

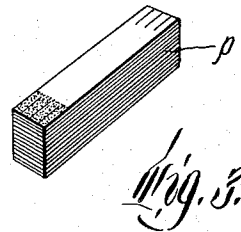
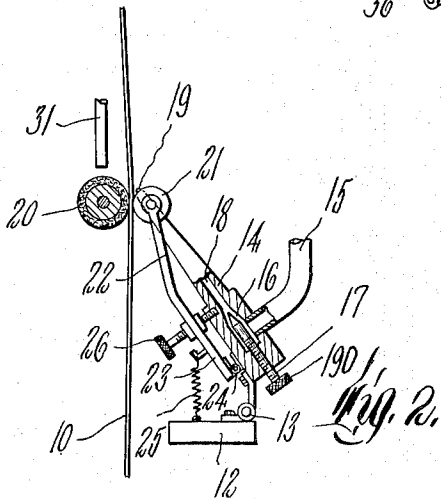
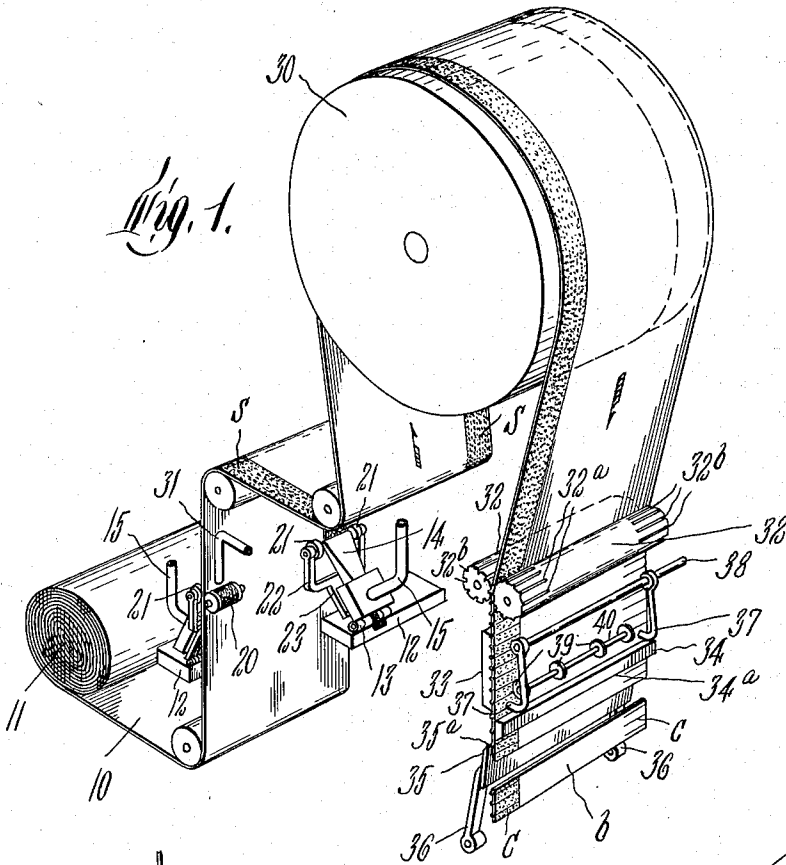
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METHOD OF AND MACHINE FOR MAKING TIE BANDS

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METHOD OF AND MACHINE FOR MAKING
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7 Claims. (Cl. 93—1)

This invention relates to a method of and machine for making tie-bands of paper or the like that are put to use with their end portions in bonded overlapping relationship. It deals more especially with the manufacture of bands conforming to my Patent No. 2,000,763, dated May 7, 1935, according to which the bands carry on only a pair of opposite faces of opposite end portions a dry coating of latex or equivalent composition cohesive to a similar coating but non-adhesive to a paper or other ordinary surface. Because the use of a band of this type requires merely the bringing together of its opposite end portions into contacting overlapping relationship, it represents an important improvement over the usual tie-band coated at either end portion with dry gum or adhesive that must be moistened or otherwise activated in order to exert the desired bonding effect.

