K. KIEFER.

BOTTLE RINSING MACHINE.

APPLICATION FILED JUNE 30, 1911.

1,022,196.

Patented Apr. 2, 1912

4 SHEETS—SHEET 1.

Fig. 1.

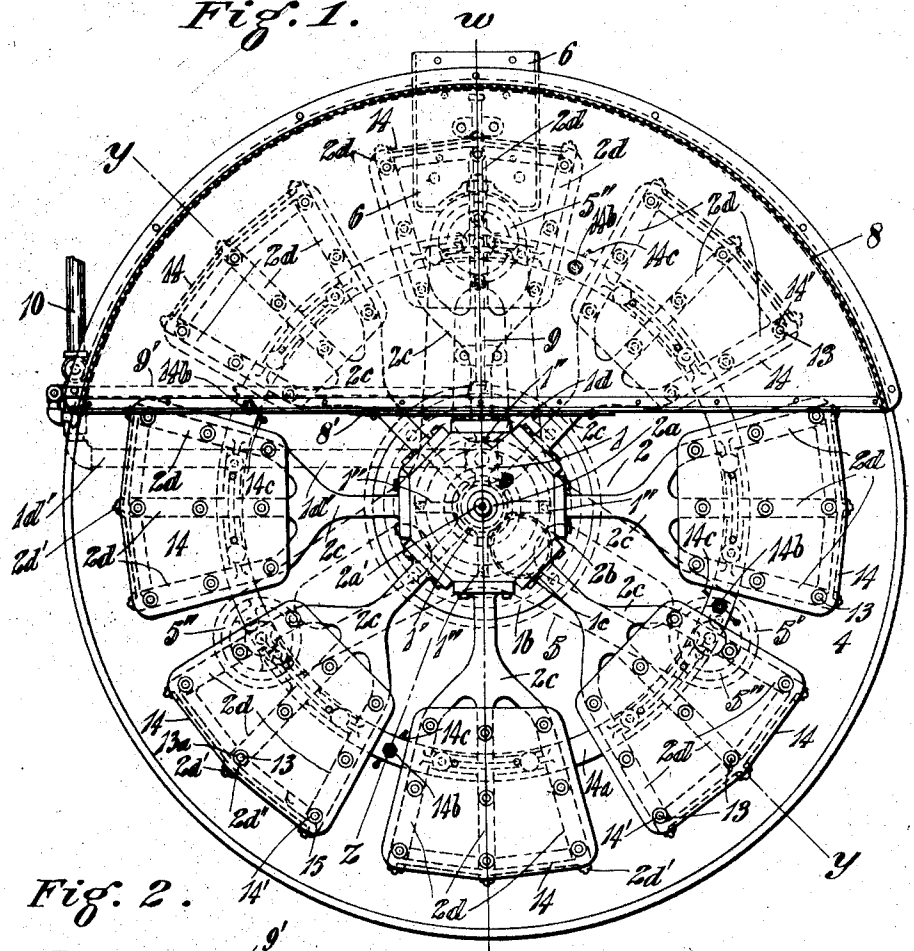
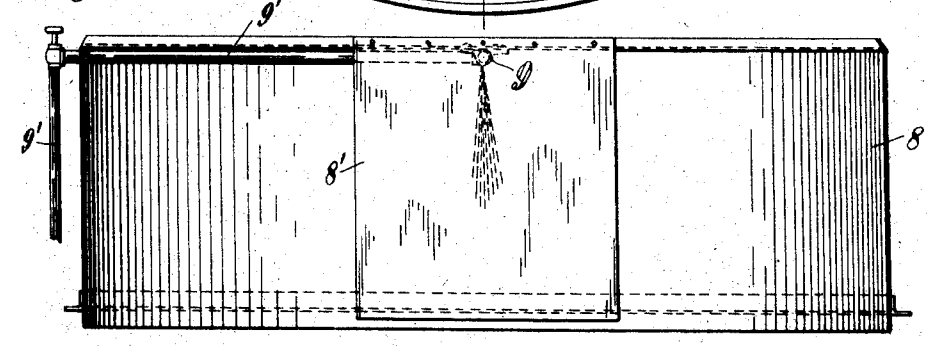


Fig. 2.



