

Aug. 28, 1956

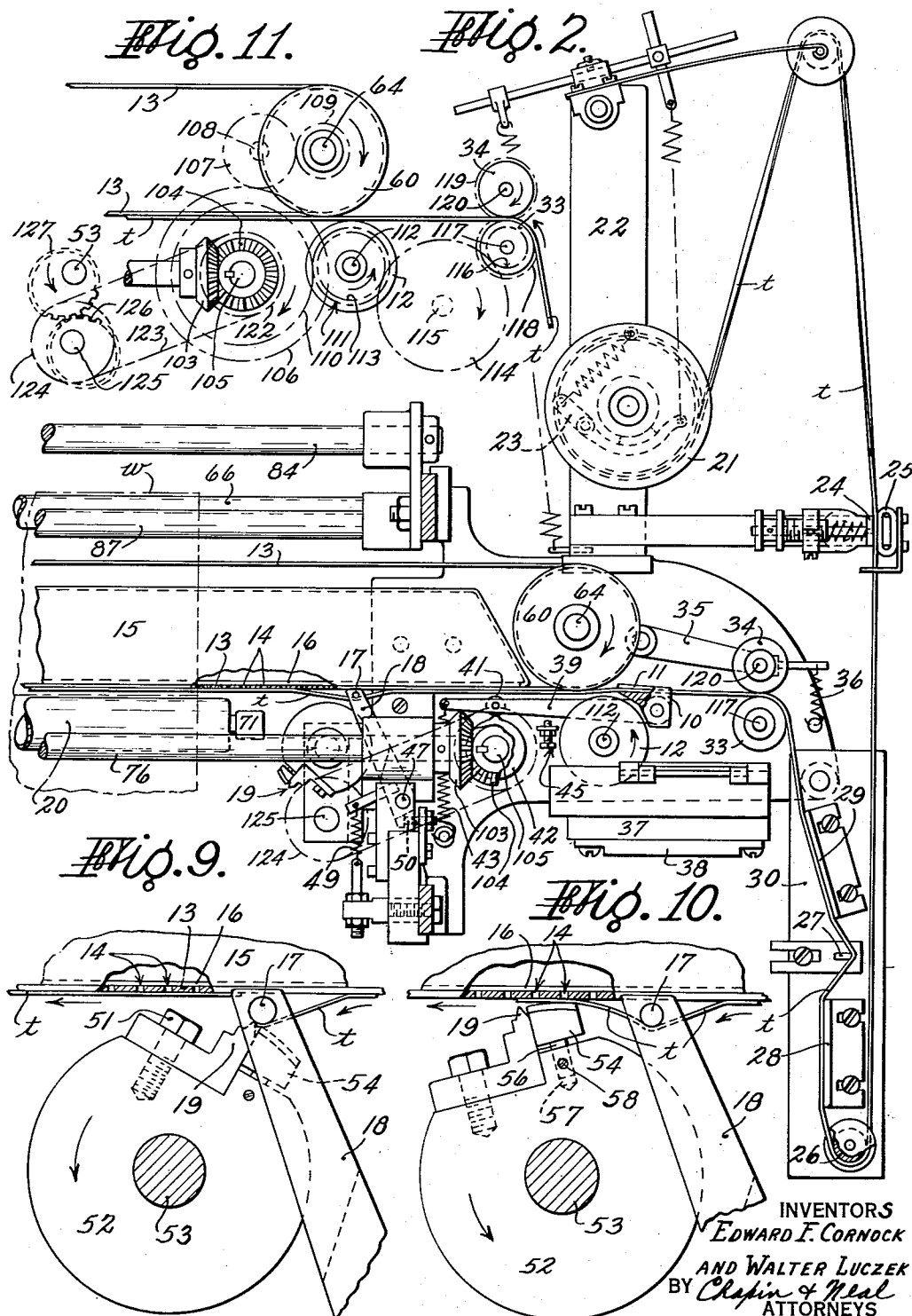
E. F. CORNOCK ET AL

2,760,414

DEVICE FOR APPLYING STRIPS TO WRAPPERS

Filed Jan. 16, 1953

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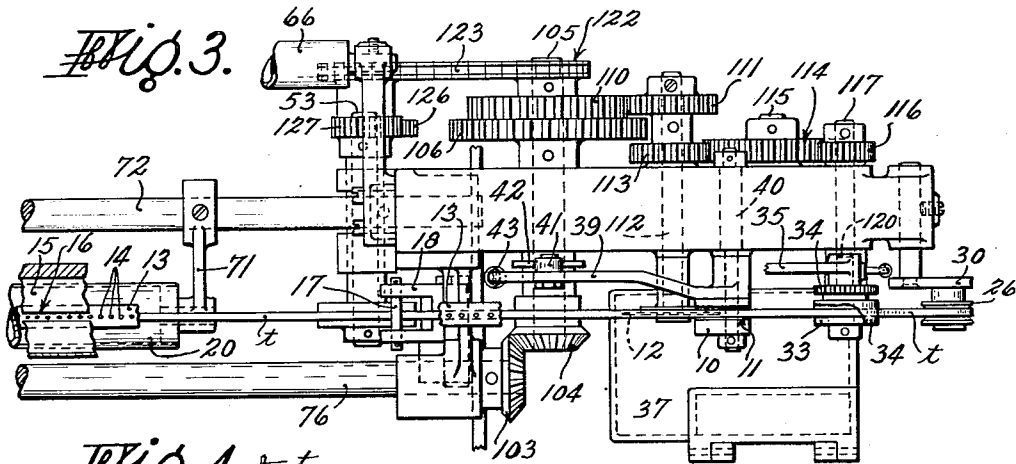
