Sept. 26, 1939. J. D. LANE 2,173,972

TIE BAND

Filed April 1, 1937

Fig. 1.

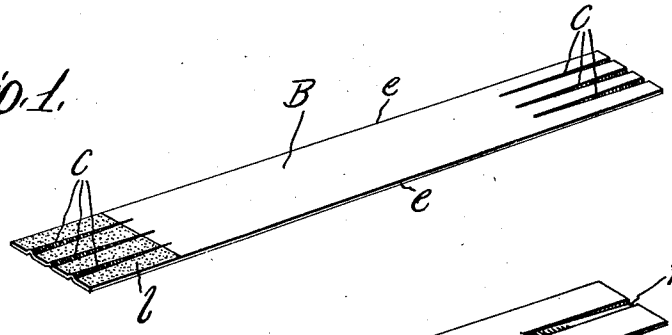


Fig. 2.



Fig. 3.

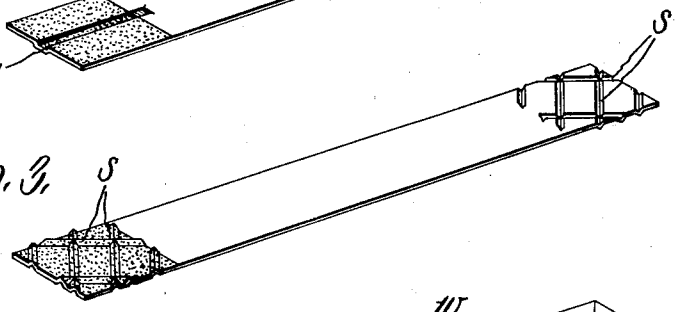
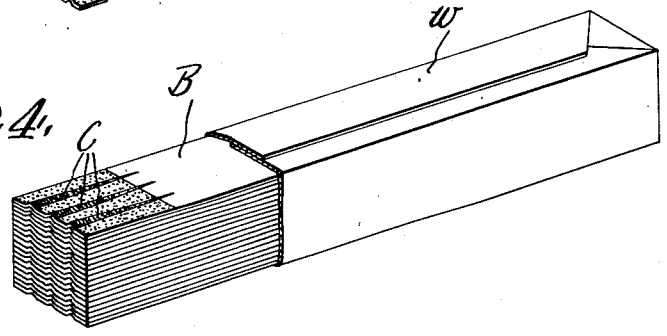


Fig. 4.



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TIE BAND

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Application April 1, 1937, Serial No. 134,232

5 Claims. (Cl. 24—67)

This invention relates to a tie-band more particularly of the kind carrying on opposite faces of opposite marginal portions a coating which, although non-adhesive to paper, wood, glass, and other ordinary surfaces, is firmly cohesive with a similar coating, thus enabling the use of the band as a binder about various articles or packages, e. g., shirts, cakes, stack sheets or envelopes, etc., through the mere act of bringing together the coated marginal portions into contacting or overlapping relationship, that is, without the need of a moistening or activating liquid.

In making tie-bands of the type described, it is generally desirable to use rubber latex or rubber latex composition as the coating medium, for rubber latex yields upon drying or setting a highly flexible and smooth coating that is dry to the touch and substantially non-adhesive to surfaces such as are ordinarily encountered and that is at the same time possessed of strong bonding affinity for a similar coating. However, the application of rubber latex or rubber latex composition to flexible or light-weight paper, such as is desirable for use as tie-bands, followed by the drying or coagulation of the solids or rubber content of the latex or latex composition as a coating on opposite faces of opposite marginal portions of a paper sheet, is attended by pronounced curling or cockling of the marginal portions of the paper sheet, the curling being in a direction away from the coated face of the paper. It is evidently the case that the drying or setting of rubber latex applied as a coating to one face of the marginal portion of a relatively thin or light-weight paper sheet of considerable length beyond the coated area is accompanied by shrinking forces, incident to the evaporation of the aqueous content of the latex and the coalescence of the dispersed rubber particles as a continuous dry coating or film, sufficiently great to offset the relatively low firmness or rigidity of the originally flat paper sheet. Thus, the problem of curling is apt to arise when paper of a basis weight less than about 60 pounds is being coated with rubber latex as already described; and the thinner the paper is, the more serious is the curling problem.

