June 21, 1966 J. H. CASEY 3,256,813

STRIP MATERIAL WINDING MACHINE

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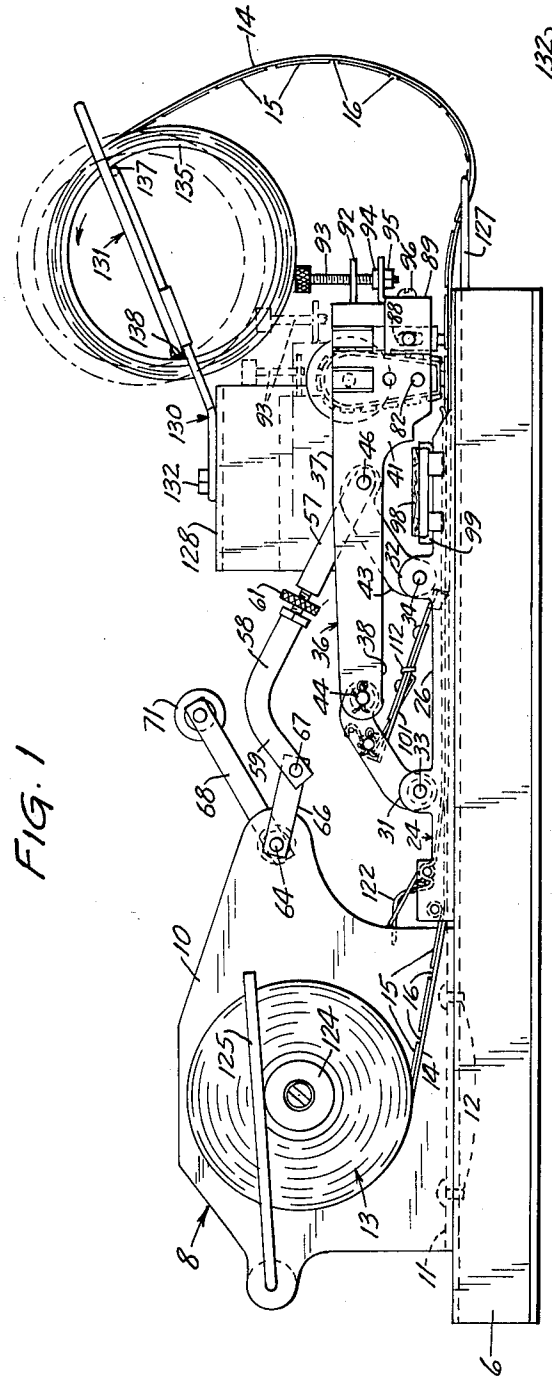


FIG. 1

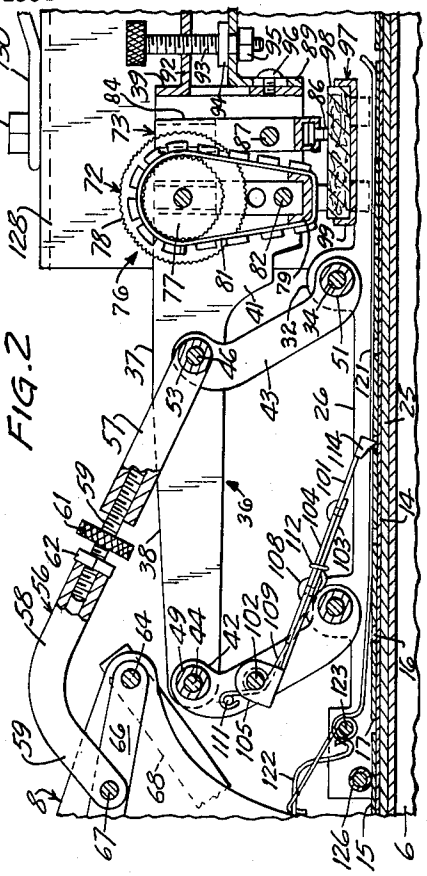


FIG. 2

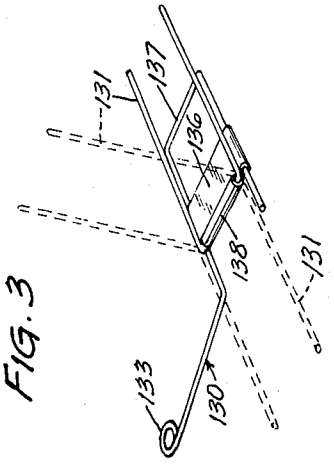


FIG. 3

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STRIP MATERIAL WINDING MACHINE

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This invention relates to an apparatus for convolutely winding elongate strip material on a core after said material has been processed in some manner and in one aspect relates to a novel device for printing on a continuous strip of tape and rewinding the printed tape.

