March 3, 1970 E. J. SCHWOEGLER 3,497,969

FLEXIBLE, ROLLABLE CHALKBOARD SURFACES

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Fig. 1.

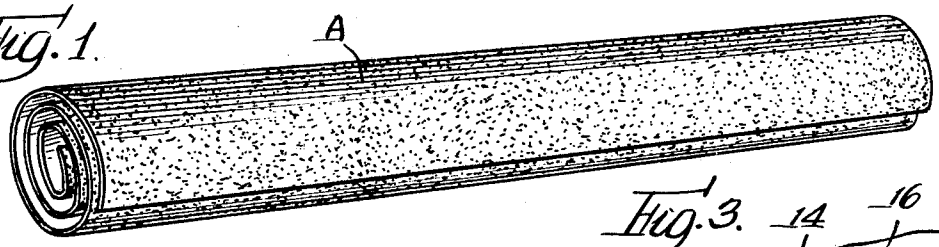


Fig. 2.

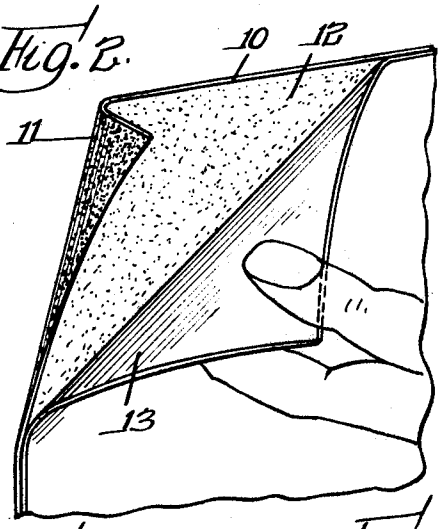


Fig. 3.

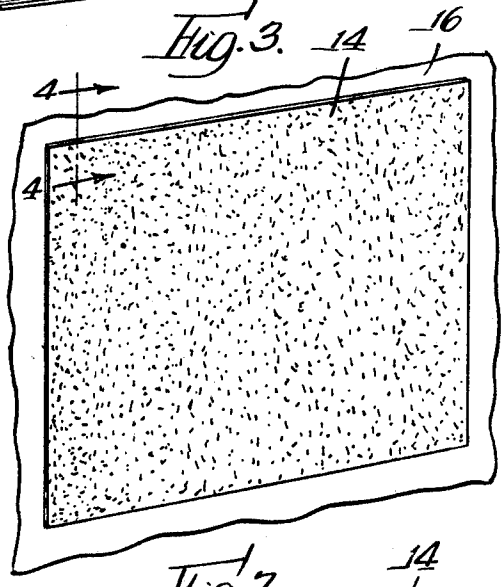


Fig. 4.

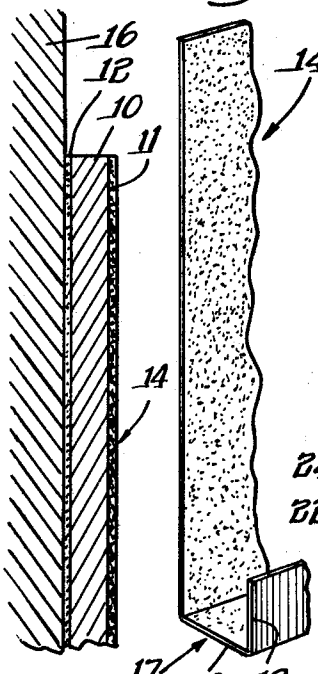


Fig. 5.

Fig. 6.

