Feb. 5, 1963 J. V. BERG 3,076,493

TAPE ATTACHING MACHINE

Filed Oct. 30, 1959 2 Sheets-Sheet 1

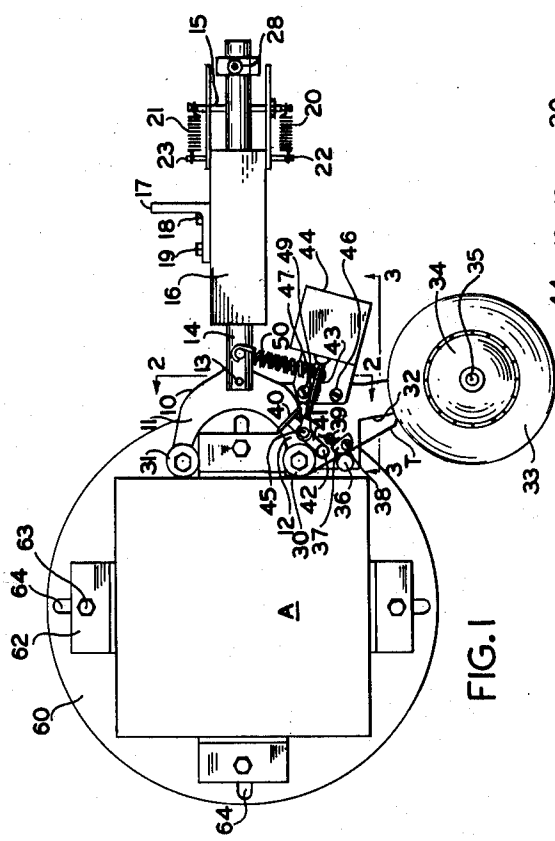


FIG. 1

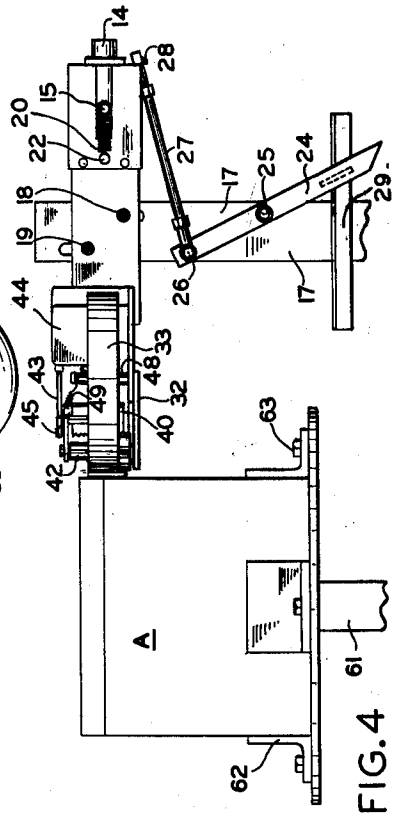


FIG. 4

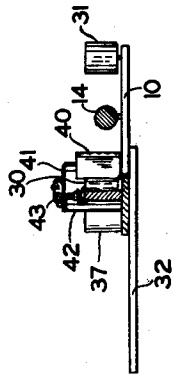


FIG. 2

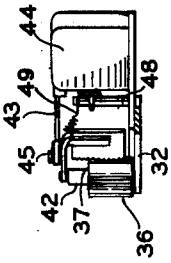


FIG. 3

INVENTOR.
JACK V. BERG
BY
Carpenter, Abbott, Coulter & Kinney
ATTORNEYS

Feb. 5, 1963 J. V. BERG 3,076,493

TAPE ATTACHING MACHINE

Filed Oct. 30, 1959 2 Sheets-Sheet 2

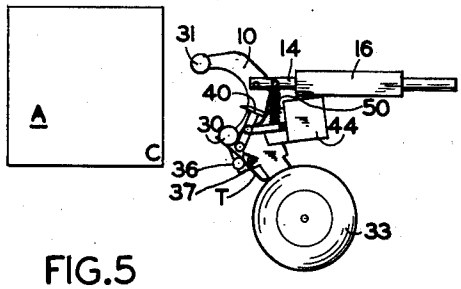


FIG.5

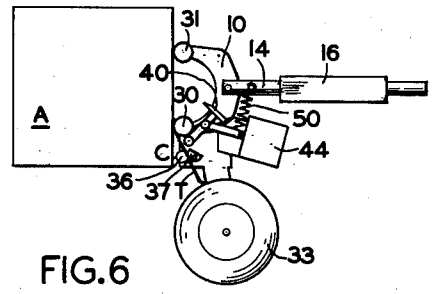


FIG.6

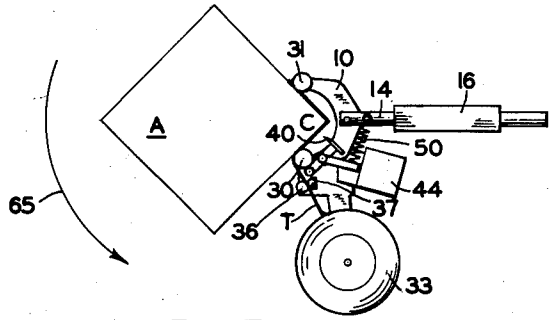


FIG.7

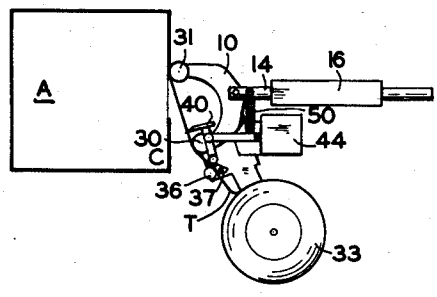


FIG. 8

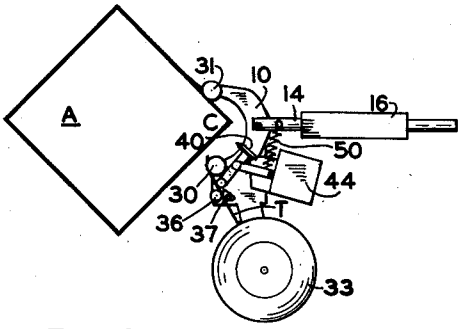


FIG.9

INVENTOR.

JACK V. BERG

BY

Carpenter, Abbott, Coulter & Kinney

ATTORNEYS

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TAPE ATTACHING MACHINE

Jack V. Berg, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn., a corporation of Delaware

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7 Claims. (Cl. 156—446)

This invention relates to a machine for attaching normally tacky pressure-sensitive adhesive tape to articles and packages, etc. More particularly, it relates to a tape attaching apparatus which has particular advantage in applying such tape to, or around, angular articles.

The invention provides a solid, two prong forked taping arm to which guiding and adhering rotatable rollers are affixed. Said rollers serve to conduct tape into adhesive engagement with the surface of an article being taped, and relative movement between these rollers and the surface of the article, along the surface of the article, causes the rollers to attach the tape to the surface of the article which the rollers bear against. The forked taping arm is pivotally attached to the supporting structure for the machine, and the invention includes means for permitting reciprocal movement between the taping arm and a vertical (in the embodiment shown) axis through the central portion of the article being taped during the relative movement between the taping arm and the article.

In the use of the machine herein described, tape from a supply roll is brought, with its adhesive side facing the article to be wrapped, beyond a roller (called an applying roller) on one prong of the taping arm. The tape is brought sufficiently beyond that roller so that the periphery thereof will press the tape against the article (see FIGS. 1 and 6), and "tab" the lead tip of the tape to that article. A roller located on the other prong of the taping arm, called a buffing roller, follows behind the applying roller, buffing against the non-adhesive surface of the tape, thereby attaching the tape to the article more securely. The two prongs of the taping arm are in fixed relationship to each other (i.e. the prongs will not spread away from, or move toward each other during use of the machine) and the applying roller and the buffing roller tend to act in cooperation with each other when both rollers are urged against the surface of an article being taped. That is, the pressure between the article and one of the rollers is transmitted through the taping arm to the roller at the other end of the arm, and this action serves to inhibit the tendency of either roller to move away from the surface of the article, or "jump" as either roller is moved around a corner of the article.

