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(54) BAR CODE PRINTING DEVICES

(71) We, KABUSHIKI KAISHA SATO KENKYUSHO, a Japanese Company of 21-23, 3-Chome, Kamikitazawa, Setagaya-ku, Tokyo, Japan do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates generally to a label printing and applying apparatus of stationary or portable type, and more particularly to bar code printing devices made usable with the label printing and applying apparatus for printing the bar codes which can be read out in the whole directions by the use of an optical reader.

Recently, POS (Point-of-Sale) systems utilizing an electronic computer are put into practice in supermarkets of large scale. In these systems, bar codes are displayed directly on packages or bags of merchandise or indirectly through labels or tags on the merchandise. The bar codes thus displayed are optically read out upon the checkout so as to control the sales, stock and management of the merchandise.

Symbol marks representative of the bar codes are the UPC (Universal Product Codes) symbol marks which are adopted by the U.S. Supermarket Institute. In the UPC symbols marks, each of the characters corresponding to the ten numerals "0" to "9" is composed of seven modules. Each of the characters is composed of one or two continuous modules, namely, of a combination of two dark bars and two light spaces, both of which have different widths. A plurality of characters thus formed are arranged in parallel so as to form the bar codes displaying information concerning one merchandise. The characters, which are composed of an odd or even number of dark bars, are called odd or even parity characters, respectively.

The portable or stationary label printing and applying apparatus conventionally used in the supermarkets or the like are equipped with a bar code printing device as as to meet the in-store coding requirements. In the conventional printing device, there are rotatably juxtaposed a plurality of bar coding rings of regular decagonal shape, each of which carries on its ten outer peripheral sides the bar coding types of either odd or even parity characters corresponding to the ten numerals "0" to "9". Thus each bar coding ring carries either only odd or only even parity characters. The printing device of this type can be applied without any difficulty to the Version A of the UPC symbol marks, in which the modes of the parity to be adopted are hardly varied at all times. However, the printing device can not be applied as it is to the Version E of the UPC symbol marks, in which the modes of the parity have to be varied in accordance with the numeral of the module check type, as will be explained in connection with Table 1.

In order to accomplish the printing operations of the Version E, either of the following requirements has to be satisfied in the conventional printing device:

(1) The bar coding ring sets of odd and even parities should be exchanged to obtain the combination in Table 1 for every numeral of the module check type; and

(2) Ten sets of the printing devices having ten variations in the parity combination in accordance with Table 1 should be prepared and replaced for every printing operation.

As a result, the label applying and printing device of conventional type requires not only troublesome operations but also high cost.

According to this invention a bar code printing device for use with a label printing and applying apparatus capable of accomplishing a plurality of cycles, each having the steps of printing, dispensing and applying a label to a merchandise comprises; a pair of end plates

adapted to be fixed to the frame of said label printing and applying apparatus; a support shaft assembly interposed fixedly between said end plates; a plurality of bar coding rings juxtaposed to one another between said end plates and mounted on said support shaft assembly in an independently rotatable manner of one another, each of said bar coding rings carrying bar coding types of both odd and even parities on its outer periphery; and a bar code selecting shaft made rotatable and axially movable for selectively turning one of said bar coding rings to bring the desired one of said bar coding types into its printing position; each of said bar code rings being shaped to have twenty regular sides and carrying bar code types of both odd and even parities on the outer peripheral sides.

The invention may be performed in various ways and one specific embodiment will now be described by way of example with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view showing the general construction of a bar code printing device exemplifying the present invention;

Figure 2 is an exploded perspective view showing assembly of the parts of the printing device of the present invention;

Figures 3(a), 3(b) and *3(c)* are perspective views showing the index frame, the pressure plate and the irrotational bar coding ring of the present printing device;

Figure 4 is a front elevation showing the body of the present printing device;

Figure 5 is a longitudinal section of the body of the present printing device;

Figure 6 is a section of the present printing device taken along the line 6 - 6 of Figure 5;

Figure 7 are side elevations showing the bar coding ring assembly, the pressure plate and the push button of the present printing device;

Figures 8(a) and *8(b)* are enlarged sections of Figure 5 but show the conditions, in which the bar coding rings are in contact with one another and in which rotation-allowing clearances are formed between the bar coding rings, respectively;

Figure 9 is an enlarged top elevation showing one example of the UPC symbol marks of the Version A; and

Figure 10 is also an enlarged to elevation showing one example of the UPC symbol marks of the Version E.

Before entering into the detailed description of the printing device, the aforementioned UPC symbol marks will now be discussed in connection with Figures 9 and 10 so as to more clarify the background of the present invention. The Version A, which is the most fundamental one of the five Versions A to E of the UPC symbol marks, is composed of ten characters which are divided into five characters 21 of odd parity at the lefthand side of centre bars 22 and five characters 23 of even parity at the righthand side, as shown in Figure 9. At the left end, there are arranged guard bars 24 and number system characters 25 for affording information about the meaning of the codes. At the right end, moreover, there are also arranged other guard bars 26 and module check characters 27 for ensuring the checks as to whether the code-reading operations are correctly accomplished or not.

