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Boshinski et al.

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[54] **PRINTING APPARATUS**

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[52] **U.S. Cl.** ..... **101/93 R,** 101/288, 101/336, 197/168

[51] **Int. Cl.** **B41j 15/20,** B41f 31/16

[58] **Field of Search** .....101/96, 93 MN, 93 R, 93 C, 101/336, 66, 91, 274, 113; 197/133 R, 153 R, 168

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[57] **ABSTRACT**

A tape printing apparatus for use in connection with a weighing scale includes a set of printing wheels which are electrically positioned in accordance with signals from circuitry within the weighing scale. A roll of adhesive tape is contained within the apparatus, and tape may be removed manually from the roll by the operator. A continuous inked ribbon is provided with the ribbon being positioned between the printing wheels and the tape so that, as the printing wheels are pressed through the ribbon and against the tape, a visible indication of the electrical input signal is provided on the tape. This indication may include such things as weight, price per unit weight, and/or total value of the merchandise on the scale platform. Removal of the tape with the printing thereon from the machine also causes the movement of the inked ribbon so that fresh ribbon will be positioned between the tape and the printing wheels in preparation of the next printing operation.

2 Claims, 7 Drawing Figures

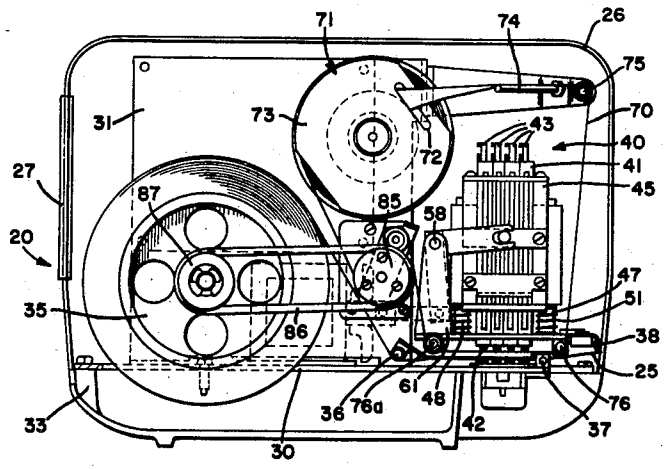


FIG-1

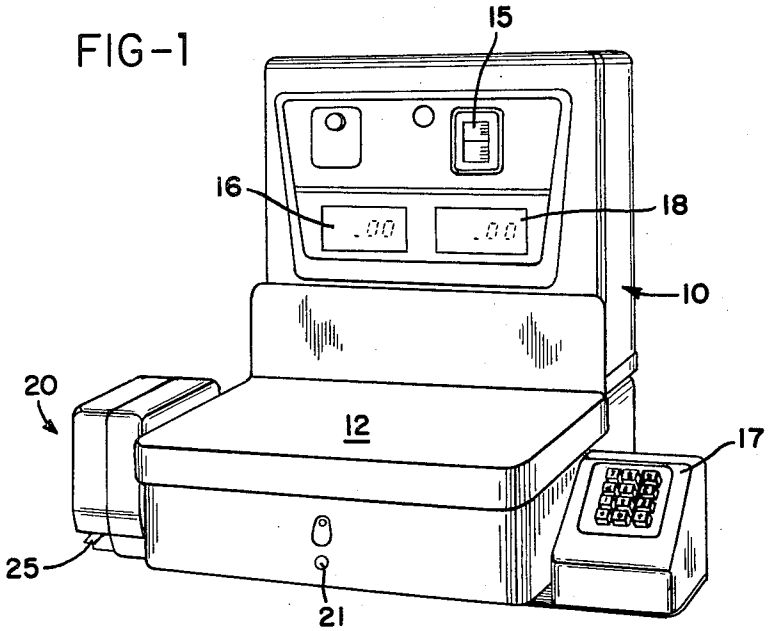
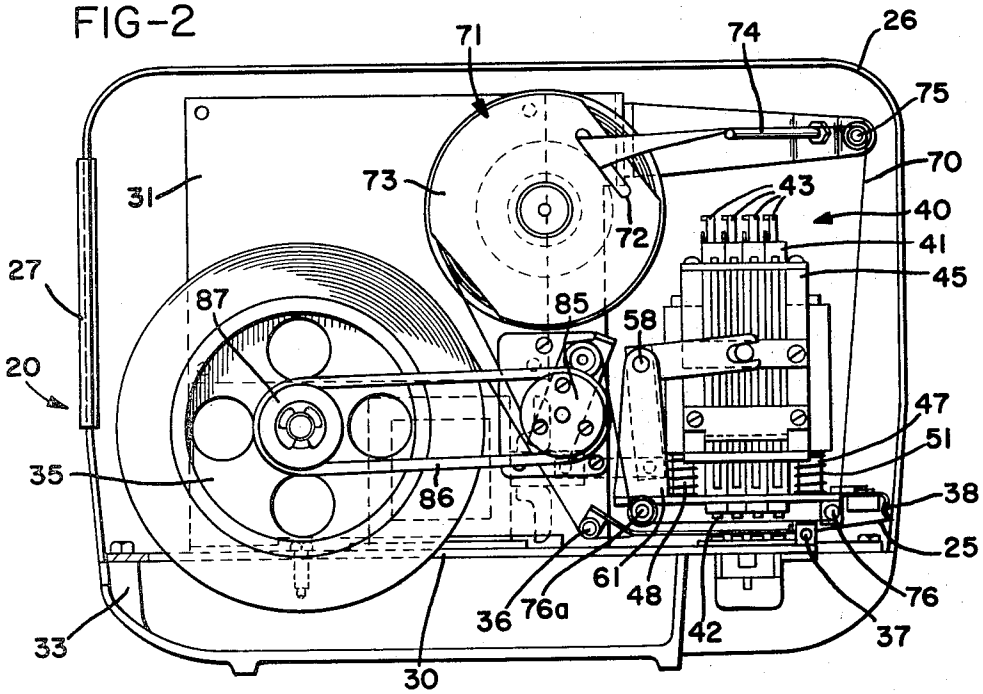


