

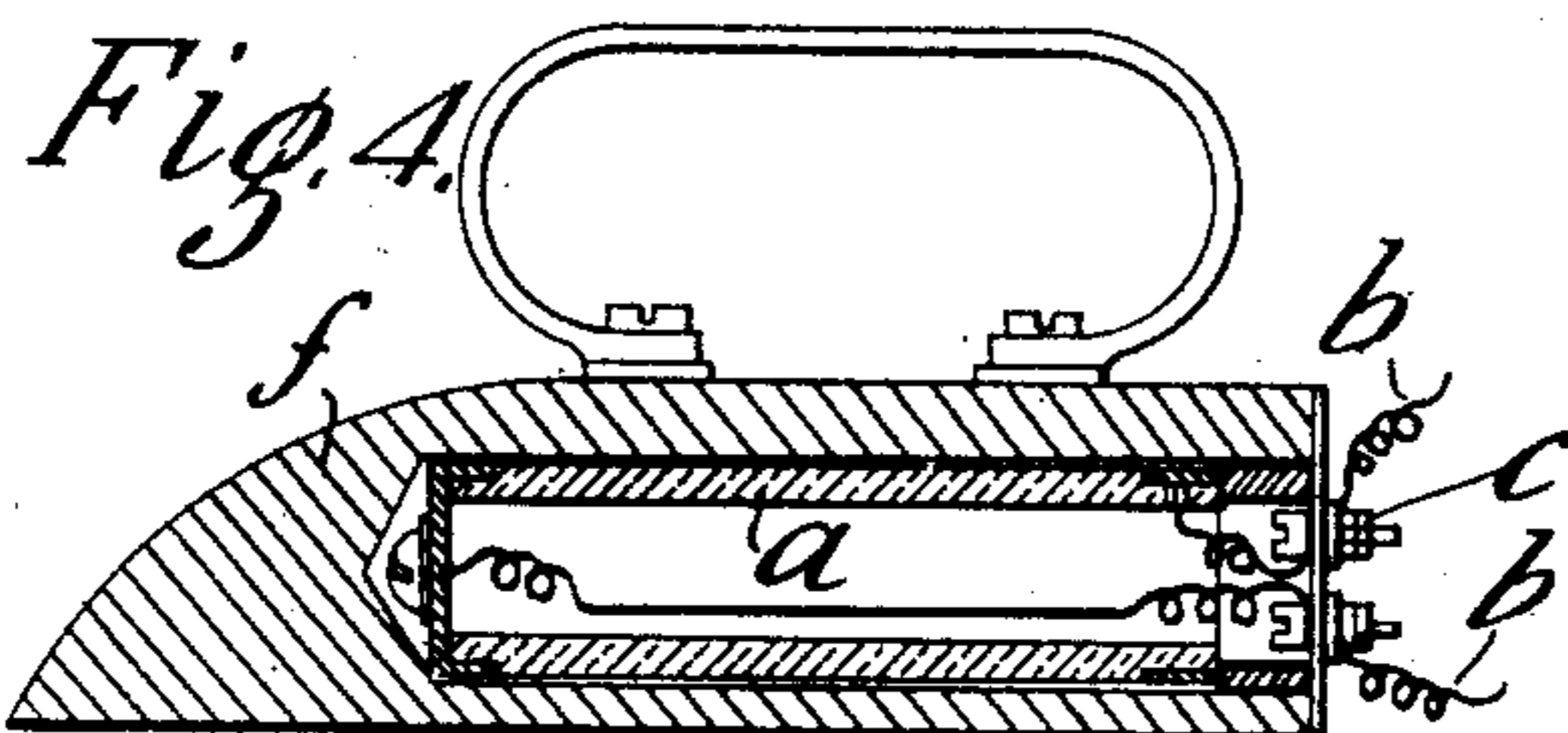