There is also a simplified version called the Version E, in which the numerals "0" of the undesired units are eliminated from the lefthand and righthand characters 21 and 23 of the Version A to make a sum of five characters and in which the centre bars 22, the number system characters 25 and the module check characters 27 are also eliminated. This simplified Version E is used, in case a merchandise is so small that it cannot be imprinted by other Versions A to D, and is composed of six centre characters 28 and the guard bars 24 and 26 at the both ends, as seen from Figure 10. In this Version E, moreover, the six characters 28 are different in the indication mode of numerals 0 to 9 and are indicated by three even parity characters and three odd parity characters. The selection as to which parity should indicate a character in any unit is regulated, as exemplified in Table 1, in accordance with the numeral of the module check type which is calculated from the numeral in the original Version A by a predetermined calculating method.

TABLE 1

Numeral of Module Check	Printing Unit Position 1	2	3	4	5	6
0	E	E	E	O	O	O
1	E	E	O	E	O	O
2	E	E	O	O	E	O
3	E	E	O	O	O	E
4	E	O	E	E	O	O
5	E	O	O	E	E	O
6	E	O	O	O	E	E
7	E	O	E	O	E	O
8	E	O	E	O	O	E
9	E	O	O	E	O	E

Letter "E" : Even Parity

Letter "O" : Odd Parity

It will be apparent from Table 1 that there are ten modes for indicating the six characters, in the Version E, in a manner to correspond to the numberals 0 to 9 of the module check types. Therefore, the check as to whether the code-reading operations are correctly accomplished or not is accomplished by confirming with use of an electronic computer whether the even and odd parity characters are three, respectively, or not.

The present invention will now be described in detail in connection with its preferred embodiment with reference to the accompanying drawings. Generally indicated at reference numeral 30 in Figure 1 is a printing device according to the present invention. This printing device 30 is mounted for use on the frames 31 and 31'of a label printing and applying apparatus of stationary or portable type, as shown in Figure 5.

Each of bar coding rings 32 is formed into a regular twenty-angular shape and is formed on the ten outer peripheral sides of its half with bar coding types 33*a* of odd parity which imply the numerals 0 to 9 of the UPC symbol marks and which are arranged consecutively. The other half of each of the bar coding rings 32 are also formed on its ten outer peripheral sides with bar coding types 33*b* of even parity which also imply the numerals 0 to 9 and which are arranged similarly. At one end of each of the outer peripheral sides, moreover, there is formed a numeral type 34 which corresponds to each of the bar coding types 33*a* and 33*b*.

In the illustrated embodiment, the bar coding rings 32 are composed of seven ring elements 32*a* to 32*g*, of which: the ring element 32*a* is formed with the types for the guard bars 24 and with the bar coding types 33*a* and 33*b*; the ring elements 32*b* to 32*f* are formed with the bar coding types 33*a* and 33*b*; and the ring element 32*g* is formed with the types for the guard bars 26.

On the other hand, the inner peripheries of the bar coding rings 32 are formed with internal teeth 35, as better seen from Figures 2 and 3. Indicated at numeral 36 is a support member which is formed integrally with such elastic retaining members 37 in pairs of the number corresponding to that of the bar coding rings 32 as are afforded with elastic forces in the centrifugal direction. The support member 36 and the retaining members 37 are thus made to constitute a support shaft assembly 38, which has its outer periphery inscribed with the internal teeth 35 of the bar coding rings 32. Moreover, indicated at numeral 39 are support pins which extend through and protruded from the support member 36 so as to support the support shaft assembly 38. The bar coding ring assembly of the elements 32*a* to 32*g* are mounted on the support shaft assembly 38 such that the retaining members 37 of the

support member 36 engage with the inter-tooth roots 42 of the internal teeth 35. As a result, the respective bar coding rings 32 are rotatably supported on the support shaft assembly 38 in juxtaposition to one another.

The support pins 39 are supported at both their ends in a pair of end plates 42 and 42'. These end plates 42 and 42' are used to act as the frame 43 of the printing device of the present invention so as partly to rotatably support the respective bar coding rings 32 in the frame 43 together with the support shaft assembly 38 and partly to hold the assembly of the bar coding rings 32 at its sides both. Thus, the internal size of the frame 43 is determined by inserting a cylindrical shaft 44, which is formed with internal threads, into a through hole in the support shaft assembly 38 and then by fastening two screws 45 into the cylindrical shaft 44 from the outsides of the end plates 42 and 42'.