Witnesses:

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Fig. 3.

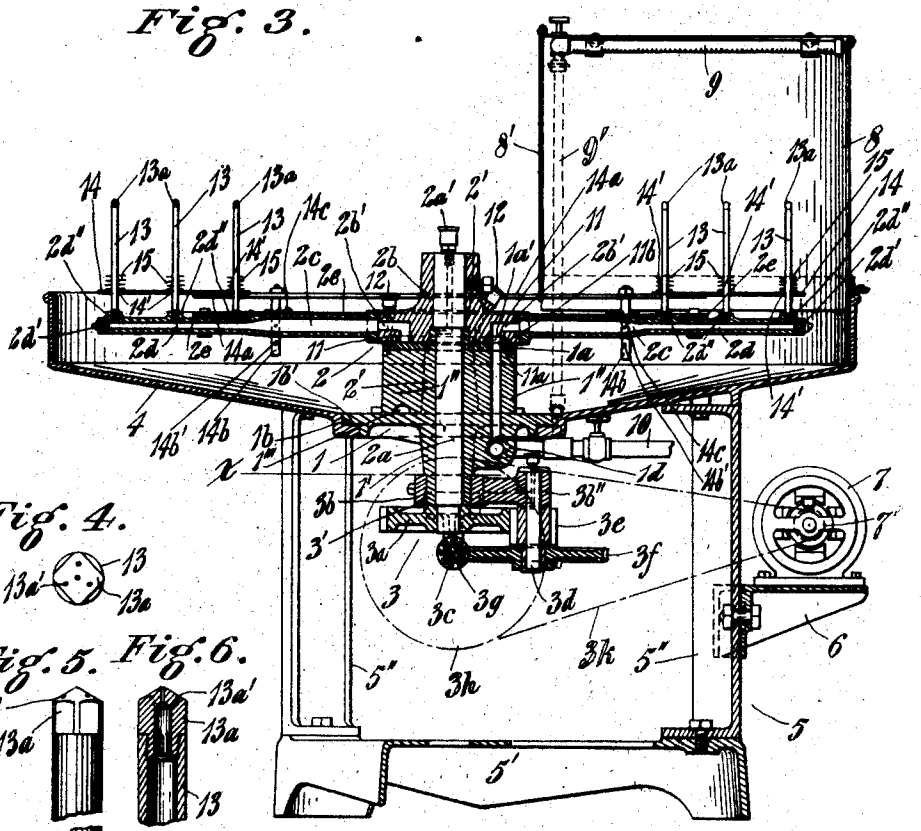


Fig. 4.

Fig. 5.

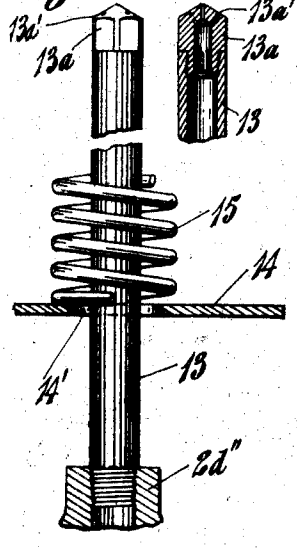
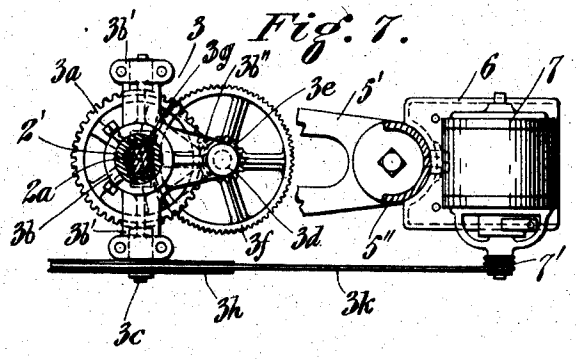


Fig. 6.

Fig. 7.



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4 SHEETS—SHEET 3.

Fig. 8.

