Feb. 26, 1957 H. B. WOLF 2,783,358

ELECTRICALLY HEATED PAD

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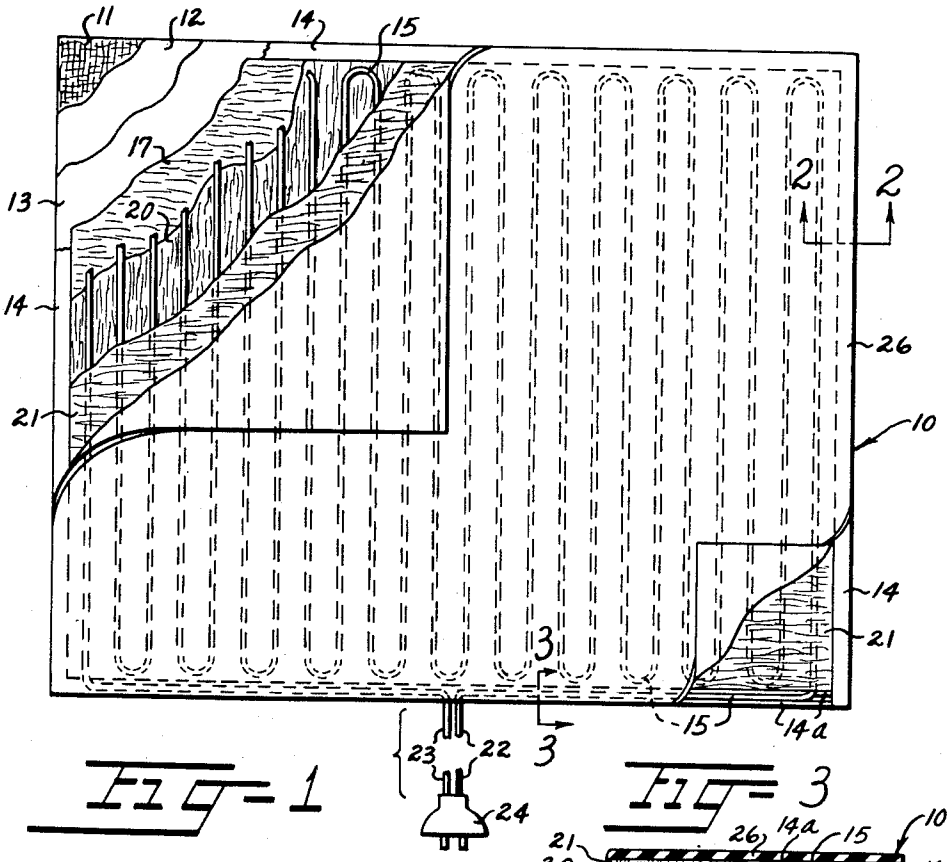


Fig-1

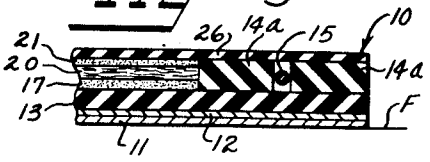


Fig-3

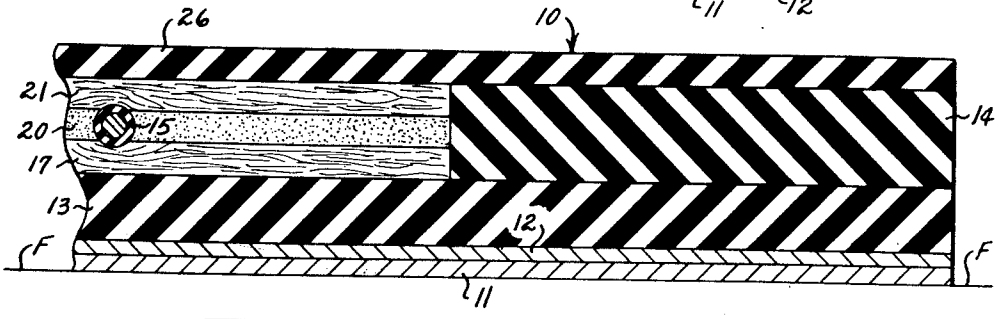


Fig-2

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ELECTRICALLY HEATED PAD

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9 Claims. (Cl. 219—46)

This invention generally relates to floor coverings and, more especially, to an improved rug or carpet warming or heating mat or pad for disposition beneath a rug, carpet or the like for transmitting heat thereto.

