(No Model.)

A. E. APPLEYARD.

ELECTRICAL HEATING APPARATUS.

No. 467,075. Patented Jan. 12, 1892.

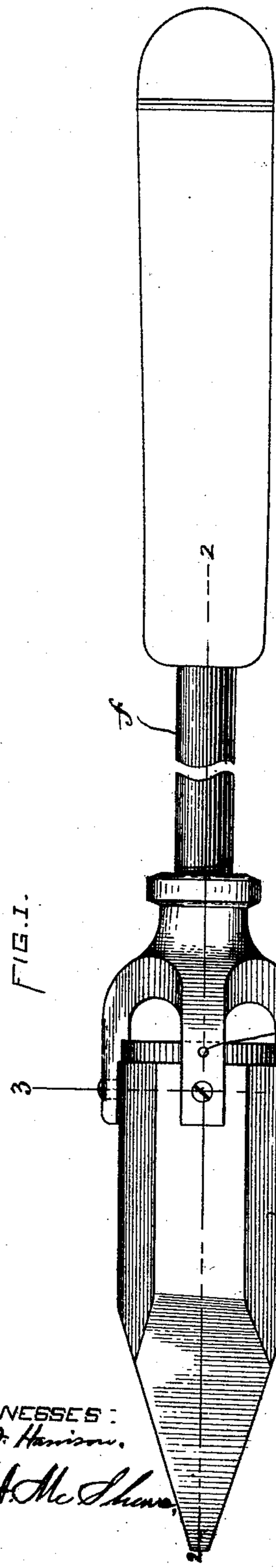


FIG. 1.

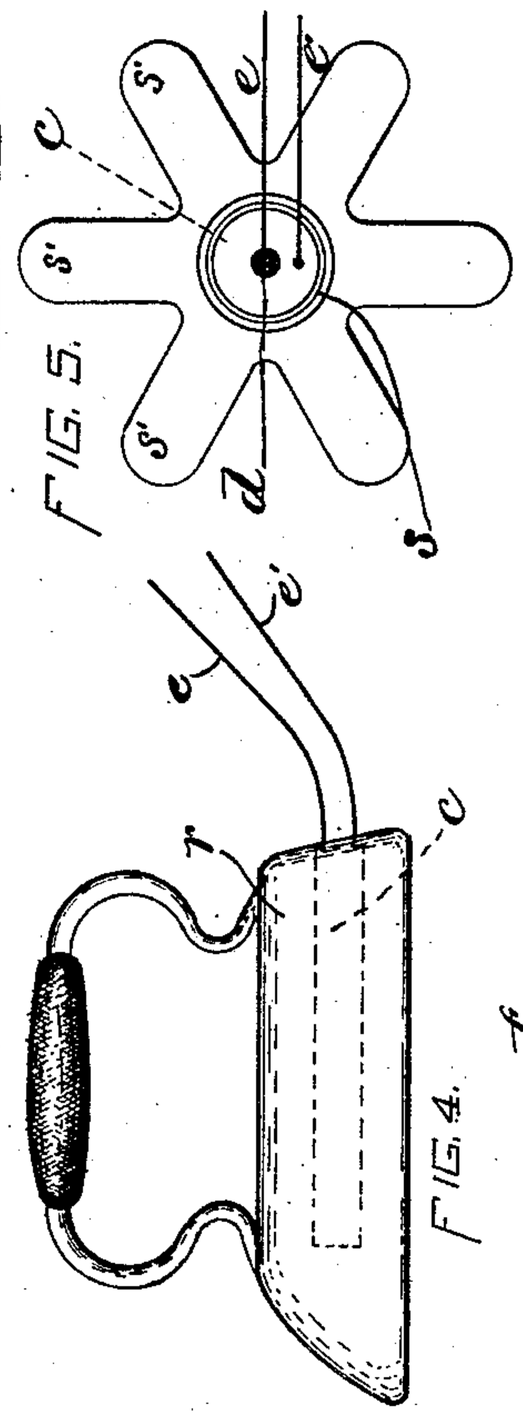
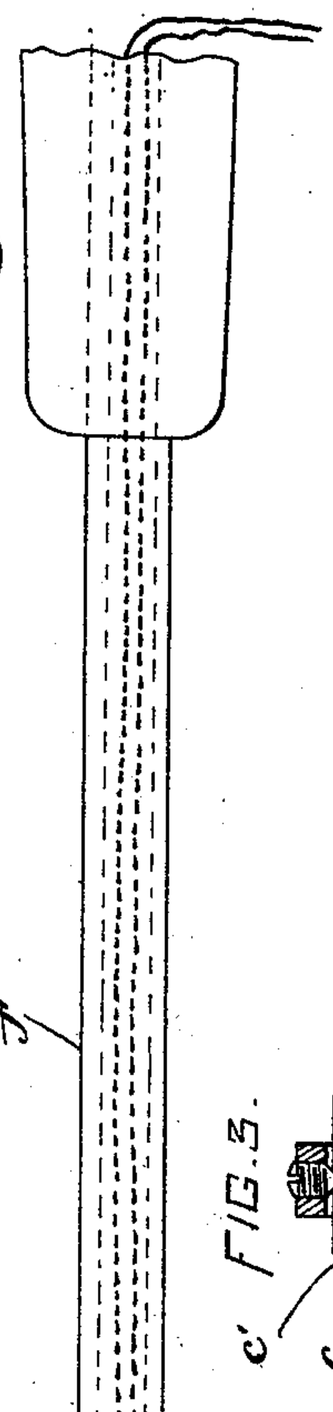


FIG. 5.

