Feb. 4, 1958 C. W. VOGT 2,822,286

METHOD FOR SLITTING TAPES AND DISPLACING ADHESIVE

Filed Sept. 21, 1953

FIG. 1

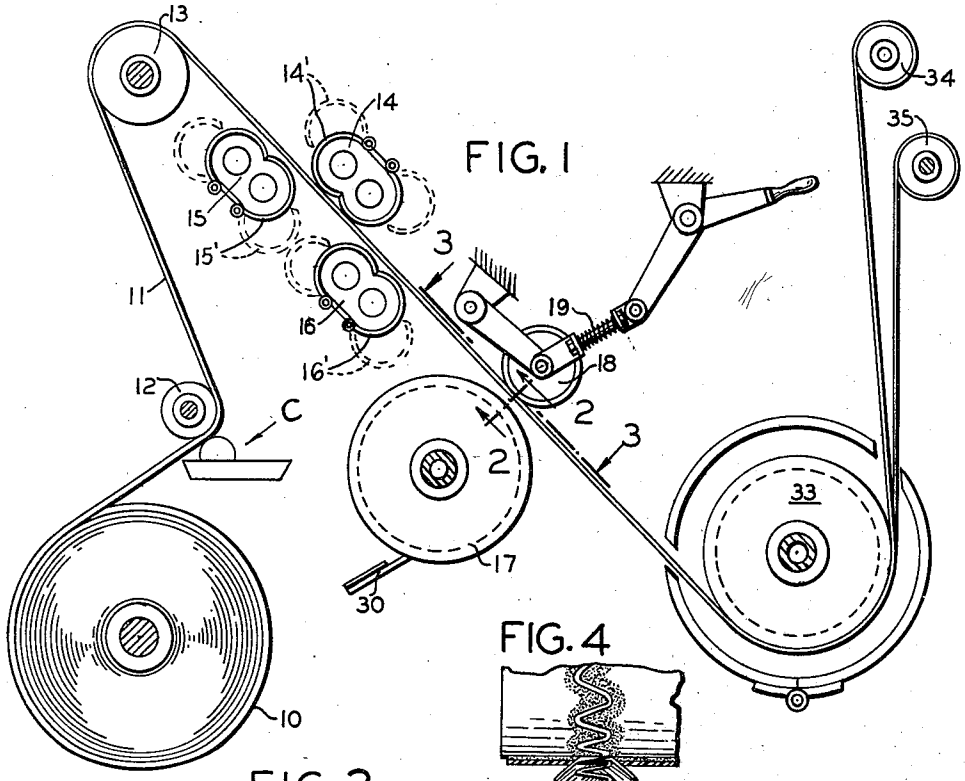


FIG. 4

FIG. 2

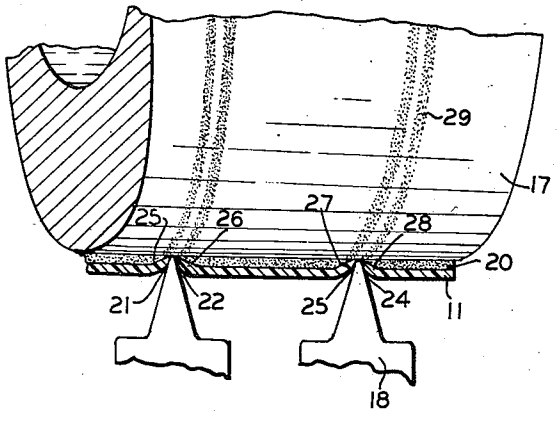


FIG. 3

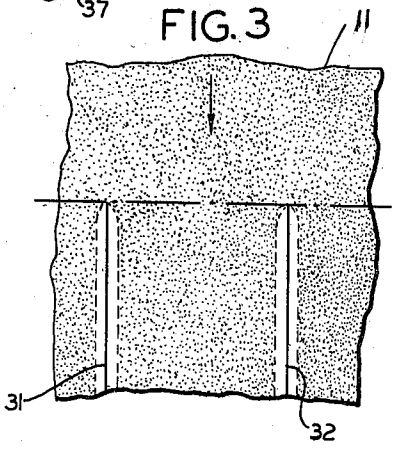


FIG. 6

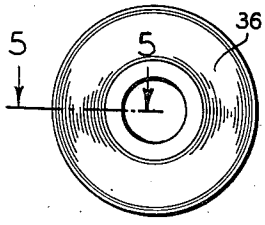
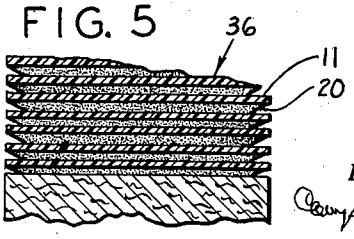


FIG. 5



INVENTOR.
CLARENCE W. VOGT
BY
Campbell Brumbaugh, Free & Graves
his ATTORNEYS.

