July 12, 1938. W. A. JOPLIN 2,123,363

BOTTLE TRANSFER DEVICE

Filed Dec. 21, 1936 6 Sheets-Sheet 1

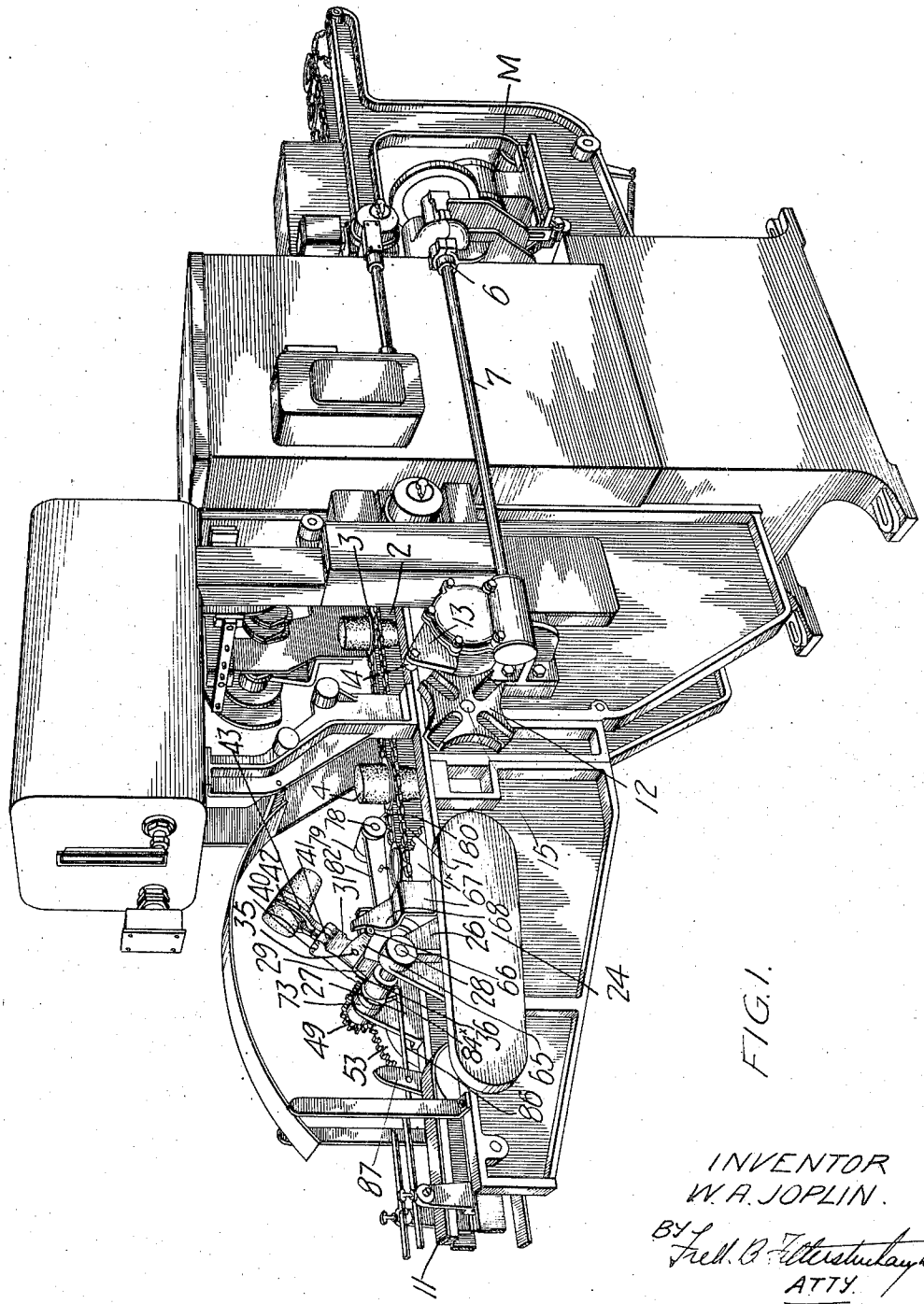

FIG. 1.

INVENTOR
W. A. JOPLIN.
BY Fred B. Fitzsimmons
ATTY.