FIG. 4.



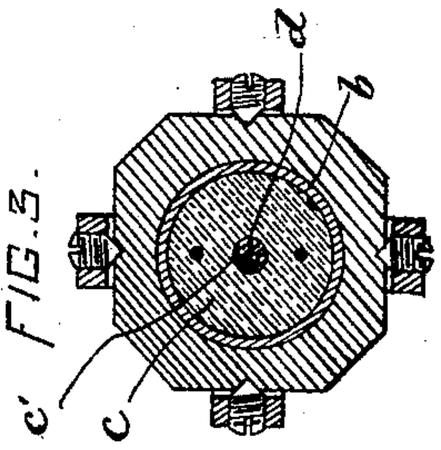


FIG. 3.

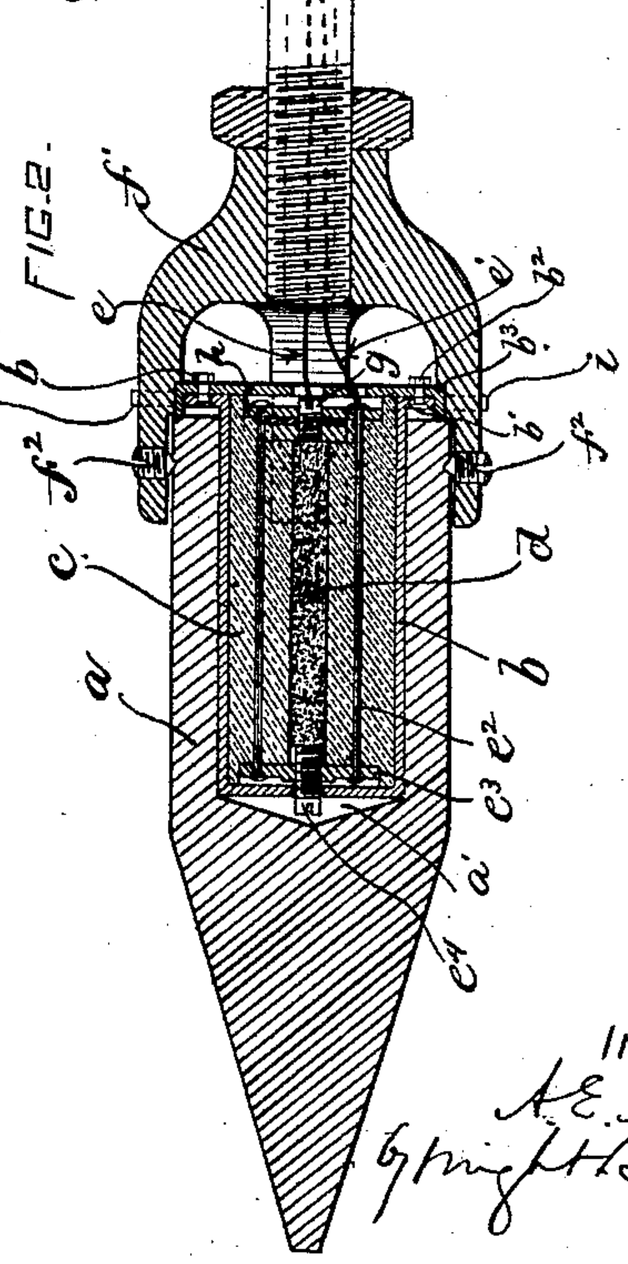


FIG. 2.

WITNESSES:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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ELECTRICAL HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 467,075, dated January 12, 1892.

Application filed January 16, 1891. Serial No. 378,006. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. APPLEYARD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electrical Heating Apparatus, of which the following is a specification.

This invention has for its object to provide improved means for utilizing an electric current for heating purposes, and particularly for heating soldering-irons; and it consists in the improved apparatus, which I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a soldering-iron embodying my invention. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a section on line 3 3 of Fig. 1. Fig. 4 represents a side view of a flat-iron, and Fig. 5 a top view of a heating radiator provided with my improved apparatus.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the external shell to be heated, the same being in this instance formed externally like an ordinary soldering-tool and made of copper or other suitable material, although it may be of any other suitable form and construction. The shell *a* has a cavity *a'*, in which is fitted a metallic holder or casing *b*, preferably of cylindrical form, the cavity *a'* being also cylindrical and closely fitting said holder, as shown in Fig. 3.

