

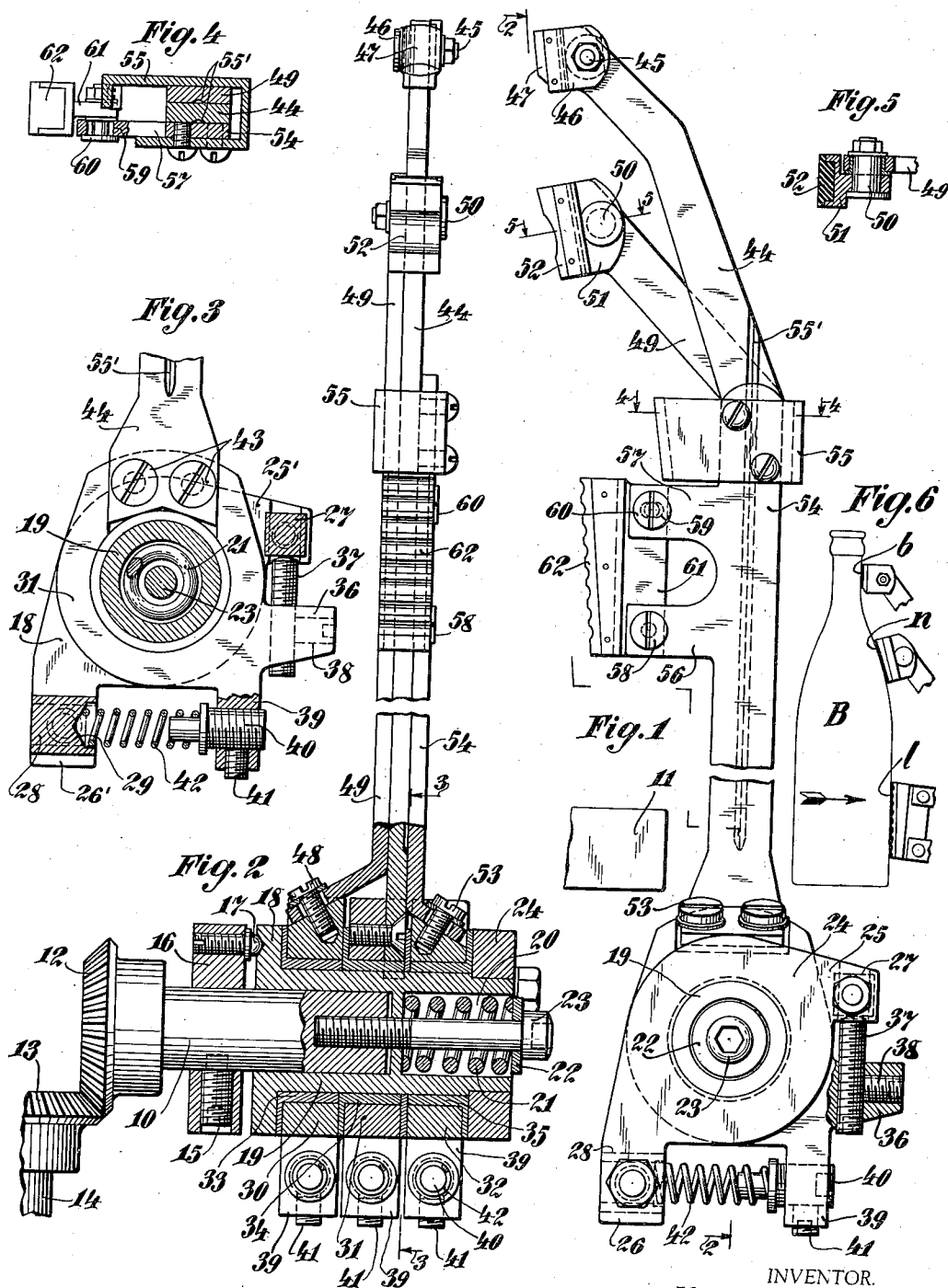
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LABEL GRIP FINGER MECHANISM

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LABEL GRIP FINGER MECHANISM

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This invention relates to label grip finger mechanism and has particular reference to grip finger mechanism for use on labelling machines for the purpose of holding the gummed label in proper position preparatory to securing it to a bottle or other container.

