April 4, 1972 S. A. KLEIN 3,654,067

BUILDING WALL STRUCTURE

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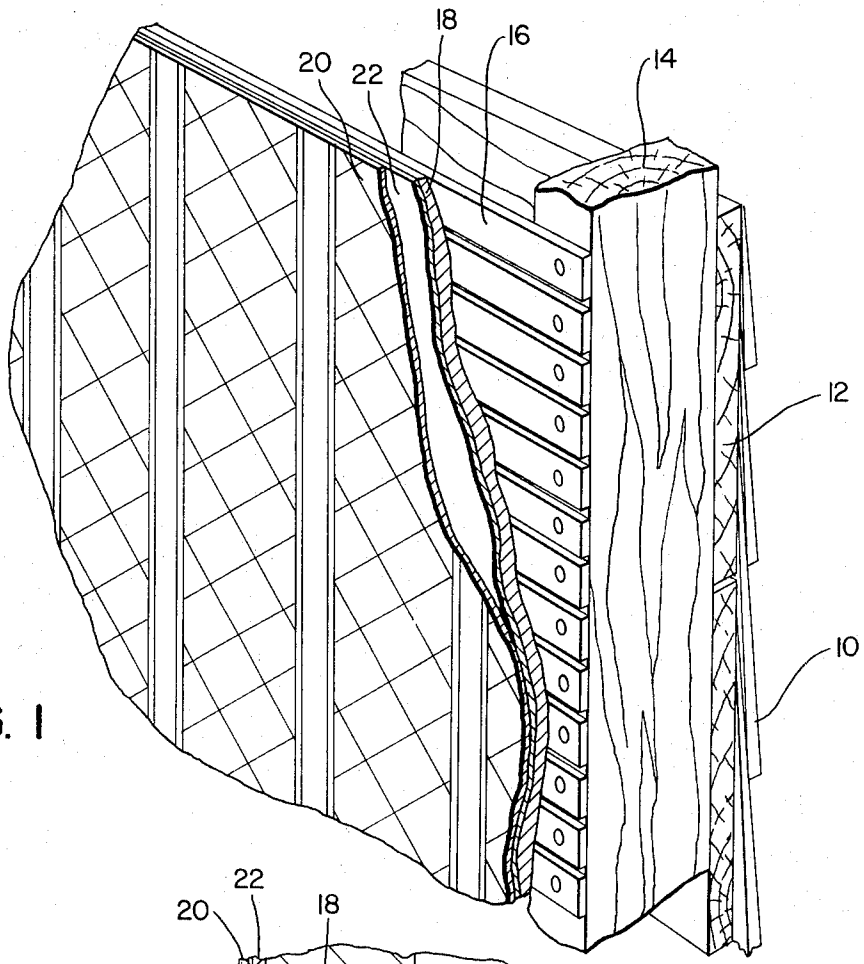


FIG. 1

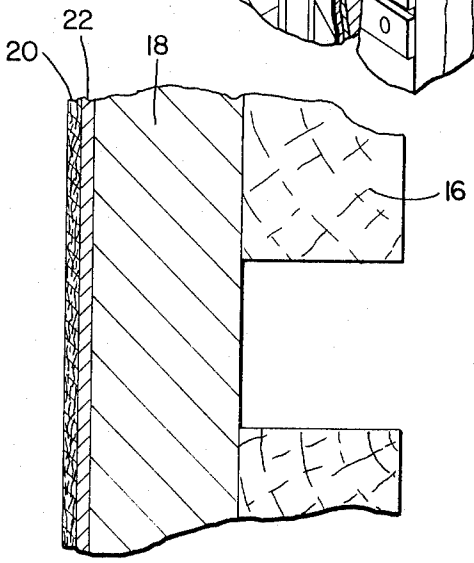


FIG. 2

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BUILDING WALL STRUCTURE

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Continuation-in-part of application Ser. No. 490,157, Sept. 15, 1965, which is a continuation-in-part of application Ser. No. 205,303, June 26, 1962. This application Mar. 16, 1970, Ser. No. 19,720

Int. Cl. B32b 15/06; E04c 2/02

U.S. Cl. 161—216 2 Claims

ABSTRACT OF THE DISCLOSURE

An interior plastered house wall is covered with a covering having a front paper ply and a metal foil back ply, this covering being adhered to the wall by an adhesive composition which (1) facilitates the application of the covering to a wall, (2) permits the covering to be pulled from the wall years later, and (3) effectively holds the covering to the wall for several years unless removed by force.

