Feb. 17, 1959 R. L. LARSON 2,873,967

TAB-FORMING TAPE DISPENSER

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FIG. 1

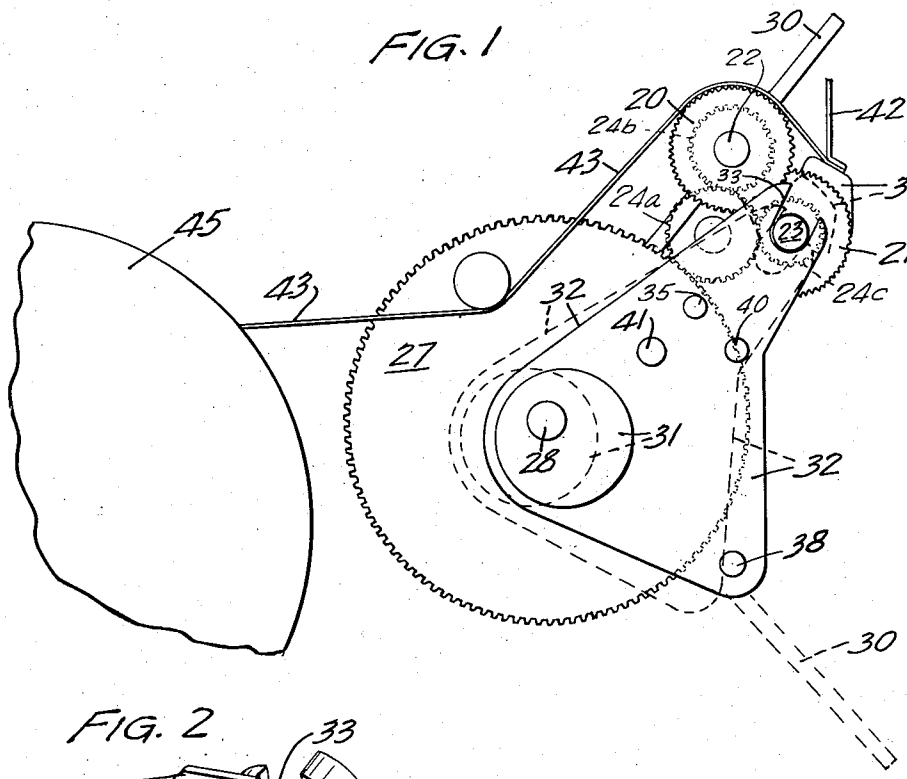


FIG. 2

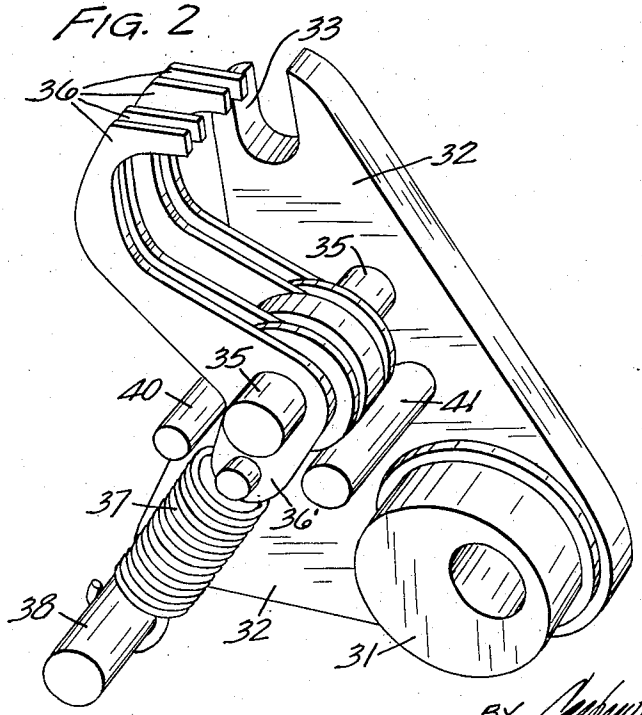
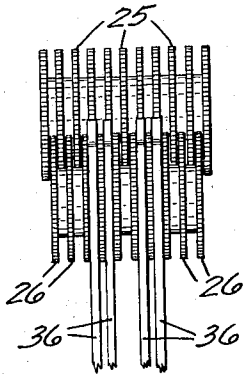


