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2,271,632

BUNDLING OF SLATS AND SIMILAR UNITS

Filed May 13, 1940

2 Sheets-Sheet 1

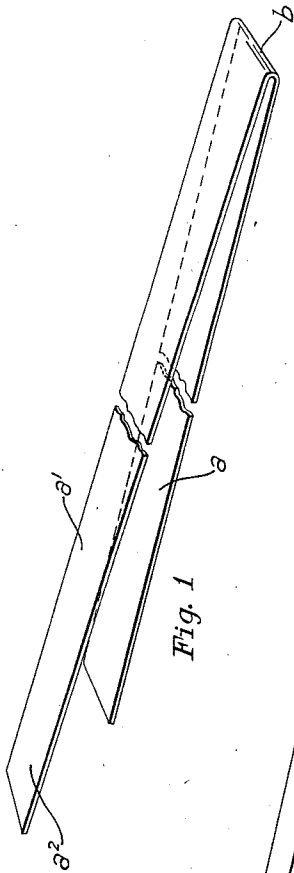


Fig. 1

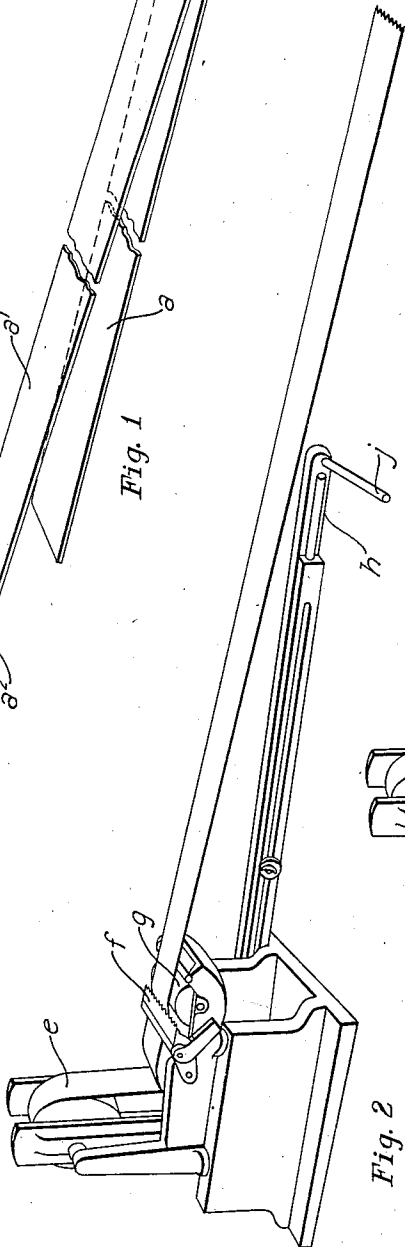


Fig. 2

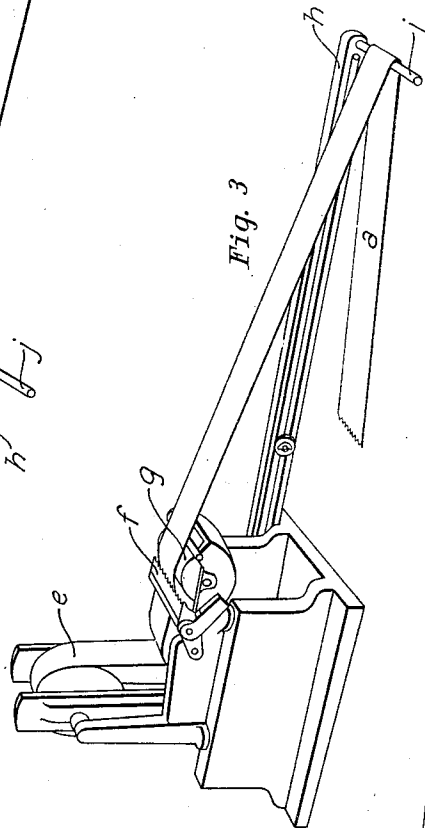


Fig. 3

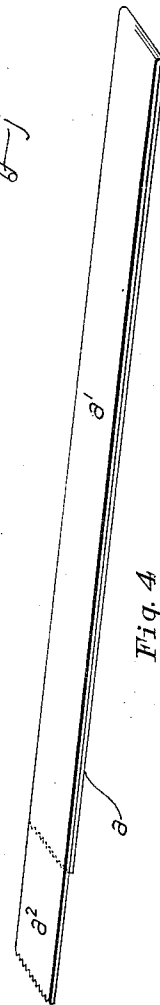


Fig. 4

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2 Sheets-Sheet 2

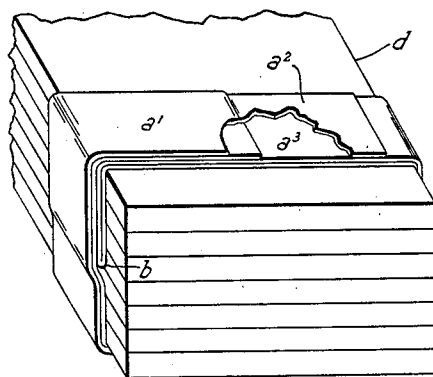


Fig. 5

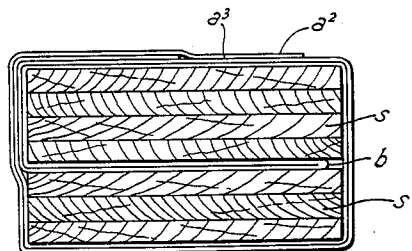


Fig. 6

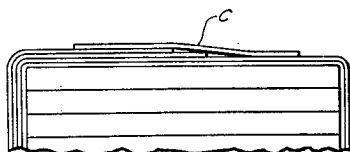


Fig. 7

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UNITED STATES PATENT OFFICE

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BUNDLING OF SLATS AND SIMILAR UNITS

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Application May 13, 1940, Serial No. 334,951

6 Claims. (Cl. 93—93)

My invention relates particularly to the tying together of units of highly finished material—for example converted material such as wooden slats and moldings—into a firm bundle, without danger of marring the surfaces of the exterior units of the bundle by the tying elements, or by the contact of one bundle with another.

When units of finished material are tied into a bundle by cords, the cords tend to cut into and mar the finished surfaces over which the cords are drawn. This happens especially when the units consist of soft wood. In order to prevent such marring, it has been customary to place pieces of stiff cardboard under the tying cords; or, to place first some other wrapping around the bundle and tie the cords over these wrappings. But such procedure is troublesome and expensive, because of the extra time required for making up the bundle. Furthermore, the placing of a wrapping of cardboard under the tying cord is not always effective. The cardboard's protective wrapping may slip from under the cords unless the cords are tied very tight; and if the cords be tied sufficiently tight to hold the cardboard protective sheets firmly