RELATED APPLICATIONS

This application is a continuation-in-part of copending application Ser. No. 490,157, filed Sept. 15, 1965, now abandoned, which in turn is a continuation-in-part of application Ser. No. 205,303 filed June 26, 1962 (now abandoned).

BACKGROUND AND SUMMARY

The invention relates to a wall structure for a houre or other building, an object of the invention being to provide an effective barrier to prevent passage of moisture through the wall and to act as a heat insulator. To this end a wall covering is employed having a decorative paper ply, and a reflective metal foil ply, preferably of aluminum, on its rear face. For the successful hanging of any wall-paper, an adhesive must be employed which will not set too soon but will allow "open time" for the paper hanger to slide the paper to its proper position after it has been applied to the wall. The paper must also be capable of being removed from the wall when the time comes to replace it. This is ordinarily done by steaming or otherwise moistening the paper so that the moisture goes through to the film of adhesive and dissolves or tempers it sufficiently for the release of the paper. Since in the present case, the paper is backed by an impervious metal ply which prevents access of moisture to the adhesive film when applied to the paper ply, a special adhesive must be employed which

(a) Will provide sufficient initial adhesion to hold the paper to a surface when first applied thereto,

(b) Is sufficiently slow in setting to allow "open time" for sliding the paper into correct position after it has been applied to the wall,

(c) Will hold the paper firmly to the wall after the adhesive has set,

(d) Will retain sufficient tackiness for a long period after setting to permit the paper to be peeled from the wall, and

(e) Will retain a constant adhesiveness for a period of several years after setting.

BRIEF DESCRIPTION OF THE DRAWINGS

A papered wall is illustrated on the drawing, of which

FIG. 1 is a fragmentary perspective view of a house wall embodying the invention; and

FIG. 2 is a magnified fragmentary sectional view of the inner portion of the wall shown in FIG. 1.

DETAILED DESCRIPTION

The use of a wall covering which includes a layer of metal foil is not limited to any particular kind of building wall. By way of example a fragmentary portion of the wall of a conventional frame building is shown in FIG. 1, this wall comprising (from outside inward) clap-boards or shingles **10** sheathing **12**, studs **14**, lath **16**, plaster or plaster-board **18**, and a wall covering consisting of a decorative paper ply **20** backed by a reflective metal foil ply **22** which is against the face of the plaster **18** and is secured thereto by a thin film of suitable adhesive. During the construction of a house, insulation material of one kind or another can readily be included and often is. When a house has been completed, the later insertion of barriers for heat and moisture is usually difficult and expensive. According to the present invention, the erection of an effective barrier against the passage of moisture through the walls and a deterrent to the passage of heat is no more difficult or expensive than papering the walls of the room which are outside walls of the building.

To hang foil-backed wallpaper which can be adjustably moved after application to the wall, which will stay in place for long periods of time but which can be peeled from the wall without the application of moisture or heat, a special adhesive is provided, the optimum formula comprising a mixture, by total weight, of the following:

	Lbs.
Member of the class consisting of polyvinyl acetate emulsion, acrylic emulsion, and vinyl acetate acrylic copolymer emulsion	16 to 32
Glycerine	10 to 22
Inert filler	8 to 1
Carboxy methyl cellulose	6 to 2
Amioca starch	10 to 6
Water	54.9 to 35.9
Preservative	Approximately 0.1

The emulsion provides the specific adhesiveness required to fasten aluminum foil firmly to a wall. The glycerine is a plasticizer. The clay adds body to the composition. The carboxy methyl cellulose and starch provide sufficient slipperiness to the composition for adjustable sliding of paper on the wall within a reasonable time after its initial application thereto. Since the paper but on a wall ordinarily is expected to last for a period of years, a preservative, such as the sodium ortho phenyl phenate, is desirable to preevnt the organic ingredients of the composition from becoming moldy.