In a conventional bottle labelling machine, an adhesive picker abstracts two or more labels from appropriately spaced label stacks, swings into the path of movement of a bottle on a conveyor, lays the gummed labels at the proper places on the surface of the bottle, and grip fingers move into contact with the labels to hold them in place as the picker is withdrawn, so that the labels are properly held preparatory to and while being secured to the surface of the bottle by the label wiping or brushing means. Standard containers, and bottles in particular, have many manufacturing irregularities, such as variations in the diameters of the body and the neck, variations in height, including the position of the slope of the neck with respect to the body of the bottle, variations in the slope of the neck of the bottle, and the like.

In an effort to compensate for these variations, it has been the practice to loosely mount the grip fingers on the actuating arm, such as on horizontal pivots, and this expedient to a certain extent corrects for some irregularities in the different bottles. At the same time, however, this loose mounting of the grip fingers introduces other objections, principal among which is the disalignment of the body or neck label by the grip fingers while they are adjusting themselves to variations in the shape of the bottle.

Also, because the neck and body label grip fingers are in a relatively fixed position with respect to the actuating arm which carries them, it is common for one of them to engage the bottle before the other finger or fingers engage it, with the result that the finger which engages first is applied with excessive pressure to the corresponding label as the other finger or fingers are attempting to adjust themselves to the bottle, so that the first label is disaligned and frequently marred.

Furthermore, the actuating arm for the conventional grip finger arrangement is so connected to its driving mechanism, that when a bottle breaks on the labelling machine and fragments of glass are carried around by the conveyor and lodge behind the actuating arm it cannot be retracted, and not only jams but frequently interferes with other parts of the machinery with consequent breakage or disalignment, which requires that the machine be shut down for adjustment or repair, with a resulting loss of operating time.

In accordance with the present invention, a label grip finger mechanism is provided in which the individual grip fingers are independently sup-

ported and bodily movable so as to automatically compensate for all manufacturing irregularities in different bottles and to engage each label on the bottle with uniform pressure, regardless of the shape of the bottle, with the result that no labels are marred or torn or disaligned by the grip finger mechanism during the labelling operation. Also, the new grip finger actuating mechanism is provided with a yielding driving connection adapted to adjust itself to any unusual force opposing its normal movement, such as when a fragment of a broken bottle jams under it, with the result that the mechanism is not injured or placed out of adjustment during the normal operation of the labelling machine.

More particularly, the mechanism of this invention includes an oscillating drive shaft to which the grip finger supporting means is connected by means of a slip clutch, which, when there is resistance to movement of the grip finger supporting means, yields by slipping relatively to the drive shaft so that the supporting means is not injured nor can the means obstruct or interfere with the other parts of the machine because of jamming as the result of such resistance or interference.

The grip finger supporting means comprises a plurality of separate arms, one for each grip finger, mounted on a common sleeve connected to the oscillating drive shaft through the aforementioned slip joint, so that all of the arms are driven simultaneously as a unit. The connection of each arm to the sleeve is resilient, so that each arm, although positively driven in association with the other arm or arms, is free to adjust itself bodily to the position required by irregularities in the shape of the bottle, and the resilient connection is such that a uniform pressure is applied to each label, regardless of such bottle irregularities and regardless of the fact that one finger may engage the bottle before the other or others.

It will be seen that with the simple arrangement of this invention, the objectionable characteristics of the conventional labelling machine is avoided in that disalignment, marring or tearing of labels, due to the inability of the label grip finger mechanisms to adjust itself to variations in the bottle, no longer occur. Also the slip joint prevents injury to the operating parts. The new grip finger arrangement of this invention, including the slip joint, also has the advantage that it may be applied without material change to conventional labelling machines.

