Sept. 26, 1939. R. H. WILBUR 2,173,989

TIE BAND

Filed Nov. 9, 1937



Fig. 1.

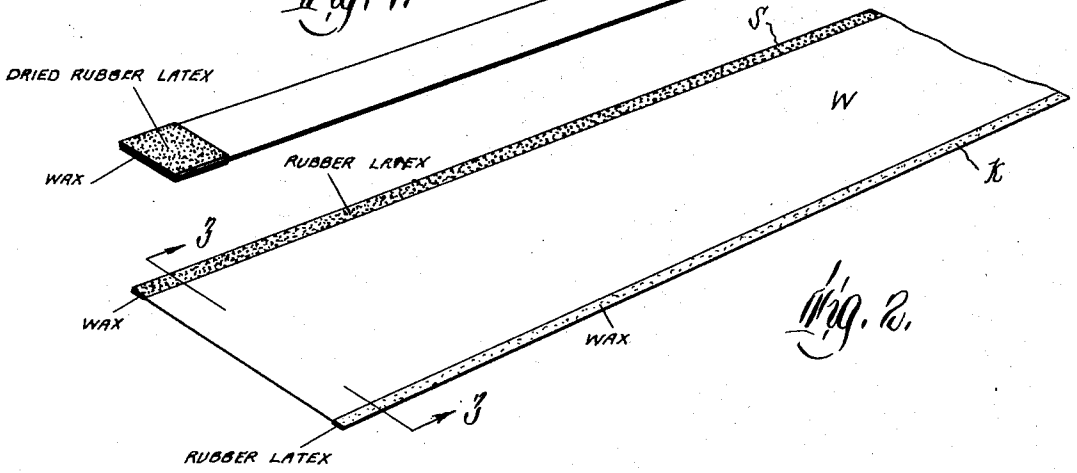


Fig. 2.

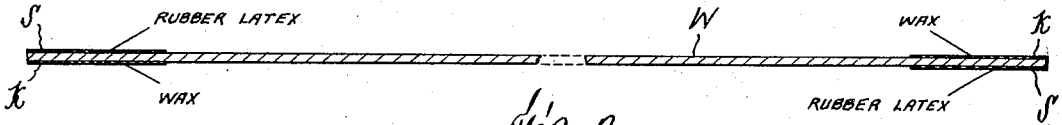


Fig. 3.

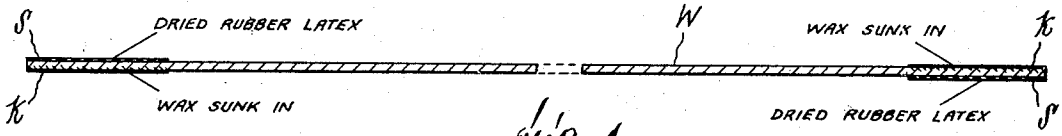


Fig. 4.

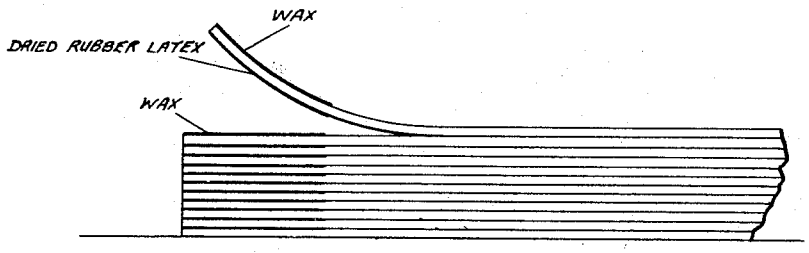


Fig. 5.

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TIE BAND

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Application November 9, 1937, Serial No. 173,642

4 Claims. (Cl. 24—17)

This invention relates to tie-bands comprising a paper or equivalent flexible base adapted to be joined at its opposite marginal portions so as to form a tie or binder about an article or group of articles. It deals more especially with a tie-band whose paper base is coated on opposite faces of opposite marginal portions with dried rubber latex as the medium capable of bonding the overlapping marginal portions of the band. Such a tie-band is the subject of Lane Patent No. 2,000,763, dated May 7, 1935, and presents the important advantage that its coated marginal portions need no moistening treatment or activation to be bonded or united, for the dried latex coatings on the marginal portions cohere firmly when brought together under light pressure. Such bands are now being manufactured and sold in large quantities for various purposes, for instance, as the ties for laundered shirts, cake packages, etc.

