

Aug. 9, 1932.

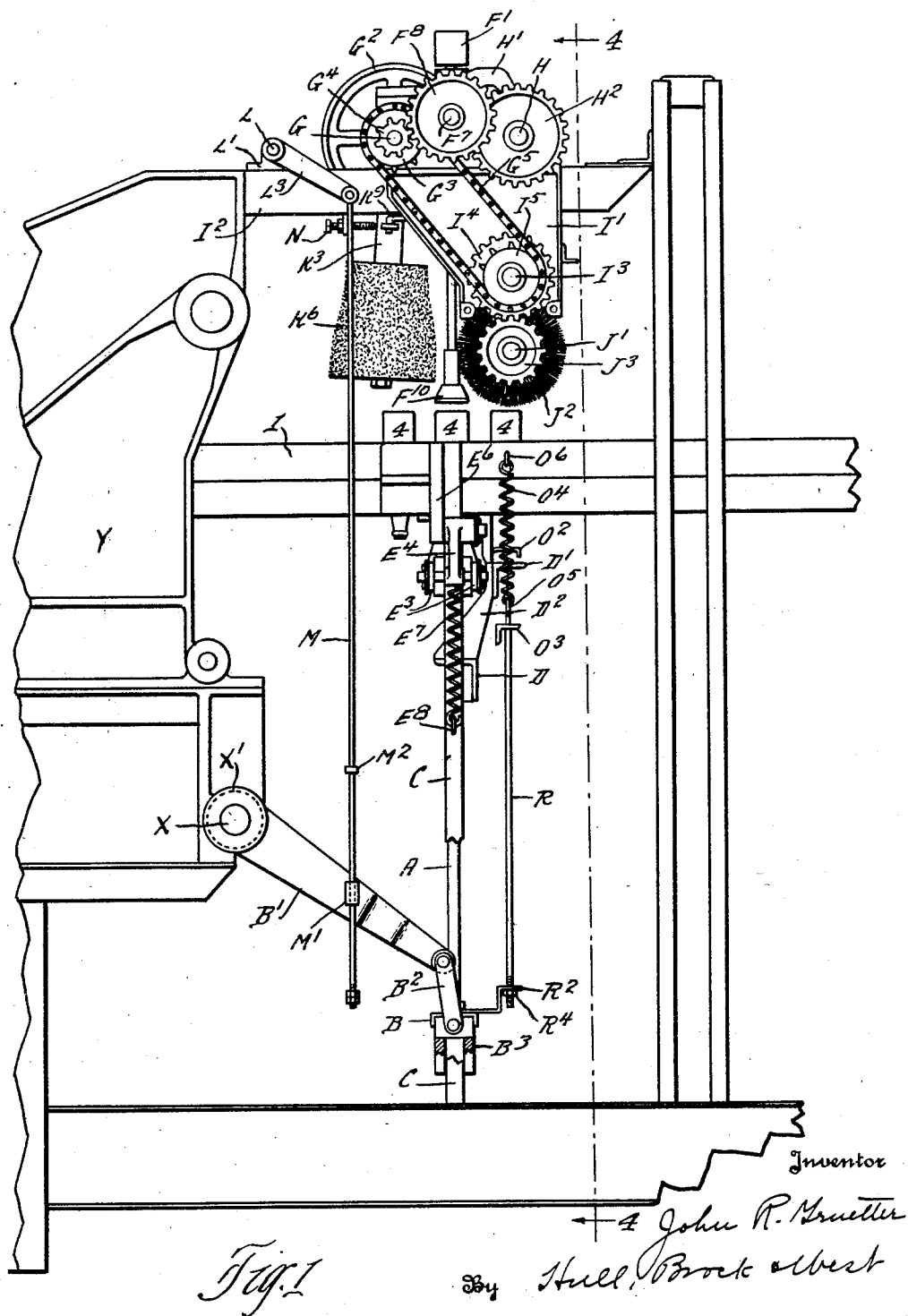
J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 1



Aug. 9, 1932.

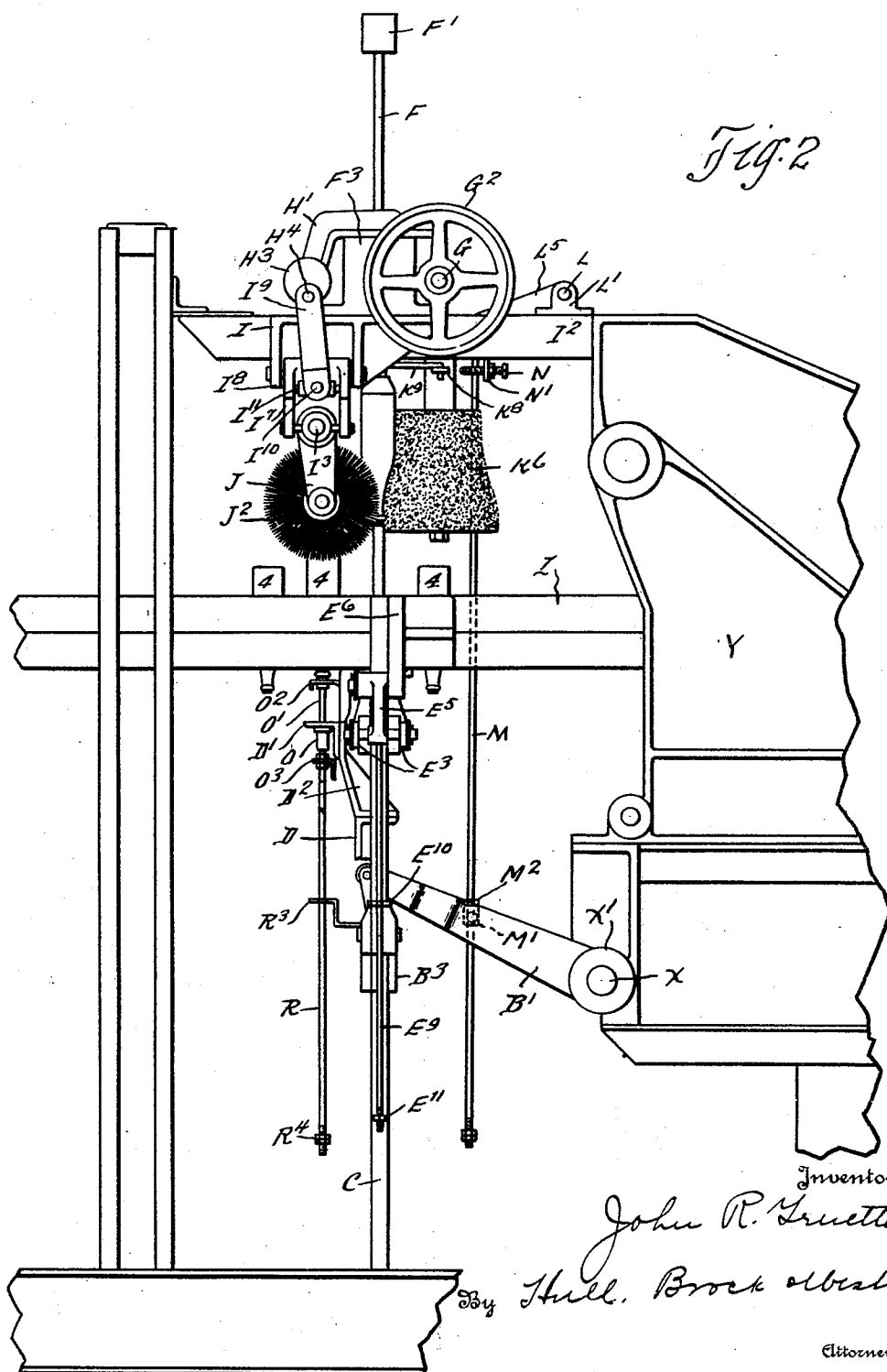
J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 2



Aug. 9, 1932.