July 12, 1938. W. A. JOPLIN 2,123,363

BOTTLE TRANSFER DEVICE

Filed Dec. 21, 1936 6 Sheets-Sheet 2

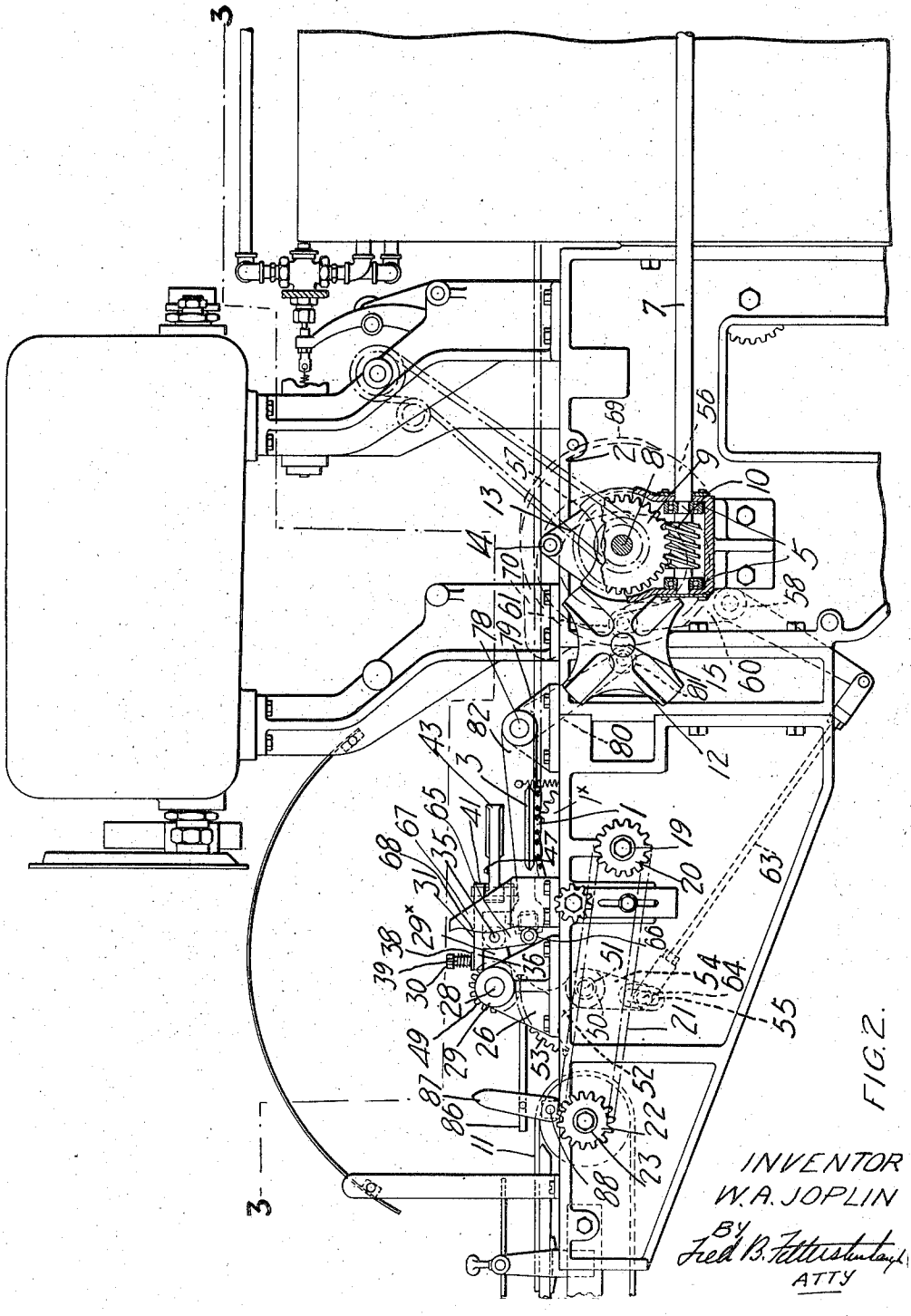

FIG. 2.

July 12, 1938. W. A. JOPLIN 2,123,363

BOTTLE TRANSFER DEVICE

Filed Dec. 21, 1936 6 Sheets-Sheet 3

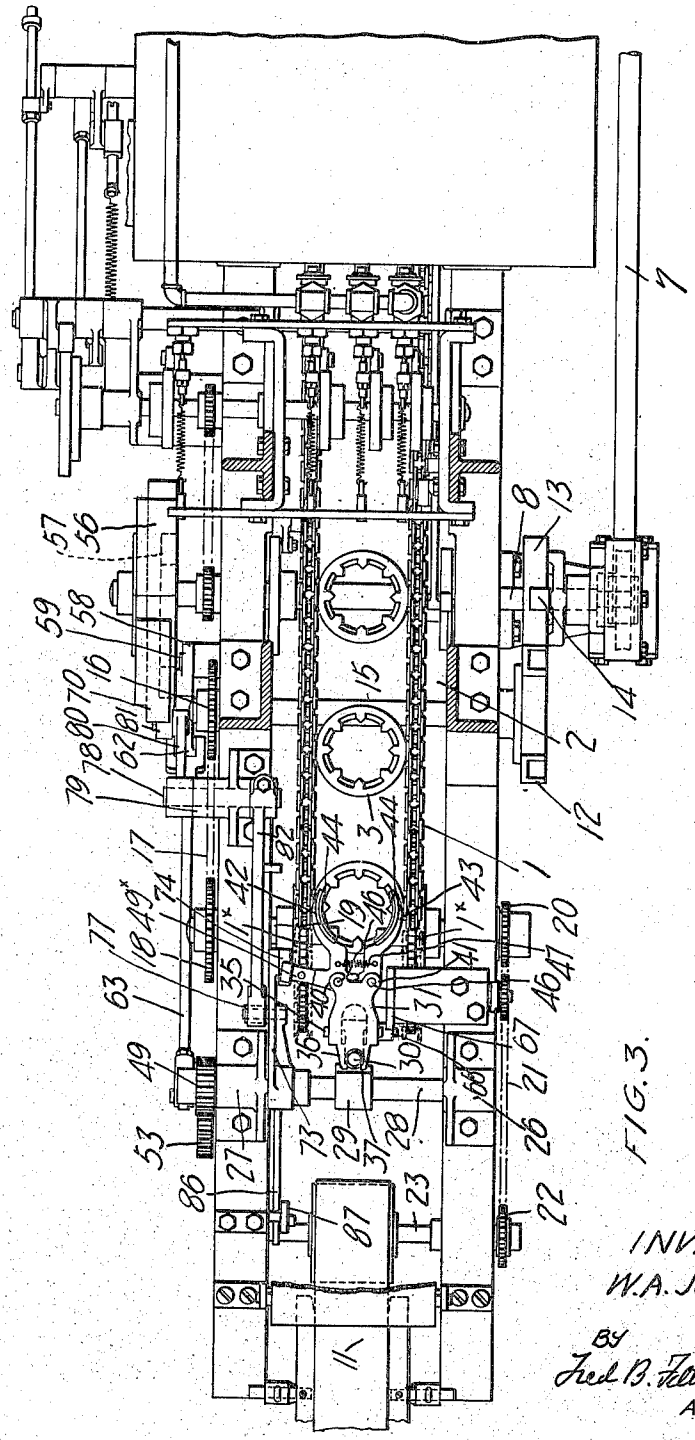

FIG. 3.

