

995,806.

3 SHEETS—SHEET 1.

Fig. 2.

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BOTTLE CLEANING MACHINE.  
APPLICATION FILED OCT. 11, 1910.

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Patented June 20, 1911.  
3 SHEETS—SHEET 2.

Fig. 6. (V--V)

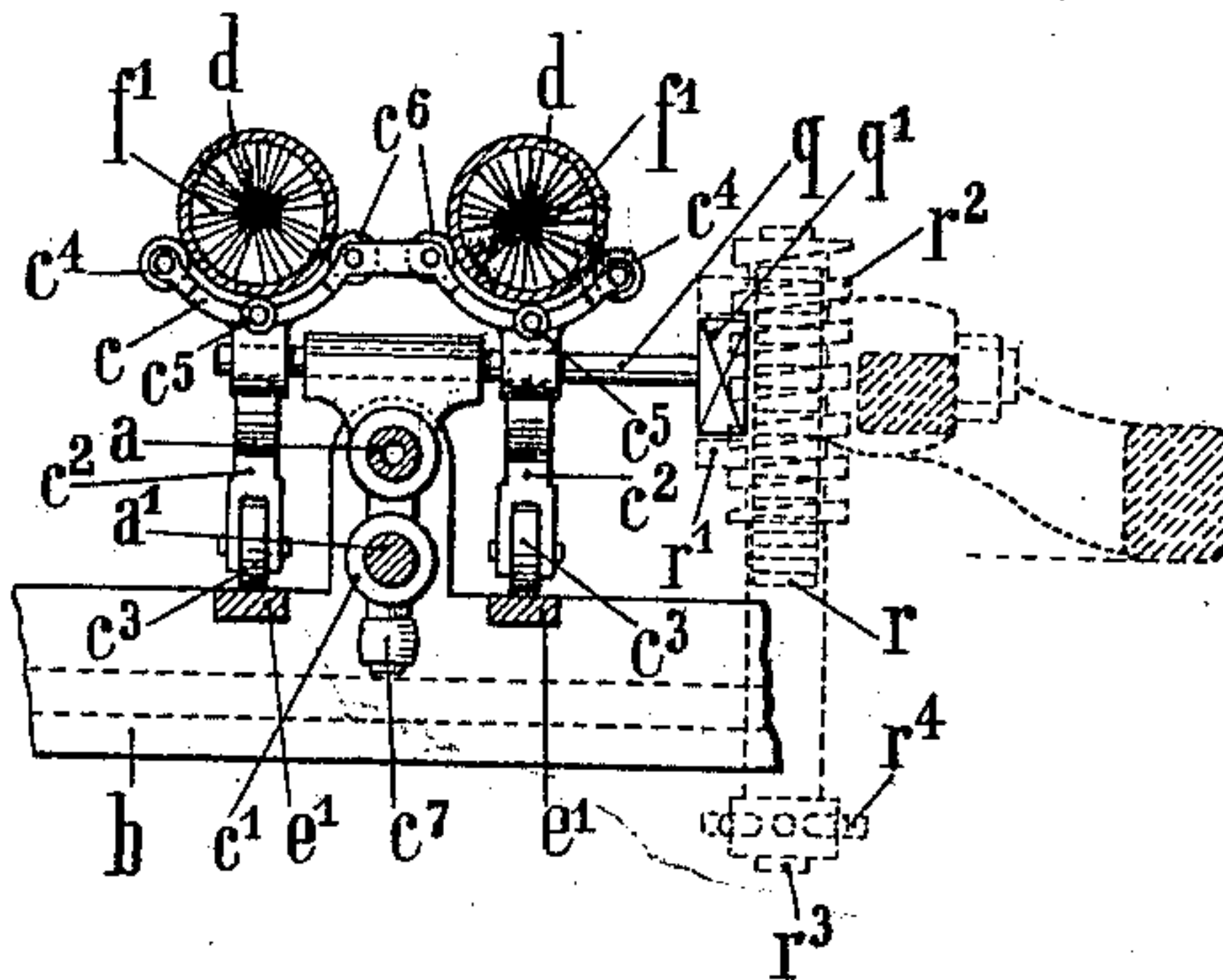
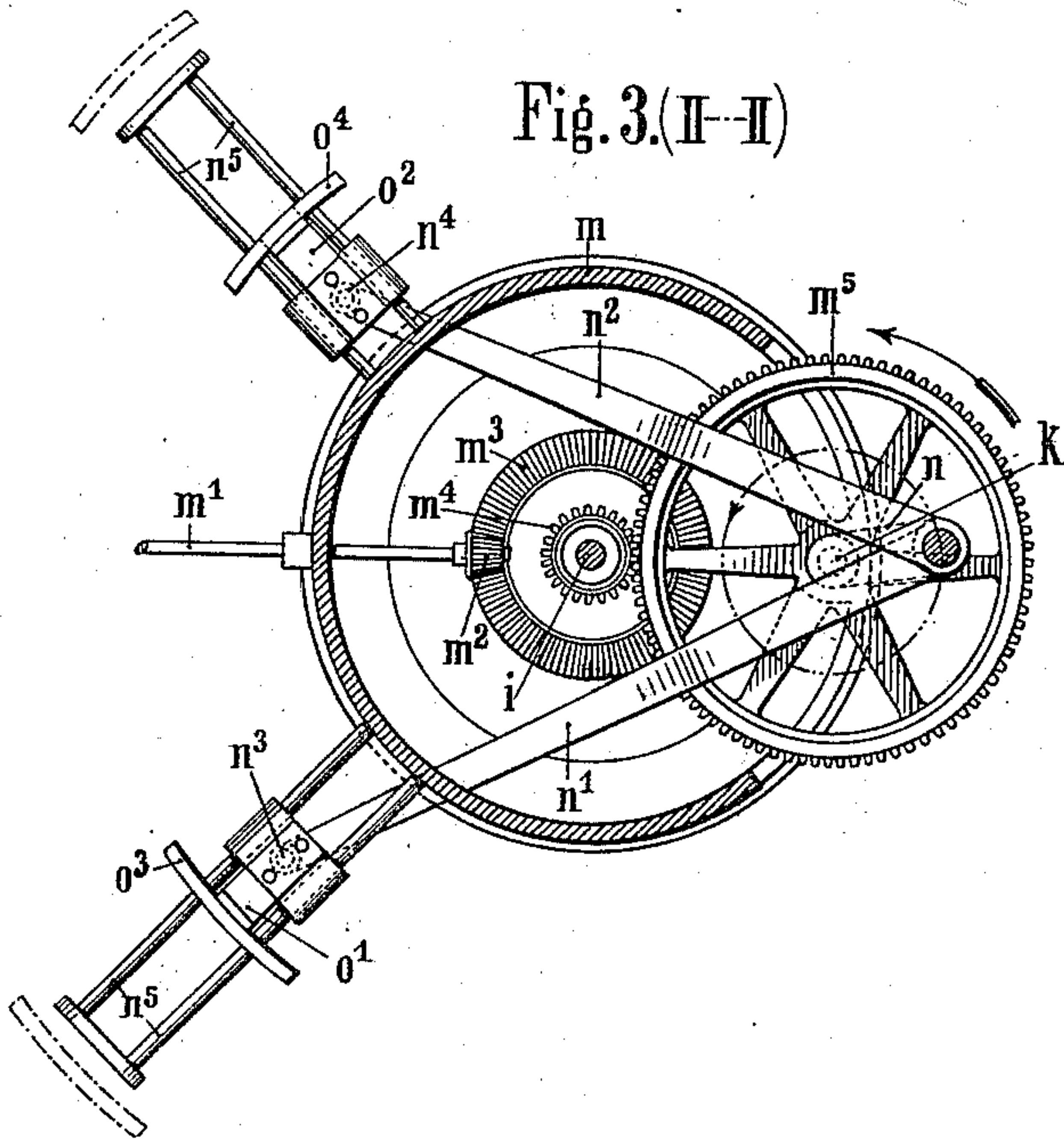