in place, the protective sheets after a time tend to become fatigued, as it were, and give way under the cords sufficiently to permit the cords to make noticeable depressions or impressions upon the underlying surfaces of the units. Furthermore, in tying the units into a bundle by cords, the knots made in the cords constitute hard exterior projections on the bundle which tend to mar the surfaces of an adjacent bundle; for the knots will not always be located so as to come opposite the protective wrapping, or cardboard sheet of the adjacent bundle; or the knots may bear with such force, due to the weight imposed upon adjacent bundles, as to cause the knots to make an impression through the protective covering, and thus mar the finished surface of the underlying unit.

The object of my invention is to provide a method for making and applying strong bands by which units, such as mentioned, may be tied together into a firm bundle, and all danger of marring the surfaces of the exterior units of the bundle, by any of the causes mentioned, be eliminated.

I accomplish my object by employing as the tying element, a wide band consisting preferably of a single strip of flexible strong material, such as a strip of gummed "kraft" paper or tape, doubled upon itself so as to constitute a two-ply band with a film of adhesive, preferably water soluble, interposed between the opposed faces of

the two plies. Two separate strips instead of a folded strip may of course be used to make the band, but the use of a single folded strip is obviously simpler.

The strips are preferably folded or arranged so that one of the ends projects beyond the other, so that such end will constitute an exterior overlapping end which may be fastened on the band after the band has been firmly wrapped around the bundle, thus sealing the band tightly around the bundle. By the use of gummed tape folded upon itself there is no possibility of the intermediate adhesive film coming into contact with the material tied together.

