Feb. 10, 1959 W. S. POWEL 2,873,039

PACKING

Filed April 30, 1956 3 Sheets-Sheet 1

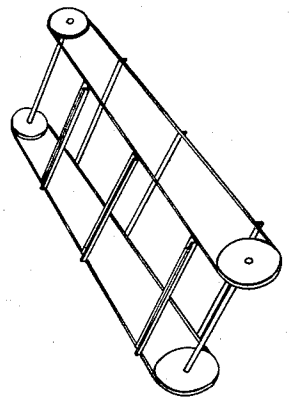


FIG.4

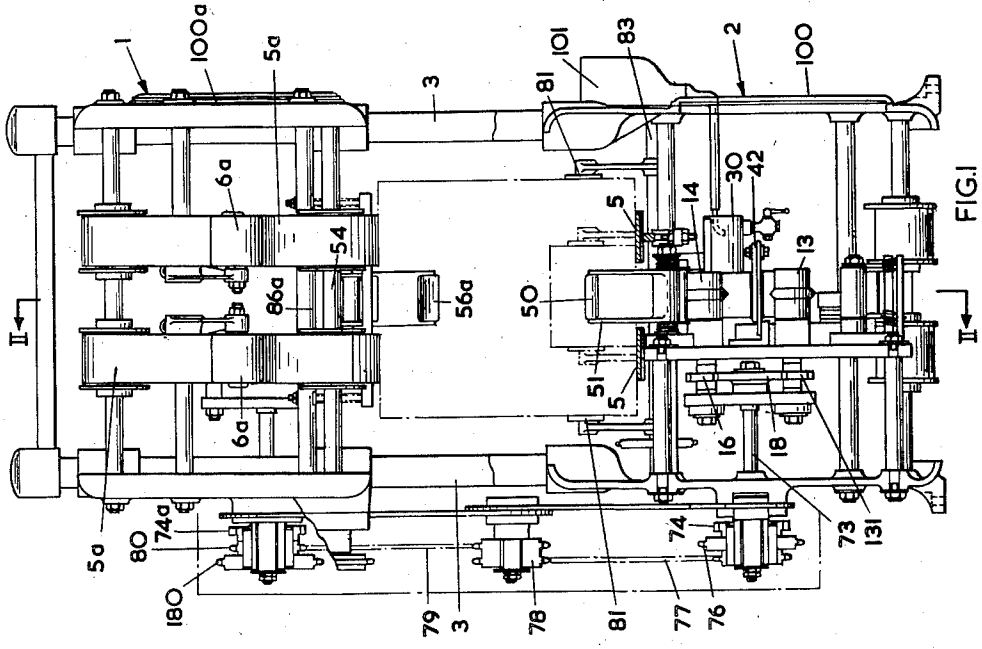


FIG.1

