No. 765,641. PATENTED JULY 19, 1904.

N. A. SULLIVAN & W. F. RYAN.

SOLDERING IRON.

APPLICATION FILED DEC. 2, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

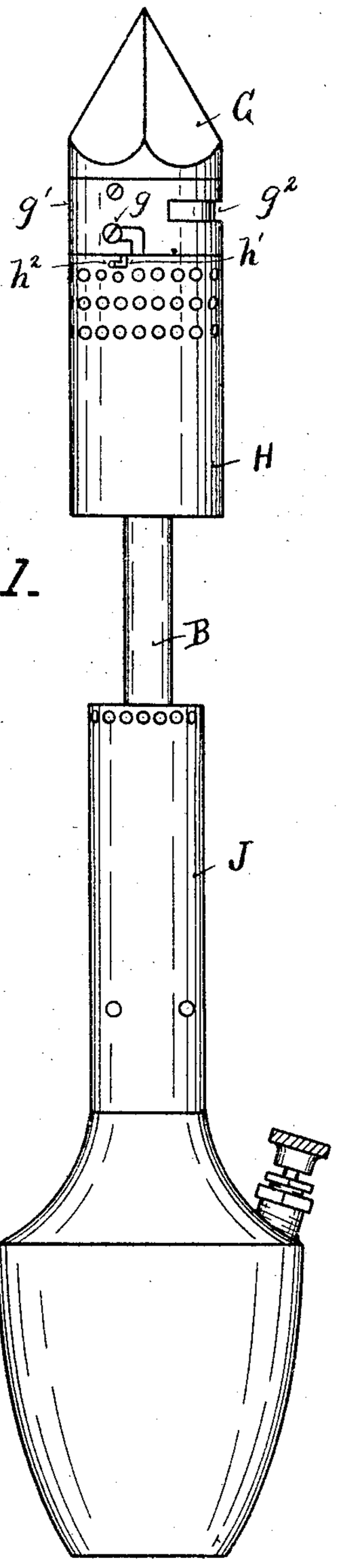

Fig. 1.

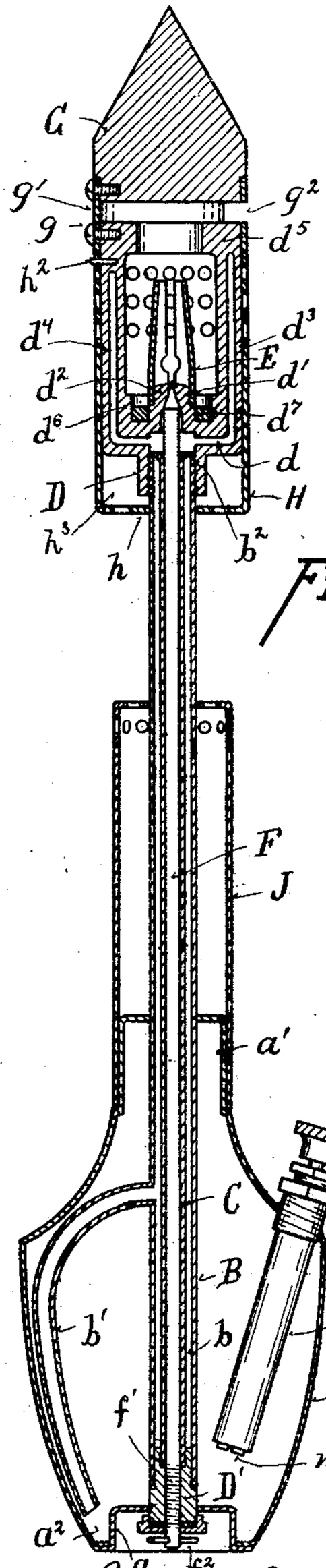

Fig. 2.

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NO MODEL. 2 SHEETS—SHEET 2.