Heretofore, various attempts have been made to develop a pad suitable for underlining floor coverings, such as rugs, carpets and the like in which means were incorporated for effectively concealing from both sight and feel the fact that electrical conductors, heating elements or the like were disposed between the folds or plies of the pad. However, in order to effectively conceal the electrical conductors and resistance wires, it has been necessary to sacrifice resiliency in the pad and, more especially, a substantial proportion of the heat radiated by the conductors or heating elements has been conducted away from the upper surface of the floor covering by the floor upon which the pad was positioned and the resultant dissipation of heat has required relatively large heating elements for a pad of a given size in addition to a relatively extensive period of time being required to effectively heat the pad or the rug, carpet or the like positioned thereon. Moreover, no medium of high heat conductivity has heretofore been provided for conducting heat from the heating elements and diffusing it throughout the mat.

It is therefore the primary object of this invention to provide an improved mat or pad having an electrical resistance means or heating element therein and having means for effectively concealing from both sight and feel the presence of the electrical resistance means and providing a means of diffusing or conducting heat throughout the mat, without sacrificing resiliency of the pad, and, also, wherein a heat reflective member, such as aluminum foil or the like forms one of the plies of said mat or pad and is disposed adjacent the opposite side of the electrical resistance means from that which supports the carpet, rug or the like to thereby reflect the heat and cause the same to be radiated upwardly in the direction of the rug or carpet supported on the mat or pad.

It is another object of this invention to provide an improved electric heating pad or mat and method of making same, which pad comprises a pair of spaced resilient plies formed from rubber, plastic or other resilient web material between which an electrical conductive means is positioned and formed with spaced parallel runs which extend throughout the width of the pad or mat and wherein a layer or ply of shredded metal, such as steel wool, is positioned on each side of the heating element or electrical conductive means and between each of the runs thereof. The steel wool is then coated or impregnated with a suitable adhesive binder which is permitted to dry while the steel wool is under compression. The binder adds to the resiliency of the steel wool plies and prevents corrosion or rusting of the steel wool.

The outer surface of one of said resilient plies is covered with a thin ply of metallic material, such as aluminum or tin foil with the bright or polished side thereof facing the corresponding resilient ply. A loosely

woven fabric, such as burlap, is positioned against the outer surface of the ply of heat reflecting material. Thus, the resiliency of the pad is maintained, and heat from the resistance elements is diffused throughout the mat due to the novel arrangement of the shredded metal or steel wool between the proximal surfaces of the resilient plies while effectively concealing the heating element from both sight and feel. Also, the heat reflecting surface, embodied in the sheet or layer of metal foil, causes the heat radiated by the heating element to be reflected upwardly therefrom and toward the resilient ply upon which the rug or carpet is positioned.

It is also contemplated that the improved heating pad construction may, in itself, constitute a suitable floor covering and serve as the visible covering member.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

Figure 1 is a plan view of the improved electrically heated pad or mat showing opposite corners of the uppermost ply thereof rolled upon itself with others of the plies and portions of the coils of the heating element being broken away for purposes of clarity;

Figure 2 is an enlarged fragmentary vertical sectional view through the improved pad or mat taken along line 2—2 in Figure 1;

Figure 3 is a view, on a reduced scale, similar to Figure 2, but being taken along line 3—3 in Figure 1.

Referring more specifically to the drawings, the improved rug pad or mat is broadly designated at **10** and comprises a first outer or bottom sheet or ply **11** made up of a suitable fabric, preferably an open weave fabric such as burlap. Positioned upon the fabric ply **11** is a layer or ply **12** of impervious heat-reflecting material, such as metal and which is preferably in the form of metallic foil such as tin foil or aluminum foil. As is well known, foil is generally of substantially the same thickness as writing paper and the thickness thereof is proportionately exaggerated in Figure 2 for purposes of clarity.

