Dec. 22, 1936. E. F. SCHWELLER 2,065,402

REFRIGERATING APPARATUS

Filed Feb. 28, 1933

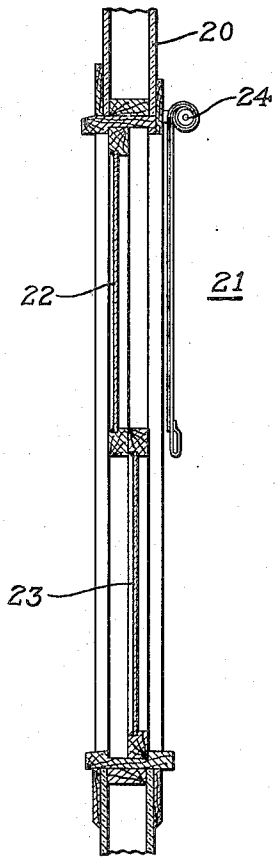

Fig. 1

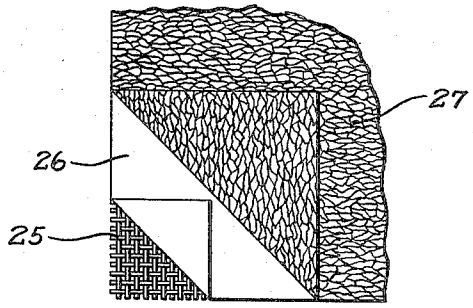

Fig. 2

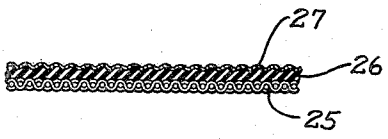

Fig. 3

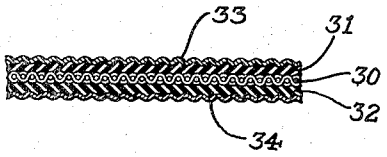

Fig. 4

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REFRIGERATING APPARATUS

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5 Claims. (Cl. 156—10)

This invention relates to refrigerating apparatus and more particularly to heat reflecting window shades for materially retarding the entrance of heat into refrigerated rooms or enclosures which it is desired to keep cool.

In recent years there has been considerable interest in the cooling of rooms and railway cars during the summer months to increase the comfort of occupants. In many instances refrigerating apparatus has been provided for removing heat from the rooms or from the interior of the railway car. It has been found that great amount of heat enters the rooms of the railway cars through the windows. It is desired to keep this heat out of the rooms or out of the railway car whether the interior is being cooled by refrigerating means or if no cooling means is provided. It has been proposed to coat the window shades with some bright substance which readily reflects heat and particularly the rays of the sun so that this radiant heat may be kept out of the room. There, however, has been much difficulty in finding a suitable substance which will properly reflect the radiant heat as well as to permanently adhere to the window shade.

It is therefore an object of my invention to provide a window shade, preferably of the spring roller type, having a bright metallic coating such as a bright metallic foil surface permanently incorporated thereon by means of a flexible elastic material.

It is a more specific object of my invention to provide a heat reflecting window shade having a fabric backing sheet provided with a flexible elastic rubber-like coating to which is attached a sheet of bright metallic foil or bright metallic coating which is embossed into the rubber-like coating so as to provide a way in which the foil may stretch when the shade is rolled upon a spring roller.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a vertical sectional view through a portion of an enclosure showing a window provided with a window shade embodying the invention;

Fig. 2 is a plan view of the window shade shown in Fig. 1;

Fig. 3 is a sectional view through a portion of the window shade shown in Figs. 1 and 2; and

Fig. 4 is a fragmentary sectional view of a modified form of window shade.

Referring to the drawing, there is shown a wall 20 of a room 21 containing an upper section 22 and a lower section 23 of a window. At this window there is provided a spring roller type of window shade 24 embodying the invention and having a bright metallic aluminum foil surface.