J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 3

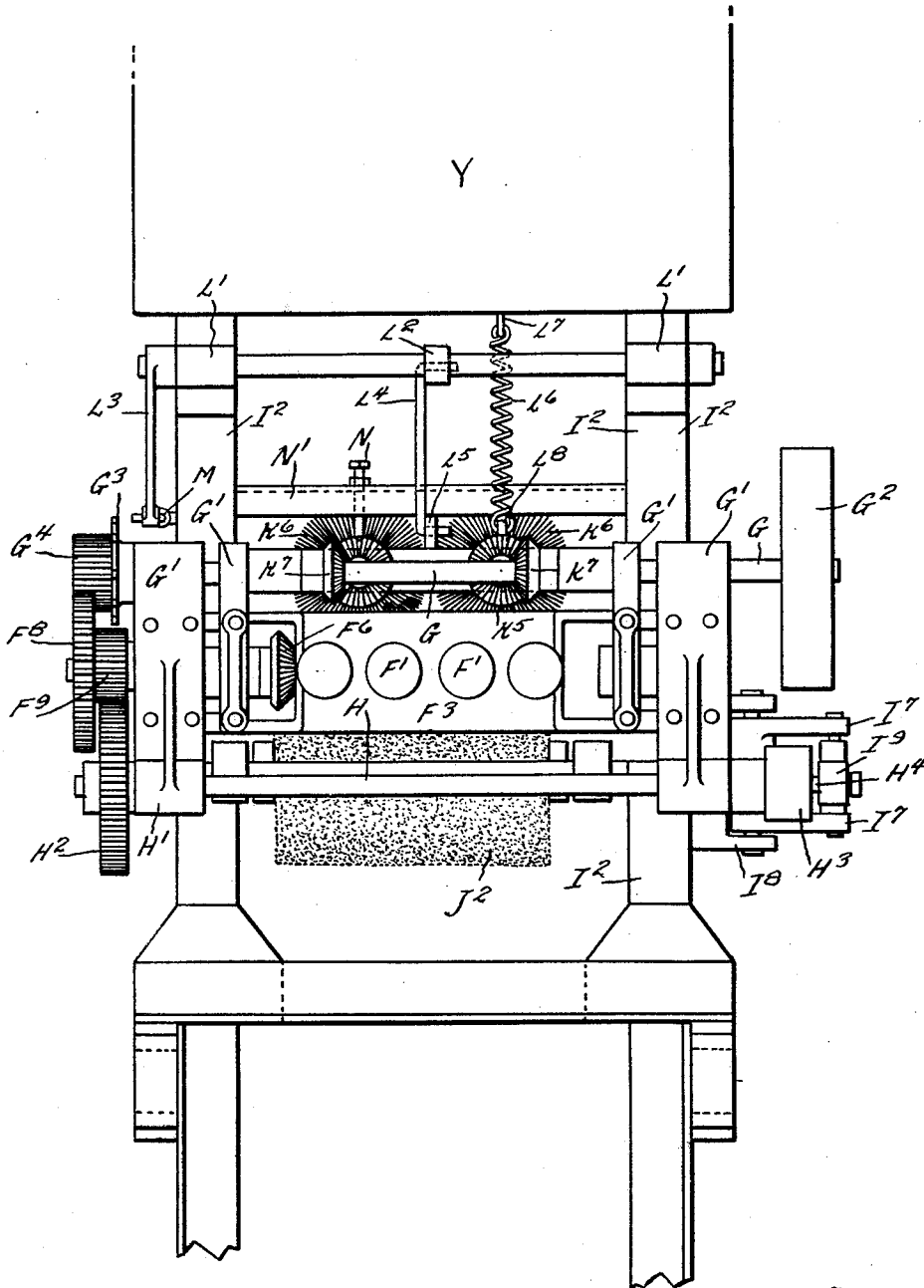


Fig. 3

Inventor
John R. Grutter
By Hull, Brock & West

Attorney

Aug. 9, 1932.

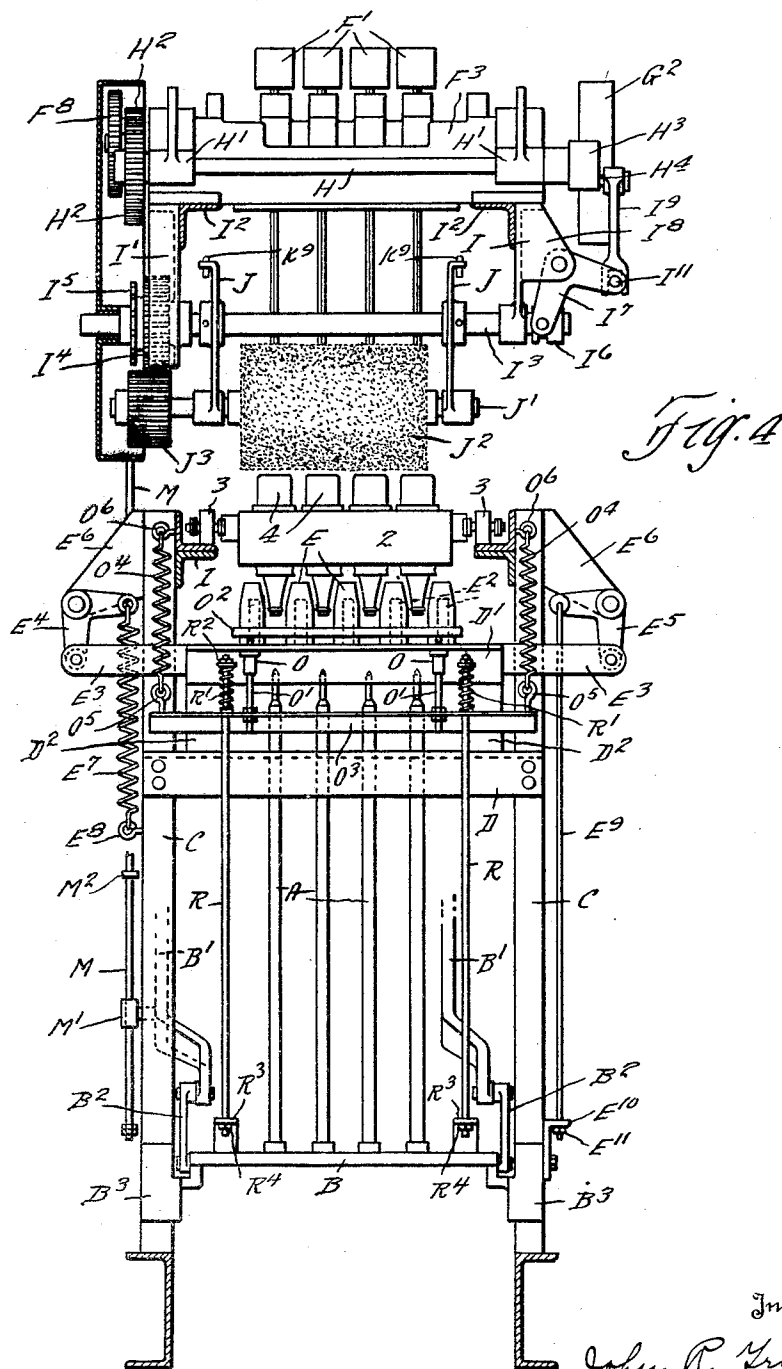
J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 4



Inventor

John R. Gruetter

By Huel Brock Albert

Attorney

Aug. 9, 1932.