When paper sheets or tie-bands have been coated with rubber latex on opposite faces of opposite marginal portions and, by reason of the thin or light weight character of the sheets or bands, the coated marginal portions have undergone curling, it becomes disconcertingly difficult to pack the thus coated and curled sheets at the desired speed or with any degree of neatness; and the user of the sheets or bands is apt to complain, since such sheets or bands cannot be piled up for use without such dislodgment or separation of the units from the pile as slows down the user considerably in removing the units from the pile and putting them to use.

In accordance with the present invention, the foregoing difficulties in packaging and using the latex-coated sheets or bands under discussion are obviated by indenting or creasing the sheets or bands at their coated zones along one or more lines running longitudinally of the sheets or bands, thereby creating in such zones ribs or protuberances whose effect is to stiffen such zones sufficiently to offset or neutralize completely the curling tendency otherwise prevailing thereat. While the creases or indentations may be formed on the same face of the coated paper sheet or band, it is preferable that the creasing knife or other indenting instrumentality be brought to bear against the uncoated face or sheet of the band immediately in back of the coated zone, thereby avoiding any significant disruption or break-up of the continuity of the coating or disturbance of its bond to the paper base. In other words, it is preferable that the stiffening ribs or protuberances be raised on the coated faces and, because of the disposition of the coatings on opposite faces, thus project from the opposite faces of the coated sheet or 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 depicts a tie-band coated and creased in conformity with the invention hereof.

Figure 2 shows a similar band containing only a single coarse crease at each of its coated marginal portions and productive of a rib upstanding from each of the coated faces.

Figure 3 illustrates a band wherein the creasing is along criss-crossing lines and wherein the ribs are, as in the case of Figure 1, raised on the opposite coated faces of the band.

Figure 4 depicts a package of the bands of Figure 1, the wrapper for the package being partially broken away to reveal the creased end portions of the band.

A band such as appears in Figure 1 may be made by any suitable method or machine, although it may advantageously be made by the method and machine disclosed in my application Serial No. 112,116, filed November 21, 1936. It might be noted that the method of that application involves performing successive coating, drying, creasing, and cutting steps on a progressively

moving web or sheet of paper as it is being unwound from a roll to produce as the end product the very band that is illustrated in Figure 1, that is, a band B having multiple creases *c* at each of its coated marginal or end portions, the ribs defined by the creases projecting from the opposite coated faces of the band substantially only at its coated areas and being substantially coextensive longitudinally with such coated areas or portions. The ribs may, as shown, advantageously extend along lines substantially parallel to the side edges *e* of the band; and they may occur in such number and be of such coarseness as to impart to the coated marginal portions a degree of stiffness or rigidity sufficient to overcome or neutralize completely the curling stresses developed in such portions by virtue of the deposition and drying of the latex coatings *l* on such portions. In actual practice, the paper for the band B is preferably of a basis weight less than about 60 pounds, since such paper is economical and leads to a band of the desired light weight and flexibility. Indeed, papers whose basis weight range from about 35 to 50 pounds can be used to best advantage in making the bands hereof. The latex or latex composition used for coating such papers to produce the bands hereof may have any suitable solids content, for instance, a solids content of about 33% to 37% (normal latex), but the thickness of dried latex coating most appropriate for the bands hereof may be had advantageously by a single application of so-called concentrated or centrifuged rubber latices, e. g., ammonia-preserved rubber latex concentrated to a solids content of about 60%.

It is unnecessary for the purposes hereof that the creasing of the coated marginal portions of the band be performed in such a way as to raise ribs on opposite faces of the coated areas, even though such latter creasing practice is preferable, as already indicated. The fact is that, as illustrated in Figure 2, the ribs at the marginal portions of the bands may protrude or be upstanding from the very same face of the band. By providing ribs *r* of suitable size or coarseness, it is possible to realize from a single rib in each coated marginal portion sufficient firmness or stiffness at such marginal portion to do away with any curling or cockling tendency thereat; and it is for this reason that the band in Figure 2 has been shown with only a single relatively coarse crease at each coated marginal portion.