INVENTOR
W. A. JOPLIN.
BY
Fred B. Fetterstuck
ATTY.

July 12, 1938. W. A. JOPLIN 2,123,363

BOTTLE TRANSFER DEVICE

Filed Dec. 21, 1936 6 Sheets-Sheet 4

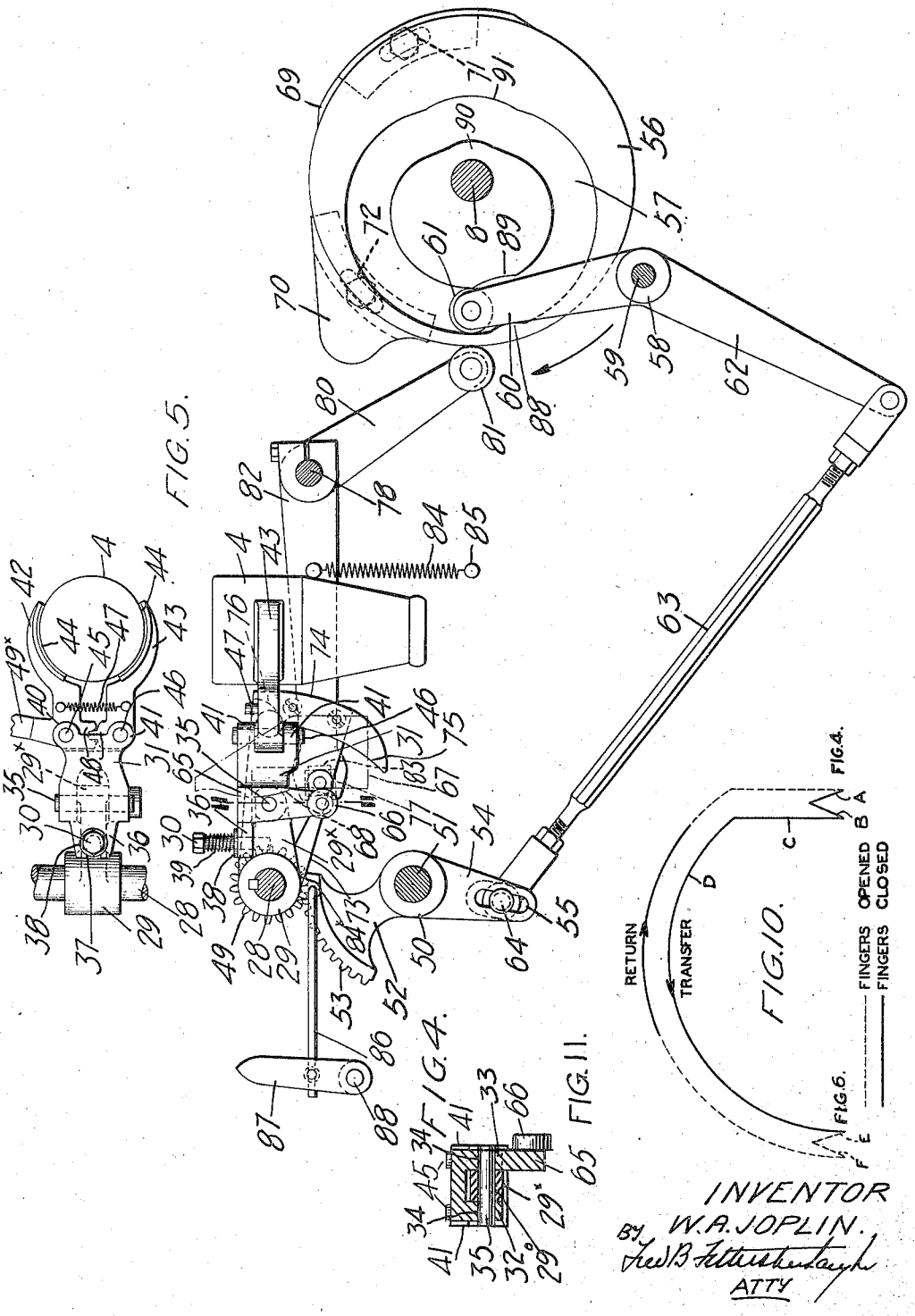

FIG. 5.

FIG.10.

FIG.4.

FIG. 11.