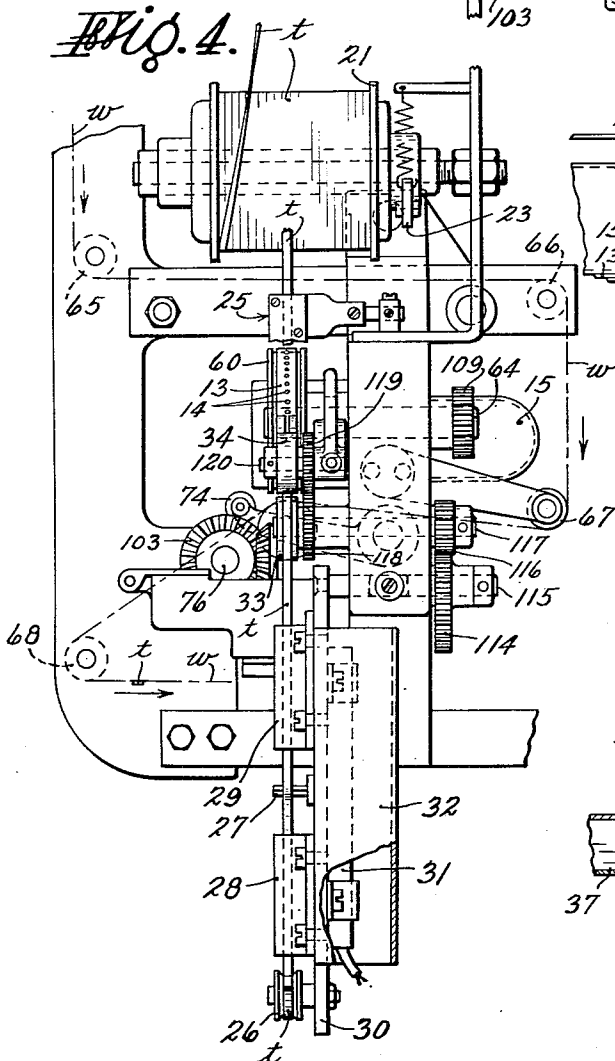
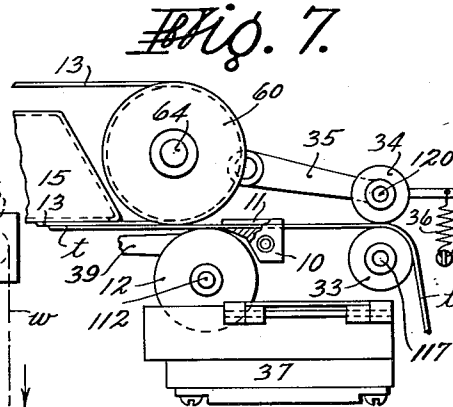
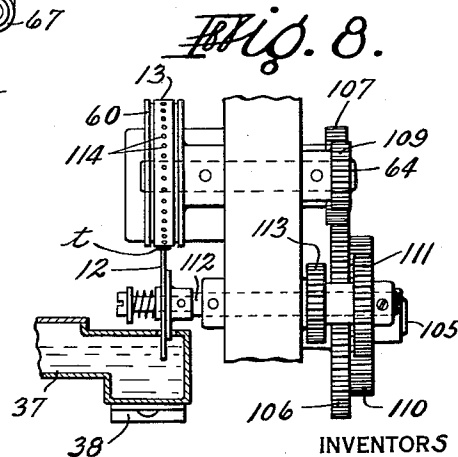
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DEVICE FOR APPLYING STRIPS TO WRAPPERS