Fig. 3. (II--II)



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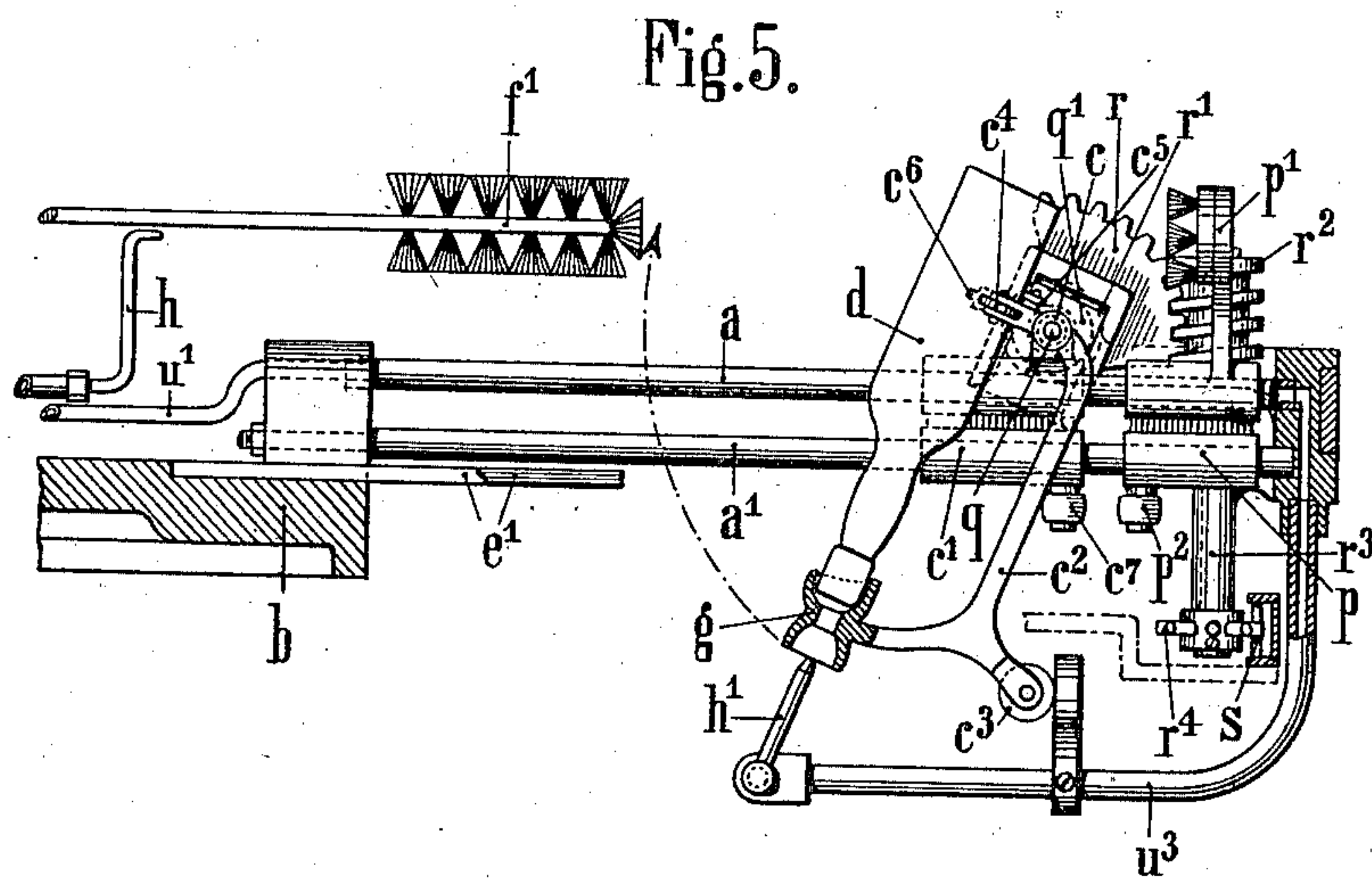
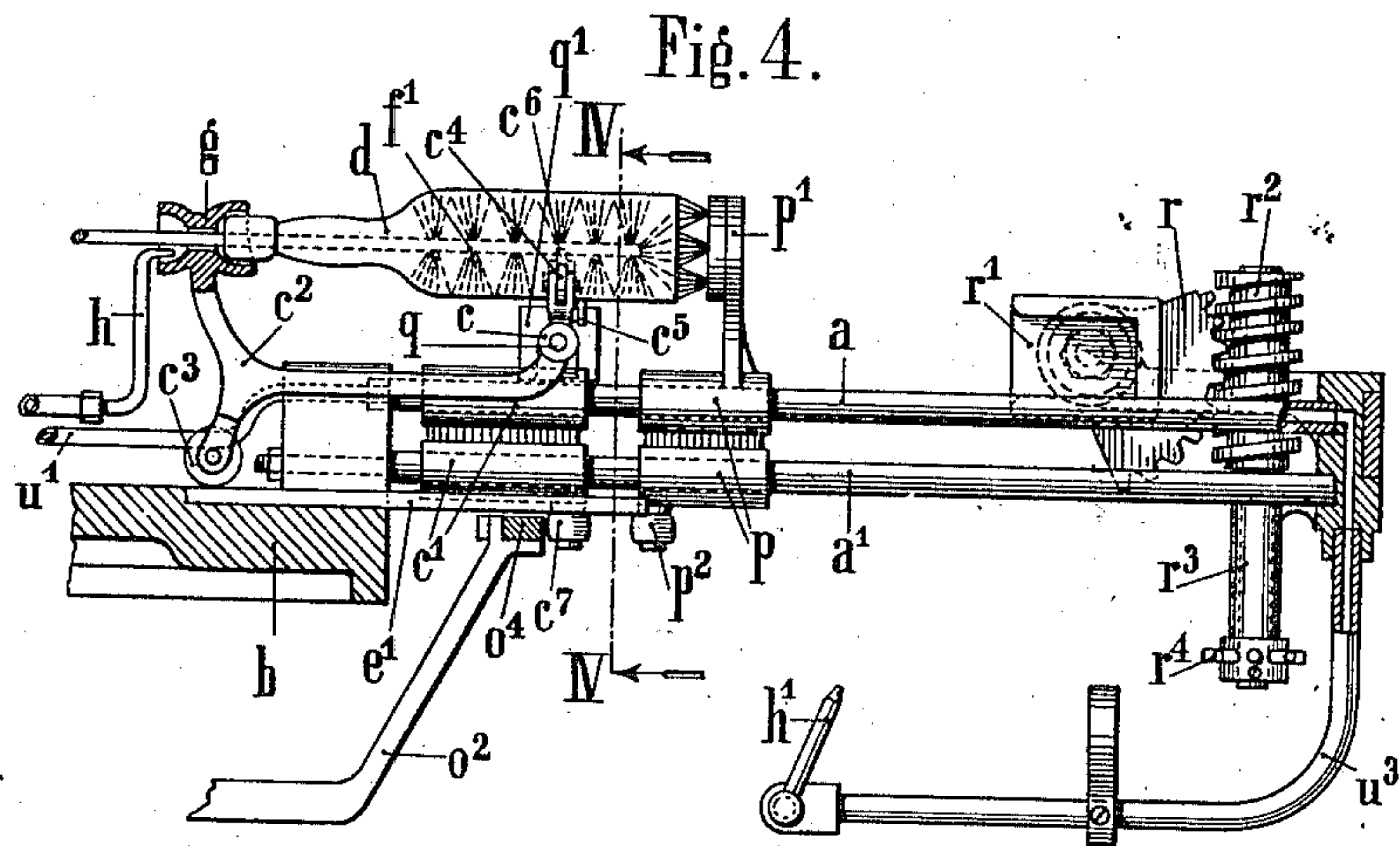
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3 SHEETS—SHEET 3.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## BOTTLE-CLEANING MACHINE.

