Jan. 8, 1963 W. B. JONES 3,072,044

MARKING DEVICE

Filed Aug. 8, 1960 2 Sheets-Sheet 1

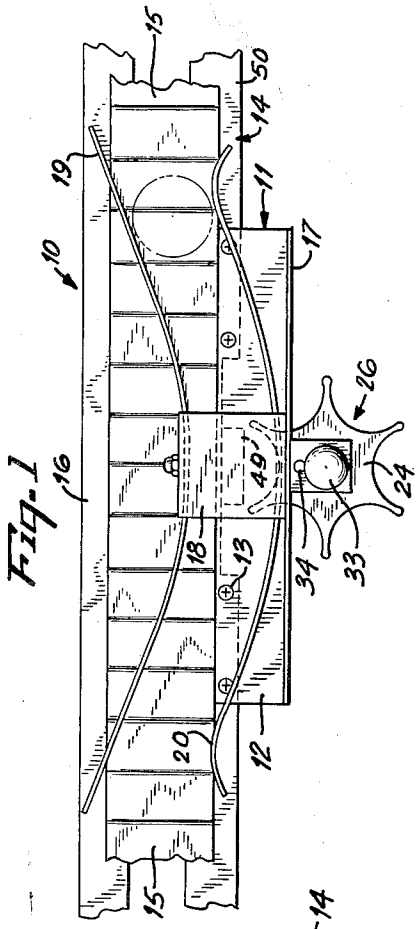


Fig. 1

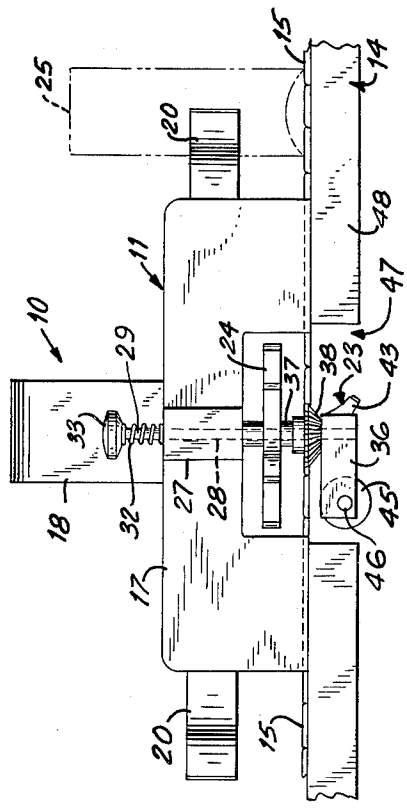


Fig. 2

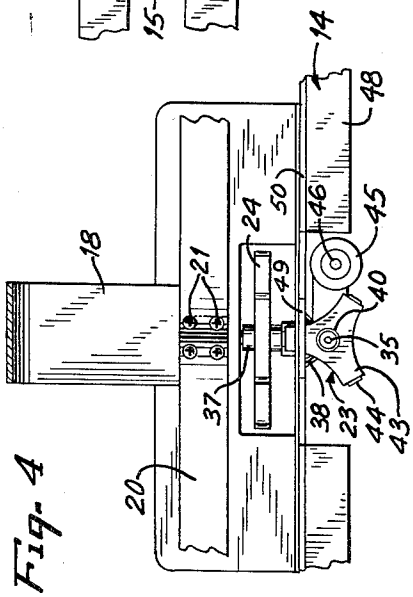


Fig. 4

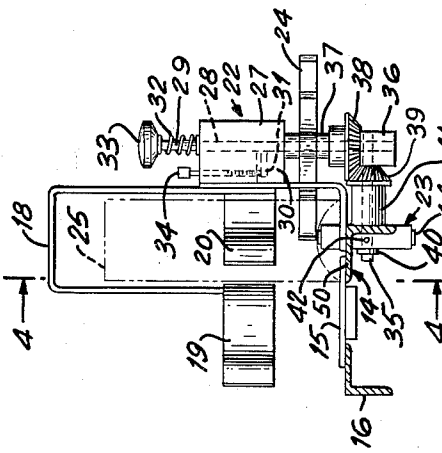


Fig. 3

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Jan. 8, 1963 W. B. JONES 3,072,044

