

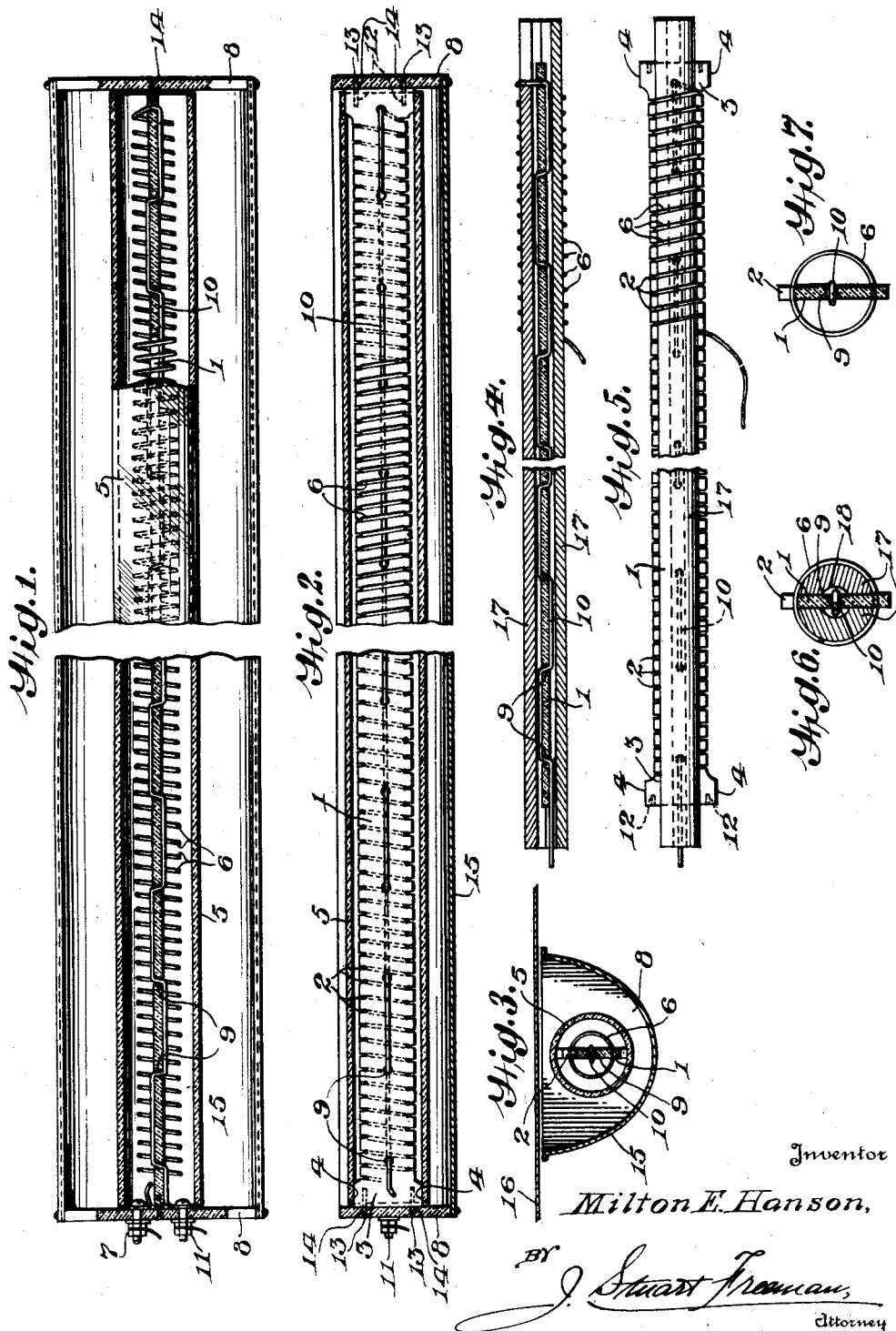
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RADIANT HEATER

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RADIANT HEATER

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4 Claims. (Cl. 219—34)

The object of the invention is to provide improvements in radiant heaters broadly, and especially in heaters of this class which are particularly adapted for the application of heat to rapidly moving webs of paper, textiles, and the like.

Another object is to provide an improved method of making a heater of this type, which consists in winding the electric resistance element or resistor upon a permanent support augmented by temporary form-giving members, and after the winding has been completed removing said members in order to leave a hollow coiled resistor, the major portion of which is freely supported at a minimum number of points for each convolution, thereby increasing the radiant efficiency of the device.

A further object is to so mount a resistor of this type that it will be fully protected from direct contact with a passing web, that the protecting medium will not insulate the web from the heat-conducting light rays from the resistor to an appreciable degree, and that rays originally extending from said resistor away from the plane of an adjacent moving web will be reflected to a maximum degree towards such plane.