FIG. 3



INVENTOR
RICHARD L. LARSON
BY Carpenter Abbott Coulter & Kinney
ATTORNEYS

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FIG. 4

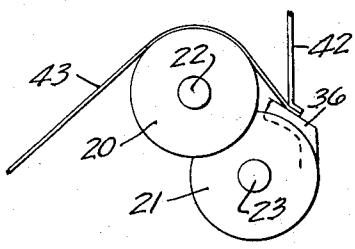


FIG. 5

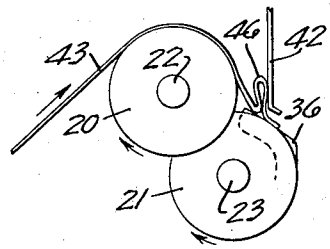


FIG. 6

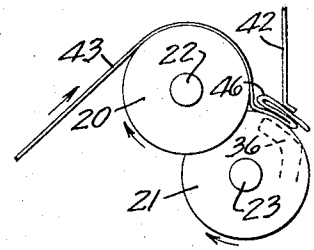


FIG. 7

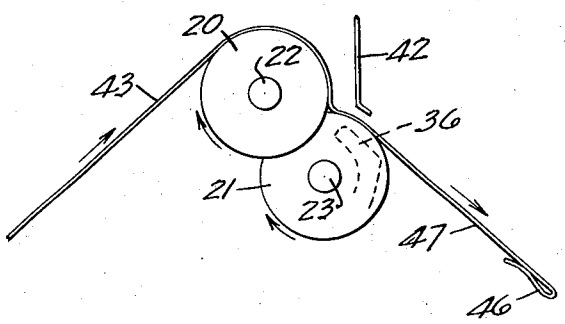


FIG. 8

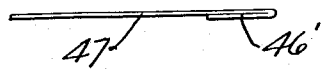


FIG. 10

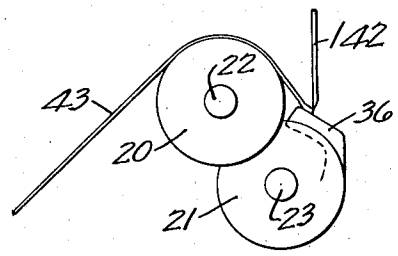
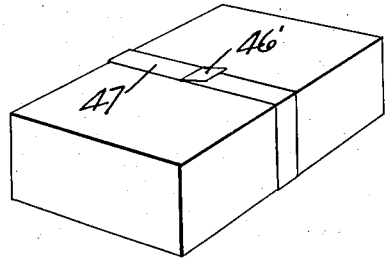


FIG. 9



INVENTOR
RICHARD L. LARSON
BY Cushman Darby & Cushman
ATTORNEYS

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2,873,967

TAB-FORMING TAPE DISPENSER

Richard L. Larson, White Bear Township, Ramsey County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn., a corporation of Delaware

Application May 3, 1956, Serial No. 582,565

5 Claims. (Cl. 270—68)

The present invention provides a means for dispensing a length of adhesive tape with a portion of the leading end folded back on itself with the adhesive surfaces together to form a grasping tab for use in removing the length from a surface to which it has been applied in use.

An important objective is to provide a tab-forming means suitable for existing types of dispensers.

One such type is characterized by a tape dispensing unit having two meshed rollers that are formed from a plurality of concentric fixed axially spaced discs of equal diameter, the discs of each roller extending into the spaces between the discs of the other. Such dispensers are described and claimed in Patents Nos. 1,972,850 and 1,972,851.

The present invention provides a tape-holding finger that briefly retards the movement of the leading end of tape that is being propelled forwardly in a dispensing operation until a loop is formed in the leading end by reason of the continued forward movement of the succeeding unretarded portion, whereupon the finger releases the tape to permit the forward movement of the entire length that is to be dispensed. A flattening of the loop produces a grasping tab in which the leading end of the tape is folded back on itself with the adhesive surfaces together.

An illustrative embodiment is described herein and shown in the accompanying drawings in which:

Figure 1 is a left side elevation of a tape dispensing mechanism;

Figure 2 is a perspective view of the right side of the tab-forming finger assembly as seen from a point slightly above and to the rear of the assembly;

Figure 3 is a front elevation of the dispensing rollers and the upper ends of the tab-forming fingers;

Figures 4, 5, 6 and 7 are diagrams of the dispensing rollers and the fingers in successive stages of a dispensing and tabbing operation;

Figure 8 shows a tabbed length of tape that has been dispensed;

Figure 9 shows a box to which the tabbed length has been applied; and

Figure 10 shows an alternative form of the knife.

A cylindrical draft roller **20** and a cylindrical projecting roller **21** are mounted by means of shafts **22** and **23** for rotation about their respective axes.

