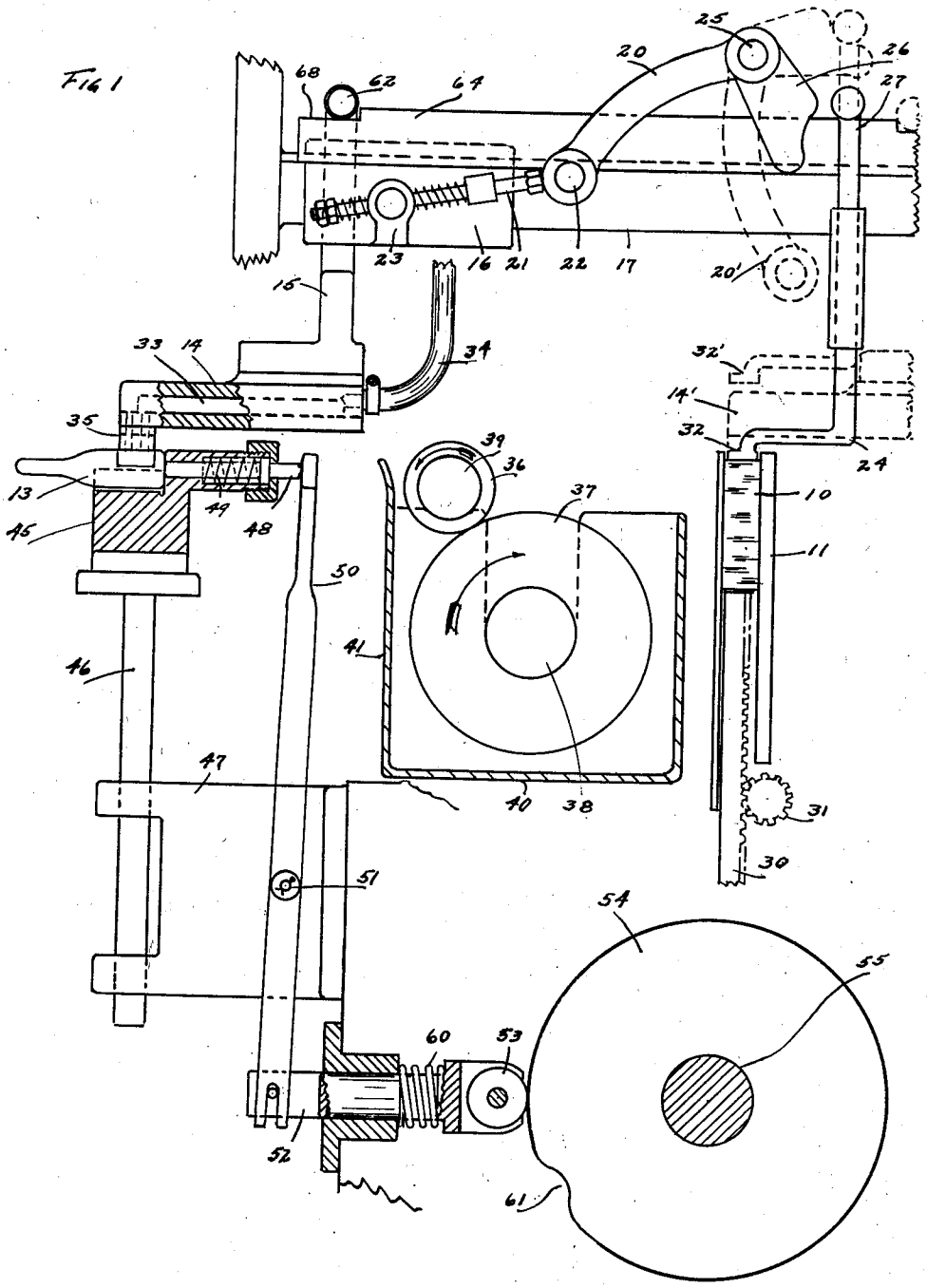
Jan. 6, 1942. J. A. McCONNELL ET AL 2,268,760