The present invention, and the various objectives and advantages obtained thereby, will be apparent from the following description of the illustrative embodiment shown in the accompanying drawings, wherein like reference characters refer to similar parts in the corresponding views, and in which drawings:

FIGURE 1 is a plan view of a taping machine of this invention showing the apparatus in position to begin attaching tape to a square article;

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 1;

FIGURE 4 is a side elevational view of the tape attaching apparatus shown in FIGURE 1;

FIGURES 5 through 9 are schematic plan views, showing successive positions assumed by the tape applying apparatus and an article during a tape attaching operation

Referring now to FIGURES 1 and 4, forked taping arm 10, having prongs 11 and 12, is pivotally attached by bolt 13 to axle 14. Axle 14 is journaled through

housing 16 so that axle 14 is movable along its length within housing 16, but axle 14 is prevented from rotational movement within housing 16. Housing 16 is adjustably attached to support 17 by bolts 18 and 19. Support 17 is adjustably attached to the frame of the machine, which frame is not shown in the drawings. Pin 15 is journaled through shaft 14, and springs 20 and 21 are attached at one of their ends to each of the opposite ends of pin 15. The other ends of each of springs 20 and 21 are attached to bolts 22 and 23. Bolts 22 and 23 are affixed to housing 16, and springs 20 and 21 serve to urge axle 14 toward article A.

Axle 14 can be drawn away from article A by movement of handle 24. Handle 24 is pivotally attached to support 17 by bolt 25 and one end of handle 24 is pivotally attached by bolt 26 to connecting rod 27. Connecting rod 27 is attached to axle 14 by bolt 28. Bracket 29 is affixed to support 17, and said bracket contains notches for engagement with handle 24, to retain axle 14 in a withdrawn position when the movement of handle 24 acts to pull axle 14 in the direction away from article A.

Tape applying roller 30 is rotatably attached to the end of prong 12 of forked taping arm 10, and tape buffing roller 31 is rotatably attached to the end of prong 11 of arm 10. Platform 32 is affixed to the back side of prong 12. Platform 32 serves to support supply roll 33 of tape T and the means for pinching and severing tape T.

Supply roll 33 of tape T is mounted on hub 34, and hub 34 is rotatable about pin 35. Pin 35 is attached to platform 32. Pinch roller 36 is rotatably attached to platform 32 and the surface of this roller is preferably knurled, or covered with an adhesion resistant covering, since the adhesive coated side of tape T contacts roller 36. Reference character 37 designates a pinch stop. Pinch stop 37 is not rotatable, but is pivotally attached to platform 32 by bolt 38, which bolt is offset from the center of pinch stop 37. This attachment of pinch stop 37 causes the periphery thereof to move eccentrically in relationship to the periphery of pinch roller 36. Torsion spring 39 is attached at one end to platform 32, and at its other end to pinch stop 37. Spring 39 acts to urge pinch stop 37 in the counter-clockwise direction, when viewed as shown in FIGURE 1. This movement of pinch stop 37 on bolt 38 causes the periphery of pinch stop 37 to contact the periphery of pinch roller 36. Tape T is threaded from supply roll 33 between pinch stop 37 and pinch roller 36, with the non-adhesive back of tape T facing pinch stop 37, and tape T is thus retained in position and is permitted to move toward applying roller 30, but tape T is prevented from movement toward supply roll 33.

