

United States Patent

[11] 3,603,250

[72]	Inventor	David S. Knudsen St. Louis, Mo.
[21]	Appl. No.	779,473
[22]	Filed	Nov. 27, 1968
[45]	Patented	Sept. 7, 1971
[73]	Assignee	McKenna Equipment Company Inc. St. Louis, Mo.

2,691,936	10/1954	Farkas et al.	101/35
2,927,525	3/1960	Baumgartner	101/35
3,327,624	6/1967	Beaver	101/35
3,344,740	10/1967	Hilton	101/228
2,186,555	1/1940	Phillips	101/36

FOREIGN PATENTS

745,086	9/1953	Germany.....	101/224
---------	--------	--------------	---------

Primary Examiner—Clyde I. Coughenour
Attorney—Gravelly, Lieder & Woodruff

[54] MARKING DEVICE
6 Claims, 5 Drawing Figs.

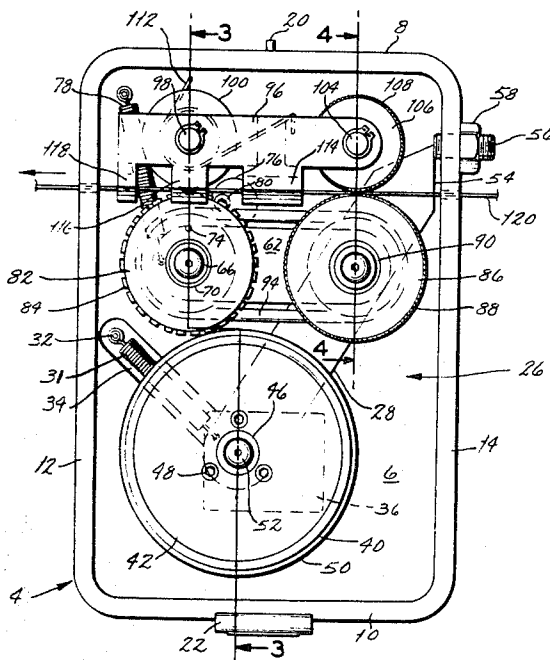
[52]	U.S. Cl.....	101/36, 101/219, 101/228
[51]	Int. Cl.....	B41f 17/10
[50]	Field of Search.....	101/53, 92, 228, 219, 224, 225, 226, 227, 35, 37, 212

