No. 620,306. Patented Feb. 28, 1899.

W. S. HADAWAY, JR.

ELECTRICALLY HEATED TOOL.

(Application filed Jan. 26, 1898.)

(No Model.)

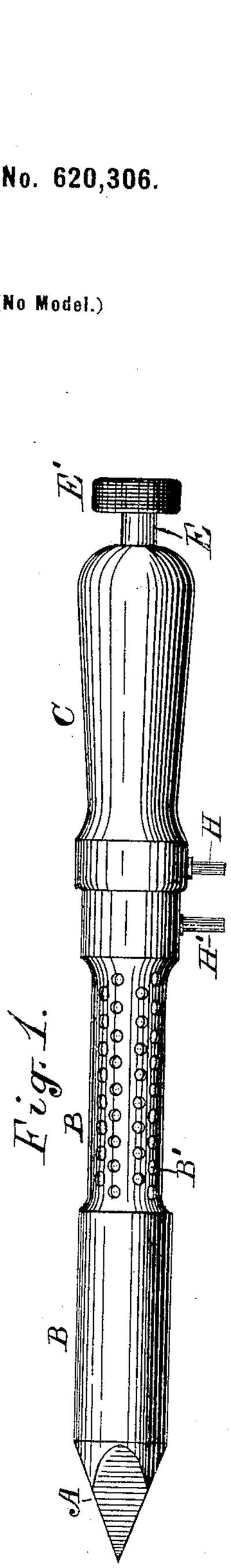

Fig. 1.

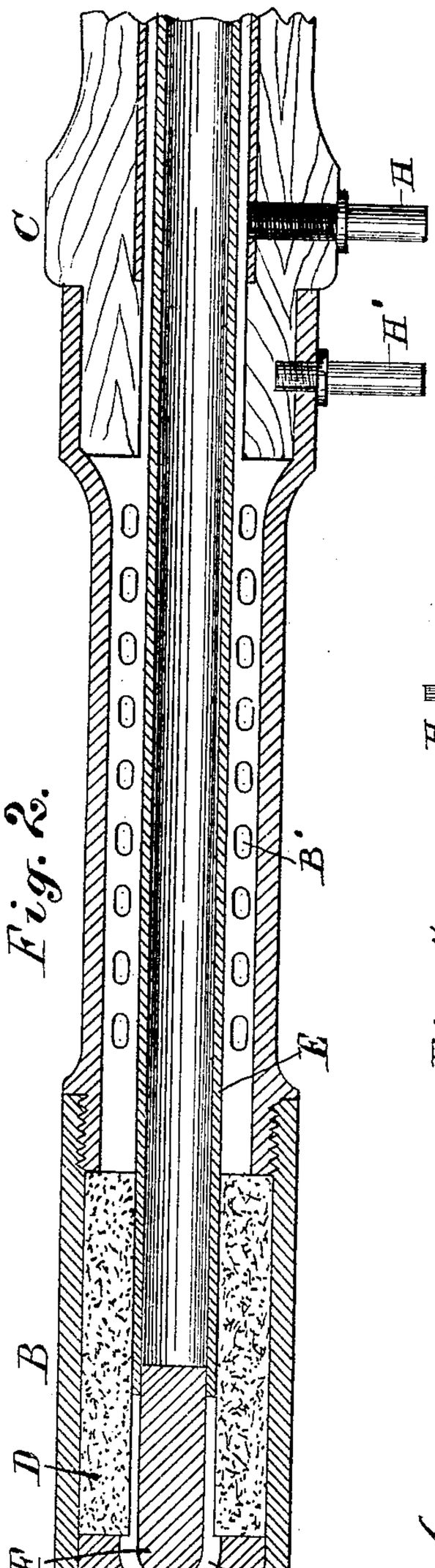

Fig. 2.