Pinch roller 36 and pinch stop 37 are so positioned on platform 32 that tape T extends from between them toward the periphery of applying roller 30, with the non-adhesive back side of tape T positioned adjacent to, and slightly beyond, the area on the periphery of applying roller 30 which will first bear against the surface of an article to which tape is to be applied. The tacky adhesive side of tape T is thus in position for attachment to the surface of the article A.

Knife 40 is affixed to one end of shaft 41. The other end of shaft 41 is pivotally attached to bolt 42, and bolt 42 is affixed to platform 32. Rod 43 of solenoid 44 is pivotally attached at its end to shaft 41, intermediate the ends of shaft 41, by pin 45. Solenoid 44 is affixed to platform 32 by bolts 46 and 47. As is shown in FIGURE 3, post 48 is affixed to solenoid 44. One end of spring 49 is attached to post 48, and the other end of spring 49 is attached to pin 45. As is shown in FIGURE 2, bolt 42 is longer than applying roller 30, and shaft 41 is attached to the extreme end of bolt 42. When solenoid 44 is energized, expelling rod 43 from solenoid 44, shaft

41 is caused to rotate about bolt 42, and shaft 41 is moved across applying roller 30, moving knife 40 against tape T, severing the tape. When solenoid 44 is de-energized, spring 49 acts to return shaft 41 and knife 40 to the rest position, which position is that shown in FIGURE 1.

One end of spring 50 is attached to post 48 and the other end of spring 50 is attached to axle 14.. Spring 50 acts to urge platform 32 toward axle 14, and serves to bias taping arm 10 in its rotation on bolt 13.

Article support 60 is affixed to one end of shaft 61, and shaft 61 is rotated by a power means not shown in the drawings. Brackets 62 are attached to article support 60 by bolts 63, and brackets 62 are adjustable along the top of article support 60 in tracks 64. Brackets 62 are moved against the exterior surfaces of an article A, to which tape is to be attached, and by tightening bolts 63 the article A is held in place on article support 60 as said article support is rotated by the rotation of shaft 61. Shaft 61 may be raised or lowered so that the position of article support 60 may be adjusted to accommodate articles of various size. The position of applying roller 30 is also adjustable, by varying the position of support 17 on the frame of the machine (not shown) so that the portion of the article A to which tape T is to be applied can be aligned with applying roller 30. As shown in FIGURE 4, the relative positions of article support 60 and applying roller 30 have been adjusted and aligned to attach tape T simultaneously to both the lid-flange and the side of a square can A.

The operation of the machine shown in FIGURES 1 and 4 is shown schematically in FIGURES 5 through 9. FIGURE 5 shows axle 14 and taping arm 10 withdrawn from an article A, to which tape T is to be attached, with tape T threaded as described above. Axle 14 is held in this position by engagement of handle 24 in a notch of bracket 29, and to begin the tape applying and attaching operation, handle 24 is moved out of the notch, permitting springs 20 and 21 to impel axle 14 through housing 16, moving taping arm 10 toward and against article A. The action of spring 50 causes buffing roller 31 to contact the surface of article A prior to the contact of applying roller 30 with that surface, and buffing roller 31 is rolled along the surface of article A as the continued movement of axle 14 forces taping arm 10 to pivot on bolt 13 until applying roller 30 presses against the back of tape T, and the adhesive side of tape T is applied to the surface of article A, as is shown in FIGURE 6.

Tape T is attached to the surface of article A by rotating article support 60, and thus rotating article A, in the direction shown by arrow 65. The pressure of applying roller 30 against the back of tape T causes the adhesive surface of tape T to adhere to article A, and the rotational movement of article A results in the stripping of tape T from supply roll 33, between pinch roller 36 and pinch stop 37, to the periphery of applying roller 30, and then to the surface of article A. As the surface of article A is moved relative to applying roller 30, tape T is attached to the surface of article A which passes adjacent to applying roller 30. Buffing roller 31 follows behind applying roller 30, and acts to buff tape T against article A, as is shown in FIGURE 7.

