April 25, 1944. E. R. BECKER 2,347,453

BOTTLE CLEANING APPARATUS

Filed March 27, 1942 4 Sheets-Sheet 1

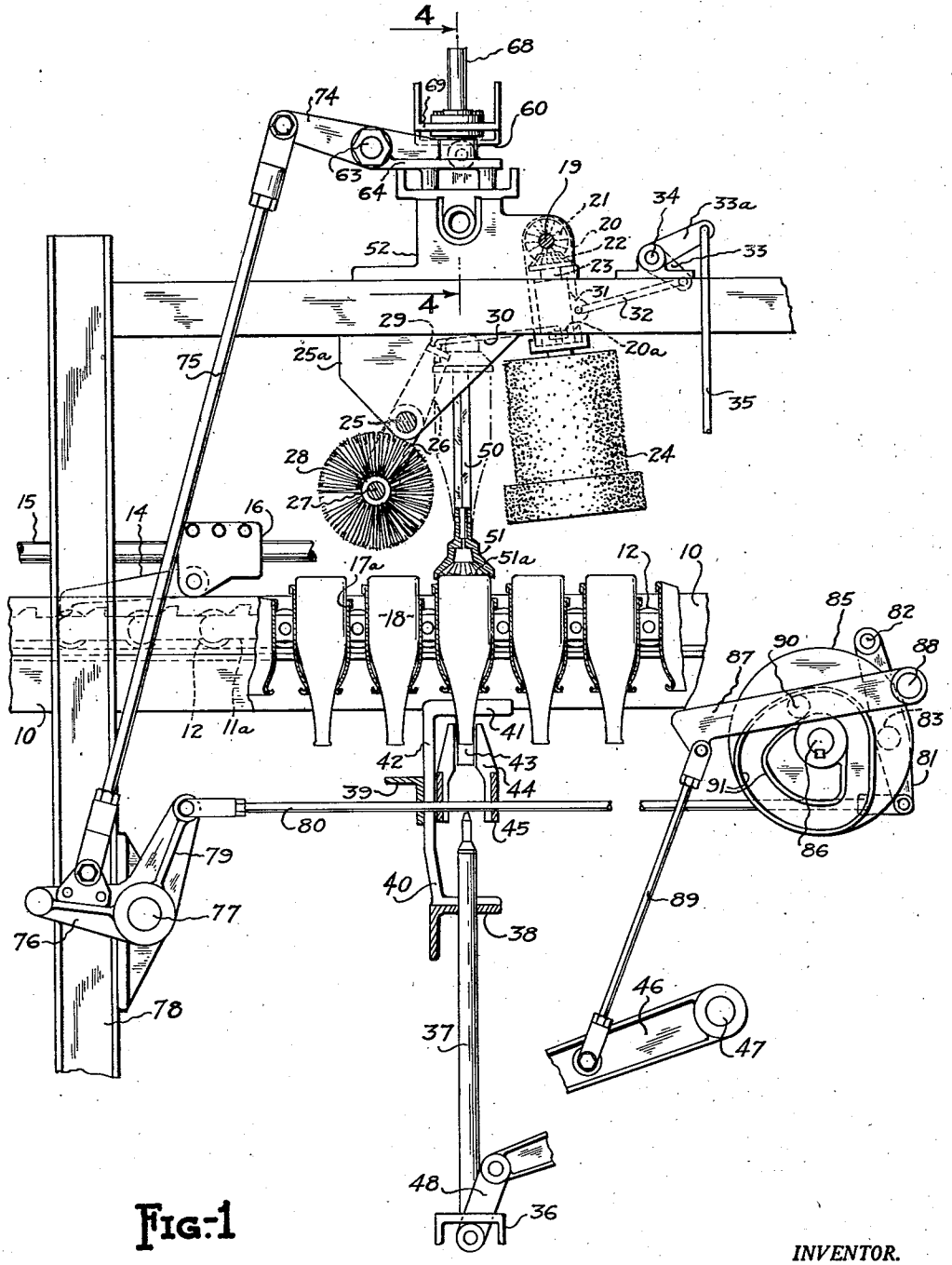


FIG-1

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