Referring now to Figures 5 and 7 as well as Figure 2, numeral 46 is a pinion which is made engageable with one of the bar coding rings 32 at its internal teeth 35 so as to turn the selected bar coding ring 32. The pinion 46 thus made is arranged in the space which is surrounded both by such an arcuate surface as is formed by the addendum circles of the bar coding rings 32 and by the upper inside curved surface of the support shaft assembly 38. Indicated at numeral 47 is a hollow selecting shaft which has its one end supported rotatably by and protruding from the end plate 42 and its other end formed with a bore. Into the bore of the selecting shaft 47 is fitted a support shaft 48 which is fixed to the other end plate 42' by means of a screw 49. As a result, the selecting shaft 47 is arranged in the frame 43 in a manner to slide axially on the support shaft 48. The afore-mentioned pinion 46 is fitted on the outer periphery of the selecting shaft 47 by means of a snap ring 51.

The ring components 32*a* to 32*g* are supported on the outer periphery of the support shaft assembly 38. From the structural view of point, however, the supporting action on the assembly 38 is found insufficient for ensuring the precision in flatness of the type carrying sides as a whole of the bar coding types 33*a* and 33*b* which are arranged adjacent to one another. For this purpose, there are provided a pair of aligning rods 52 which are fixed to a later-described connecting plate 53. These aligning rods 52 are fitted both in semicircular grooves 54, which are formed in the outer periphery of the support shaft assembly 38, and in aligning holes 55 which are formed in the end plate 42, as better shown in Figures 2, 6 and 7, so that the rods 52 may be supported and retained in the inter-tooth roots 41 of the bar coding rings 32, thus ensuring the flatness precision of the type carrying sides.

The following description is directed to a mechanism for bringing the bar coding rings 32, during the printing operations, into contact with one another and for separating them during the type selecting operations. As better seen from Figure 5, the cylindrical shaft 44 is made so slightly longer than the sum of the thickness of the whole ring elements 32*a* to 32*g*, which are juxtaposed to one another, as to regulate the spacing between the two end plates 42 and 42'. Reverting to Figure 2, however, since the cylindrical shaft 44 is located at a lower portion of the frame 43 of the end plates 42 and 42', the spacing between the end plates 42 and 42' at their upper portions can hardly be assured merely by the cylindrical shaft 44. Therefore, a later-described index frame 56 is fixed to the frame 43, as best shown in Figure 1, with a view to assure the spacing at the upper portions of the frame 43.

Turning to Figures 3(c) and 8, numeral 57 indicates two inclined recesses which are formed in the outer side of the bar coding ring element 32*g* and which have their bottom surfaces inclined toward the end plate 42 as taken in the downward direction. In the inner side of the end plate 42', moreover, there is formed a guide groove 58 which is arranged upright. Thus, a pressure plate 59 is fitted both in the inclined recesses 57 in the ring element 32*g* and in the guide groove 58 in the end plate 42', as better seen from Figures 2 and 3(b). The inner side of the plate 59 is positioned substantially on the same plane as that of the inner side of the end plate 42', when it is fitted in the guide groove 58, so that the plate 59 may slide up and down even if the index frame 56 is fixed to the end plate 42', as seen from Figure 5. In other words, as shown in Figure 8(a), the pressure plate 59 of Figures 2 and 3(b) is interposed through a printing clearance 61 between the end plates 42' and the ring element 32*g* in the frame 43 which is assembled of the two end plate 42 and 42' by means of the cylindrical shaft 44 and the index frame 56. As better seen from Figure 2, there are formed integrally at upper and lower portions of the pressure plate 59 a pair of thrusting projections 62 which have their surfaces inclined toward the end plate 42 as taken in the downward direction. The pressure plate 59 is further formed with oval relief holes 63, 64 and 64'. An elevating pin 65 is studded at an upper portion of the side of the pressure plate 59 facing the end plate 42'. A removing pin 66 is also studded on the same side of the pressure plate 59 in a position lower than the relief hole 64'.

The attaching conditions of the pressure plate 59 will now be described in the following with reference to Figures 2, 3(b), 5 and 7. The cylindrical shaft 44 is inserted into the relief hole 63, the support shaft 48 of the selecting shaft 47 is inserted into the relief hole 64, and a hook pin 67 fixed to the end plate 42' is inserted into the relief hole 64'. Then, the pressure

plate 59 is fitted in the guide groove 58 such that the removing pin 66 is made to protrude to the outside of the frame 43 through a slot 68, which is formed in the end plate 42′ (See Figure 2), as better seen from Figure 4. A coil spring 69 is interposed under tension between the removing pin 66 and the hook pin 67 so as to pull the pressure plate 59 upwardly at all times. As a result, the inclined surfaces of the thrusting projections 62 are urged to slide on the inclined surfaces of the inclined recesses 57, as shown in Figure 8(a), thus thrusting the side of the bar coding ring element 32*g* in the axial direction. As a result, moreover, the bar coding rings 32 are thrusted toward the end plate 42, and the rotation-allowing clearances 71, which have been maintained between the ring elements 32*a* to 32*g*, are accordingly eliminated to bring them into contact with one another. As this proceeds, the printing clearance 61 is established between the ring element 32*g* and the end plate 42′.

