Nov. 18, 1941. D. B. WHEELER ET AL 2,263,201

HEAT INSULATING MEANS AND METHOD OF MAKING THE SAME

Original Filed May 24, 1938

Fig. 1.

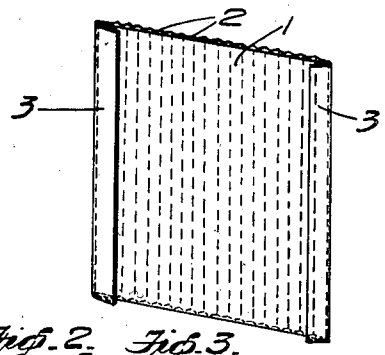


Fig. 4.

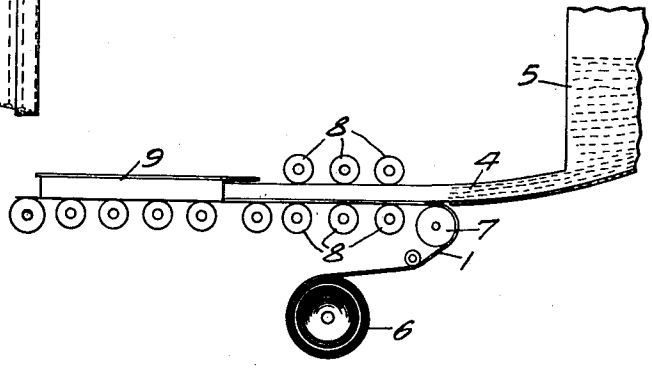


Fig. 2.

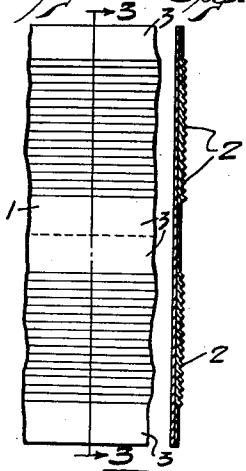


Fig. 3.

Fig. 5.

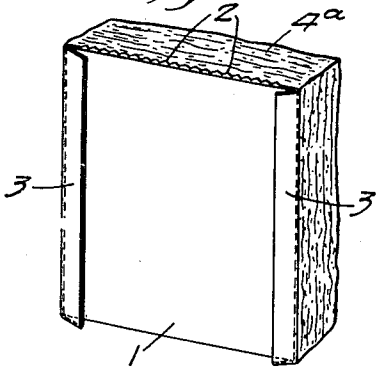
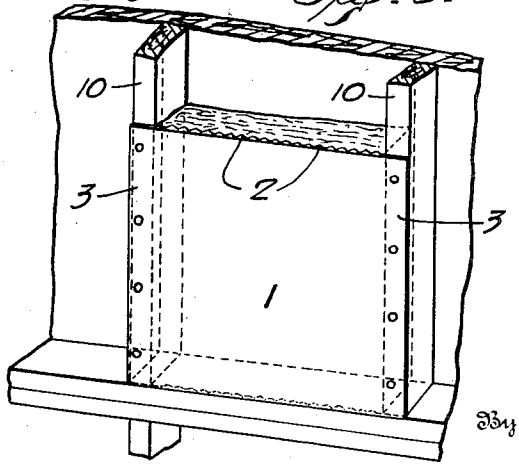


Fig. 6.



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HEAT INSULATING MEANS AND METHOD OF MAKING THE SAME

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11 Claims. (Cl. 154—28)

This application is a division of our prior application Ser. No. 209,830, filed May 24, 1938.

The present invention relates to heat insulating means and the method of making the same, and the primary object of the invention is to provide a novel and improved means of this character which can be manufactured inexpensively and with facility and which can be readily applied to the wall of a building or other structure, and when so applied will effectively protect the wall from the passage of heat or air and the insulating material will be protected from absorption or saturation with moisture, the component elements of the insulating means being permanently united so that they will not be liable to separate under the influences of wide temperature variations.

More particularly, it is an object of the present invention to provide heat insulating means comprising a body of a fibrous or filamentary heat insulating material such as rock wool or glass wool and a facing sheet having thereon a coating of an adhesive compound which is substantially non-tacky at any ordinary atmospheric temperature but which becomes adhesive when heated to an appropriate temperature and may be readily applied to the insulating material to secure or bond it thereto, the adhesive compound being of a character which is air and moisture proof and which will not crack or lose its adhesive properties through all ranges of atmospheric temperatures.

Another object of the invention is to provide a heat insulating unit comprising a batt of heat insulating material having a facing sheet of flexible material adhered thereto by a coating of an adhesive compound on the facing sheet which is ribbed to more effectively secure or bond the batt of insulating material thereto, edges of the facing sheet being uncoated with the compound and projecting beyond the edges of the batt, these edges of the facing sheet being foldable against the body of the sheet or the batt of insulating material, as during storage or shipment, and adapted to be extended beyond the edges of the batt to receive nails or other suitable means for securing the batt of insulating material in place in a wall or other structure.