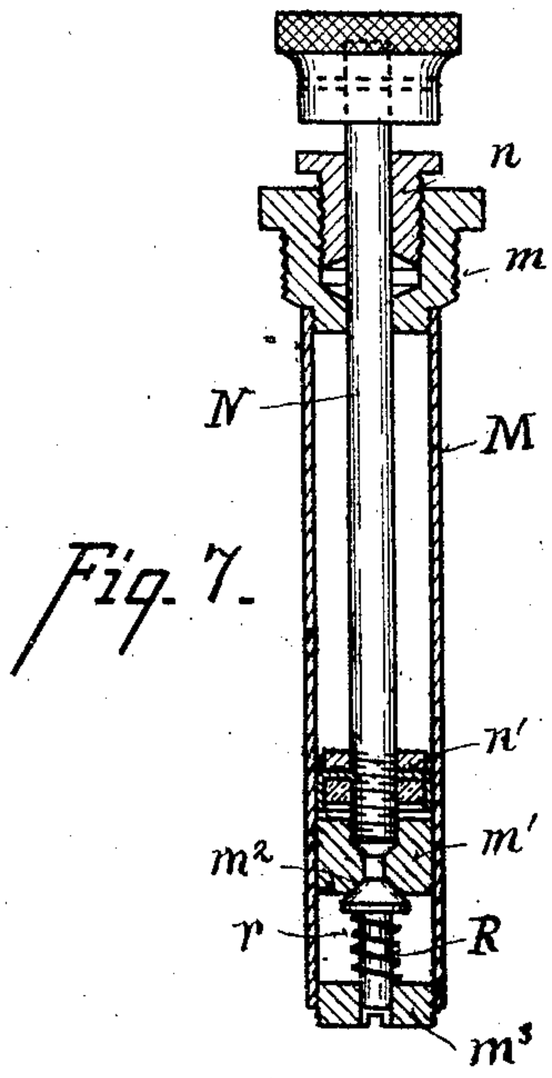

Fig. 7.

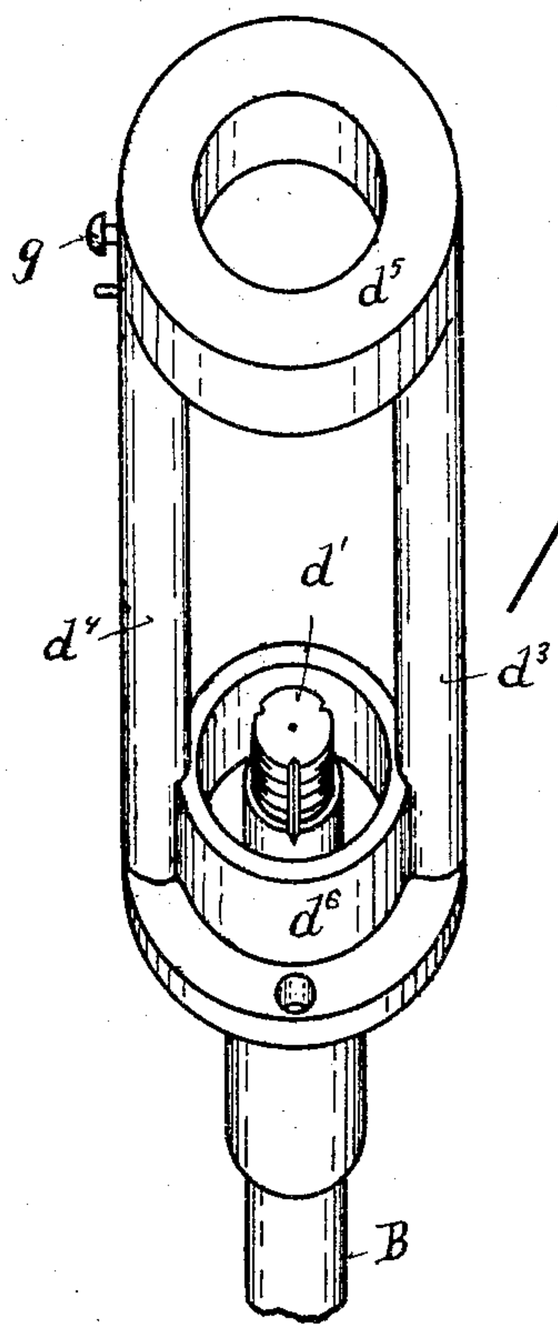

Fig. 3.