INVENTOR
W.A.JOPLIN.
BY Fred B. Fitzsimmons
ATTY

July 12, 1938. W. A. JOPLIN 2,123,363

BOTTLE TRANSFER DEVICE

Filed Dec. 21, 1936 6 Sheets-Sheet 5

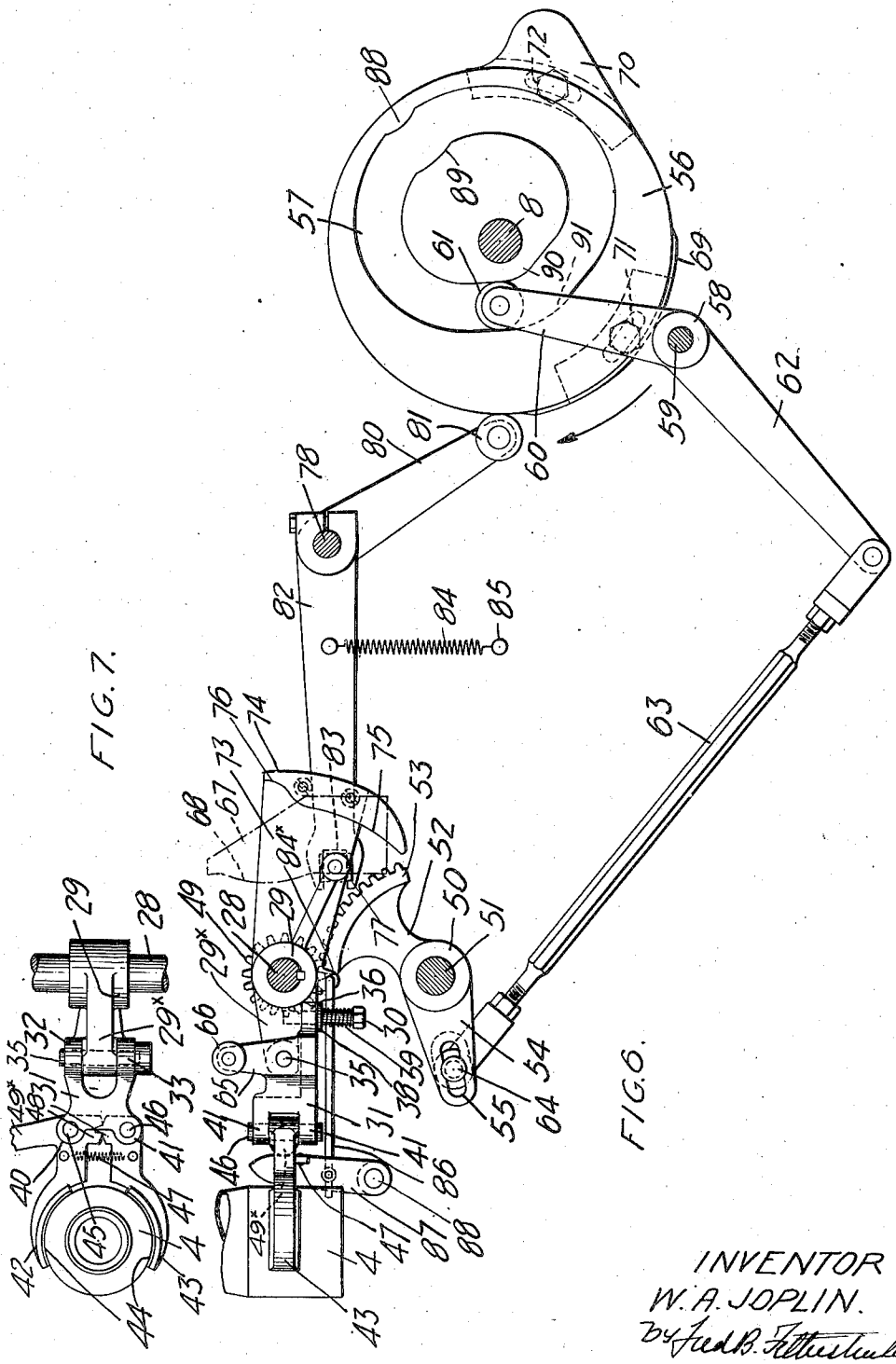

FIG. 7.

FIG. 6.

INVENTOR
W. A. JOPLIN.
By Fred B. Fitzsimmons
ATTY.