MARKING DEVICE

Filed Aug. 8, 1960 2 Sheets-Sheet 2



Fig. 7

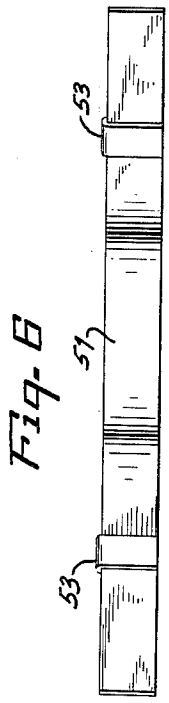


Fig. 6

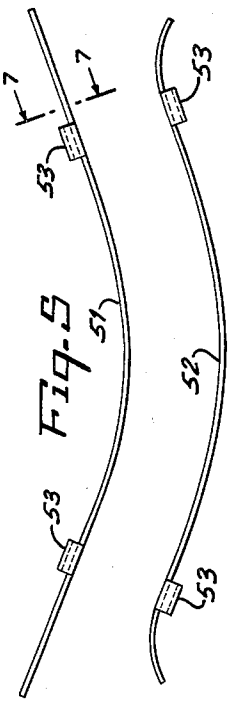


Fig. 5

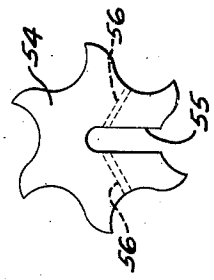


Fig. 8

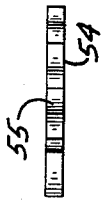


Fig. 9

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United States Patent Office

3,072,044
Patented Jan. 8, 1963

3,072,044
MARKING DEVICE

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Filed Aug. 8, 1960, Ser. No. 48,151
12 Claims. (Cl. 101—35)

The present invention relates to marking devices and particularly to a bottom coding device operative for printing a coding insignia upon the bottom of containers.

Present bottom coding devices are relatively complicated instruments and therefore necessarily expensive for the function they perform. They ordinarily employ power means for transferring the container off a conveyer, through the device, and back again upon a conveyer, and the imprinting operation is such that the particular container must be stopped during the printing operation or the message will not register properly. By reason of the complexity and multiplicity of parts necessary to have a device which will function in this manner, its range and ease of adjustment is necessarily restricted, and repairs necessitate almost a complete shutdown of the product packaging line.

It is therefore a primary object of the present invention to generally improve the operation and construction of bottom coding devices.

A further object of the present invention is to provide a bottom coding device which entails no separate power means for moving the containers to be imprinted through the device, which imprints the desired message on the containers while the containers are in their normal speed of movement, which is easily and readily adjustable for imprinting a wide range of container sizes, including containers having deep concave bottoms, and which provides means for imprinting at a pre-selected pressure against the bottom of the containers so as to guarantee uniform printing pressure on each container regardless of the weight of the containers.

A still further object of the present invention is to provide a printing device employing a floating drive mechanism which automatically moves the imprinting device in a predetermined path of movement in response to movement of containers through the device, which insures automatic adjustment of the operative elements of the device to compensate for wear or any other cause of misalignment, which allows deformed containers to pass through the device without jamming, and which permits a pre-selected pressure to be applied by the imprinting means against the bottom of the containers irrespective of the weight of the containers passing through the device.

Yet another object of the present invention is to provide a coding device which is highly efficient in operation, which is relatively simple in design and therefore relatively inexpensive to manufacture and foolproof in operation, and which can be easily installed and is extremely simple to maintain.

Other objects and advantages of the present invention will be readily apparent to those skilled in the art upon perusal of the following description and drawings in which:

FIG. 1 is a plan view of a coding device embodying the principles of the present invention shown attached to a container conveyer, with parts broken away.

FIG. 2 is a side elevational view of the coding device disclosed in FIG. 1.

FIG. 3 is an end view of the coding device disclosed in FIG. 2.

FIG. 4 is a view taken on the line 4—4 of FIG. 3, with parts broken away.

FIG. 5 is a plan view of auxiliary guide rails.

FIG. 6 is a side elevational view of one of the rails disclosed in FIG. 5.

FIG. 7 is a cross-sectional view taken on the line 7—7 of FIG. 5.

FIG. 8 is a plan view of an auxiliary star wheel.

FIG. 9 is a side elevational view of the star wheel disclosed in FIG. 8.

A coding device embodying the principles of the present invention is disclosed in FIGS. 1 through 4 and broadly designated by the number 10. The coding device 10 comprises a main support frame 11, which is preferably L-shaped in configuration and a horizontal leg 12 of which is fixed by means of suitable screws 13 to a rail 14 of a suitable container conveyer 15. The conveyer 15 can be of any suitable or well-known construction for conveying containers and is disclosed as being of the conventional slat-chain type. Also, as will be more fully appreciated hereinafter, the coding device can be positioned on either side of the conveyer and, therefore, the main frame can be just as readily fixed to rail 16.