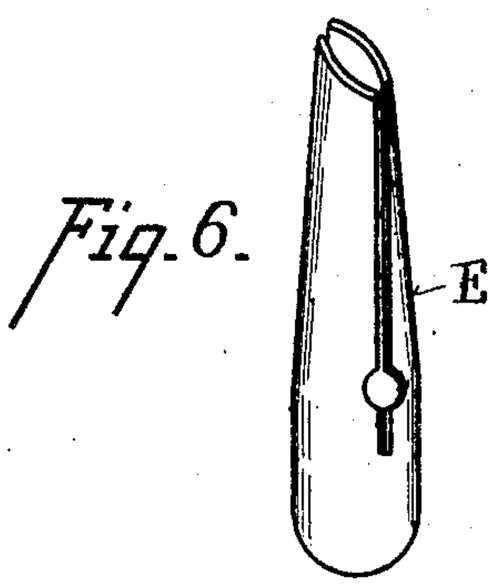

Fig. 6.

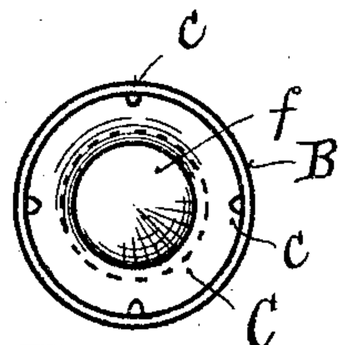

Fig. 5.

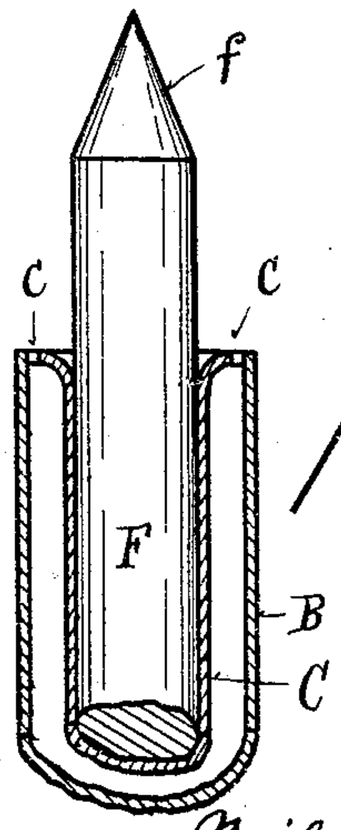

Fig. 4.

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No. 765,641. Patented July 19, 1904.

UNITED STATES PATENT OFFICE.

NEIL A. SULLIVAN AND WILLIAM F. RYAN, OF CINCINNATI, OHIO, ASSIGNORS OF ONE-THIRD TO WILLIAM LINK, OF CINCINNATI, OHIO.

SOLDERING-IRON.

SPECIFICATION forming part of Letters Patent No. 765,641, dated July 19, 1904.

Application filed December 2, 1903. Serial No. 183,455. (No model.)

To all whom it may concern:

Be it known that we, NEIL A. SULLIVAN and WILLIAM F. RYAN, citizens of the United States of America, and residents of Cincinnati, county of Hamilton, and State of Ohio, have invented certain new and useful Improvements in Soldering-Irons, of which the following is a specification.

The object of our invention is to provide a soldering-iron of the kind that is heated by the ignition of vapors from a reservoir carried by the iron, in which the vapors come to the burner in a highly-gaseous condition and issue therefrom in a state to produce theoretically perfect combustion, in which the feeder for the oil is not affected by the position in which the operator holds the iron, and which is provided with a ready means for igniting and for regulating the flame.

The object is reached by the means illustrated and described in the accompanying drawings and specification.

