J. SEARS.

Soldering-Tools.

No. 137,244. Patented March 25, 1873.

FIG. 1.

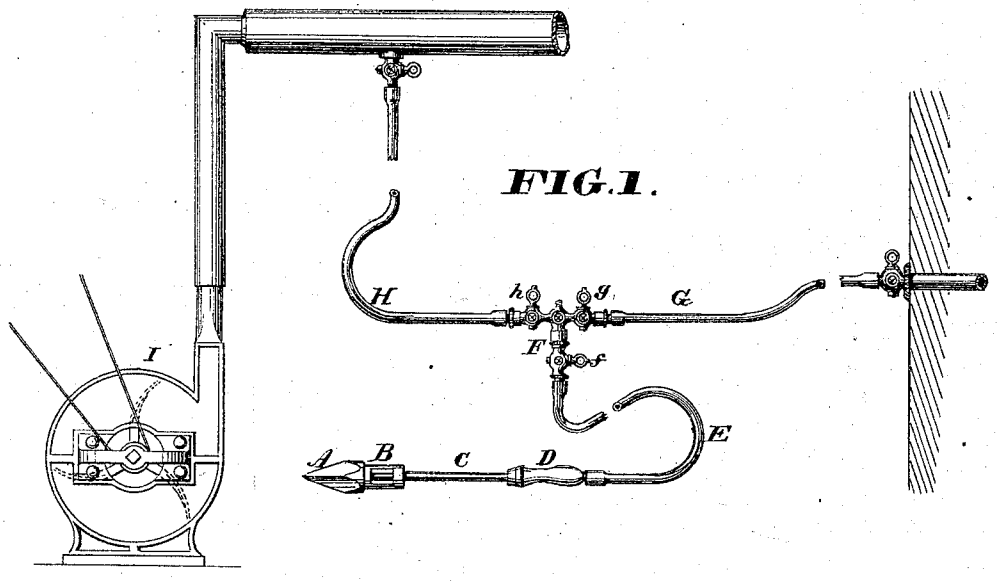


FIG. 2.

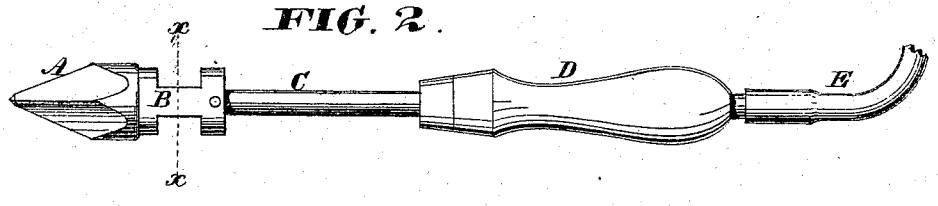


FIG. 3.

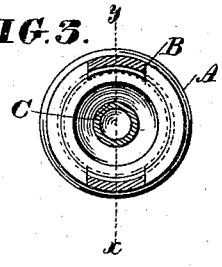
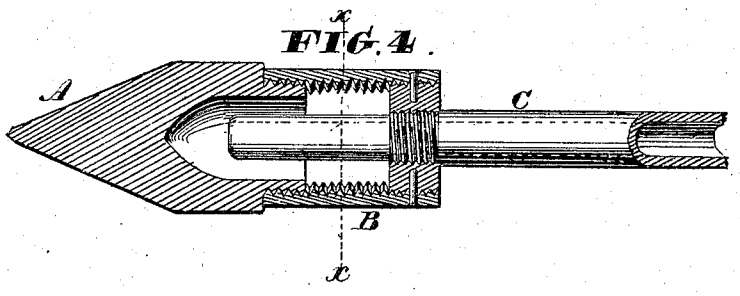


FIG. 4.



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JOSEPH SEARS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN SOLDERING-TOOLS.

Specification forming part of Letters Patent No. **137,244**, dated March 25, 1873.