The band is wrapped around the bundle while the interposed film of adhesive is still in a moist state. In this state the band is in a semi-plastic condition which enables the tight binding of the bundle; and further enables the two plies to adjust themselves relatively, so that the outer or longer ply will encompass evenly and uniformly the inner ply, by which the full tensile strength of the two plies is utilized. If the outer ply does not uniformly encompass the inner ply, but in places rises from the ply, then in such places the effective tensile strength of the band as a whole is reduced to that of the inner ply only. When the cementing agent has set and dried, the band will be restrained against again returning to a straight form. Thus the band is given a slight, but appreciable clamping action, supplementing and aiding the action of the seal of the band in keeping the band wrapped tightly around the bundle.

Furthermore, by wrapping the band around the bundle while the adhesive film between the two plies is still moist, such moisture is transmitted to some degree to the web of the plies, causing the band to be slightly, but appreciably, lengthened, and, upon drying, the band will shrink or contract and thus becomes more tightly and firmly drawn around the bundle.

Further details as to the practical use of my invention are hereinafter given with reference to the accompanying drawings in which:

Figure 1 illustrates the making of my two-ply band from a single strip of kraft paper, one face of which is coated with a film of glue and softened by the application of water;

Figures 2 and 3 illustrate a device by means of which a strip of such flexible material may be folded upon itself into two plies with the glue-carrying faces of the plies opposed to each other, and wetted before the fold is made;

Fig. 4 illustrates the finished two-ply strip ready to be wrapped around the bundle;

Fig. 5 illustrates the band wrapped around and tying together a bundle of slats;

Fig. 6 illustrates a modification which may be made in the arrangement of my band when wrapped around a bundle; in this arrangement the initial or inner end of the band is tucked in, and thus clamped and anchored between the slats, to hold the band more firmly in place while it is being wrapped around the bundle; and

Fig. 7 illustrates an alternative way of securing the end of the tape.

Referring first to Figure 1, a strip of gummed kraft tape is cut to a length longer than at least twice the girth of the bundle to be bound. The gummed side is moistened throughout the entire length of the piece, and the piece is then transversely folded near the middle as at *b*, but sufficiently removed from the middle so that one section *a'* will be longer than the other section *a* in order to provide an extending portion *a²* of the longer section. In folding the tape the surface carrying the adhesive is placed on the inside.

Figures 2 and 3 illustrate how a conventional tape-dispensing machine may be used for the cutting and moistening of the tape which, as it is unwound from the roll *e*, passes under the cutting blade *f* and over the moistening roller *g*. For convenience in the folding of the moistened tape, an arm *h* is adjustably secured in any suitable manner adjacent the tape-dispensing machine, and this arm carries a short horizontal rod *j* at its outer extremity around which the shorter section *a* of the strip of moistened tape may be conveniently folded back as shown in Figure 3, the entire strip then being severed from the roll by the cutter blade *f* and two sections brought together into the position shown in Figure 4. The strip of tape is now ready for tying the bundle.

In wrapping the doubled moistened tape around the bundle, the fold *b* of the strip is held against the bundle until the tape is wound about the bundle *d* as shown in Figure 5. The doubled tape is wound in such manner that the longer strand *a'* will be on the outside, and thus, after the winding is completed the extending portion *a²* at the end of the outside longer section can be brought into contact with the outer surface of the underlying section as at *a³* in Figure 5. This extended portion *a²*, is then pressed down firmly on the underlying section *a³* sealing the tape binding.

It is an important fact in this method, that during the process of wrapping the doubled tape around the bundle, the outer layer of tape will slide on the inner layer to compensate for the differences in the distances around the surfaces to which they are applied, and this is made possible, when gummed tape is used, by the moist condition of the adhesive substance on the adjacent surfaces of the tape. This enables the two sections of the tape to be wound tightly around the bundle so that equal tension is obtained on both outer and inner layers of tape. This eliminates any creasing, scoring, or wrinkling of the inner layer of tape that might otherwise occur due to the lesser degree of tension in the inner layer. Furthermore, by providing for the equalization of the tension of the two layers of tape in this manner, I am able to use a much lighter-weight tape than would otherwise be necessary, since the tape is doubled and will not

be easily fractured in the weakest spots, namely where it passes over and around the corners *d* of the bundle.