July 12, 1938. W. A. JOPLIN 2,123,363

BOTTLE TRANSFER DEVICE

Filed Dec. 21, 1936 6 Sheets-Sheet 6

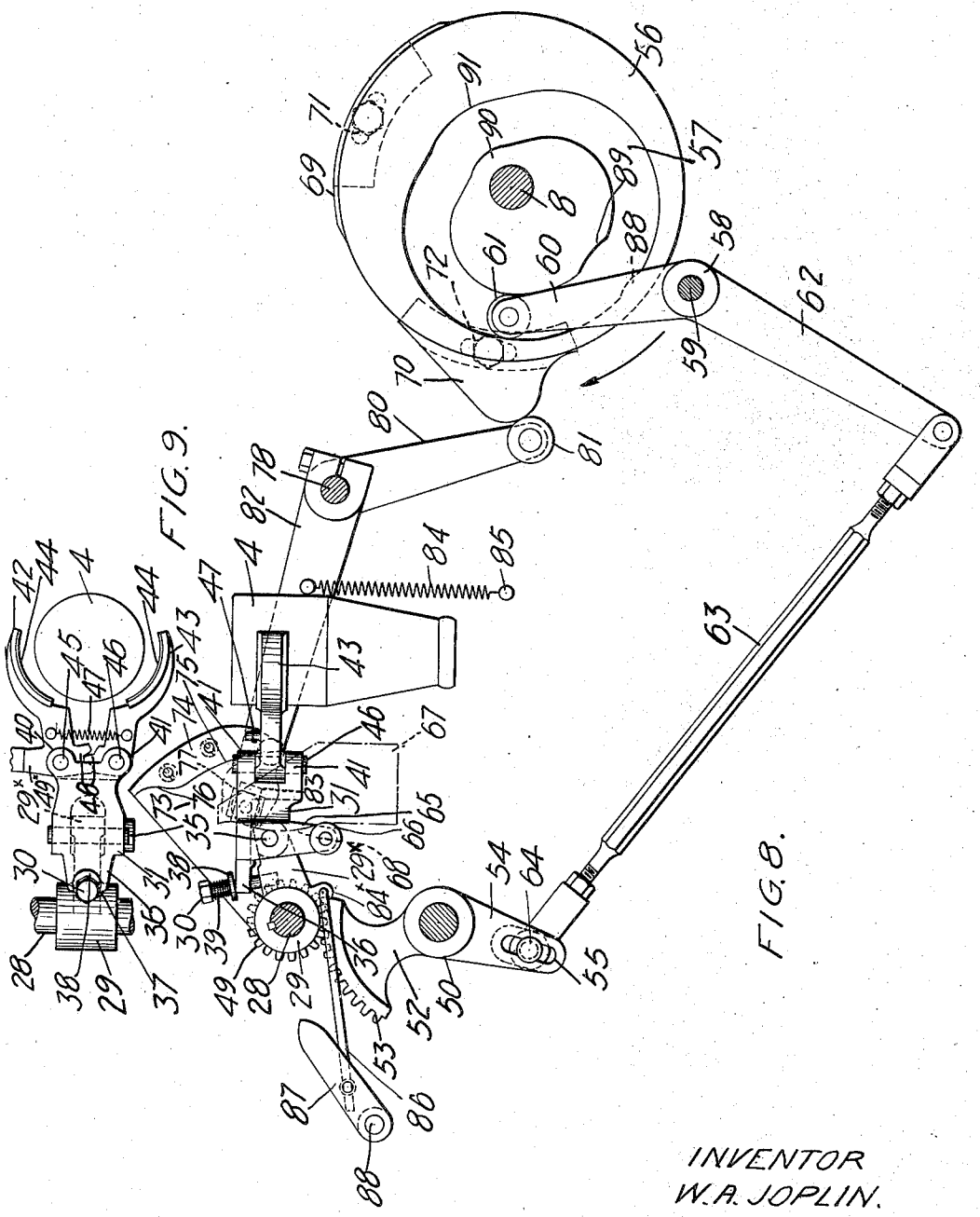

FIG. 9.

FIG. 8.

INVENTOR
W. A. JOPLIN.
BY Fred B. Fitzsimmons
ATTY.

Patented July 12, 1938

2,123,363

UNITED STATES PATENT OFFICE

2,123,363

BOTTLE TRANSFER DEVICE

William Abbott Joplin, Quincy, Mass., assignor to Reinforced Paper Bottle Corporation, New York, N. Y., a corporation of Delaware

Application December 21, 1936, Serial No. 116,949

7 Claims. (Cl. 214—1)

My invention relates to improvements in bottle transfer devices used in conjunction with paper bottle paraffiners. The object of the invention is to devise a device whereby bottles passed from a paraffiner in an inverted position may be transferred onto a transporting conveyor and deposited thereon in an up-ended or filling position and at the same time prevent the congealing of superfluous liquid wax into lumps in the bottom of the bottle when up-ended into the filling position and also prevent the gripping fingers sticking to the bottle, when they are releasing the bottle, as the wax on the surface of the bottle congeals. It consists essentially of a bottle gripping device which seizes and shakes the paraffined bottle; means for lifting the gripping device and seized bottle vertically clear of the conveyor of a paraffiner; means for then swinging the lifted bottle concentrically in a vertical plane to up-end and deposit the bottle in such up-ended or filling position onto a transporting conveyor; and means for releasing the gripping device and imparting a quick up and down reciprocating or shaking movement to the gripping device as it releases the bottle as hereinafter more particularly explained.

Fig. 1 is a perspective view of a paraffining machine, the adjacent end of an endless conveyor and the transfer mechanism for transferring the paraffined bottle from the paraffiner to the transporting conveyor.

Fig. 2 is a view in elevation of the rear portion of the paraffining machine and the transfer device shown in the normal position or the position in which the bottle is gripped preparatory to transferring it to the transporting conveyor.

Fig. 3 is a plan sectional view taken on line 3—3 Fig. 2.

Fig. 4 is a detail of the bottle transferring mechanism separated from the rest of the machine and shown in its normal position.

Fig. 5 is a plan view of the gripping fingers and adjacent parts shown in Fig. 4.

Fig. 6 is a view similar to Fig. 4 showing the transfer mechanism in the position it assumes after the transfer operation and prior to the deposit of the bottle on the transporting conveyor.

Fig. 7 is a plan view of the gripping fingers and adjacent parts when in the position illustrated in Fig. 6.

Fig. 8 is a view similar to Fig. 6 showing the transfer mechanism in the position it assumes when the gripping fingers are in position ready to engage another bottle for transfer.

Fig. 9 is a plan view of the gripping fingers and adjacent parts in the position illustrated in Fig. 8

Fig. 10 is a diagrammatic illustration of the path of travel assumed by the gripping fingers during a transfer operation. The dotted line indicates the period the gripping fingers are open and the full line indicates the period the gripping fingers are closed.

Fig. 11 is a cross sectional view on line 11—11 Fig. 4.

In the drawings like characters of reference indicate corresponding parts in each figure.

An endless conveyor 1 passes horizontally through the paraffiner 2 by which the walls of the bottle are coated with liquid paraffin. The conveyor 1 comprises two parallel chains connected together by retaining rings 3 in which the paper bottle bodies 4 are slipped, the rings being so formed as to support the bottle bodies in the inverted position shown in Fig. 1.

I do not describe the paraffiner and the conveyor thereof in detail as they do not form part of the present invention.