For a more complete understanding of the invention, reference may be had to the accompanying drawing, in which:

Figure 1 is an elevation of the new label grip finger mechanism of this invention;

Fig. 2 is a combined face view and axial section as seen along line 2—2 of Fig. 1;

Fig. 3 is a transverse section as seen along the line 3-3 of Fig. 2;

Fig. 4 is an enlarged section through the multi-part actuating arm, as seen along the line 4-4 of Fig. 1;

Fig. 5 is a section through one of the grip fingers, as seen along the line 5-5 of Fig. 1; and Fig. 6 illustrates the label grip fingers in engagement with a bottle.

Referring to Fig. 2 of the drawing, numeral 10 designates a horizontal drive shaft suitably supported in bearings, not shown, beneath the table 11 of the container labelling machine. The inner end of shaft 10 is fitted with a beveled gear 12 which meshes with beveled gear 13 mounted on the end of vertical shaft 14, which is oscillated by a cam or crank mechanism, not shown, so that shaft 10 is also oscillated.

Secured by set screw 15 on the oscillating drive shaft 10 is a collar 16 having a plurality of axial studs 17 arranged at spaced intervals on one face thereof, the projecting ends of which are rounded and are normally seated in corresponding sockets in the outer surface of the flange 18 of sleeve 19 mounted on the end of oscillating shaft 10 but not directly secured thereto except through the connection afforded by studs 17. The free end of sleeve 19 extends beyond the free end of shaft 10 and is provided with a recess 20 in which is seated a coil spring 21 engaged at its outer end by a washer 22 adjustably held in place by a tap screw 23 threaded into the outer end of oscillating shaft 10. Spring 21 urges sleeve 19 to the left, as seen in Fig. 2, so that studs 17 are firmly seated in the corresponding sockets in flange 18. By means of the slip clutch formed by studs 17 and the cooperating flange 18 of sleeve 19, the latter is positively but yieldingly connected to oscillating shaft 10 and is driven thereby.

Mounted on the reduced outer end of the sleeve 19 is a collar 24 provided with two laterally extending lugs 25 and 26, shown in Fig. 1, which are spaced substantially ninety degrees apart, the former extending horizontally and the latter extending vertically. The flange 18 of sleeve 19 is provided with like lugs 25' and 26', shown in Fig. 3, also spaced substantially ninety degrees apart, the former extending horizontally and the latter extending vertically, so that they are aligned with lugs 25 and 26, respectively, of collar 24.

As illustrated in Fig. 3, extending between lugs 25 and 25' and secured at its opposite ends to each of them is a bar 27 of square cross section. Extending between lugs 26 and 26' and secured to each of them is a second bar 28 of square cross section provided with three spaced sockets 29 on its inner surface. Bars 27 and 28 serve to hold collar 24 and sleeve 19 together against relative rotation.

As illustrated in Figs. 2 and 3, three rings 30, 31 and 32 are journaled on sleeve 19 over appropriate bushings 33, 34 and 35, respectively, these bushings being L-shaped in cross section so that their radial flanges serve as bearing surfaces between rings 30, 31 and 32, and between ring 30 and flange 18 and ring 32 and collar 24. These rings are held together in proper assembled relation between flange 18 of sleeve 19 and collar 24, which are spaced apart by bars 27 and 28 in the manner described.

Each of the rings 30, 31 and 32 is shaped substantially as is illustrated in Fig. 3, in which ring 31 is shown, so that a description of ring 31 will suffice for an understanding of all three of them. Ring 31 is provided with a horizontally extending

lug 36 through which is threaded a set screw 37, the tip of which engages bar 27 and which is locked in adjusted position by a small lock screw 38 threaded through lug 36. By adjusting set screw 37 the angular position of ring 31 with respect to sleeve 19 may be varied at will.