LABELING MACHINE

Filed April 15, 1940 2 Sheets-Sheet 1

Fig 1



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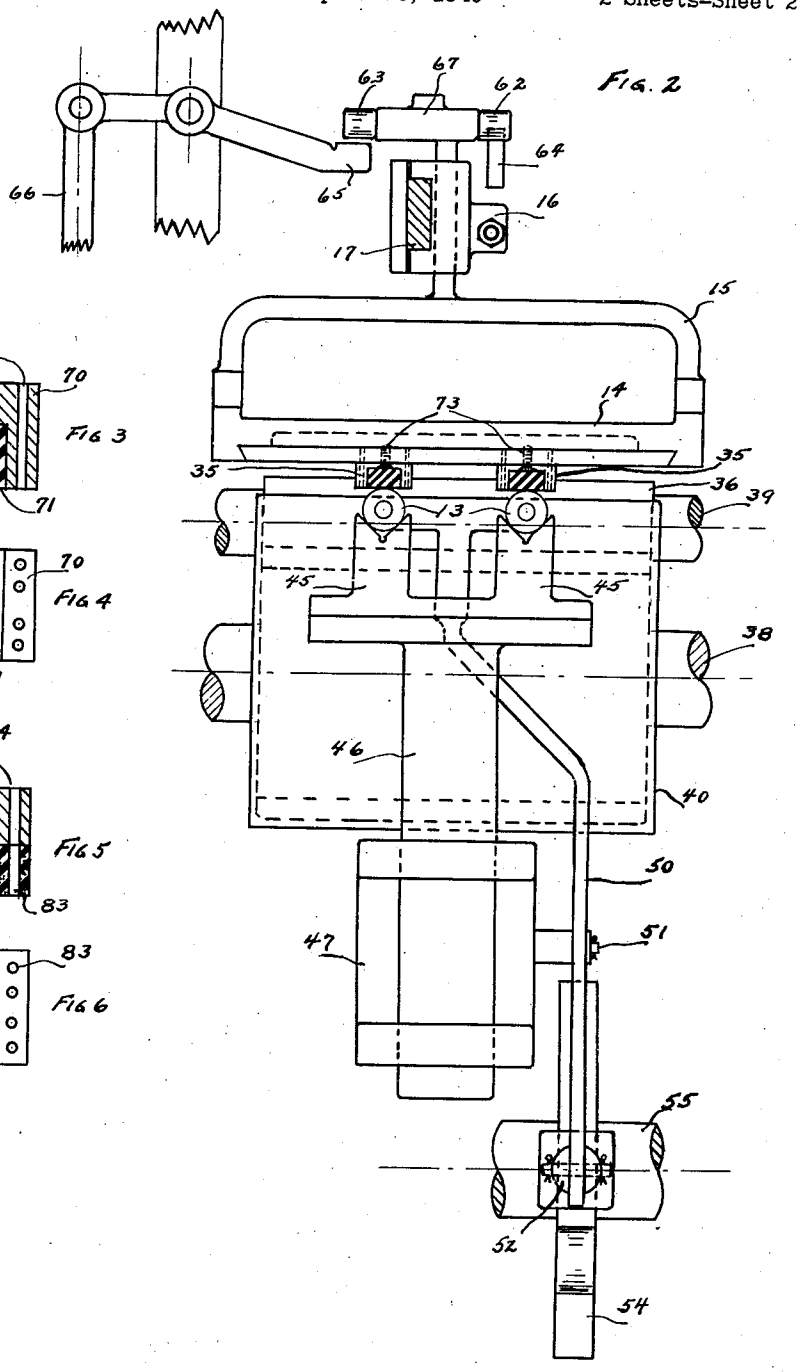

Fig. 2

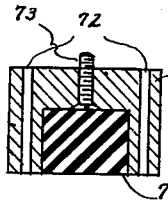

Fig 3

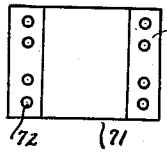

Fig 4

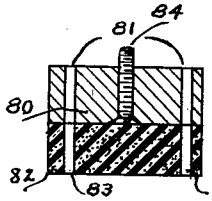

Fig 5

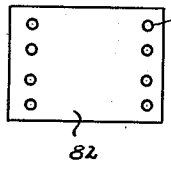

Fig 6

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UNITED STATES PATENT OFFICE

2,268,760

LABELING MACHINE

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Application April 15, 1940, Serial No. 329,684

4 Claims. (Cl. 216—55)

This invention relates to the labeling of merchandise and more particularly to the affixing of a sheet, web, or wrapper on a blank such as a box, container, or bottle.

An object of this invention is to label a fragile blank, such as a cylindrical bottle, quickly and effectively without breakage.

A more particular object of this invention is to increase the productivity of automatic labeling devices and at the same time to decrease the loss due to the destruction of blanks in the labeling operation.

Another more particular object of this invention is to insure that the label is firmly affixed to the container.