FIG-2



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FIG-3

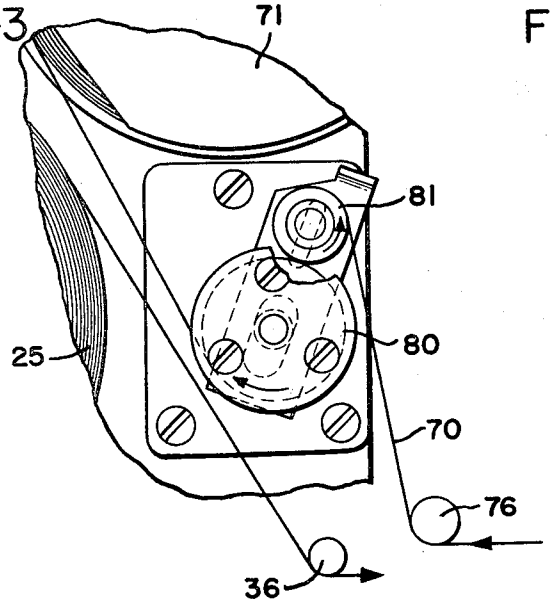


FIG-4

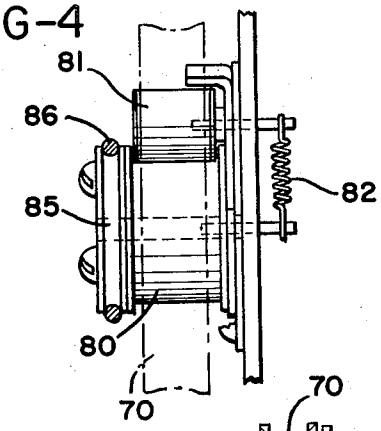


FIG-5

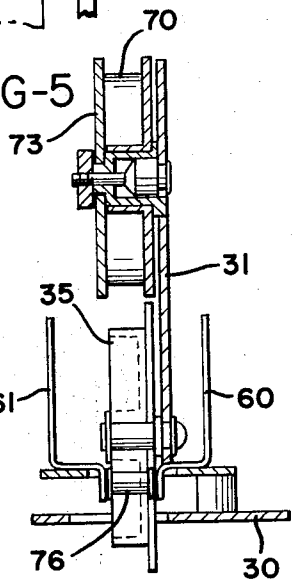


FIG-6

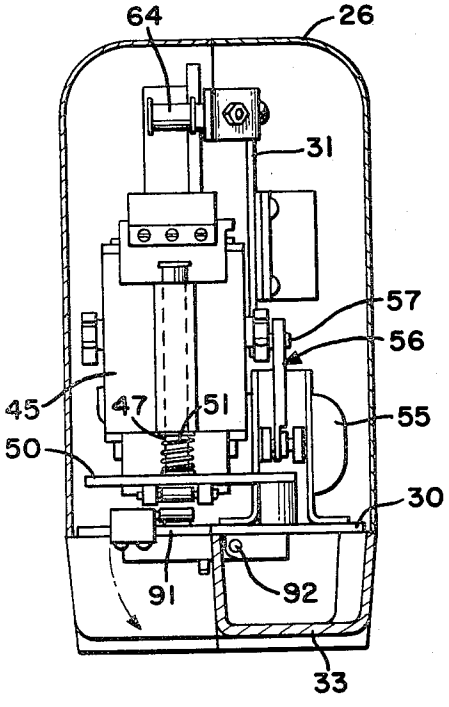
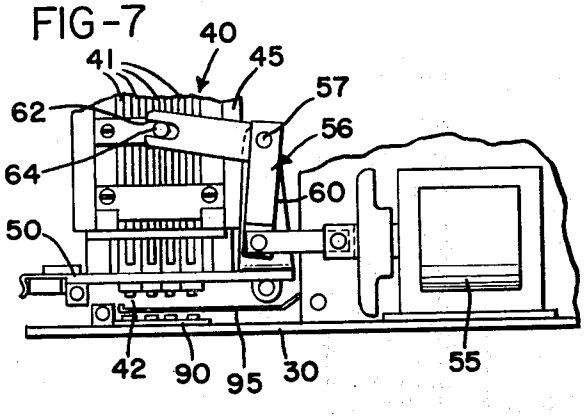


FIG-7



PRINTING APPARATUS

BACKGROUND OF THE INVENTION

In a grocery store operation, there are many places where a weighing scale is used which is provided with charts or some other means for calculating the total price of merchandise placed on the scale. Once the total value of the goods is known, the operator usually marks the package containing the goods with this information.

SUMMARY OF THE INVENTION

This invention relates to a tape printing apparatus which may be attached to a weighing scale which will provide on adhesive tape a printed representation of the total value, the weight, and/or the price per unit weight of goods placed on the scale platform. More particularly, this invention relates to a relatively inexpensive printer attachment containing a roll of adhesive tape on which this information may be printed with the printed portion of the tape being manually removed from the device, separated from the remainder of the roll, and made available to the operator so that it may be placed directly on the goods.

The printing apparatus includes a supply reel for holding tape having adhesive coated on one side thereof and means for directing this adhesive to a location accessible at the exterior of the device. A cutting edge is provided so that the operator may separate the printed portion of the tape removed from the device from the remainder of the reel. In the preferred embodiment of the invention, a plurality of electrically positionable type wheels are placed side by side and mounted for reciprocating movement within the device. These type wheels contain numbers around its outer circumference which are positioned by electrical signals provided by the circuitry within the weighing scale.

The weighing scale used with the preferred embodiment includes an optical chart which is rotated through an angular displacement proportional to the weight of an object placed on the scale platform, and photocell detectors decode the optical information from the chart to provide an indication of the total weight. Price per unit weight information is supplied by a keyboard, and both the price per unit weight and the total value of the commodity is then displayed visually on electronic display tubes. The same circuitry used to display the total value also supplies the signals to the printing wheel modules to set these devices to their appropriate positions.