Reverting now to Figure 2, a pair of bosses 72 are formed to project from the inner side of the end plate 42′ in the positions corresponding to the aligning rods 52. These bosses 72 are sized to have their length slightly smaller than the thickness of the ring element 32*g*. The bosses 72 thus sized are fitted in the spaces which are defined by semicircular grooves 54 of the support shaft assembly 38 and by the inter-tooth roots 41 of the ring elements 32*g*. As a result, different from other ring elements 32*a* to 32*f*, the ring element 32*g* cannot rotate but can slide freely in the axial direction.

Turning to Figure 5, the printing device 30 of the present invention is attached to beams 73, which are fixed to the insides of the frames 31 and 31′ of the label printing and applying apparatus of stationary or portable type, by fitting the beams 73 in mounting grooves 74 which are formed in the outer sides of the end plates 42 and 42′.

As best shown in Figure 8(a) or 8(b), an edge 75 is formed integrally at the upper extremity of the end plate 31′ which is located at the side of the pressure plate 59. A push button 76 is mounted on the edge 75 in a manner to slide back and forth. This push button 76 has its depending portion formed with a lower surface 77, which is composed of an inclined portion 77*a* inclined from front to back, of an upper flat portion 77*b* and of a lower flat portion 77*c*. Indicated at numeral 78 is a flexible retaining member which is formed in a rear portion of the push button 76. The retaining member 78 in turn is formed with a retaining projection 78*a* which is made operatively engageable with either of the retaining recesses 75*a* formed in the edge 75.

It should be noted here that the lower surface 77 of the push button 76 is always brought into contact with the elevating pin 65 by the action of the coil spring 69. When, therefore, the push button 76 is in its front position (or in the lefthand position as viewed from Figure 8(b)), namely, when the rotation-allowing clearances 71 exist for permitting the selecting operations of the bar coding types 33*a* and 33*b*, the elevating pin 65 is in abutment contact with the lower flat portion 77*c*. When, on the other hand, the push button 76 is in its rear (or righthand) position as viewed from Figure 8(a), namely, when the printing clearance 61 exists, the elevating pin 65 is brought into abutment contact with the upper flat portion 77*b* by the action of the coil spring 69.

With these construction arrangements, when it is intended to select the desired bar coding type 33*a* or 33*b* of the desired of the bar coding rings 32, the aligning rods 52 are first of all pulled axially and released. Then, the push button 76 is slid forward, as shown in Figures 7 and 8(b), so that the retaining projection 78*a* may be retained in the recess 75*a* at the front side and at the same time so that the elevating pin 65 may be lowered to move the pressure plate 59 downward. Then, the thrusting projections 62 of the pressure plate 59 are forced to slide into the inclined recesses 57 of the ring element 32*g*, as seen from Figure 8(b). As a result, the contacting conditions between the ring elements 32*a* to 32*g* are loosened to form the rotation-allowing clearances 71 inbetween. Thus, it becomes possible to freely select and turn the desired one of the ring elements 32*a* to 32*f*.

On the other hand, when it is intended to imprint labels, the push button 76 is slid backward, as shown in Figure 8(a), so that the retaining projection 78*a* may be retained in the recess 75*a* at the rear side. Then, the pressure plate 59 is raised by the action of the coil spring 69. In accordance with the rise of the pressure plate 59, the elevating pin 65 is also raised along the inclined portion 77*a* of the lower surface 77 of the push button 76 until it comes into contact with the upper flat portion 77*b*. Concurrently as the pressure plate 59 or the push button 76 resumes its original position, the thrusting projections 62 thrust the ring element 32*g* toward the end plate 42. As a result, the rotation-allowing clearances 71 are completely eliminated to bring the ring elements 32*a* to 32*g* into close contact with one another. In this meanwhile, the bar coding types 33*a* and 33*b* come close to one another with regular spacings, thus forming a desired printing surface having predetermined inter-type spacings. It should not be forgotten that the printing clearance 61 has been established at the same time. Incidentally, it should be understood that many modifications are conceivable as means for thrusting the bar coding rings. For example, a suitable mechanism may thrust the bar coding rings by the use of a screw or a leaf spring.

Indicated at reference numeral 79 in Figures 2 and 6 is an index ring which is used to indicate the same symbols or letters as those of the bar coding types 33*a* and 33*b* of the bar coding rings 32 in a manner to correspond to those bar coding types 33*a* and 33*b*. This index ring 79 is formed with internal teeth 81 on its inner periphery and with retaining grooves 82 on its outer periphery. Reverting now to Figure 3(a), the index frame 56 is made substantially into a trapezoidal shape and is formed at its centre with a through bore 83 and in its upper surface with a sight aperture 84 which is open to the through bore 83. This index frame 56 is further formed at its one slope with a corrugated surface 85, which is made to extend sideways, and at the centre of the other slope with a slit 86 which is made to merge sideways into the through bore 83. The inner periphery of the through bore 83 is wholly made to contact with the outer periphery of the index ring 79 so that the bore 83 may support therein the index ring assembly 79 which is composed of ring components of the same number as that of the bar coding rings 32.