The basic machine which forms a part of this invention provides for the continuous feeding of a tape from a supply roll and imprinting thereon. The machine is particularly adapted for manual operation, however the same may be provided with any suitable powered driving means to make said printing machine more automatic. In either instance the device provides means for rapidly imprinting a tape, which may be a liner having a series of labels adhesively secured thereto, but when printing a large number of said labels with the same information it is generally desirable to rewind the imprinted tape after imprinting the same such that said tape may be readily inserted in a label dispensing and applying machine. It has therefore become desirable to provide a tape winding mechanism on the printing machines. The problem encountered in trying to adapt previously known rewinding techniques to the presently known printing devices is excessive tension is applied to the tape by said devices where in fact only a small amount of tension should ever be applied to the strip during rewinding. This is due to the fact that if a constant tension and/or too much tension is applied to the tape, the tape will be drawn off the supply roll due to tension applied during rewinding rather than solely from the feeding mechanism of the device. This causes the labels to be moved out of register with the printing unit of the printing device, resulting of course in inaccurate printing. In printing devices of this general type there is no provision easily provided for braking the tape in both directions and therefore means for restricting movement of the tape toward the supply roll under retracting movement of the drive means is the only movement limiting device provided for said tape. It was therefore necessary to accomplish the rewinding without at the same time applying tension on the tape.

The present invention has the advantage of providing a simple workable tape winding mechanism.

The present invention further has the advantage of providing a very economical label tape winding structure which does not substantially increase the cost of a printing machine of which it is made a part and which may be used during the operation of the machine or not without requiring any readjustment or manipulation of any elements on the basic machine.

The present invention has the additional advantage of providing a winding mechanism which cannot cause sufficient tension in the tape to interfere with the normal feeding and imprinting of the tape.

The novel winding technique of the present invention is accomplished by a core means upon which the strip may be wound, support means loosely supporting said core means affording vertical movement of the axis of said core and rotational movement of said core means about the axis thereof, and striking means for imparting a series of impacts to the outer periphery of said core means while on said support means to lift the axis of the core and rotate said core means in one direction.

These and other novel features of the present invention will become more apparent uopn reading the more

detailed specification which follows and by reference to the accompanying drawings of which:

FIGURE 1 is a side elevation of a device illustrating the present invention with the parts thereof in an operating position;

FIGURE 2 is a fragmentary longitudinal sectional view illustrating details of the device of FIGURE 1 with the parts in an initial retracted position;

FIGURE 3 is a detail perspective view of an element forming part of the present invention.

The printing device illustrated in the drawing is portable and comprises a base **6** of generally rectangular shape to which is secured adjacent the rear end thereof and to one side an upright member **8**, generally U-shaped in transverse section, which consists of a pair of spaced vertical walls **10** with a bottom connecting wall **11**. The upright member is secured to the base **6** by suitable fastening means **12** passing through the bottom connecting wall.

The upright member is adapted to support a roll of tape generally indicated at **13**. This roll of tape comprises a liner or strip of treated paper **14** on which a series of labels **15** having a pressure-sensitive surface are successively secured along one face thereof. The labels are generally positioned on the liner in slightly spaced relation to provide a space **16** between each label so that the fingers of the printing machine, to be hereinafter described, may engage the rear edges **17** of the labels to advance the tape from the roll to and through a processing location at which said labels are imprinted. The labels may have other forms but are primarily adapted after imprinting to be removed from the liner and applied to any container or packaged product as desired.

Stationarily supported on the base **6** is a guide member generally indicated at **24** for guiding the tape from the supply roll to the imprinting area. The guide member is channel-shaped, having a bottom **25** and two spaced sides or upstanding flanges **26**. The bottom **25** of the guide member **24** terminates at the front thereof in a widened rectangular-shaped flat plate portion **28** which forms a printing area.