The tape printing device also includes a continuous inked ribbon roll, with a portion of the ribbon positioned between the printing wheels and the adhesive tape. An electrical solenoid is used to move the printing wheel modules against the adhesive tape through the inked ribbon to impress upon the tape a visual representation of the electrical signals supplied thereto. The electrical solenoid may be actuated by a push button accessible to the operator at the exterior of the printing device or preferably at the scale when the operator desires to record the price or weight information. During printing the adhesive side of the tape is opposite the printing wheels and is supported by a resinous block to which the adhesive does not adhere. Fresh inked ribbon is provided between the printing wheels and the tape prior to each printing operation by advancing the ribbon each time adhesive tape is removed from the printing device. In the preferred embodiment, a capstan having a pulley attached thereto is used to advance the inked ribbon, and this capstan is rotated by a belt connected to the tape supply reel.

Accordingly, it is an object of this invention to provide an improved and inexpensive tape printing device which includes a continuous inked ribbon positioned between a font of type and a tape wherein the inked ribbon is moved each time the tape is removed from the apparatus; and to provide a label printing apparatus in which a font of type is electrically controlled and which is moved into engagement with tape through a continuous inked ribbon.

These and other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view showing a weighing scale and the label printing device of this invention;

FIG. **2** is an elevational view with a portion of the housing removed to show the printing device of this invention;

FIG. **3** is a side view showing in detail the mechanism for moving the inked ribbon;

FIG. **4** is an end view showing in detail the mechanism for moving the inked ribbon;

FIG. **5** is a cross sectional view showing the main supporting frame;

FIG. **6** is an end view of the label printer attachment; and

FIG. **7** is a view showing in detail the electrical solenoid and the means for moving the type wheels into engagement with the tape.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIG. **1**, a weighing scale **10** includes a platform **12** on which merchandise may be placed with the weight of the merchandise being shown optically at **15.** The price per unit weight may be displayed visually by means of electronic numerical display tubes **16,** with this price information being supplied by means of a keyboard **17.** Electronic circuitry within the scale **10** computes the total price which is displayed by a second set of electronic tubes **18.**

A printer **20** is electrically connected to the weighing scale **10,** and this printer attachment may record in permanent form the total value of the merchandise when the operator actuates an electrical switch **21.** It is to be understood that not only the total value of the merchandise, but its type, price per unit weight, and/or total weight could also be recorded in this same manner. The record is made on a tape **25** which is accessible at the front of the printer. The printed portion of the tape may be manually removed from the printer and placed upon the merchandise. In the preferred embodiment, the tape has an adhesive coating on one side and thus it may be applied directly to seal the wrapping material containing the merchandise.

The printer **20** includes a housing **26** which is hinged at its rear at **27** to permit access to its interior. Within the housing **26** is mounted a horizontal frame member

30 and a vertical frame member 31 with these two frame members being joined together. The horizontal frame member is bolted to a base 33. A tape supply reel 35 is rotatably supported on the vertical frame member 31, and a roll of adhesive tape 25 is mounted thereon with the tape being directed to the exterior of the housing by guide rollers 36 and 37. A cutter 38 permits the operator to cut the tape 25 after it has been withdrawn from the housing.

A font of type used to print the value of the merchandise placed on the scale platform, its weight, and/or its price per unit weight is shown generally at 40, and, in the embodiment shown, includes four type modules 41, such as Model CMTOP/27/ manufactured by Practical Automation, Inc., Shelton, Conn. Each module includes a circular type wheel 42, a portion of which extends from its lower end, having numbers which may be selected electronically through electrical contacts 43 accessible at the top of each module. As mentioned above, electronic signals used to set the type wheels are provided by electronic circuitry within the scale 10.

The modules 41 are mounted together within a housing 45 and reciprocate together between a first or rest position, as shown in FIG. 2, and a second position where the type wheels engage the tape 25. The housing 45 is slidably mounted on two shafts 47 and 48 which extend vertically upwardly from a horizontal platform 50 which is in turn mounted on the horizontal frame member 30. The housing 45 is held upwardly in the first position by springs 51.