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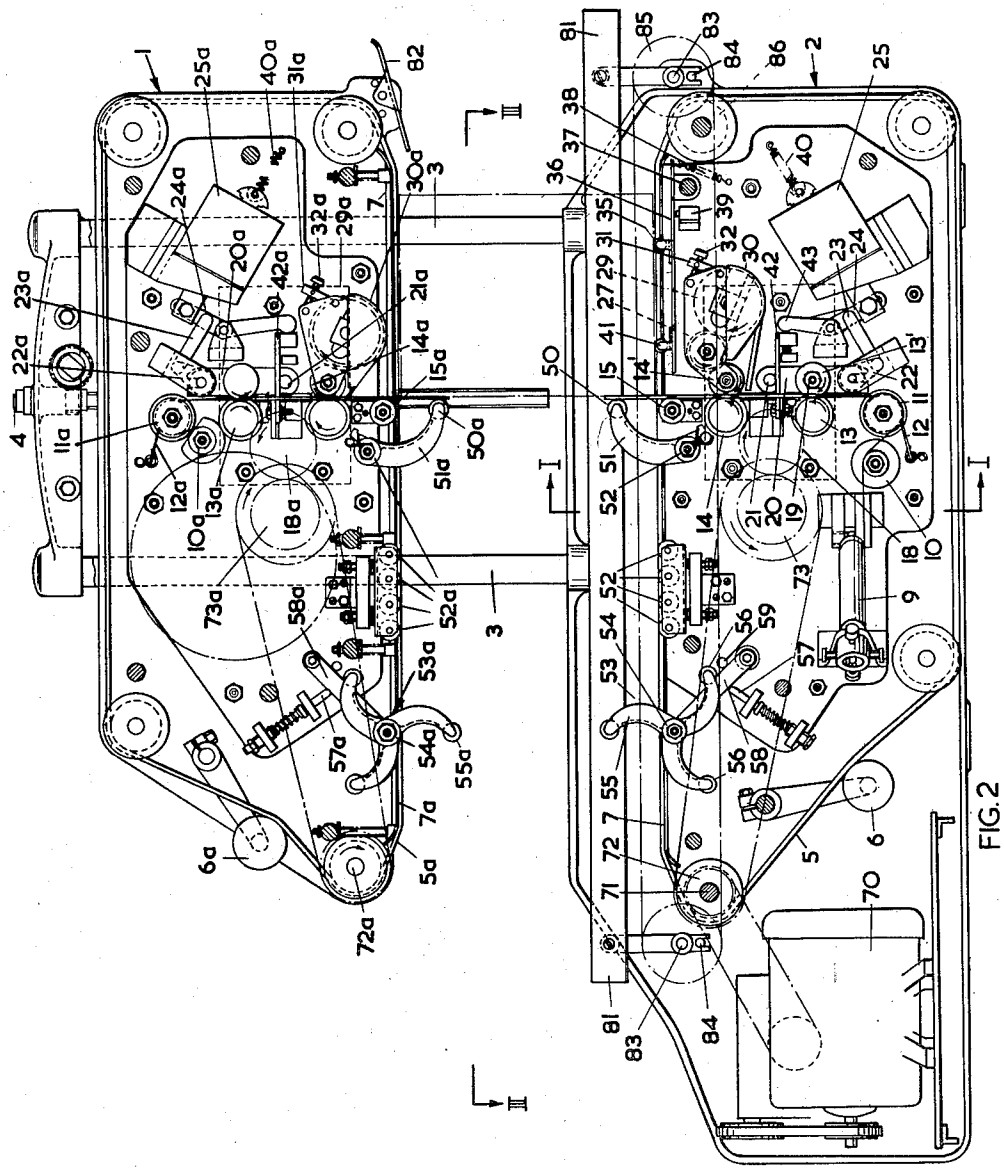


FIG. 2

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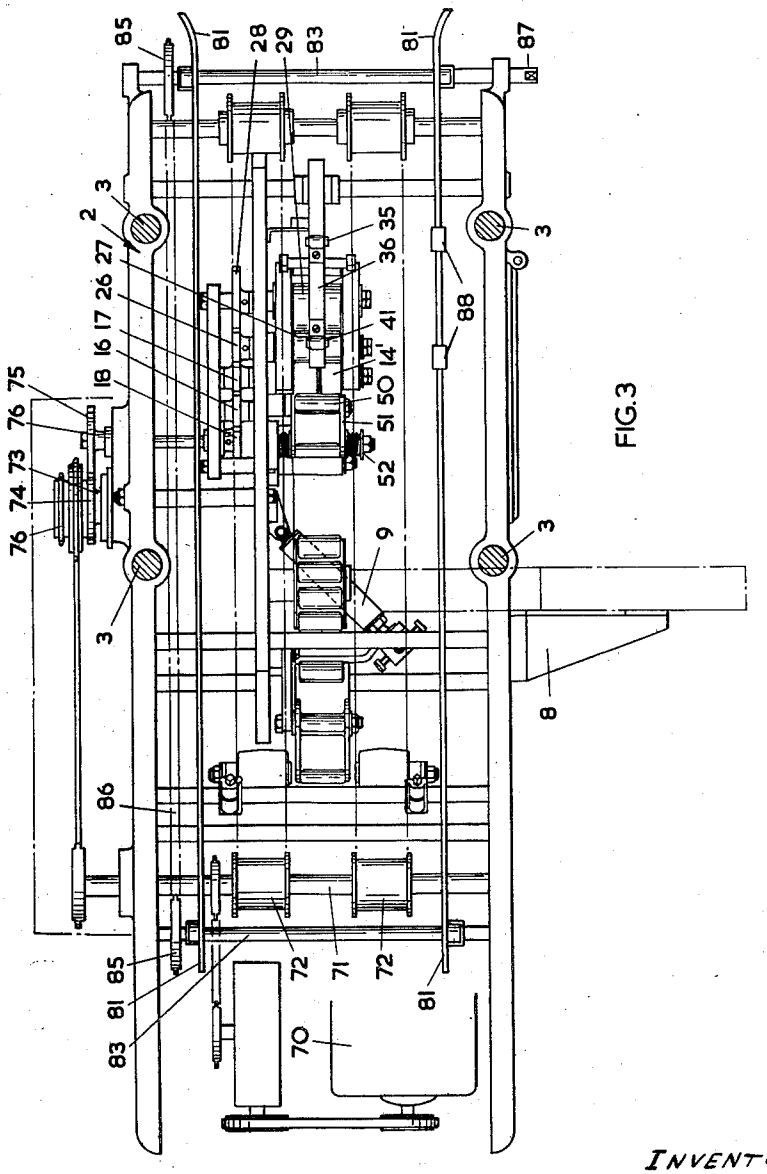


