de-
 110 scribed, the combination of a source of fluid fuel, a hollow generator consisting of a series of annular retorts connected by passages longitudinal of the generator, a passage for sup-
 115 plying fuel to the retort nearest the fuel-supply, a passage in the generator for conveying the vapor from the retort which is farthest from the supply of fuel to the jet-nozzle dis-
 charging into a mixing-chamber in the inte-
 120 rior of the hollow generator, means for admitting air into the mixing-chamber, means for turning back a portion of the products of combustion to impinge first on the retort far-
 thest from the fuel-supply and means for al-
 125 lowing the exit of the products of combustion.

5. In an implement for soldering and simi-
 lar purposes, a tubular shank internally screw-
 threaded at both ends, in combination with a
 conduit arranged within the same and tapered
 130 at both ends, a tank and the tool-body, each

having screw-threaded parts for engaging the said shank and tapering recesses fitting the ends of the said conduit, means for supplying liquid fuel from said tank to the rear end of
5 said conduit, a generator, means of communication between said conduit and the said generator, and means for discharging the gas produced by said generator in proximity thereto within the said body, in order that the flame
10 produced by the ignition thereof may heat the said generator as well as the operative end of said tool substantially as set forth.

6. In an implement for soldering and similar uses, a hollow generator-body, having
15 formed in its wall a series of annular retorts, a series of passages extending from one retort to another, an inlet-passage for fuel supplying the rearmost one of the said retorts and an outlet-passage for gas or vapor supplied

by the most forward one of the said retorts, 20 with relation to the operative end of said tool, in combination with a mixing-chamber and burner in the interior of the said hollow body, a gas-jet nozzle supplied by the said generator through the said outlet-passages and discharg- 25 ing into the said mixing-chamber, means for supplying liquid hydrocarbon to the rearmost of the said retorts and means for turning back the flame from said burner against the said generator, substantially as and for the pur- 30 pose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIS MITCHELL.

Witnesses:

E. E. ROCKWOOD,
H. P. TARBOX.