The roller **20** is made up of a plurality of fixed axially spaced toothed discs **25** of equal diameter, the points of the teeth forming the peripheral surface of the roller. The roller **21** is similarly constructed of spaced toothed discs **26**. The rollers are parallel and are positioned with the discs of each roller extending into the spaces between the discs of the other roller.

The rollers **20** and **21** are rotated clockwise simultaneously in a dispensing operation through gears **24***a*, **24***b* and **24***c* by a large driving gear **27** that is fixed to a rotatable shaft **28**. The gear **27** is rotated clockwise by a downward dispensing stroke of an operating lever **30** which is fixed to the shaft **28**. The upward return stroke of the lever, produced by a suitable spring means not shown, turns the shaft **28** back in the opposite direction, but, by reason of a ratchet means not shown, does not turn the gear **27**.

A cylindrical cam **31** is eccentrically fixed on the shaft **28**. A vertical finger plate **32** of a generally triangular configuration is supported at its rear corner by the cam, the cam being journaled in the plate. The plate is held at its upper corner by the roller shaft **23** which is positioned freely in a notch **33** in the plate. A horizontal finger shaft **35** is fixed to the plate below and to the rear of the notch.

Four tape-holding fingers **36** are journaled on the shaft **35**, and extend forwardly and thence upwardly between discs **26** of the projecting roller **21** to a point above the roller. The lower ends **36'** of the fingers **36** extend downwardly from the shaft **35** for a short distance. A spring **37**, under tension, connects the finger ends **36'** with a finger anchoring shaft **38** that is fixed to the finger plate **32**.

The fingers **36** are thus normally fixed in relation to the finger plate **32** but may be oscillated slightly against the tension of the spring, forwardly and rearwardly, if so impelled (as by pressure of the tape), the spring having a cushioning effect. The forward and rearward oscillation of the fingers against the tension of the spring is limited by finger stop pins **40** and **41** that are fixed to the plate.

The fingers **36** normally extend radially beyond the circumference of the projecting roller **21**, as shown in solid lines in the drawings. When in retracted position they are within the circumference of the projecting roller **21**, as shown in dotted lines. They are reciprocated between these two positions by the oscillations of the cam **31** in response to the dispensing and return strokes of the lever **30**, the cam acting to reciprocate the plate **32** to which the fingers are attached.

A knife **42** is fixed adjacent the projecting roller **21** opposite the fingers **36**.

Pressure-sensitive adhesive tape **43** is led from a supply roll **45** thereof, tacky side down, forwardly over the roller **20** in adhesive contact therewith and thence to a point beneath the knife **42** with the leading end of the tape in adhesive contact with the fingers **36** (Figure 4).

The lever **30** is then depressed downwardly through its full dispensing stroke, causing the rollers **20** and **21** to rotate and propel the tape forwardly, and the fingers to move downwardly into their retracted position. The fingers however, do not reach their retracted position until after the commencement of the said tape-propelling rotation, but remain exposed for a brief period. The duration of this period of exposure depends upon how far they extend radially beyond the circumference of the projecting roller **21** when in their normal position before the commencement of their downward movement, and the speed at which they move downwardly. During this said period the leading end of the tape remains adhered to the fingers and is thereby retarded so that a loop **46** is formed in the leading portion by reason of the continued forward movement of the succeeding unretarded portion (Figure 5). At this point in the operation (after the loop **46** has been formed) the fingers pass within the circumference of the roller **21** whereupon the portion of the tape that was adhered to the fingers becomes adhered to the peripheral surface of the roller **21**.

The rollers **20** and **21** then operate as dispensing rollers in a manner well known. As they turn, the tape is pulled or withdrawn from the supply roll **45** by the

draft roller **20** by reason of its adherence thereto. It is deflected and removed from the roller **20** by the roller **21** to which it then becomes adhered. The area of adhesive contact between the peripheral surface of the roller **21** and the tape is relatively small, and the roller **21** rotates slightly faster than the roller **20**. This produces a deflection and removal of the tape from the roller **21** so that the roller **21** serves as a projecting roller to thrust or project the tape outwardly and forwadly in a position for cutting and removal.

As the tape is thus thrust forwardly, the knife **42** forms a deflector for the loop **46** of tape so that the loop is bent backwards as it passes under the knife (Figure 6). This tends to flatten and to stabilize the loop by increasing the area of adhesive contact between its opposite inside surfaces, so that upon the completion of the rotation of the rollers **20** and **21** at the end of the downward dispensing stroke of the lever **30**, the loop **46** appears as indicated in Figure 7 as contrasted with its initial more open form shown in Figure 5.