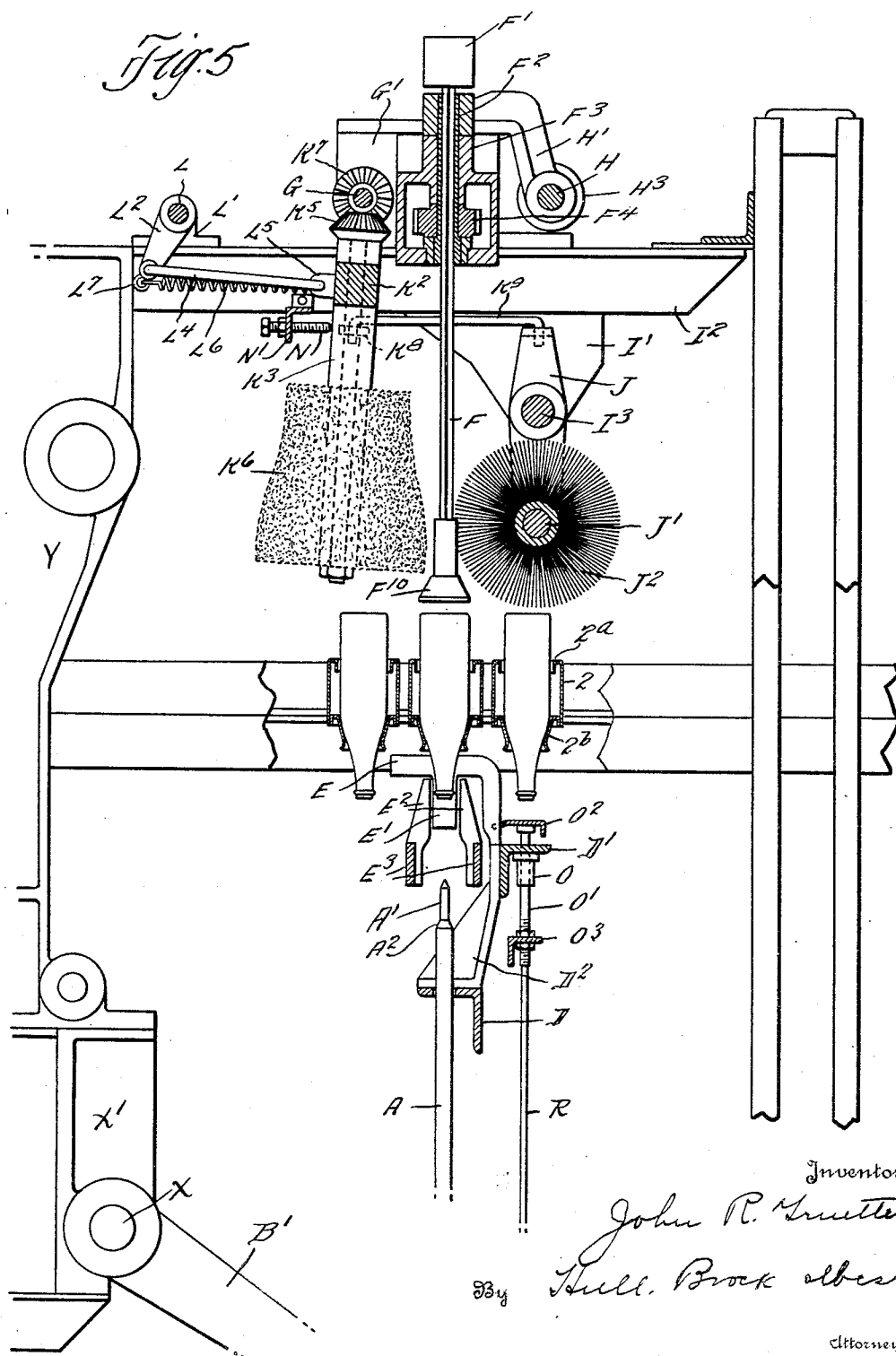
J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 5



Aug. 9, 1932.

J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 6

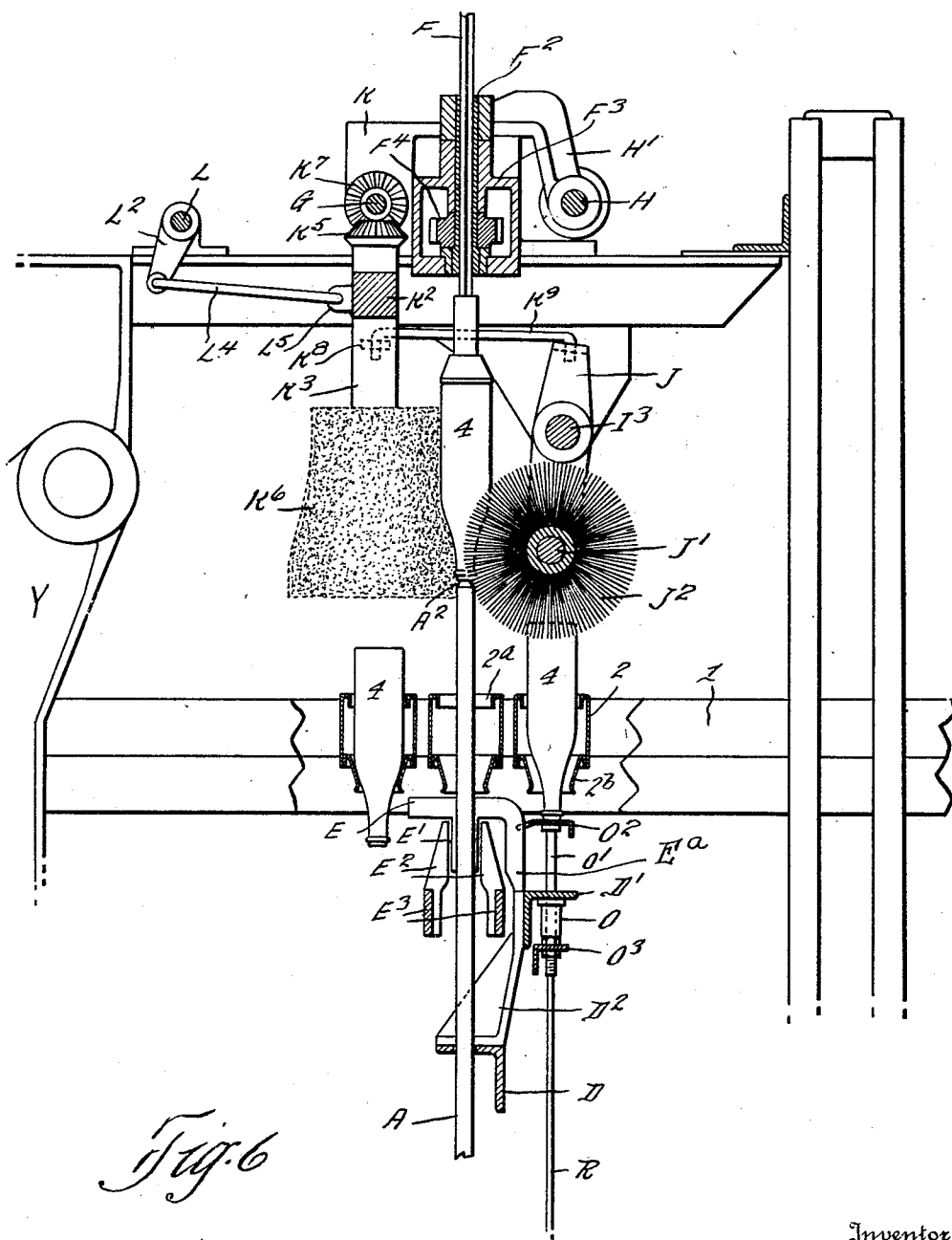


Fig. 6

Inventor

John R. Grutter

By

Wm. Brock & Co.

