2 Sheets—Sheet 1.

J. S. HULL.

HEATING DEVICE FOR SOLDERING IRONS, &c.

No. 186,677. Patented Jan. 30, 1877.

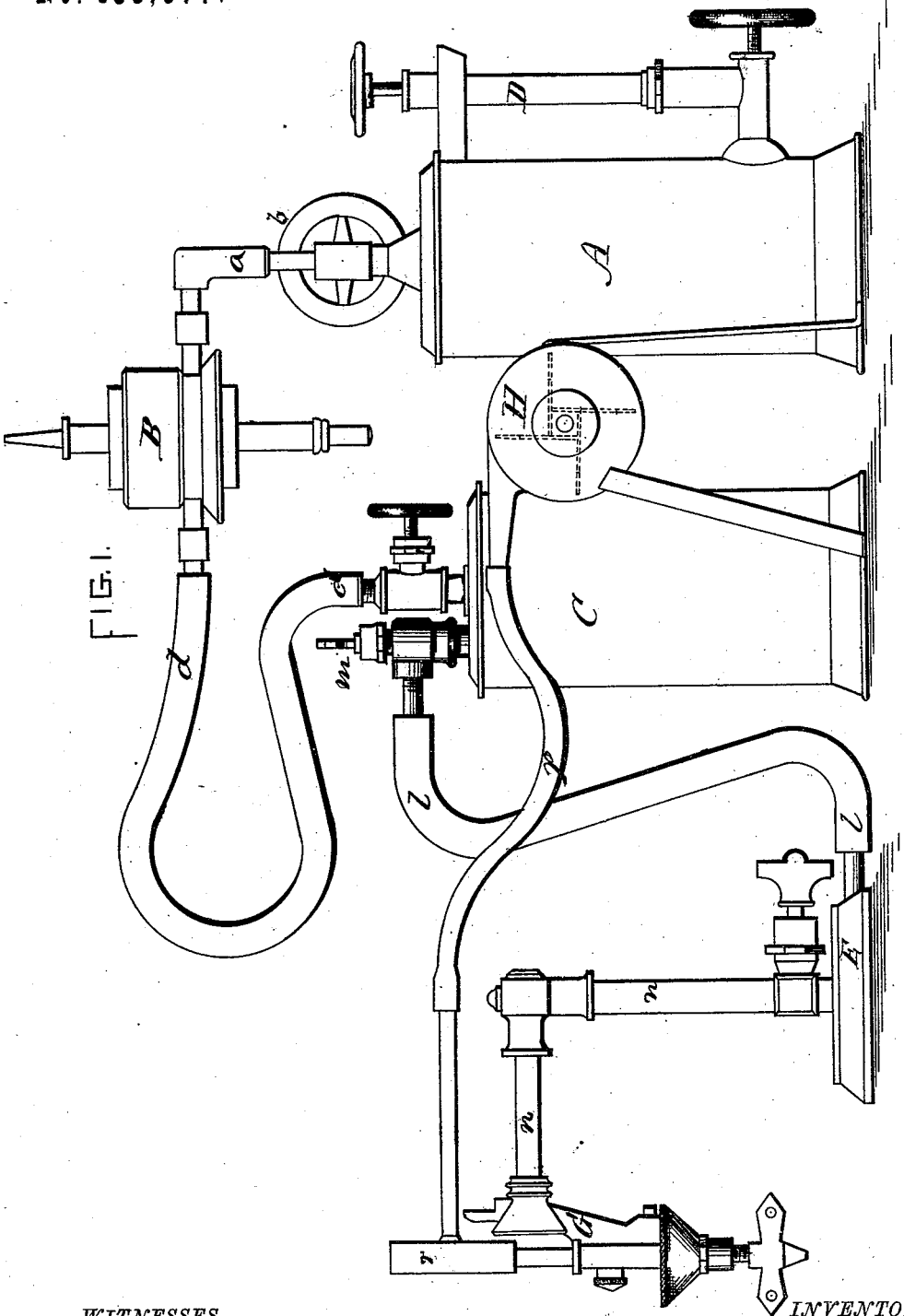

FIG. 1.