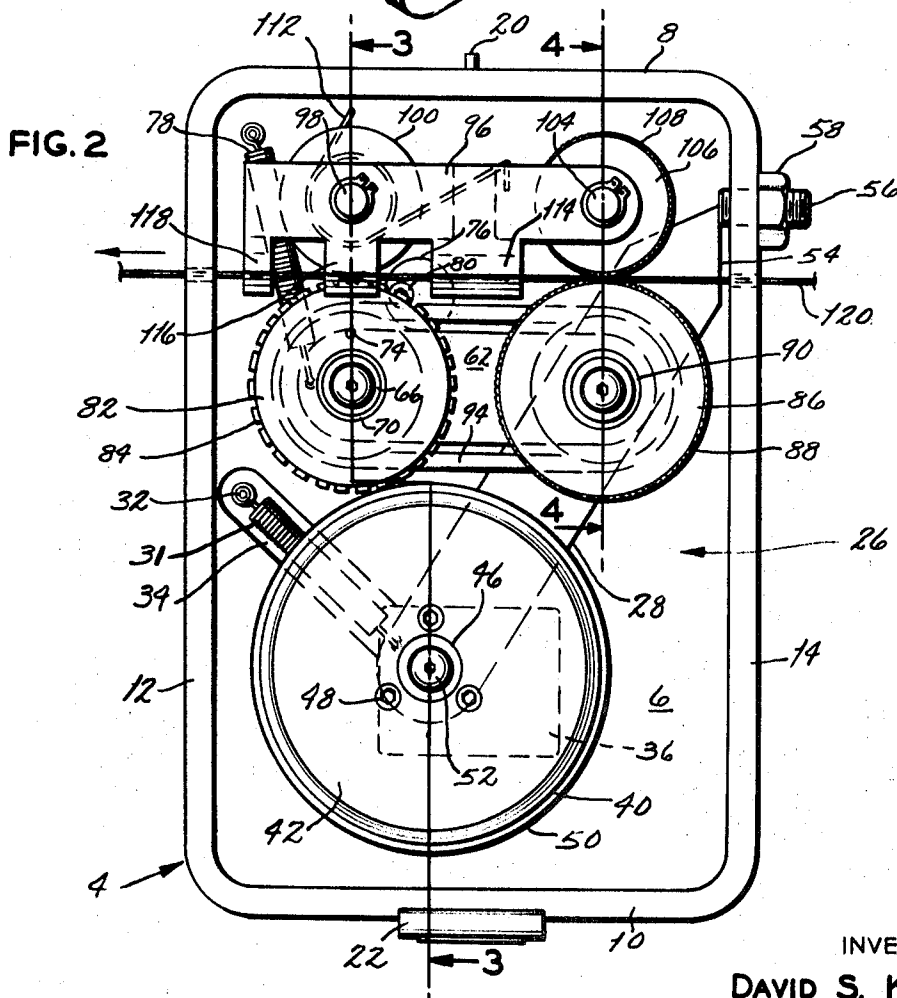
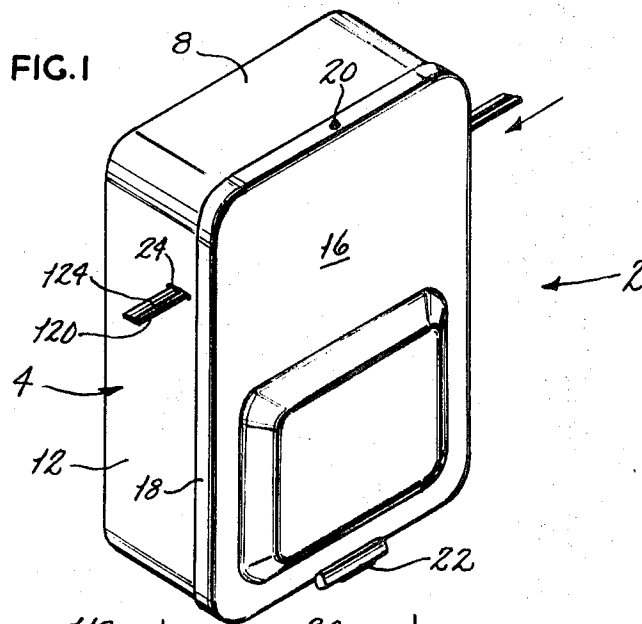
[56] **References Cited**

UNITED STATES PATENTS

1,496,331	6/1924	Wheelock	101/212
1,653,522	12/1927	Trahan	101/227
2,184,552	12/1939	Hinsky	101/37
2,186,788	1/1940	Olson	101/37 X

ABSTRACT: A device for imprinting characters on extended lengths of tape and including a drive roll driven by the tape and a marking roll rotated by the drive roll such that the linear velocity at the periphery of the marking roll is the same as the linear velocity at the periphery at the drive roll. The tape is compressed against raised characters on the periphery of the marking roll by a backup roll and is similarly compressed against the drive roll by a pressure roll. Since the peripheries of the drive roll and marking roll have the same linear velocity, the characters are left as a clear printed impression on the tape, notwithstanding incremental advancement of the tape.