Referring to the drawings, Figure 1 is an elevation of a soldering-iron embodying our invention. Fig. 2 is a central section of the same. Fig. 3 is a detail perspective view, upon an enlarged scale, of the vapor-chamber and burner with the burner-tip removed. Fig. 4 is a detail sectional view, upon a still more enlarged scale, of the upper end of the oil-chamber and the needle-valve. Fig. 5 is a plan view of the upper ends of the external and internal tubes. Fig. 6 is a perspective view of the burner-tip. Fig. 7 is a central sectional view of the air-pump.

Referring to the parts, the fuel-reservoir A has a recess in its base a and has its upper end a' tapering. Extending centrally through the base a and through the upper end a' of the reservoir are two tubes, an outer one B and an inner one C, leaving between them an oil-passage b. The lower end of the pipe B is internally screw-threaded to fit over the external screw-threads of the coupling D', which is secured to the base a, and the lower end of pipe C is externally screw-threaded to fit into the internal screw-threads of the coupling D'. The upper end of the pipes C and B are soldered or swaged together, as shown in Fig. 5, except for a series of small holes c. Within the reservoir A is a feed-pipe b', which taps into the pipe B in the upper part of the reservoir A and thence curves outward adjacent to the walls of the reservoir and follows the contour of the walls, projecting at its lower end into the groove a^2 between the recess a and the walls of the lower end of the reservoir. The purpose of having the pipe b' of this form is that it will feed the liquid from the reservoir into the pipe B in whatever position the reservoir may be held.

The upper end b^2 of the pipe B is externally screw-threaded to receive a casting D, within which is formed a vapor-chamber d and at the upper side of which is a nipple d', forming a needle-valve seat d. Casting D has cast integral with it two upwardly-projecting pipes d^3 d^4, forming the chamber for superheated vapors. At the upper ends the pipes d^3 d^4 are formed integral with a ring d^5. Nipple d' is surrounded by an ignition-cup d^6, within which asbestos d^7 may be placed, and is externally screw-threaded to receive a burner-tip E. Extending centrally through the pipe C is a stem F, pointed at its upper end f to form a needle-valve. The lower end f' of the needle-valve is screw-threaded to engage the internal screw-threads of the coupling D' and has a pin f^2 within the recess a for the purpose of regulating the opening of the needle-valve.

The ring d^5 has a set-screw g, by means of which a short tube g' is secured to the ring. Tubing g' has perforations in its upper edges to receive set-screws by which the soldering-tip G is secured to it. Below the soldering-tip the ring g' has a slot g^2 opening into the atmosphere. Surrounding the casting D is a perforated housing H, which consists of a tube having a perforated flange h at its lower end to contact the pipe B, so as to form a hot-air chamber h^3 and allowing the housing to reciprocate. The upper end of the housing H has an angle-notch h', as shown in Fig. 1, to engage a pin h^2, which is secured to the upper end of the pipe d^4 to lock the housing H in its upper position when desired. The pipe B has surrounding it a perforated sleeve

J, by which the soldering-iron is held, the sleeve being perforated to keep it cool.

Reservoir A has an opening in its top in which is located a sleeve *m*, to which is secured a tube M, which projects into the interior of the reservoir. In the sleeve *m* is located a packing-gland *n*, through which passes a rod N, to the lower end of which is secured a leather cup. Located in the interior of tube M is a perforated disk *m'*, which upon its upper side is screw-threaded to engage the lower screw-threaded end of the stem N and the lower side of which is beveled to form a seat m^2 for a valve R, which is held upward by a spring *r*, the lower end of tube M having a perforated plug m^3 in it.