Attorney

Aug. 9, 1932.

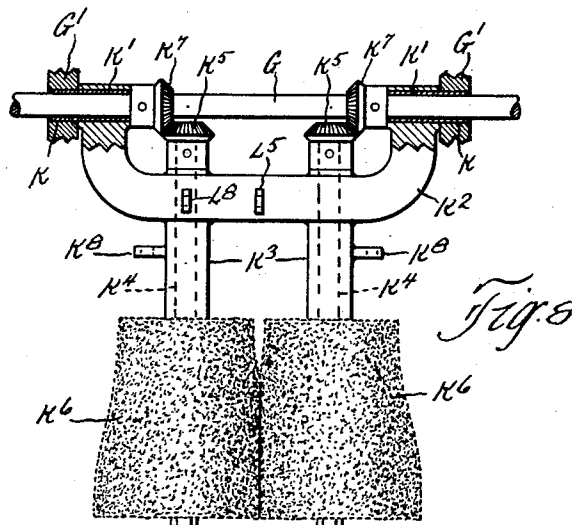
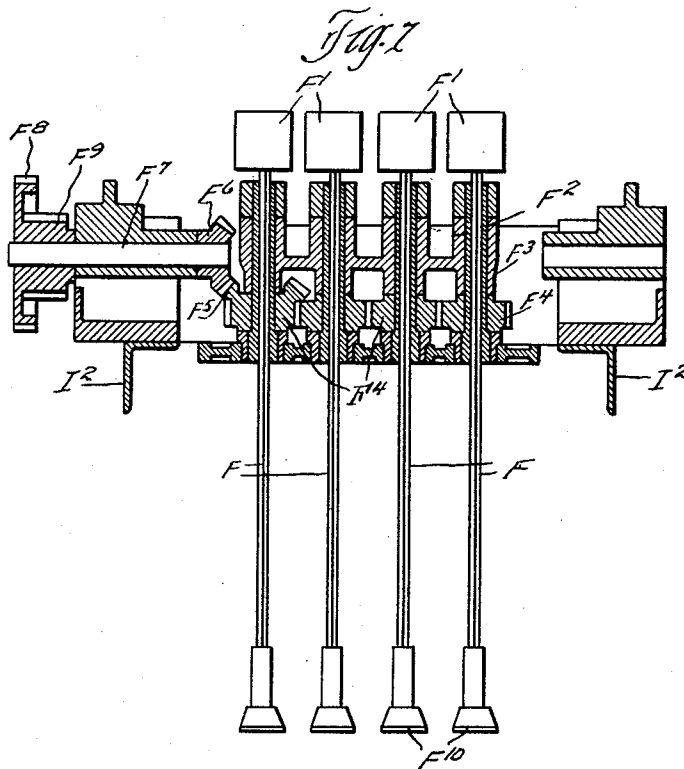
J. R. GRUETTER

1,870,503

BOTTLE CLEANING APPARATUS

Filed Jan. 23, 1931

7 Sheets-Sheet 7



Inventor
John R. Gruetter
 By *Hall, Brock & West*

Attorney

UNITED STATES PATENT OFFICE

JOHN R. GRUETTER, OF CLEVELAND, OHIO, ASSIGNOR TO THE LIQUID CARBONIC CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

BOTTLE CLEANING APPARATUS

Application filed January 23, 1931. Serial No. 510,713.

This invention relates to apparatus for cleaning bottles and more particularly to apparatus of the general type wherein the bottles are mounted on transverse carriers flexibly connected and constituting 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 the mechanism for brushing the outsides of the bottles while in transit through an apparatus of the general character referred to. More limitedly, the invention relates to the means for centering the bottles on the carriers with respect to a series of lifting rods which serve to subject them to the action of cleaning means. An instance of apparatus of the general type to which this invention relates is disclosed in Patent No. 1,313,706 issued to Charles H. Loew and myself on August 19, 1919; also in Patent No. 1,719,844, issued July 9, 1929 to Paul W. Loew and Robert R. McKechnie.

It is the general purpose and object of the invention to enable bottles, while being conducted through an apparatus of the general character aforesaid, to be brushed in a particularly efficient manner; also to insure that the bottles in each transverse carrier shall be conveniently and effectively aligned with respect to the lifting rods or spindles by which they are lifted from their carriers into operative relation to cleaning mechanism located above the carriers and the conveyor of which the carriers form a part.

In the accompanying drawings, Fig. 1 represents a side elevation of a part of a bottle washing apparatus of the general type referred to, showing three of the transverse series of bottles, together with the brushing mechanisms and the means for lifting the bottles from their seats in the carriers into operative relation to the brushing mechanisms, the brushing mechanisms being shown in the positions occupied thereby prior to lifting a series of bottles therebetween; Fig.

2 is a view similar to Fig. 1, but taken from the opposite side of the apparatus and showing one series of bottles lifted between the brushing mechanisms and the positions of the brushes during this operation; Fig. 3 is a top plan view of a portion of the apparatus shown in Figs. 1 and 2; Fig. 4 is a sectional view corresponding to the line 4—4 of Fig. 1; Fig. 5 is a longitudinal sectional view through the apparatus shown in the preceding views, the parts being in the positions which they occupy in Fig. 1; Fig. 6 is a view, similar to Fig. 5, but showing the parts in the positions which they occupy in Fig. 2; Fig. 7 is a transverse sectional view through the mechanism for rotating the bottle bottom clamps; and Fig. 8 is a sectional elevation showing the manner of rotating and oscillating the vertically rotating brushes.

In the operation of the portion of the apparatus disclosed herein, the bottle conveyor is moved intermittently along tracks and, when each series of bottles reaches the first brushing station, the mouths of the bottles are automatically centered above their respective lifting rods, the brushes which operate on the sides of the bottles being separated at this time to permit the passage of the bodies of the bottles therethrough; the bottles are then elevated between vertically rotating and horizontally rotating brushes, which are thereby moved toward each other, the brushes rotating and operating on opposite sides of the bottles; the bottles are then lowered into the seats provided therefor in their transverse carrier, the brushes being separated during this movement; the conveyor is advanced another step, bringing the bottles just treated beneath the horizontally rotating brush and said bottles are then raised from their seats in the carrier a short distance to bring their bottoms into engagement with said brush, the series of bottles next adjacent to the rear being lifted meanwhile between the horizontally rotating brush and the vertically rotating brushes to have their outer sides cleaned in the manner referred to hereinbefore.

The details of the mechanism by which the foregoing operations are accomplished will now be described.