As is generally known, one surface of foil is usually relatively bright and the opposite surface thereof is usually relatively dull and, such being the case, the dull surface of the foil layer **12** should be positioned against the inner or upper surface of the fabric ply **11** and the dull surface of the foil ply **12** is preferably adhesively secured to the inner surface of the fabric ply **11**. Thus, the bright upper surface of the foil ply **12** serves as a heat reflecting surface.

Adhesively or otherwise secured to the upper surface of the foil ply **12** is a relatively thick layer, ply or sheet of resilient or rug matting material **13** which is preferably made up of rubber or felt or fibers which are suitably matted together to become intermingled and cohesively held together to form a thick resilient fabric or mat layer.

Positioned upon the upper end and side outer edge portions of the relatively thick layer **13** of resilient material in Figure 1, and preferably being adhesively secured thereto, is a resilient border strip or filler strip **14** which is made from any suitable resilient material, such as rubber or its equivalent. The lower edge portion of the ply or layer **13** has a composite border strip or filler strip adhesively secured thereto which includes two parallel spaced sections **14***a* (Figure 3) to accommodate lead wires or conductors therebetween, to be later described. The border strips **14**, **14***a* define the side walls of a heating element chamber within which a suitably insulated coiled heating element, resistance conductor or other electrical conductive means **15** is disposed, the coils of the heating element **15** being arranged in closely spaced generally parallel relationship.

As illustrated in Figures 1 and 2, the coils of the heating

element 15 rest upon a layer or ply 17 of fibrous or shredded metal, such as steel wool, which, in turn, rests upon the upper surface of the relatively thick resilient ply 13. The shreds or fibers in the layer 17 extend in generally parallel relationship transversely of the runs or coils of the heating element or resistance conductor 15.

After the coils of the heating element 15 have been positioned upon the resilient shredded metal layer or ply 17, another ply 20 of material identical to the material in the ply 17 is formed between adjacent runs or coils of the heating element 15, but wherein the fibers or shreds extend in substanitally parallel relationship and substantially parallel to the adjacent runs or coils of the heating element or the resistance conductor 15. Positioned upon the ply 20 and the coils of the heating element or resistance conductor 15 is a resilient shredded metal or steel wool ply 21 which is similar to the ply 17 and wherein the fibers or shreds thereof are also arranged in substantially parallel relationship transversely of the coils or runs of the heating element or resistance conductor 15. The three matted layers of fibrous or shredded metal 17, 20 and 21 actually become intermingled to some extent when the improved rug pad or mat is assembled and the three layers 17, 20 and 21 are collectively of substantially the same thickness as the border or filler strip 14 thus serving, with the coils of the heating element 15, as a filler between the resilient cover or ply 13 and a second outer or upper resilient ply or cover 26. In order to prevent shifting of the shredded or fibrous metal in the layers 17, 20 and 21, each of these layers is preferably coated or impregnated with a suitable adhesive binder or compound such as varnish, plastic, rubber or other material. This binder also prevents rusting or corrosion of the steel wool or fibrous metal and adds to its resiliency.

When the fibrous or shredded metal layers 17, 20 and 21 are initially positioned about the coils of the heating element 15, it is apparent that the fibers or shreds thereof are relatively loose and, in order to insure that an ample amount of said fibers is provided between the resilient plies 13 and 26, the fibrous metal layers 17, 20 and 21 are suitably compressed after the binder has been applied thereto and while the binder is still in the wet state. The fibers remain compressed until the binder has dried. Thus, after the binder has dried or hardened sufficiently, the shape of the mat formed from the shredded metal plies 17, 20 and 21 is retained so the upper surface of the upper resilient ply 26 is smooth and flat throughout. Other arrangements of the heat conducting shredded metal may be made.

Suitably insulated lead wires 22 and 23 are connected to opposite ends of the heating element, resistance conductor or other electrical resistance means 15, adjacent opposite ends of the filler strip sections 14*a*. The lead wires 22 and 23 penetrate the innermost filler strip section 14*a*, extend longitudinally between the filler strip sections and then penetrate the central portion of the outermost filler strip section 14*a*. A suitable plug 24 is connected to the free ends of the wires 22 and 23 and is adapted to be connected to a suitable source of electrical energy.