An objective of the present invention is to make possible high-speed and low-cost production of the foregoing type of bands. Another objective is to insure bands that are not only ready for use by the consumer but that are in substantially flat condition and can hence be properly piled or stacked for packaging and shipment. Another objective is to produce the finished bands continuously from a moving web of paper of an indefinite length, for instance, from a paper web as it is being progressively unwound from a roll. Still another objective is to produce the finished band by a method and machine requiring little supervision and plant space.

With the foregoing and other objectives and features in view, the present invention will now be described in some detail with reference to the accompanying drawing, wherein—

Figure 1 depicts somewhat diagrammatically in perspective a machine for practicing the method hereof.

Figure 2 represents a side elevation of one of the instrumentalities for coating the marginal portion of a progressively moving paper web.

Figure 3 illustrates the stacking of the bands, as they come from the machine, for wrapping or packaging purpose.

As appears in Figure 1, a web of paper 10 may be progressively unwound from a supply roll 11 and guided upwardly past suitable instrumentalities for coating opposite faces of its marginal or side edge portions with the appropriate liquid bonding composition, preferably fluent rubber latex composition, which gives a dried coating readily cohesive to a similar coating but non-adhesive to a paper or other usual surface. Each

instrumentality may, as best appears in Figure 2, include a stationary support 12 to which may be hingedly secured, as at 13, an inclined nozzle 14 for applying the liquid bonding composition. The liquid bonding composition may be fed under pressure from a suitable source (not shown) through a pipe 15 into the receiving chamber 16 of the nozzle; and the flow of the composition into the nozzle may be regulated by a needle valve 17 threaded therein whose pointed or needle end may be adjusted from the outside by a knurled head 190 to open or close to the desired extent a passageway 18 leading from the receiving chamber 16 to the discharge opening 19 at the upper end of the nozzle. The nozzle may, as shown, take the form of a wedge of progressively increasing width but of tapering thickness toward its discharge opening 19, which may consist of a narrow slit of sufficient length to deposit composition over a substantial marginal area of the paper web.

The discharge or upper end of the nozzle is stationed, as appears in Figure 2, barely to clear the progressively moving paper surface as the paper web is being backed up by a resilient or yielding roll 20 against which it is pressed by a pair of spaced rollers 21 each located immediately next to a side of the nozzle and making pressing contact with the paper surface immediately below the point at which composition is discharged from the nozzle and is deposited on the paper. The rollers 21 may be rotatably mounted at the upper end portions of the arms 22 of a yoke 23 hingedly secured, as at 24, to the lower end portion of the nozzle 14. The desired pressing contact of the rollers 21 with the paper web may be afforded by a tension spring 25, one end portion of which engages a lower end portion of the yoke 23 and the other end portion of which engages the support 12. The upper end or discharge opening of the nozzle 14 may be maintained at the desired clearance from the paper web by an adjusting screw 26 passing through and rotatably fixed to the yoke 23 and threaded into the body of the nozzle. The rollers 21 thus keep the paper web smoothly pressed against the roll 20 so that the composition may be applied as a thin, substantially uniform or even coating as it flows continuously and in regulated amount from the nozzle onto the region of the web immediately above the points of application of pressure onto the web.

After the paper web has moved past the coating instrumentalities and the rubber latex or equivalent bonding composition has been deposited as stripes or coatings S on only a pair of

opposite faces of its marginal or side edge portions, the coated web is progressively dried, as by passage over a steam-heated drier drum 30. Inasmuch as the drying of the coatings tends to cause curling of the marginal portions of the paper web, it is desirable to offset this tendency at least in part by moistening the uncoated face of the web immediately in back of each coating; and, to this end, the periphery of the roll 20 may be made of felt, sponge rubber or equivalent resilient, absorptive material and be kept moist with water supplied constantly and in regulated amount, as from a drip pipe 31, so as to moisten or wet the appropriate uncoated areas of the web.