Indicated at reference numeral 87 is an index shaft which is made integral with an index pinion 88 at its leading end. This index shaft 87 is formed, as shown in Figure 5, with a bore 89 which extends axially from the side of the pinion 88. The index shaft 87 thus made is inserted in the index ring 79 such that its index pinion 88 is in meshing engagement with the internal teeth 81 of the respective components of the index ring assembly 79. Indicated at numeral 91 is a support shaft which is used for supporting the index shaft 87 and which is attached to the end plate 42′ by a screw 92 made integral with the hook pin 67.

Thus, the respective components of the index ring assembly 79 are supported at their outer peripheries in the inner periphery of the through bore 83 of the index frame 56 and at their inner peripheries on the index shaft 87 which in turn is supported through its bore 89 on the support shaft 91 fixed to the end plate 42′ by means of the screw 92. Moreover, the end portion of the index shaft 87 at the opposite side to the index pinion 88 is made to extend to the outside of the end plate 42.

In this way, the index pinion 88 and the index shaft 87 are supported in the end plates 42 and 42′. As a result, the respective components of the index ring assembly 79 are held between the end plates 42 and 42′. Indicated at numeral 93 in Figures 2 and 5 is a key groove which is formed in the index shaft 87 and which is made to extend axially to the opposite end to the index pinion 88.

Indicated at numeral 94 is a key groove which is formed to extend axially to the opposite end of the pinion 46 of the selecting shaft 47. Numeral 95 in Figure 2 is a recess which is formed in the outer side of the end plate 42. As shown in Figure 5, a driven gear 96 is retained but fitted loosely in the key groove 93 in that portion of the index shaft 87 which projects to the outside from the end plate 42. Likewise, a drive gear 97 is retained but fitted loosely in the key groove 94 in the projecting portion of the selecting shaft 47. An intermediate gear 98 is interposed in meshing relationship between the gears 96 and 97 so as to transmit the drive force from the latter to the former. These gears 96, 97 and 98 are all accommodated in the recess 95 and are protected by a cover plate 99, as shown in Figure 2. This cover plate 99 is formed with a support hole 101 for supporting the selecting shaft 47 and with a support hole 102 for supporting the index shaft 87. Further formed is another support hole 103 which is operative to support the intermediate gear 98 together with a support shaft 104 formed in the end plate 42.

The operation of the connecting plate 53 is, as shown in Figures 1 and 2, to integrally shift the aligning rods 52 and the index shaft 87 in accordance with the actions of the selecting shaft 47 when it is intended to select the desired bar coding type 33*a* or 33*b*. The connecting plate 53 is formed generally into an inverted "T" shape and has its upper extension fastened to the index shaft 87 through a collar member 105 and male and female flange members 106 and 107 by means of a not-numbered screw and its both horizontal extensions, to which the aligning rods 52 are fastened by means of not-numbered screws, respectively. The centre portion of the connecting plate 53 is held between a selecting knob 108 and the selecting shaft 47 through a collar member 109 and a flange 111. The selecting knob 108 is fastened to the selecting shaft 47 by means of a screw 112.

Referring now to Figure 6 as well as Figures 1 and 2, numeral 113 designates an indicating member which is operative to indicate such index characters or symbols 114 as are displayed in the index ring components 79. As best shown in Figure 2, the indicating member 113 is fixed to the connecting plate 53 and made to extend from the connecting plate 53 to the sight aperture 84 of the index frame 56 such that it has at its extending extremity an indicator 115 which is made partially engageable with the corrugated surface 85 of the index frame 56 so as to indicate the index characters 114. Indicated at numeral 116 is a positioning member which is placed on a shelf 117 extending horizontally from the lower portion of the slit 86 of the index frame 56. This positioning member 116 is formed with a plurality of elastic retaining elements 118 which are made integral with the base plate to extend in the shape of rectangular comb teeth such that they may be brought into abutment engagement

with the corresponding retaining grooves 82 of the respective components of the index ring assembly 79.

Thus, when it is intended to select the bar coding types 33*a* and 33*b*, the selecting knob 108 is first of all pulled to move horizontally the integral structure of the connecting plate 53, the selecting shaft 47, the aligning rods 52 and the index shaft 87. As a result, the index pinion 88 comes into meshing engagement with that index ring component 79 which comes into alignment with the bar coding ring element 32 in the row meshing with the pinion 46. At the next step, the selecting knob 108 is suitably turned to turn the driven gear 96 by way of the drive gear 97 and the intermediate gear 98, thereby to turn the index ring component 79 which is in mesh with the bar coding ring element 32 in the row meshing with the pinion 46.

After the desired bar coding types 33*a* and 33*b* are obtained for the respective bar coding ring elements 32*a* to 32*f*, the selecting knob 108 is returned toward the end plate 42′ so that the aligning rods 52 may be forced into the spaces which are defined by the semicircular grooves 54 of the support shaft assembly 38 and by the inter-tooth roots 41 of the bar coding rings 32.