The most economical and therefore the preferred embodiment of foregoing composition incorporates polyvinyl acetate emulsion. As indicated, however, alternative embodiments employ acrylic emulsions, which typically are obtained by the emulsion polymerization of at least one monomer from each of the following three classes: (A) alkenyl aromatic monomers, such as styrene and substituted styrene having at least one substituent selected from the alkyl groups having from 1 to 4 carbon atoms and the halogens particularly chlorine and bromine, for example styrene and alpha metal styrene; (B) esters of acrylic acid or methacrylic acid in which the alkyl moiety has from 6 to 12 carbon atoms, for example n-hexyl acrylate, ethylhexyl acrylate, 2-ethyl hexyl acrylate, n-octyl acrylate, n-decyl acrylate, dodecyl acrylate, n-hexyl methacrylate, ethyl hexyl methacrylate, 2-ethylhexyl methylacrylate, n-octyl methacrylate, n-decyl methylmethacrylate (2-ethyl hexyl acrylate being preferred); and (C) α,β-ethylenically unsaturated carboxylic acids having from 3 to 5 carbon atoms, for example acrylic acid, meth-

acrylic acid, fumaric acid and itaconic acid (a mixture of these acids may be used resulting in a heteropolymer).

Any one of a number of inert fillers can be used, such as clay, barium sulfate, calcium carbonate, calcium silicate, calcium sulfite, talc or diatomaceous earth. While starch from corn is preferred, starch from other sources such as potatoes, wheat, sorghum, sago or tapioca can be used.

As preferred specific adhesive embodying the present invention has the following composition:

	Lbs.
Polyvinyl acetate emulsion (55% solids)	24.0
Glycerine	16.0
Clay	4.0
Carboxymethyl cellulose	4.0
Amioca starch	8.0
Water	42.9
Sodium orthophenyl phenate	0.1

An adhesive composition made according to such a formula possesses sufficient adhesion to hold the paper to the wall as soon as it is applied thereto, is slow setting, develops sufficient additional adhesiveness when set to hold the paper firmly in place for years, but retains enough permanent tackiness to permit the paper to be peeled from the wall after a period of years without the application of heat or moisture. This results in a simple, low-cost barrier to prevent or reduce the passage of moisture and heat through a wall, the metal-backed paper being easily hung, permanently held in place if undisturbed, and readily stripped from the wall when its removal is desired.

What is claimed is:

1. For an interiorly plastered house wall, a wall covering having a decorative paper ply and a continuous reflective metal foil ply, and an adhesive film removably securing said wall covering to said wall with the metal ply against the wall, said film being of a composition consisting of a mixture of 16 to 32 pounds of an emulsion (55% solids) of one of the class consisting of acrylic emulsions obtained by the emulsion polymerization of at least one monomer from each of the following three classes: (A) alkenyl aromatic monomers having at least

one substituent selected from the alkyl groups having from 1 to 4 carbon atoms and the halogens, (B) esters of acrylic acid or methacrylic acid in which the alkyl moiety has from 6 to 12 carbon atoms, and (C) α,β-ethylenically unsaturated carboxcyclic acids having from 3 to 5 carbons atoms, 10 to 22 pounds of one of the class consisting of glycerine, ethylene glycol and propylene glycol, 8 to 1 pounds of an inert powdery filler, 6 to 2 pounds of carboxy methyl cellulose, 10 to 6 pounds of starch, 54.9 to 35.9 pounds of water, and 0.1 pound of a preservative.

2. An interiorly plastered house wall, a wall covering having a decorative paper ply and a continuous reflective metal foil ply, and an adhesive film removably securing said wall covering to said wall with the metal ply against the wall, said film being of a composition consisting of a mixture of ingredients approximately in the amounts given as follows:

	Lbs.
Polyvinylacetate emulsion (55% solids)	24
Glycerine	16
Clay	4
Carboxy methyl cellulose	4
Starch (preferably amioca)	8
Water	42.9
Sodium ortho phenyl phenate	0.1

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