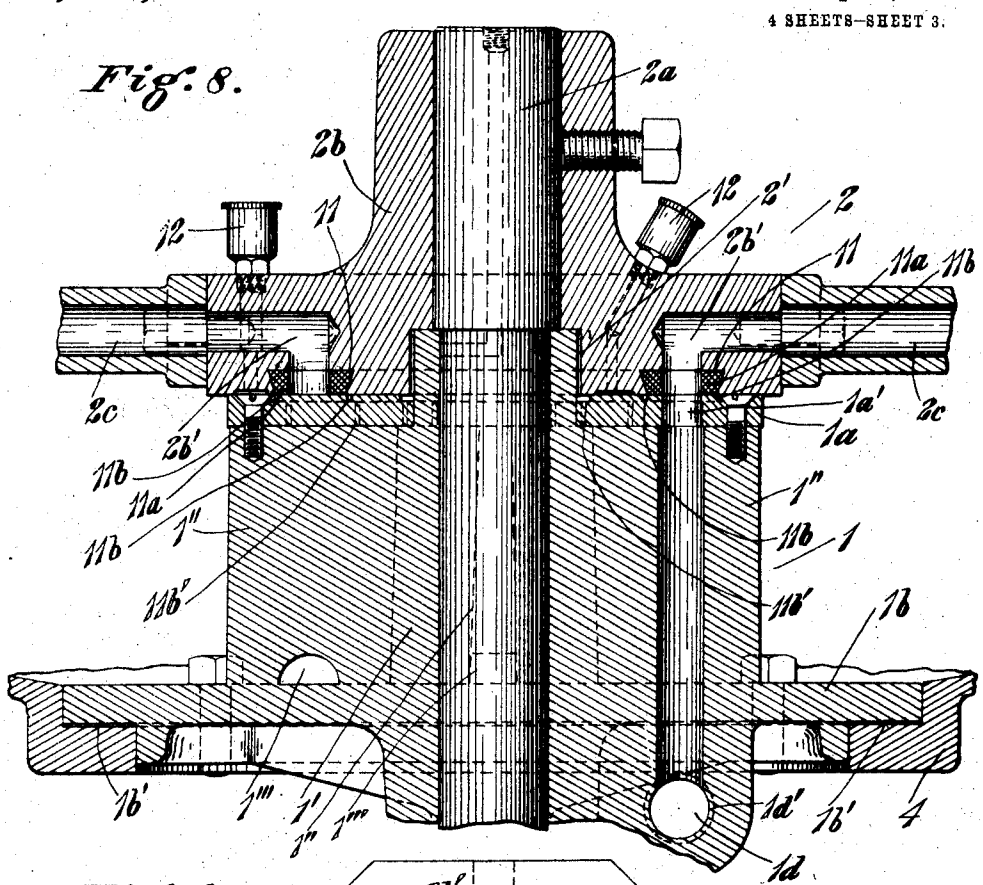
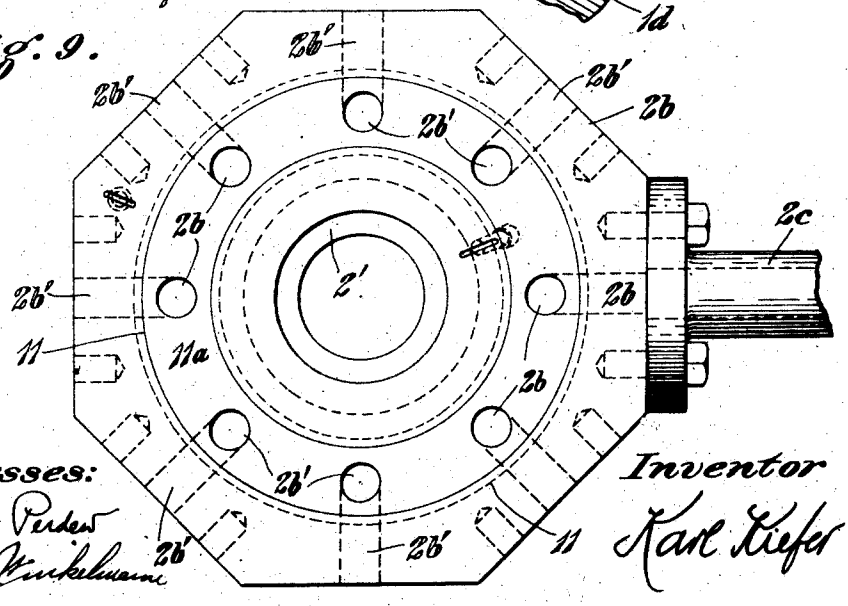


Fig. 9.