FIG.3

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2,873,039

PACKING

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Claims priority, application Great Britain April 29, 1955

5 Claims. (Cl. 216—25)

This invention is concerned with improvements in and relating to tape dispensing apparatus and machines incorporating such apparatus.

According to the present invention there is provided a tape dispenser comprising a first and a second pair of profiled feed rollers, each pair of feed rollers defining a bite including a V-shaped portion, means for moistening the tape and cutter means located between the first pair of feed rollers and the moistening means to cut the tape when the required length of tape to be moistened has been fed by the first pair of feed rollers.

According to a further feature of the present invention there is provided a taping machine comprising means for moving an article past a tape dispenser for feeding tape into the path of an article in which dispenser means are provided for driving a first and a second pair of feed rollers, profiled to form bites each including a V-shaped portion and lying on a common tangent, means for moistening the tape after passing said first pair of feed rollers and cutter means provided between the first pair of feed rollers and the moistening means, means being provided which upon contact with an article initiate feed by the first pair of feed rollers and upon an article passing out of contact therewith arrest said feed by the first pair of feed rollers and operate the cutter means to sever the tape.

In order that the present invention may be well understood there will now be described some embodiments thereof, by way of example only, reference being had to the accompanying drawings in which

Figure 1 is a view of the discharge end of a carton taping machine, partly sectioned on the line I—I of Figure 2.

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is a section on the line III—III of Figure 2.

Figure 4 is a perspective view of a modified form of conveyor.

The machine comprises substantially an upper unit **1** for applying tape to the upper part of a carton and a lower unit **2** for applying tape to the lower part of a carton.

The two units co-operate and are adjustable towards and away from one another to suit the size of carton to be dealt with. Thus the upper unit is mounted upon pillars **3** and a screw adjustment mechanism **4** is provided for lowering or raising the upper unit.

Each unit has a pair of spaced endless belts each tensioned by a jockey pulley and by spring loaded slippers. Referring to the lower unit the belts are indicated at **5**, the jockey pulleys at **6** and the slippers at **7**.

A carton to be taped up is fed in from the right as viewed in Figure 2 and is gripped at the top and bottom by the belts which in the upper unit will as viewed in Figure 2 travel clockwise and in the lower unit anti-clockwise and which will hold the top and bottom flaps of the carton in the closed condition.

The belts draw the cartons past a tape dispenser. The tape dispenser comprises a bracket **8** for holding a reel of gummed tape, a turnover bar **9**, a guide roll **10**, a flanged guide roll **11**, with which cooperates a spring loaded

finger **12**, a first pair of profiled feed rollers **13**, **13'** a pair of profiled feed and moistening rollers **14**, **14'** and a roller **15**.

In operation the feed rollers, one of which has a V-shaped recess and the other a mating V-shaped projection, draw the tape from the reel, bend the tape transversely to include a V-shaped part to make it substantially self-supporting and pass it to the moistening rollers which have similar profiles, are similarly mated, and the bite between which lies on the tangent at the bite of the feed rollers, whence the tape, moistened upon one side is fed up in front of the guide roller **15**.

The feed roller **13** is fast with a pinion **131** (Figure 1) meshing with a pinion fast with the roller **13'**. Similarly feed roller **14** is fast with a pinion **16** (Figures 1 and 3) meshing with a pinion **17** fast with the moistening roller **14'**. The pinions fast with rollers **13** and **14** mesh with a driving pinion **18**. Thus the driven feed rollers **13** and **14** positively drive their mating rollers.

Provisions are however made for interrupting feed by the rollers **13**, **13'**. The roller **13'** is mounted on a spindle **19** carried by a pair of arms **20** pivoted at **21** and coupled at their other ends through the levers **22** and **23** to a lever **24** operable by a solenoid **25** the operation of which will be described below.

The pinion **17** of the moistening roller **14'** drives through a pinion **26** a roller **27** and the pinion **26** drives through a pinion **28** a roller **29** running in a water trough **30**.