In the accompanying drawing:

Figure 1 is a length of a facing sheet coated with the adhesive compound in accordance with the present invention;

Figure 2 is a face view and Figure 3 is a cross section on the line 3—3 in Fig. 2 of a portion of a coated strip of double width from which the sheet shown in Fig. 1 may be cut;

Figure 4 is a side elevation of an apparatus suitable for use in applying the strip adhesively to a strip of insulating material;

Figure 5 is a perspective view showing a batt of insulating material having the sheet applied adhesively thereto; and

Figure 6 is a perspective view showing the manner of installing and securing the batt in place in a wall.

According to the present invention, the facing strip 1 which may be composed of any cellulosic paper or similar flexible material but is preferably composed of kraft paper, is coated on one side in any suitable manner as, for example, by the process disclosed in our prior application hereinbefore mentioned, with a compound which will be liquid when heated to a temperature ranging between 300° and 360° F. and when cooled to any ordinary atmospheric temperature will solidify and be substantially non-tacky and waterproof, and when heated upon being applied to a strip or batt of insulating material will possess good adhesive properties. The adhesive compound preferably consists of a bituminous compound composed of a mixture of montan pitch and an asphalt or a pitch. The compound is preferably of the following composition:

50% montan pitch, in its unrefined or raw state.
50% asphalt, 14 penetration petroleum base, having a melting point of 290° to 300° F.

The montan pitch preferably employed is the Riebeck brand imported from Germany. It is the residue from bleaching montan wax, which is extracted from lignite by the application of heat. The analysis of the montan pitch is as follows:

Melting point according to Kramer-Sarnow method	°F	144 to 153
Acid value		2 to 5
Ester value		3 to 5
Saponification value		5 to 10
Insolubles in benzol	per cent	0.2 to 0.3
Ash	do	0.1 to 1.0

The asphalt preferably employed and which is available on the market according to specifications is a petroleum base asphalt which is preferably air-blown so that it is free from water or decomposition products, has a specific gravity at 77° F. of not less than 1.003 and a melting point (ball and ring method) not lower than 275° F. and not higher than 300° F. and a flash point,

when determined by the Cleveland open cup method, not lower than 500° F. and is soluble in C. P. carbon bisulphide or cold carbon tetrachloride to the extent of at least 99.5% and soluble in 86 degrees Bé. Pennsylvania paraffine naphtha to the extent of not less than 56.0% and not more than 66.0%. Its penetration (Dow method) using a No. 2 needle is as follows:

At 32° F. 60 sec. 200 grams weight, not less than 5;
At 77° F. 5 sec. 100 grams weight, not less than 7 nor more than 13;
At 115° F. 5 sec. 50 grams weight, not more than 18.

Fifty grams of the material upon being maintained at a uniform temperature of 325° F. for five hours in a cylindrical vessel $2\frac{3}{8}$ inches in diameter and $1\frac{3}{8}$ inches high should not lose more than 0.4% by weight.

In place of the asphalt, stearine pitch may be employed in the compound, in the same proportion with the montan pitch as stated above. Such stearine pitch consists preferably of 50% to 60% cotton seed pitch and the balance animal pitch, and is air blown so that it will be free of water and decomposition products and have a melting point of from 190° F. to 200° F. (ball and ring method).

The adhesive compound which coats one side of the strip is formed into ribs 2 in any suitable manner, as by a ribbed doctor blade during the coating of the sheet, the longitudinal marginal portions 3 of the strip however being scraped clear, or substantially so, of the adhesive compound. Figs. 2 and 3 show a double-width sheet coated with the adhesive compound, before splitting longitudinally into single strips.

The opposite side of the sheet is preferably coated in any suitable manner, as for example, by the process set forth in our prior application hereinbefore mentioned, with a suitable waterproof wax, preferably paraffine maintained in a liquid state by heating it to a temperature of from about 128° to 130° F., to further increase the vapor and waterproof properties of the sheet and to provide a backing for the coating of adhesive thereon.

Paper or other flexible material treated according to the present invention is highly flexible and the adhesive compound applied thereto is substantially non-tacky at all ordinary atmospheric temperatures but is rendered highly adhesive when heated to a suitably higher temperature, such as a temperature ranging between 175° and 275° F. and it will not crack or lose its adhesive properties within the limits of from sub-zero temperature to summer heat.

The non-tacky property of the adhesive compound at all ordinary atmospheric temperatures, due to the proportion of the waxy montan pitch constituent of the compound, facilitates the handling of the strip.

A sheet prepared in accordance with the present invention coated with such an adhesive compound is especially adapted to be applied as a facing and support for the heat insulating material used in the building of houses and other structures, it being capable of application adhesively to the insulating material by applying heat at a suitable temperature, the composition applied to the sheet providing protection to the insulating material against saturation with moisture from wet plaster when applied to the wall and preventing the passage of air, thereby improving the effectiveness of the insulating material, and the sheet serving as a means for holding the insulating material in place, the edges of the sheet extending beyond the insulating material so that they may be applied and secured to studding or other wall supports.