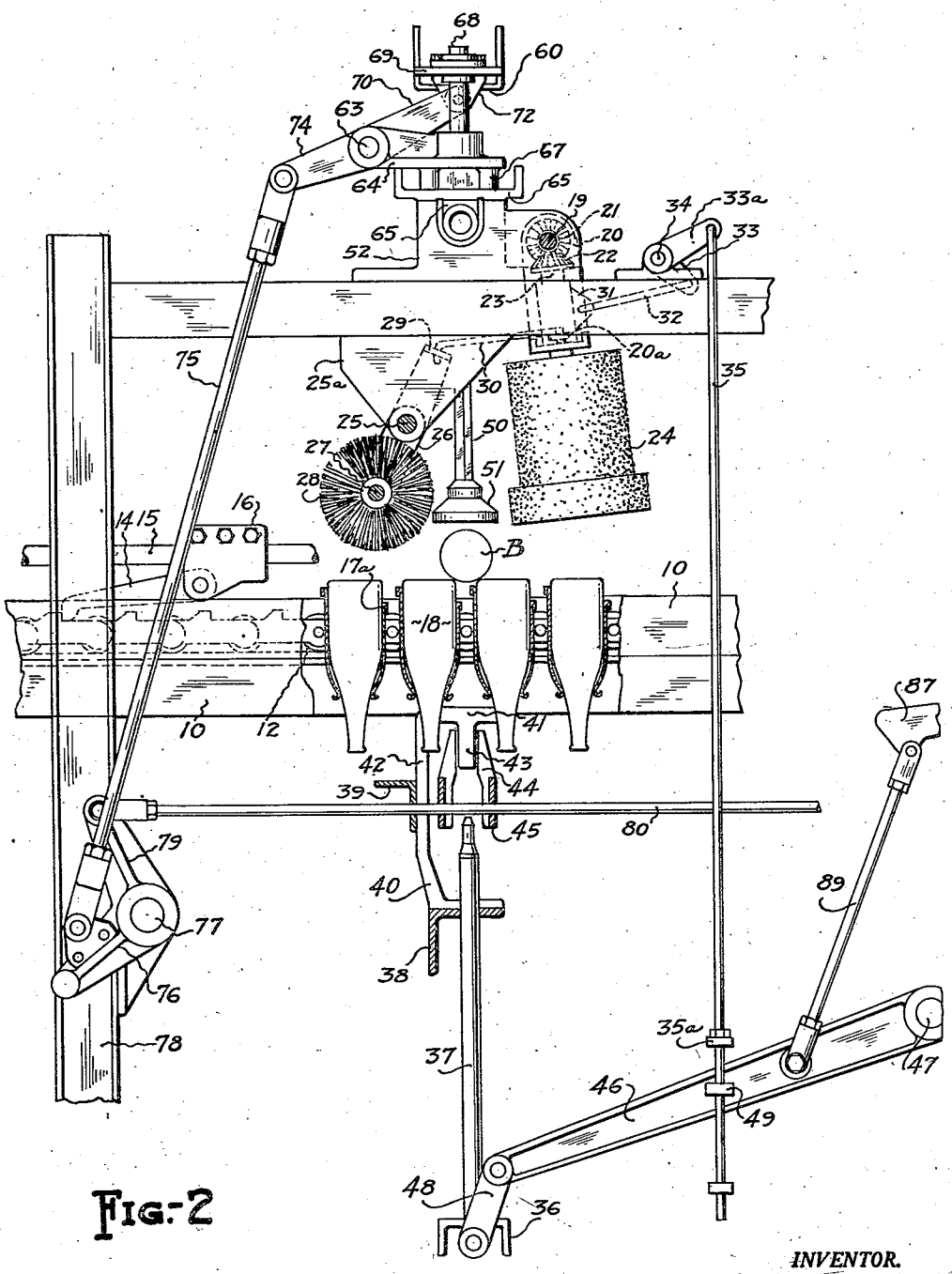


FIG. 2

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BOTTLE CLEANING APPARATUS

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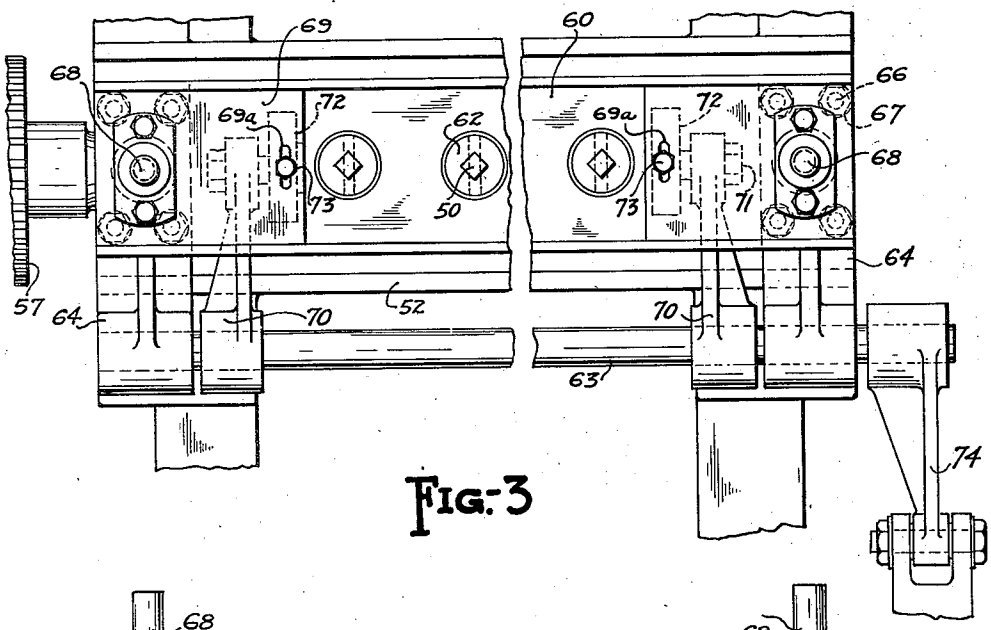