To all whom it may concern:

Be it known that I, JOSEPH SEARS, of Chicago, in the county of Cook and State of Illinois, have invented an Improvement in Soldering Apparatus, of which the following is a specification:

Nature and Objects of the Invention.

My invention relates to soldering-irons heated with gas; and it consists in introducing within or against the tip—which is preferably made hollow—a jet of mingled inflammable gas and atmospheric air, conducted through a flexible pipe common to both, into which pipe they are each introduced under pressure. The invention further consists in burning the gas within a confined chamber to prevent loss of heat, as hereinafter explained.

General Description.

In the accompanying drawing, Figure 1 is an elevation of an apparatus illustrating my invention. Fig. 2 is an elevation of the soldering-tool on a larger scale. Fig. 3 is a transverse section, on a still larger scale, on the line *x x*, Figs. 2 and 4. Fig. 4 is a longitudinal section of the soldering-point and its attachments on the same scale as Fig. 3, the line *y y* indicating the plane of section.

The tip or head A of the soldering-iron is, externally, of customary form. It is, preferably, made hollow, and is attached removably to an open shell or frame, B, which permits the escape of consumed gases, and forms the means of attaching it adjustably or otherwise to the tubular stock C, upon which is placed the handle D. To the rear end of the tubular stock C is attached the flexible pipe E, which conducts the combined air and gas from a T-coupling, F, the said coupling forming a junction between the gas-supply pipe G and air-supply pipe H. The pipes G H and T-coupling F are provided with regulating-cocks *f g h*.

The said pipes and coupling may be of metal, and constitute permanent fixtures, the pipe G being connected with any source of supply of gas from public or private works, and the pipe H being connected with a blast apparatus of any suitable kind.

For illustration I have shown a blower at I; but do not confine myself to any special means for supplying the gas or air.

Operation.

To light the gas in the iron the cocks *f g* are opened, causing the gas to escape outside the neck B, where it is ignited. The cock *h* is then opened to cause a current of air to mingle with the gas; and, if necessary, the gas-cock *g* is partially closed until the combustion is confined to the interior of the chamber formed by the neck B in connection with the tip A. If the latter be hollow, as illustrated in the drawing, the jet of flame will be thrown against the apex of the cavity, resulting in the rapid heating of the copper point; and the flame being confined to the precise point where it is needed, the heat is produced without waste of fuel.

From the foregoing description it will appear that all the atmospheric air to support combustion is forced, together with the gas, through the conducting-pipe, the opening in the neck being to permit the escape of the gaseous products of combustion.

In practice, the amount of gas mingled with the air in the pipe is too little to support a flame in the atmosphere; but within the confined chamber, where it is applied to the best advantage, being surrounded on all sides with metal, which serves to conduct the heat to the working-surface, the admixture of air results in perfect combustion with intense heat and no smoke or liberated carbon.

If the copper tip be solid the jet of flame is thrown against its rear end with the same effect in principle; but the most advantageous results are produced by the use of a hollow tip, which gives the largest amount of soldering-surface with a given weight of copper. This mode of heating avoids the greatest cause of injury to the surface of the soldering-iron, so that comparatively slight necessity exists for filing; but when the point is eventually used up it is readily removed, and its place supplied by a new one without throwing away any more than the small copper tip itself.

I am aware that it has before been proposed to connect a tubular soldering-tool with flexible pipes for conducting inflammable gas and

compressed air. In my improvement the gas and air are conducted through one and the same tube, in which they are thus thoroughly mingled, and the mingled air and gas are burned within a chamber in the rear of the soldering-tip; the cavity in the latter being made sufficiently large to inclose the tip of the hollow stock or handle.

Claims.

The following is claimed as new:

1. The combination of the gas-pipe G, air-pipe H, flexible mixing-tube E, and the tubular soldering-tool A B C D, substantially as and for the purposes described.

2. The hollow tip A, formed with a cavity which incloses the end of the handle-tube C, so as to locate the flame completely within the hollow tip, as explained.

JOSEPH SEARS.

Witnesses:
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