During the attaching movement, taping arm 10 is free to pivot on bolt 13, against the force of spring 50, and axle 14 is permitted to reciprocate in housing 16, with and against the force of springs 20 and 21. The reciprocal movement of axle is caused by springs 20 and 21 and the movement of taping arm 10 as said taping arm is moved along the surface of article A and is pushed away from an axis through the central portion of article A by the surface of article A. The axis through the central portion of article A is an imaginary line which is always parallel to the surface of article A to which tape is being attached, which line is also always at right angles to the length of the tape being attached to article A. The

reciprocal movement of axle 14 permits taping arm 10 to reciprocate with respect to the axis through article A, and the reciprocal and pivotal movement of taping arm 10 permits applying roller 30 and buffing roller 31 to remain in contact with the surface of article A during the relative movement between taping arm 10 and the surface of article A. This reciprocal and pivotal movement of taping arm 10 is particularly evident as tape T is attached to, or around, a corner C of article A, as is shown in FIGURE 7.

The positioning of buffing roller 31 and applying roller 30 at the opposite ends of forked taping arm 10 (the forks of which are fixed in relation to each other), and the reciprocal and pivotal movement of that arm, has particular advantage in that these factors permit a transmission of pressure from applying roller 30 to buffing roller 31 as applying roller 30 passes around a corner of article A. This pressure serves to inhibit the tendency of the rollers to move away from, or "jump" away from the surface of article A at a corner C. That is, the pressure between buffing roller 31 and the surface of article A is transmitted through taping arm 10 to applying roller 30. Thus, as applying roller 30 is moved around corner C of article A, this transmitted force causes taping arm 10 to pivot on bolt 13, with the result that applying roller 30 is held tightly against the successive surface of article A by the pressure between buffing roller 31 and the preceding surface of article A. The same effect occurs when buffing roller 31 moves around a corner of article A.

The attached tape may be severed from the supply at any time, but, if it is desirable to completely encircle article A with tape T, article support 60 is rotated until applying roller 30 is returned to the approximate place at which tape T was first applied. Handle 24 is then moved to withdraw axle 14 into housing 16, against the force of springs 20 and 21, until spring 50 moves applying roller 30 away from the surface of article A, as is shown in FIGURE 8. During this movement, handle 24 is not moved to the extent of its stroke, but into an intermediate notch on bracket 29, so spring 50 will cause taping arm 10 to pivot on bolt 13 allowing buffing roller 31 to roll along, but still bear against, the surface of object A. As is shown in FIGURE 8, with applying roller 30 positioned so that there will be enough tape to provide an overlap over the point at which tape was first applied to article A, solenoid 44 is energized and knife 40 is moved against tape T, severing the tape. Solenoid 44 is then de-energized, and spring 49 returns knife 40 to its rest position. Axle 14 is held by handle 24 in the partially withdrawn position while article support 60 rotates article A, and buffing roller 31 serves to buff the end of tape which was cut from the roll against article A, as is shown in FIGURE 9. Handle 24 is then moved to the extent of its stroke, to withdraw axle 14 until buffing roller 31 is retracted from contact with article A. The machine is then in the position which is shown in FIGURE 5, and is ready to attach tape to another article.

As is evident from the above description of an embodiment of my invention, variations in the operation and various modifications of my machine can be envisioned. For example, the reciprocal movement described may be achieved by mounting article A on a spring held support which may move toward and away from arm 10, rather than by providing spring urged axle 14, as shown. Also, the tape applying device can be rotated or moved, instead of moving the article to which tape is attached. Such variations, embodying some or all of the novel features herein disclosed are comprehended, and I do not intend to be limited only to the specific embodiment herein described, but, rather, I intend to be limited only by my disclosure taken as a whole, including the appended claims.