Supported in bearings 5 and 6 is a power shaft 7 from which is driven a cam shaft 8 by means of the worm gear 9 and worm 10. The power shaft 7 is driven from any suitable source such as the motor M shown in Fig. 1.

An endless transporting conveyor 11 receives the bottles in a right side up or filling position when transferred from the paraffiner conveyor 1 by mechanism hereinafter described. The conveyor 1 and transporting conveyor 11 are driven in unison by a step-by-step movement.

The drive for the conveyor 1 and transporting conveyor 11 consists of a four point Geneva wheel 12 secured to the shaft 15 and driven from the cam shaft 8 by the Geneva arm and roller designated 13 and 14 respectively. The shaft 15 extends transversely beneath the conveyor 1. A sprocket gear 16 is secured to the opposite end of the shaft 15. The sprocket 16 drives the sprocket gear 18 by means of the sprocket chain 17 meshing with the gears 16 and 18.

A transverse shaft 19 is mounted in suitable bearings and carries thereon the gears 1x forming carriers for the conveyor chains 1.

The conveyor 11 is driven from the shaft 19 of the conveyor 1 by means of the sprocket wheel 20 secured to the opposite end of the shaft 19 and connected by a sprocket chain 21 to the sprocket wheel 22 secured to the carrying shaft 23 of the conveyor 11. The sprocket wheels 20 and 22 and chain 21 are enclosed in a housing 24 (see Fig. 1). Keyed to the main cam shaft 8 is a

main cam 56 which controls all the operations and functions of the transferring mechanism.

Mounted on bearings 26 and 27 is a rock shaft 28. The rock shaft 28 carries the gripping fingers and associated mechanism which will now be described.

A bracket 29 is keyed to the shaft 28 and is provided with a normally horizontally extending portion 29^x having a transverse orifice 29^o. Adjacent the body of the bracket 29 surrounding the shaft 28 is located a bolt 30.

A bracket member 31 is provided with depending spaced apart lugs 32 and 33 having orifices 34 and between which extends the portion 29^x so that the orifices 29^o and 34 are in transverse alignment for the reception of the hinge pin 35 whereby the bracket 31 is hingedly connected to the bracket 29. The bracket 31 is also provided with a lug 36 extending towards the shaft 28 and provided in its end with an open ended slot 37 through which the bolt 30 extends. The bolt 30 is provided with a washer 38 bearing against the lug 36 pressed thereagainst by the spring 39 and by such pressure tending to keep the bracket portions 29^x and 31 in alignment under normal conditions. The end of the member 31 which is normally remote from the shaft 28 is provided with two pairs of lugs 40 and 41.

Gripping fingers 42 and 43 for gripping the bottle body are provided, the gripping portions thereof being arc-shaped to grip the external periphery of the bottle, such gripping portions being lined with sponge rubber or other suitable material 44. The fingers 42 and 43 are pivoted at 45 and 46 in the lugs 40 and 41 and are spring held together as indicated at 47 and are geared together as indicated at 48.

I will now describe the means by which the gripping fingers are swung concentrically around the shaft 28.

A pinion 49 is fixed to the rock shaft 28 and a lever 50 is swung upon a shaft 51 carried by the frame of the machine. One arm 52 of the lever 50 is provided with a gear quadrant 53 meshing with the pinion 49. The other arm 54 of the lever depends and is provided with a longitudinal slot 55.

56 is a disc secured concentrically on the cam shaft 8. In a face of the disc 56 is formed an eccentric cam groove 57. A bell crank 58 is mounted on a shaft 59. One arm 60 of the bell crank 58 is provided with a cam roller 61 tracking in the cam groove 57. The other arm 62 of the bell crank is connected by a link 63 to the lever arm 54 by a connection 64 adjustable in the slot 55. By the rotation of the disc 56, the bell crank 58 is reciprocated so as to reciprocate the lever 50 and through the gear quadrant 53 and pinion 49 rock the shaft 28 to swing the fingers 42 and 43 from the position shown in Fig. 4 to the position shown in Fig. 6 and back again to the normal position in Fig. 4.

It is necessary in raising the bottle from the paraffiner conveyor 1 that it be held vertical.

It has been previously described that the parts 29^x and 31 carrying the fingers 42 and 43 are hingedly connected together by the hinge pin 35 and are normally held in longitudinal alignment by the pressure of the spring 39 bearing against the lug 36. By breaking this joint upward the fingers 42 and 43, during their initial upward movement, are held horizontal and, therefore, the bottle is held vertical to draw out of the retaining rings 3 and during the downward or return movement of the finger they are held horizontal so as to engage the next vertically disposed bottle 4 in the paraffiner conveyor 1.

In order to automatically break the joint, the member 31 is provided with a depending arm 65 carrying at its lower end a freely rotatable roller 66. Coacting with the roller 66 is a stationary cam plate 67 having a convexed edge portion 68. The roller 66 engages the plate 67 normally below the convexed portion 68.

As the fingers 42 and 43 are swung either upward or downward in the reverse swinging movement, the roller 66 engages the convex cam portion 68 forcing the arm 65 outward so as to tilt the member 31 in a downward direction to compensate for its normal swinging movement and thus retaining it in a horizontal position until it passes the cam portion 68 when the spring 39 compressed by the aforesaid movement returns the member 31 into alignment with the member 29^x.

I will now describe the means by which the fingers 42 and 43 are opened.

The cam disc 56 is provided with cam portions 69 and 70 extending beyond the exterior periphery of the disc 56 and which are adjustably secured to such disc as indicated at 71 and 72.