FIG. 3

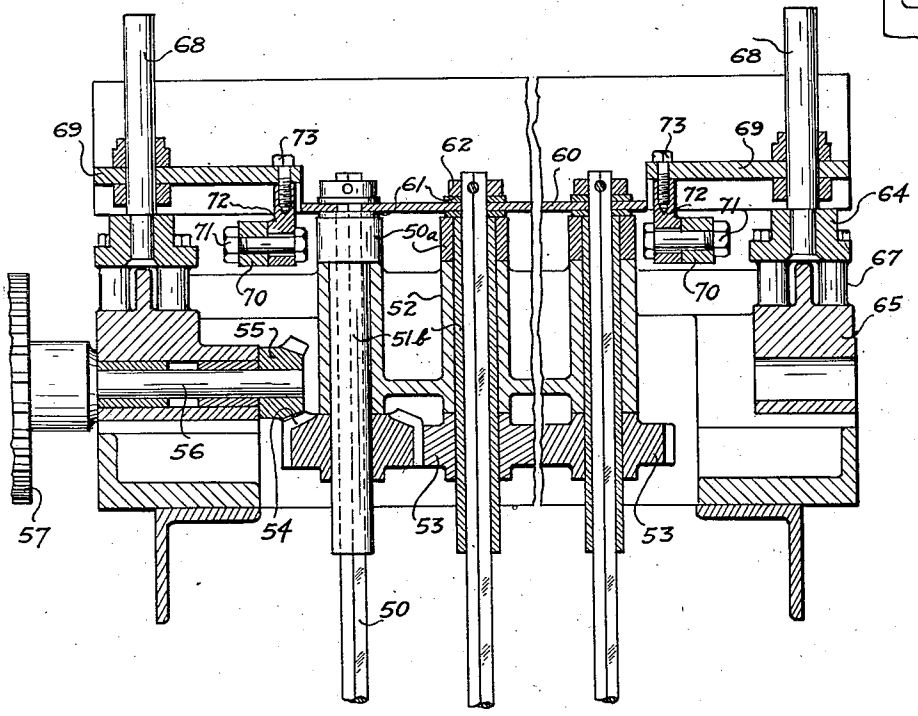


FIG. 4

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BOTTLE CLEANING APPARATUS

Filed March 27, 1942 4 Sheets-Sheet 4

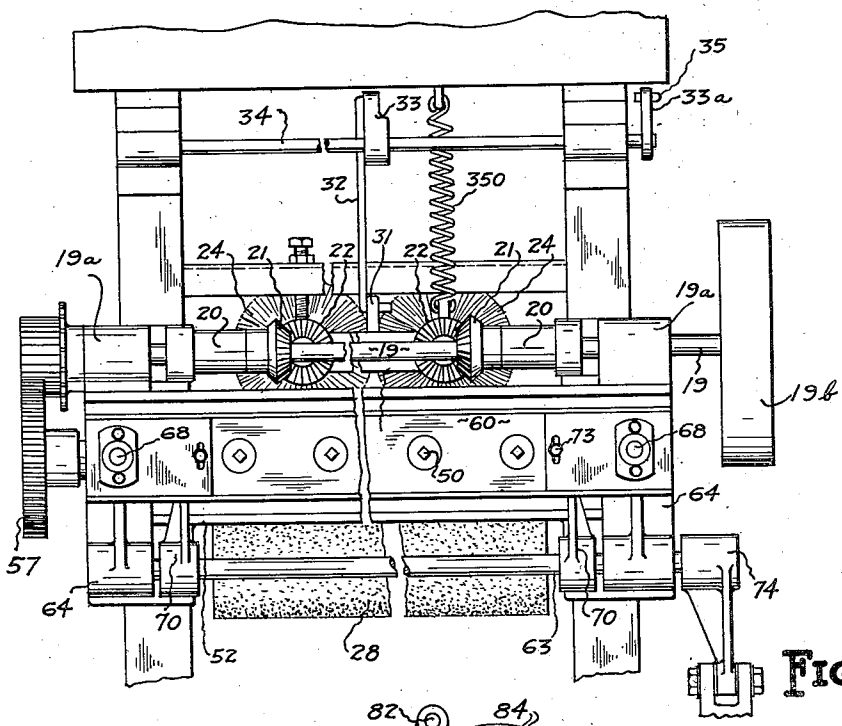


FIG.-5

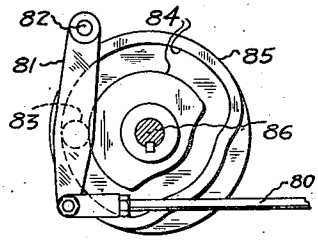


FIG.-6

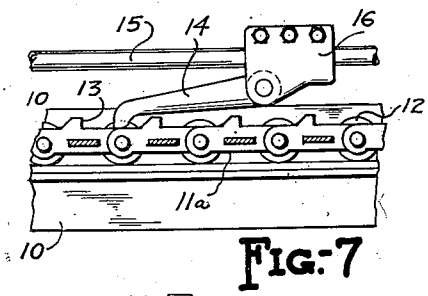


FIG.-7

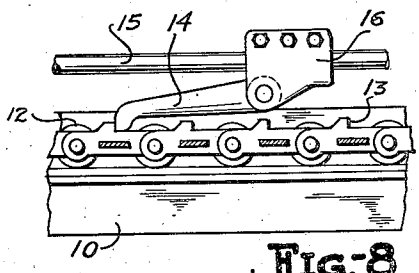


FIG.-8

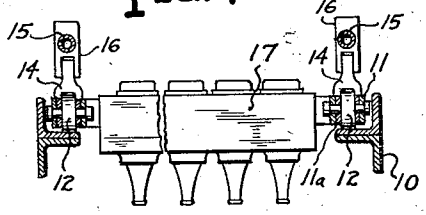


FIG.-9

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Patented Apr. 25, 1944 2,347,453