WITNESSES

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2 Sheets—Sheet 2.

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FIG. II.

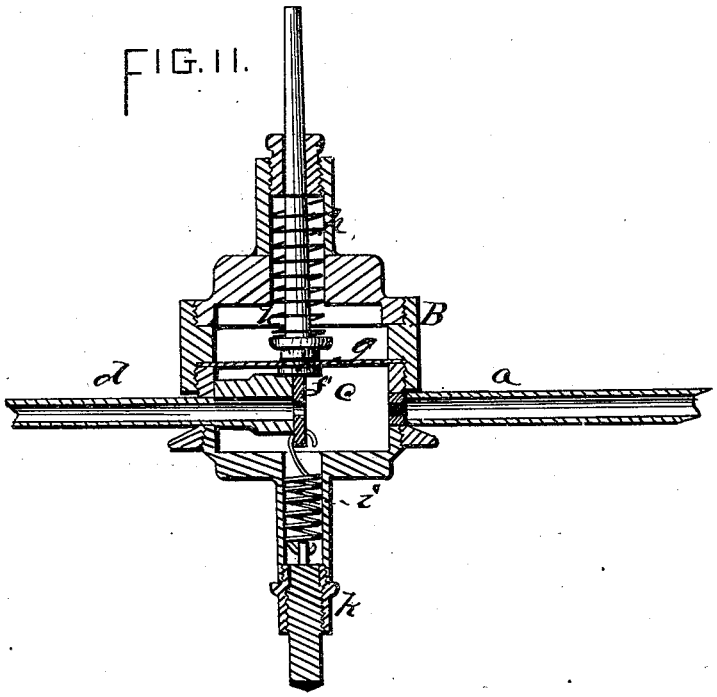
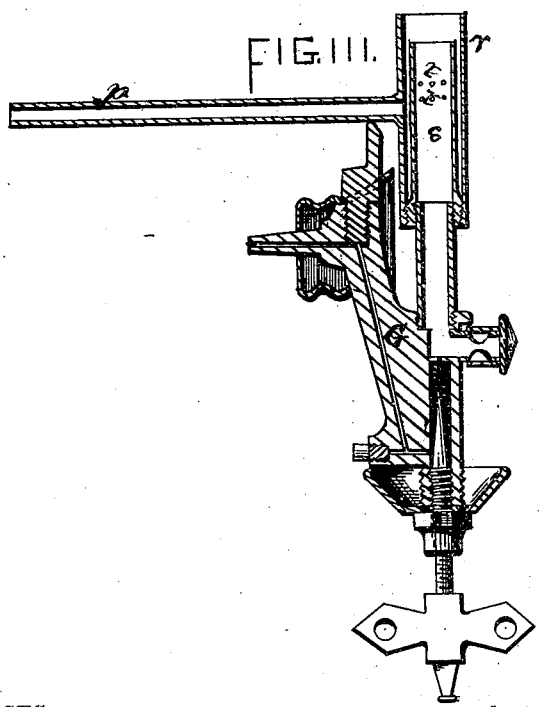


FIG. III.



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UNITED STATES PATENT OFFICE.

JOHN S. HULL, OF CINCINNATI, OHIO.

IMPROVEMENT IN HEATING DEVICES FOR SOLDERING-IRONS, &c.

Specification forming part of Letters Patent No. **186,677**, dated January 30, 1877; application filed November 12, 1875.

To all whom it may concern:

Be it known that I, JOHN S. HULL, of Cincinnati, in the county of Hamilton and State of Ohio, have invented an Improved Carbureter and Air-Blast combined therewith for Heating Soldering-Irons, and for other heating purposes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification—

Figure 1 being a side view of all the parts composing the apparatus; Fig. 2, a central vertical section of the air-pressure regulator of the carbureter; Fig. 3, a central vertical section of the burner.