An arm 73 is mounted to swing freely on the shaft 28 and carries at its outer end a cam member 74 having a concave inner edge 75 terminating at its upper end in an inwardly notched portion 76. A block 77 is pivotally mounted on the arm 73 intermediate of its length.

A rock shaft 78 is journalled in a bearing bracket 79 carried on the machine frame. A cam arm 80 is secured to the shaft 78 and is provided with a roller 81 travelling on the exterior periphery of the disc 56 in the path of the cam portion 69 and 70. An arm 82 is secured to the opposite end of the shaft 78 and is provided at its free end with an open ended slot 83 in which the block 77 slidably fits. A tension spring 84 is secured to the arm 82 at one end and to a suitable anchoring point 85 at the opposite end whereby the roller 81 is held to the periphery of the disc 56 and to follow the cam surfaces 69 and 70.

On the arm 73 is a lug 84^x to which is pivotally connected a link rod 86. The opposite end of the link rod 86 is pivotally connected to a lever 87 freely mounted on a stud 88 carried by the machine frame.

As the cam groove 57, roller 61 and bell crank arm 60 have actuated to swing the fingers 42 and 43 counterclockwise, the arm 49^x is carried by such movement adjacent to the lever 87 (see Fig. 6).

The roller 81 then engages the cam face 69 so as to swing the arms 82, 73 slightly upward carrying the lug 84^x also in a counterclockwise direction pulling the lever 87 against the arm 49^x to force the fingers 42 and 43 apart when in the position shown in Fig. 7. When the fingers 42 and 43 are swung in the reverse direction around the shaft 28, the arm 49^x is carried above the lever 87 allowing the fingers 42 and 43 to close by means of the spring 47. When the reverse swing of the fingers 42 and 43 is near completion, the roller 81 is engaged by the cam portion 70 swinging the arms 82 and 73 upward carrying the cam 74 into the position shown in Fig. 8 to engage the arm 49^x as it descends thus opening the fingers 42 and 43 until they come to the bottle gripping position. The arm 49^x then passes off

the cam 74 allowing the spring 47 to act to close the fingers on the bottle.

Immediately upon the gripping and prior to lifting of one bottle and prior to the release of another bottle, the bottle to be gripped or released is given a shaking movement. This is done in the first case to ensure of any surplus wax being drained off the inverted bottle so that when the bottle is up-ended wax will not flow to the bottom of the bottle and coagulate into lumps and render the bottle interior unsightly. In the second case the bottle is shaken to prevent the sticking of the fingers to the congealing wax as the bottle is released.

In order to effect this movement, the cam groove at the beginning of its lifting operation is provided in its outer wall with a convex protuberance 88 and radially opposite in the inner wall with corresponding concavity 89. By this means as the roller 61 passes between the portions 88 and 89 a quick inward and outward movement is given to the roller 61 thereby imparting a quick up and down or shaking movement to the fingers 42 and 43 and the bottle gripped thereby by means of the roller and intervening mechanism.

Similarly at the end of the transfer movement, the fingers 42 and 43 and the gripped bottle are given a quick up and down or shaking movement by means of the convex protuberance 90 and the radially opposite concavity 91 imparting a quick inward and outward movement to the roller 61 and thereby supporting a similar quick up and down or shaking movement to the bottle as it is deposited on the belt conveyor 11 to free the fingers 42 and 43 from the congealing wax.

The complete cycle of operation is as follows, such cycle starting from the position shown in Fig. 4.

With reference to Fig. 10, it will be seen that this position is indicated on the chart by the notation "Fig. 4". Referring now to the cam 56, Fig. 4, it will be noticed that the roller 81 being on the lower dwell portion will retain the cam 74 in its ineffective position thus allowing the gripping fingers 42 and 43 to grasp the bottle under the tension of the spring 47 (Fig. 5). As the cam 56 rotates in the direction of arrow, the roller 61 is influenced by the portions 88, 89 of the groove 57. It is obvious that this influence will cause the segment gear 52 to oscillate sharply and this oscillation is communicated to the shaft 28 through the pinion 49 which raises and lowers the gripping fingers 42 and 43 and bottle 4 rapidly to shake off any superfluous paraffin that may be clinging thereto. This reciprocation of the bottle is vertical because the roller 66 is contacting the cam bracket 67. Referring to Fig. 10, the vertical reciprocation of the gripping fingers is graphically illustrated by the lines A and B. As the cam 56 continues to rotate the segment gear 52 has a uniform oscillation imparted to it through the medium of the groove 57. As explained before, for the first portion of this movement, the gripping fingers and bottle are raised vertically until the bottle is clear of the retaining ring 3 and this vertical movement is indicated by the line C Fig. 10. When the gripping fingers are free of the influence of the cam 67 they will assume an arcuate path of travel represented by D, Fig. 10 until they reach the position illustrated in Fig. 6 and indicated as such in Fig. 10 up-ending the bottle so that it assumes a bottom down or filling position resting on the conveyor belt 11.