Two spaced ears **31** and **32** are formed on the upper portions of each side **26** of the guide member **24** in transversely aligned relationship and each pair of spaced ears **31** and **32** support a rod, **33** and **34** respectively, upon which are pivotally mounted the links of a reciprocating unit generally indicated **36**. The reciprocating unit **36** includes an upper frame member **37** having a pair of side members **38** joined by a front connecting wall **39**. The side members **38** are widened adjacent the front or right-hand end of the machine as viewed in FIGURE 1 as at **41** and are reduced to narrower portions rearwardly thereof. The upper frame member **37** is pivotally supported on two pairs of spaced links **42** and **43**. The links **42** and **43** are joined to the frame **37** and the guide member **24** to form parallelogram linkages affording longitudinal reciprocatory movement for the upper frame **36** with respect to said guide member **24** and oscillation of any part thereof.

The rear links **42** are pivotally supported on the rear rod **33** through suitable openings formed in enlargements at the lower end of the links **42**. The rod **33** is supported in the ears **31** of the guide member **24**. The upper ends of the links **42** support a transverse rod **44** extending through openings in said links and through openings in the rear ends of the sides **38** of the frame **37**. The front links **43** are similar in size and shape to the rear links **42** and they in turn are secured at the lower ends to the rod **34**, which is supported in the ears **32** of the guide member **24**, and at their upper ends to a rod **46** which in turn is secured to the sides **38** of the frame **37**.

Sleeves 48 and 49 are positioned coaxially on the rods 33 and 44 between the links 42. A sleeve 51 is also secured on the lower front rod 34, while the upper rod 46 supports a pair of sleeves 53 spaced therebetween to accommodate the front end of an arm 56 which has a transverse opening at the forward end thereof whereby it is pivotally secured to the rod 46. The rods 33, 34, 44 and 46 are held in place with respect to the frame 37 and guide member 24 by suitable retaining means such as the cotter pins illustrated in FIGURE 1.

The arm 56 is formed in two sections, 57 and 58, the front section 57 being pivotally secured to the rod 46 in the manner above-described. The rear section 58 of the arm extends for a portion of its length on the same longitudinal axis as the front portion and then curves downwardly at its rear portion as illustrated in FIGURES 1 and 2. The two arm sections 57 and 58 have internally threaded bores to accommodate a threaded connecting member 59 having a central knurled knob 61 formed integral with the threaded end portions thereof, one of which supports a locking nut 62. The connecting member 59 provides the length adjustment of the arm 56 to adjust the pressure applied by the printing unit during operation.

Rotatably supported at the front end of the upright member 8 is a shaft 64. The shaft 64 has one radially extending arm 66 secured thereto for rotation about the axis of said shaft and having the free end thereof pivotally connected as by the pin 67 with the rear section 58 of the arm 56. A second radial arm 68 secured to the end of the shaft 64 opposite the arm 66 has a handle member 71 secured at its outer end thus forming driving means in the form of a crank by which to reciprocate the frame forwardly and downwardly to the printing position, as shown in FIGURE 1 by the broken and solid lines, upon rotation of the shaft 64. Continued rotation of the shaft 64 will pivot the frame 37 upwardly and rearwardly to its raised or nonprinting position as shown in FIGURE 2 where the inking of the printing unit occurs. This reciprocating movement of the reciprocating unit 36 occurs with each complete rotation of the shaft 66 by the radial crank arm 68 and handle 71.

The printing unit or stamp is mounted at the forward end of the upper frame 37. In the illustrated embodiment the printing unit or stamp comprises two printing members. The printing member 72 is of the type used in the hand stamps and is of conventional construction comprising a frame 76 having side members which support, between the upper edges thereof, several rotatable spools 77, each having a knurled disk 78 for rotating the same. A bottom cross-member 79 extends between the side members of the frame 76 at the lower portions thereof. Conventional continuous type bands 81 extend around the spools 77 and the bottom cross-member 79 and the same are adapted to be rotated manually through the disks 78 to position desired ones of the type in a printing position below the bottom cross-member 75. A removable pin 82 extends through aligned openings in the sides 38 of the reciprocable upper frame 37 and in the frame 76 of the printing member to detachably lock the printing member to said frame 37.