Rather than creating in the coated marginal band portions ribs or protuberances extending substantially parallel to the side edges of the band, one may create ribs *s* occurring along crisscrossing lines, as illustrated in Figure 3, which ribs are also substantially coextensive longitudinally with the coated marginal band portions. In such case, too, the spacing of the ribs *s* should be coordinated with a rib size such as will impart to the coated marginal band portions a degree of firmness or stiffness consonant with complete neutralization of such curling stresses as may exist at such portions. The ribs *s*, like those shown in Figure 1, are preferably raised on the opposite coated faces of the band, thereby preserving so far as possible the integrity of the dried coating against the disrupting influence of the creasing knives or indenting instrumentalities, which are thus brought to bear against the uncoated paper faces.

By applying the principles of the present invention it is possible to ensure in a simple and inexpensive way substantial flatness in coated paper bands that otherwise present trouble in packaging and use. A stack or pile of bands embodying more particularly the form of creases or ribs depicted in Figure 1 is shown in Figure 4, as constituting a package enveloped by a suitable wrapper *w* and ready for shipment in cartons or otherwise. It will be observed that the various bands *b* in the package lie flat on top of one another with the ribs *c* of one band overlying and conforming to the ribs *c* of the next lower band. When the wrapper *w* is removed from the package by the band-user, a uniformly stacked pile of bands is had from which the band-user may remove the bands successively one by one for application as a tie-band about the particular article or package to be bound.

It might be remarked that the expression "basis weight" as used herein means the weight in pounds of 480 sheets whose dimensions are 24 x 36 inches. In other words, it is the poundage of 2,880 square feet of the paper sheet. It might further be remarked that for the purposes hereof, various kinds or grades of paper might be employed, including well-sized papers and papers only lightly sized, if at all. Those papers that are substantially unsized are particularly susceptible to curling in making the bands thereof, although even sized papers are subject to curling trouble especially when they are of the thin or light weight character already mentioned.

The expression "rubber latex" or "rubber latex composition" as used in the foregoing description and in the appended claims is meant to include all sorts of rubber latices, for instance, natural rubber latex or artificial rubber latex of various solids contents and, if desired, compounded with the various ingredients known or employed for the compounding of rubber latex so as to enable through the drying of the rubber latex the realization of rubber compounds of the particular characteristics desired for service as cohesive, dried coatings at opposite faces of opposite marginal portions of a paper band, as hereinbefore described.

So far as concerns certain subject matter, this application is a continuation-in-part of my application Serial No. 112,116, filed November 21, 1936.

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 containing one or more ribs extending generally longitudinally in each of said coated portions and being substantially coextensive therewith longitudinally to offset curling tendency at said portions and to facilitate packing of said band in a 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 containing one or more ribs extending generally longitudinally in each of said coated portions and being substantially coextensive therewith longitudinally to offset curling tendency at said portions and to facilitate packing of said band in a stack.

3. 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, said band of paper having a basis weight not in excess of about sixty pounds and containing one or more ribs, and said band containing one or more ribs extending generally longitudinally in each of said coated portions and being substantially coextensive therewith longitudinally to offset curling tendency at said portions and to facilitate packing of said band in a stack.

4. 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, said band containing one or more ribs extending generally longitudinally in each of said coated portions and being substantially coextensive therewith longitudinally to offset curling tendency at said portions and to facilitate packing of said band in a stack, and said one or more ribs upstanding from the coated faces of said coated portions.

5. 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, said band containing one or more ribs extending generally longitudinally in each of said coated portions and being substantially coextensive therewith longitudinally to offset curling tendency at said portions and to facilitate packing of said band in a stack, and said one or more ribs upstanding from the coated faces of said coated portions.

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