995,806.

Specification of Letters Patent. Patented June 20, 1911.

Application filed October 11, 1910. Serial No. 586,431.

To all whom it may concern:

Be it known that I, ADOLF JOHANNES PETERSEN, a subject of the German Emperor, and resident of Berlin, in the Kingdom of Prussia, German Empire, have invented new and useful Improvements in Bottle-Cleaning Machines, of which the following is a full, clear, and exact specification.

My invention relates to bottle cleaning machines and its object is to provide an improved construction of machines of this class wherein the bottles are automatically brushed internally and externally and rinsed by means of jets of water while being carried around in front of the operator who simply places the bottles to be cleaned on the machine and takes them off again when cleaned.

To this end my invention consists in the improved construction and combination of parts hereinafter to be more fully described and shown in the accompanying drawings.

In the drawings Figure 1 is a vertical section, on the line I—I in Fig. 2, of one form of the improved machine, with parts omitted, others shown broken away and still others shown in elevation. Fig. 2 is a plan with parts omitted and others shown broken away such as the upper or outside brushes and their spindles, which brushes and their spindles are positioned above the inside brushes and in the same vertical plane as the radial arms or spokes of the rotary frame. Fig. 3 is sectional plan on the line II—II in Fig. 1, with parts omitted. Figs. 4 and 5 are side views, drawn to a larger scale, of part of the machine, showing the bottle carriers and parts coöperating therewith in different operative positions. Fig. 6 is a sectional view on the line VI—VI in Fig. 4 as seen from the right in that figure.

In the preferred construction illustrated the radial arms or spokes *a* of a rotary frame or spider *b*, adapted to be rotated in a horizontal plane, support carriers *c* for the bottles *d* to be cleaned and rinsed, said

carriers being mounted to slide on the said arms *a*. The center portion of the frame or spider *b* is in the form of closed casing *e*, and two series of brush spindles, *f*, *f'* extend substantially radially outward from said casing. Each brush spindle is, for a part of its length, provided with a brush. The brushes of the upper spindles *f* constitute the outside brushes, and the brushes of the lower spindles *f'*, the inside brushes. The upper brush spindles *f* all extend in a radial direction, while a pair of lower brush spindles *f'* extends below each of the upper brush spindles, parallel thereto. These brushes and their spindles are continuously rotated during the operation of the machine. By a sliding movement of the carriers *c* toward the center of the frame or spider *b* the bottles *d* resting on the said carriers are moved into operative engagement with the inside and outside brushes, so that the inside brushes of spindles *f'* will enter the bottles through guide rings *g*, while each of the outside brushes will rotate in contact with the bottles from without. The operator places the bottles on the carriers between the points 1 and 2 (Fig. 2) as the frame or spider rotates, the carriers when passing between these points resting near the periphery of the frame or spider *b*. As the latter rotates farther in the direction of the arrow the carriers with the bottles thereon will, in passing the point 2, be gradually moved toward the center of the frame or spider into engagement with the brushes, to be acted upon by the latter, and as the bottle travels between the points 2 and 3, a jet of water will be injected into said bottle from one of the nozzles *h*. As the carriers *c*, with the bottles resting thereon, pass the point 3 they will be moved away from the brushes in the direction toward the periphery of the frame or spider and will then, on arriving at the point 4, be tilted with their mouth downward into an approximately vertical position, as shown on the right hand side in Fig. 1 and in Fig. 5. While resting in this posi-



tion jets of water issuing from nozzles  $h^1$  will enter the bottles on their way between points 4 and 5, thereby causing the bottles to be rinsed so that any bristles and other particles may be removed therefrom. After the carriers and their bottles have passed the point 5 they will resume their horizontal position, so that the bottles may then be taken off their carriers between the points 5 and 1 in a completely clean condition.

The tilting of the carriers and bottles into the approximately vertical position may be effected either through the action of the gravity of the carrier and bottles or, preferably as shown in the drawings, by special means provided for the purpose.

The frame or spider  $b$  with its casing  $e$  and the parts provided thereon loosely surround the upright shaft  $i$  and are rotated from a crank shaft  $k$  by the intermediation of a gear  $k^1$  mounted at the upper end of the said crank shaft and meshing with the toothed rim  $k^2$  provided on the bottom portion of the casing  $e$ . To this end the said casing is mounted to freely rotate on the standard  $m$ . Any suitable means may be provided for transmitting rotary movement to the crank shaft  $k$ . In the construction shown these means consist in a main or driving shaft  $m^1$  and a conical gear  $m^2$  thereon which meshes with another conical gear  $m^3$  loosely surrounding the shaft  $i$  and carrying on its hub portion a gear  $m^4$  which meshes with a larger gear  $m^5$  keyed to the crank shaft  $k$ .

The means for rotating the brush spindles  $f$  and  $f^1$  are as follows: To the upper end of the vertical shaft  $i$ , which extends into the casing  $e$ , is keyed a conical gear  $i^1$  which meshes with smaller conical gears  $i^2$  provided on the upper brush spindles  $f$ . Each of the said upper brush spindles rotated thereby imparts rotary movement to two lower brush spindles  $f^1$  through a gear  $i^3$  on  $f$  engaging with the gears  $i^4$  of two lower brush spindles.