As stated in Patent No. 2,000,763, it is possible to package in a pile paper bands coated with dried rubber latex on opposite faces of opposite marginal portions by reason of the fact that the dried rubber latex coatings, while firmly cohesive, are practically non-adhesive to ordinary surfaces, including the paper surfaces with which they contact in package or pile form. However, under certain conditions, for instance, in hot moist weather or in the hot moist atmosphere apt to prevail in a laundry or bakery, the bands in a pile may not be separable or removable individually with the desired rapidity on account of some tendency for the coatings of one band to grip slightly the paper surfaces of an adjacent band. It is evidently the case that under the influence of heat and moisture the dried rubber latex coatings acquire an enhanced degree of softness or plasticity such that, with a band in tight pile or package form and under the weight of superposed bands, they assume the minute surface irregularities or surface texture of adjacent paper surfaces sufficiently to induce a very weak bond with adjacent bands, which bond, while it is very readily broken without injury to the coatings or the paper surfaces, nevertheless undesirably slows down the user of the bands in taking or removing the bands individually from a pile.

In accordance with the present invention, a tie-band comprising a paper base coated on opposite faces of opposite marginal portions with dried rubber latex is waxed on at least its surfaces immediately in back of the latex coatings so that when the band is packaged in a pile the rubber latex coatings of one band in the pile contacts with the waxed surface of an adjacent band in the pile. I have found that bands thus waxed on their surfaces to contact with the dried latex coatings of adjacent bands in a pile or package have not the slightest tendency to bond with adjacent bands even under extreme climatic conditions and under such temperature and humidity conditions as prevail in laundries, bakeries, and other establishments in which the bands are used. The wax evidently functions not only to enhance the smoothness of the waxed paper surfaces with which the dried rubber latex coatings contact but also as a barrier repelling any tendency of such coatings to adhere to the fibers or surface texture of the waxed paper surface. It appears that the desired repellency of the waxed paper surfaces toward the dried latex coatings manifests itself most markedly under the very conditions apt to be conducive to undesirable plasticity in the dried rubber latex coatings, that is, under high humid atmospheric conditions attended by comparatively high absorption of moisture by such coatings. In other words, the wax being highly water-repellent also repels the humidified, predried latex coatings whose moisture content or humidity evidently restores in slight measure the bonding quality inhering in undried rubber latex. In this latter connection, it might be observed that when dried rubber latex is subjected to pronounced heat and humidity, for instance, the action of steam, the bonding quality possessed thereby in its original wet or undried state is restored to a marked degree. It is thus seen that the present invention makes provision for counteracting completely such slight restored plasticity or bonding quality in the dried rubber latex coatings of the piled bands as may result from the exposure of the piled bands to a warm moist atmosphere and as might otherwise induce one band in the pile to cling weakly to an adjacent band.

With the foregoing and other features and objects in view, the present invention will now be described in further detail with reference to the accompanying drawing, wherein:

Figure 1 illustrates in perspective a band embodying the present invention.

Figure 2 depicts similarly an endless sheet of paper from which the bands hereof are cut, the sheet being appropriately coated with rubber latex and with wax and being on its way to a drier.

Figure 3 represents a transverse section through the sheet on the line 3—3 of Figure 2.

Figure 4 is a section similar to Figure 3 but after the latex coatings have been dried at suffi-

ciently elevated temperature to fuse or melt the wax coatings.

Figure 5 is a fragmentary front elevation of a pile of the bands hereof, the marginal portion of the top band being lifted from the corresponding portion of the underlying band.

In producing the paper bands, hereof, one may coat a continuous or progressively moving sheet of paper at its appropriate marginal surfaces with rubber latex and wax, dry or set the coatings, and finally cut the sheet transversely into the bands hereof. Thus, as illustrated in Figure 2, rubber latex may be applied as a continuous stripe *s* to opposite faces of opposite marginal portions of a continuously or progressively moving paper web *w* of a width commensurate with the length of finished bands desired. Immediately in back of the rubber latex stripes *s* the wax is applied as continuous stripes *k*. Both the latex and wax coatings may be applied to the web simultaneously; or the latex coatings may be applied to the web before or after the wax coatings. The latex used in depositing the marginal coatings or stripes *s* may be the usual ammonia-preserved rubber latex of commerce containing, if desired, suitable compounding ingredients; and such latex as applied to the web may be of various solids content, depending upon the caliper or thickness of dried rubber latex film to be deposited on the web. The wax used in depositing the marginal coatings or stripes *k* may be in molten form or in the form of an aqueous emulsion or dispersion of the desired wax content and containing a suitable stabilizing or dispersing agent, such as soap. While paraffin wax has been found to be eminently suitable and economical for the wax coatings or stripes *k*, it is possible to use various other waxes, such as montan, carnauba, etc. Both the latex and the wax coatings or strips may be laid down on the paper web by "kiss" rolls, sprays, or any other suitable applicator. As deposited, the wax film in the stripe *k* is of sensible thickness, as appears best in Figure 3.