The second outer or upper resilient ply, cover or layer 26 is positioned upon and adhesively secured to the upper surface of the upper layer 21 of shredded or fibrous metal with its outer edge portions being suitably adhesively secured to the upper surface of the filler strip or border strip 14 and the sections 14*a*. The upper ply 26 is preferably made from molded rubber or plastic, felt, or textile fibers which are suitably matted together to become intermingled and cohesively held together. The upper ply or layer 26 is preferably, but not necessarily, of slightly less thickness than the layer 13, the proximal surfaces of the layers or plies 13 and 26 defining the lower and upper walls, respectively, of the heating element chamber or resistance conductor chamber.

In order to insure that the adhesive used in securing the opposing plies 13 and 26 to the steel wool plies 17 and 21 and the border strip 14 is dried completely and to thereby insure that the improved rug pad is free of undesirable odors caused by the adhesive, it is highly desirable that one corner of the upper resilient ply 26 is turned upon itself, substantially as shown in the right-hand lower portion of Figure 1, for a sufficient period of time to permit the moisture in the adhesive to evaporate and to thereby release the odor of the adhesive from the heating element chamber. Thereafter, the previously turned corner of the upper ply 26 is adhesively secured to the previously exposed corner portions of the steel wool ply 21 and the border or filler strip 14.

It is apparent that the combination of the steel wool or fibrous metal layers 17, 20 and 21 and the resilient layers 13 and 26 disposed on opposite sides of the fibrous metal or steel wool layers effectively conceals the coils of the electrical resistance means or heating element 15 from both sight and feel and provides an effective means for conducting heat from the resistance elements and diffusing this heat throughout the mat without sacrificing resiliency of the pad 10, although the heating element traverses the same general area as that defined by the rug mat or pad 10. In addition, of great import is the fact that heat radiated by the coils of the heating element or electrical resistance means 15 is reflected upwardly away from the floor F by the foil ply 12, thus preventing undue heat loss and insuring that the air surrounding and immediately above the rug pad 10 is efficiently heated and, of course, insuring that the rug, carpet or the like positioned upon the upper surface of the layer 26 of the improved rug pad 10 is heated with a minimum amount of current being consumed by the heating element 15. The steel wool or metal fibers in the layers 17, 20 and 21 also assist materially in uniformly diffusing the heat radiated by the coils of the heating element 15. Also, the resilient opposed covers or plies 13 and 26 and the border or filler strips 14, 14*a* are preferably made from a waterproof material to prevent dust, moisture and the like from entering the chamber in which the heating element 15 and the steel wool plies 17, 20 and 21 are disposed.

It is thus seen that I have provided a novel floor covering, a preferable form of which may be in the nature of a rug pad or mat for disposition beneath a decorative floor covering and which is arranged to effectively accommodate and conceal both from sight and feel, electrical resistance means or heating element coils, and means for diffusing heat uniformly throughout the rug or mat without sacrificing the resiliency of the rug pad and, further, being so arranged as to effectively radiate the heat upwardly or away from the floor so that a predominant amount of the heat is not dissipated to or conducted by the floor.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. A heat radiating pad comprising a pair of opposing covers, a coiled heating element having spaced coils arranged between said opposing covers, a fibrous metal pad construction disposed between said opposing covers and in which said coils of the heating element are embedded, and a foil sheet on the exterior surface of one of said opposing covers.

2. A resilient rug pad comprising upper and lower spaced resilient plies of non-metallic material, a fibrous metal mat construction disposed between said spaced resilient plies, a heating coil embedded in the mat of fibrous metal, and a sheet of metal foil applied to the exterior surface of one of said resilient plies.

3. An improved floor covering construction comprising a pair of spaced opposing resilient plies, a compressed

steel wool mat disposed between said opposing plies, said steel wool mat being impregnated with an adhesive binder, a heating element having coils arranged between said pair of opposed plies and being embedded in said steel wool mat, and a sheet having a heat reflecting surface thereon adhesively secured to the outer surface of one of said opposing resilient plies.