The labeling of pharmaceutical products involves many considerations which do not prevail in other industries. Usually these products are distributed in fragile containers, such as glass, which are easily susceptible of breakage. Since the contents of these containers are relatively expensive, any loss due to breakage in the labeling operation results in a definite economic loss. Then, too, due to certain regulations for pharmaceutical products, the adhesive employed for affixing the labels to the containers must be starch paste and this material is extremely difficult to apply to the labels with apparatus at present available.

In accordance with this invention a flexible sheet or web is affixed to a fragile container, such as a glass bottle, efficiently and quickly without danger of breakage to the container and a viscous adhesive, such as starch paste, may be employed with the same effectiveness for affixing the label to the container as other more mobile adhesives. The label is transported from a hopper to a holder for holding a blank or container by means of an element associated with the suction head now employed on labeling machines. This element is composed of a resilient material so that when it places the label on the container, the resilient portion of the element yields to conform substantially to the configuration of the container with which it is in contact. As a consequence, no breakage results. In passing from the hopper to the holder, adhesive is applied to the label by means of an adhesive applying roll. To insure that the label is supplied with sufficient viscous adhesive, such as starch paste, means are provided for supplying the roll constantly with adhesive. Means, which are responsive to the affixing of a label on a bottle or other container, are provided for ejecting the bottle or container from a holder in which the bottle is located during the labeling operation. A plurality of bottles or other containers may have labels affixed to them simultaneously and after affixation of the labels on the bottles, the bottles are simultaneously ejected from their respective holders.

A more comprehensive understanding of this invention is obtained by reference to the accompanying drawings in which:

Fig. 1 shows a side elevation of a section of a labeling machine which embodies the features of this invention.

Fig. 2 is a fragmentary front elevation of the machine shown in Fig. 1.

Figs. 3 and 4 show respectively a front view in section and a face view of the transfer head employed in the apparatus shown in Fig. 1.

Figs. 5 and 6 are respectively a sectional view and a face view of a modification of the transfer head shown in Figs. 3 and 4.

In Fig. 1, a stack of labels 10 is contained in a hopper 11 of a labeling device similar to that disclosed in United States Patent No. 2,108,628 granted to G. W. von Hofe and B. D. Dans on February 15, 1938. The uppermost label on the stack 10 is conveyed by means of a suction head 14 to a blank, such as a cylindrical bottle 13, on which the label is to be affixed. The suction head 14 is fixedly attached to a brace 15 and the brace is slidably mounted on a carrier 16. The carrier 16 is slidably moveable along a track 17 which determines the horizontal movement of the suction head 14 and brace 15. An arm 20 controls the movement of the carrier 16 along the track 17 by means of a rod 21 pivotally connected by a pintle 22 to a spring controlled coupling 23. The arm 20 is actuated by the rotation of a shaft 25 which carries the arm 20 and a cam 26. The cam 26 controls the vertical movement of a feeler or determiner 24 through a vertical rod 27. A depending rack 30 and pinion 31 operate to raise the stack of labels 10 whenever the feeler 24 falls below a predetermined level. The carrier 16 and the feeler 24 are controlled in the same manner as the similar mechanism in the above noted patent. One extremity of the feeler 24 terminates in a shoe 32 adapted to engage and rest upon the upper label of the stack 10. The feeler or determiner 24 operates in synchronism with the action of the suction head 14 so that the feeler 24 rises up from the stack when the suction head 14 is in the position to remove the uppermost label in the operation of transporting that label to the cylindrical bottle 13. The dotted configuration 14' and 32' repre-

sent respectively the position of the suction head 14 and shoe 32 of the feeler when the suction head 14 is located above the stack of labels in the process of removing the uppermost label therefrom.

The suction head 14 has a chamber 33 therein which is supplied with a suitable source of suction through a flexible hose 34. The suction head 14 also includes an element 35 to be described hereinafter in detail. Passages through the element 35 are connected to the chamber 33 and in a conventional manner the top label in the stack 10 is held by the suction supplied from the chamber 33 in conveying the label from the stack to the cylindrical bottle 13. When the label held by the element 35 is located on the proper place on the bottle 13, the suction is removed to release the label from the element 35.