The means for moving the font of type 40 from its rest position to its second position is provided by electrical solenoid 55 (FIG. 7). This solenoid is connected through a mechanical linkage 56 to the housing 45. The linkage 56 is pivotally supported at 57 and 58 on vertically upstanding supports 60 and 61. Slotted ends 62 and 63 cooperate with pins 64 and 65 extending from the housing 45 to move the housing downwardly to the second position upon energization of the solenoid and upon actuation of the solenoid, the housing will move downwardly to its second position.

A continuous inked ribbon 70 is supplied from a reel 71 and is placed between the type wheels 42 and the tape 25. As shown in FIG. 2, the inked ribbon 70 is removed from the center of the roll 71 through a slot 72 in an outer cover plate 73, directed over a straightening bar 74 and around rollers 75 and 76, between the type wheels 42 and the tape 25, and roller 76*a* where it is then returned to the outermost layer of the continuous roll.

The ribbon is removed from the roll by the rotation of a capstan 80. The ribbon 70 engages this roll for approximately 180° (FIG. 3) in order to provide the necessary frictional force to move the inked ribbon. A pressure roll 81 (FIGS. 3 and 4) assists in maintaining the ribbon 70 in continuous contact with the capstan 80 and a spring 82 biases the roll 81 against the capstan 80.

The capstan 80 has mounted thereto a pulley 85. A flexible belt 86 is connected to this pulley and to a pulley 87 attached to rotate with the reel 45 so that as tape 25 is removed from the printing device, the capstan 80 is rotated and the inked ribbon is then moved to a new position in preparation for a new printing operation.

During printing the tape 25 is supported by a pad 90 which is formed from a material, such as Teflon, to which the adhesive side of the tape 25 will not adhere. This pad 90 is mounted on a doorlike platform 91 and this platform is pivotally mounted at 92 to the frame 30 to allow easy threading of the tape 25.

A thin elongated plate 95, pivotally supported on the same axis as roller 36, is also positioned between the type wheels and the tape 25. This plate has an opening which allows the printing wheels to carry the inked ribbon into engagement with the tape.

SUMMARY

The label printing apparatus thus described therefore provides an inexpensive and efficient means for providing a printed indication of the total value, the price per unit weight, and/or the weight of the merchandise placed on a scale platform. A continuous inked ribbon, which is advanced each time the printed portion of the tape upon which this information is printed is removed from the device, is used and therefore very little attention to this device is required.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and the changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. Printing apparatus for use in connection with a weighing scale to provide a permanent, visible indication from an electrical signal generated within the scale, said apparatus including

a housing;

means for rotatably supporting a roll of pressure sensitive adhesive tape within said housing, said tape having a surface onto which may be printed said visible indication;

a font of type selectable by the electrical signal from the weighing scale;

means for supporting said font of type within said housing for movement between a first or rest position, and a second or printing position;

a continuous inked ribbon supported within said housing, a portion of said ribbon positioned between said font of type and said tape;

means for moving said font from said first position to said second position to press said type through said inked ribbon and against said tape to provide a printed representation of the electrical signal from said scale;

tape supporting means positioned on the side of the tape opposite said font of type for supporting said tape against movement during printing, the tape engaging portion of said means including a resinous material to which the adhesive on said tape does not adhere;

means defining an opening in said housing through which said adhesive tape may be manually removed after said visible indication has been printed thereon; and

means responsive to the rotation of said roll of tape as the tape is manually removed from said housing for advancing said inked ribbon to a new position, said means including

a pulley mounted for rotation with said means supporting said roll of tape, a capstan frictionally engaging said inked ribbon and including a second pulley mounted for rotation therewith, and a flexible belt connected between said pulleys for ad-

vancing said inked ribbon to a new position as said tape is manually removed and said roll of tape rotated.

2. The apparatus of claim 1 further including a solenoid attached to said type supporting means for moving said type from said first position to said second position upon the application of an electrical signal thereto.

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