Ring 31 is provided with a second lug 39 extending in a vertical direction and having adjustably threaded therethrough a stud 40 locked in adjusted position by lock screw 41 and receiving one end of a stiff coil spring 42, the other end of which is seated in the corresponding socket 29 of cross bar 28. Spring 42 accordingly urges ring 31 in a counterclockwise direction, as seen in Fig. 3, so that the tip of set screw 37 is forced into contact with bar 27. In this way ring 31 is resiliently secured to sleeve 19 and oscillates therewith as the sleeve is oscillated by drive shaft 10 in the manner described.

Secured by screws 43 in a recess in the face of ring 31 is a substantially vertically-extending arm 44, the upper end of which is directed at an angle to the left, as seen in Fig. 1. Pivoted in a vertical plane on the tip of arm 44 by means of horizontal pivot pin 45 is a grip finger 46 having a rubber pad 47 adapted to engage the neck band of bottle B advanced by suitable conveying mechanism, not shown, along the surface of table 11 in the direction indicated by the arrow (Fig. 6).

Secured by tap screws 48 to the laterally sloping upper surface of ring 30 is a second arm 49, which is shorter than arm 44 and the upper end of which is also directed at an angle to the left as seen in Fig. 1. Pivoted in a vertical plane on the tip of arm 49 by means of horizontal pin 50 is a grip finger 51 provided with a rubber pad 52 adapted to engage the neck label *n* of the bottle B, as illustrated in Fig. 6. The construction of the grip finger 51 is illustrated in the cross section of Fig. 5.

Secured to the laterally sloping upper surface of ring 32 by means of tap screws 53 is a short arm 54, the upper end of which carries a box-section collar 55, which embraces the other two arms 44 and 49 so as to hold the three arms together but to allow lateral movement between them. The particular arrangement is illustrated in Fig. 4, slots 55' being oil grooves. Short arm 54 is provided below collar 55 with two lateral lugs 56 and 57, the former being provided with an opening for receiving pivot pin 58 and the latter being provided with an elongated slot 59 for loosely receiving pin 60. Pins 58 and 60 carry the body label grip finger 61 which is provided with the rubber pad 62 adapted to engage body label *l* as illustrated in Fig. 6.

In operation, the label grip finger mechanism of this invention is oscillated by drive shaft 10 in a vertical plane in the path of movement on the bottles B over the table 11, the drive taking place through collar 16, clutch studs 17, flange 18 of sleeve 19, bar 28 carried by flange 18 and collar 24, springs 42, spring studs 40, lugs 39, the corresponding rings 30, 31 and 32, and the corresponding independent arms 49, 44 and 54, respectively. The relative angular positions of the arms 44, 49 and 54 are adjustable by means of the corresponding set screws 37 and the tension of the individual grip finger arms 44, 49 and 54 may be adjusted at will by regulating the compression of springs 42 by means of the corresponding spring studs 40.

The three arms 44, 49 and 54 move as a unit from a substantially horizontal position in a counterclockwise direction to the substantially

vertical position illustrated in Fig. 1, in which their grip finger pads 47, 52 and 62 engage the corresponding neck band *b*, neck label *n*, and body label *l* of bottle B, respectively. The neck band grip finger 46 and neck label grip finger 51 move about their horizontal pivots 45 and 50, respectively, to adjust themselves to the angle of slope of the corresponding surfaces of the bottle B. Similarly, body label grip finger 61 adjusts itself to the surface of the body of the bottle B by pivoting about pin 58 and swinging at its upper end in accordance with the lost motion afforded by the pin and slot combination 59, 60.