Referring more particularly to Figs. 2 and 3, there is shown a fragmentary portion of the material which is fastened to the spring roller and forms the active heat reflecting portion of the window shade. This heat reflecting portion of the window shade is provided with a fabric backing sheet 25 of loosely woven material. To this fabric backing sheet 25 I attach a sheet 26 of a rubber-like substance such as rubber, synthetic rubber, polymerized isoprene, an isoprene substance, a rubber substitute, or a substance containing ethylene dichloride and sulphur. Such a rubber-like sheet may be vulcanized and impregnated into the fabric backing or it may be applied to the fabric backing by a suitable adhesive such as a rubber cement or the fabric backing sheet may be dipped or otherwise coated with a rubber-like substance. On the outermost side of such a sheet, that is, on the side opposite the fabric backing sheet, I provide a bright metallic coating such as a sheet of bright aluminum foil which is caused to adhere to the sheet of this rubber-like substance by the adhesion of rubber itself, by vulcanization, or by a suitable adhesive such as rubber cement. Instead of the aluminum foil, a coating of metallic dust or metallic paint may be used as a coating. After this sheet of aluminum foil 27 is applied, I emboss the metallic coating, such as the sheet of aluminum foil, into the rubber-like substance so that this sheet of foil may be stretched without breaking when it is wrapped upon the spring roller.

In Fig. 4, I show the type of the material I use for the shade having a bright metallic coating, such as a foil surface on both sides. In this type of shade I provide the fabric backing sheet 30, and to this backing sheet I attach the sheet 31 of a rubber-like substance, such as mentioned above, to one side of the backing sheet 30, and another similar sheet 32 is attached to the other side of the backing sheet 30. This may be done by dipping the fabric backing sheet 30 into a fluid rubber-like substance, or by impregnating the sheets to the fabric backing on both sides with the rubber-like substance, or by attaching the sheets or rubber-like substance 31 and 32 to the fabric backing sheet 30 by a suitable adhesive such as

rubber cement. On to the outer sides of these two sheets, 31 and 32, of rubber-like material I attach sheets 33 and 34 of bright aluminum foil by a suitable adhesive such as rubber cement, or by the adhesive properties of the rubber-like substance itself. After this bright aluminum foil is so applied, I emboss each of the sheets of foil into the rubber-like substance so that the entire sheet of material can stand a considerable amount of relatively sharp bending and so that it may stand the flexing necessary when it is rolled on a spring roller.

When this type of shade is made in this way, the shade is very durable and has a long life, as well as effectively reflects heat and light rays. Its long life is aided by the fact that the rubber-like substance and the fabric backing sheet are protected from the rays of the sun which tend to shorten its life. The rubber-like substance also tends to prolong the life of the shade since it distributes the strains within the shade caused by frequent rolling upon a spring roller and in this way prevents ruptures.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A device for preventing the entrance of radiant heat to an enclosure through a window opening therein comprising a flexible backing material, and a sheet of thin embossed metallic foil substantially covering said backing and bonded thereto by an elastic rubber-like material, said sheet of foil being embossed into said elastic rubber-like material whereby said sheet of foil is rendered extremely flexible.

2. A metal surfaced material comprising a flexible backing material and a sheet of metallic foil substantially covering said backing material and bonded thereto by an elastic rubber-like material, said sheet of foil being embossed into said rubber-like material whereby said sheet of foil is rendered extremely flexible and said materials each being much thicker than said foil.

3. A window shade comprising a flexible backing material and a sheet of thin metallic foil substantially covering said backing material, said sheet of foil being bonded thereto by an elastic rubber-like material and being embossed into said rubber-like material whereby said sheet of foil is rendered extremely flexible and remains bonded to said backing material when the shade is flexed.

4. A window shade comprising a flexible backing material and metallic material applied to and substantially covering said backing material in the form of a thin sheet which has a highly reflecting surface and is bonded to said backing material by an elastic rubber-like material, said sheet of metallic material being embossed into said rubber-like material whereby said sheet of metallic material is rendered extremely flexible and remains bonded to said backing material when the shade is flexed.

5. A window shade adapted to be rolled upon a curtain roller, said shade comprising a flexible backing material and a sheet of thin metallic foil substantially covering said backing material and bonded thereto by an elastic rubber-like material, said sheet of foil being embossed into said rubber-like material whereby said sheet of foil is rendered sufficiently flexible to remain undamaged and bonded to said backing material when repeatedly rolled upon a curtain roller.

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