INVENTOR
DAVID S. KNUDSEN
 BY *Gravelly, Lieder & Woodhuff*
 ATTORNEYS

FIG. 3

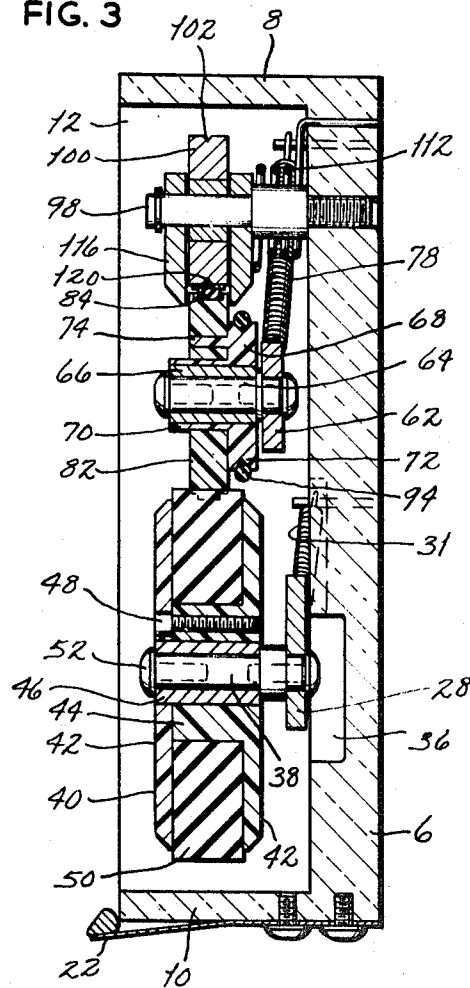
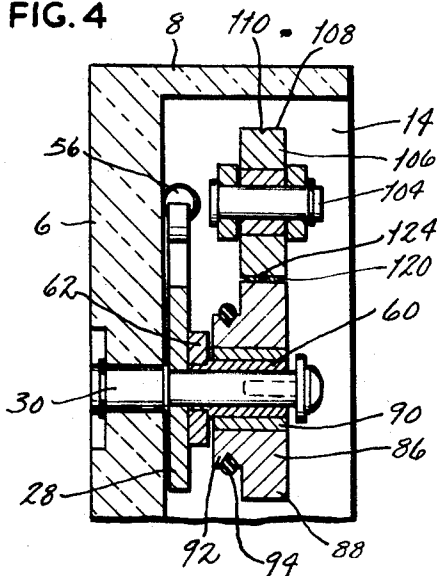