Referring now to Fig. 6 and particularly to the cam 56, it will be seen from this figure that upon further rotation of the cam 56, the segment gear 52 will be influenced by the portions 90, 91 of the groove 57 and the gripping fingers will again be subjected to a shaking movement as illustrated at E, F Fig. 10 similar to the movement (except it is arcuate and not vertical) A, B, Fig. 10 imparted when the gripping fingers and bottle were being raised. Just as this reciprocation starts, the roller 81 is influenced by the cam surface 69 which raises the cam 74 slightly and pulls the link 86 and lever 87 which in turn pulls the arm 49^x of the gripping finger 42 thereby opening the fingers to release the bottle. The reciprocation movement E, F, imparted by the portions 90, 91 of groove 57 prevents the bottle from adhering to the gripping fingers. As the cam 56 continues to rotate the segment gear 52 is given a retrograde oscillation about the shaft 28 through the influence of the groove 57 to return the gripping fingers 42 and 43 to their normal position to transfer another bottle first upward in an open position to clear the up-ended bottle as indicated at G in Fig. 10, then closing as the arm 49^x passes the upper end of the lever 87 and remaining closed as indicated at H Fig. 10.

Referring to Figs. 8 and 9, as the gripping fingers near the completion of their retrograde oscillation around the shaft 28, the roller 81 is influenced by the cam portion 70 and raises the cam 74 into the path of the arm 49 carried towards the cam by such oscillating movement so as to swing the arm 49 to open the gripping fingers 42 and 43 again as indicated at I Fig. 10 ready to grasp a bottle. From Figs. 8 and 9 it will be noted that the roller 66 is again influenced by the cam 67 as the gripping fingers 42 and 43 move down to envelop a bottle so that they pass longitudinally of the bottle parallel to its axis and in a horizontal position to the gripping point as indicated at J Fig. 10.

Additional rotation of the cam 56 will cause the roller 81 under the influence of the spring 84 to roll down the portion 70 onto the periphery of the disc 5 carrying the cam back to its normal position and thus leaving the fingers 42 and 43 under the influence of the spring 47 to grip the bottle before the segment gear 52 again oscillates to transfer the next bottle.

What I claim as my invention is:—

1. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm extending radially therefrom and comprising two members, a spring hinge between the members, bottle gripping means comprising two pivoted members spring held together and carried by the outer hinged member, means for rocking the rock shaft, and means for holding the outer hinged member in a horizontal position until the bottle engaged by the gripping members is raised clear of its retainer, and means for opening the gripping means at each end of the rocking stroke.

2. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm extending radially therefrom and comprising two members, a spring hinge between the members, bottle gripping

means comprising two pivoted members spring held together and carried by the outer hinged member, means for rocking the rock shaft, and means for holding the outer hinged member in a horizontal position until the bottle engaged by the gripping members is raised clear of its retainer and comprising an arm depending from the outer hinged member, a roller journalled on the arm, and a stationary cam plate against the cam edge of which the roller bears as the hinge arm recedes from or approaches the bottle gripping position.

3. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm secured to the rock shaft and extending radially therefrom, a pair of gripping members pivotally mounted on the end of the arm and geared and spring held together, an operating arm extending from one of the gripping members adjacent its pivot, an arm freely swung on the rock shaft, a main cam, means operated by the main cam for rocking the rock shaft, and means also operated by the main cam for swinging the free arm on the rock shaft, and means connected to the swinging arm for engaging the operating arm to open the gripping members at each end of the rock shaft stroke.

4. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm secured to the rock shaft and extending radially therefrom, a pair of gripping members pivotally mounted on the end of the arm and geared and spring held together, an operating arm extending from one of the gripping members adjacent its pivot, an arm freely swung on the rock shaft, a main cam, means operated by the main cam for rocking the rock shaft, and means also operated by the main cam for swinging the free arm on the rock shaft, a cam piece secured to the freely swinging arm by which the operating arm of the gripping member is engaged to open the gripping members as such gripping members are swung towards the inverted bottle, and a peripheral cam piece on the main cam and means operated thereby for swinging the free arm upward.

5. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm secured to the rock shaft and extending radially therefrom, a pair of gripping members pivotally mounted on the end of the arm and geared and spring held together, an operating arm extending from one of the gripping members adjacent its pivot, an arm freely swung on the rock shaft, a main cam, means operated by the main cam for rocking the rock shaft, and means also operated by the main cam for swinging the free arm on the rock shaft, a lug depending from the freely swinging arm, a pivoted lever, a link between the lug and the lever, and a peripheral cam piece secured to the main cam and means operated thereby for swinging the free arm upward to swing the pivoted lever against the operating arm of the gripping members to open such gripping members when engaging the deposited bottle in the filling position.

6. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm secured to the rock shaft and extending radially therefrom, a pair of gripping members pivotally mounted on the end of the arm, a gear quadrant lever mounted to rock, a pinion on the rock shaft with which the gear quadrant is in mesh, a main cam provided with a cam groove in its face, a pivoted bell crank lever provided at one end with a roller engaging the cam groove, a link connecting the opposite end of the bell crank to the gear quadrant lever, and means for opening the gripping members adjacent one end of the rocking stroke preparatory to gripping an inverted bottle, means for opening the gripping members at the other end of the rocking stroke to release a bottle in the filling position, and a short jog formed in the groove of the main cam at diametrically opposite points to provide a quick lift and return or shaking movement to the gripping members preliminary to each forward and each return rocking movement of the gripping members.

7. The combination with a conveyor provided with retainers adapted to carry bottles in an inverted position and a bottle transporting conveyor adapted to carry bottles in a filling position, of a rock shaft, an arm extending radially therefrom and comprising two members, a spring hinge between the members, bottle gripping means comprising two pivoted members spring held together and carried by the outer hinged member, means for rocking the rock shaft, and means for holding the outer hinged member in a horizontal position until the bottle engaged by the gripping members is raised clear of its retainer, means for opening the gripping means at each end of the rocking stroke, and means for imparting to the rock shaft and arm a sudden forward and return movement during the main rocking movement of the arm.

WILLIAM ABBOTT JOPLIN.