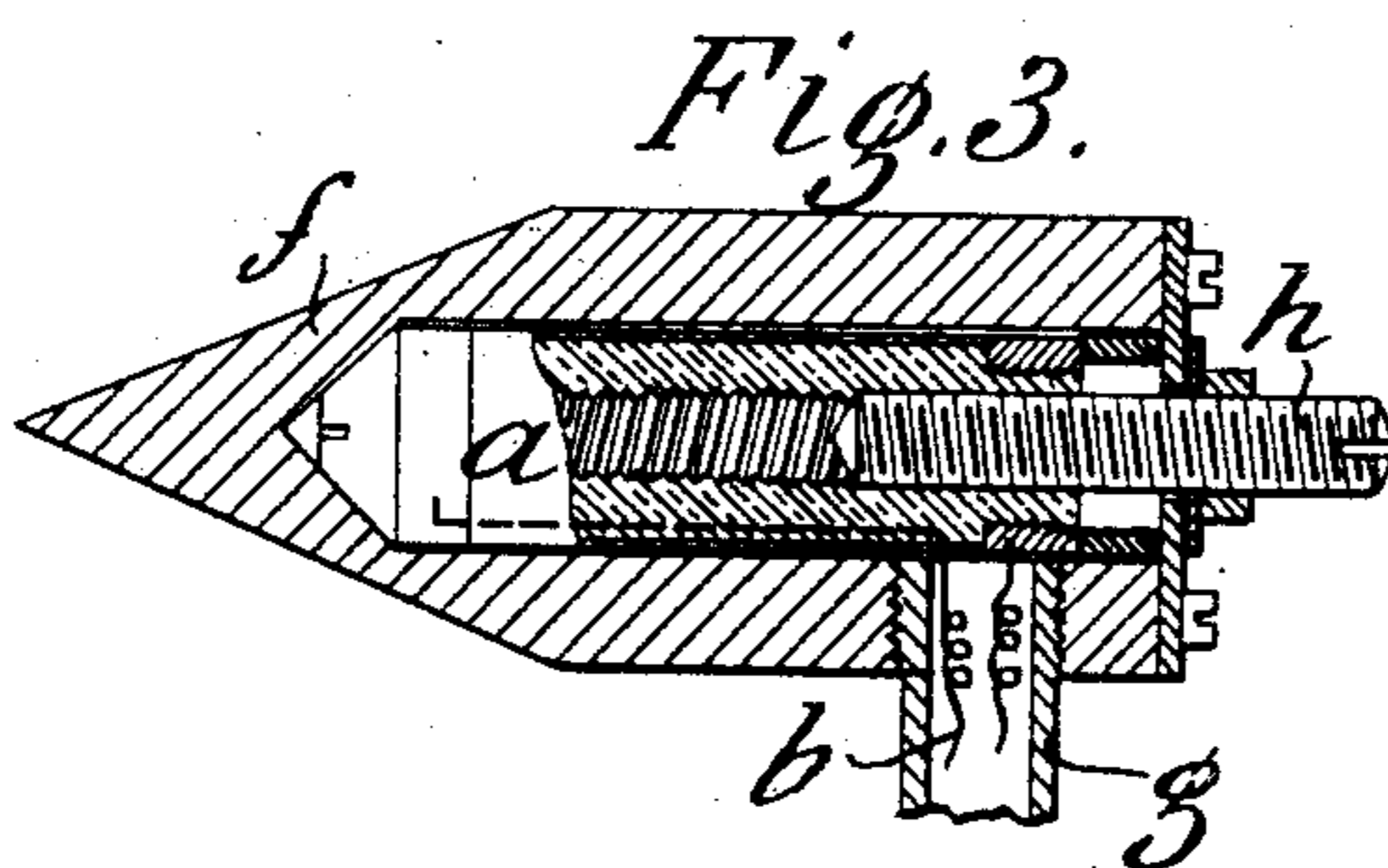
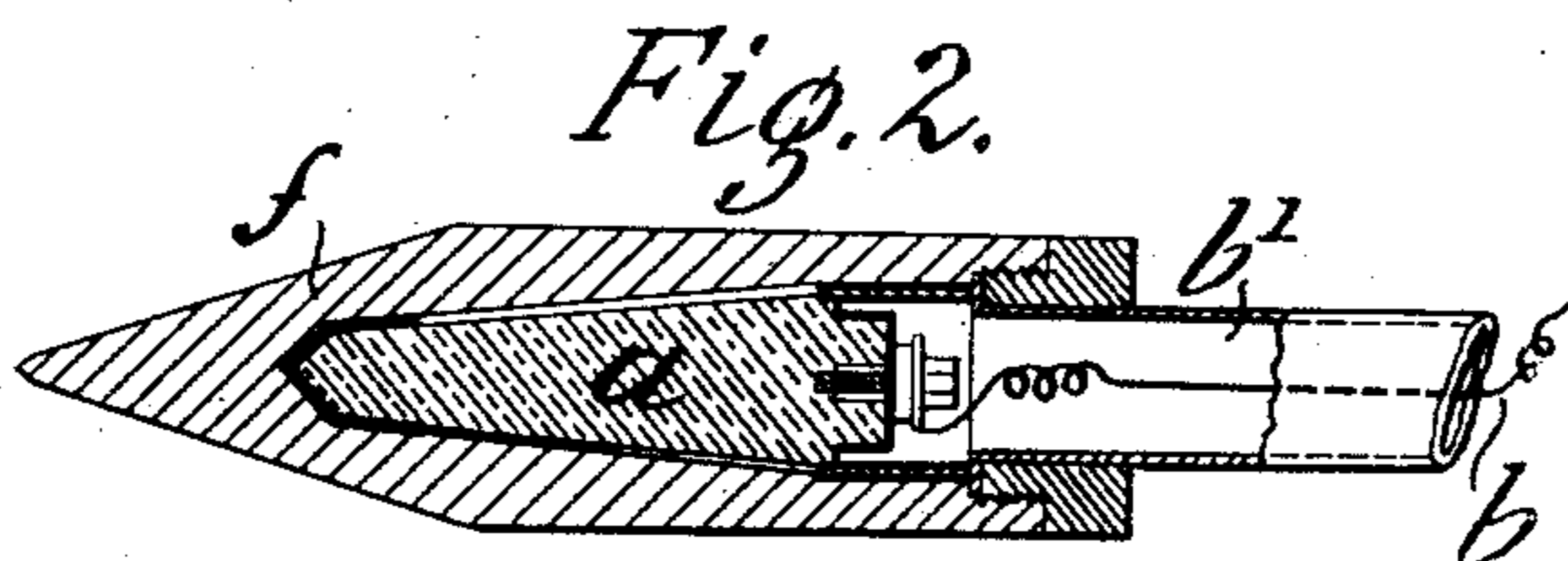