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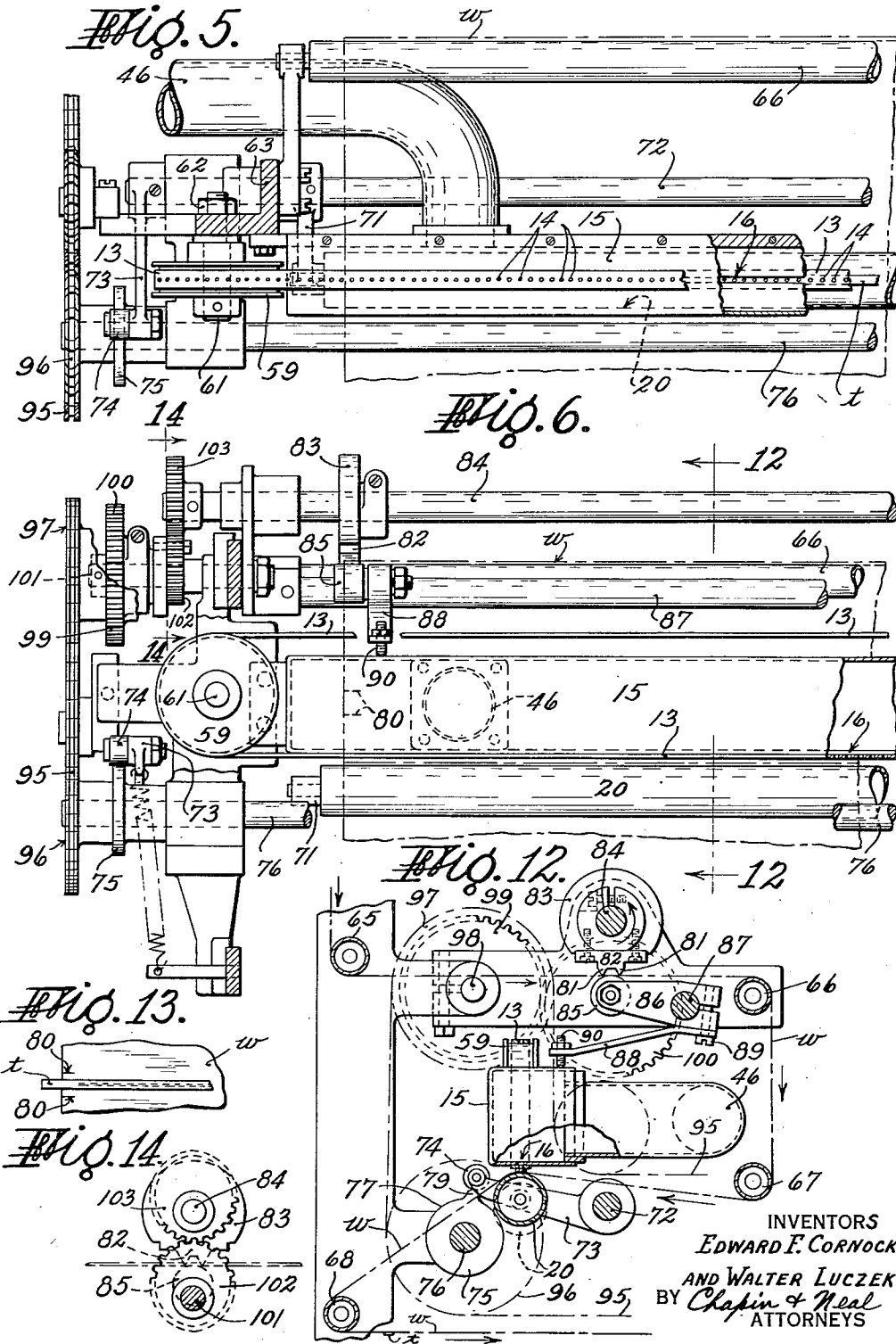
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DEVICE FOR APPLYING STRIPS TO WRAPPERS

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2,760,414

DEVICE FOR APPLYING STRIPS TO WRAPPERS

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11 Claims. (Cl. 93—1)

This invention relates to a device for applying strips or tapes transversely of sheets of wrapping material in cut sheet or web form, for application to an article in a suitable wrapping machine.