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4 SHEETS—SHEET 4.

Fig. 10.

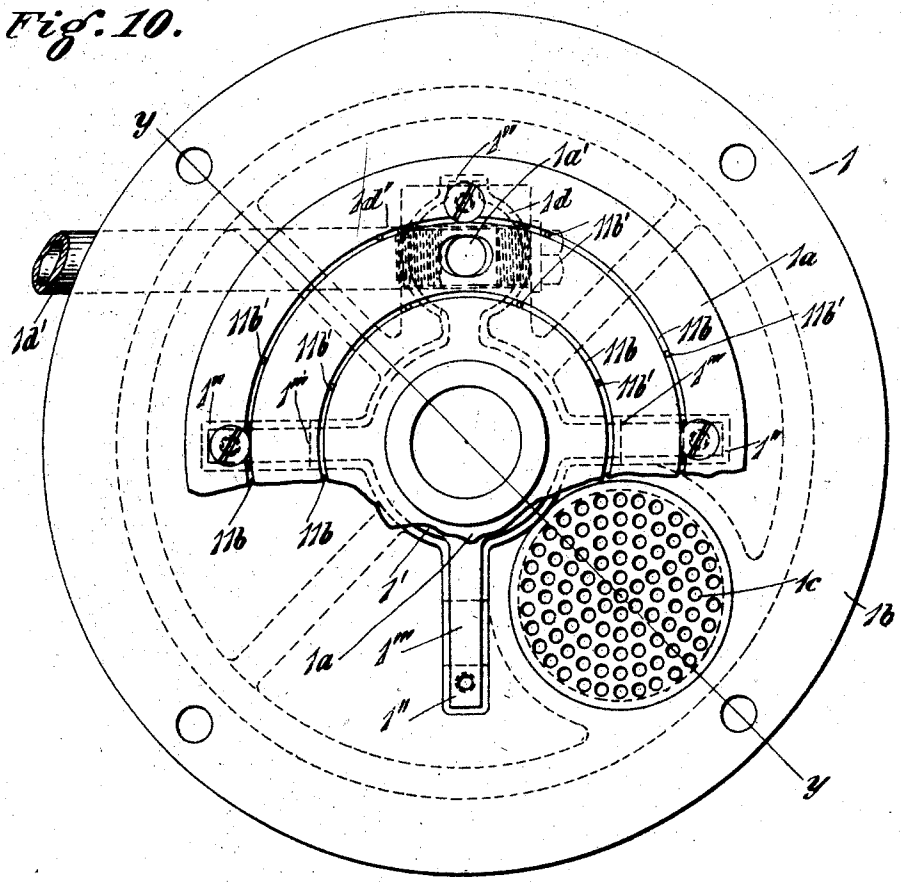
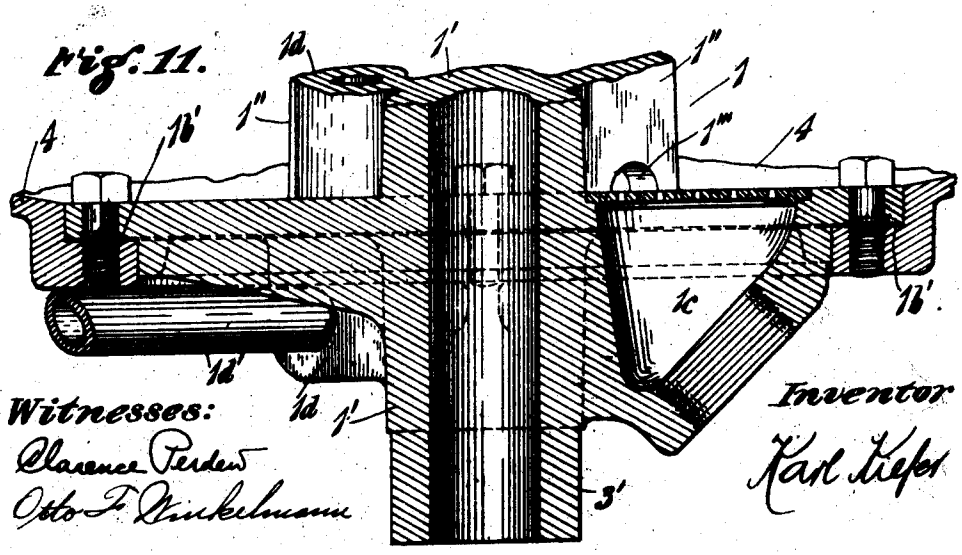


Fig. 11.