Like letters designate corresponding parts in all of the figures.

For my improved air-carbureter I employ a close vessel or reservoir, A, to contain air under pressure; a pressure-regulator, B, to automatically regulate the flow of air from the air-reservoir; and a hydrocarbon vaporizer, C, for carbureting the air which flows from the air-reservoir.

The air-reservoir A is supplied with air condensed to any required degree by means of an air-pump or condenser, D, of any suitable construction, attached thereto, or connected therewith. The reservoir is replenished with air from time to time, as required, to keep up the pressure as the air flows away through a pipe or passage, *a*, to the regulator B. The flow may be entirely cut off by a globe-valve, *b*.

The self-acting regulator B is constructed substantially as follows: It has a close chamber, *c*, Fig. 2, for the main body, into which the air is admitted through the pipe *a*, and from which the air is discharged through another pipe, tube, or passage, *d*, to the vaporizing-chamber C. The inner end of the tube *d*, or end aperture of the chamber, is more or less opened, or entirely closed, by a sliding valve, *f*, fitting close against the end of the tube, and connected at one end with a diaphragm, *g*, of india-rubber or other impervious and elastic material stretched across the chamber *c*, as shown in the figure. The elasticity of the diaphragm, together with the force of a spring, *h*, above or outside of it, and of another spring, *i*, if desired, below the valves, ordinarily keeps the valve in a central position over the outlet-aperture, where there is a hole through the valve, as shown. This aperture is of such a size that it will allow sufficient air to pass out for the purpose under the desired or normal pressure; but if the pressure of air becomes greater than that, as when the reservoir A is first filled under pressure, then the pressure of the air in chamber *c* increases, and raises the diaphragm *g* more or less, thereby raising the valve *f* attached thereto, and partially closing the outlet-passage by the said valve in inverse proportion to the increased velocity of the outflowing air from the increased pressure, and therefore keeping the absolute rate of air discharged constant, or nearly so. The amount of flow can be regulated by means of a set-screw, *k*, connected with the lower end of the valve.

The vaporizer C may be of any suitable and known construction for vaporizing the light hydrocarbon fluid placed therein, and mingling it with the air admitted into the vessel through the pipe *d*.

The carbureted air flows from the vaporizer through a pipe or tube, *l*, direct to the burner, or to a burner-stand, E; and this entire flow may be cut off by a globe-valve, *m*, above the vaporizer. From this stand the carbureted air or gas flows to the burner G through a pipe, *n*, the flow being regulated by a valve, *o*.

The burner G may be a gas-generating burner, as shown in Fig. 3.

The air-blast is combined with the carbureted air at the burner, to perfect the combustion and produce a strong heating-flame. In the drawings, A fan-blower, H, is represented for producing an air-blast, and from a pipe, *p*, conducts the air to the burner. The air is received into a tube, *r*, which surrounds the burner-tube *s*, with an annular space between, through which the air escapes around the issuing flame and completes the combustion.

In addition to the air-discharge through the annular space, small apertures *t t*, Fig. 3, open through the burner-tube *s* for throwing little jets of air into the issuing gas, rarefying it, and commingling the air therewith. A flame of intense heat is produced by this apparatus.

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

1. In an apparatus for vaporizing and burn-

ing hydrocarbon liquids, the combination of a compressed-air chamber A, a vaporizing vessel or chamber, C, and an air-blast device, H, substantially as and for the purposes herein specified.

2. In combination with the compressed-air reservoir A and vaporizing vessel or chamber C, an automatic regulator, B, provided with a sliding valve, *f*, diaphragm *g*, and spring *h*, all operating substantially as and for the purpose herein specified.

3. In combination with an air-carbureting device, A C, and an air-blast device, H, a burner, G, provided with an outer air-tube, *r*, and a perforated inner burner-tube, *s*, substantially as and for the purpose herein specified.

Specification signed by me this 15th day of June, 1875.

JOHN S. HULL.

Witnesses:
J. S. BROWN,
EDWARD SMALL.