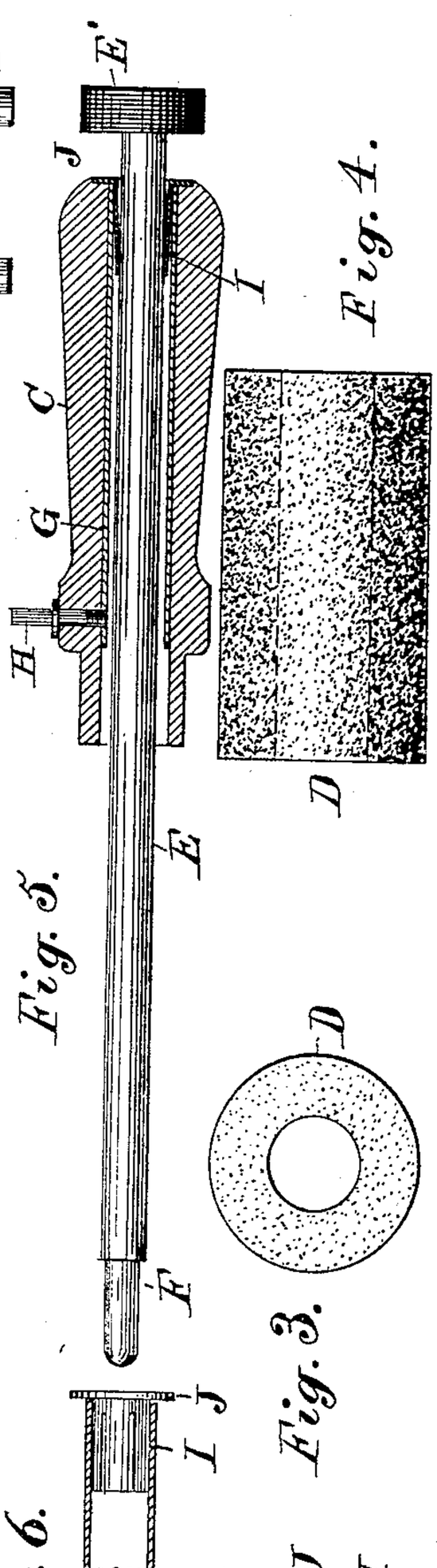

Fig. 4.

Fig. 5.

Fig. 3.

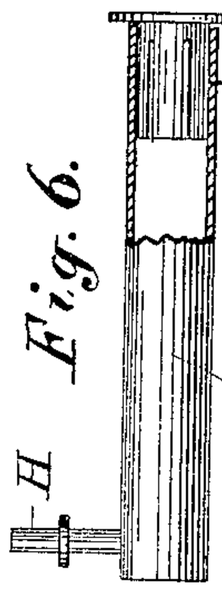

Fig. 6.

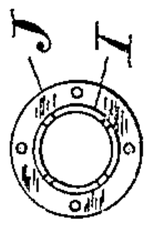

Fig. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM S. HADAWAY, JR., OF NEW YORK, N. Y.

ELECTRICALLY-HEATED TOOL.

SPECIFICATION forming part of Letters Patent No. 620,306, dated February 28, 1899.

Application filed January 26, 1898. Serial No. 667,969. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. HADAWAY, Jr., a citizen of the United States, residing at New York, county of New York, State of New York, have invented certain new and useful Improvements in Electrically-Heated Tools, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to certain improvements in the heating of soldering-irons and other tools by means of the electric arc; and the objects of the invention are partly to confine the arc in a closed chamber, in which the generated gases expel the air and produce a rarefied environment which permits the elongation of the arc, partly to protect the parts adjacent to the arc from its great heat, and thus to secure durability in such parts, partly to secure the diffusion of heat from the arc to the heater-body, and partly to insulate the electrode-carrier from the heater-body or from the holder which conducts the current to such body. These objects are attained by surrounding the carbon-holder adjacent to the heater-body by a sleeve of fused magnesia which is arranged in contact with the heater-body and fitted snugly to the carbon-holder, so that when the latter is adjusted therein the space about the arc is wholly confined and forms a closed gas-chamber.

It is well known that magnesia is of the most refractory character and requires an exceedingly high temperature to effect its fusion, and the sleeve D, when formed of such material, is therefore of very great durability and is not liable to be cracked or distorted in shape by the heat of the arc. Such substance is also an excellent insulator, and it therefore operates most effectively to insulate the conducting-tube E, which holds and adjusts the carbon F.

The invention includes means for adjusting the electrode within the holder of the heater-body and means for making the electrical connections therewith.

The construction will be understood by reference to the annexed drawings, in which—

Figure 1 is a side elevation of a soldering-iron embodying the improvements. Fig. 2 is a longitudinal section of the same with a portion of the handle broken away for want of space upon the drawings. Figs. 3 and 4 are respectively an end view and side view of the magnesia sleeve. Fig. 5 is a side elevation of the carbon-carrier tube with a section of the handle. Fig. 6 is a side view, and Fig. 7 an end view, of the friction-bushing detached from the handle. Figs. 1, 5, 6, and 7 are upon a smaller scale than the other figures.

The invention is illustrated in connection with a soldering-iron to be held in the hand.

A designates the heater-body forming the point of the soldering-iron and provided upon its inner end with a recess A′, in which the arc is formed. B is a tubular holder secured upon the base of such body and extended to a handle C, formed of wood or other insulating material.

D is a fused magnesia sleeve fitted within the holder B in contact with the body A and formed with tubular bore adapted to guide and insulate an electric conducting-tube E, which serves as a carrier for the carbon F. The carbon is fitted tightly in the end of the tube, so as to be adjusted and supported thereby, and the tube or carrier is extended into the sleeve sufficiently to form a long joint, and thus exclude the air without a tight fit.

Magnesia which has been crystallized by fusing in an electric arc is of peculiar constitution, as the crystallization produces the greatest density of which the substance is capable, and the crystallized magnesia expands and contracts so little when heated and cooled that it may be fitted into close contact with the tubular holder B and the body A and be fitted to support the carbon-carrier E movably and maintain its relation to all of these parts indefinitely.