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UNITED STATES PATENT OFFICE.

KARL KIEFER, OF CINCINNATI, OHIO.

BOTTLE-RINSING MACHINE.

1,022,196. Specification of Letters Patent. Patented Apr. 2, 1912.

Application filed June 30, 1911. Serial No. 636,203.

To all whom it may concern:

Be it known that I, KARL KIEFER, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Bottle-Rinsing Machines, of which the following is a specification.

My invention relates to washing apparatus, and has for its object the simplification of the construction and operation of machines of this character, as well as to add to the efficiency of such machines, both in the mechanical operation and in the conduit of the water to and from the articles operated upon.

My invention consists in the parts and in the details of construction and arrangement of parts, as will hereinafter be more fully described and claimed.

In the drawings: Figure 1 is a general plan view of a machine embodying my invention. Fig. 2 is a front elevation of the upper part of the same, comprising the part of the apparatus that rinses the outsides of the bottles. Fig. 3 is a front-to-rear vertical section on the line *w* of Fig. 1, a motor for driving the machine being illustrated in elevation, and the operative connection therefrom to the machine driving apparatus being indicated by broken lines. Fig. 4 is a plan view of one of the stems. Fig. 5 is a partial side elevation of the same, surrounding parts being shown in section, and parts being shown as broken away for lack of space. Fig. 6 is a vertical section of the upper part of the stem and its nozzle. Fig. 7 is a partial horizontal section of the machine on the line *x* of Fig. 3, showing the driving mechanism, as well as the motor and the operative connection therefrom, in full plan view. Fig. 8 is a vertical section of the connection head and connection hub, and adjacent parts, enlarged, on the line *w* of Fig. 1, aforementioned. Fig. 9 is a bottom plan view of the connection hub, with part of one of the distributing arms or conduits attached thereto. Fig. 10 is a plan view of the connection head with part of the bearing plate broken away to reveal the drainage arrangement. Fig. 11 is a partial vertical section of the connection head on lines *y*—*y* of Figs. 1 and 10, showing the drainage outlet.

My improved rinsing-machine comprises, in general, the connection head 1 supporting the rotary distributing device 2 above, and supporting the driving mechanism 3 below; this head 1 is, in turn, supported in the central opening of the drainage tank 4, with which it has watertight connection, and the drainage tank is supported directly on the stand 5, which consists in a base 5′ with three upright columns 5″ secured to the bottom of the drainage tank. A bracket 6 is adjustably secured on the rear one of the columns 5″, and supports a motor 7, which is preferred for driving the machine. The drainage tank 4 carries a hood 8 on its upper rim at the rear of the machine, embracing and covering somewhat less than half of the extent of the drainage tank; this hood has a central distributing pipe 9 extending from front to rear at the top, and supplied by a supply pipe 9′ leading up the side of the machine and horizontally into the hood at the front thereof. A splash plate 8′ depends from the top of the hood in front, closing about one-third of the extent of the otherwise open front of the hood, so that an approximately equal open space is left at each side.