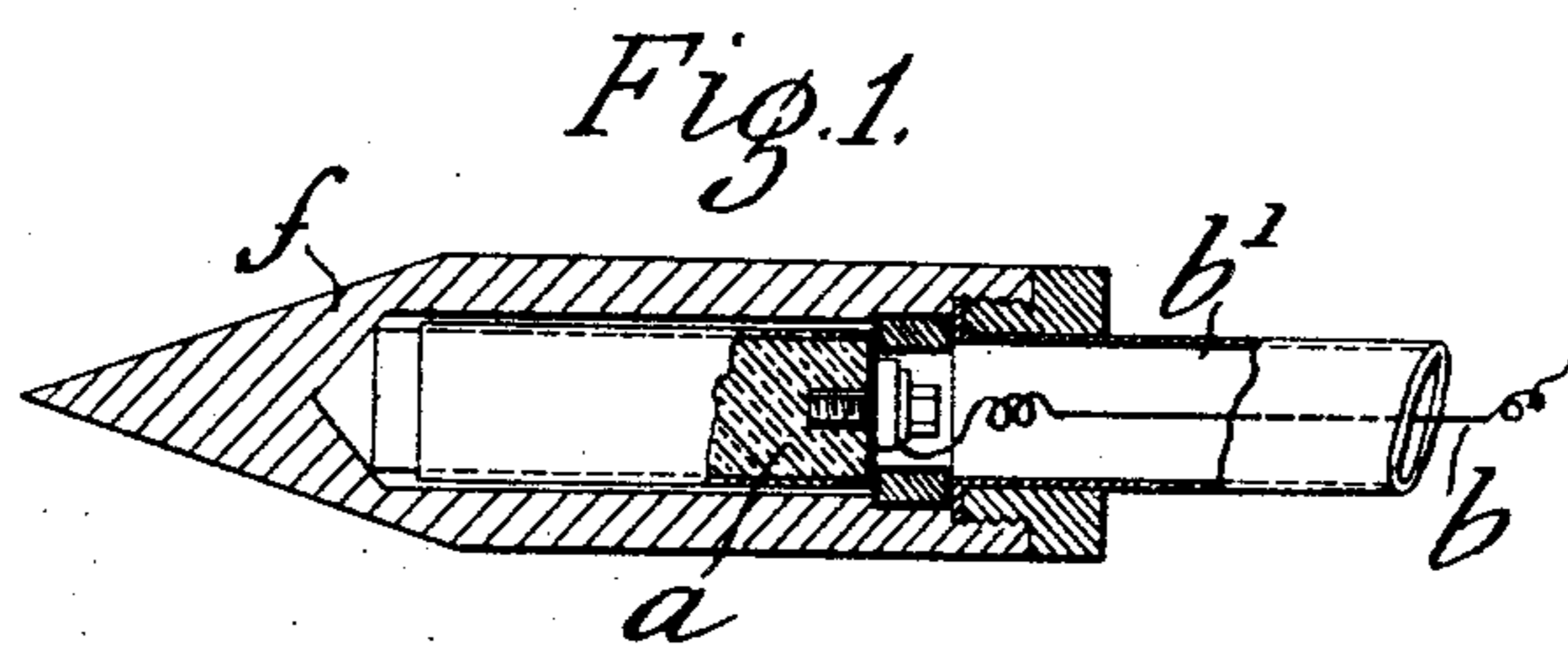
No. 695,995.