One object of the invention is the provision of a device for accurately applying a length of tape of desired width in desired position transversely of a wrapper.

A further object is a provision of a device of the above character capable of operating at a speed commensurate with that of present high speed wrapping machines, so that the strip may be applied to the wrapper as the latter, either in cut or web form, is fed to the wrapping machines without substantial alteration in the wrapper feeding, cutting or folding instrumentalities which such machines may include.

Other and further objects will be made apparent in the following specification and claims and in the drawings.

In the accompanying drawings,

Fig. 1 is a front elevational view of a tape applying device embodying the invention;

Fig. 2 is a view similar to the right hand portion of Fig. 1, parts being broken away and showing the tape feed;

Fig. 3 is a plan view of the right hand portion of the device of Fig. 1;

Fig. 4 is an elevational view looking from the right of Fig. 1;

Fig. 5 is a plan view, parts being broken away, of the left hand portion of the device of Fig. 1;

Fig. 6 is a front elevational view of the structure of Fig. 5;

Fig. 7 is a detail view of the means for applying adhesive to the tape;

Fig. 8 is an end elevational view of the structure of Fig. 7;

Figs. 9 and 10 are detail views on a larger scale showing successive steps in severing the tape;

Fig. 11 is a diagrammatic view showing the drive of certain of the parts;

Fig. 12 is a sectional view substantially on line 12—12 of Fig. 6;

Fig. 13 is a fragmentary view showing the relation of the tape and wrapper at the edge of the latter; and

Fig. 14 is a sectional view substantially on line 14—14 of Fig. 6.

Referring to Figs. 1 and 2 of the drawings the device, in brief, includes means later described, for supplying a narrow web of tearing strip or tape indicated at *t*. The tape *t* is fed through a guide block 10 having a tape receiving groove 11, and over an adhesive applying roll 12, which applies adhesive to the underside of the tape. Periodically in the travel of the tape the guide block 10 is raised, as shown in Fig. 2, to lift the tape from roll 12 so that at spaced portions the tape is free of adhesive. Forwardly of roll 12, the tape engages beneath a belt 13 of greater width than the tape and provided with perforations 14. The lower run of the belt 13 travels in engagement with the bottom of an elongated suction box 15 which is provided with a longitudinal slot 16 which is

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bridged by the belt. For reasons later made apparent the belt is driven at a speed in excess of the speed at which the tape is advanced by the tape supply means. The suction within the box thus normally holds the tape to the belt, to be drawn along thereby, and holds the belt against the bottom of the box as the belt moves forwardly.

A short distance beyond the rear end of box 15 the tape is threaded under a bar or spacing member 17, carried by a forked arm 18, to draw a portion of the tape away from the belt. As the portion of the tape which is free from adhesive passes under bar 17 the tape is severed by a rotating cutter 19 acting against bar 17. The severed end of the tape is snapped back against the belt by the suction and the severed length of tape is thereafter carried forward by the belt at belt speed to a position transversely of a web of wrapping material, diagrammatically indicated by broken lines at *w* in Figs. 1, 2, 5, 6 and 12. As the severed length of tape is carried by the belt to a position over a wrapper web *w* the latter is moved upwardly into contact with the adhesively coated tape by the upward movement of a roll 20 (see also Fig. 12) to adhere the tape to the web and remove it from the belt upon further travel of the web, all as will now be more fully described below.