After the coating stripes *s* and *k* have been formed on the paper web *w*, the web is passed over a steam-heated drum drier or through a hot-air drying chamber so as to dry or set the latex coatings completely and, if emulsified wax has been used in the wax coatings, to dry and set the latter coatings also. It is preferable that the latex coatings be dried under sufficiently elevated temperature conditions to cause fusion or melting of the wax coatings, in consequence of which the wax largely sinks or penetrates into the body of the paper sheet, as illustrated in Figure 4, and only a very thin or superficial film of wax is left behind on the paper surface. Thus, when paraffin wax constitutes the stripes *k* and the rubber latex stripes are dried or set at temperatures upwards of about 180° F., the originally sensible or observable coatings or deposits are no longer plainly visible, since most of the wax has been dissipated in the body of the paper. The sinking or dissipation of the wax largely into the body of the paper is desirable in that it means that the rubber latex coatings of the finished bands contact with only such a very slight or superficial amount of wax that they do not tend to pick up any significant amount of wax, when the bands are in pile or package form, such as might impair the desired strong bond or cohesiveness with the rubber latex coatings at the opposite marginal portions of the bands.

The paper web emerging from the drier is cut transversely into finished bands of any desired width. A finished band is shown in Figure 1 with the wax coating on its surface at each marginal portion immediately in back of the dried rubber latex coating on the opposite face and with the latex coatings on opposite faces of its opposite marginal portions. When the bands hereof are put into pile or package form, as illustrated in Figure 5, the wax coating on one band contacts with the dried rubber latex coating on an adjacent band and thus serves its function of insulating or maintaining individuality between the successive or superposed bands. It will be appreciated that the wax coating might extend beyond the band zone or area occupied by a rubber latex coating. Indeed, in some instances, it may be desirable to start with a paper sheet already waxed on its surfaces immediately in back of the surfaces to receive the latex coatings or waxed beyond such surfaces, i. e., the paper surfaces to be unoccupied by the latex coatings. In other words, practically all of the paper surfaces may, if desired, be waxed excepting those surfaces to receive the rubber latex coatings, since it is distinctly preferable for the purpose of realizing the desired coating of the paper with rubber latex and also realizing a strong bond of the dried rubber latex films with paper surfaces to leave such surfaces in unwaxed condition and hence non-repellent to the rubber latex as it is being applied.

The expression "rubber latex" as used herein is meant to include rubber latices or rubber latex compositions of widely variant character, including not only the natural rubber latices or aqueous rubber emulsions but also artificial aqueous rubber dispersions or emulsions partaking of the qualities of natural rubber latices. In using the term "paper" in characterizing the base of the tie-band hereof, I mean also to include thereby various flexible sheet materials, such as regenerated cellulose sheets, that are equivalents or substitutes of paper.

I claim:

1. A band of flexible material carrying thin flexible rubber coatings comprised of dried and coalesced rubber latex particles only on opposite faces of opposite marginal portions, said coatings presenting exposed rubber surfaces and being firmly cohesive under pressure but practically non-adhesive with the uncoated surface of the band and said band being waxed on at least its faces immediately in back of those carrying said coatings, whereby, when said band is placed in a stack with other similar bands, said coatings of one band will contact with the waxed faces of an adjacent band in the stack.

2. A band of paper carrying thin flexible rubber coatings comprised of dried and coalesced rubber latex particles only on opposite faces of opposite marginal portions, said coatings presenting exposed rubber surfaces and being firmly cohesive under pressure but practically non-adhesive with the uncoated surface of the band and said band being waxed on at least its faces immediately in back of those carrying said coatings, whereby, when said band is placed in a stack with other similar bands, said coatings of one band will contact with the waxed faces of an adjacent band in the stack.

3. A band of flexible material carrying thin flexible rubber coatings comprised of dried and coalesced rubber latex particles only on opposite faces of opposite marginal portions, said coatings presenting exposed rubber surfaces and being firmly cohesive under pressure but practically non-adhesive with the uncoated surface of the

band and said band being filmed with paraffin wax on at least its faces immediately in back of those carrying said coatings, whereby, when said band is placed in a stack with other similar bands, said coatings of one band will contact with the paraffin-wax-filmed faces of an adjacent band in the stack.

4. A band of paper carrying thin flexible rubber coatings comprised of dried and coalesced rubber latex particles only on opposite faces of opposite marginal portions, said coatings presenting exposed rubber surfaces and being firmly cohesive under pressure but practically non-adhesive with the uncoated surface of the band and said band being filmed with paraffin wax on at least its faces immediately in back of those carrying said coatings, whereby, when said band is placed in a stack with other similar bands, said coatings of one band will contact with the paraffin-wax-filmed faces of an adjacent band in the stack.

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