The projecting end portion *a²* should be long enough to furnish a firm grip hold on the underlying section *a³*, but need not be extremely long, since nothing would be gained by increasing the length of this single extending end portion. The most satisfactory relative length would be approximately as illustrated in Figure 5.

As the moistened adhesive of the tape dries, the tape has a slight tendency to contract and this has the advantage of making the bundle binding even tighter. To unfasten the bundle all that is necessary is to break or cut the outer portion *a²* of the tape whereupon the tape will immediately become loose or can easily be unwound from the bundle.

In the slightly modified method of applying the tape illustrated in Figure 6, the group of slats to be bound is separated into two parts, *s* and *s'* sufficiently to permit the passing of the fold *b* of the strip of tape, between the upper and lower groups of slats, to a distance which is slightly less than the width of the slats as shown. The two groups of slats are then pressed together upon the interposed folded end of the tape, and the remaining double tape, with the adhesive coated surfaces against each other, is tightly wound around the entire bundle of slats and overlapped in the manner previously described with the extending portion *a²* at the end of the outer longer section of tape secured to the underlying section and thus sealing the tape binding. This modified method facilitates the winding of the bundle by insuring the firm holding of the folded end in place until the tape is completely wound about the bundle.

Instead of making the end of one ply of the doubled tape longer than the other, the two plies could be made approximately the same length and an extra piece of tape used to fasten down the end of the binding as shown at *c* in Figure 7. Since this, however, necessitates an extra operation, I consider it much preferable to make the outer ply of the doubled tape band longer than the other as previously described. Also, while it is possible to use two separate strips of tape for the plies of the binding band instead of the folded strip, the use of the single folded strip will be found simpler and more practical.

I claim:

1. The method of tying together a bundle of units of the character described which consists in making a band composed of at least two plies of strong flexible material arranged one over the other, with a film of liquid-softened adhesive between them, and immediately, while the film of adhesive is still moist and soft, wrapping the band tightly and completely around the bundle, thereby to cause the outer ply to become evenly adjusted over and around the inner ply so that the tensile strength imposed on the band-wrapping is sustained substantially equally by the individual plies, and the strength of the band as a whole equals uniformly approximately the sum of the individual tensile strengths of the plies and fastening the overlying end of the band down on the band.

2. The method of tying together a bundle of units of the character described which consists in making a band of a strip of strong paper, one face of which is coated with a film of adhesive, wetting the adhesive, folding the strip on itself so as to constitute a two-play band, and immedi-

ately, while the film of adhesive is still moist and soft, and the band thus in a semi-plastic condition, wrapping the band tightly and completely around the bundle, thereby to cause the outer ply to become evenly adjusted over and around the inner ply so that the tensile strength imposed on the band-wrapping is sustained substantially equally by the individual plies, and the strength of the band as a whole equals uniformly approximately the sum of the individual tensile strengths of the plies and fastening the overlying end of the band down on the band.

3. The method of tying together a bundle of units of the character described which consists in taking a strip of flexible material, one face of which is coated with a film of adhesive, wetting the adhesive, folding the strip on itself so as to constitute a two-ply band, tucking one end of the band between the units, and immediately, while the film of adhesive is still moist and soft, wrapping the band firmly around the bundle, and fastening the overlying end of the band down on the band.

5 4. The method of tying together a bundle of units of the character described which consists in taking a strip of flexible material, one face of which is coated with a film of adhesive, wetting the adhesive, folding the strip on itself so as to constitute a two-ply band with the end of the overlying ply projecting beyond the end of the other, tucking the folded end of the band between the units, and immediately, while the film of adhesive is still moist and soft, wrapping the band firmly around the bundle, and fastening said projecting ply end as well as the overlying band end down on the band-wrapping.

10 5. The method described by claim 1 in which the inner end of the band is clamped between two units of the bundle.

20 6. The method described by claim 1 in which the outer end of the overlying ply projects and is fastened down on the band-wrapping as well as the overlying end of the band.

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