Referring to Fig. 2 the tearing tape *t* is supplied from a roll or drum 21 supported on a standard 22 and provided with any suitable form of braking and tensioning device 23. The tape is usually formed of cellophane or similar material which in the narrow width suitable for tearing strip purposes has an inherent tendency to twist and curl. It is therefore desirable to remove as far as possible any tendency of the tape to twist and curl, and for this purpose the tape is first drawn between adjustable tension members 24 and 25, around a guide roll 26 and over an adjustable anti-curling edge 27. At either side of anti-curling edge 27 the tape passes over ironing shoes 28 and 29 which are supported by a plate 30 to the rear of which is fixed, as shown in Fig. 4, an electric heating unit 31 by which plate 30, members 28 and 29 and edge 27 are heated to increase their straightening action on the tape. Heater 31 is enclosed in a housing 32. From shoe 29 the tape passes between driven feed rolls 33 and 34, the latter being carried by a pivoted arm 35 and drawn toward roll 33 by a spring 36. From rolls 33—34 the tape passes to guide block 10 and over adhesive roll 12 previously mentioned. Roll 12 receives adhesive from a reservoir 37 (Figs. 2 and 8), the adhesive being maintained at a suitable temperature by an electric heating unit 38 secured to the bottom of the reservoir.

The guide block 10 is fixed to an arm 39 pivoted at 40. Arm 39 is provided intermediate its ends with a cam roll 41 held against an operating cam 42 by a spring 43. Cam 42 is secured to a shaft 105 which is constantly driven by means later described. Cam 42 periodically raises the tape from its position, shown in Fig. 1, in contact with adhesive roll 12 to the position shown in Fig. 2 where it is maintained out of contact with roll 12 whereby spaced portions of the tape are left free of adhesive. Preferably an adjustable stop, indicated at 45, is provided to limit the extent of downward movement of arm 39 to assure proper contact of the tape with roll 12.

From guide block 10 and roll 12 the tape passes into contact with perforated belt 13 beneath slotted suction box 15 by which the tape is, by suction acting through the perforations 14 of the belt and slot 16 in the suction box, held to the belt and carried forward therewith, as previously described. Suction is applied to box 15 through a pipe 46 connected to a suitable source of suction, not shown.

As best shown in Figs. 2, 9 and 10, at a point adjacent the rear end of box 15 the tape is passed beneath bar 17 carried by the forked arm 18 which is pivoted at 47.

Arm 18 is provided with a lug 48 which is held by an adjustable spring 49 against an adjustable stop 50, by means of which the normal position of bar 17 may be adjusted relative to knife 19. Knife 19 is secured as by machine bolts 51 to roll 52 fixed to a shaft 53, driven as later described, in the direction of the arrows in Figs. 9 and 10. As the tape, traveling beneath bar 17, is engaged by knife 19 it is severed against the bar 17 which exerts a predetermined yielding cutting pressure through adjustable spring 49, as shown in Fig. 9.

As previously mentioned the belt 13 is driven at a speed in excess of that at which the tape is being supplied to the belt by the tape feed rolls 33—34. Therefore up to the point of severance there is slippage between the tape and belt since the speed of advance of the tape is controlled by rolls 33—34. As shown in Fig. 9 the trailing end of the severed length of tape is immediately drawn by the suction upwardly against the belt and is carried forward at full belt speed separating the severed length from the body of the tape as shown in Fig. 10.

Immediately behind the knife 19 roll 52 carries a block 54 which may, if found desirable, be provided with a covering 55 of rubber, leather or other suitable material, which engages the end of the tape behind the knife and advances the leading end of the tape forwardly and into contact with belt 13, as shown in Fig. 10, to advance with the latter, subject to slippage caused by the feed rolls 33—34 as above described.

The timing of cam 42 and of knife 19 is made such that the cutting of the tape and the engagement of the tape by the surface of member 54 occurs at a portion of the tape which is free of adhesive. Block 54 is adjustably secured to roll 52 by a stem 56 extending from block 54 and slidably engaging in a bore 57 formed in roll 52. A set screw 58 secures stem 56 in adjusted position in the bore.

The belt 13 is carried by pulleys 59 and 60 positioned at the ends of suction box 15. Pulley 59 is rotatably mounted on a stub shaft 61 which is bolted at 62 (Fig. 5) to a frame member 63. Pulley 60 is fixed to a shaft 64 which is driven as later described to drive the belt in the direction of the arrows in Figs. 2, 9 and 10.

The severed length of adhesively coated tearing tape is carried rapidly forward by belt 13 to a position above and transversely of the continuously moving wrapper web *w*.