As has been described hereinbefore, since the bar code printing device according has on its respective bar coding rings the bar coding types of both odd and even parities which are arranged consecutively, it should be appreciated that, even for the printing operations of the Version E having at least ten variations in the parity combination in accordance with the numeral of the module check characters, neither the exchange of the bar coding ring sets of odd and even parities nor the replacement of ten printing devices having the above ten variations is required as different from the prior art. According to the present arrangement the printing operations of the Version E can be accomplished by simply selecting the bar coding type of either odd or even parity for every bar coding ring of a single printing device. It should also be appreciated as practical advantages of the present arrangement that the efficiency of the printing operations can be remarkably raised and that the cost for the printing device as a whole can be reduced.

WHAT WE CLAIM IS:

1. A bar code printing device for use with a label printing and applying apparatus capable of accomplishing a plurality of cycles, each having the steps of printing, dispensing and applying a label to a merchandise, comprising: a pair of end plates adapted to be fixed to the frame of said label printing and applying apparatus; a support shaft assembly interposed fixedly between said end plates; a plurality of bar coding rings juxtaposed to one another between said end plates and mounted on said support shaft assembly in an independently rotatable manner of one another, each of said bar coding rings carrying bar coding types of both odd and even parities on its outer periphery; and a bar code selecting shaft made rotatable and axially movable for selectively turning one of said bar coding rings to bring the desired one of said bar coding types into its printing position, each of said bar code rings being shaped to have twenty regular sides and carrying bar code types of both odd and even parities on the outer peripheral sides.

2. A bar code printing device according to claim 1, wherein the bar coding types of odd parity are arranged consecutively on one half of the outer periphery of one of said bar coding rings while the bar coding types of even parity are arranged similarly on the other half of the same outer periphery.

3. A bar code printing device substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

Agents for the Applicants
WILSON GUNN & ELLIS,
Chartered Patent Agents,
41 Royal Exchange,
Manchester,
M2 7DB.

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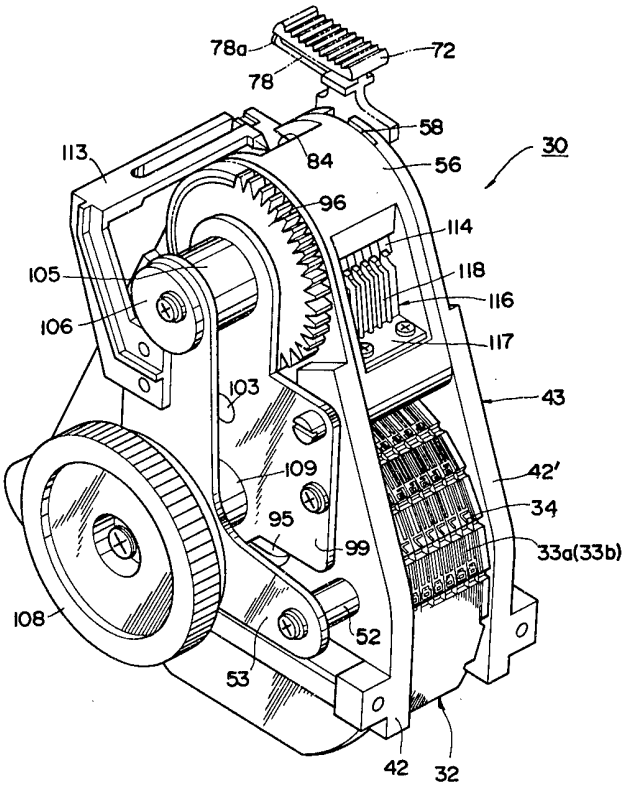
1575671 COMPLETE SPECIFICATION

7 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

FIG.1



1575671 COMPLETE SPECIFICATION

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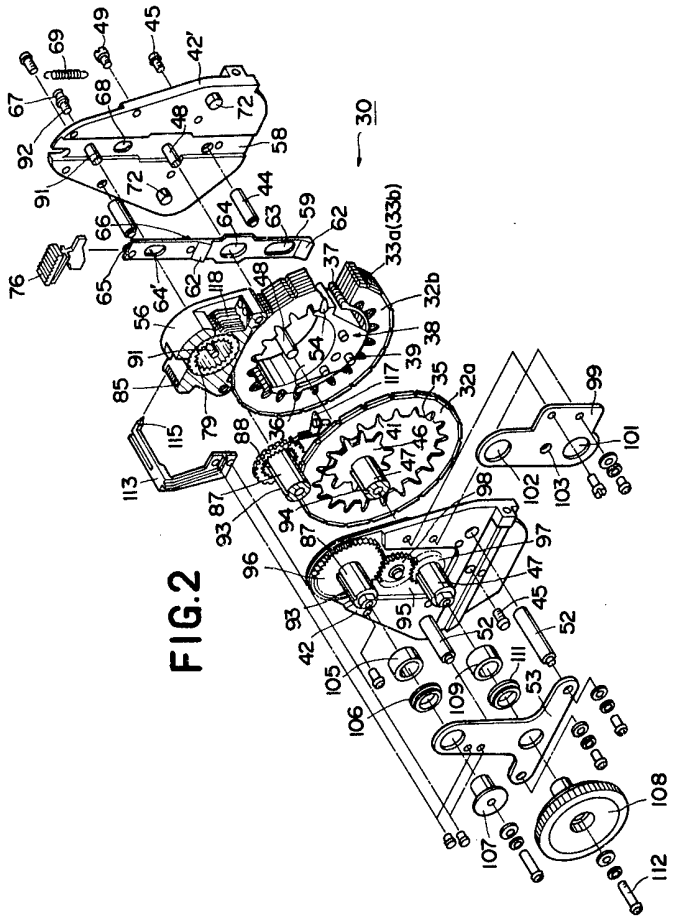
Sheet 2