The connection head is the nucleus of the apparatus. It comprises, centrally, a long, vertical bearing hub 1′ for the driving shaft 2^a, which shaft extends, enlarged, thereabove, and has the connection hub 2^b rigidly attached by a set screw; below, this shaft 2^a has the spur gear 3^a rigid thereon, by which it is rotated. Adjacent the lower end of the connection head 1, a yoke 3^b, with lateral arms $3^{b\prime}$ and a rear arm $3^{b\prime\prime}$, is fitted on a reduced part 3′ of said connection head, and is held thereon by set screws. The lateral arms $3^{b\prime}$ carry bearings for a transverse worm shaft 3^c, and the rear arm $3^{b\prime\prime}$ supports a depending stud 3^d, upon which rotate, rigidly and concentrically attached to each other, a pinion 3^e and a worm wheel 3^f; the pinion is above, and meshes with the spur gear 3^a, and the worm wheel, below, meshes with a worm 3^g on the worm shaft 3^c. This worm shaft 3^c has, at one side of the driving mechanism, a belt wheel 3^h, which has a belt 3^k passing around it and around a pulley 7′ of the motor 7. By this means, the high speed of the motor is reduced to a slow speed of rotation of the connecting hub 2^b and the rest of the rotary distributing device.

For supporting the hub 2^b and forming connection therewith to supply water to the

rotary distributing device, the connection head has the bearing plate 1^a fitting down around a reduced upper part of the connection head, and supported upon the radial wings $1''$, integral with the hub $1'$ of the head and with the concentric circular drainage flange 1^b about midway of the vertical length of the hub $1'$. It is this drainage flange 1^b that supports the head 1 in the drainage tank 4, being bolted therein and having a gasket $1^{b'}$ between it and the adjacent annular recess around the pening in the tank, and having its upper surface even with the inwardly sloping bottom of the tank. The wings $1''$ have openings $1'''$ through them where they join the flange 1^b, to facilitate the drainage away from the central part of the device. The drainage outlet 1^c is provided in the flange 1^b, between two of the wings $1''$ at one side at the front, and leads out and down over the driving mechanism 3, under the tank. The water inlet 1^d is at the rear, and consists in a hollow lug below the flange 1^b, and integral with it and with the central hub $1'$ of the head; it leads above the flange 1^b, in the form of a vertical hollow lug, integral with the flange and the center hub $1'$, and forming an enlargement of the rear one of the wings $1''$. The bearing plate 1^a has an opening $1^{a'}$ permanently alined with the interior of the inlet 1^d; it flares upwardly, circumferentially of the plate 1^a as shown in Fig. 10. The inlet pipe $1^{d'}$ leads into the side of the inlet 1^d and connects with its hollow interior. This pipe $1^{d'}$ and the pipe 9 of the upper distributing device are branches of the main supply pipe 10, and it, and said branches, as well, are suitably controlled by means of valves, as indicated.

The connection hub 2^b has an extended flat lower surface bearing on the bearing plate 1^a, and is, as here shown, octagonal, affording flat sides to which the eight radial distributing conduits 2^c are attached. This hub 2^b has angular passages $2^{b'}$ formed by radial passages inward from the sides, joining vertical passages opening downward through the bearing surface which the hub has on the bearing plate 1^a, and adapted to successively aline with the inlet opening of the plate 1^a. The degree to which the inlet opening $1^{a'}$ in the bearing plate 1^a flares upwardly, as hereinbefore alluded to, determines, in connection with the rotative speed of the distributing device, the duration of flow of water into the radial distributing conduits 2^c, which have their interior passages alined with the radial parts of the angular passages $2^{b'}$. As may be noted, the reduced upper part of the connection head, that the plate 1^a fits down around, also extends up into an enlargement $2'$ of the central bearing opening of the connecting hub. The full bearing of the distributing device is imposed on the bearing plate 1^a. For the purpose of thus constituting the contacting surfaces of the plate 1^a and the hub 2^b a bearing contact for the mechanical operation and a watertight connection for the intermittent water supply, the lower surface of said hub 2^b has the undercut annular channel 11, of diameter and radial width such that it embraces the lower openings of the angular passages $2^{b'}$ and leaves a substantial space radially extended therefrom on both sides of each of them. This undercut channel 11 is filled with a suitable gasket material 11^a; this material may be suitable composition metal, such as Babbitt metal, used in machinery bearings. This filling of the channel thus presents a gasket surface all around in the immediate vicinity of the openings of the passages $2^{b'}$, of the extent of the lower narrower open side of the channel. The rest of the lower surface of the hub, radially inwardly and outwardly of the gasket surface, and flush therewith, may consist in the material of the hub, such as cast iron, and these parts of the surfaces may have small radial grooves therein, supplied with lubricant from cups 12. Whatever the material of the hub thus presented as a bearing, and thus lubricated, the material of the plate 1^a will be such that the surface of the plate will afford a bearing with these surfaces of the hub with a minimum of friction. For instance, if the hub be of cast iron, the plate 1^a may be of bronze. The material of the plate is presented throughout to both the bearing surfaces of the hub and to the gasket thereof; thus, bronze or similar metal sustaining a minimum of corrosion under the action of water, is suitable for the material of the plate, with respect to its contact with the gasket surface of the hub. Thus having different surfaces on the hub, peculiar to their functions, they are confined to those functions by concentric annular groove 11^b in the bearing plate 1^a, one of said grooves extending around just inside, away from the inner edge of the gasket surface on the hub 2^b, and the other surrounding said surface just outside, away from the outer edge thereof. These grooves 11^b are drained through small holes $11^{b'}$ down through the plate 1^a, between the wings $1''$, onto the drainage flange 1^b. These grooves thus drain any water that does escape from the sliding gasket connection between the inlet $1^{a'}$ and the angular passages $2^{b'}$, and prevent such water from flowing out onto the bearing surfaces of the hub and head. Likewise, these grooves prevent the lubricant from flowing from said bearing surfaces onto the gasket surface, aided by the repellent effect which the water has on the lubricant. Any small