As best shown in Figs. 5, 6 and 12 the wrapper web *w* is guided in a predetermined path through the device by guide rolls 65, 66, 67 and 68. Between guide rolls 67 and 68 the wrapper web passes over the applying roll 20 which is positioned below and parallel with the belt 13. Roll 20 is carried by arms 71 fixed to a rock shaft 72 (Figs. 3 and 5). Rock shaft 72 carries an arm 73 provided with a cam roll 74 engaging a cam 75 fixed to main drive shaft 76. While the severed length of tearing tape is being brought forward by belt 13 at belt speed, cam roll 74 is held against the low surface 77 of cam 75 by a spring 78 (Fig. 6) maintaining roll 20 in dotted line position (Fig. 12) spaced below belt 13. As the length of tearing tape is brought by belt 13 into desired position above the web *w* cam roll 74 engages a high surface 79 of cam 75 raising roll 20 to bring the web *w* into adhering contact with the adhesively coated tearing tape on belt 13, as shown in full lines in Fig. 12. Roll 20 is immediately lowered so as to lower web *w* from the belt, the web carrying the adhering severed length of tape *t* with it, completing the application.

Preferably one margin of web *w* is provided with spaced cuts 80 (Fig. 13) positioned to lie at opposite sides of the free end of the tearing tape when the latter is in position on the wrapper web. As best shown in Figs. 12 and 6 the cuts 80 are formed in the margin of web *w* by spaced parallel cutting edges 81 formed on a cutting member 82 secured to a roll 83 adjustably fixed on a shaft 84. The web *w* is cut by cutting member 82 against a spring backed roll 85 carried by an arm 86 pivoted on

a rod 87. One end of a leaf spring 88 is fixed at 89 to arm 86, the other end of the spring being provided with an adjustable stop 90 which engages the top of the suction box 15. Stop member 90 is set so that the roll 85 is slightly depressed against the action of spring 88 as the overlying web *w* is engaged by the cutting edges 81.

The main drive shaft 76, which carries cam 75, is driven by a sprocket chain 95 (Fig. 12) from the wrapping machine or from an electric motor or other suitable source of power not shown. Chain 95 is trained over a sprocket 96 fixed to shaft 76, over a sprocket 97 rotatably mounted on a stud shaft 98; over an idler sprocket and thence back to the motor or other power source. Stud shaft 98 carries a gear 99 which meshes with a gear 100 secured to a countershaft 101 (Figs. 6 and 14). Shaft 101 carries an elliptical gear 102 which meshes with an elliptical gear 103 secured to shaft 84 which carries cutting roll 83.

Referring to Figs. 2, 3, 8 and 11, the end of main drive shaft 76 opposite sprocket 96 carries a bevel gear 103 which meshes with a bevel gear 104 fixed to the end of countershaft 105. Countershaft 105 (Figs. 3, 8 and 11) carries a gear 106 which meshes with a gear 107 on a stud shaft 108. Gear 107 meshes with a gear 109 on shaft 64 of belt pulley 60 to drive belt 13.

Shaft 105 also carries a gear 110 meshing with a gear 111 secured on shaft 112 which carries adhesive applying roll 12 (Figs. 3 and 11). Shaft 112 also carries a gear 113 which meshes with an idler gear 114 on a stud shaft 115. Gear 114 meshes with a gear 116 on shaft 117 of lower feed roll 33 to drive the latter. Shaft 117 carries a gear 118 meshing with gear 119 on the shaft 120 of upper feed roll 34 to drive the latter.

Shaft 105 carries a sprocket 122 which is connected by a sprocket chain 123 to a sprocket 124, see Fig. 11, on a countershaft 125. Shaft 125 carries an elliptical gear 126 which meshes with an elliptical gear 127 on shaft 53 of knife roll 52 to drive the latter.

Gears 110 and 111 are change gears to provide for feeding different lengths of tape before severing, to accommodate different widths of wrapper web. The tape cut off can be adjusted by adjusting elliptical gears 126 and 127 with respect to their shafts.

The invention has been above described as applying a narrow tape to a web of wrapping material for the purpose of providing the wrapper with a so-called "tearing strip" to facilitate subsequent removal of the wrapper from the wrapped package. It will be understood, however, that the invention is not limited to applying strips or tapes to wrappers for that purpose and that the invention is equally applicable to the application of tapes, strips or bands, of any desired width, to sheets or webs for decorative, labeling advertising or other purposes.

