April 8, 1947. A. A. REISER 2,418,557

ELECTRICAL CONTACT HEATER

Filed Oct. 27, 1943

Fig. 1.

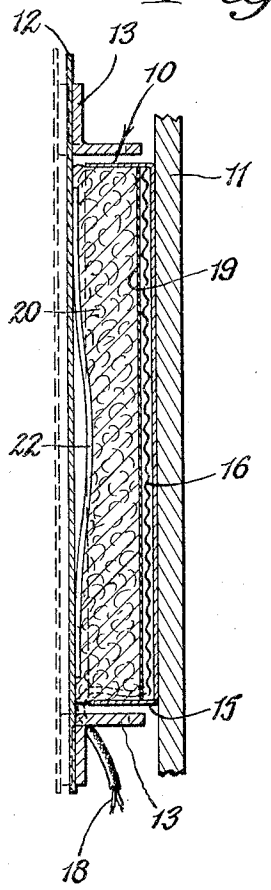


Fig. 2.

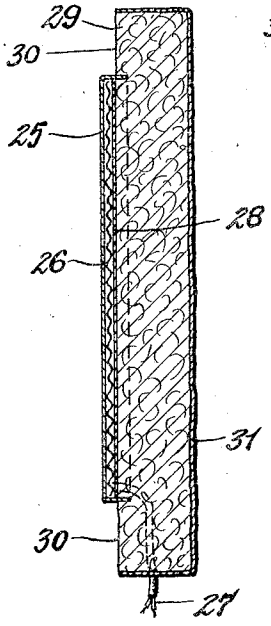


Fig. 3.

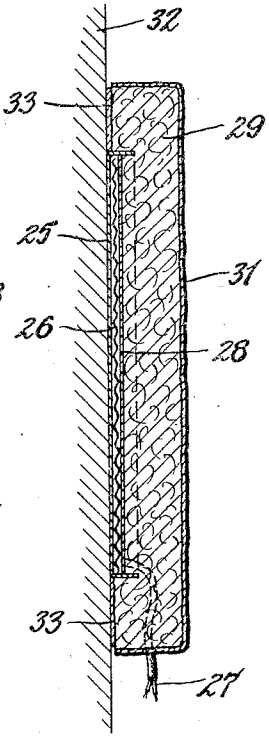
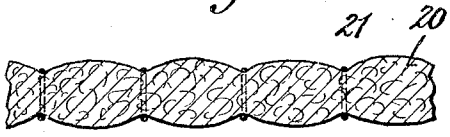


Fig. 4.



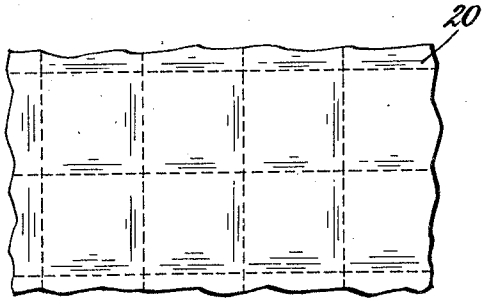


Fig. 5.

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UNITED STATES PATENT OFFICE

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ELECTRICAL CONTACT HEATER

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Application October 27, 1943, Serial No. 507,797

3 Claims. (Cl. 219—19)

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This invention relates to an electrical contact heater and more particularly to a heating unit adapted to be used in a contact heater of the type shown in my copending application Serial No. 459,793, filed September 26, 1942, although the heating unit forming the subject of the present application is applicable wherever contact heating is desired.

One of the principal objects of the present invention is to provide a heater unit of the general type shown in my said copending application which can be made at very low cost and can readily be assembled into a holder so as to be held resiliently in contact with the surface to be heated, this resilient connection permitting the unit to adapt itself to the surface to be heated and thereby insure a uniform resilient contact with maximum heat transfer.

Another object of the invention is to employ a resilient material as the thermal insulation for the heating element and to utilize the resiliency of this thermal insulating material to provide the flexibility of the unit in adapting itself to obtain uniformity of contact with the part to be heated.

A further object of the invention is to provide such a contact heater in which the metal outer casing is eliminated and which at the same time firmly holds the heating surface in planar contact with the surface to be heated.

In the accompanying drawings:

Fig. 1 is a fragmentary vertical section through one form of contact heater embodying my invention and showing the same applied to a surface to be heated.

Fig. 2 is a vertical section through a modified form of contact heater embodying the present invention and showing the same about to be applied to the surface to be heated.

Fig. 3 is a view similar to Fig. 2 showing the contact heater applied to the surface to be heated.

Fig. 4 is a cross section through the quilted asbestos felt used as the resilient backing medium for the heating element.

Fig. 5 is a face view of the quilted asbestos felt used as the resilient backing medium for the heating element.

The form of heating unit shown in Fig. 1 is adapted to be used in connection with a contact heater as shown in my said copending application in which the heating pad or unit, indicated generally at 10, is held against the outer face of a part 11 to be heated by means of a sheet metal holder 12 which is yieldingly urged toward the part 11 to be heated in any suitable manner. This holder 12 is shown as having angle bars

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13 secured to its inner face and between which the heating unit or pad 10 is arranged.

The heating unit or pad 10 comprises a cup-shaped metal container or shell 15 which can be made of copper or other metal having high heat conductivity, the outer face of this cup-shaped container 15 being held against the outer face of the part 11 to be heated. Arranged against the inner face of this cup-shaped container 15 is a heating element 16 which can be insulated from the copper shell 15 in any suitable manner and which is supplied with current by means of wires 18. This heating element is shown as being backed by a sheet 19 of insulating material and the remainder of the container or shell 15 is filled with a pad 20 of quilted asbestos felt having both inherent resiliency and also thermal insulating properties.