FIG. 4



INVENTOR

DAVID S. KNUDSEN

BY *Gravelly, Lieder & Woodhuff*

ATTORNEYS

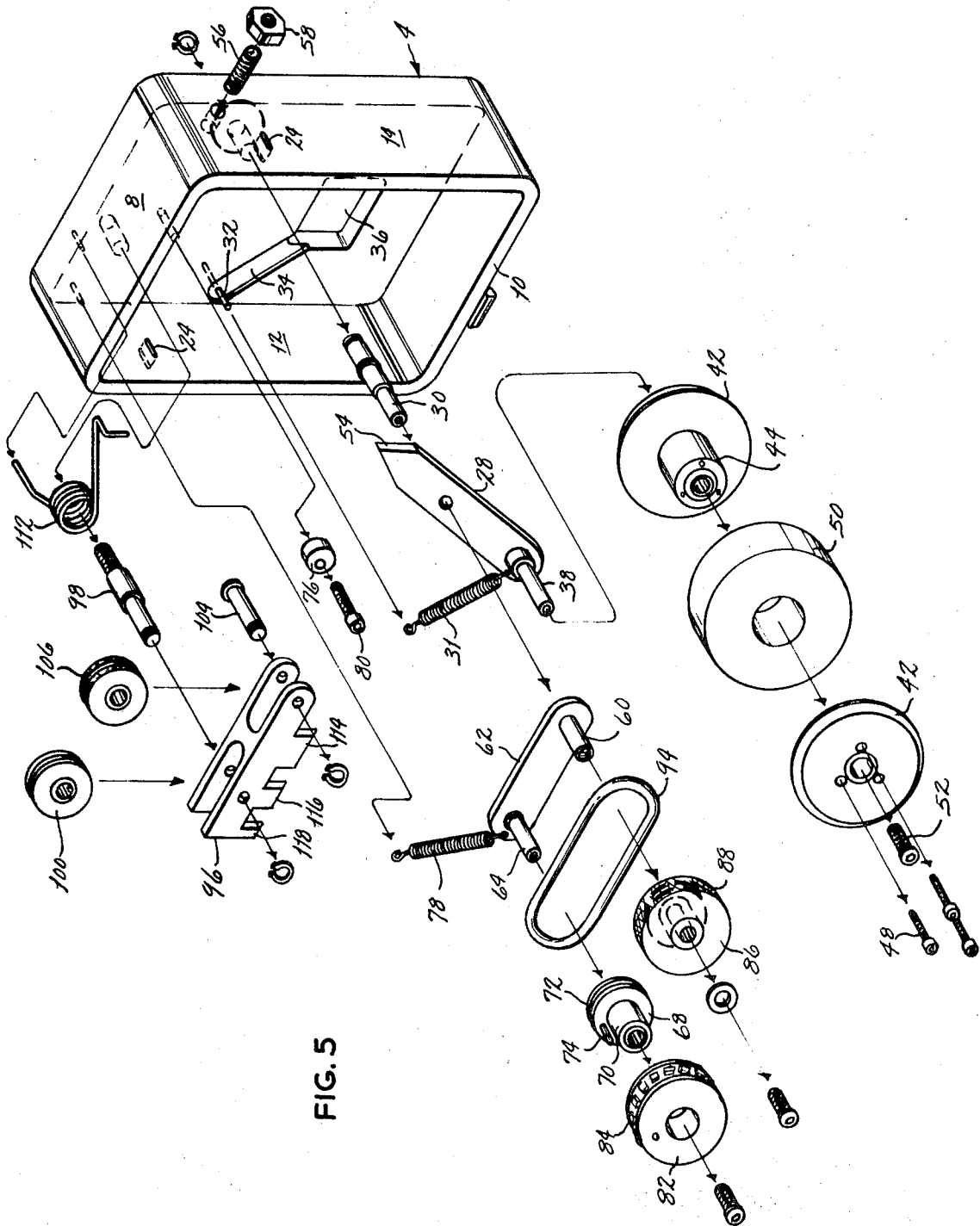


FIG. 5

INVENTOR
DAVID S. KNUDSEN
 BY *Gravelly, Lieder & Woodruff*
 ATTORNEYS

MARKING DEVICE

BACKGROUND OF THE INVENTION

This invention relates in general to marking devices and more particularly to a device for imprinting characters on extended lengths of materials.

Many different varieties of goods are now packaged and marketed in plastic bags having their ends gathered and held together by a piece of tape. This is particularly true of bakery goods, such as loaves of bread. Normally, the tape consists of a laminated strip of paper or plastic having a stiffening wire embedded intermediate its laminations. Adhesive coated plastic tapes are also used in such applications, although not to such a wide extent as the laminated paper variety.

In such packaging operations often the most convenient place to mark the package is on the tape holding the gathering together, and this is particularly true when the marking must be changed at periodic intervals. For example, bakeries often mark their bread wrappers with the day of the week during which the loaves contained within such wrappers were baked. For bakery goods sealed in plastic bags, the tape holding the gathering together is an ideal place for such markings since the tape is applied to the bags immediately after the bakery goods are introduced into them. The machines which apply the tape, however, render conventional printing procedures difficult inasmuch as they advance the tape incrementally or, in other words, in a series of successive jerks. Consequently, printing wheels which engage the tape and derive their motion directly from the tape tend to slip across the tape and blur the imprinted characters as the tape accelerates.

One of the principal objects of the present invention is to provide a device for imprinting characters on incrementally advanced material without blurring those characters. Another object is to provide a printing device of the type stated in which the indicia printed on the material can be easily altered. A further object is to provide an imprinting device of the type stated which marks package binding tapes and can be installed on existing wrapping machines utilizing such tapes in their operation. Still another object of the present invention is to provide an imprinting device of the type stated which is simple and rugged in construction and economical to manufacture.

These and other objects and advantages will become apparent hereinafter.