A still further object is to provide in a heater of this type the combination of an insulating resistor support, means to operatively support said first support, and an insulating protector shielding said resistor from a neighboring web but permitting the free passage of heat and light rays thereby.

With these and other objects in mind, the invention comprises further details of construction and operation which are fully brought out in the following description, when read in conjunction with the accompanying drawing, in which Fig. 1 is a part plan and part horizontal sectional view of one embodiment of the invention; Fig. 2 is a partial longitudinal vertical section of the same, also showing portions of the several elements in elevation; Fig. 3 is a transverse section of the completed heater; Fig. 4 illustrates a step in the improved resistor-forming method and shows the resistor support separating a pair of form-giving members, all being partly in section; Fig. 5 is a side elevation of the same partly in section; Fig. 6 is a transverse section of the same; and Fig. 7 is a transverse section of the same after the form-giving members have been removed therefrom.

Referring to the drawing, there is first provided a substantially rigid strip 1 of suitable insulating material having longitudinally spaced

notches 2 cut or otherwise formed in its opposite edge portions, and the opposite end portions of said strip being transversely widened at 3, to provide shoulders 4 which are adapted to slidably engage and fixedly support a resistor protector comprising a transparent cylinder or tube 5 of glass or other suitable substance, having the characteristics of transparency, rigidity and electric but not heat insulation.

Surrounding said strip is a cylindrical helix 6, the adjacent convolutions of which are spaced apart by and within the consecutive notches 2, one end of said helix being attached to a binding post 7 mounted upon one of the insulating end plates 8, the opposite end of said helix being threaded alternately from side to side through spaced apertures 9 in said strip and thus extending by way of a relatively direct path 10 to a second binding post 11, also mounted upon the end plate 8 preferably adjacent to but spaced from said first binding post.

Secured in spaced bores 12 in each of its opposite end portions, said strip is provided with pins 13 which normally extend into similarly positioned apertures 14 in the end plates 8, said pins being in threaded or other normally fixed engagement with said plate apertures. These end plates are preferably parallel and have secured to a portion of their peripheries a reflecting element 15 by any suitable means such as the screws shown, said reflector in cross section being of any convenient shape designed to reflect radiant heat, as it is not essential as in many instances that the rays pass therefrom in any particular manner other than with the utmost freedom, since a paper or textile web 16 acted upon by the device passes the plane of the open side of said reflector in but slightly spaced relation therewith, as indicated in Fig. 3.

Such a heater can be supported by any suitable extraneous structure, and it has been found that a heater of this type can be depended upon to emit through its open face a high percentage of the heat generated within, irrespective of its position, as such heat comprises in addition to that given out by convection a high percentage due to radiation, both directly from the helix when glowing and indirectly therefrom by the reflecting element 15, such radiant heat having the characteristic of piercing a web carrying any form of ink impression and moving closely past said open face, to the same degree that light rays from the helix penetrate such web and the material such as ink which may be carried by it. In the formation of the resistor helix, it has

been found to be advantageous to first thread an end portion of the resistance element alternately through the apertures 9 in the strip 1 from side to side, then to temporarily place upon the opposite sides of said strip a pair of substantially semi-cylindrical members 17, having longitudinally extending recesses 18 in their plane faces, to receive the threaded portion of said element adjacent to said strip, after which the free portion of the resistance element is wound about said members and through the consecutive notches in the intervening strip, to form a regular and unbroken helix from one end of said strip to the other. The forming members may then be removed longitudinally, after which the opposite sides of the helix will remain suspended free from contact with said strip, except where the former engages the latter in said notches. Then by mounting said strip in a plane which bisects the reflector along its longitudinal axis, a maximum degree of radiant heat passes to the reflector from the two halves of the helix upon the opposite sides of said strip, and thence in leaving said reflector passes said strip in the reverse direction with a minimum degree of obstruction.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. A heater comprising a reflector, end closures for said reflector, a protector tube within the reflector having both ends initially open and spanned by said closures, a strip of insulation

diametrically of said tube having a generally longitudinal row of transverse openings there-through, a resistor element laced in said openings having a helix surrounding the strip, said strip having enlargements at each end providing shoulders extending outwardly beyond the said helix and contacting with the inner wall of the tube whereby the tube is in spaced relation to the helix, and binding post means on one of said closures for the terminals of said resistor element.

2. A heater comprising a reflector having a transverse wall, binding posts on said wall, a strip of insulation disposed with one end in contact with said wall, a resistor element terminally secured to said posts having a helix surrounding the strip and a portion laced in openings of the strip, whereby the resistor tends to hold the strip in place, said resistor having shoulders outwardly of the helix, and a protector tube telescoped over and supported by the strip at said shoulders, the helix thereby being spaced from the wall of the tube.

3. A heater according to claim 1 having inter-fitting pins and recesses between the closures and the ends of said strip.

4. A heater according to claim 2 having inter-fitting means between the wall and adjacent end of said strip disaligned with respect to said binding posts.

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