The second printing member 73, comprises a generally U-shaped frame 84 which is adjustably supported relative to the upper frame 37. The bottom cross-member of the frame 84 is formed with downwardly extending and inwardly directed flanges which form an inverted channel to slidably receive a strip of type 86 so that when the printing member 72 makes a printing impression on a label the type 86 may also print on the same label. The type 86 may contain type bearing the name of a store or a particular type of product and is not generally changed as often as the pricing information applied by the printing member 72. The upstanding sides of the frame 84 are formed with aligned openings through which extend a pin 87. The pin 87 also

extends through slotted openings 88 formed in the sides 38 of the upper frame 37 and through openings formed in a vertically adjustable U-shaped bracket 89. The bracket 89 extends around the lower forward face of the upper frame 37. The bracket 89 is formed with an ear 91 projecting forwardly from the upper edge of the front portion thereof. The front connecting wall 39 of the frame 37 is also provided with an ear 92 which is formed with a threaded opening extending vertically therethrough in aligned relation with an opening formed in the ear 91. An adjusting screw 93 is threadably received in the ear 92 and is joined to the ear 91 on the bracket 89 by a collar 94 and lock nut 95 such that vertical movement imparted to the adjusting screw 93 by rotation thereof due to rotation of the knurled top on the screw 93 by the operator imparts vertical movement to the bracket 89 and to the frame 84 of the printing member 73. The screw 93 thus provides means for adjusting the position of the type 86 to give the impression desired. The printing member 73 is held in adjusted position by the fasteners 96 extending through the bracket 89 and front connecting wall 39. The top of the screw 93 during operation of the machine acts as a striking means to impart an impact to a cylindrical core upon each cycle of the machine to afford rewinding to be hereinafter described.

The inking unit, generally indicated at 97, is removably supported in the guide member 24 forwardly of the front rod 34. A felt inking pad 98 for the inking unit 97 is supported in a housing 99 which in turn is secured to a holder having the opposite ends thereof formed to frictionally engage the transversely spaced sides 26 of the guide member 24.

The reciprocating frame 37 carries means for advancing the tape 14 from the roll 13 through the guide member 24 comprising a pair of transversely aligned fingers 101, only one of which is shown, which are supported at their rear ends on a cross rod 102, which in turn is secured to the rear links 42. As best seen in FIGURE 2, the fingers 101 comprise a lower section 103 and an upper section 104 adjustably positioned thereon. The lower section 103 has upwardly extending spaced ears 105 which engage the cross rod 102. The upper section 104 is provided with slots which are in alignment with spaced threaded openings in the lower portion 103. Threaded fastening members 108 are secured in the threaded openings 107 and secure the upper sections 104 of the fingers to the lower sections. The upper sections 104 are adjustable relative to the lower sections 103 for lengthening or shortening the fingers 101. Each finger is biased downwardly by means of a coil spring 109 on the rod 102. One end of the spring 109 engages a cross bar 111 supported on the links 42 and the other end engages the fingers as indicated at 112. The forward end of each of the fingers, which would be the forward ends of the upper sections 104, has a downwardly extending lip 114 which provides a sharp front edge. A spacer sleeve 115 is supported on the cross rod between the fingers 101.

A pressure member generally indicated at 121 is supported in the guide member 24 to rest on the tape as it travels through the tape guide member. The pressure member 121 is fixedly secured near the rear end thereof to a cross pin 123, which in turn is secured to the sides 26 of the guide member 24. The rear of the pressure member 121 extends upwardly and terminates in a finger engaging portion 124.

A coil spring 126 is supported on the rod 123 with one end of the spring engaging the sides of the guide member 24 and the other end engaging the pressure member 121 to normally pivot the pressure member downwardly so that it will be urged toward the guide member, thereby placing a slight pressure on the tape within the guide member as the tape is fed forwardly by the fingers 101. The pressure member 121 is fairly narrow in its transverse dimension and is positioned between the pair of

fingers **101** but is wider in transverse dimension at the forward end thereof.