It might be noted that the tendency in drying the coated web is to render its coated surface concave and that wetting of the uncoated surface in back of the coated surface tends to induce opposite curling or shrinkage forces in subsequent drying and thus to offset at least in part the curling of the coated web areas. The dried coated paper web coming from the drum 30 may be delivered into the nip of a pair of rolls 32 which serve to crease the coated web areas transversely at spaced intervals and thus to destroy any residual curling tendencies therein. Thus, an end portion of one roll periphery may be provided with ribs or teeth 32a and the corresponding end portion of the other roll periphery provided with recesses 32b into which the paper is forced to form a succession of transverse creases or tiny ribs in the coated paper zones. It might be noted that the tiny ribs thus formed project from the uncoated face at each edge portion of the paper web and that, accordingly, one end portion of each roll periphery is ribbed and the other end portion is recessed, as already described.

The creased paper web is led from the rolls 32 over a backing plate 33 and thence to a stationary upper knife 34 fixed to suitable framework (not shown). At predetermined timed intervals a lower knife 35 fixed to a pair of spaced cranks 36 is caused to oscillate in an arcuate path until its upper cutting edge 35a moves past the lower cutting edge 34a of the knife 34 and thus to cut off a paper band b of the desired width from the paper web. The arcuate oscillatory movement of the cranks 36 to move the knife 35 into an out of cutting engagement with the stationary knife 34 may be effected by suitable means (not shown). While the knife 35 is approaching the knife 34 and is cutting off a band of the desired width from the paper web, the web is held from further downward movement past the cutting edge 34a by a pair of gripping fingers 37 that force the web against the backing plate 33. The gripping fingers may be fixed, as shown, to an oscillating shaft 38 whose oscillation by suitable means (not shown) is effected in such timed relationship to the oscillatory movement of the knife 35 as to bring the fingers 37 into gripping contact with the paper web and thus to hold it against the backing plate 33 and permit it to accumulate above the knife 34 during the cutting stroke of the knife 35 and to disengage the fingers from the web and thus to permit the forward or downward movement of the web past the cutting edge 34a during the retractive stroke of the knife 35.

Each paper band b as it issues from the machine may be provided with a plurality of spaced transverse creases c at its edge portion which keeps it substantially flat. Were no such creases

formed, the band would tend to curl very decidedly at its edge portions, particularly if the coated paper web from which it is cut had been dried without previous moistening of the uncoated surfaces directly in back of the coated surfaces. By ensuring substantial flatness of the bands as they issue from the machine, it is possible to pile them into a stack p as shown in Figure 3 without warping or irregularity of the stack. The stack may thus be packed satisfactorily as in a wrapper or carton for storage and/or shipment to the consumer.

It is to be understood that the various rolls shown in the drawing may be supported for rotation by suitable bearings and that they may be rotated to feed the paper through the machine at the appropriate speed. Thus, the drier drum 30, whose interior may be hollow and be supplied with steam as is known to those skilled in the art, may be caused to rotate by suitable means so as to unwind the paper from the supply roll 11; and the creasing rolls 32 may also be positively driven at the same peripheral speed as the drier drum to feed the paper past the cutting knives. The paper web may be kept constantly against the backing plate 33, as by a series of tiny rollers 39 free to rotate on a shaft 40 during the forward or downward movement of the paper and remaining stationary and thus serving to hold the paper at spaced points between the fingers 37 when the latter exerts its gripping action on the paper web against the plate 33. It will be appreciated that various changes are possible in the machine and method hereinbefore described without departing from the spirit or scope of my invention as defined in the appended claims.

I am using the expressions "paper" and "paper web" in the foregoing description and in the appended claims in a generic sense to include paper or equivalent flexible or paperlike sheet materials, for instance, to include films, foils, or the like capable of being used as tie-bands. Thus, flexible film materials such as are sold on the market under the trade-marks "Cellophane," "Protectoid," "Kodapak," etc., are meant to be included by the expressions "paper" and "paper web."