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2,822,286

METHOD FOR SLITTING TAPES AND DISPLACING ADHESIVE

Clarence W. Vogt, Norwalk, Conn.

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4 Claims. (Cl. 117—4)

The present invention relates to methods and apparatus for slitting bands of adhesively coated material and forming the same into rolls of adhesive tape, as well as to the resulting products formed thereby.

More particularly, the invention relates to methods and apparatus (as well as products) by means of which bands of adhesively coated material may be slit and simultaneously formed in such fashion that the marginal portions of the adhesive material will be modified in such fashion as to provide rolls of adhesive tape, the edges of the convolutions of which lie in common parallel planes that are perpendicular to the axis of the roll and wherein the edges or sides of the roll are clean and not fouled with escaping adhesive material.

It is a matter of common knowledge that pressure sensitive adhesive tapes now commonly available have the disagreeable property, particularly in the Summertime, of becoming fouled at the sides of the rolls by reason of the fact that the pressure sensitive adhesive escapes from between the convolutions of the roll and is present upon the sides thereof. In order to overcome these and other objections, the present invention has been made and, in order that it may be more fully understood, reference will now be made to the accompanying drawings, wherein:

Fig. 1 is a view in side elevation showing an apparatus in somewhat schematic form and by means of which the present invention may be practiced;

Fig. 2 is an enlarged view somewhat in perspective and partially in section taken on the plane indicated by the line 2—2 of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is a partial plan view of a portion of the band of tape material, illustrating the structure thereof in the region of the band where its cutting or slitting is accomplished (the line 3—3 in Fig. 1 illustrates the region of the tape illustrated in Fig. 3);

Fig. 4 is a partial view in section similar to Fig. 2, and showing a modified form of the invention;

Fig. 5 is a partial view in section showing a portion of a roll of adhesive tape formed in accordance with the present invention; and

Fig. 6 is a view in side elevation showing a roll of adhesive tape formed in accordance with this invention.

Turning to the above drawings, a roll of tape material is illustrated at **10**, this material either having had an adhesive coating applied to one side thereof or, if desired, it may be uncoated material to which adhesive material is applied by means of a coating device C as the material is drawn from the roll. In any event, tape material from the roll **10** is illustrated at **11** and passes over guide rollers **12** and **13** and between heating elements **14**, **15** and **16** by means of which the band of material, as well as the adhesive coating applied thereto, may be heated to a desired extent. The heating elements have shutters **14'**, **15'** and **16'**, which may be adjusted to regulate the heating of the web or closed to shield the web from the heating elements when the web stops.

The tape material may be plain or it may be printed with suitable decorative or other matter before or after being withdrawn from the roll **10**.

The adhesively coated material then moves over a heated back-up roll **17**, in association with which one or more conventional score-slitting rolls **18** may be provided. Score-slitting rolls are commonly used for slitting paper webs and the like and are usually blunt, rounded edge disks which sever or slit the paper or the like principally by pressure. As illustrated, the score-slitting rolls **18** are mounted upon a suitable retracting mechanism **19** in order that they may be withdrawn from slitting relation with respect to the back-up roll **17**. The structure is such that the adhesive side of the band of material **11** is in contact with the back-up roll **17** and the slitting rollers **18** are thus applied to the uncoated or back side of the band of material **11**.

In Fig. 2 the adhesive coating is illustrated at **20** and the score slitters are shown as two in number. The sides of the slitters taper away from the blunt slitting edge and thus cause a varying pressure to be applied to the regions of the band of material **11** adjacent the line of cut. As a result, the band of material is indented, as illustrated at **21**, **22**, **23** and **24** in Fig. 2. The pressure thus applied to the portions **21**, **22**, **23** and **24** squeezes the adhesive and results in a gradually diminishing thickness of adhesive material as the precise line of cut is approached at the edges of the slits formed in the band of material **11**. These marginal regions of diminishing thickness are illustrated respectively at **25**, **26**, **27** and **28**.