An upper leg 17 of the main frame 11 supports a bridge 18 which is preferably U-shaped in construction so as to accommodate the movement of containers between a pair of guide rails 19 and 20. Guide rail 20 is fixed adjacent the end of a leg of the bridge 18 by a plurality of screws 21 and the screws 21 likewise fix the bridge with the leg 17 of the frame 11. The rail 19 is similarly fixed with the other leg of the bridge 18 and the rails are disposed in substantially parallel spaced relationship and shaped so as to direct a container moving in one direction by the conveyer 15 in the path of travel defined by the rails. It will be appreciated in viewing FIG. 1 that the path of travel defined by the rails maintains the containers at all times upon a portion of the conveyer so that the movement of the container in this path of travel is effected by the conveyer as opposed to the employment of separate drive means.

A floating printing mechanism, broadly designated as 22, is carried by the leg 17 of the frame 11 and comprises an imprinting device 23 which is movable in synchronism with a star wheel 24. It will be appreciated, therefore, that as a container, for example, container 25, is moved in the path of travel defined by the guide rails 19 and 20, it is received in a throat portion 26 of the star wheel and causes the star wheel to turn a predetermined distance. The imprinter 23 is interconnected with the star wheel in a manner as will be more fully described hereinafter so as to rotate in synchronism therewith and at substantially the same rate of speed as the movement of the container so that at the moment of imprinting, the type head of the imprinter and the container are both traveling in the same direction at substantially the same rate of speed, and the printing can be effected clearly and legibly. The coding operation, therefore, takes place while the container is in its path of movement defined by the rails 19 and 20 and at the normal speed defined by the conveyor 15. Movement of the entire line of containers is not stopped momentarily during the imprinting operation.

The floating mechanism 22 comprises a main block 27 which is fixed by the screws 21 to the leg 17 of the frame 11 opposite the bridge 18. A substantially vertical opening 28 is formed in the block 27 and slidably receives a support shaft 29. A slot 30 is also formed in the block 27 and opens into the opening 28 so as to accommodate a stop member 31 fixed to the shaft 29. The shaft 29 is floated in the opening 28 by a compression spring 32 which encircles the shaft adajacent the other end thereof and is confined between the upper end of the block and a turning knob 33 affixed to the shaft. A type height adjustment screw 34 is threadedly

received in the block 27 and adjustable so as to extend any pre-selected distance into the slot 30 into abutment with the stop 31 and functions so as to regulate the height of the imprinter 23 as will be more fully appreciated hereinafter.

An imprinter shaft 35 is disposed substantially normal to the shaft 29, and a block 36 is fixed to each of these shafts adjacent their lower end for fixing them in their previously mentioned substantially normal relationship.

The star wheel 26 is force fit on a bearing sleeve 37 which is suitably fixed so as to be an integral part with a bevel gear 38. The bevel gear 38 is in intermeshing relationship with a bevel gear 39 and the imprinter 23 is received by a sleeve 40 which is integrally fixed in any suitable manner with a hub 41 of the bevel gear 39. The imprinter 23 is fixed with the sleeve 40 by means of a suitable key 42 so that it is in synchronism with the pockets of the star wheel 26 so that the imprinting operation is in timed sequence with movement of the star wheel as previously suggested. The imprinter is preferably formed of suitable flexible material, such as plastic or rubber, and preferably of triangular shape with concave interconnecting sides so that each leg 43 can carry standard type 44. It will be appreciated that the concaved interconnecting sides of the imprinter permit printing to be applied to the concave bottoms of containers without striking the periphery of these containers. In other words, the shape of the imprinter is such that its rotation about the axis of shaft 35 permits the type to be moved into printing relationship with respect to the upper surface of the concave bottoms thereby permitting bottom coding of containers having this particular type of construction, such as aerosol containers.

An inking wheel 45, which can be formed of any ink absorbent material, is rotatably carried on a spindle 46 fixed with the block 36. The inking wheel 45 is so positioned that rotation of the imprinter 23 will cause the type 44 to brush against the ink wheel and rotate the ink wheel prior to the printing operation.

When installing the coding device, a section 47 of a vertical leg 48 of the rail 14 is cut out so as to accommodate the imprinter under the path of movement of the containers and an opening 49 is cut into a horizontal leg 50 of the rail 14 to accommodate movement of the imprinter.