It will be understood that the major portion of the complete apparatus is enclosed within a casing, a portion of which is indicated at Y, the said apparatus including
 5 longitudinally extending rails 1 on which the bottle conveyor, consisting of flexibly connected transverse carriers 2, is supported by rollers 3—as is shown generally in the patent to Loew and myself referred to hereinbefore.
 10 As the means for moving the conveyor intermittently along the rails 1 is well known to those skilled in this art, illustration of such mechanism is deemed unnecessary.

For the purpose of lifting the bottles 4 from their respective carriers when each carrier reaches its proper position with respect to the brushes thereabove, I have provided lifting rods A, one for each bottle on a carrier, extending upwardly from a cross-head
 20 B. Four bottles are shown in each transverse series and four lifting rods; but it will be understood that the number of bottles constituting each series and the number of lifting rods therefor may be varied in accordance
 25 with the capacity of a given apparatus. Each of these lifting rods has its upper end pointed, as indicated at A', and is provided with a tapered seat A² therebeneath that engages within the mouth of a bottle thereabove. Opposite ends of the cross-bar B are
 30 connected by arms B' and links B² with a rock shaft X which extends transversely of the apparatus, being mounted in bearings provided therefor in opposite sides of the housing or casing T, as shown at X'. B³ denotes guide brackets which are secured to
 35 each end of the cross-head B and which are adapted to slide upon the vertical guide rods C.
 40 Secured to and extending between the guide rods C is an angle iron member D having guide openings therethrough for the upper portions of the rods A (see Figs. 4 and 5). D' denotes another angle iron member which
 45 is supported above and at the rear or right of the member D by means of a bracket D², secured to the member D.

The bottle centering mechanism consists of laterally spaced angular guide members each
 50 having a portion E extending longitudinally of the apparatus and a vertical portion E^a secured to the vertical branch of the angle iron D', the longitudinal portion of each guide member having a downwardly projecting
 55 tongue E', between which tongues the necks of the bottles on a transverse carrier which has been moved above the rods A are positioned. These tongues serve to center
 60 the necks of the bottles in one direction with respect to the corresponding rods A. Vertical tongues E² which are mounted on a pair of transversely extending bars E³ project
 65 upwardly toward the portions E of the guide members and serve, when the bars E³ are moved as pointed out hereinafter, to complete

the centering of the mouths of the bottles above the rods A, the tongues then forming in effect a temporary box-like structure around
 70 each bottle neck. When the bottle carrier and the bottles therein are being moved, the upwardly extending tongues E² are out of the paths of the bottles, being in the position
 75 shown by dotted lines in Fig. 4. When a bottle carrier stops above the rods A, the bars E³ are moved in the following manner transversely of the apparatus to bring the tongues
 80 E² into aligning relation to the mouths of the bottles, thereby to form with the tongues E' a complete centering box for the mouth of each bottle on such carrier. The manner of
 85 supporting and moving the bars E³ whereby the tongues E² will also be moved into appropriate relation to the tongues E', will now be described:

The opposite ends of the bars E³ are pivotally connected to the downwardly extending
 90 arms E⁴, E⁵, of a pair of bell cranks, the bell cranks being pivoted on brackets E⁶ projecting from the sides of the apparatus (see Fig. 4). A spring E⁷ is connected at one end to the horizontal arm of the bell crank carrying
 95 the arm E⁴ and at its other end to an eye bolt E⁸ which is secured to the guide rod C. A vertical rod E⁹ is connected at its upper end to the horizontal arm of the other bell crank and has its lower end slidably mounted in a
 100 bracket E¹⁰, carried by the guide bracket B³ therebeneath, the said rod having a nut E¹¹ on the lower end thereof normally engaged by the said bracket.

When the cross-head B is in its lowered position, the spring E⁷ will be inoperative to
 105 rock the bell crank to which it is connected, and the tongues E² will be in the positions shown in Fig. 4. When the cross-head starts moving upwardly, however, the spring E⁷ is free to rock the bell crank to which it is
 110 connected, thereby moving the bars E³ transversely and bringing the tongues E² into register with the spaces provided between the guide members E. This results in completing
 115 the alinement of the mouths of the bottles above the lifting rods A. When the cross-head B is moved downwardly, the bracket E¹⁰ will engage the nut E¹¹ and will pull downwardly on the rod E⁹, thereby moving
 120 the bars E³ to the position shown in Fig. 4, with the tongues E² out of the paths of movement of the bottles.

The bottle rotating mechanism is of substantially the same character as that shown
 125 in the patent to Loew and myself referred to hereinbefore and in the patent to Loew and McKechnie No. 1,719,844 issued July 19, 1929. This mechanism consists generally of
 130 a series of vertically movable angular rods F corresponding in number and position to the bottles in a transverse carrier and each having a weight F' at its upper end. These rods are guided during their vertical move- 135

ments by sleeves F^2 within a housing, indicated generally at F^3 (see Figs. 4, 5 and 7). Each sleeve is provided with a spur gear F^4 , the gears intermeshing with one another and one of the final gears being provided with a beveled gear F^5 integral therewith which meshes with a beveled gear F^6 on one end of a shaft F^7 which is mounted in an extension of the framework of the apparatus and which shaft is provided at its opposite end with a double spur gear consisting of a hub having on the outer end thereof a large gear F^8 and on the body thereof a small gear F^9 .

The shaft F^7 is driven by a shaft G extending transversely of the apparatus and mounted in brackets G' secured to the housing F^3 (see Figs. 1, 3, 5 and 8). To one end of the shaft is fastened a pulley G^2 whereby the shaft is driven from any convenient source of power. On the opposite end of the shaft there is mounted a sprocket G^3 and a gear G^4 . The shaft G drives the shaft F^7 by means of the gear G^4 which meshes with the gear F^8 . Sprockets G^3 and I^5 are connected by a sprocket chain G^5 .

H denotes a shaft which is supported on the opposite side of the housing from the shaft G by means of bearing brackets H' extending from the said housing and in alignment with the brackets G' . One end of the shaft H is provided with a spur gear H^2 and its opposite end with a crank disk H^3 .

I and I' denote brackets which extend downwardly from the longitudinal members I^2 located on opposite sides of the machine (see Figs. 1, 2, 4 and 5). A shaft I^3 is mounted for rocking and reciprocatory movements in the said brackets. On one end of the shaft I^3 there is loosely mounted a gear I^4 carrying a sprocket I^5 . Pinned to the shaft I^3 , between the brackets I and I' , are arms J which extend upwardly and downwardly from the shaft and which are provided at their lower ends with journals 4 in which is mounted the shaft J' carrying the horizontal brush J^2 . Secured to the shaft J' is a wide gear J^3 , which meshes with the gear I^4 .

On the opposite end of the shaft I^3 from the gear I^4 and sprocket I^5 is a grooved collar I^6 which is engaged by the pins on the forked arm of a bell crank I^7 which is pivoted between lugs I^8 carried by the bracket I (see Figs. 2 and 4). I^9 denotes a connecting rod which has its upper end connected to a crank pin H^4 on the crank H^3 and its lower end connected to the forked end of the other end of the bell crank I^7 through a universal joint connection I^{10} , I^{11} . It will be evident that, as the shaft H is revolved, the shaft I^3 will be reciprocated in its bearings by the connections just described, thereby reciprocating the brush J^2 which is being rotated through the gears I^4 and J^3 .