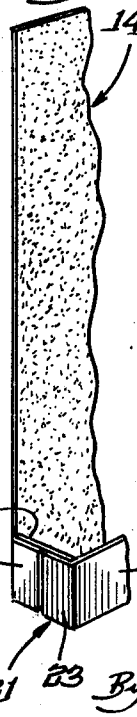
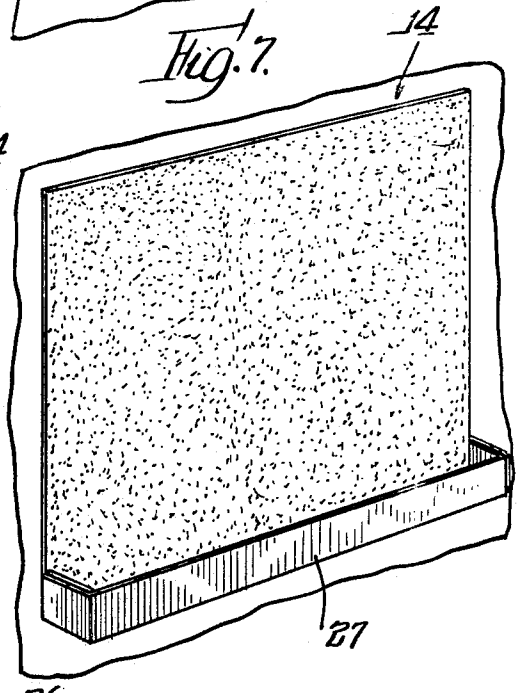


Fig. 7.



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FLEXIBLE, ROLLABLE CHALKBOARD SURFACES

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Continuation-in-part of application Ser. No. 460,278, June 1, 1965. This application Dec. 6, 1967, Ser. No. 693,041

Int. Cl. B43l 1/08

U.S. Cl. 35—66 4 Claims

ABSTRACT OF THE DISCLOSURE

A flexible, rollable chalkboard in the form of flexible, rollable sheet material on one surface of which there is a coating of an abrasive material to delineate a chalk mark thereon and on the other surface of which there is a coating of a pressure sensitive adhesive. Releasably attached to said pressure sensitive adhesive coating is a protective sheet which, upon removal, permits the flexible, rollable chalkboard to be mounted on a supporting surface, subsequently removable therefrom, and adapted to be recovered by said protective sheet and stored away, if desired, by rolling the chalkboard into the form of a roll.

This application is a continuation-in-part of my prior application Ser. No. 460,278, filed June 1, 1965.

My invention relates to novel chalkboards in the form of flexible, rollable chalkboard surfaces. The term "chalkboard surfaces," as used herein, is employed in a generic sense to encompass surfaces upon which calk markings may be delineated and surfaces upon which wax or soap crayon markings may be delineated.

Chalkboards and other similar writing surfaces have been known and used for many years. Modern conventional chalkboards consist of moderately abrasive films deposited on such base materials as metal, slate, "Transite," "Masonite" or other dense fiberboard, and wood, such as plywood. The films contain pulverulent or relatively finely divided abrasives such as pumice, Carborundum, emery, or the like and may be colored with various pigments. The films are deposited on the base in varieties of ways such as by spraying, brush coating and roller coating and then dried by conventional means such as air drying or the use of banks of infrared lamps.

My present invention is based upon the concept of novel chalkboards which are in the form of flexible, rollable sheets having on one surface thereof a coating of an abrasive material adapted to delineate a chalk mark thereon, said sheet material having on the other surface thereof a coating of a pressure sensitive adhesive. There is releasably attached thereto and readily peelable therefrom sheet material having a release coating in contact with said adhesive whereby, upon removal of said last-mentioned sheet material, said chalkboard may be removably adhered to any desired surface.

The novel chalkboards of my invention are formed by coating certain sheet stock, as described in detail below, in the form of a continuous sheet, or in desirably sized sheets, of a flexible, rollable base material, which may be of cellulosic character, such as paper, or a synthetic plastic such as cellophane, cellulose acetate, cellulose acetate propionate, cellulose acetate butyrate, Saran, polyvinyl chloride acetate, Lucite, Mylar, polyethylene, polypropylene, or paper laminates, or woven or nonwoven fabrics, metal foils, or the like, with a pigmented coating composition, for instance, a black or gray pigmented rubber latex paint, containing a sufficient quantity of a mild abrasive material such as finely divided Carborundum, to provide a continuous writing surface having substantial moisture and water impermeability, all without interfering with the rollability of the coated base stock into a roll suitable for shipment. The surface is of such character that it can be used for chalk writing in the same way as conventional blackboards and readily brushed or washed to remove the chalk to permit reuse of the surface for chalkboard marking.