UNITED STATES PATENT OFFICE

2,347,453

BOTTLE CLEANING APPARATUS

Ernest R. Becker, Oak Park, Ill., assignor to The Liquid Carbonic Corporation, Chicago, Ill., a corporation of Delaware

Application March 27, 1942, Serial No. 436,446

8 Claims. (Cl. 15—60)

This invention relates to bottle cleaning apparatus of the general type wherein the bottles are mounted on transverse carriers flexibly connected to side chains and constituting therewith an endless conveyor by which the bottles are advanced intermittently through the apparatus and are subjected, during their transit therethrough, to various interior and exterior treatments with liquid, their exteriors and interiors also being subjected to the action of brushes, as part of the cleaning treatment.

The particular invention disclosed herein relates more especially to mechanism for brushing the outsides of the bottles in an apparatus of the character referred to, the type of brushing mechanism being shown, described and claimed in the patent to John R. Gruetter, No. 1,870,503, issued August 9, 1932.

In the operation of the external brushing mechanism set forth in the aforesaid patent, when each transverse carrier is brought below the external brushing station, the bottles are lifted by spindles from said carrier and are reciprocated between rotating brushes which operate upon the exterior surfaces thereof, the bottles being rotated during their reciprocation by means of clamping cups which engage the bottoms of the bottles and are carried by reciprocable spinning rods. The reciprocation of each transverse series of bottles occurs during a stationary cycle of the progress of the conveyor.

Owing to the fact that a bottle occasionally becomes dislodged from its seat and is carried along on top of the other seated bottles, it has been found necessary, in the operation of the external bottle brushing mechanism, to space the bottoms of the spinning-rods and clamping cups a sufficient distance above the bottoms of the bottles brought therebeneath to provide clearance for the passage of any bottle which may have been so dislodged. This spacing, however, has presented an ever present difficulty, namely; the tendency of the bottles to tilt away from a vertical position when lifted from their seats in the carriers by the lifting spindles and to engage the clamping cups in eccentric relation thereto. This eccentric engagement has caused the externally operating brushes to disengage the bottles from their lifting spindles; and bottles thus displaced fall on top of the preceding or succeeding rows of bottles and are carried along in that position to the inside brushing station, located beyond the external brushing station, where they are liable to endanger the brushing spindles or the mechanism operating the same.

By means of the construction and arrangement of parts shown and described herein, I have been able to reduce to a minimum the danger of dislodging bottles from their carriers, due to the external brushing operation, and also to protect the lower ends of the spinning rods and the cups thereon against impact by any bottles that may have been dislodged in an operation preceding the brushing operation and that may be brought to the brushing station by subsequent movements of the conveyor.

In the drawings herein, Fig. 1 represents a detail in side elevation, with parts broken away of part of a bottle cleaning machine of the character referred to wherein my invention is incorporated and showing the positions of the parts prior to lifting the bottles from a carrier and reciprocating the same between the external brushes; Fig. 2 a view similar to Fig. 1, but showing the positions of the parts during a forward or feeding stroke of the conveyor; Fig. 3 an enlarged plan view of a portion of the apparatus shown in Figs. 1 and 2; Fig. 4 an enlarged detail in section taken on the line 4—4 of Fig. 1 and looking in the direction of the arrows; Fig. 5 a plan view of the portion of the apparatus shown in Figs. 1 and 2; Fig. 6 a detail in elevation of the inner cam which serves to impart a short lifting movement to the spinning rods during the forward movement of the conveyor; Fig. 7 a detail in sectional side elevation showing the positions of the driving rods and pawls with reference to the side chains of the conveyor during an inactive phase of the conveyor; Fig. 8 a view, similar to Fig. 7, showing the rods and pawls operating to drive the conveyor; and Fig. 9 a detail in section through the conveyor and its supporting rails.

Bottle cleaning apparatus of the type to which my invention relates include opposed side rails 10, on which opposed links of the side conveyor chains are supported, each link comprising outer and inner members 11 and 11a with rollers 12 interposed therebetween, said links being supported on the said side rails by the said rollers. Each of the said links is shown as provided with a detent 13 adapted to be engaged by a plurality of longitudinally spaced pairs of transversely opposed pawls 14, the said pawls being pivotally connected by suitable clamping brackets 16 to rods 15 reciprocably mounted on opposite sides of the apparatus. The mechanism for imparting intermittent movement to the conveyor is old and well known in the art, being shown and described, for instance, in the patent to Loew and Gruetter

No. 1,313,706, and further description of the same and of the means for reciprocating the said rods and the pawls is unnecessary to an understanding of the objects of the invention sought to be protected hereby.