The roll of tape **13** is supported from the upright **8** by means of a stem **124** and pivoted L-shaped bar **125**. The tape is fed forwardly from the roll into the guide member **24** under a roller **126** secured between the sides of the guide member and under the pressure member **121** to be engaged by the fingers **101** as the crank is rotated to move the frame **37** and the fingers **101** thereon.

After the labels have been imprinted by the printing member **72** and the printing member **73** the tape is pushed from the guide member off the front of the base **6** where it is directed beneath a fixed guide member **127**. The guide member **127** serves to maintain the tape in a planar relation at the printing area when the rewinding attachment is utilized.

When a substantial number of labels bearing the same indicia are to be printed it is desirable that the tape be rewound rather than be allowed to fall to the supporting surface and possibly become wrinkled or damaged in some other manner. Additionally, rewinding of the tape makes the same ready for use in other machines, e.g., the label applicator. Therefore, a second upright **128** is mounted on the base **6** adjacent the forward edge thereof. The second upright **128** provides a mounting means for a rewinding attachment including a core support member **130** and a core retaining member **131**. The upright **128** has a flange portion formed with an opening to receive a fastener **132** suitable for fixedly mounting the core support member **130** to the upright.

The support member **130** is illustrated as formed from material circular in cross-section and is formed at one end thereof with a fastener receiving end portion **133** and extends from said end portion to a position whereby said member may position a core **135** forwardly of the initial position of the reciprocating frame **37**, but in the path of said frame, and above the forward end of the base **6** with the axis of said core extending normal to the direction of movement of the tape and of said frame. The core supporting portion of the support member **130** is formed at the opposite end of the member from said fastener receiving portion **133** and is formed by placing a U-shaped bend in said round material and joining the straight aligned lengths of said member by a cross-plate **136** formed with rolled edges adapted to receive the straight sections and be adjustable along said sections. The transverse portion **137** of the member **130** and a transverse rounded edge portion **138** formed on the plate **136** contact the interior of the core **135** at two points spaced about the inner circumference of said core a distance less than one-half said inner circumference to provide a rockable support therefor.

The core retaining member **131** is illustrated as a U-shaped member formed of material circular in cross-section and the bight portion **139** thereof is received within the rounded edge **138** of the plate **136** to pivotally connect said retaining member **131** to the core supporting member. The retaining member **131** limits the axial displacement of said core and permits an empty core to be readily positioned on the support **130** and both the core and tape to be easily removed after the winding. When a core having an inside diameter of 3 inches, which is a very common core size for industrial tapes, the core support member is preferably affixed to dispose the transverse portion **137** and rounded edge portion **138** in a vertically spaced relation as illustrated in FIGURE 1 providing a rockable support for said core with said members spaced about two and three-fourths (2¾) inches apart and with the transverse portion about one and three-eights (1⅜) inches above the rounded edge portion. The support member **130** positions the core **135** in the path of movement of the reciprocating upper frame **37** such that upon each cycle of the machine to imprint a label the top of the screw **93** will strike the core at a position circumferentially spaced from and below the rounded edge portion of said support member **130** and below the axis of the core, as illustrated in FIGURE 1. The impact on the core causes the axis of the core to move vertically, by rocking said core about the rounded edge portion **138**. The rocking of the core lifts it off the transverse portion **137** such that when said core returns to its position onto its transverse supporting surfaces it has rotated about its axis in the direction of the arrow shown in FIGURE 1. The normal operation of the printing machine occurs at a cyclic rate of between 50 and 250 cycles per minute and at any speed the screw **93** imparts a series of impacts to the outer periphery of the core, or tape convolutely wound thereon, such that the core is rotated in only one direction.

The legs of the core retaining member **131** also serve to guide the tape as the same is wrapped upon the core during the vertical and rotating movement thereof to provide an even roll of label tape upon completion of the winding.

This rewinding technique for the label tape has proved very satisfactory on a machine of the type illustrated. The winding of the core can be accomplished without applying any significant tension on the tape during the winding which could cause misalignment of the labels with the printing unit and the use of the guide member **127** additionally aids in preventing any direct force upon the tape in the path defined by the guide member **24** tending to withdraw the same from the supply roll.

Having thus defined one embodiment of my invention, it is to be understood that certain changes and modifications may be made therein, such as variations in the support means for the core, but all such changes and modifications are considered to come within the scope of the present invention as defined by the appended claims.