amount of lubricant that may enter the channels 11^b will, of course, be drained away with the water, through the holes $11^{b'}$. These holes $11^{b'}$ thus constitute relief spaces, where water, following the line of least resistance, may be diverted into the drainage tank, instead of leaking through the bearing of the shaft 2^a to the driving mechanism 3. A further important provision against leakage through the bearing is the extension of the upper part of the connection head up into the enlargement 2′ of the central bearing opening of the connecting hub. Since the pressure on such water as does escape past the channels 11^b is practically reduced to *nil*, this extension of the head will prevent the leakage of water to the shaft without the use of any stuffing box or other packing means around the shaft; the gravitational action on the water is sufficient to counteract such leakage, where the upward extension is combined with the horizontal bearing surfaces. The long bearing of the driving shaft 2^a in the head 1 is lubricated from the cup $2^{a'}$ at its upper end above the hub 2^b.

The eight radial distributing conduits 2^c, attached to the sides of the hub 2^b, each have three branches 2^d, and the outer ends of their interior passages are closed by plugs $2^{d'}$, which, when removed, allow access to the passages. These branches have the upper bosses $2^{d''}$, into which are screwed the stems 13 that enter the bottles. A binding ring 2^e extends around between the two inner series of stems and is rigidly attached to all of the conduits 2^c. The open spaces at the sides of the hood 8 are so proportioned that the successive groups of stems pass in under the hood near the middle of the space on one side and out near the middle of the space on the other side. The inlet $1^{a'}$ in the bearing plate 1^a is so located, and so proportioned, that the discharge of water through the passages and out through the tubes will be limited to the period when the tubes are passing thus through said hood 8. Thus all the rinsing is done under the hood, leaving the rest of the machine freely accessible for inserting and removing the bottles, and effecting economy in water and protecting the operator against the splashing of the rinsing operation. The adjustment of the bottles to the stems, so as to secure uniformity of distribution of the rinsing water inside the bottles, is effected by means of the vertically adjustable bottle supporting segments 14. Drainage openings 14′ are provided in the segments around and concentric with the stems 13. These segments 14 are supported on a ring 14^a, and this supporting ring 14^a has vertical legs 14^b rigidly secured to it, which extend down through holes in the binding ring; these legs have transverse holes $14^{b'}$ in them, and pins 14^c are passed through correspondingly different holes in the several legs, to rest on the binding ring 2^e, and thus afford vertical adjustments of the segments 14. Each stem 13 has a nozzle 13^a in its upper end, having a series of upwardly divergent holes $13^{a'}$, directing water in divergent streams throughout the inside of the bottle.

The general simplicity of the design is largely permitted by the arrangement allowed with the use of the novel connection between the head and the hub, and the durability of the machine in its most vital part is increased by the self-protective bearing thus provided between the two relatively movable parts.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a bottle-rinsing machine, connection elements one of which is rotatable with respect to the other, a shaft passing through the elements and having a bearing in one of them, said elements having registering orifices, and one of said elements having a relief opening to divert water, escaping from the registering orifices, away from the bearing of the shaft.