SUMMARY OF THE INVENTION

The present invention is embodied in a device for imprinting indicia on tape and includes drive means engaged by the tape and connected to a marking roll having characters over which the tape passes. The drive means is powered by the tape and drives the marking roll such that its periphery has the same linear velocity as the tape. Thus, the characters are left as a clear impression on the tape. The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the specification and wherein like numerals and letters refer to like parts wherever they occur:

FIG. 1 is a perspective view of a tape printing device constructed in accordance with and embodying the present invention;

FIG. 2 is a front elevation view of the tape printing device with the cover plate removed;

FIG. 3 and 4 are sectional views taken along lines 3—3 and —4 respectively, of FIG. 2; and

FIG. 5 is an exploded perspective view of the tape printing device

DETAILED DESCRIPTION

Referring now in detail to the drawings, 2 designates a tape printer including a housing 4 having a rear wall 6, an upper wall 8, a bottom wall 10, and sidewalls 12 and 14. The housing 4 further includes a cover plate 16 having a peripheral lip 18 which laps over the walls 8, 10, 12 and 14 and prevents dust and other airborne particles from entering the housing 4. The cover plate 16 is removably secured to the upper and bottom walls 8 and 10 by means of an upwardly projecting pin 20 in the former and a spring clip 22 on the latter. The sidewalls 12 and 14 are provided near their upper ends with elongated apertures 24 sized to accommodate an extended length of conventional package binding tape.

Internally the housing 4 is provided with a tape imprinting mechanism 26 including an inking arm 28 swingable about the axis of a main mounting pin 30 which is fitted securely in the arm 28 and is journaled for rotation in a bore formed in the rear wall 6 below the apertures 24. The inking arm 28 is biased in a clockwise direction by means of a coil spring 31 extending under tension between the lower end of the arm 28 and a pin 32 fitted into the rear wall 6 at the end of a diagonally extending groove 34 in which the spring 31 is partially contained. The groove 34 opens into a recess 36 located in the wall 6 beneath the extreme lower end of the inking arm 28 for accommodation of the head of an ink wheel spindle 38 which projects outwardly from the inking arm 28.

The ink wheel spindle 38 carries a split inking wheel 40 including a pair of spaced flanges 42 separated by a hub portion 44 which contains a pair of roller bearings 46 for journaling the wheel 40 on the spindle 38. The halves of the inking wheel 40 are held together by means of circumferentially spaced machine screws 48 in the hub portion 44. Accordingly, the wheel 38 may be split apart for reception of an inking roll 50 which is formed from a wicklike material capable of absorbing a suitable printing ink. The wheel 40 is maintained on the spindle 38 by a machine screw 52 threaded axially into the spindle 38.

At its upper end the inking arm 28 is provided with an abutment edge 54 which is biased against the end of an adjusting screw 56 by the spring 31. The screw 56 is threaded into the sidewall 14 above the aperture 24, and once set it is locked by a jam nut 58 threaded over it. The adjusting screw 56 limits clockwise rotation of the swing arm 28. The portion of the pin 30 projecting outwardly beyond the inking arm 28 fits into a bushing 60 which is, in turn, securely fitted into a marking arm 62 having a marking wheel spindle 64 fitted into and projecting outwardly from its other end. Journaled on the spindle 64 by means of roller bearings 66 is a marking wheel 68 integrally including a hub portion 70 and a grooved pulley portion 72, the latter of which is fitted with an axially extending drive pin 74 located in radially offset relation to the hub portion 70. The marking arm 62 is biased clockwise against a circular stop 76 by means of a coiled tension spring 78, and in that position the arm 62 is presented generally horizontally beneath the apertures 24. The stop 76 is secured to the rear wall 6 by a mounting screw 80 which is located eccentrically therein so that the exact angular disposition of the marking arm 62 when unrestrained can be altered.

The marking wheel 68 carries a marking roll 82 which fits over the hub portion 70 against the grooved pulley portion 72 and is prevented from rotating relative to the wheel 68 by the drive pin 72. On its periphery the marking roll 82 is provided with raised characters 84 which roll across the peripheral surface of the inking roll 50. Since the marking arm 62 and inking arm 28 are swingable relative to one another the two arms can be spread apart for installation of the marking roll 82 on the former and the inking roll 50 on the latter without having one interfere with the other. Moreover, the adjusting screw 56 allows only the outer periphery of the inking roll 50 to engage the marking roll 82 at the raised characters 84 so that the roll 82 is not over inked.