I claim:

1. In a taping machine, a unitary two-pronged forked taping arm, said arm being provided with guiding and

adhering means at each of its ends for conducting adhesive tape into adhesive engagement with the surface of an article to be taped, said arm being pivotally affixed to said machine at a point intermediate the ends of said arm, means being provided to permit reciprocal movement between said arm and an axis through the central portion of said article, and means for causing relative movement between said arm and the surface of said article, along the surface of that article; reciprocal movement between said arm and said axis of said article occuring during relative movement between said arm and the surface of said article, said axis through said article being parallel to the surface of said article to which tape is to be applied and at right angles to the length of the tape to be applied to the surface of said article.

2. In a machine for attaching adhesive tape to an article, a unitary two-pronged forked taping arm, a roller rotatably affixed to each end of said arm, said rollers being adapted to conduct tape into adhesive engagement with the surface of an article to which tape is to be attached, said arm being pivotally affixed intermediate its ends to a reciprocable member supported on said machine, means for impelling said reciprocatable member and said arm toward an article and means for causing relative movement between said arm and said article, along the surface of said article.

3. In a machine for attaching adhesive tape to an article, a unitary two-pronged forked taping arm having a rotatable roller affixed to each of its ends for engagement against the non-adhesive surface of tape being attached to said article, to apply and buff said tape to the surface of said article, said arm being pivotally affixed intermediate said rollers to a reciprocable member supported on said machine, means for impelling said reciprocable member and said arm toward said article, and means for causing rotational movement of said article as said rollers bear against the surface thereof.

4. A machine for attaching adhesive tape to an article, said machine comprising a supporting structure, applying means, means for permitting reciprocal movement between said applying means and an axis through the central portion of an article to which tape is to be attached, and means for providing relative movement between said applying means and the surface of said article, along the surface of said article; said applying means including a unitary two-pronged forked taping arm, said arm being provided with guiding and adhering means at each of its ends for conducting adhesive tape into adhesive engagement with the surface of said article, said taping arm being pivotally affixed intermediate its ends to said supporting structure; reciprocal movement between said arm and said axis of said article occurring during relative movement between said arm and the surface of said article, said axis of said article being parallel to the surface of said article to which tape is to be attached and at right angles to the length of the tape to be attached to said article.

5. A machine for attaching adhesive tape to an article, said machine comprising a supporting structure, applying means, means supported on said supporting structure for permitting reciprocal movement of said applying means and means for providing relative movement between said applying means and the surface of an article to which tape is to be attached, along the surface of said article; said applying means including a unitary two-pronged forked taping arm having at least one roller rotatably affixed to each end of said arm, said rollers being adapted to conduct tape into adhesive engagement with the surface of an article to which tape is to be attached, said arm being pivotally affixed intermediate its ends to said reciprocal means for reciprocal movement of said arm during relative movement between said arm and the surface of said article.

6. A machine for attaching adhesive tape to an article, said machine comprising a supporting structure, applying means, reciprocal means for permitting reciprocal movement of said applying means, and means for providing rotational movement of an article to which tape is to be attached as said applying means contacts the surface of said article; said applying means including a unitary two-pronged forked taping arm having a rotatable roller affixed to each of its ends for engagement against the non-adhesive surface of tape being attached to said article, to apply and buff said tape to the surface of said article; said arm being pivotally affixed intermediate said rollers to said reciprocal means for reciprocal movement of said arm during rotational movement of said article.

7. A machine for attaching adhesive tape to an article, said machine comprising a supporting structure, applying means, means for permitting reciprocal movement of said applying means, means for providing rotational movement of an article to which tape is to be attached as said applying means contacts the surface of said article, means for retaining a supply of tape to be attached to said article, said retaining means including means for preventing the movement of said tape toward said supply, means for severing said tape after it has been attached to said article, and means for withdrawing said applying means from contact with said article; said applying means including a unitary two-pronged forked taping arm having a rotatable roller affixed to each of its ends for engagement against the non-adhesive surface of tape to apply and buff said tape to the surface of said article, said taping arm being pivotally affixed intermediate said rollers to said means for permitting reciprocal movement of said arm, reciprocal movement of said arm being induced by rotational movement of said article as said rollers bear against tape on the surface thereof.

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