The arrangement for imparting radial sliding movement to the bottle carriers on the frame or spider is best shown in Figs. 1 and 3. To the crank  $n$  of the crank shaft  $k$  are linked with their ends two connecting rods  $n^1$  and  $n^2$ , having their other ends connected with cross heads  $n^3$  and  $n^4$  which slide on guide rods  $n^5$ . Upper extensions  $o^1$  and  $o^2$  of the said cross heads are provided with arms  $o^3$  and  $o^4$ , respectively, which are curved so as to extend parallel with the periphery of the frame or spider  $b$ , the said arms serving to act on the bottle carriers and other cooperating parts in a manner to be hereinafter described.

The construction and arrangement of the bottle carriers and cooperating parts are best to be seen in Figs. 4, 5 and 6. In these

figures, the same as in Fig. 2, the upper or outside brushes  $f$  are omitted, as their arrangement is fully clear from Fig. 1. In the construction shown the bottle carriers  $c$  are arranged to carry two bottles each. Each carrier consists of a slide  $c^1$  movably mounted on two superimposed radial arms  $a$  and  $a^1$  of the frame or spider  $b$  and of two interconnected supporting arms  $c^2$  linked to the slide  $c^1$ . In the horizontal position of the carrier and bottles resting thereon the arms  $c^2$  are supported by rollers  $c^3$  thereon resting on corresponding guide rods  $e^1$  connected to the casing  $e$ . Upon the carrier having been moved sufficiently far outward, the rollers  $c^3$  will leave the said guide rods  $e^1$ , so that the carrier arms  $c^2$  with the bottles resting thereon will be free to tilt downward into the position shown in Fig. 5 and on the right hand side of Fig. 1. An upper extension of each carrier arm  $c^2$  is provided with a guide ring  $g$  to receive the head of the bottle and to guide the corresponding inside brush  $f^1$  into the bottle. The body portions of the bottles rest on rubber rollers  $c^4$ ,  $c^5$  and  $c^6$  provided on arched tail portions which connect the carrier arms  $c^2$  of each pair near their fulcrumed ends as shown in Fig. 6, so that the bottles may be free to rotate under the frictional engagement of the brushes in contact therewith. Near the bottom ends of each pair of bottles resting on the carriers, and slidably mounted on the radial arms  $a$  and  $a^1$  of the frame or spider  $b$ , is mounted a slide  $p$ , each having an upper extension carrying two bottom brushes  $p^1$  for the two bottles in each carrier. The operator having placed two bottles on the carrier moves the slide  $p$  forward, until the two bottom brushes thereon are in contact with the bottoms of the bottles as shown in Fig. 4. It will thus be seen that bottles of any length desired may be placed on the carriers and the bottom brushes be brought in engagement therewith. The carrier slide  $c^1$  is provided with a roller  $c^7$  below. A similar roller  $p^2$  is provided on each slide  $p$  of the bottom brushes. The said rollers are acted upon by the arms  $o^4$  and  $o^3$  of the cross heads  $n^4$  and  $n^3$ , respectively, to thereby slide the bottle carriers into and out of engagement with the inside and outside brushes. When a carrier, after having had two bottles placed thereon between the points 1 and 2 in Fig. 2, is carried around in the rotary movement of the frame or spider in the direction of the arrow shown in Fig. 2, the cross head arm  $o^3$  will act on the roller  $p^2$  of the bottom brush slide  $p$  to draw the same toward the center of the frame or spider  $b$ . This will, by reason of the bottom brushes  $p^1$  pressing on the bottles  $d$ , cause the latter and its carrier  $c$  to be moved forward as well, so that two of the inside



brushes  $f^1$  will enter the respective two bottles by way of the corresponding guide rings  $g$ . In the continued rotary movement of the frame or spider the cross head arm  $o^4$  will then, on its part, act on the roller  $c^7$  of the bottle carrier, thereby returning the latter as well as the slide  $p$  of the bottom brushes to the peripheral position on the frame or spider.