It will be appreciated that since the shafts 29 and 35 are fixed in substantially normal relationship, and since the star wheel is in effect an integral part of the bevel gear 38, and since the bevel gears 38 and 39 are each rotatable on their respective shafts with the imprinter being in effect an integral part of bevel gear 39, that once the bevel gears have been aligned and meshed, they will remain in precision alignment without backlash, even after wear is encountered. It will be appreciated that the star wheel maintains constant pressure on the meshing bevel gears so that when wear does take place, the pressure of the star wheel moves the bevel gears to automatically take up the slack caused from this wear. Also, this whole mechanism floats under the tension exerted by spring 32 and the imprinter is movable downwardly against the force exerted by spring 32 when accommodating irregular container bottoms. Irregular container bottoms, therefore, will not jam or interrupt the printing operation. The height adjustment for normal printing with respect to any particular container is easily adjusted by screw 34 and movement of the imprinter from this normal adjustment is downwardly against the force exerted by the spring. Because this operating mechanism is floating, the imprinter can be moved out of the line easily and readily and maintains constant adjustment. This is effected by pushing downwardly against the turning knob 33 to an extent sufficient to move the stop 31 out of the slot 30 and then turning the knob 180 degrees in either direction which in effect moves the imprinter 180 degrees out of the path of travel of the containers. The flow of containers through the device does not have to be discontinued during this servicing operation. To return the imprinter to its operative position, the turning knob 33 is once again turned to an extent sufficient to move the stop 33 into alignment with the slot. Upon release, the spring 32 moves the unit upwardly to an extent sufficient to move the stop 33 into abutment with the adjustment screw 34. It will also be appreciated that not only does this floating mechanism permit the imprinting of deformed containers, but allows a pre-set pressure to be applied by the imprinter against the container bottom regardless of the weight of the container. Also, as previously suggested, the star wheel and the imprinter are so designed that at the moment of printing operation, the type 44 is moving at substantially the same rate of speed as the container to be printed so that the imprinting operation can be effected while the containers are in their normal path of movement and at their normal rate of speed, and the print is clear and concise.

FIGURES 5, 6 and 7 disclose rail attachments for accommodating containers of smaller size than those accommodated between rails 19 and 20. These attachments, 51 and 52, each comprise a pair of clips 53 which easily engage their respective rails 19 and 20. It will be appreciated, therefore, that if containers of lesser diameter than those which can be readily accommodated between rails 19 and 20 are to be coded, auxiliary rails 51 and 52 can be clipped to their respective rails 19 and 20 so as to permit containers of such lesser diameter to be readily accommodated.

Also, if containers of lesser diameter or different cross-sectional shape are to be coded, and the throat portion 26 of star wheel 24 is too large, an auxiliary star wheel 54, see FIGS. 8 and 9, can be accommodated so that it is positioned on the top of the star wheel 24. This is accomplished by providing a slot 55 in the star wheel 54 and by accommodating the bearing sleeve 37 in the slot. The star wheel 54 is fixed to the bearing sleeve in its pre-determined position with reference to star wheel 24 by means of suitable set screws received in suitable threaded openings 56. Through the utilization, therefore, of auxiliary guide rails 51 and 52 and auxiliary star wheel 54, the coding device has great versatility and can be readily and very inexpensively adjusted to accommodate containers having a wide range of sizes and shapes. Also, as previously pointed out, these adjustments can be made while the conveyor 15 continues in operation without disrupting the flow of containers between the rails 19 and 20 through the device. Therefore, the packaging line does not have to be disrupted.

What is claimed is:

1. A coding device for attachment to a container conveyor, comprising means for guiding the containers to move along a pre-determined path of travel on the conveyor, an imprinter normally disposed in the plane of said path of travel and being rotatably mounted for moving type means into imprinting contact with the bottoms of the containers moving along said path of travel, said imprinter being further movable in a direction downwardly of the container bottoms, resilient means resisting downward movement of the imprinter so that the latter exerts a pre-determined pressure against the bottom of each container being imprinted irrespective of the weight of the container, stop means limiting upward movement of said imprinter by said resilient means for establishing a predetermined printing height within a pre-determined range of adjustment, means for moving said imprinter out of said path of travel without disrupting movement of the containers along said path of travel, a star wheel extending into said path of travel and rotatable about an axis substantially normal to the axis of rotation of said imprinter so as to be rotated in pre-determined increments by the successive containers moving along said path of travel, and means drivingly connecting said star

wheel with said imprinter so that the latter is caused to rotate in synchronism with rotation of the star wheel for imprinting the bottom of each container passing along said path of travel.