17 denotes the transverse bottle carriers the opposite ends of which are connected to transversely opposed inner link members 11ª, preferably by means of end castings such as shown, described and claimed in my application Serial No. 399,500, filed June 24, 1941, which has matured into Patent No. 2,329,687, dated Sept. 21, 1943. The transverse carriers are provided each with a series of bottle receiving seats, shown as pockets 17ª adapted to support bottles 18 with their bottoms above the tops of the said pockets, the lower ends of the pockets being shaped to conform to the shoulders of the bottles, with the necks of the latter projecting therebelow.

19 denotes a shaft which extends transversely of the apparatus and which is suitably supported thereon by opposite side brackets 19ª and provided with a pulley 19ᵇ for driving the same. This shaft extends through opposite ends of a yoke 20, which is journaled thereon and which shaft is provided with a pair of spaced beveled pinions 21, each of which meshes with a beveled pinion 22 on the upper end of a shaft 23 which is journaled in the said yoke and to the lower end of each of which shafts a brush 24 is secured. This construction is substantially the same as shown in the aforesaid patent to Gruetter No. 1,870,503.

25 denotes a transverse shaft which is suitably supported from the side members of the apparatus by hanger brackets, one of which is shown at 25ª. 26 denotes one of a pair of arms through which said shaft extends, said arms carrying journals (not shown) in which the shaft 27, which carries the horizontal brush 28, is mounted for rotation, one end of the shaft being provided with a gear (not shown) for rotating the same. The upper end of each of said arms 26 is provided with an apertured lug 29 which is adapted to receive one end of a link 30, the opposite end of which extends through an aperture provided therefor in a lug 20ª carried by the yoke 20.

31 denotes a second apertured lug carried by the yoke 20, intermediate of the ends thereof, and connected to one end of a link 32, the opposite end of which link is connected to one of the arms 33, 33ª of a bell crank lever, said arms being secured to the shaft 34, and the arm 33ª having a vertical connecting rod 35 connected thereto. It will be evident that, while the pair of brushes 24 and the brush 28 will be moved toward each other by the upward movement of the rod 35, a spring 350, connected to the yoke 20 (see Fig. 5) serves normally to separate the said brushes. The construction and arrangement of parts thus far described for supporting and rotating the brushes and for moving the brush 28 and the pair of brushes 24 toward and from each other are substantially the same as shown and described in the aforesaid Gruetter patent.

36 denotes a cross head located below the central portion of the space between the brushes. This cross head supports a plurality of lifting rods or spindles 37, one for each bottle in a transverse carrier. These spindles extend through the horizontal flange of an angle-iron guide member 38. 39 denotes another angle iron member which is supported above the member 38 by means of a bracket 40. The vertical leg of the angle iron member 39 supports bottle centering mechanism, each of which comprises laterally spaced angular guide members each having a portion 41 extending longitudinally of the apparatus and a vertical portion 42 by which it is so supported from the member 39; the longitudinal portion of each guide member having a downwardly projecting tongue 43 between which tongues the necks of the bottles, on a transverse carrier which has been moved above the spindles 37, are received. These tongues serve to center the necks of the bottles in one direction with respect to the spindles 37; while vertical tongues 44, which are mounted on a pair of transversely extending reciprocable bars 45 and which project upwardly toward the portions 41 serve, through the movement of said bars, to complete the centering of the mouths of the bottles above the spindles 37, the tongues forming in effect a temporary box-like structure around each bottle neck. The centering means employed herein are substantially the same as shown and described in the aforesaid patent to Gruetter and, in their details, form no part of the invention intended to be covered hereby.

46 denotes one of a pair of laterally opposed lifting arms which are secured to a shaft 47, suitably supported in opposite side portions of the apparatus. The operating ends of these arms are flexibly connected to opposite end portions of the cross head 36 by means of links 48. One of the arms is provided with a stop lug 49 through which the connecting rod 35 extends. A stop 35ª is secured to the rod 35 and is adapted to be engaged by the lug 49 as the arm 46 is moved upwardly, thereby to rock the bell crank lever 33, 33ª, 34 and thus bring the brush 28 and the pair of brushes 24 in operative relation to bottles lifted therebetween by the lifting spindles 37, as pointed out hereinbefore.

50 denotes a transverse series of bottle spinning rods, corresponding in number and spacing with the number and spacing of the bottles on each of the carriers and each provided at its bottom with a clamping member comprising a spinning cup 51 having a bottom-engaging pad 51ª therein. These rods are preferably angular in section and are mounted in correspondingly shaped guides provided therefor in bushings 51ᵇ located within housings, indicated generally at 52, each bushing being provided with a spur gear 53, the gears intermeshing with one another and one of the final gears being provided with a bevel gear 54 integral therewith which meshes with a bevel gear 55 on one end of a shaft 56, which is mounted in an extension of the framework of the apparatus and which shaft is shown as provided at its opposite end with a spur gear 57 which is adapted to mesh with and be driven by a gear (not shown) on the shaft 19.