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Sheet 3

FIG.3(a)

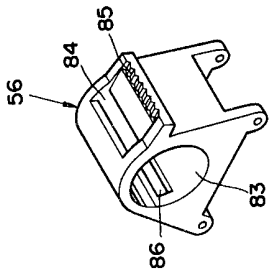


FIG.3(b)

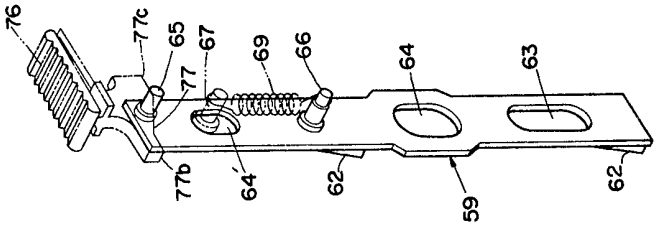


FIG.3(c)

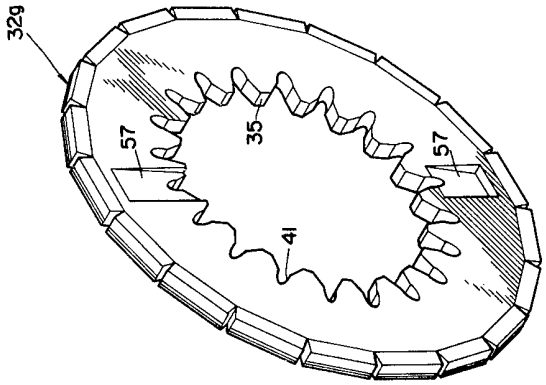
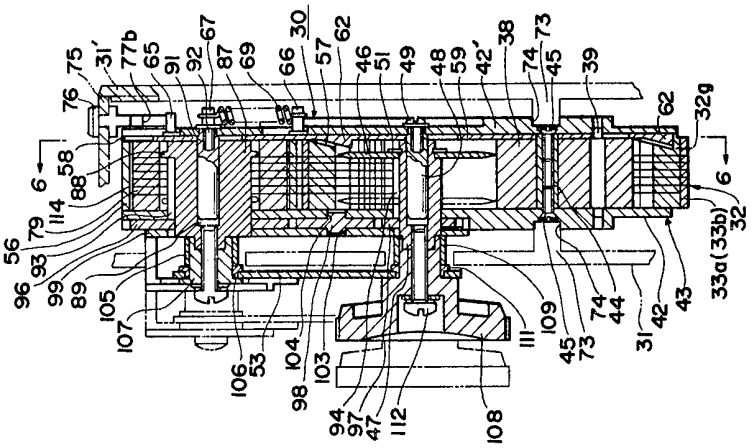


FIG.5


75
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62
46
51
49
48
59
42'
38
74
73
45
39
62
32g
76
58
88
114
79
56
93
96
99
89
105
107
106
53
104
103
98
94
97
47
112
108
111
109
45
73
74
44
31
42
43
33a(33b)
32
6

FIG.4

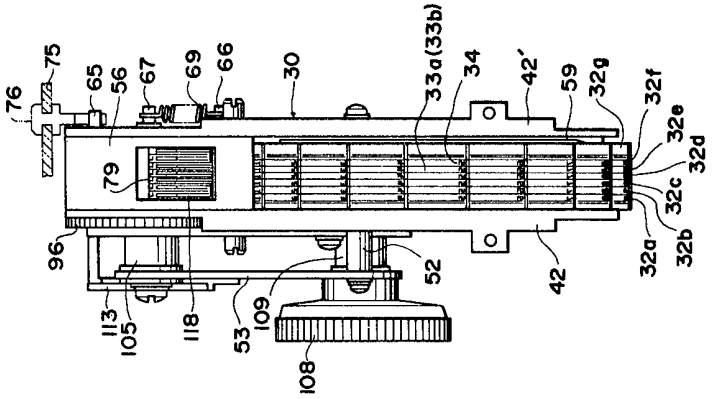
76
75
65
56
67
69
66
30
33a(33b)
34
42'
59
32g
32f
32e
32d
32c
32b
32a
79
96
113
105
118
53
109
108
52
42

