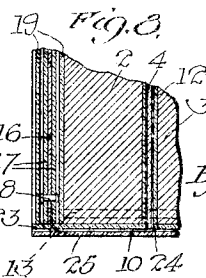
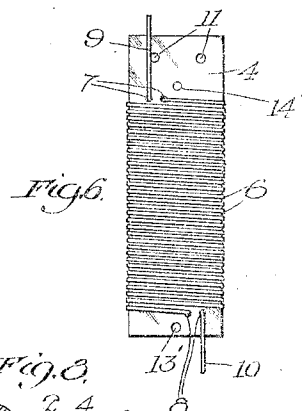
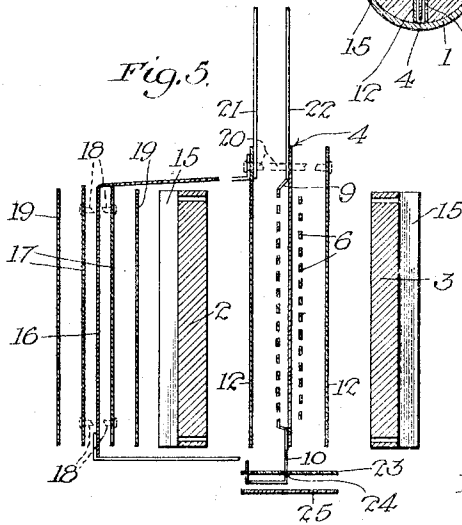
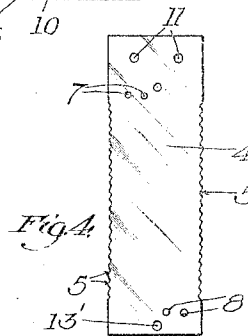
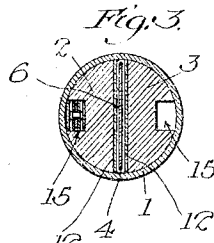
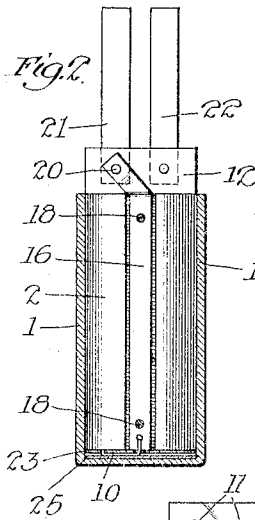
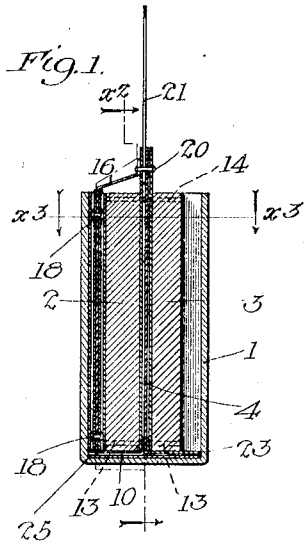


B. FALKENBURG.
HEATING UNIT.
APPLICATION FILED MAY 27, 1912.

1,065,037.

Patented June 17, 1913.



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UNITED STATES PATENT OFFICE.

BJARNE FALKENBURG, OF ONTARIO, CALIFORNIA.

HEATING UNIT.

1,065,037.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed May 27, 1912. Serial No. 700,098.

To all whom it may concern:

Be it known that I, BJARNE FALKENBURG, a subject of the King of Norway, residing at Ontario, in the county of San Bernardino, State of California, have invented a new and useful Heating Unit, of which the following is a specification.

This invention relates to a heating unit specially adapted for use in electric perforators, and the main object of the invention is to provide a heating unit which is light, thin and flat and of small size, which may be easily mailed in an ordinary envelop, and which may be very economically manufactured.

Referring to the drawings:—Figure 1 is a vertical cross section through the heating unit. Fig. 2 is a vertical cross section in a plane on line x^2-x^2 , Fig. 1. Fig. 3 is a cross section on line x^3-x^3 Fig. 1. Fig. 4 is a front elevation of one of the insulating sheets. Fig. 5 is an expanded view of the parts, showing them slightly separated from each other and in contiguous relation. Fig. 6 is a front elevation of one of the mica sheets wound with resistance wire. Fig. 7 is a plan view of one of the bottom insulating disks. Fig. 8 is an enlarged section of a portion of the lower end of the unit.

1 designates a tubular casing which contains the elements, this casing being preferably of a good heat conducting material such as German silver, and preferably being reamed out to form a perfect fit with a removable filling core which lies within it and which consists of two semi-cylindrical members 2 and 3, both of which are of similar construction. The members 2 and 3 are also formed of good heat conducting material such as brass or copper, and closely fit the wall of the casing 1, although being easily slidable therein to enable removal or replacement. The members 2 and 3 are not strictly semi-cylindrical, each member embracing in cross section slightly less than a semi-circle, thereby providing a central diametrical chamber within which is the electrical conductor of resistance material which provides the heat. This comprises a sheet of mica 4, the edges of which are pro-