In operation gasolene is placed in the reservoir A by removing the packing-gland *n* and the piston *n'* from the tube M, the needle-valve being carried to its seat d^2 by turning the end f^2. Then pump is replaced, and a small pressure of air is placed upon the gasolene by operating the pump, after which the stem N is turned so that its screw-threaded end engages the disk *m'* to prevent any leakage of the air into the pump and likewise to assist the valve R in retaining the pressure of air upon the liquid in the reservoir. The housing H is then moved downward to uncover the casting D, and the needle-valve is opened, the burner-tip E removed, and a small amount of gasolene is allowed to flow through the needle-valve into the ignition-cup d^6. The needle-valve is then closed, the burner-tip is replaced, and the liquid in the ignition-cup is ignited, and after it has burned awhile, generally until the liquid in the ignition-cup is almost burned out, the needle-valve is opened and the vapors issue therefrom through the burner-tip and burn with a hot blue flame. The pipes d^3 d^4 adjacent to the flame serve to superheat the vapors therein, which are thence carried into the vapor-chamber *d* and press back into the passage *b* between the pipes C and B, so that the vapors issuing from the needle-valve will be in a highly-gaseous state. After the flame has been ignited at the burner the housing H is pushed up and locked in position, so as to protect the flame from drafts. The flame is then directed against the bottom of the lower side of the soldering-tip G and issues likewise through the opening g^2. This flame issuing through the opening g^2 is utilized in heavy work to heat the metal which is being soldered to prepare it for soldering metal by the burner-tip.

The contracted openings *c*, while preventing a free flowing of the gasolene into the vapor-chamber *d*, allow the gasolene after it has become vaporized to pass freely into the vapor-chamber. Thus the tendency is to have the vapors in the chamber *d* in a highly-gaseous state.

The position of the feed-pipe *b'* permits the operator to use the soldering-iron in any position without interfering with the flow of the liquid into the passage *b* and likewise feeds the liquid from the reservoir A until there is practically none left therein. When the operator wishes to put the soldering-iron aside for a short while, he may lower the flame by means of the needle-valve readily, and the flat base with the recess *a* allows the iron to stand firmly upon the reservoir A, as shown in Figs. 1 and 2.

What we claim is—

1. A soldering-iron consisting of a reservoir and two tubes extending therethrough leaving a passage for liquid fuel between them, means of communication between the passage and the reservoir, a vapor-chamber at the upper end of the tubes having formed in it a needle-valve seat and an elongated stem extending through the inner tube having at its upper end a needle-valve seated against the valve-seat and a soldering-tip secured opposite to the opening of the needle-valve substantially as shown and described.

2. A soldering-iron consisting of a reservoir and two tubes extending therethrough leaving a passage for liquid fuel between them, a feed-pipe tapped into the outer tube in the upper end of the reservoir and curving thence outward nearly adjacent to the walls of the reservoir and terminating near the base thereof, a vapor-chamber at the upper end of the tubes having formed in it a needle-valve seat and an elongated stem extending through the inner tube having at its upper end a needle-valve seated against the valve-seat and a soldering-tip secured opposite to the opening of the needle-valve substantially as shown and described.

3. In a soldering-iron the combination of a reservoir, and two tubes one within the other and extending through the reservoir having their lower ends connected to the base of the reservoir and their upper ends connected to each other except for a series of contracted openings, a vapor-chamber secured to the upper end of the tubes and having a port in alinement with the inner tube, a needle-valve whose stem extends through the inner tube and which is seated against the port substantially as shown and described.

4. In a soldering-iron the combination of a reservoir, and two tubes one within the other and extending through the reservoir having their lower ends connected to the base of the reservoir and their upper ends connected to each other except for a series of contracted openings, a vapor-chamber secured to the upper end of the tubes and having a port in alinement with the inner tube, a series of pipes communicating with the vapor-chamber and extending above the port to be heated by a flame issuing therefrom, substantially as shown and described.

5. In a soldering-iron the combination of a reservoir, two tubes one within the other ex-

tending through the reservoir and connected at their lower ends to the base thereof, leaving between them an oil-passage, means for placing the oil-passage in communication with the reservoir, a vapor-chamber secured to the upper end of the outer tube and having a port in alinement with the inner tube, a needle-valve seated against the port and whose stem extends through the inner tube, an ignition-cup surrounding the port, an air-pump in the walls of the reservoir for putting a pressure upon the liquid therein and a movable perforated housing surrounding the vapor-chamber, substantially as shown and described.

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