FIG.7

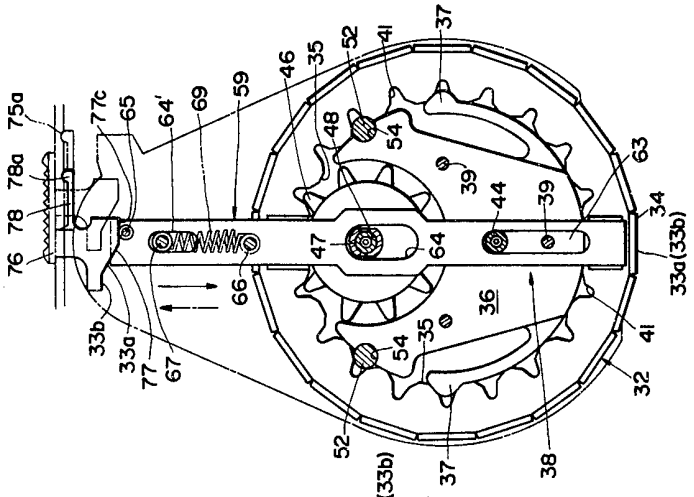
75a
77c
65
64'
69
59
46
35
52
41
37
48
54
39
44
63
34
33a(33b)
78a
78
76
47
64
66
36
33b
33a
77
67
32
38

FIG.6

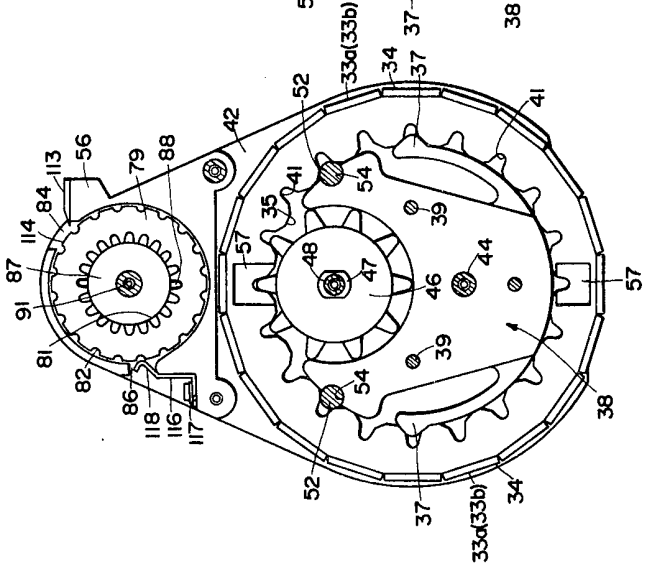
33a(33b)
34
37
52
42
41
56
113
79
88
84
114
87
91
81
82
86
118
116
117
35
54
39
57
48
47
46
44
38

FIG.8(a)

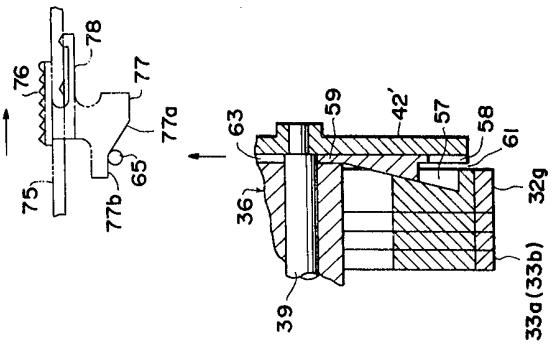
78
76
77
77a
75
77b
65
63
59
42'
57
58
61
32g
36
39
33a(33b)

FIG.8(b)

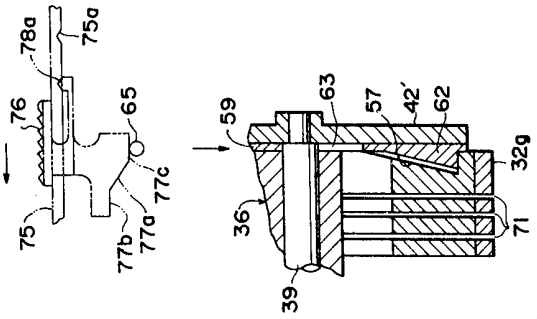
78a
75a
76
65
77c
75
77b
77a
59
63
57
42'
62
32g
36
71
39

FIG.10

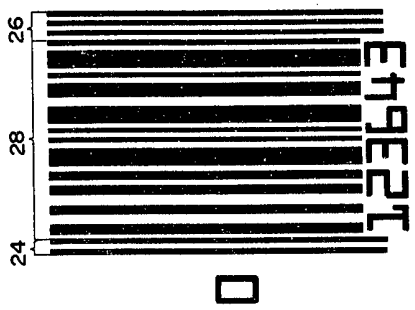

FIG.9