As best shown in Figs. 4 and 5, the quilted asbestos felt pad 20 is made of felted asbestos and can be quilted by means of threads 21 which are passed through the felt body at intervals so as to insure the pad retaining its form. This quilted asbestos pad 20 projects a substantial distance beyond the rim of the metal shell or container 15 and engages the inner face of the holder 12. The quilted asbestos pad 20 thereby provides a resilient component between the metal shell or container 15 and the holder 12 so that when the holder 12 is moved from the dotted line position to the full line position shown in Fig. 1 the metal shell or container 15 is free to adapt itself and find uniform resilient contact with the face of the part 11 to be heated, thereby to insure maximum heat transfer from the heating element 16 to the part to be heated. If desired the resiliency of the quilted asbestos pad 20 can be augmented by means of one or more steel springs 22 interposed between this pad and the inner face of the holder 12.

In the form of the invention shown in Figs. 2 and 3 a flexible pad of asbestos or like thermal insulation material is utilized both for thermal insulation and also for supporting a heated cup-shaped shell or container resiliently against the part to be heated so that this shell is free to adapt itself and obtain uniform resilient contact with the part to be heated. In this modified form of the invention the cup-shaped shell or container 25 is likewise made of copper or other metal having high thermal conductivity and is shown as housing a resistance element 26 supplied with current from electric lines 27, this resistance element 26 being thermally insulated from the copper shell 25 in any suitable manner.

This resistance element is shown as having a backing sheet **28** of insulating material, and as being set into the face of a quilted asbestos felt pad **29** which is made in the same manner as the quilted asbestos pad **20** shown in Figs. 1, 4 and 5. This pad is, however, substantially larger in outline than the cup-shaped metal shell or container **25** so as to provide a marginal face **30** which surrounds this cup-shaped metal part or container. The sides and outer face of the quilted asbestos pad **29** can be covered with a coating of paint or plastic **31** to provide a rigid structure.

In applying the heating element shown in Figs. 2 and 3 to the part **32** to be heated, the marginal face **30** of the quilted asbestos pad **29** is coated with adhesive cement **33**. The assembly is then pressed against the surface of the part **32** to be heated until the adhesive **33** adheres thereto. In so pressing the unit against the face of the part **32** to be heated, the cup-shaped shell or container **25** is pressed into the body of the quilted asbestos felt pad **29** so that when the adhesive **33** hardens this cup-shaped metal shell or container is firmly and yieldingly held against the face of the part **32** to be heated to obtain good thermal conductivity. Further, in so pressing the unit against the face of the part to be heated, it will be seen that the cup-shaped metal holder or container **25** is free to adapt itself and find uniform resilient contact with the surface to be heated.

From the foregoing it will be seen that the present invention provides a very simple and inexpensive form of contact heater in which the quilted asbestos pad or like resilient thermal insulating pad is utilized, both for obtaining thermal insulation and also to insure the proper planar engagement between the metal holder for the heating element and the face of the part to be heated. It will further be seen that the invention can be produced at very low cost and will stand up under conditions of severe and constant operation without getting out of order or requiring repairs.

I claim:

1. An electrical contact heater, comprising a cup-shaped heat conductive member having a face adapted to contact a face of the part to be heated and having its rim projecting in the opposite direction from the margin thereof, an electrical resistance heating element arranged in said cup-shaped member and along the opposite face thereof from that engaging the part to be heated, a pad of compressible material arranged in said cup-shaped member and projecting outwardly therefrom a substantial distance perpendicularly to said faces and also projecting generally parallel with said faces beyond said rim of said cup-shaped member, means for exerting pressure against the outwardly projecting part of said pad to hold said cup-shaped member embedded in said pad and the first face thereof in uniform yielding contact with the said face of the part to be heated, and a coating of a hardening plastic material applied over the exterior of said pad to form a case for the contact heater.

2. An electrical contact heater, comprising a cup-shaped heat conductive member having a face adapted to contact a face of the part to be heated and having its rim projecting in the opposite direction from the margin thereof, an electrical resistance heating element arranged in said cup-shaped member and along the opposite face thereof from that engaging the part to be heated, a pad of compressible material arranged in said cup-shaped member and projecting outwardly therefrom a substantial distance perpendicularly to said faces and also projecting generally parallel with said faces beyond said rim of said cup-shaped member, and means for exerting pressure against the outwardly projecting part of said pad to hold said cup-shaped member embedded in said pad and the first face thereof in uniform yielding contact with the said face of the part to be heated, comprising an adhesive uniting the opposing face of said generally parallel projecting part of said pad with the part to be heated.

3. An electrical contact heater, comprising a cup-shaped heat conductive member having a face adapted to contact a face of the part to be heated and having its rim projecting in the opposite direction from the margin thereof, an electrical resistance heating element arranged in said cup-shaped member and along the opposite face thereof from that engaging the part to be heated, a pad of compressible material arranged in said cup-shaped member and projecting outwardly therefrom a substantial distance perpendicularly to said faces and also projecting generally parallel with said faces beyond said rim of said cup-shaped member, means for exerting pressure against the outwardly projecting part of said pad to hold said cup-shaped member embedded in said pad and the first face thereof in uniform yielding contact with the said face of the part to be heated, comprising an adhesive uniting the opposing face of said generally parallel projecting part of said pad with the part to be heated, and a coating of a hardening plastic material applied over the exterior of said pad to form a case for the contact heater.

ALFRED A. REISER.

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