2. In a bottle-rinsing machine, connection elements one of which is rotatable with respect to the other, a shaft passing through the elements and having a bearing in one of them, said elements having a bearing between them, one of them having annular grooves in its bearing surface with relief openings leading therefrom, and the elements having orifices registering within a region between grooves, said relief openings leading from said annular grooves being adapted to divert water, escaping from the registering orifices, away from the bearing of the shaft.

3. In a bottle-rinsing machine, connection elements one of which is rotatable with respect to the other, a shaft passing through the elements, and having a bearing in one of them, said elements having a bearing between them and the bearing surface of one of the elements having a part composed of gasket material flanked radially by parts composed of more durable material, and the elements having orifices registering within the limits of the part composed of gasket material, and one of said elements having relief openings to divert water, escaping from the registering orifices past said gasket surface, away from the bearing of the shaft.

4. In a bottle-rinsing machine, connection elements one of which is rotatable with respect to the other, a shaft passing through the elements and having a bearing in one of them, said elements having a bearing between them, and one of said elements having

part of its bearing surface composed of material adapted to make water-retaining and lubricant-excluding contact with the bearing surface of the other element, and having another part of its surface adapted to make a bearing contact with the surface of said other element and to have said bearing contact lubricated, said elements having orifices registering within the limits of said water-retaining and lubricant-excluding part of the surface of said element, and one of said elements having relief openings, to divert water, escaping from the registering orifices, away from the bearing contact of the elements and from the bearing of the shaft.

5. In a bottle-rinsing machine, a connection head comprising a central vertical bearing hub, a horizontal drainage flange surrounding the bearing hub, radial undercut wings above the flange, and a bearing plate supported above and upon said hub and said wings, the head having a supply passage opening through said plate, and the plate having means for draining its upper surface to said flange between said wings.

6. In a bottle-rinsing machine, a connection head comprising a central vertical bearing hub, a horizontal drainage flange surrounding the bearing hub, with means for supporting the head in the machine, means for supporting a bearing plate above and upon said hub whereby the upper surface of said plate may be drained to said drainage flange, and an extension to said hub, below the drainage flange, to support a driving mechanism for said machine.

7. In a bottle-rinsing machine, in combination with a rotatable connection hub having a series of connection orifices and an annular gasket part within the limits of which the orifices are located, a connection head having a bearing for the hub and having a supply orifice registering intermittently with the orifices in the hub, the bearing having annular grooves embracing the gasket part of the hub radially, and having openings from the grooves to drain them.

8. In a bottle-rinsing machine, connection elements, one of which is movable with respect to the other, with a bearing between them composed of a part having a water-retaining and lubricant-excluding surface rigidly joined to a part having a surface adapted to make bearing contact and to be lubricated, and said surfaces of said rigidly joined parts being opposed by a surface adapted to co-act with them with a minimum, respectively, of corrosion and of friction, said opposing surface being discontinuous from its contact with one of said rigidly joined parts to its contact with the other of said parts, and said elements having orifices registering within the limits of said part having said water-retaining and lubricant excluding surface.

9. In a bottle-rinsing machine, vertically disposed connection elements, one of which is rotatable with respect to the other, having a horizontal bearing between them, and having orifices registering within the limits of their horizontal bearing, a shaft extending vertically through the elements, one of the elements having an annular opening around the shaft, and an extension on the other element, around the shaft, extending into the annular opening, whereby leakage from the registering orifices to the shaft is gravitationally counteracted.

10. In a bottle-rinsing machine, connection elements one of which is rotatable with respect to the other having a bearing between them and having orifices registering within the limits of their bearing, a shaft extending centrally through the elements, one of the elements having an annular opening around the shaft, and an extension on the other element, around the shaft, extending into the annular opening in the other element, and one of the elements having relief spaces diverting water, escaping from the registering orifices, away from the shaft, said extension counteracting leakage of water from said relief spaces to said shaft.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

KARL KIEFER.

Witnesses:

CLARENCE PEIDEW,

OTTO WINKELMANN.