Any manufacturing irregularities in the shapes of the different bottles B are compensated for by bodily movement of the corresponding grip fingers 46, 51 and 61, which is allowed by the resilient connection of their arms 44, 49 and 54 respectively to sleeve 19 through the intermediary of corresponding springs 42. Accordingly each grip finger arm gives as much as is necessary to accommodate any irregularities in the shape of the bottle, such as variations in diameter between different parts of the bottle, a different angle of slope of the neck, an uneven bottom, uneven height, or the like. Also, if one of the grip fingers, such as neck band grip finger 46 should engage the bottle before grip fingers 51 or 61, its arm 44 will recede as allowed by its spring 42 until the other grip fingers engage the bottle, so that all labels are engaged with a uniform pressure. Accordingly, with these self-adjusting features, no labels are marred or torn or disarranged because of undue or uneven pressure of the grip fingers.

In the event that a fragment of broken bottle or some other obstruction jams behind the composite grip finger supporting means 44, 49, 54 during its retracting movement in a clockwise direction, as seen in Fig. 1, slip clutch 17, 18 releases, so that the driving connection between shaft 10 and the grip finger supporting means yields as a unit and no parts of the mechanism are broken nor can they jam other parts of the machine as a result of the obstruction or interference by the broken bottle fragment, or the like. The slippage of the clutch in the manner described is effected by a sort of cam action of the studs 17 out of their sockets in flange 18 and results in axial movement of sleeve 19 to the right, as seen in Fig. 2, which axial movement is permitted by spring 21. Mere manual movement of the grip finger arms 44, 49 and 54 is required to restore it to its initial position and no further adjustment is necessary, studs 17 properly locating the arms angularly on sleeve 19.

Although a preferred form of the invention has been illustrated and described herein, it is to be understood that the invention is not limited thereby but is susceptible to changes in the form and detail within the scope of the appended claims.

I claim:

1. In a label grip finger mechanism for use in container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of individual label-gripping members mounted on and carried by the element and adapted to be moved into engagement with the container by the element, and a yielding connection between the members and the element, whereby the members are capable of bodily movement relatively to the element.

2. In a label grip finger mechanism for use in container labelling apparatus and the like, the

combination of an oscillatable driving element, a plurality of individual label-gripping members supported on and carried by the element and adapted to be moved into engagement with the container by the element, and a flexible connection between the members and the element, whereby the members are moved bodily individually and collectively by the element and are displaceable relatively to the element in accordance with resistance to their movement.

3. In a label grip finger mechanism for use in container labelling apparatus and the like, the combination of a driving element, a plurality of individual label-gripping members on the element adapted to be moved into engagement with the container by the element, a yielding connection between the individual members and the element, and a second yielding connection between the members collectively and the element, whereby the members move bodily individually and collectively in accordance with resistance to their movement by the element.

4. In a label grip finger mechanism for use in container labelling apparatus and the like, the combination of a driving element, a plurality of individual label-gripping members on the element adapted to be moved into engagement with the container by the element, a yielding connection between the members and the element, and a yielding connection between each individual member and the first yielding connection, whereby the members move bodily individually and collectively in accordance with resistance to their movement by the element.

5. In a label grip finger mechanism for use in container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of individual label-gripping members supported on and carried by the element and adapted to be moved into engagement with the container by the element, and a resilient connection between each member and the element whereby the individual members are normally self-adjustable with the element and bodily self-adjustable relatively to each other and the element in their engagement with the corresponding label on the container to compensate for irregularities in the container.

6. In a label grip finger mechanism for use in container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of arms carried by the driving element and simultaneously driven thereby, a label gripping member on each arm for engaging a corresponding label on the container, and a resilient connection between each arm and the driving element whereby the individual members are bodily movable with the element and self-adjustable relatively to each other and the element in their engagement with the corresponding label on the container to compensate for irregularities in the container.

7. In a label grip finger mechanism for use in container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of individual label gripping members movably mounted on and carried by the element, and resilient means forming a driving connection between each member and the element and normally causing the members to move in unison with the element, whereby the individual members are bodily self-adjustable relatively to each other in their engagement with the corresponding label on the container to compensate for irregularities in the container.

8. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of resilient individual arms carried by and movable bodily with the element, and a label gripping member on each arm whereby the individual members are bodily self-adjustable relatively to each other in their engagement with the corresponding label on the container to compensate for irregularities in the container.
9. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of label-gripping members carried by and movable bodily with the element, and resilient driving connections interposed between each member and the element, whereby the individual members are bodily self-adjustable relatively to each other in their engagement with the corresponding label on the container to compensate for irregularities in the container.
10. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a support, an oscillating shaft mounted thereon, a plurality of label-gripping members on the shaft, and resilient means securing each member in a predetermined angular position on the shaft, whereby the individual members are self-adjustable in their engagement with the corresponding labels on the container to compensate for irregularities in the container.
11. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a support, an oscillating shaft mounted thereon, a plurality of label-gripping members on the shaft and a spring securing each member in a predetermined angular position on the shaft, whereby the individual members are self-adjustable in their engagement with the corresponding labels on the container to compensate for irregularities in the container.
12. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of label-gripping members carried by and movable with the element, means for adjusting the relative angular positions of each of said members, whereby the individual members may be positioned in accordance with the variations in the shape of the container to be labelled and means resiliently retaining the members in their adjusted positions.
13. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of an oscillatable driving element, a plurality of label-gripping members carried by and movable with the element, means for adjusting the angular positions of the individual members relatively to each other and to the element, whereby the members may be positioned in accordance with the variations in the shape of the container to be labelled and means resiliently retaining the members in their adjusted positions.
14. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a driving element, an arm carried thereto, a label-gripping member on the arm, and clutch means connecting the element and the member and responsive to a predetermined resistance to movement of the arm for breaking the connection between the arm and the element to allow the element to move independently of the arm.
15. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a driving element, a plurality of arms carried by the element, a resilient driving connection between each arm and the element, a label-gripping member on each arm, and a slip clutch between said arms and said element which is effective to release the arm from the element upon the arm encountering a predetermined resistance to movement.
16. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a support, an oscillating shaft mounted thereon, a plurality of arms on the shaft, resilient means operatively securing each arm in a predetermined angular position on the shaft, a label-gripping member loosely mounted on each arm and a slip clutch in the drive of said arms.
17. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a driving element, a plurality of label-grip members operatively connected to said element, and a slip clutch in said connection normally positively connecting said members to said element and including two resiliently engaged parts severally connected to the members and to said element, said parts being relatively movable upon a predetermined resistance to the movement of said members by said element.
18. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a driving element, a plurality of arms, a slip clutch operatively connecting said arms to said element, a spring interposed between each arm and the element, whereby each arm is independently movable, a label-gripping member loosely mounted on each arm, and means for adjusting the relative angular position of each arm, said slip clutch being a positive connection during normal operation of the mechanism but slipping in response to a predetermined resistance to the movement of said arms.
19. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a support, an oscillating driving shaft mounted thereon, a sleeve mounted for angular movement on the shaft, a slip clutch connecting the sleeve and the shaft in relatively fixed angular relation, and a plurality of label grip fingers carried by the sleeve, said clutch being adapted to slip upon a predetermined resistance to the movement of said fingers.
20. In a label grip finger mechanism for use on container labelling apparatus and the like, the combination of a support, an oscillating driving shaft mounted thereon, a sleeve mounted for angular movement on the shaft, adjacent flanges on the shaft and sleeve, one of said flanges having sockets and the other having projections seating in the sockets, a spring for urging said flanges together to hold the projections in the corresponding sockets, whereby the shaft and the sleeve are resiliently locked together in angular relation, and a plurality of label grip fingers carried by the sleeve, said projections and sockets being so shaped that they release from each other to permit relative angular movement between the shaft and sleeve upon a predetermined resistance to the movement of said fingers.

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