I have found that, for the purposes of the present invention, the nature of the sheet stock upon which chalkboard surface or coating of abrasive material adapted to delineate a chalk mark thereon is supported is extremely important. Such sheet stock must satisfy a number of significant requirements. It must, when the chalkboard surface is applied to one surface thereof and when the pressure sensitive adhesive is applied to the opposite surface thereof, result in a finished product which, when repeatedly rolled and unrolled, is resistant to undue absorption of water in those instances where the chalkboard is washed with water to remove chalk from the writing surface; and it must be dimensionally stable, that is, undergo very small change by reason of expansion and contraction due to changes in humidity and temperature, particularly where the chalkboard is used to cover a frame which has become worn. The aforementionted resistance to undue water absorption is additionally important in that the chalkboard as well as the pressure sensitive adhesive are not loosened, thereby assuring maintenance of the integrity of both the writing surface and the pressure sensitive adhesive.

I have discovered that the foregoing important advantages are obtained if the sheet stock, particularly in the form of cellulosic material or paper, is impregnated with latex prior to the operations of coating it on opposite sides with the chalkboard surface and the pressure sensitive adhesive. The latex impregnated cellulosic material or paper should, most advantageously, have a thickness in the range of 3 to 30 mils and, better still, 7 to 15 mils. The proportions of latex are somewhat variable but, in general, it is especially advantageous that the latex content, based upon the weight of the total impregnated sheet, range from 30 to 40%, better still 33 to 37%. The cellulosic material or paper into which the latex is impregnated may be of variable character but excellent results are obtained, for instance, from 140# basis weight paper. Such latex impregnated sheet material has the further advantages of constituting an exceptionally adherent base for the chalkboard surface and the pressure sensitive adhesive, absorption of said adhesive by said latex impregnated sheet being very low and the finished chalkboard sheet having an unusually effective and prolonged stability in storage.

The chalkboard surface coating can constitute either a single film containing the abrasive material or it can constitute a plurality of such films in the form of multi-layers. The multi-layer films, where employed, can also constitute one or more initial films which do not contain the abrasive material with the top film or films containing the abrasive material to form the chalkboard marking surface.

In any event, after the one surface of the sheet base stock, notably latex impregnated paper as described above, has been coated with the chalkboard surface ingredients, in the form of a film, the other or reverse side of the sheet base stock is coated with a pressure sensitive adhesive, and then the latter is covered with a protective sheet having a release coating thereon. Conventional pressure sensitive adhesive compositions, such as Dow Latex 630 (30% butadiene–70% styrene polymer), and conventional protective sheets carrying release coatings (e.g. silicones) thereon can be used and my invention is in no way concerned with any particular pressure sensitive adhesive compositions or release coatings. The application of the pressure sensitive adhesive to the reverse side of the sheet

stock to which the chalkboard surface is applied can likewise be effected by conventional coating squipment and this can be done in a continuous manner by known coating equipment and coating techniques or in any other desired manner. After the pressure sesitive adhesive coating is applied as aforesaid, the protective sheet carrying a release coating is applied to said adhesive surface and the resulting finished sheet is then rolled into a roll for packaging and shipment. The rolls can be made of any convenient width and the length of the sheets in the rolls is likewise variable. Thus, for instance, the length of the chalkboard sheets may be sufficient to make a single chalkboard surface, or it may be such as to provide for a plurality of chalkboard surfaces of any desired length by cutting the chalkboard sheets with a scissors or other cutting instrument. In any event, in use, the protective sheet is peeled away and the remaining chalkboard sheet is simply applied to any desired surface such as a wall or desk to which it is firmly, but removably, held by the adhesive. After use of the chalkboard sheet, it can readily be removed or lifted from its supporting surface without leaving any marks thereon, and transferred to another location or, if desired, the protective release-coated sheet is reapplied to the pressure sensitive adhesive side and stored as such for later use, or rolled into a compact roll and stored away for further use.