Some of the adhesive material in the marginal regions **25**, **26**, **27** and **28** is transferred to or offset upon the heated back-up roller **17**, such portions being indicated generally by the stippled portions **29** in Fig. 2 so that the tape directly beneath the slitter is free of adhesive. A suitable heated doctor **30** may be provided to scrape such portions of adhesive from the back-up roller **17**, or these portions may be removed or destroyed in any other suitable fashion. Unless the roll **17** is heated, the adhesive will not transfer to the roll and a clean, adhesive-free edge is not produced at each side of the slit. The heated roll **17** as well as the heater element **14** is also useful for drying ink which may be imprinted on the web to ornament or mark it immediately before slitting the band. Printing and slitting at almost the same time assures proper positioning of the printed matter with respect to the edges of the strips severed from the band of material **11**.

The adhesive layer on the band of material **11** and adjacent the region of the cuts formed therein is illustrated in Fig. 3, reference characters **31** and **32** indicating the slits formed by the respective score slitters **18**, and the marginal bands of reduced thickness of adhesive are illustrated by the absence of stippling.

Following the slitting operation, the strips of adhesive material are passed over a guide roller **33** and directed to a plurality of wind-up rollers **34** and **35** in order that a plurality of rolls of adhesive tape **36** (Fig. 6) may be formed. The roll **33** may be cooled to reduce the temperature of the tape. The structure of the roll **36** is illustrated in Fig. 5 wherein it will be seen that the thickness of the adhesive **20** on the respective convolutions of tape material is gradually reduced as the edges of the tape are approached. As a result, any tendency of the adhesive material to seep or escape from between the convolutions will merely result in the material occupying a portion of the void spaces between the convolutions of the roll, and none will escape beyond the sides of the roll.

In Fig. 4, a modified form of slitting mechanism is illustrated. In this structure, a score slitter **37** is provided having a zigzag or pinking profile. The sides of the slitter taper away from the line of cut and, as above de-

scribed, cause the adhesive material to be removed from the marginal edges of the tape to provide the advantage hereinabove mentioned. Moreover, removal of the adhesive along the zigzag or pinked edges permits the adhesive coated tape to be unrolled without breaking at the roots of the pinks.

It is understood, of course, that the temperature of the adhesive should reach its highest points when and where it is caused to be pressed into intimate contact with heated roll 17, and directly under the noses of each of the score slitters 18. In the spaces intermediate the score slitters, where there is substantially no pressure to cause intimate contact of the adhesive with the back-up roll, the heat transfer is of a substantially lower order. It is also desirable, under certain conditions, to accomplish the slitting operation by means of substantially tangential contact of the tape material with the rollers 17 and 18. As illustrated in Fig. 1, the normal path of the tape material may be somewhat spaced from the back-up roller 17 in order that no overheating or offsetting or transfer of adhesive material may take place during down periods of the machine.

It has also been found that, under certain conditions, a somewhat higher back-up roll temperature is desirable in order to accomplish the transfer of the adhesive to the back-up roll adjacent the slitters. This is particularly true because of a mere tangential or momentary contact of the web with the back-up roll. In this connection it has been found that with tape materials having adhesives of the kind used on Scotch type of pressure sensitive tapes, desirable transfer of adhesive occurs at temperatures in the range of about 220° to 250° F. These temperatures depend, of course, upon the nature of the tape and the adhesive material. For example, microcrystalline wax coatings soften and also transfer at substantially lower temperatures than the above.

This invention relates generally to the subject matter described in my copending applications Serial Nos. 285,335, now abandoned, and 335,536, filed April 30, 1952, and February 6, 1953, respectively.

I claim:

1. The method of forming rolls of adhesive tape comprising applying a coating of adhesive material to a base material, drawing the coated material forward by contact with a drive member, moving the coated material over a heated supporting surface with the adhesively coated surface in contact with the supporting surface, applying a score cutting element to the uncoated surface of the base material to sever the material into a plurality of portions and transfer adhesive from the severed edges of said portions to said supporting surface, and subsequently rolling the severed portions of the material into a plurality of rolls of adhesive tape.

2. The method of claim 1 wherein the cutting of the base material is accomplished with simultaneous application of pressure to the uncoated surface of the base material in a band adjacent the severed edge.

3. The method of claim 1 wherein the cutting of the base material is accomplished by forming the severed edge with a multiplicity of reversely extending portions.

4. The method of claim 1 wherein, simultaneously with the cutting of the base material, pressure is applied to the uncoated surface adjacent the line of cut and diminishing inwardly of the line of cut.

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