Mounted within the brackets G' and ex-

tending inwardly therefrom are sleeves K , through which the shaft G also extends, and a hanger yoke K^2 is rotatably mounted on the extensions K' of said sleeves (see Fig. 8). Journal sleeves K^3 extend downwardly from the yoke K^2 and serve as bearings for vertical shafts K^4 , each of which has at its upper end a beveled gear and at its lower end a brush K^6 . It will be noted that the brushes K^6 are shaped to conform to the contours of the bottles which they engage and that they intermesh with each other; also that the beveled gears K^5 mesh with beveled gears K^7 on the shaft G . It will be evident that, as the shaft G rotates, the brushes K^6 are also rotated about substantially vertical axes.

Each journal sleeve K^3 is provided with an apertured lug K^8 , each of which is adapted to receive one end of a link K^9 . The opposite ends of these links are connected respectively to the upper ends of the arms J by which the horizontal brush J^2 is suspended from the shaft I^3 (see Figs. 2, 5, 6 and 8). It will be seen from Figs. 5 and 6 that the arrangement is such that, when the brushes K^6 are rocked, the brush J^2 will be rocked in the opposite direction, due to the manner of pivoting the yoke K^2 and the arms J and the manner of connecting the said yoke and arms by the links K^9 . The manner in which the brushes are so rocked will now be described (see Figs. 1, 5 and 6).

L denotes a shaft extending transversely of the apparatus and mounted in bearings L' on the members I^2 . Intermediate its ends, this shaft is provided with a downwardly projecting arm L^2 and at one end thereof with a substantially horizontal arm L^3 . The arm L^2 is connected to the yoke K^2 by means of a link L^4 having one end pivotally connected to the lower end of the said arm and its opposite end connected to a lug L^5 on the yoke. A vertical rod M is connected at one end to the outer end of the arm L^3 , the lower end of said rod extending through a sleeve M' carried by one of the arms B' . A stop M^2 is secured to the rod M and is located above the arm B' when the latter is in its lowered position. As the arms B' move upwardly from the position shown in Fig. 1 to the position shown in Fig. 2, the sleeve M' will engage the stop M^2 and lift the rod M , thereby rocking the shaft L which, through the arms L^2 and the link L^4 , will rock the yoke K^2 , thereby moving the brushes K^6 toward the bottles which have been lifted by the upward movement of the arms B' , and this movement of the brushes K^6 will in turn rock the brush J^2 toward the brushes K^6 , the brushes then occupying the positions shown in Figs. 2 and 6. As the arms B' move downwardly, a spring L^6 connected to the housing at L^7 and to the yoke K^2 at L^8 (see Figs. 3 and 8) will rock the yoke in the opposite direction, bringing it into

engagement with the adjustable stop N, which is mounted in a cross bar N' extending between the members I², the stop providing means for adjustably limiting the separation of the brushes J² and K⁶.

Reference has been made hereinbefore to the raising of the bottoms of the bottles in successive transverse series against the brush J². The manner in which this is accomplished will now be described.

Extending downwardly from the horizontal flange of the angle member D' are guides O through which rods O' extend (see Figs. 4, 5 and 6). The upper ends of the rods are connected to an upper bottle lifting bar O² and the lower ends are connected to the horizontal flange of an angle bar O³ constituting a lower bottle lifting bar. The lower bar is yieldably supported by springs O⁴ connected at their lower ends to eye bolts O⁵ carried by opposite ends of said bar while their upper ends are connected to opposite sides of the frame of the apparatus, as shown at O⁶. Rods R extend through the horizontal flange of the angle bar O³ and are surrounded at their upper portions by springs R' bearing at their lower ends against the horizontal flange of the angle bar O³ and at their upper ends against stops R² on their respective rods. The lower ends of the rods R extend through brackets R³ carried by the cross-head B and are provided with nuts R⁴ thereon below said brackets. When the cross-head is in its lowered position, the springs R' are under sufficient compression to overcome the lifting effort of the springs O⁴. However, as the cross-head B rises, the brackets R³ move away from the nuts R⁴, thus relieving the compression exerted on the springs R' and allowing the springs O⁴ to elevate the lower lifting bar O³ and the upper lifting bar O² and the bottles above the latter, bringing the bottoms of the bottles into contact with the brush J² (see Fig. 6). When the cross-head B is lowered, the lugs R³ will engage the nuts R⁴ and pull the rods R and the bar O downwardly to the position shown in Figs. 1, 4 and 5, thus lowering the bottles into the seats provided therefor in their carrier. The springs R' function as an additional cushion in the lowering movements of the bars O² and O³, thus serving to lower the bottles into their carrier seats without injury.

From the foregoing detailed explanation, it is believed that the general operation of the apparatus will be readily understood. The conveyor will be operated to move the same intermittently along the rails 1. When the carrier has been brought below the rotating spindles F, the brushes J² and K⁶ will be in the separated relation shown in Figs. 1 and 5, due to the action of the spring L⁶ and the connecting links K⁹. As the cross-head B starts to move upwardly, the cross

bars E³ are moved so that the tongues E² carried thereby will cooperate with the tongues E' carried by the bars E to center the mouths of the bottles in such series above the lifting rods A. The bottles, when lifted from their seats by the rods A, will engage the rotating clamps F¹⁰ on the bottoms of the rods F and will be rotated thereby. As the bottles move upwardly, the sleeve M' engages the stop M² and rocks the shaft L to bring the brushes J² and K⁶ toward each other, thereby to operate upon the sides and necks of the bottles, as shown in Fig. 2. The brushes K⁶ are rotating about vertical axes while the brush J² is rotating about a horizontal axis and is also being reciprocated by means of the shaft H, crank H³ and the connections between the crank and the shaft I³ hereinbefore described. When the arms B' are lowered, the bottles are lowered with them, the clamps F¹⁰ remaining in contact with the bottles until the latter are nearly within their seats. During this downward movement of the bottles the sleeve M' will move away from the stop M² and the spring L⁶ will move the brushes J² and K⁶ apart, as shown in Figs. 1 and 5.

The conveyor is then advanced another step, bringing the series of bottles just treated beneath the brush J² and the succeeding series beneath the bottle bottom clamps F¹⁰. The arms B' are again rocked upwardly, lifting the succeeding series of bottles into engagement with the clamps F¹⁰ and between the brushes J² and K⁶, which are moved toward each other in the manner described hereinbefore. As the cross-head B moves upwardly, the springs O⁴ are permitted to lift the upper and lower lifting bars O² and O³ in the manner described, the upper bar engaging the mouths of the bottles of the series thereabove and lifting the bottoms of the bottles into engagement with the rotating and reciprocating brush J². On the downward movement of the arms B', resulting in the downward movement of the cross-head B, the two series of bottles are returned to the seats in their respective carriers.

The manner of brushing the bottles disclosed herein has been found to be extremely efficient, the sides and necks of the bottles being subjected to the action of the intermeshing brushes K⁶ which are rotatable about substantially vertical axes, and to the action of the brush J² which rotates about a horizontal axis and which at the same time is reciprocated along the sides and necks of the rotating bottles. Furthermore, the brush J² serves to clean the bottoms of the bottles most effectively, due to its rotary and reciprocatory movements; and the construction by which the foregoing results have been obtained has proved to be extremely practical and efficient in operation.

Having thus described my invention, what I claim is:—

1. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, a transverse series of bottle-bottom clamps mounted for reciprocation between the two brushing mechanisms, means for rotating the bottle-bottom clamps, means for lifting a transverse series of bottles from their respective seats in a carrier into engagement with the bottle-bottom clamps and for moving the bottles thus clamped upwardly between said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means operative by the lifting of the said bottles from their seats for moving said brushing mechanisms toward each other and for moving the said brushing mechanisms apart during the downward movement of the bottles toward their seats, means for rotating the said brushes and means for reciprocating one of the said brushing mechanisms transversely of the conveyor.

2. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between the said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means operative by the lifting of said bottles from their seats for moving the brushing mechanisms toward each other and for moving the said brushing mechanisms apart during the downward movement of the bottles toward their seats, means for rotating said brushes, and means for reciprocating one of said brushing mechanisms transversely of said conveyor.

3. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between the said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means for rotating said brushes, means for reciprocating the second brushing mechanism, means for thereafter lifting the bottles from the said carrier to bring their bottoms into engagement with such second brushing mechanism and for restoring the said bottles to their seats in such carrier, and connections between the first mentioned bottle lifting means and the second mentioned bottle lifting means for operating the latter lifting means by the former means.

4. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means operative by the lifting of said bottles from their seats for moving the said brushing mechanisms toward each other and for moving the said brushing mechanisms apart during the downward movement of the bottles toward their seats, and means for rotating the said brushes.

5. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said con-

veyor, the said means comprising brushing mechanisms between which the bottles on a carrier are adapted to be raised and lowered, one of said mechanisms comprising a
 5 brush mounted for rotation about a substantially horizontal axis, means for raising and lowering the bottles from their seats in a carrier between the said brushing mechanisms, and means for lifting the bottles from
 10 an adjacent carrier to bring their bottoms into contact with the said brush, the last-mentioned means comprising a lifting bar extending transversely of the apparatus beneath the last-mentioned carrier, spring
 15 mechanism tending to elevate said lifting bar, and connections between the said bar and the bottle raising and lowering means whereby the said spring mechanism is inoperative to raise the lifting bar when the said
 20 bottle lifting means is in its lowered position but is rendered operative to lift said bar by the upward movement of said bottle lifting means.

6. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising brushing
 30 mechanisms between which the bottles on a carrier are adapted to be raised and lowered, one of said mechanisms comprising a brush mounted for rotation about a substantially
 35 horizontal axis, means for raising and lowering the bottles from their seats in a carrier between the said brushing mechanisms and means operative by the bottle-raising and lowering means for lifting the bottles
 40 from an adjacent carrier to bring their bottoms into contact with the said brush, the last-mentioned means comprising a cross-head connected with the first bottle lifting means, an upper lifting bar positioned beneath the mouths of the bottles in said adjacent carrier, a lower bar connected to said
 45 upper bar, springs connected to the lower bar and tending to elevate the same, brackets carried by said cross head, rods extending through the lower bar and through said
 50 brackets and each having a nut on the lower end thereof below such bracket, and a spring surrounding each such rod above the said lower bar and pressing downwardly upon
 55 said bar thereby to normally hold both bars in lowered position.

7. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each
 60 having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising brushing mechanisms between which the bottles on a
 65 carrier are adapted to be raised and lowered,

one of said mechanisms comprising a brush mounted for rotation about a substantially horizontal axis, means for raising and lowering the bottles from their seats in a carrier between the said brushing mechanisms, and means operative by the bottle raising and lowering means for lifting the bottles from an adjacent carrier to bring their bottoms into contact with the said brush, the last mentioned means comprising a lifting bar
 70 extending transversely of the apparatus beneath the last mentioned carrier, spring mechanism tending to elevate said lifting bar, and spring mechanism operatively connected to the said bar and to the first bottle lifting means for preventing the lifting movement of the first mentioned spring mechanism when the first bottle lifting means is in a lowered position and for permitting such lifting action when the first bottle lifting means is in an elevated position.

8. In an apparatus of the character described, the combination, with means for supporting a series of bottles with their mouths downward and a brush mounted for rotation about a substantially horizontal axis above said bottles, of means for lifting the bottles from their supports and for bringing their bottoms into engagement with the said brush and for
 90 thereafter restoring them to their seats, the said means comprising a lifting bar positioned beneath the mouths of said bottles, a spring operatively connected to said lifting bar and tending to elevate the same, a spring also operatively connected with said lifting bar and normally preventing the lifting operation of the first mentioned spring, and means reciprocable toward and from the said lifting bar for relieving the resistance of the second mentioned spring during the upward movement of said reciprocating means thereby to permit the lifting action of the first mentioned spring and for restoring the resistance of the second mentioned spring during the downward movement of said reciprocating means thereby to lower the said lifting bar.

9. In an apparatus of the character described, the combination, with means for supporting a series of bottles with their mouths downward and a brush mounted for rotation about a substantially horizontal axis above said bottles, of means for lifting the bottles from their supports and for bringing their bottoms into engagement with the said brush and for thereafter restoring them to their seats, the said means comprising an upper lifting bar arranged beneath the mouths of the bottles, a lower lifting bar, one or more
 115 rods connecting the said bars, springs operatively connected to opposite ends of the lower lifting bar and tending to elevate the same and the upper lifting bar, rods extending through the lower lifting bar and
 120 125 130

each having a spring surrounding its upper portion and bearing at its lower end against the lower lifting bar, a vertically movable member having openings through which the lower ends of the said rods extend, the said rods being provided with stops on the lower ends below the said openings whereby, when the said member is in lowered position, the springs on said rods will hold the lower bar in its depressed position against the action of the first mentioned springs, and means for reciprocating said member whereby on the upward movement of the same the resistance of the second springs to the first springs will be overcome and the bottles lifted from their seats to bring their bottoms into engagement with the brush and, on the reverse movement of said movable member, the rods will be pulled downward thereby to compress the second mentioned springs to cushion the downward movement of the lifting bars and the return of the bottles to their seats.

10. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between the said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means for rotating said brushes, and means for reciprocating one of said brushing mechanisms transversely of said conveyor.

11. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of the apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between the said brush-

ing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means for rotating said brushes, and means for reciprocating the second brushing mechanism.

12. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, and means for rotating said brushes.

13. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brushing mechanism consisting of a set of brushes mounted for rotation each about a substantially vertical axis and extending transversely of said apparatus, and a second brushing mechanism comprising a brush adjacent to the said set of brushes and extending transversely of said apparatus and mounted for rotation about a substantially horizontal axis, means for lifting a transverse series of bottles from their respective seats in a carrier and for moving the bottles upwardly between the said brushing mechanisms and for thereafter restoring the bottles to their seats in such carrier, means for rotating said brushes, and means for thereafter lifting the bottles from the said carrier to bring their bottoms into engagement with said second brushing mechanism.

14. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising brushing mechanisms between which the bottles on a carrier are adapted to be raised and lowered, one of said mechanisms comprising a brush mounted for rotation about a substantially horizontal axis, means for raising and lowering the bottles from their seats in a carrier between the said brushing mechanisms, means for lift-

ing the bottles from an adjacent carrier to bring their bottoms into contact with the said brush, and means for axially reciprocating the said brush.

15. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brush mounted for rotation about a substantially horizontal axis and extending transversely of said conveyor, and means for lifting the bottles from a carrier to bring their bottoms into contact with the said brush, the last-mentioned means comprising an upper lifting bar positioned beneath the mouths of the bottles in said carrier, a lower bar connected to said upper bar, a spring connected to the lower bar and tending to elevate the same, a vertically movable bracket, a rod extending through the lower bar and extending through said bracket and having a nut on the lower end thereof below said bracket, a spring surrounding said rod above the lower bar and pressing downwardly upon said bar thereby to normally hold both bars in lowered position, and means for reciprocating said bracket vertically.