The lever **30** is then released whereupon its upward return stroke returns the fingers to their initial normal position in adhesive contact with the tape. The dispensed length **47** of tape is then cut off by grasping it and drawing it upwardly against the knife **42**, and the mechanism is then as shown in Figure 4, ready for the next dispensing operation.

Grasping the loop **46** flattens it so as to form the completed tab **46'**, and the length **47** is then ready for use (Figure 8). When the length is applied to an article such as the box shown in Figure 9, the tab **46'** remains unadhered and facilitates the grasping of the tape for subsequent removal from the box.

There are numerous alternatives, equivalents and variations within the scope of the invention as herein described and/or claimed, all of which are contemplated.

For example, severing means other than the fixed knife **42** may be employed.

A fixed knife however is preferred. A fixed knife acts as a deflector means to assist in forming the loop **46** in the manner previously described. A fixed knife also serves as a platen means against which the non-adhesive upper side of the tape may bear when the fingers **36** press upwardly against the adhesive under side upon the return of the fingers to their normal position at the end of a dispensing cycle, thereby insuring a better adhesion between the tape and the fingers.

The knife **42**, having a serrated cutting edge and being bent outwardly to form a shelf-like portion adjacent thereto, may instead be a straight blade with a straight cutting edge such as the knife **142** shown in Figure 10. In the illustrated machine, the knife **42** is desirable for tapes having a relatively smooth firm backing, such for example as cellophane tape; the knife **142** is desirable for tapes having a paper backing, such for example as masking tape.

As will be seen in the drawings, portions of the fingers **36** may still extend or protrude radially beyond the circumference of the projecting roller **21** for a time even after the portions of their surfaces to which the tape was adhered are within the said circumference and the tape has become adhered to the periphery of the roller **21**. If such protrusion does not interfere with the feeding and projecting of the tape from the roller **21**, then the fingers are regarded as being within the said circumference for the purposes of the present invention.

One or more additional dispensing rollers may be inserted between the rollers **20** and **21** to form a chain or succession of enmeshed rollers commencing with the roller **20** and ending with the roller **21**, with the tape passing successively over their peripheries. Whether the chain of rollers be two, as here shown, or more, the thickness of the toothed discs that form the rollers and/or the number and size of the teeth are usually such that the periphery of each succeeding roller has a lesser contact with the tape per unit area of tape than does the next preceding roller; and the speed of the final roller (the roller **21**) is slightly greater than the one that precedes it.

The finger plate assembly shown in Figure 2 forms a tabbing unit for the type of dispenser herein described, that can be inserted or removed, according to whether tabbed or untabbed tape is desired.

I claim:

1. A tape dispensing and tab-forming mechanism comprising a cylindrical draft roller and a cylindrical projecting roller mounted for rotation about their respective axes, each roller comprising a plurality of axially spaced fixed discs, the rollers being parallel and positioned with the discs of each roller extending into the spaces between the discs of the other roller, a plurality of tape-holding fingers between discs of the projecting roller mounted for reciprocation from a normal position to a retracted position and return, the fingers normally extending radially beyond the circumference of the projecting roller into adhesive contact with tape that passes successively over the draft and projecting rollers, and when in retracted position being within the circumference of the projecting roller, means for rotating the rollers simultaneously for a given distance in a direction to propel the tape from the draft roller to the projecting roller, means for moving the fingers into their retracted position after the commencement of the said tape-propelling rotation, means for returning the fingers to their normal position in adhesive contact with the leading portion of the succeeding length of tape upon the completion of the said rotation, and means for severing the dispensed length of tape at a point adjacent the fingers.

2. The mechanism of claim 1 having a tape loop deflector means adjacent the projecting roller opposite the tape-holding fingers.

3. The mechanism of claim 1 having a knife adjacent the projecting roller opposite the tape-holding fingers, to serve as a tape loop deflector means and a tape-severing means.

4. The mechanism of claim 1 having a finger plate mounted for reciprocation in a plane parallel to the discs, the fingers being attached to the plate, and cam means for reciprocating the plate to reciprocate the fingers from their normal to their retracted position and return, the cam means being impelled by the roller-rotating means.

5. The mechanism of claim 4 wherein the fingers are mounted on the plate for oscillation in a plane parallel to the discs, and having spring means to render the fingers resistant to the said oscillation.

References Cited in the file of this patent

UNITED STATES PATENTS

2,300,423	Holben	Nov. 3, 1942
2,526,494	McNeil	Oct. 17, 1950