For example, it is frequently desirable to have a transparent wrapper, such as cellophane or the like, carry printed matter. As compared with printing directly on the relatively large wrapper, substantial economies may be obtained by printing relatively narrow strips, or webs from which strips of desired length are subsequently cut, since the cost of printing is usually based on the weight of the material printed. Such procedure secures further economies in operation since the printed matter appearing on a given wrapper may be changed by changing the tape supply without changing the wrapper supply of the wrapping machine.

It will be understood that the term "wrapper sheet" includes wrapper sheets in either web or individually cut form.

What is claimed is:

1. A device for applying a length of tape to a wrapper sheet which comprises, a belt, means to drive the belt, means to supply a length of tape, adhesively coated on one side, to said belt lengthwise thereof with the uncoated side of the tape in contact with the belt, means to apply suction through the belt to hold said tape length to the belt, means to advance the wrapper sheet transversely of and into proximity with the belt carried tape

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and means to bring the wrapper sheet and the adhesively coated side of the tape into contact to transfer the tape from the belt to the wrapper sheet.

2. A device for applying a length of tape to a wrapper sheet which comprises, a belt, means to drive the belt, means to advance a length of tape material into lengthwise contact with the belt, suction means for holding the tape in contact with the belt for travel therewith, means to apply adhesive to the side of the tape opposite the belt, means to advance the wrapper sheet transversely of and into proximity with the belt carried tape and means to bring the adhesively coated length of tape on the belt and said wrapper sheet into contact to transfer the tape from the belt to the wrapper sheet.

3. A device for applying a length of tape to a wrapper sheet which comprises, a belt, means to drive the belt, means to advance a web of tape material into lengthwise contact with the belt, suction means for holding the tape in contact with the belt for travel therewith, means to apply spaced lengths of adhesive to the side of the tape opposite the belt, means to sever the tape web between said lengths of adhesive, means to advance the wrapper sheet transversely of and into proximity with the belt carried tape and means to bring the severed and adhesively coated length of tape on the belt and said wrapper sheet into contact to transfer the tape from the belt to the wrapper sheet.

4. A device for applying a length of tape to a wrapper sheet which comprises, a belt, a heated smoothing means, an adhesive applying means, means to advance a web of tape material over said smoothing means and said adhesive applying means and deliver it to said belt lengthwise thereof, suction means acting through said belt to hold the adhesive free face of the tape web against the belt, means to drive said belt, means to sever lengths of tape from said tape web while the latter is held to the belt by said suction means, means to guide and advance the wrapper sheet transversely of and into proximity with the adhesive coated face of the belt-held severed length of tape and means to move the advancing wrapper sheet into contact with the adhesive coated face of said length of tape to transfer the length of tape to the wrapper sheet.

5. A device for applying a length of tape transversely of a wrapper sheet which comprises a belt, means to advance a web of tape material into contact with the belt, suction means acting through the belt to hold the tape in contact therewith, means to apply spaced lengths of adhesive to the side of the tape opposite the belt, means to drive the belt at a speed higher than the speed of said tape advancing means, means to sever the tape between the lengths of adhesive while the length to be severed is held to the belt by said suction means for movement therewith at belt speed upon said severance, means to advance the wrapper sheet transversely of said belt and in proximity thereto and means to bring the severed and adhesively coated length of tape on the belt and said wrapper sheet into contact to transfer the tape from the belt to the wrapper sheet.

6. A device for applying a length of tape transversely of a wrapper sheet which comprises a belt, means to advance a web of tape material into contact with the belt, suction means acting through the belt to hold the tape in contact therewith, an adhesive applying roll positioned between said advancing means and said belt and contacting the face of the tape web opposite that engaged by the belt, means to intermittently raise the tape web out of contact with said adhesive applying roll whereby the adhesive is applied in spaced lengths to said face of the tape web, means to drive the belt at a speed higher than the speed of said tape advancing means, means to sever the tape between the lengths of adhesive while the length to be severed is held to the belt by said suction means for movement therewith at belt speed upon said severance, means to advance the wrapper sheet transversely of said

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belt and in proximity thereto and means to bring the severed and adhesively coated length of tape on the belt and said wrapper sheet into contact to transfer the tape from the belt to the wrapper sheet.