In the passage of the label from the hopper 10 to the cylindrical bottle 13, some form of adhesive, such as starch paste, is applied to the bottom surface of the label. In the embodiment of the invention illustrated in the drawings, this result is achieved by passage of the bottom of the label over a cylindrical adhesive applying roll 36 mounted to rotate on a shaft 39. The peripheral surface of the adhesive applying roll 36 is in tangential relation with a cylindrical transfer roll 37 rotated continually during the operation of the machine on a shaft 38. The shafts 38 and 39 are rotated by the same power and gearing mechanism is provided so that these shafts rotate at the same rate. The cylindrical transfer roll is preferably completely contained within a reservoir 40 for containing the adhesive, while the adhesive applying roll 36 is preferably partly contained in the reservoir 40. The transfer roll 37 is rotated by the shaft 38 in a clockwise direction, while the adhesive applying roll 36 rotates in a counter-clockwise direction. Consequently in the embodiment of the invention shown in Fig. 1, the adhesive is supplied from the transfer roll 37 to the applying roll 36 on the right side of the reservoir or that adjacent to a side 41 of the reservoir 40. The distance between the transfer roll and the side 41 of the reservoir is relatively small in order to insure that adhesive is supplied from the transfer roll to the adhesive applying roll. When this distance is relatively small the adhesive which is supplied to the adhesive applying roll 36 from the transfer roll 37 is prevented from flowing from the applying roll 36. By restricting the distance between the side 41 of the reservoir and the transfer roll 37, means are provided for insuring that the adhesive is continually supplied to the adhesive applying roll 36. A distance of 3/8 inch from transfer roll 37 and the side 41 of the reservoir has been found satisfactory. A baffle extending preferably from slightly below the transfer roll to slightly above the jointure of the two rolls may also be employed for this purpose. In that case, a larger reservoir may be used, but the baffle must be located a relatively short distance from the jointure of the transfer roll 37 and the applying roll 36.

The container 13 is held in a holder 45 which is secured to a supporting table 46 and means are provided for adjusting the holder to locate the label properly on the container. The table 46 is movably attached to framework 47 of the machine. Means are provided for ejecting the blank, such as the cylindrical bottle 13, after a label has been affixed thereto. This means comprises a piston 48 located on the holder 45 immediately behind the position normally occupied by the bottom of the bottle 13 during the operation of affixing a label thereto. The piston 48 is normally biased by a spring 49 to permit the insertion of the bottle 13 in the holder 45. A lever 50 pivoted on the framework 47 of the device by means of a pintle 51 controls the movement of the piston 48. The lever 50 is in turn actuated by a rod 52. The rod 52 is provided with a roller 53 in rolling engagement with the periphery of a cam 54 which is rotated by a shaft 55. A spring 60 surrounds the rod 52 for insuring that the roller 53 is continually engaged with the periphery of the cam 54. The periphery of the cam 54 has an indentation 61 therein. When the roller 53 contacts the indentation 61 the rod 52 is suddenly actuated to the right and this action imparts a movement to the piston 48 to the left to eject the bottle 13 from the holder 45. The indentation 61 on the cam 54 is located in a position in relation to the rotation of the shaft 55 so that the bottle 13 is ejected from the holder 45 after a label has been affixed to the bottle. The shaft 55 operates in synchronism with the transfer of the label from the hopper 10 to the bottle 13 by gears or other well known mechanical linkage and completes one rotation in the process of the affixing of one label on a bottle. Preferably the indentation 61 is relatively sharp so that a complete movement of the piston 48 to the left and its restoration to the right occurs in a short interval whereby a new unlabeled bottle may be inserted in the holder 45 as quickly as possible after the ejection of the labeled bottle.

In Fig. 2, which illustrates a front elevation of a portion of the apparatus shown in Fig. 1, a plurality of holders 45—45 and bottles 13—13 are shown together with elements 35—35 for conveying a label to each of the bottles in its respectively associated holder. A hopper, not shown, similar to the hopper 10, is provided for each holder and the label held to an element 35 passes over the adhesive applying roll 36 and affixes the label to the bottle in its respectively associated holder 45. By means of this system, a plurality of bottles may be labeled simultaneously. A short interval after the labels are affixed to all of the bottles in the holders 45, they are ejected simultaneously by the actuation of lever 50, and new, unlabeled bottles may be inserted in the holders 45 to be labeled.

Referring to Figs. 1 and 2, the manner in which the vertical movement of the brace 15 is conventionally controlled is by means of two rollers 62 and 63 which are mounted on a frame 67 which is integral with the brace 15. The roller 62 rides upon a fixed rail 64, while the roller 63 is in engageable relation with a moveable rail 65. The roller 62 rides on the fixed rail 64 in the movement of the carrier from right to left, as shown in Fig. 1; the roller 63 rides on the movable rail 65 when the carrier 16 is actuated from left to right. This result is accomplished by the actuation of the movable rail 65 through a mechanical linkage 66, after a label has been placed on the blank 13. The moveable rail 65, when raised, is on a slightly higher horizontal plane than the fixed rail 64 so that while the label on the element 35 contacts the adhesive applying roll 36 in the movement of the carrier 16 from right to left, the element 35 does not engage the roll 36 in the return journey from left to right. There is an indentation 68 in the fixed rail 64 in the position at which the roller 62 is

located when the label is to be placed on the blank 13. When the roller 62 reaches this indentation 68 in the movement of the carrier 16 from right to left, the roller 62 drops and with it the frame 67, brace 15, and suction head 14 is also lowered. This drop is relatively sudden and the element heretofore employed for conveying the label from the hopper to the blank frequently breaks the blank. More particularly does this breakage occur if there is considerable variation in the size of the blanks.