The roller **29** is carried by a pivotal frame **31** adjustable by a screw **32** to control the moistening of the roller **27** and the moistening roller **14'**.

When a carton enters between the upper and lower units the front edge of the carton runs over a first sensing roller **35** carried upon an arm **36** lying between the belts of the lower unit and pivoted near the mouth of the machine at **37**. A spring **38** urges the roller upwardly. Beneath the arm **36** is a micro switch **39** which upon depression of the roller **35** energises the solenoid **25** which moves the feed roller **13'** toward the feed roller **13** to initiate feed, in the de-energised condition these rollers being held sufficiently apart by a spring **40** acting through the solenoid armature so that no feed is effected. The feed rollers continue to feed until the solenoid is de-energised which occurs when the rear edge of the carton passes beyond a second sensing roller **41** on the arm **36**. Thus an amount of tape is automatically fed of a length greater than the length of the carton by an amount equivalent to the spacing of the rollers **35** and **41**. As soon as the solenoid is de-energised, i. e. when the end of the carton passes the roller **41** a guillotine blade **42** is driven through the tape by a lever **43** actuated on movement of the armature by the spring **40**. In the drawing a construction of the guillotine is shown in which the guillotine is not released after the cutting stroke until the solenoid is again energised. Instead a fly back guillotine may be employed which will normally remain in the open position or a pair of rollers may be used one carrying a blade and one an anvil. Furthermore while a pair of rollers **35** and **41** on a spring loaded arm have been shown for controlling feed and cut of the tape, it is preferred to mount a pair of micro switches upon one of the pairs of lateral guide rails as will be later described.

The front edge of the carton as has been described initiates feed of the tape when it contacts the roller **35**. By the time the front edge of the carton approaches the roller **15** the end of the moistened tape has reached the position shown in Figure 2. At that point the leading face of the carton contacts a roller **50** carried by a pair of convex arms **51** pivoted at **52**. By virtue of their shape these arms, which are spring urged in a clockwise

direction as viewed in Figure 2, will, on being moved anti-clockwise by the carton, carry the roller **50** first upwardly and then downwardly. Thereby the end of the tape which projected into the path of the carton will be rolled against the carton.

The carton will continue past the arm **51** over pressure rollers **52** and will then contact a member **53**. Meanwhile the rear end of the carton has left the roller **41**, the feed has been arrested and the length of cut off tape has been fed by the moistening rollers and thereafter by the carton until it extends along the base of the carton. Thus once the requisite length of tape has been fed by the feed rollers, no further feed by those rollers occurs and hence no moistened tape will remain in the machine after a taping operation.

The member **53** comprises a spindle **54** at each end of which are arcuate convex arms **55** carying free running rollers **56**. The spindle **54** is rotatable and is carried by a pair of pivotal arms **58** urged by spring operated plungers **57** toward stops **59**.

The front of the carton engages a pair of the arms **55** and rotates the member **53** anti-clockwise as viewed in Figure 2 so that a roller **56** contacts the base of the carton. Further rotation of the member **53** is thereby prevented and further advance of the carton depresses the member **53**. As the carton rides over the member **53** it tends to continue the anti-clockwise rotation of the member **53** thereby causing the roller contacting the base of the carton to exert an upward pressure. As soon as the rear of the carton passes that roller, that roller runs up the rear side of the carton, so rolling the end of the tape against that side.

The drive for the machine is provided by an electric motor **70** coupled by chain drive to a shaft **71** carrying belt driving roller **72**, and coupled by chain drive to a shaft **73**. On the shaft **73** is a pinion **74** meshing with a pinion **75** fast to a shaft **76** carrying the driving pinion **18**. The shaft **73** also carries a sprocket **76** around which passes a chain **77** (Figure 1) to an intermediate sprocket **78** around which in turn passes a chain **79** to a driving sprocket **80** for the upper unit. The chain drive to the upper unit is a scissors drive to accommodate the adjustment of the position of the upper unit with respect to the lower unit.

The upper unit is substantially the same as the lower unit. However in the upper unit the reel is housed on an axis parallel to the feed rollers and no turnover bar is required. In the drawing parts in the upper unit corresponding to parts of the lower unit are designated with same reference numerals but with the added suffix *a*. In the upper unit no intermediate roller **27***a* is required between the roller **14'***a* and **29***a* and the drive to the belts **5***a* is a chain drive from sprocket **180** fast to sprocket **80** to a sprocket on the belt driving shaft **72***a*. Further, the solenoid is energised by the micro switch **39** of the lower unit. To guide the cartons during their travel through the machine a pair of adjustable guide bars **81** are provided. At the mouth of the machine a tilting plate **82** is provided to avoid tipping the cartons and to hold the top flaps of the carton closed.