The bushing 60 on the marking arm 62 carries a drive roll 86 provided with a knurled outer surface 88 which is diametrically equal in size to the marking roll 82 at the outer ends of the raised characters 84. The drive roll 86 is journaled on the bushing 60 by means of a roller bearing 90, and it integrally includes a grooved pulley portion 92 which is diametrically equal to the pulley portion 72 on the marking wheel 68. The grooved pulley portions 72 and 92 accept an elastomeric drive belt 94 so that the drive roll 86 and marking roll 82 rotate in unison at the same angular velocity. Moreover, their peripheries have the same linear velocity. The diametrical size of the rolls 72 and 92 is such that their outer peripheries will pass tangent to the plane defined by the longitudinal center lines of the elongated apertures 24.

The tape imprinting mechanism 26 further includes a bifurcated pressure arm 96 which is disposed generally horizontally above the marking arm 62 and swings on a pin 98 threaded securely into the rear wall 6 above the marking wheel spindle 64 on the marking arm 62. Journaled on the pin 98 intermediate the furcations of the arm 96 is backup roll 100, the outer surface of which is centrally provided with a peripheral groove 102 and passes in juxtaposition to the raised characters 84 of the marking roll 82. At its opposite end above the mounting pin 32 the furcations of the bifurcated arm 96 are connected by a cross pin 104 on which a pressure roller 106 is journaled. The pressure roll 106 aligns with the drive roll 86 and is provided with a knurled outer surface 108 into which a peripheral groove 110 is cut. The knurled outer surface 108 of the roll 106 is biased against the knurled outer surface 88 of the drive roll 86 by a spiral spring 112 which is wound around the pin 98 and connected at its ends with the rear wall 6 and the bifurcated arm 96. Finally, the furcations of the arm 96 depend downwardly beyond the peripheries of the rolls 100 and 106 in the provision of opposed sets of guide tabs 114, 116 and 118 which are spaced apart a distance slightly less than the length of the apertures 24. The guide tabs 116, moreover depend downwardly beyond the sides of the marking roll 82 so as to preclude outward withdrawal of that roll when the marking arm 62 is in its raised or horizontal position.

The tape printer 2 is used in conjunction with packaging machine (not shown) of the variety which gathers and ties the ends of packages with a short length of the tape 120. The tape 120 is supplied commercially in extended lengths on rolls and is advanced incrementally prior to each tying operation by the packaging machine. Normally, although not necessarily, the tape 116 is of the laminated paper variety, reinforced and stiffened by a wire 124 which is centrally embedded within it between the paper laminations.

In use the end of the extended length of tape 12 is passed through the elongated aperture 24 in the sidewall 14, and with the pressure arm 96 raised it is threaded intermediate the knurled surfaces 88 and 108 on the drive roll 86 and the pressure roll 106, respectively. The tape 120 is then advanced between the pair of guide tabs 114 and with the marking arm 62 pressed downwardly against the bias of its spring 78 the tape 120 is threaded intermediate the backup roll 100 and the marking roll 82 as well as between the remaining pairs of guide tabs 116, 118. In this connection, the eccentric stop 76 should be turned such that the raised characters 84 barely contact the backup roll 100 when the tape 120 is withdrawn from the imprinter 2. The longitudinally extending ridge created on the tape 120 by the embedded wire 124 will project into the grooves 102 and 110 on the rolls 100 and 106, leaving the smooth surface on the backup roll 100 and the knurled surface 108 on pressure roll 106 free to engage the tape 116 on each side of the wire 124. The tape 120 is then passed through the aperture 24 in the sidewall 12 and into the packaging machine where it is threaded into the tying mechanism thereof.