Patented Mar. 25, 1902.

J. F. BACHMANN & A. VOGT.
ELECTRICAL HEATING APPLIANCE.

(Application filed Nov. 22, 1898.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

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ELECTRICAL HEATING APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 695,995, dated March 25, 1902.

Application filed November 22, 1898. Serial No. 697,191. (No model.)

To all whom it may concern:

Be it known that we, JOSEF FRANZ BACHMANN and ADOLF VOGT, subjects of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Electrical Heating Appliances; and we 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to electrical heating apparatus formed of artificial-stone compound produced in the manner described in our application, Serial No. 654,560, dated October 8, 1897, by mixing together a conductor, such as carbon or metal, and a non-conductor, such as kaolin, with water or other liquid to form a paste, which after molding and drying is heated to a high degree while embedded in carbon powder or surrounded by reducing-gases.

The present invention relates to the application of such artificial-stone compound as a heater for heating appliances, such as hollow soldering-irons, box-irons, and generally all such apparatus in which a hollow body is heated by an internal heating device for conveying heat through the walls of the body to the outside thereof.

Figures 1, 2, and 3 of the accompanying drawings show, by way of example, vertical sections of different forms of soldering-irons with our said invention applied thereto. Fig. 4 shows a vertical section of a box-iron heated internally by such electrical heater.

In the constructions shown at Figs. 1, 2, and 3 the hollow metal body *f*, constituting the soldering-iron, has inserted into it the heating-body *a*, made of the said artificial-stone compound, so that by the passage of an electric current through the body *a* this becomes heated in consequence of the resistance it offers to the passage of the current, such heat being transmitted through the walls of *f* to

the outside thereof. The body *a* can be insulated from the soldering-iron *f* by means of an insulating material or by air-insulation or by a coating of glaze or enamel, or such insulation may be advantageously effected as follows: The body *a* is in the first instance made with a somewhat-less resistance than it is required to have when in use. It is then provided with contacts and included in the circuit of an electric current, whereby it is heated to a high degree, such as to a white heat. By this means the conducting material is burned out all over the outer surface of the body *a*, so that this is now left with an envelop of the remaining non-conductor, constituting an insulating-covering, but which is of a porous nature. This porous surface is then saturated or painted with an insulating substance in liquid form, which may consist either of a solution of the same non-conductor that was used for the body *a*, such as clay or of a salt thereof, such as nitrate or sulfate of alumina, this operation being repeated, if necessary, so as to effectually fill up the the pores of the said insulating-covering. If the body *a* is to be glazed or enameled, this is effected in any well-known manner.

The point of the heater *a* which is in contact with the soldering-iron is preferably galvanized or made of metal for the better transmission of the heat. The heater *a* can also be made with varying specific resistances at its different parts in order to produce the greatest development of heat at the point where it is more particularly required.

The one contact-wire *b* of the circuit is connected to the heater by means of a screw, as shown, while the second contact is formed by the soldering-iron *f*, to which the circuit-lead is connected. In place of the second contact-wire of the circuit a metal tube *b'*, Figs. 1 and 2, may be advantageously used as the conductor, passing through an insulated handle.