The parts shown and described thus far are substantially the same in construction and mode of operation as corresponding parts in the aforesaid Gruetter patent; and, due to the manner in which the parts are so constructed and arranged and operated, during each rest or inactive cycle of the conveyor (at which time a transverse carrier with the bottles thereon is beneath the rods 50 and the clamping cups 51) the cross head 36 is lifted by the arms 46 and shaft 47 (through means to be described), thereby lifting the spindles 37, the upper ends of which enter the mouths of the bottles on the carrier thereabove and, by

heir further movement, lift the bottles from the carrier and raise them between the brushes 24 and 28. As the bottles are thus raised, they are rotated slowly by the rods 50 and the clamping cups 51; and the upward movement of one of the arms 46 will lift the rod 35, through engagement of the stop members 49 and 39a, thereby rocking the bell crank lever 33, 33a, 34 and moving the brush 28 and the pair of brushes 24 into engagement with the bottles as the latter are moved upwardly therebetween. On the downward movement of the bottles, the brushes will be separated by means of the spring 350, as explained hereinbefore.

For the purpose of preventing the tilting of the bottles in their carriers during the lifting operation, I have provided the following construction whereby the clamping cups 51 and the pads therein, may be brought into close proximity to the bottoms of the bottles on the carrier therebeneath prior to imparting the lifting movement to said bottles. I have also provided mechanism for imparting a short lifting movement to the rods 50 and the bottle-clamping cups thereon, during the forward stroke of the pawls 14, whereby a bottle (indicated at B) that may have been dislodged and have been resting in the space between adjacent transverse series of bottles may pass clear of the said clamping cups. The aforesaid construction and mechanism will now be described:

60 denotes the bottom plate of a transversely extending lifting channel through which plate the upper ends of the rods 50 extend, there being bronze washers 61 surrounding the said rods above and below the plate, the lower washers being located above bushings 50a which are mounted upon the upper ends of the bushings 51b. To the upper end of each rod there is secured a collar 62. 63 denotes a shaft extending transversely of the apparatus and supported by brackets 64, each secured to a supporting base 65 by means of bolts 66 extending through spacing sleeves 67. 68 denotes guide posts having their lower ends mounted in the brackets 64 and each extending through a transverse plate 69 of the lifting channel, said transverse plates being located above and at opposite ends of the bottom plate 60 of said channel through which the upper ends of the rods 50 project.

70 denotes lifting arms secured to the shaft 63 and having their outer ends connected to the transverse plates 69 by means of pivot bolts 71 and shoes or brackets 72 which are slidably secured at their upper ends against the bottoms of said plates by means of bolts 73 extending through slots 69a in said plates and threaded into the upper ends of said shoes or brackets.

An arm 74 is secured to the shaft 63, adjacent to one end of the latter. A connecting rod 75, adjustable as to length, is pivotally connected at its upper end to the said arm and at its lower end to an arm 76 secured to one of the end portions of a transverse shaft 77 supported by opposed vertical members 78 of the apparatus. 79 denotes an arm also secured to the said end portion of the shaft 77 and angularly spaced from the arm 76 and forming a bell-crank lever with said shaft and the arm 76. One end of a connecting rod 80, which is also adjustable as to its length, is pivotally connected at one end to the arm 79 and at the other end to the lower end of an arm 81 which is pivotally supported upon a stud 82, the latter being supported by a suitable side portion of the apparatus (not shown) said arm supporting a roller 83 intermediate of its ends and which roller engages a track cam 84 on the inner face of a cam plate 85 (see Fig. 6), which plate is secured to a shaft 86 mounted for rotation in a suitable portion of the side of the apparatus (not shown).

87 denotes an arm one end of which is pivotally supported upon a stud 88 which in turn is also supported by a suitable portion of the side of the apparatus (not shown) and the opposite end of which is pivotally connected to a connecting rod 89, which is adjustable as to its length, the other end of said connecting rod being pivotally connected to the adjacent lifting arm 46, intermediate of the ends of the latter. The arm 87 is provided with a roller 90, intermediate of the ends thereof, which roller engages a track cam 91 on the outer face of the cam plate (see Fig. 1).

With the parts constructed and arranged as described, the operation will be as follows: The conveyor, consisting of the side chains and the transverse bottle carriers connected thereto, is advanced intermittently by the reciprocations of the rods 15, which are operated in the manner usual in the type of machines to which this invention relates—see, for instance, the aforesaid Loew and Gruetter patent. In Figs. 1 and 7, the parts are shown in the positions which they occupy after the completion of a forward stroke of the rods 15 and the pawls 14, and as the rods and pawls start upon their return or inactive stroke. At that time, the pads 51a in the clamping cups 51 are in close proximity to the bottles of the transverse series of bottles that have been brought therebeneath by the preceding forward stroke of the rods 15, the collars 62 supporting the rods 50 and clamping cups in this position. The driving mechanisms are so timed that, during the cycle intervening between successive forward movements of the conveyor, the shaft 86 and the track cam 91 on the outer face of the cam disk 85 will lift the outer end of the arm 87, which rocks the shaft 47, and the arms 46 on opposite sides of the apparatus are raised, thereby lifting the cross head 36 and projecting the upper ends of the spindles 37 into the mouths of the bottles thereabove and raising the bottles between the brushes 24 and 28, the positions of the clamping cups 51 at the end of the upward stroke of the cross head 36 being shown in dotted lines in Fig. 1. As the bottles are thus raised, their bottoms engage the cup pads 51a immediately, thereby obviating any tendency of the bottles to be tilted from a vertical position during their reciprocatory movements. As the bottles are thus being raised, they are rotated slowly by the clamping cups 51 and the rods 50 by which the said cups are carried, the rotation of said rods being effected by the pinions 54 and 55 and the shaft 56. During this lifting movement of the bottles, the brush 28 and the pair of brushes 24 will be swung toward each other and into engagement with the sides of the bottles; and, on the downward movement of the cross head 36, the brush 28 and the pair of brushes 24 will be swung away from each other by the spring 350, thereby to permit the bottles to pass between the said brushes without being displaced from the spindles 37.