I claim:

1. A method of making paper tie-bands adapted to be bonded together by bringing their end portions into contacting overlapping relationship, which comprises progressively coating one surface of a progressively moving paper web along one longitudinal marginal portion thereof and also the opposite surface of the web along the opposite longitudinal marginal portion thereof with a fluent composition capable of yielding upon being dried a coating cohesive to a similar coating but non-adhesive to a paper surface, progressively drying the coated web, creasing the coated portions of the web transversely at predetermined, regularly spaced intervals to offset any curling tendencies in said portions, and cutting the creased web transversely at predetermined, regularly spaced intervals to produce said tie-bands.

2. A method of making paper tie-bands adapted to be bonded together by bringing their end portions into contacting overlapping relationship, which comprises progressively coating one surface of a progressively moving paper web along only one longitudinal marginal portion thereof and also the opposite surface of the web along the opposite longitudinal marginal portion thereof

with rubber latex composition capable of yielding upon being dried a coating cohesive to a similar coating but non-adhesive to a paper surface, moistening the uncoated web faces directly in back of said coated areas with water, progressively drying the coated and moistened web, and cutting the dried coated web transversely at predetermined, regularly spaced intervals to produce said tie-bands.

3. A method of making paper tie-bands adapted to be bonded together by bringing their end portions into contacting overlapping relationship, which comprises progressively coating one surface of a progressively moving paper web along only one longitudinal marginal portion thereof and also the opposite surface of the web along the opposite longitudinal marginal portion thereof with a fluent composition capable of yielding upon being dried a coating cohesive to a similar coating but non-adhesive to a paper surface, moistening the uncoated web faces directly in back of said coated areas with water, progressively drying the coated and moistened web, creasing the coated portions of the web transversely at predetermined, regularly spaced intervals to offset any curling tendencies in said portions, and cutting the web transversely at predetermined, regularly spaced intervals to produce said tie-bands.

4. A method of making paper tie bands adapted to be bonded together by bringing their end portions into contacting overlapping relationship, which comprises progressively coating one surface of a progressively moving paper web along only one longitudinal marginal portion thereof and also the opposite surface of the web along the opposite longitudinal marginal portion thereof with rubber latex composition capable of yielding upon being dried a coating cohesive to a similar coating but non-adhesive to a paper surface, moistening the uncoated web faces directly in back of said coated areas with water, progressively drying the coated and moistened web, creasing the coated portions of the web transversely at predetermined, regularly spaced intervals to create ribs therein protruding from the

pre-moistened web faces and thereby to offset any curling tendencies in said portions, and cutting the creased web transversely at predetermined, regularly spaced intervals to produce said tie-bands.

5. A machine of the class described comprising instrumentalities for applying fluent coating composition to one surface of a progressively moving paper web along one longitudinal marginal portion thereof and simultaneously to the opposite surface of the web along the opposite longitudinal marginal portion thereof, means for progressively drying the coated web, means for creasing the coated portions of the web transversely at predetermined, regularly spaced intervals, and means for cutting the creased web transversely at predetermined, regularly spaced intervals into bands.

6. A machine of the class described comprising instrumentalities for applying fluent coating composition to one surface of a progressively moving paper web along one longitudinal marginal portion thereof and simultaneously to the opposite surface of the web along the opposite longitudinal marginal portion thereof, means for progressively moistening the uncoated web faces directly in back of said coated areas with water, means for progressively drying the coated web, and means for cutting the dried web transversely at predetermined, regularly spaced intervals into bands.

7. A machine of the class described comprising instrumentalities for applying fluent coating composition to one surface of a progressively moving paper web along one longitudinal marginal portion thereof and simultaneously to the opposite surface of the web along the opposite longitudinal marginal portion thereof, means for progressively moistening the uncoated web faces immediately in back of said coated areas with water, means for progressively drying the coated web, means for creasing the coated portions of the web transversely at predetermined, regularly spaced intervals, and means for cutting the creased web transversely at predetermined, regularly spaced intervals into the bands.

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