It will readily be seen, in the light of the foregoing description, that my novel chalkboard invention makes possible marked economies not only in the chalkboard itself but, also, in connection with its manufacture and equipment. In the manufacturing operation, for instance, continuous coating equipment can be used and the chalkboard sheets can be manufactured utilizing coating techniques similar to those used in coating paper sheet stock and plastic film sheet stock. Again, the finished chalkboard sheets, with the protective release-coated sheet thereon, can be rolled and stored or shipped in roll form for subsequent application to any desired surface such as steel, "Transite," "Masonite," plywood, etc. Not only is there a marked saving in production costs but, in addition, shipping or transporation and packaging costs are appreciably reduced since the packing and shipping of finished rigid chalkboards is obviated. Furthermore, for the renewal of fixed and installed chalkboards as, for instance, in schools, the chalkboards of my present invention can simply and easily be applied directly over the old surface to produce a fresh, new chalkboard surface. Furthermore, my invention readily permits the application of differently colored chalkboard surfaces should that be desired.

The coating compositions for the chalkboard surfaces, as previously stated, may be formulated so as to delineate chalk markings or, if desired, wax or soap crayon markings. These types of coating compositions are, as previously indicated, broadly well known to the art and no novelty is claimed therein per se. Broadly speaking, the coating compositions utilized may be considered to be basically the same, varying, for the specific use involved, in degree of roughness, gloss and like characteristics by the inclusion of specific abrasive materials, roughing techniques, and gloss-imparting or gloss-reducing components to provide the desired surface characteristics.

The coating comprises a resinous or plastic film which has dispersed therethrough an abrasive material. A wide variety of resinous or plastic materials is available for use for my purposes, among which are, for instance, alkyd resins, epoxy resins, polyvinyl chloride, vinyl chloride-vinyl acetate copolymers, acrylic polymers, polyethylene, polypropylene, rubber, rubber latices, acrylonitrile-butadiene-styrene copolymers, vinyl acetate polymers, polyesters, high styrene-butadiene copolymers such as "Goodyear S-S" and "Marbon," silicones, and the like. The film-forming resinous or plastic material, carrying the incorporated abrasive material, may be applied to produce the carrier film from organic solvent systems, or plastisols or organosols, or emulsions, or as hot melts, depending upon the particular compositions utilized, and by such conventional coating techniques as mentioned above. The film thickness is variable but, generally speaking, it need not be in excess of ⅛" in thickness and is preferably somewhat less. For best results, in addition to good rollability and flexibility and resiliency, it should possess toughness, durability, abrasion resistance, imperviousness to water or moisture so that, for instance, the backing sheet stock is not weakened or caused to deteriorate, not cause fading of pigments or dyes which may be incorporated therein, and adhere well to any flexible or rollable backing sheet material to which it is applied.

The abrasive materials which are used to provide the chalkboard surfaces include such materials as emery powder, silicon carbide, aluminum carbide, pumice, silica, paint pigments of various types, and the like, the particle size of which may vary but are usually of a size such as will pass through an 80 mesh screen and preferably are of finer size down to of the order of 300 mesh.

In the drawing, which illustrates certain embodiments of my invention:

FIG. 1 is a perspective view showing the flexible chalkboard in the form of a loose roll;

FIG. 2 is a view, in perspective, of a section of the flexible, rollable chalkboard with the release coated backing sheet partially peeled back to expose the adhesive;

FIG. 3 is a front view from slightly to one side showing the flexible, rollable chalkboard applied or adhered to a rigid supporting surface;

FIG. 4 is an enlarged sectional view taken along the line 4—4 of FIG. 3, looking in the direction of the arrows;

FIG. 5 is a perspective view showing the flexible, rollable chalkboard with an integrally formed dust- and chalk-carrying trough;

FIG. 6 is a perspective view showing one illustrative way of forming a dust- and chalk-carrying trough at the bottom of the flexible chalkboard; and

FIG. 7 is a perspective view showing another illustrative dust- and chalk-carrying trough.