Following the completion of the cycle just described and during the succeeding forward cycle of the conveyor (see Figs. 2 and 8), the inner cam 84 operates through the roller 83 and the arm 81 to move the connecting rod 80 on Fig. 1 toward the left, thereby rocking the shaft 77 and causing the arm 76 to move downwardly and rock

the shaft 63, through the connecting rod 75 and the arm 74. This rocking of the shaft 63 causes the lifting arms 70 thereon to raise the lifting channel through the bolts 71, the lifting shoes or brackets 72, and the plates 69. The parts are so timed that the bottom plate 60 of the lifting channel will raise the spinning rods 50, through the collars 62, to the positions indicated in Fig. 2 in time to permit a bottle B which may have been dislodged in the preceding operation of the apparatus to pass therebeneath. While the rods and clamping cups are thus elevated, the bottle B will have been carried beyond the clamping cups and the cam 84 will operate to rock the shaft 77 in the reverse direction, thereby seating the lifting channel and bringing the bottle spinning rods and their clamping cups to the positions shown in Fig. 1.

On narrow machines of the type shown herein—not over eight-bottles wide—it will be necessary to use only a single connecting rod 75 between a corresponding single bell crank lever (comprising the arms 76, 79 and shaft 77) and a single arm 74. On wider machines, the bell crank 76, 79 and 77 will be duplicated on the opposite side of the machine, as will the connecting rod 75 and the arm 74, in order to avoid any misalignment which might occur through flexure of the shaft 63.

From the foregoing, it will be evident that all danger of stoppage of the apparatus through bottles that might be dislodged during the external brushing operation has been overcome. Owing to the fact that, practically immediately upon the start of the operation of lifting the bottles from the carriers, their bottoms are engaged by the cups 51, there will be no dislodgement of these bottles during the external brushing operation; and hence one of the causes for such stoppage has been eliminated.

Having thus described my invention, what I claim is:

1. An apparatus for cleaning bottles comprising; a conveyor having transversely extending bottle carriers each provided with seats for bottles, a transverse series of bottle-bottom clamping members, and means normally supporting the same in close proximity to and above the bottoms of the bottles on the carriers brought successively therebeneath, means for imparting intermittent movement to said conveyor thereby to bring the carriers and the bottles supported thereby successively beneath said clamping members, and means operative during an inactive cycle of the conveyor for lifting a transverse series of bottles from their respective seats in a carrier thus brought beneath said clamping members and for also lifting the clamping members above the said carrier with their bottoms in clamping engagement with the bottoms of the bottles thus lifted and for thereafter restoring the bottles thus lifted to their seats in said carrier and the clamping members to their original positions above and in close proximity to the bottoms of these bottles; and additional means, operative during the next succeeding forward cycle of the conveyor, for raising the said clamping members and lowering them to their positions in close proximity to and above the bottoms of the bottles on the carriers.

2. An apparatus for cleaning bottles comprising; a conveyor having transversely extending bottle carriers each provided with seats for bottles, a transverse series of reciprocable rods, bottle-bottom clamping members carried by the bottoms of said rods and located above and normally in close proximity to the bottoms of the bottles on the carriers brought successively therebeneath, means for imparting intermittent movement to said conveyor, thereby to bring the carriers and the bottles supported thereby successively beneath said clamping members, and means operative during an inactive cycle of the conveyor for lifting a transverse series of bottles from their respective seats in a carrier thus brought beneath the said clamping members and for also lifting the clamping members and the rods above the said carrier with the bottoms of the clamping members in engagement with the bottoms of the bottles thus lifted and for thereafter restoring the bottles thus lifted to their seats in said carrier and the clamping members and rods to their original positions with the clamping members above and in close proximity to the bottoms of the bottles; and additional means, operative during the next succeeding forward cycle of said conveyor, for lifting the said clamping members and rods and lowering them, thereby to bring the clamping members again in close proximity to and above the bottoms of the bottles on the carriers, said additional means comprising a transverse member through which the upper portions of the said rods extend, a projection carried by each of said rods above said transverse member whereby the rods are supported in their lowered positions with the clamping members closely adjacent to the bottoms of the bottles therebeneath, and means for raising and lowering the said transverse member.