7. A device for applying a length of tape transversely of a wrapper sheet which comprises a belt, means to advance a web of tape material into contact with the belt, suction means acting through the belt to hold the tape in contact therewith, means to apply spaced lengths of adhesive to the side of the tape opposite the belt, means to drive the belt at a speed higher than the speed of said tape advancing means, means to maintain an intermediate portion of the belt engaged tape web spaced from the belt, cutting means for severing the tape web between the lengths of adhesive while the portions of the tape web which are free of adhesive is held spaced from the belt by said spacing means and while the length to be severed is held to the belt by said suction means for movement therewith at belt speed upon said severance, means to advance a wrapper sheet transversely of said belt and in proximity thereto and means to bring the severed and adhesively coated length of tape on the belt and said wrapper sheet into contact to transfer the tape from the belt to the wrapper sheet.

8. A device for applying a length of tape transversely of a web of wrapping material which comprises a belt, means to advance a web of tape material into contact with the belt, suction means acting through the belt to hold the tape in contact therewith, an adhesive applying roll positioned between said advancing means and said belt and contacting the face of the tape web opposite that engaged by the belt, means to intermittently raise the tape web out of contact with said adhesive applying roll whereby the adhesive is applied in spaced lengths to said face of the tape web, means to drive the belt at a speed higher than the speed of said tape advancing means, spacing means to maintain an intermediate portion of the belt engaged tape web spaced from the belt, cutting means for severing the tape web between the lengths of adhesive while the portions of the tape web which are free of adhesive is held spaced from the belt by said spacing means and while the length to be severed is held to the belt by said suction means for movement therewith at belt speed upon said severance, means to advance a web of wrapping material transversely of said belt and in proximity thereto and means to bring the severed and adhesively coated length of tape on the belt and said web of wrapping material into contact to transfer the tape from the belt to the web.

9. A device for applying a length of tape transversely of a web of wrapping material which comprises, means to guide a web of wrapping paper in a predetermined path, a roll extending transversely of and positioned at one side of the path of travel of the web, an elongated suction box extending parallel to said roll at the opposite side of said path of travel of the web, the face of the box opposite said roll being provided with an elongated slot extending lengthwise of the box and transversely of the path of travel of the web, a belt traveling lengthwise of and in contact with the slotted face of said box and closing said slot, said belt being formed with a series of perforations in line with said slot, means to drive the belt, means to feed a web of tape into contact with said belt lengthwise thereof to be held thereagainst by suction acting through said perforations and slot, means to apply spaced lengths of adhesive to the surface of the tape opposite that engaged by the belt, means to sever lengths of adhesively coated tape from the tape web at a point free from adhesive while the length to be severed is held by suction to the belt, and means to move said roll against the web of wrapping material transversely thereof to press the latter into engagement with the adhesively coated length of tape carried by the belt to transfer the length of tape to the wrapper web transversely thereof.

10. A device for applying a length of tape transversely

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of a wrapper sheet which comprises, an elongated suction box having a longitudinally extending slot, a belt traveling in contact with the slotted face of said box and closing said slot, said belt being formed with a series of perforations in line with said slot, means to drive the belt, means to advance a web of tape into contact with said belt to be held thereagainst by suction acting through said perforations and slot for travel with the belt, means, positioned in the path of advance of the tape toward the belt and engaging the side of the tape opposite that to be engaged by the belt, to apply adhesive thereto, means periodically raising the tape from contact with said adhesive applying means to provide spaced portions of the tape free of adhesive, a spacing member spaced from the belt and suction box over which the tape is directed to temporarily separate the tape from the belt, cutting means acting against the spacing member as a portion of the tape free of adhesive passes over said spacing member to sever the tape within said adhesive free portion, means engaging the severed end of the tape web and advancing it into contact with the belt in spaced relation to the severed length of tape, means to guide a wrapper sheet transversely of and beneath the severed length of tape carried by the belt, and means to move said wrapper sheet into contact with the adhesive coated side of the length of tape to transfer the latter from the belt to the wrapper sheet.

11. In a device for applying lengths of tape to wrapper sheets, a suction box having a slot, a belt traveling in

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contact with the slotted face of the box and closing the slot, said belt being formed with openings in line with the slot, means to constantly drive the belt, means to constantly advance a web of tape at less speed than the belt into contact with the belt lengthwise thereof to be held by suction acting through said openings against the belt and in slipping relation therewith, and means positioned to sever the web intermediate portions thereof so held by suction against the belt to free the severed leading end portion of the web for travel with the belt while the remainder of the web in contact with the belt continues to advance in alignment with the severed portion but at the speed imparted by the web feeding means.

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