Fig. 3 shows a transverse vertical section of the element 35 shown in Figs. 1 and 2, while Fig. 4 is a face view of this element. The element 35 to which the label is held during its transportation from the hopper to the bottle or blank comprises an inverted U-shaped metal block 70. The inside hollow portion of the block 70 is filled with a resilient material 71, such as rubber. The element is fixedly held to the suction head 14 by means of a machine screw 73. A plurality of vertical channels 72 pass through the block 70. These channels are connected to the suction chamber 33 of the suction head 14 shown in Fig. 1, so that a reduced pressure is applied to the label during the conveying operation. The width of the resilient material 71 should be at least as great as the maximum width of the largest bottle accommodated in the device at the point at which the material contacts the bottle. The depth of the resilient material 71 is sufficiently great so that the material yields without exerting a breaking force on the bottle when the label is placed on the bottle.

In operation, a label is picked up from the stack by the element 35 due to the suction applied through the channels 72, adhesive is applied to it by the adhesive applying roll 36 and then it is placed on the blank, such as the cylindrical bottle 13. The suction is then removed, the suction head and element 35 withdrawn, and pressure applied to the label. When the element comprising the resilient material 71 locates the label on the bottle 13, the resilient portion of the element yields under the pressure incident in this operation to conform to the configuration of the bottle or blank without any danger of breakage to the bottle. With any given type of bottle, variations in size occur and any slightly larger than that for which the element 35 was constructed to accommodate will not break. Further, larger size bottles may be used with the same element without danger of breakage.

In Figs. 5 and 6, there is shown a transverse section and a face view respectively of a modification of the conveying element shown in Figs. 3 and 4. The element comprises a block 80 having channels 81 therein connected to the suction chamber 33 of the suction head 14 shown in Fig. 1. The block 80 may be connected to the suction head by means of a machine screw 84. A pad of porous resilient material 82, such as sponge rubber, is fixedly attached to the block 80. Channels 83 pass through the pad 82 to connect with the channels 81. The element comprising the block 80 and the pad 82 picks up the label, and after the application of adhesive thereon, conveys it to the bottle 13. In the process of locating the label on the bottle, the resilient element 82 yields to conform to the configuration of the blank or bottle, and the label is affixed to the bottle without danger of breakage.

While preferred embodiments of this invention have been illustrated and described, various modifications may be made therein without departing from the scope of the appended claims.

What is claimed is:

1. A labeling machine comprising a hopper for containing a supply of labels, a holder for holding a blank upon which the label is to be affixed, transfer means for conveying a label from said hopper to a blank in said holder, said transfer means including a rigid member for holding a label in contact therewith during the conveying operation and a pressure-exerting means for exerting a uniform pressure on the surface of the label in contact with the blank upon the locating of the label on the blank, said pressure-exerting means comprising a resilient yieldable material.

2. In a labeling machine, a hopper for containing a supply of labels, a holder for holding a blank upon which a label is to be affixed, conveying means for conveying a label from said hopper to said blank, said conveying means comprising two rigid parallel elements by which the label is secured in the conveying operation and an element with which a portion of the label is in contact in the conveying operation and which imparts a uniform pressure on the portion of the label which contacts the blank.

3. In a labeling machine, a hopper for containing a supply of labels, a holder for holding a blank, conveying means for conveying a label from said hopper to said blank, said conveying means comprising holding means for holding the label during the conveying operation, and a pressure-applying means for applying pressure to the label in contact with the blank, said holding means comprising a rigid member with which a portion of the label is in contact and which holds securely a label in the conveying operation and said pressure-applying means comprising a yieldable element which imparts a uniform pressure on the portion of the label in contact with a blank and which yields to conform to the configuration of the part of the blank with which it is in contact.

4. In a labeling machine, a hopper for containing a supply of labels, a holder for holding a blank upon which a label is to be affixed, a suction head for conveying a label from said hopper to said blank, said suction head comprising a U-shaped metallic member having channels in the arms thereof through which a reduced pressure is applied to a label during the conveying operation and a resilient material contained within the arms of said U-shaped member.

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