3. An apparatus for cleaning bottles comprising; a conveyor having transversely extending bottle carriers each provided with seats for bottles, a transverse series of reciprocable rods, bottle-bottom clamping members carried by the bottoms of said rods and located above and normally in close proximity to the bottoms of the bottles on the carriers therebeneath, means for imparting intermittent movement to said conveyor, thereby to bring the carriers and the bottles supported thereby successively beneath said clamping members, and means operative during an inactive cycle of the conveyor for lifting a transverse series of bottles from their respective seats in a carrier beneath the said clamping members and for also lifting the clamping members above the said carrier with their bottoms in engagement with the bottoms of the bottles thus lifted and for thereafter restoring the bottles to their seats in such carrier and the clamping members to their original positions above the bottoms of these bottles; and additional means operative during the next succeeding forward cycle of said conveyor for raising the said clamping members and rods and lowering them, thereby to bring the clamping members again in close proximity to and above the bottoms of the bottles on the carriers, said means comprising a transverse member through which the upper portions of the said rods extend, a projection carried by each of said rods above said member, and means for raising and lowering the said transverse member, the means for raising and lowering the transverse member comprising a transversely extending rock shaft, arms carried by said rock shaft and in operative engagement with opposite end portions of the said transverse member, an operating arm also connected to said rock shaft, a bell crank lever pivotally supported by said apparatus, a connecting rod connecting the last mentioned arm to one of the arms of the bell-crank lever, a connecting rod secured to the other

arm of said bell crank lever, and power operated means for reciprocating the second connecting rod during a forward movement of the conveyor.

4. In the apparatus set forth in claim 3, the means for reciprocating the second connecting rod comprising a cam, a shaft on which said cam is mounted, an arm having one end pivotally supported by said apparatus and having its other end connected to the second connecting rod, and a roller carried by the last mentioned arm intermediate the ends thereof and engaging the said cam.

5. In the apparatus recited in claim 2, the transverse member comprising a plate through which the rods extend and the rods being provided with bushings above and below said plate, and guide pins located at opposite ends of said plate and projecting through end extensions of the said transverse member.

6. An apparatus for cleaning bottles comprising; a conveyor having transversely extending bottle carriers each provided with seats for bottles, a transverse series of bottle-bottom clamping members located above and normally in close proximity to the bottoms of the bottles on the carriers, means for imparting intermittent movement to said conveyor, thereby to bring the carriers and the bottles supported thereby successively beneath said clamping members, and means operative during an inactive cycle of the conveyor for lifting a transverse series of bottles from their respective seats in a carrier beneath the said clamping members and for also lifting the clamping members above the said carrier with their bottoms in engagement with the bottoms of the bottles thus lifted, and for thereafter restoring the bottles to their seats in said carrier and the clamping members to their original positions above and in close proximity to the bottoms of these bottles; and additional means operative during the next succeeding forward cycle of said conveyor for raising the said clamping members and lowering them, thereby to bring the clamping members again in close proximity to and above the bottoms of the bottles on the carriers, the means for imparting the additional reciprocatory movement to said clamping members comprising rods to which the said members are secured, a transversely extending channel member having a bottom plate through which the upper ends of said rods extend, projections on the upper end portions of said rods above the bottom plate, channel bottom plates located beyond the opposite ends of the first mentioned bottom plate, lifting arms operatively connected with the last mentioned plates, vertical guide pins extending through the last mentioned plates, and means for operating the said arms thereby to raise and lower the channel member.

7. In the apparatus recited in claim 6, a rock shaft on which said lifting arms are mounted and means for rocking said shaft, and the means for connecting the said arms with their respective bottom plates comprising shoes or brackets slidably connected at their upper ends to the latter plates and means pivotally connecting the said arms to the said shoes or brackets.

8. An apparatus for cleaning bottles comprising; a conveyor having transversely extending bottle carriers each provided with seats for bottles, a transverse series of rods adapted to be reciprocated, bottle-bottom clamping members carried by the bottoms of said rods above and normally in close proximity to the bottoms of the bottles on the carriers, means for imparting intermittent movement to said conveyor, thereby to bring the carriers and the bottles supported thereby successively beneath said clamping members, and means operative during an inactive cycle of the conveyor for lifting a transverse series of bottles from their respective seats in a carrier beneath the said clamping members and for also lifting the clamping members above the said carrier with their bottoms in engagement with the bottoms of the bottles thus lifted; and for thereafter restoring the bottles to their seats in such carrier and the clamping members to their original positions above and in close proximity to the bottoms of the bottles, the last-mentioned means comprising a cross head and lifting spindles carried by said cross head and adapted to enter the mouths of a transverse series of bottles brought beneath the said clamping members and means for raising and lowering said cross head; and additional means operative during the next succeeding forward cycle of said conveyor for raising the said clamping members and rods and lowering them, thereby to bring the clamping members again in close proximity to and above the bottoms of the bottles on the carriers, said means comprising a transverse member through which the upper portions of the said rods extend, a projection carried by each of said rods above said member, and mechanism for raising and lowering the said transverse member, the last-mentioned mechanism comprising a rock shaft, arms mounted on said rock shaft and adapted to engage the opposite end portions of the said transverse member, thereby to lift the latter, an additional arm carried by the said rock shaft, a bell crank lever, a connecting rod connecting the last-mentioned arm with one of the arms of the bell crank lever, a shaft, a cam on the said shaft, and means operatively connecting the said cam with the other of the arms of the bell crank lever.

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