What is claimed is:

1. An apparatus for winding strip material comprising in combination:
   - cylindrical core means upon which elongate strip material may be convolutely wound, said core means having an axis,
   - support means for loosely supporting said core means affording vertical movement of the axis of said core and rotational movement of said core means about the axis thereof,
   - retaining means for limiting axial displacement of said core means supported by said support means, and
   - striking means for imparting a series of impacts to the outer peripheral surface of said core means to afford vertical movement of the axis of said core means and rotation of said core means in one direction for the winding of a said strip material thereon.

2. An apparatus for winding strip material comprising in combination:
   - cylindrical core means upon which elongate strip material may be convolutely wound, said core means having an axis,
   - support means for rockably supporting said core means for vertical swinging movement of the axis of said core means and for rotation of said core means about its axis,
   - retaining means for limiting axial displacement of said core means supported by said support means during swinging movement thereof, and
   - striking means for imparting a series of impacts to the outer peripheral surface of said core means to afford swinging movement of the axis of said core means and rotation of said core means for winding of a said strip material on the outer periphery surface of said core means.

3. An apparatus for winding strip material comprising in combination:
   - cylindrical core means upon which elongate strip material may be convolutely wound;

support means for contacting the interior of said core means over less than one-half the inner circumference to provide a rockable support therefor with the axis of said core being horizontally positioned;

core retaining means for limiting axial displacement of said core means and for guiding a strip material being wound on said core means; and

striking means for imparting a series of impacts to said core means to effect rotation of said core means and winding of a said strip material thereon.

4. An apparatus for winding strip material comprising in combination:

cylindrical core means upon which elongate strip material may be convolutely wound;

support means for contacting the interior of said core means in at least two points spaced circumferentially a distance less than one-half the inner circumference of said core means to provide a rockable support therefor with the axis of said core being horizontally positioned;

core retaining means for limiting axial displacement of said core means and for guiding a strip material being wound on said core means, said retaining means being movable to a position affording mounting and removal of said core means on said support means;

striking means movable in an oscillating path and disposed for imparting a series of impacts to the outer surface of said core means and a wound strip material at a point spaced from said support means to effect rotation of said core means about said support means and winding of a said strip material on said core.

5. An attachment for use with a tape feeding and processing mechanism including a base, means on said base for supporting a supply roll of tape, guide means on said base along which said tape is advanced, an oscillating unit supported for oscillating movement with respect to said base, and means for advancing said tape along said guide means and past said oscillating unit and for reciprocating said unit, said attachment comprising

a core supporting frame having a fastener receiving end portion adapting the same for attachment to a said base and having a loosely retentive core supporting portion disposed at the other end thereof and constructed to rockably support a cylindrical core by engagement with the interior of said core over less than one-half its inner circumference and to position a said core with the axis thereof generally perpendicular to the plane of movement of a said oscillating unit with said core disposed such that the outer periphery thereof will be struck by a said oscillating unit upon movement thereof whereby rotational movement will be imparted to a said core, and a U-shaped core retaining member pivotally supported at the bight thereof onto said core supporting portion to afford easy mounting and removal of a core with respect to said supporting frame.

6. An attachment for use with a tape feeding and processing mechanism including a base, means on said base for supporting a supply roll of tape, guide means on said base along which said tape is advanced, a reciprocating unit supported for reciprocating movement with respect to said base, and means for advancing said tape along said guide means and past said reciprocating unit and for reciprocating said unit, said attachment comprising

a cylindrical core,

a core supporting frame having a fastener receiving end portion adapting the same for attachment to said base and having loosely retentive core supporting means disposed at the other end thereof for rockably supporting said cylindrical core by contacting the interior of said core over less than one-half its inner circumference to position a said core with the axis thereof generally perpendicular to the path of movement of a said reciprocating unit and a tape to be wound thereon with said core disposed such that the outer periphery thereof will be struck at a position circumferentially spaced from said supporting means by a said reciprocating unit upon movement thereof whereby said core will be rocked and rotated about said supporting means, and

core retaining means for limiting axial displacement of a said core on said supporting means and for guiding a said tape to be convolutely wound on a said core upon rotation thereof.