c represents a block or mass of any suitable refractory heat-conducting material which is not a conductor of electricity. I prefer to make said block or mass of slate or soapstone, but may make it of any other suitable material. The refractory block *c* is formed externally to closely fit the interior of the holder *b*, and is provided with a longitudinal pocket or cavity *c'* for the reception of an electrical resistance *d*, the latter being a rod or pencil of any material which, although a conductor of electricity, possesses sufficient resistance to cause it to be heated to incandescence by the passage of an electric current through it, so that it will be caused to heat the block *c* and the inclosing shell or casing *a*. I prefer as the material for the resistance *d* some form of carbon, and particularly a form containing a considerable proportion of graphite or plumbago, the resistance being preferably a rod or pencil of compressed plumbago molded or otherwise formed to fit the cavity or pocket *c'* in the refractory block *c*. The refractory heat-conducting block *c* is of rigid or inflexible material, such as soapstone or slate, as above referred to, and is therefore capable of holding the resistance *d* in its pocket without danger of breaking it, whether the said block is contained in the casing or removed from it. Furthermore, the said block is capable of having the plates e^3 and *h* firmly clamped to its ends without compression of the block.

Electrical connections are made with the resistance *d* by means of wires *e e'*, extending through the handle *f*, the wire *e* being connected with one end of the resistance through a screw *g*, inserted in a metallic plate *h* in one end of the block *c* and bearing on one end of the resistance *d*, while the wire *e'* is connected with a small rod or wire e^2, extending through the block *c* and electrically connected with the outer end of the resistance *d* through a metallic plate e^3, inserted in the block *c*, and a screw e^4, engaged with said plate and bearing on the outer end of the resistance. The screws *g* and e^4 should be insulated from all adjoining parts of the apparatus, excepting the resistance and the wires *e* and *e'*, so that the course of the current will be through wire *e*, screw *g*, resistance *d*, screw e^4, plate e^3, rod e^2, and wire *e'*, the wires *e* and *e'* being suitably connected with a dynamo or other source of electricity.

I do not of course limit myself to the described electrical connections between the wires *e e'* and the resistance, as said connections may be made in any suitable way.

I have found that a resistance composed wholly or mainly of plumbago and inclosed in a refractory heat-conducting block of soapstone operates very advantageously in heating a casing or structure in which said parts may be placed, the plumbago resistance developing a high degree of heat, which is conducted by the soapstone block to the surrounding casing. The plumbago resistance and soapstone block or holder possess the ad-

vantage of being extremely durable, as well as possessing the necessary qualities for the rapid generation and conduction of heat. I do not limit myself to these particular materials, however, and may use any other suitable materials.

In the specific form of apparatus here shown—viz., a soldering-iron—the handle *f* is provided with a yoke *f'*, the arms of which bear on the exterior of the shell *a*, and are detachably secured to the latter by screws f^2. The shell is also detachably fitted to the tubular casing *b*, which incloses the refractory block *c* and resistance *d*, so that by withdrawing the screws f^2 the shell may be removed and replaced by another when it has become so reduced by wear as to be useless. The tubular casing *b* is here shown as provided with an outwardly-projecting flange *b'* at its outer end, to which is affixed by screws or rivets b^2 or otherwise a cap or cover b^3, which is perforated for the passage of the wires *e* and *e'*. Said cap is secured to the yoke *f'* by means of screws *i i*, passed through arms of the yoke and bearing on the flange of said cover, as shown in Figs. 1 and 2. Said screws *i i* constitute means for holding the tubular casing *b* and its contents in engagement with the handle independently of the screws f^2, which hold the shell *a*, so that when said shell is removed the tubular casing *b* remains operatively engaged with the handle.

As already indicated, the described heating apparatus may be used for general heating purposes, and is not limited to its specific application to soldering-irons.

In Fig. 4 I show a flat-iron *r*, and in Fig. 5 a radiator *s*, provided with my improved electric-heating apparatus, said radiator being shown as provided with wings *s'* to afford large areas of radiating-surface. The apparatus may also be applied to cooking-stoves.

I claim—

1. In an electric-heating apparatus, the combination, with a cylindrical inclosing shell or casing, of an inflexible block of homogeneous heat-conducting insulating material within said shell, said block having a pocket, a rod or pencil of compressed carbon in said pocket, a plate secured to each end of the block for holding the rod in position, and electrical connections with said rod or pencil, as set forth.

2. The combination, with the casing *b*, of the block *c* of heat-conducting insulating material, having an opening or pocket extending through it, a resistance contained in said pocket, plates e^3 and *h* at the ends of the block *c*, means for securing them thereto, and the screws e^4 and *g*, extending through the plates and into the block, substantially as described.

3. The combination of a resistance, a rigid holder of refractory heat-conducting insulating material, a metallic shell inclosing said holder, a handle detachably secured to said shell, and an outer metallic shell detachably secured to the handle by independent means, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 13th day of January, A. D. 1891.

ARTHUR E. APPLEYARD.

Witnesses:
C. F. BROWN,
A. D. HARRISON.