16. In an apparatus for cleaning bottles, the combination, with a conveyor comprising transversely extending bottle carriers each having seats for bottles and adapted to be moved intermittently through such apparatus, of brushing means above said conveyor, the said means comprising a brush mounted for rotation about a substantially horizontal axis and extending transversely of said conveyor, and means for lifting the bottles from a carrier to bring their bottoms into contact with the said brush, the said means comprising a lifting bar extending transversely of the apparatus beneath the mouths of the bottles in said carrier, spring mechanism tending to elevate said lifting bar, a vertically movable member, spring mechanism operatively connected to the said bar and to the said member for preventing the lifting movement of the first mentioned spring mechanism when the said member is in its lowered position and for permitting such lifting action when the said member is in an elevated position.

17. In an apparatus for brushing the outside of bottles, the combination of a yoke having aligned bearings at opposite ends thereof, a shaft rotatably mounted in said bearings, shafts supported by said yoke and extending at substantially right angles to the first mentioned shaft, a brush mounted on each of the last mentioned shafts, pinions on the first mentioned shaft and a gear on each of the second mentioned shafts meshing each with one of the first mentioned pinions, a shaft spaced from the first mentioned shaft

and substantially parallel therewith, a pair of arms mounted on the last mentioned shaft and extending on opposite sides thereof, one end of each of the last mentioned arms having a bearing, a shaft mounted in said bearings, a brush on said last mentioned shaft, a link connecting with the said yoke the portion of one of said arms which is on the opposite side of its supporting shaft from the brush shaft, driving connections between the first mentioned shaft and the last mentioned brush shaft, a spring operatively connected with said yoke and tending to move the said yoke away from the arms which support the last mentioned brush shaft, means for moving a bottle between said brushes, and means operated by such movement for rocking the said yoke against the action of the said spring.

18. In an apparatus for brushing the outside of bottles, the combination of a yoke having aligned bearings at opposite ends thereof, a shaft rotatably mounted in said bearings, shafts supported by said yoke and extending at substantially right angles to the first mentioned shaft, a brush mounted on each of the last mentioned shafts, pinions on the first mentioned shaft and a gear on each of the second mentioned shafts meshing each with one of the first mentioned pinions, a shaft spaced from the first mentioned shaft and substantially parallel therewith, a pair of arms mounted on the last mentioned shaft and extending on opposite sides thereof, one end of each of the last mentioned arms having a bearing, a shaft mounted in said bearings, a brush on said last mentioned shaft, a link connecting with the said yoke the portion of one of said arms which is on the opposite side of its supporting shaft from the brush shaft, driving connections between the first mentioned shaft and the brush shaft, a spring operatively connected with said yoke and tending to move the said yoke away from the arms which support the last mentioned brush shaft, means for moving a bottle upwardly between said brushes, means operated by such movement for rocking the said yoke against the action of the said spring, and means for reciprocating the last mentioned brush shaft and its supporting shaft without breaking the driving connections between said last mentioned brush shaft and the first mentioned shaft.

19. In an apparatus for brushing the outside of bottles, the combination of a rotatably supported hanger, a shaft supported by said hanger, a brush mounted on the said shaft, a pair of pivotally supported arms adjacent thereto, a shaft mounted in said arms, a brush on the last mentioned shaft, means for driving the said shafts, means connected with the shaft-supporting members and tending to move the said shafts apart, means for moving a bottle between said

brushes, and means operated by such movement for moving the shaft-supporting members toward each other upon the insertion of the bottle between said brushes.

20. In an apparatus for brushing the out-
sides of bottles, the combination of a ro-
tatably supported hanger, a shaft supported
in said hanger and depending therefrom, a
brush mounted on the said shaft, a pair of
pivottally supported arms adjacent thereto,
a shaft mounted in said arms, a brush on
the last mentioned shaft means including
a spring for connecting the shaft supporting
members and tending to move the said shafts
apart, means for driving said shafts, means
for moving a bottle between said brushes,
and means operative by such movement for
overcoming the action of said spring and for
forcing the shafts toward each other upon
the insertion of a bottle between said brushes
and for rendering the spring operative to
separate the shafts by the removal of the bot-
tle from between the said brushes.

21. In an apparatus for cleaning bottles,
the combination, with a conveyor comprising
transversely extending bottle carriers each
having seats adapted to support bottles
mouth downward and adapted to be moved
intermittently through such apparatus, of
brushing means above said conveyor, a series
of lifting rods for the bottles on each carrier
located below said brushing means and
adapted to raise the bottles from each such
carrier into operative relation to the brush-
ing means, and means for aligning the
mouths of the bottles on each carrier with
such lifting rods, the said means comprising
longitudinally extending guide members
adapted to receive the necks and mouths of
the bottles on each carrier therebetween and
to permit the passage of the same there-
through, each of said guide members having
a vertically projecting extension, a pair of
transversely extending bars vertically spaced
from the said guide members, each of said
bars having projections extending toward
but normally out of register with the spaces
between said bars, hangers pivoted to the
opposite sides of the said apparatus and
having substantially vertically extending
arms pivotally connected to the said bars,
one of said hangers comprising a bell crank,
a rod connected with said bell crank and
normally holding the said bars with the pro-
jections thereof out of register with the
spaces between the said guide members, a
spring tending to move the bars in the op-
posite direction against the action of the
last mentioned rod, means for raising and
lowering the said lifting rods, and connec-
tions between said raising and lowering
means and the rod connected with the bell
crank whereby as the said lifting rods are
raised, the restraining action upon the
spring by the rod connected with the bell

crank is overcome and the projections on
the said bars are brought into register with
the spaces between the guide members, and
upon the downward movement of the said
raising and lowering means the last men-
tioned rod is operated against the action of
said spring thereby to move the bars to bring
the projections thereof out of register with
the spaces between the said members.

22. In an apparatus for cleaning bottles,
the combination, with a conveyor comprising
transversely extending bottle carriers each
having seats adapted to support bottles
mouth downward and adapted to be moved
intermittently through such apparatus, of
brushing means above said conveyor, a series
of lifting rods for the bottles on each carrier
located below said brushing means and adapt-
ed to raise the bottles from each such carrier
into operative relation to the brushing
means, and means for aligning the mouths
of the bottles on each carrier with such lift-
ing rods, the said means comprising longi-
tudinally extending guide members adapted
to receive the necks and mouths of the bot-
tles on each carrier therebetween and to per-
mit the passage of the same therethrough,
each of said guide members having a down-
wardly projecting tongue, a pair of trans-
versely extending bars located beneath the
said guide members, each of said bars hav-
ing upwardly extending tongues adapted by
the movement of said bars to register with
the spaces between said bars, bell cranks
pivoted to the opposite sides of the said ap-
paratus and having substantially vertically
extending arms pivotally connected to the
said bars, a rod connected with one of said
bell cranks and normally holding the said
bars with the tongues thereof out of register
with the spaces between the said guide mem-
bers, a spring connected with the other of
said bell cranks and tending to move the
bars into register with said spaces, means
for raising and lowering the said lifting
rods, and a connection between said raising
and lowering means and said second men-
tioned rod whereby as the said lifting rods
are lifted, the restraining action upon the
spring by the rod connected with a bell
crank is overcome and the tongues of said
bars are brought into register with the
spaces between the guide members, and upon
the downward movement of the said lifting
rods the second mentioned rod is operated
against the action of said spring thereby to
move the bars to bring the tongues thereof
out of register with the spaces between the
said members.

In testimony whereof, I hereunto affix my
signature.

JOHN R. GRUETTER.