7. In combination:

a printing machine for imprinting labels which are secured successively to a continuous backing strip comprising an elongate base, a guide member secured on said base and through which said labels are advanced, a reciprocating unit supported on said base for fore-and-aft reciprocating movement, a printing unit supported at the forward end of said reciprocating unit, drive means connected to said reciprocating unit and adapted to reciprocate the same, and feed means secured to said reciprocating unit for advancing the strip through said guide member to a printing position upon reciprocation of said reciprocating unit; and

means for rewinding the strip and labels comprising retentive core support means fixed to said base for contacting the interior of a cylindrical core over less than one-half the inner circumference thereof and for positioning the same in a position to be struck at a point circumferentially spaced from said support means by said reciprocating unit upon reciprocation thereof by said drive means to afford rotational movement of a said core and winding the strip.

8. In combination:

a printing machine for imprinting labels which are secured successively to a continuous backing strip comprising an elongate base, a guide member secured on said base and through which said labels are advanced, a reciprocating unit supported on said base for fore-and-aft reciprocating movement, a printing unit supported at the forward end of said reciprocating unit, drive means connected to said reciprocating unit and adapted to reciprocate the same, and feed means secured to said reciprocating unit for advancing the strip through said guide member to a forward printing area upon reciprocation of said reciprocating unit;

guide means supported forwardly of said base around the lower surface of which the imprinted tape is directed; and

support means for rockably supporting a cylindrical core for rewinding the strip and imprinted labels, said support means being positioned above the printing area on the forward end of the base for contacting the interior of a said cylindrical core over less than one-half the inner circumference thereof and being positioned forwardly of the reciprocating unit to position a core in the path of said unit such that a core mounted on said support means is struck by said unit at a point circumferentially spaced from and below said support means upon reciprocation thereof by said drive means to afford rotational movement of a said core and winding the strip and labels.

9. In combination:

a printing machine for imprinting labels which are secured in spaced relation to a continuous backing strip, comprising an elongate base, a guide member secured on said base and through which said labels are advanced, a reciprocating unit supported on said base for fore-and-aft reciprocating movement, a printing unit supported at the forward end of said reciprocating unit, drive means connected to said reciprocating unit and adapted to reciprocate the same, and means secured to said reciprocating unit

and adapted to advance the strip through said guide member to a printing position when said reciprocating unit is moved forwardly with relation to said base; and

support means for a cylindrical core upon which the imprinted strip may be rewound by engagement with the inner circumference of a said core in at least two points spaced circumferentially of each other a distance less than one-half said inner circumference to provide rockable support therefor in the path of movement of said reciprocating member such that upon reciprocation thereof a said core will be struck thereby at a point circumferentially spaced from said support means, and retaining means for restricting the axial displacement of a said core supported on said support means and for guiding the strip as it is wound on a said core.

10. In combination:

a printing machine for imprinting labels, which labels are secured on a liner and supplied in roll form, said machine comprising a base of generally rectangular shape, means mounted on said base for supporting a supply roll of said labels, a guide member secured on said base and through which said labels are advanced from said supply roll, a reciprocating unit supported on said base, said reciprocating unit comprising an upper frame member and a plurality of links, said links being connected to said upper frame means for supporting the same with the lower ends of said links pivotally connected to said base, a printing member supported at the forward end of said upper frame member, drive means connected to said reciprocating unit and adapted when rotated to reciprocate said unit, means secured to said reciprocating

unit and adapted to advance the said labels when said reciprocating unit is moved forwardly to afford printing of said labels in the forwardmost position of said unit;

support means for loosely supporting a cylindrical core having a relatively large inside diameter in a position above said base in the path of said reciprocating unit as the same is moved forwardly for rotation of said core about an axis transverse to the direction of reciprocating movement of said reciprocating unit, said support means comprising a main frame member secured to said base and including a core supporting portion having transversely extending members spaced horizontally and vertically and adapted to contact the interior of a said core at two positions spaced circumferentially a distance less than one-half the inner circumference of a said core, retaining means for limiting axial displacement of a said core on said supporting portion, and

a guide member positioned forwardly and transversely of said base beneath which the imprinted labels will be directed and then guided toward said support means to be rewound on a said core upon said unit striking a said core upon each cycle of said machine.

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