The guide bars **81** are adjustable, being mounted upon threaded cross shafts **83** and guide rods **84**. A pinion **85** is fast with each cross shaft and a chain **86** surrounds these pinions. Thus rotation of one cross shaft by means of a square headed extension **87** of one of the shafts **83** causes relative lateral movement of the guide bars. Where micro switches are provided these are mounted as indicated at **88** in Figure 3.

Inspection doors **100** and **100***a* are provided for the bottom and top units and if desired a water reservoir **101** may be mounted on the lower unit.

Since the period of time during which tape is fed depends on the length of the carton, the length of tape is automatically adjusted to a value appropriate for any particular length of carton. It should be noted that by arranging for the guillotine to act on the tape before it passes through the moistening means the tape is only moistened when about to be applied to a carton in the machine. Thus, moistened tape which might dry before the next carton arrives is not left in the machine.

The invention is not limited to the use of two units together. A single unit may be provided either to operate upon the base of a carton or on the top of a carton.

I claim:

1. A taping machine comprising, in combination, conveyor means for moving an article past a tape dispenser, said dispenser having means for feeding tape into the path of movement of the article comprising a first pair and a second pair of feed rollers, each of said first and second pairs of feed rollers having profile portions defining V-shaped bites lying along a common tangent, drive means for rotating said rollers, moistening means associated with said second pair of feed rollers for moistening the tape after passing said first pair of feed rollers, cutter means disposed intermediate said first pair of feed rollers and said moistening means, sensing means associated with said drive means responsive to the passage of an article into initial taping position with the taping dispenser for initiating said feeding of said tape, said sensing means being further responsive to the passage of the article beyond a subsequent taping position to arrest said feed and to actuate said cutter means to sever the tape, a pivotally supported member for trapping the leading end of the tape against the leading face of an article subsequently to movement thereof beyond said initial taping position, said pivotally supported member in response to the advancement of the article being arranged to move with respect to that face to press the tape thereagainst, presser means for pressing the tape against the trailing face of the article, said presser means comprising a rotatable member having a plurality of individual pressers supported for rotation into the path of movement of the article about an axis normal to such path of movement, and means sequentially rotating each of said pressers individually into pressing engagement with the trailing end of successive articles.

2. A taping machine as set forth in claim 1, wherein said pivotally supported member is of arcuate configuration, the free end of said pivotally supported member having a roller directed toward said point of issue of the tape.

3. A machine according to claim 1 in which the presser means for pressing tape against the trailing face of an article comprises a spindle resiliently biased towards a stop, said pressers extending radially outwardly from the spindle, one presser normally extending into the path of an article with the convex face directed toward the article, contact with that presser by the leading face of the article causing rotation of the spindle to bring a second presser against the face of the article directed toward the dispenser, further motion of the article causing the spindle to move against its resilient bias and causing the second presser to exert pressure on the article until the second presser reaches the trailing edges of the article when the spindle will rotate further so that said second presser rides over the trailing face.

4. A machine according to claim 3 in which the means for moving the article comprises a pair of laterally spaced endless conveyors.

5. A machine for applying tape automatically to opposite faces of an article, the machine comprising means for moving an article between an upper and a lower unit each of which includes a pair of feed rollers profiled to define a bite including a V-shaped part, the tangent of the bite being substantially normal to the line of travel of the article, a pair of similarly profiled moistening rollers, the bite of which lies on said tangent, a non-profiled guide roller also on said tangent and behind the tangent reckoned in the direction of travel of the article, the machine also comprising two pressure responsive

members extending into the line of travel of the articles and arranged to operate in each unit means for interrupting the feed of the feed roller and a cutter between the feed rollers and the moistening rollers, each unit also including an arcuate pivotal presser the arcuate face of which is directed toward an oncoming article and the end of which normally extends into the path of the article so as to lie substantially on and behind said tangent and a rotary presser comprising a plurality of arcuate members extending radially outwardly from a spindle rotatably mounted for sequential rotation in a single direction by successive articles, spring means acting upon said spindle and biasing it into a position in which an arcuate member extends into the path of an article, the arcuate member being disposed so that the convex face of the member extending into the path of the articles faces the

oncoming articles whereby tape may be pressed by another of the arcuate members against the trailing face of the article upon continued rotation of the rotary presser by said spring means in response to continued passage of the trailing end of the article forwardly beyond said other arcuate member.

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