In the drawing, A shows, in loosely rolled up form, a chalkboard made in accordance with my invention. The chalkboard comprises a flexible, rollable backing sheet **10**, particularly a latex impregnated sheet of paper containing from 33–37% latex and having a thickness of, say, 9 to 12 mils, carrying on one side thereof a chalkboard marking surface **11** of the character described above, and on its opposite side carrying a layer of a pressure-sensitive adhesive **12**. Overlying said pressure-sensitive adhesive is a released coating sheet **13** which can readily be peeled away from the pressure-sensitive adhesive. In FIGS. 3 and 4, the flexible chalkboard, denoted as **14**, is shown affixed to a wall or other rigid surface **16**.

In FIGS. 5, 6 and 7, I show arrangements in which a trough is provided at the bottom of the chalkboard. The trough serves to collect and hold chalk dust and also serves as a holder for the chalk or other marking crayon or the like as well as for a lightweight eraser. In FIG. 5, the trough **17** is shown to comprise a portion which is formed from the backing sheet stock by bending the sheet adjacent the bottom thereof at right angles to the chalkboard sheet to form the bottom **18** of the trough and again at a right angle to form an upwardly extending lip **19** of the trough. In this case, the portions **18** and **19** are left free of adhesive and chalkboard coatings but are, instead, impregnated with resins or the like to impart strength thereto and the ability to be bent and to maintain their bent configuration. In FIG. 6, the trough **21** is made by forming a separate trough unit from cardboard or chipboard which is then mounted at the bottom of the chalkboard sheet and held in position through an integral flap **22** formed from the chalkboard sheet and a flap **23** formed from the trough unit which flaps are glued against a cardboard or chipboard rectangular spacing member **24** disposed at the opposite edges of the chalk-

board sheet between said sheet and the vertical lip **26** of the trough unit. In FIG. 7, the trough **27** is completely separately formed of cardboard or chipboard and is attached to the bottom of the flexible chalkboard **14** in any suitable manner as, for example, by means of adhesive. Where a trough is used, it may be made to be readily detachable and readily reattachable to the flexible chalkboard so that, when the chalkboard is not in use, the trough can be removed, the release coated sheet reapplied to the pressure-sensitive adhesive surface of the chalkboard and the latter then roller up for storage until it is ready to be used again, at which time, if desired, the trough can be reattached to the chalkboard sheet.

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A flexible, rollable chalkboard comprising a flexible, cellulosic rollable sheet material impregnated with from 30 to 40% by weight of latex and having on one surface thereof a coating of an abrasive material adapted to delineate a chalk mark thereon, said sheet material having on the other surface thereof a coating of a pressure-sensitive adhesive, said adhesive having releasably attached thereto and readily peelable therefrom sheet material having a release coating in contact with said adhesive whereby, upon removal of said last-mentioned sheet material, said chalkboard may be removably adhered to any desired surface.

2. A chalkboard in accordance with claim **1**, wherein said sheet material is impregnated with from 33 to 37% latex and has a thickness in the range of about 7 to 15 mils.

3. A flexible chalkboard in the form of a roll comprising a plurality of laps of an elongated sheet of flexible cellulosic material impregnated with from 30 to 40% by weight of latex and 3 to 30 mils in thickness and having on one surface thereof a coating of an abrasive material adapted to delineate a chalk mark thereon, said sheet material having on the other surface thereof a coating of a pressure sensitive adhesive, said adhesive having releasably attached thereto and readily peelable therefrom sheet material having a release coating in contact with said adhesive whereby to prevent the pressure-sensitive adhesive coating on the plurality of laps of the rolled sheet from adhering to the coating of abrasive material, said chalkboard being removably adherable to any desired surface upon removal of said peelable sheet material bearing said release coating.

4. A chalkboard in accordance with claim **3**, wherein said sheet material is impregnated with from 33 to 37% latex and has a thickness in the range of 7 to 15 mils.

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