2. A coding device for attachment to a container conveyor comprising spaced guide rails for directing containers on the conveyor to move along a predetermined path of travel on the conveyor, a star wheel disposed to extend into said path of travel and having means responsive to movement of successive containers along said path for causing said star wheel to rotate in pre-determined increments, a bevel gear drivingly connected with said star wheel, a support shaft rotatably supporting said star wheel and bevel gear, mounting means slidably supporting said support shaft, a second bevel gear meshing with the first mentioned bevel gear, a second support shaft rotatably supporting said second bevel gear and fixed with respect to said first support shaft in substantially normal relation to the latter, an imprinter drivingly connected with said second bevel gear and disposed below the containers moving along said path of travel, resilient means yieldably urging said first support shaft upwardly in said mounting means, thereby to urge said imprinter into marking contact with the successive containers moving along said path of travel, said mounting means having a slot therein, and a stop member extending from said first support shaft into said slot for limiting the upward sliding movement of said first support shaft in said mounting means under the urging of said resilient means.

3. A coding device as in claim 2; further comprising an adjustable screw extending into said slot to engage said stop member and thereby effect adjustment of the printing height of said imprinter within a pre-determined range of adjustment.

4. A coding device as in claim 2; further comprising a turning knob fixed to said first support shaft adjacent the upper end thereof; and wherein said resilient means consists of a helical spring encircling said first support shaft and interposed between said mounting means and said turning knob.

5. A coding device as in claim 2; further comprising an auxiliary guide rail readily attachable to one of said guide rails for decreasing the distance between the latter and thereby accommodating containers of smaller diameter.

6. A coding device as in claim 2; further comprising means for readily attaching auxiliary star wheels adjacent said star wheel for accommodating containers of different diameter and shape.

7. A coding device as in claim 2; wherein said imprinter is substantially triangular in shape, and has concave sides with means adjacent the ends of each of said sides for carrying type means so that said imprinter can imprint containers having deep concave bottoms.

8. A coding device as in claim 7; further comprising an ink wheel rotatably mounted adjacent said imprinter so that rotation of the latter moves said type means against said ink wheel prior to imprinting contact of said type means with the bottom of a container moving along said path of travel.

9. A coding device for attachment to a container conveyor, comprising means for guiding the containers to move along a pre-determined path of travel on the conveyor, support means swingable about a vertical axis at one side of said path, an imprinter carrying type means and being rotatably mounted on said support means to move between an operative position, where said imprinter is in the plane of said path to move said type means into imprinting contact with the bottoms of the successive containers moving along said path, and an inoperative position, where said imprinter is remote from said path, in response to swinging of said support means, and means for swinging said support means so as to move said imprinter from said operative position to said inoperative position without disrupting movement of the containers along said path, wherein said support means is further vertically movable; and further comprising resilient means urging said support means upwardly and thereby pressing said type means on the imprinter into imprinting contact with the bottoms of the successive containers, and locking means resisting swinging of said support means with said imprinter in said operative position and being releasable upon downward movement of said support means against said resilient means to permit movement of said imprinter from said operative position to said inoperative position only after said imprinter has moved downwardly to disengage said type means from the containers moving along said path.

10. A coding device for attachment to a container conveyor, comprising means for guiding the containers to move along a pre-determined path of travel on the conveyor, fixed mounting means, support means slidably carried by said mounting means for vertical movement relative to the latter, an imprinter rotatably mounted on said support means in the plane of said path of travel and carrying type means for moving the latter into imprinting contact with the bottoms of successive containers traveling along said path, drive means carried by said vertically movable support means for rotating said imprinter and including a container actuated drive member projecting into said path of travel so that the rotation of said imprinter is synchronized with the speed of movement of the containers along said path, and resilient means urging said support means upwardly relative to said mounting mean, thereby to ensure a unform imprinting pressure of said type means against the bottom of each container irrespective of the weight of the latter.

11. A coding device as in claim 10; wherein said support means is also swingable about a vertical axis relative to said mounting means for moving said imprinter from said plane of the path of travel to an inoperative position remote from said plane.

12. A coding device as in claim 11; further comprising cooperatively engageable means on said support means and mounting means normallyy preventing swinging of said support means for moving the imprinter away from said plane, and being disengageable to permit movement of the imprinter to said inoperative position only upon a pre-determined downward displacement of said support means relative to said mounting means against the force of said resilient means.

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