If the proper marking roll 82 is not on the marking wheel 68, the one on it at the time is withdrawn after first depressing the marking arm 62 and spreading the inking arm 28 from it. That roll 82 is then set aside and replaced with another roll 82

having characters 84 which correspond to the particular markings which are desired on the tape 120. Once the proper marking roll 82 is in place, the adjusting screw 56 is turned such that the outer surface of the inking roll 50 will engage the raised characters 84, but not the portions of the roll 82 located intermediate the characters 84.

As the tape 120 is advanced through the housing 4 it is compressed against the knurled surface 88 of the drive roll 86 by the pressure roller 106, and consequently the tape 6 imparts rotation to the roll 88. Inasmuch as the knurled surface 106 partially embeds in the tape 116 no slippage occurs, even when the tape 118 is advanced incrementally, and, therefore, at any given instance the linear velocity at the periphery of the drive roll 86 will equal the linear velocity of the tape 116. Since the marking roll 82 is driven by the drive roll 86 through the drive belt 94 such that their peripheries have the same linear velocity, the characters 84 will follow the tape 120 as it passes between the marking roll 82 and the 116 roll 100. The end result is a clear printed impression left on the tape 116 irrespective of its rate of advance or the magnitude of acceleration the tape 120 experiences.

While the marking roll 82 and drive roll 86 are equal in size, they may also be of different diametral sizes in which case the size of the pulley portions 72 and 92 would have to be adjusted so that the rolls 82 and 86 have the same linear velocity at their peripheries.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departure from the spirit and scope of the invention.

What is claimed is:

1. A device for imprinting characters on tape; said device comprising a marking roll having selected characters defining at least a portion of its peripheral surface and in engagement with the tape, drive means engaging the tape and being powered by movement of the tape, said drive means comprising a drive roll mounted for rotation about a first fixed axis, a pressure roll engaging the tape at the drive roll and mounted on a pressure arm swingable about a second fixed axis, means for urging the drive and pressure rolls toward one another so that the tape is compressed therebetween and urged against the peripheral surface of the drive roll so that the tape rotates the drive roll whereby the linear velocity at the peripheral surface of the drive roll is equal to the velocity of the tape, connecting means interconnecting the drive roll and marking roll for rotating the marking roll such that the peripheries of the two rolls have substantially the same linear velocity, a backup roll mounted for rotation about the second fixed axis and engaging the tape at the marking roll, said backup and marking rolls being biased together so that the tape is compressed therebetween, the characters on the marking roll have substantially the same linear velocity as the linear velocity of the tape, whereby a clear printed impression of the characters will be left on the tape.

2. A device according to claim 1 wherein the pressure arm is provided with at least one pair of opposed tabs which extend across the side margins of the tape and prevent the tape from running laterally off of the drive and marking rolls.

3. A device for imprinting characters on tape having a stiffening wire embedded therein said tape being relatively wide as compared to the wire embedded therein, said device comprising a marking roll having selected characters defining at least a portion of its peripheral surface and in engagement with the tape, and drive means engaging the tape and being powered by movement of the tape, said drive means comprising a drive roll, a pressure roll engaging the tape at the drive roll, means for urging the drive and pressure rolls toward one another so that the tape is compressed therebetween and urged against peripheral surface of the drive roll so that the tape rotates the drive roll whereby the linear velocity at the peripheral surface of the drive roll is equal to the velocity of the tape, elastic belt connecting means interconnecting the drive roll and marking roll for rotating the marking roll such

that the peripheries of the two rolls have substantially the same linear velocity, and backup roll engaging the tape at the marking roll, said backup and marking rolls being biased together so that the tape is compressed therebetween, the characters on the marking roll have substantially the same linear velocity as the linear velocity of the tape, whereby a clear printed impression of the characters will be left on the tape said pressure roll and backup roll being substantially flat across the entire width of the outer periphery for supporting said tape and having a peripheral groove relatively small in width compared to the width of the roll to accommodate the wire embedded in the tape.