In applying strips or sheets coated with the adhesive compound described to heat insulating material such as used in building construction, the strip 1 having the adhesive compound thereon may be conveniently applied, for example, to a strip 4 of rock wool, glass wool or other insulating material suitably fed from a storage bin 5 as shown in Fig. 4, the strip 1 of paper or the like having the adhesive compound thereon being supplied from the roll 6 and fed around a roll 7 so that the ribbed compound treated side of the strip is applied against the insulating material, the roll 7 being suitably heated so that heat is applied to the strip at a sufficiently high temperature, as within the range hereinbefore stated, to soften the compound and render it viscous. The heated adhesive strip and the strip 4 or rock wool or the like are then pressed together, as by passing them between a series of press rolls 8, and the strips 1 and 4 are then cooled to ordinary temperatures, as by passing them through a chamber 9 which may be air cooled, and the strip may be finally cut off into batts of the desired length, as shown for example in Fig. 5. Upon cooling to ordinary atmospheric temperature, the compound on the sheet 1 will adhesively secure the batt 4^a thereto.

The edges 3 of the sheet 1, which are uncoated with the compound, preferably project beyond the edges of the batt 4^a and are left free so that when the batt is placed in position in a wall, as shown in Fig. 6, these edges of the sheet may be extended and nailed or otherwise secured to the studding 10, thus holding the insulating material in place in a wall. When used in this way, the compound on the sheet serves not only to secure it to the insulating material but it also provides a moistureproof backing for the insulating material which will protect it against saturation with moisture from fresh plaster applied to the wall, and the sheet will assist the insulating material in insulating the wall by preventing circulation of air through the wall.

It has been found that by providing the sheet with the adhesive compound the surface of which is ribbed, a more effective bond is obtained between the sheet and the insulating material, especially when fibrous or filamentary material such as rock wool or glass wool is applied thereto, than is obtainable with an adhesive having a flat surface, since the fibres or filaments of such insulating material will settle into the softened ribs when applied thereto. The property of the adhesive compound coating the sheet of becoming adhesive when heated enables the sheet and insulating material to be bonded together by simply preheating the sheet. The sheet applied to a soft and pliable body or batt of insulating material such as rock wool or glass wool holds the same in shape and facilitates the handling thereof.

We claim as our invention:

1. A batt of heat insulating material having a flexible waterproof sheet of cellulosic material adhered thereto by a ribbed heat sensitive adhesive compound on one side of the sheet, the other side of the sheet having a coating of a waterproofing substance of lower melting point than that of said adhesive compound.

2. A batt of heat insulating material having a

flexible waterproof sheet of paper adhered thereto by a compound on one side of the sheet which is substantially non-tacky at ordinary temperatures but becomes adhesive when heated, the other side of the sheet having a coating of a waterproofing substance of lower melting point than that of said compound.

3. A batt of heat insulating material having a flexible waterproof sheet of paper adhered thereto by a ribbed area of a heat sensitive adhesive on one side of the sheet, the other side of the sheet having a coating of waterproof wax, marginal edges of the sheet being foldable against the wax coating on the sheet and unfoldable to extend freely beyond the batt to provide attaching portions for supporting the batt in place.

4. A body of fibrous or filamentary heat insulating material having a facing strip of paper adhered thereto by a ribbed adhesive on one side of said strip which is substantially non-tacky at ordinary temperatures but becomes adhesive when heated, the other side of said strip having a coating of a waterproofing composition of lower melting point than that of said adhesive.

5. The combination of a body of heat insulating material, and a sheet of flexible cellulosic material having on one side a coating of a heat sensitive adhesive uniting it to said body, the opposite side of the sheet being coated with paraffine wax and the edges thereof foldable against the body and unfoldable freely to extend beyond adjacent edges of the body.

6. The combination of a body of heat insulating material, and a facing sheet of flexible cellulosic material having on one side a coating of a heat sensitive adhesive uniting it to the body, the other side of said sheet having a waterproofing coating of paraffine thereon.

7. The combination of a body of heat insulating material, and a facing sheet of paper wax coated on one side and having its other side adhered to said body by a coating of montan pitch and an adhesive substance of higher melting point.

8. The combination of a body of heat insulating material, and a facing sheet of paper having a coating of paraffine wax on one side and having its other side adhered to said body by a coating of montan pitch and an adhesive substance of higher melting point in approximately equal proportions.

9. The combination according to claim 7, wherein said coating comprises asphalt and montan pitch.

10. The combination according to claim 7, wherein said coating comprises stearine pitch and montan pitch.

11. The method which comprises applying to a body of heat insulating material a flexible sheet of cellulosic material having on the side thereof which is applied to said body a coating of an adhesive compound which is substantially non-tacky at ordinary atmospheric temperatures but is adhesive when heated above such temperatures, said sheet having on its other side a coating of a waterproofing substance of lower melting point than that of said compound applying sufficient heat to the latter side of said sheet to render said compound adhesive and to melt said waterproofing substance, and pressing together said body and sheet to unite them adhesively.

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