The handle is provided at its rear end with a metallic lining G, from which is extended a binding-post H, and an adjacent binding-post H′ is connected with the tubular holder B. A split bushing I is fitted within the outer end of the lining G and provided with flange J, by which it may be fastened to the handle. The carrier E is provided at its outer end with an insulated knob E′ and is fitted through such bushing, and the divisions of the bushing form tongues which are adapted to press elastically upon such carrier and

hold it firmly in place when adjusted while making an electric contact therewith to convey the current from the binding-post H to the carbon F. In operating the device the binding-posts are connected with the electric conductors to receive the current, and the carbon F is pushed into contact with the body A to form the arc and is then gradually withdrawn as the heat of the arc generates gases which expel the air from the chamber within the recess A′. The recess is shown in Fig. 2 extended into the base or inner side of the soldering-body A and is of such depth as to receive the end of the carbon electrode and contain the arc formed therewith, so that the heat which is radiated laterally from the arc may be absorbed by the side walls of the recess and thus conducted directly to the soldering-point. Such construction of the recess and the arrangement of the sleeve D and carbon electrode F in relation thereto are of great value in concentrating the heat of the arc directly upon the soldering-point body, and I have therefore made a special claim to such construction and arrangement.

The magnesia sleeve fits so closely to the carbon electrode that very little space remains about the arc, and a very high heat is generated in such closed space, which is filled with gases which offer far less resistance than the air and permit the extension of the arc in a much greater degree than when the atmosphere is admitted.

The use of fused magnesia for the sleeve enables it to confine the heat of the arc in great degree to the chamber within the body A, while such heat as is absorbed by the refractory sleeve is also transmitted to the body, as the sleeve and body are held in contact with one another to permit such conduction.

The knob E′ serves to adjust the carbon and carrier E when required, while the bushing I forms an elastic clamp to hold the same when adjusted.

The sleeve of fused and crystallized magnesia performs several important functions. First, it is of the most refractory character and is thus enabled to endure for a great length of time the heat generated by the arc, thus perfectly preserving the insulation of the carbon-carrier and greatly increasing the durability of the device; second, it is adapted without distortion under the action of the heat to diffuse the heat absorbed from the arc and transmit the same to the heater-body with which it is in contact, and, third, it maintains its form and dimensions so perfectly when heated as to preserve the guide for the carbon-holder and fit snugly about the same, and thus exclude the atmosphere from the arc, as desired.

The magnesia sleeve is produced by fusing magnesia in the electric arc, grinding the crystals and molding the same with a suitable solvent, as chlorid of magnesia, under heavy pressure into a sleeve of the required dimensions.

As the carrier is held within the bushing by friction only, it may be instantly removed to examine or replace the carbon F.

The entire apparatus is of simple and inexpensive construction, and owing to the nature of the insulating and guiding sleeve D the device retains its efficiency for a great length of time.

Having thus set forth the nature of the invention, what I claim herein is—

1. In an electrically-heated tool having a heater-body and an electrode adjustable to and from the same to form an arc, the combination, with the body and the electrode, of a sleeve of refractory insulating material surrounding the electrode adjacent to the arc, such sleeve serving to insulate the electrode and support it movably adjacent to the body, substantially as herein set forth.

2. In an electrically-heated tool having a heater-body, and an electrode adjustable to and from the same to form an arc, the combination, with the body and the electrode, of a sleeve of fused magnesia fitted close to the electrode about the arc in contact with the body, to diffuse to the said body the heat absorbed from the arc, and the sleeve forming with the body a gas-chamber in which the arc may be materially extended by the exclusion of the atmosphere, substantially as herein set forth.

3. In a soldering or heating tool, the combination, with a soldering-point or body having a tubular holder adapted to serve as an electric conductor, of a sleeve of fused magnesia fitted within such holder contiguous to the body, an electric conducting-tube adjustable toward the body and guided by and insulated from the holder by the said sleeve, and an electrode carried by the conducting-tube to form an arc with the body, substantially as herein set forth.

4. In an electrically-heated soldering-iron, the combination, with the soldering-point or heater-body having a metallic tubular holder with an insulating-handle at the end, of a sleeve of refractory insulating material fitted within such holder contiguous to the heater-body, a friction-bushing inserted in the handle, electrical connections to the tubular holder and such bushing, and an electric conducting-tube adjustable within such bushing and the insulating-sleeve, and carrying an electrode contiguous to the point or heater-body, substantially as herein set forth.

5. In an electrically-heated soldering-iron, the combination, with the soldering-point or heater-body having a metallic tubular holder with an insulating-handle at the end, of a sleeve of a refractory insulating material fitted within such holder contiguous to the heater-body, a metallic lining to the handle with a split bushing secured therein, electrical connections to the tubular holder and such metallic lining, and an electric conducting-tube held elastically by such bushing and adjustable within the refractory sleeve to

support a carbon contiguous to the heater-body to form an arc therewith, substantially as herein set forth.

6. In an electrically-heated soldering-iron, the combination, with the soldering-point body A, having the recess A′ formed within its inner end to contain the electric arc, of a metallic tubular holder B with an insulated handle at the end, the sleeve D of refractory insulating material fitted within such holder contiguous to the body A and having its bore continuous with the said recess, the electrical conducting-tube E adjustable within the sleeve toward the recess, and the carbon F carried by such tube to form an arc within the recess, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM S. HADAWAY, JR.

Witnesses:
THOMAS S. CRANE,
EDWARD F. KINSEY.