With apparatus of this kind it appears of advantage to enable the amount of electricity converted into heat to be regulated according to the degree of heat required by altering the distance to be passed through by the current.

Such an arrangement is shown at Fig. 3. In this case the contact-wires *b*, which pass from the circuit through the tubular handle *g*, are connected to each end of the heating-body *a*, and the latter is made with a central hollow formed with a screw-thread, into which screws a screw-plug *h*. The current passing into *a* mainly flows through that part of this screw-plug which is screwed into *a*, so that according as this is screwed more or less into *a* the resistance offered by the latter, and consequently the heat generated, will be decreased or increased.

Fig. 4 shows a box-iron the body *f* of which has a hollow for the reception of the tubular heating-body *a*, the ends of which are provided with contacts, to which are connected insulated wires leading to terminal clamps *c*, to which the leads *b* of an electric circuit are attached. The heater *a* is insulated from the box-iron *f* by an insulating-coating formed either on the heater or on the hollow of the box-iron.

It will be evident that the above-described heaters of artificial-stone compound may be applied for supplying heat internally to various other apparatus requiring heat to be transmitted from their inner to their outer surfaces, such as heated stamping or branding dies, internally-heated rollers or cylinders for satin-presses, and the like.

Having thus described the nature of this invention and the best means we know of carrying the same into practical effect, we claim—

1. An electric heating appliance comprising a hollow body to be heated, an electric resistance therein composed of a refractory non-conductive and a conductive material, the outer portion of said resistance being devoid of conductive material and porous, said pores closed by a refractory non-conductive substance to form a refractory electrically-insulating heat-transmitting envelop for the resistance, and means for including the same in an electric circuit, for the purpose set forth.

2. An electrical heating apparatus for heating hollow bodies in the direction from within outward, consisting of an electric resistance composed of a mixture of conductive and non-conductive materials, said body being made of a form to fit the internal cavity of the body to be heated, with the interposition of an insulating-layer, a screw-threaded hollow in said heating-body, a screw-plug of conducting material screwed more or less into such hollow and contacts adapted to convey current from an electric circuit into said body through such conducting screw-plug and from the said body back to the circuit, for the purpose of varying the resistance offered by said body to the current, substantially as described.

3. An electric heating appliance comprising a hollow body to be heated, an electric resistance-body therein composed of a mixture of

a refractory non-conductive material and a conductive material, the outer portion of the resistance-body free from conductive material and porous and the pores closed by a refractory non-conductive substance to form a refractory, electrically-insulating heat-transmitting envelop for said resistance-body, means for including the same in an electric circuit and means for varying the resistance to the passage therethrough of the electric current, for the purposes set forth.

4. An electric heating appliance comprising a hollow body to be heated, an electric resistance-body therein composed of a mixture of a refractory non-conductive material and a conductive material, the outer portion of the resistance-body free from conductive material and porous and the pores closed by a refractory non-conductive substance to form a refractory, electrically-insulating, heat-transmitting envelop for said resistance-body, means for including the same in an electric circuit and means for lengthening or shortening the path of the electric current therethrough, for the purposes set forth.

5. The combination with a hollow body to be heated, of an electric resistance-body therein made of refractory non-conductive and conductive materials, consisting substantially of an insulated outer portion and conductive inner portion, means for connecting opposite ends thereof to an electric circuit and a metallic screw arranged to be screwed into and out of said heater to vary the resistance therein, substantially as described.

6. The combination with a hollow body to be heated, of an internally-screw-threaded heater therein composed of electrically-conductive and refractory non-conductive materials, a metallic ring at one end of said heater forming an electric terminal, means for connecting a second electric terminal to the opposite end of said heater, and a metallic screw co-operating with the thread therein to vary the resistance, substantially as described.

7. A soldering-iron comprising a hollow metallic body, an internally-threaded heater therein composed of electrically-conductive and refractory non-conductive materials, a metallic point on the end of said heater contacting with the iron, metallic bands forming electric circuit-terminals near each end of said heater, a plate closing the end of the soldering-iron and a screw organized to coöperate with the threaded portion of the heater and projecting beyond said plate, substantially as described.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

JOSEF FRANZ BACHMANN.
ADOLF VOGT.

Witnesses:

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