vided with serrations 5. Resistance wire 6 preferably of rectangular cross section is wound on the mica sheet 4, the numerous coils of the wire being received by the serrations 5 and thereby held apart to prevent short-circuiting. The mica sheet 4 has two perforations 7 and two perforations 8 through which the respective ends 9 and 10 of the wire 6 are passed, the sheet at the top has perforations 11. On each side of the wire wound element is a mica sheet 12, the sheets 12 lying between the wire 6 and the core members 2 and 3 preventing short-circuiting between the wire and core units. A rivet 13 passes through holes 13' in the bottom ends of the sheets 12 and 4 and also through the elements 2 and 3 and holds all of these parts firmly together, while a rivet 14 passes through holes 14' in the members 2 and 3 and sheets 4 and 12 near the upper end. Each of the members 2 and 3 is formed with a longitudinal groove 15 along its outer face and the groove in one of these members serves as a conduit for carrying the conductor from the lower end 10 of the wire 6. The groove in the other member is formed simply for manufacturing purposes, it not being utilized otherwise. The lower end 10 of the wire 6 passes through holes 8 as shown in Fig. 6 and is then bent at substantially a right angle and passes down in a direction parallel to sheet 4 and is then bent transversely, as shown in Fig. 8, across the lower edge of the mica sheet 4, and thence is carried to the groove 15 and there bent upwardly and soldered or otherwise attached to a broad flat wire 16 which extends up between two mica strips 17. The strips 17 are of a width which fills the groove 15, while the width of the wire 16 is less than that of the strips 17, as clearly shown in Figs. 2 and 3, so that the edges of the wire 16 do not come in contact with the member 2. Rivets 18 pass through the strips 17 and wire 16 and hold the same together, while other strips 19 of mica are arranged on opposite sides of the strips 17 to insulate the heads of the rivets 18 from the member 2 and from the casing 1. Sheets 4 and 12 project above the casing 1 and wire 16 is

bent across the upper edge of the inner strip 17 and is carried directly at a slight upward angle, as clearly shown in Figs. 1 and 2, to rivet 20 which passes through one of the holes 11, and connection is thereby made between the wire 16 and a wire 21 which is secured by the rivet 20 and rises from between the plates 4 and 12. The other end 9 of the wire 6 rises directly above the plates 4 and 12 and soldered thereto is a wider terminal wire 22.

A disk 23 of mica having a central slot 24 is arranged at the bottom of the members 2 and 3 and the wire end 10 passes through the slot 24. Below the wire end 10 and disk 23 is another imperforate mica disk 25 which insulates the wire 24 from the bottom of the casing 1. The heat generated by the coiled wire 6 passes through the mica and is imparted to the members 2 and 3 and the latter being of good heat conducting material conduct the heat directly to the shell 1 and thereby secure a close fit of the elements 2 and 3 with the casing 1, so that practically all of the heat is conducted without loss to the shell 1, and therefrom distributed.

If the element should burn out or require replacement it may be removed from the casing 1 and the rivets 13 and 14 removed, which will enable the wire 6 and its supporting sheet 4 to be withdrawn and a new one replaced between the elements 2 and 3. It is to be noted that the only replacement required is that of the wire 6 and its supporting sheet of mica 4 and the two insulating sheets 12, as the members 2 and 3 and casing 1 may be used indefinitely.

What I claim is:—

1. A heating unit comprising a tubular casing, a core therein consisting of two substantially semi-cylindrical members of heat conducting material, a sheet of insulation between said members, and wire wound on said insulating sheet between said core members.

2. A heating unit comprising a tubular casing, a core therein consisting of two substantially semi-cylindrical members of heat conducting material, a sheet of insulation between said members, and wire wound on said insulating sheet between said core members, there being a conduit formed between the wall of the casing and said core, and a conductor passed through said conduit at the top and connected to the lower end of said resistance wire.

3. A heating unit comprising a tubular casing, a core therein consisting of two members of heat conducting material, a sheet of insulating material between said members, resistance wire wound on said insulating material, said insulating material extending above said members, one of said members being formed with a longitudinal groove, and

a conductor lying in said groove and insulated therefrom and connected with lower end of said wire, the upper end of said wire being extended inwardly and connected with said resistance sheet.

4. A heating unit comprising a tubular casing of heat conducting material, a pair of semi-cylindrical members within said casing consisting of a heat conducting material, resistance wire arranged between said members and insulated therefrom, one of said members having a longitudinal groove, a conductor extending through said groove, a connection between said conductor and the lower end of said resistance wire extending across the bottom of one of said members, and a disk of insulating material between said latter member and said connection and another disk of insulating material between said connection and the bottom of said casing.

5. A heating unit comprising a tubular casing, a pair of semi-cylindrical members within said casing, resistance wire arranged between said members and insulated therefrom, one of said members having a longitudinal groove, strips of insulating material of the width of said groove lying therein, and a conductor of less width than said groove secured to said insulating strips and extending along the groove, the lower end of said conductor being connected with said resistance wire, the upper end of said conductor forming one terminal and the upper end of the resistance wire forming another terminal.

6. A heating unit comprising a tubular casing, a pair of semi-cylindrical members within said casing, resistance wire between said members and insulated therefrom, one of said members having a longitudinal groove, a conductor of less width than the groove extending through the groove and connected with the lower end of the resistance wire, insulating strips of the same width as the groove lying therein, rivets securing said resistance strips to said conductor, and other insulating strips of the width of the groove lying outside of said rivets.

7. A heating unit comprising a tubular casing, a pair of semi-cylindrical members within said casing, resistance wire between said members and insulated therefrom, one of said members having a longitudinal groove, a conductor of less width than the groove extending through the groove and connected with the lower end of the resistance wire, insulating strips of the same width as the groove lying therein, rivets securing said resistance strips to said conductor, and other insulating strips of the width of the groove lying outside of said rivets, and a sheet of insulation on which the resistance wire is wound extending above

the said members, said conductor being extended from the upper end of said groove to said projecting insulation and secured thereto.

- 5 8. A heating unit comprising two substantially semi-cylindrical members of heat conducting material, an electrical resistance between said members and lying against one face only of each member, and means for

holding said members together with said 10 resistance between them.

In testimony whereof, I have hereunto set my hand at Ontario, California, this 11th day of April, 1912.

BJARNE FALKENBURG.

In presence of—

O. H. BOOTH,
FRANKLIN BOOTH.