4. An improved floor covering construction comprising a pair of spaced opposing resilient plies, a relatively narrow filler strip disposed between adjacent edge portions of said pair of opposing resilient plies, a compressed steel wool mat disposed between said opposing plies and being confined therebetween by said filler strip, said steel wool mat being coated, at least in part, with a liquid binder of a character which becomes solidified after application thereof, a heating element having coils arranged between said pair of opposing plies and being embedded in said steel wool mat, and an impervious sheet having a heat reflecting surface thereon adhesively secured to the outer surface of one of said opposing resilient plies.

5. An improved floor covering construction comprising a pair of spaced opposing waterproof resilient plies, a relatively narrow filler strip disposed between adjacent edge portions of said pair of opposing resilient plies, a compressed fibrous metal mat disposed between said opposing plies and being confined therebetween by said filler strip, said fibrous metal mat being impregnated with a liquid binder of a character which becomes solidified after application thereof, a heating element having coils arranged between said pair of opposing plies and being embedded in said fibrous metal mat, and an impervious sheet having a heat reflecting surface thereon adhesively secured to the outer surface of one of said opposing resilient plies.

6. An improved rug pad construction comprising a pair of opposing resilient plies, a layer of fibrous metal disposed between and engaging the proximal surfaces of the opposing resilient plies, a heating element having a plurality of closely spaced substantially parallel coils embedded in said layer of fibrous metal, said layer of fibrous metal being impregnated with an adhesive binder, a foil sheet secured to the exterior surface of one of said opposing resilient plies, and a burlap fabric ply secured to the exterior surface of said foil sheet.

7. An improved rug pad construction comprising a pair of opposing resilient waterproof plies, a border strip of waterproof material disposed between and being adhesively secured to edge portions of said resilient plies, first and second spaced plies of fibrous metal disposed between and engaging the proximal surfaces of the respective opposing resilient plies and having their fibers extending in substantially parallel relationship, a heating element having a plurality of closely spaced substantially parallel coils disposed between said first and second plies of fibrous metal and wherein said coils extend transversely of the fibers in said first and second fibrous metal plies, a third fibrous metal ply disposed between the proximal surfaces of the first and second fibrous metal plies and being disposed between adjacent coils of said heating element, the

fibers in said third fibrous metal ply extending in substantially parallel relationship and substantially parallel to the adjacent coils of the heating element, and an adhesive binder coating on said fibrous metal plies.

8. An improved rug pad construction comprising a pair of opposing resilient waterproof plies, a border strip of waterproof material disposed between and being adhesively secured to edge portions of said resilient plies, first and second spaced plies of fibrous metal disposed between and engaging the proximal surfaces of the respective opposing resilient plies and having their fibers extending in substantially parallel relationship, a heating element having a plurality of closely spaced substantially parallel coils disposed between said first and second plies of fibrous metal and wherein said coils extend transversely of the fibers in said first and second fibrous metal plies, a third fibrous metal ply disposed between the proximal surfaces of the first and second fibrous metal plies and being disposed between adjacent coils of said heating element, the fibers in said third fibrous metal ply extending in substantially parallel relationship and substantially parallel to the adjacent coils of the heating element, an adhesive binder coating on said fibrous metal plies, a foil sheet adhesively secured to the exterior surface of one of said opposing resilient plies, and a loosely woven fabric ply adhesively secured to the exterior surface of said foil sheet.

9. An improved rug pad construction comprising a pair of opposing resilient plies, first and second spaced plies of fibrous metal disposed between and engaging the proximal surfaces of the respective opposing resilient plies and having their fibers extending in substantially parallel relationship, a heating element having a plurality of closely spaced substantially parallel coils disposed between said first and second plies of fibrous metal and wherein said coils extend transversely of the fibers in said first and second fibrous metal plies, a third fibrous metal ply disposed between the proximal surfaces of the first and second fibrous metal plies and being disposed between adjacent coils of said heating element, the fibers in said third fibrous metal ply extending in substantially parallel relationship and substantially parallel to the adjacent coils of the heating element, a foil sheet adhesively secured to the exterior surface of one of said opposing plies, and a loosely woven fabric ply adhesively secured to the exterior surface of said foil sheet.

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