4. A device for imprinting characters on tape; said device comprising a marking roll having selected characters defining at least a portion of its peripheral surface and in engagement with the tape, drive means engaging the tape and being powered by movement of the tape, said drive means comprising a drive roll, a pressure roll engaging the tape at the drive roll, means for urging the drive and pressure rolls toward one another so that the tape is compressed therebetween and urged against the peripheral surface of the drive roll so that the tape rotates the drive roll whereby the linear velocity at the peripheral surface of the drive roll is equal to the velocity of the tape, the tape engaging surfaces of the drive and pressure rolls being knurled so that the tape is at least partly embedded in the knurls to provide a positive nonslipping drive when subjected to external incremental pulls, connecting means interconnecting the drive roll and marking roll for rotating the marking roll such that the peripheries of the two rolls have substantially the same linear velocity, and a backup roll engaging the tape at the marking roll, said backup and marking rolls being biased together so that the tape is compressed therebetween, the characters on the marking roll have substantially the same linear velocity as the linear velocity of the tape, whereby a clear printed impression of the characters will be left on the tape, the drive and marking rolls being substantially aligned so that the tape passes between the rolls in a substantially straight path, the pressure roll and the backup roll being mounted on a movable carriage having guide means for maintaining the marking roll in alignment with the drive roll and for restraining the tape against lateral movement off the drive and marking rolls.

5. A device for imprinting characters on tape; said device comprising a marking roll mounted on a marking arm and having selected characters defining at least a portion of its peripheral surface and in engagement with the tape, drive means engaging the tape and being powered by movement of the tape, said drive means comprising a drive roll, a pressure roll engaging the tape at the drive roll, means for urging the drive and pressure rolls toward one another so that the tape is compressed therebetween and urged against the peripheral surface of the drive roll so that the tape rotates the drive roll whereby the linear velocity at the peripheral surface of the drive roll is equal to the velocity of the tape, the tape engaging

surfaces of the drive and pressure rolls being knurled so that the tape is at least partly embedded in the knurles to provide a positive nonslipping drive when subjected to external incremental pulls, connecting means interconnecting the drive roll and marking roll for rotating the marking roll such that the peripheries of the two rolls have substantially the same linear velocity, a backup roll engaging the tape at the marking roll, said backup and marking rolls being biased together so that the tape is compressed therebetween, the characters on the marking roll have substantially the same linear velocity as the linear velocity of the tape, whereby a clear printed impression of the characters will be left on the tape, the drive and marking rolls being substantially aligned so that the tape passes between the rolls in a substantially straight path, an inking roll mounted on an inking arm, the inking and marking arms being swingably mounted for limited rotation about a single axis coincident to the axis of rotation of the drive wheel, means for biasing the inking roll toward the marking roll for engagement with the characters thereon, and adjustable limit means for preventing the inking roll from advancing toward the marking roll beyond a predetermined position.

6. A device for imprinting characters on independently driven tape comprising:

- 1 A rotatable marking roll having selected characters defining at least a portion of its peripheral surface,
- 2 a rotatable drive roll mounted a fixed lateral distance from the marking roll when in tape imprinting position,
- 3 a rotatable pressure roll juxtaposed with respect to the drive roll and biased toward the drive roll to grip the tape therebetween, the pressure roll and drive roll being relatively movable to permit threading of tape therebetween,
- 4 a rotatable backup roll juxtaposed with respect to the marking roll and biased toward the marking roll to grip the tape therebetween, the backup roll and marking roll being relatively movable to permit threading of tape therebetween,
- 5 the tape being independently driven and being the sole driving means for rotating the drive roll,
- 6 means interconnecting the drive roll and the marking roll for simultaneous rotation, whereby the linear velocity at the peripheral surface of the drive roll is the same as the velocity of the tape and the characters on the marking roll have substantially the same linear velocity as the linear velocity of the tape so that a clear printed impression of the characters will be left on the tape,
- 7 means associated with the rolls for positioning the tape with respect to the rolls as the tape is pulled through the rolls, and
- 8 said pressure roll and backup roll being substantially flat across the entire width of the outer periphery for supporting said tape and having a groove relatively small in width compared to the width of the roll to accommodate a raised portion of the tape.