10 In the construction shown the arrangement for positively tilting the bottle carriers and bottles into the position shown in Fig. 5 and on the right hand side of Fig. 1 from the position shown in Fig. 4 is as follows: The joint pin  $q$  common to each pair of arms  $c^2$  of the bottle carriers  $c$  is provided at one end with a block or square  $q^1$  adapted to be brought into engagement with a groove  $r^1$  in a segment  $r$  which is fulcrumed to a suitable portion of the frame or spider  $b$  in such position that, upon the bottle carrier being moved away from the brushes, the said groove of the segment will be presented for engagement with the block or square  $q^1$ . The said segment is formed with suitable teeth for engagement with a worm  $r^2$  provided at or near the upper end of the shaft  $r^3$ , which is suitably journaled in the frame or spider  $b$ , and near the other end of the shaft  $r^3$  is provided a star wheel  $r^4$ . In the rotary movement of the frame or spider the said star wheel will, in the first place, engage with a rack  $s$  mounted on a stationary part of the machine and will thereby be rotated. The rotation thereby imparted to the shaft  $r^3$  and its worm  $r^2$  will turn the segment  $r$  as well as the block or square  $q^1$  engaged in the groove  $r^1$  of the segment, thereby turning the joint pin  $q$  and its movable carrier arm  $c^2$ , as well as the bottles resting thereon, into such a position that the said carrier arm and its bottles will be tilted into the position shown in Fig. 5. In the continued rotation of the frame or spider  $b$  the star wheel  $r^4$  will then engage with another rack  $s^1$ , but on the other side thereof, thereby causing the worm  $r^2$  to be rotated in the opposite direction, so that the bottle carrier and the bottles thereon will be returned to the horizontal position and remain in this position, so that the bottles, on arriving between the points 5 and 1 in Fig. 2, may be removed by the operator.

55 The water for rinsing may be supplied from any suitable source by way of the pipes  $t$  and  $t^1$  which are connected to corresponding passages provided in a conical part  $t^3$  of the machine. A spring  $t^4$  acts to hold this conical part continually pressed into engagement with the bottom surface of the center portion  $u$  of the casing  $e$ , from which surface passages  $u^1$  and  $u^2$  extend to the nozzles  $h^1$  and  $h$ , respectively. The passage  $u^1$

communicates with the hollow upper guide rod  $a$ , which thus forms part of the water conduit and is connected at its other end to a pipe  $u^3$  to the outer end of which is attached the nozzle  $h^1$ .

What I claim is:—

1. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of positively rotated brushes extending substantially radially outward on said frame, bottle carriers mounted to slide radially on said frame into and out of operative engagement with said brushes, means for supporting said bottle carriers in a substantially horizontal position in part of their sliding movement and permitting them to be temporarily tilted into a substantially vertical discharge position in another part of their sliding movement during each rotation of the frame, supply conduits for admitting water to the bottles and brushes, means for positively rotating the brushes, and means for imparting reciprocating sliding movement to the bottle carriers, substantially as described.

2. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of rotary brushes extending substantially radially outward on said frame, bottle carriers mounted to slide radially on said frame into and out of operative engagement with said brushes, means for supporting said bottle carriers in a substantially horizontal position in part of their sliding movement and allowing them to be temporarily tilted into a substantially vertical position in another part of their sliding movement during each rotation of the frame, water jets for injecting water into the bottles on their carriers in the horizontal and tilted positions of the carriers, means for rotating the brushes, means for imparting reciprocating sliding movement to the bottle carriers, and water supply conduits for feeding the jets, substantially as described.

3. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of rotary brushes extending substantially radially outward on said frame, bottle carriers mounted to slide radially on said frame into and out of operative engagement with said brushes, means for supporting said bottle carriers in a substantially horizontal position in part of their sliding movement, means for positively tilting the carriers into a substantially vertical position in part of the rotary movement of the frame and for positively returning them to a substantially horizontal position in another part of the rotary movement of the frame, water jets for supplying water to the bottles on their carriers in the hori-



zontal and tilted positions of the carriers, means for rotating the brushes, means for imparting reciprocating sliding movement to the bottle carriers, and water supply conduits for feeding the jets, substantially as described.

4. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of rotary outside brushes extending radially outward on said frame, rotary inside brushes extending in pairs below each of the outside brushes and parallel thereto, bottle carriers mounted to slide radially on said frame into and out of operative engagement with said brushes and each having a pair of movable arms for supporting a pair of bottles in alinement with the corresponding pairs of inside brushes, means for supporting said carrier arms in a substantially horizontal position in part of the sliding movement, means for positively tilting the carriers into a substantially vertical position in part of the rotary movement of the frame and for positively returning them into a substantially horizontal position in another part of the rotary movement of the frame, water jets for injecting water into the bottles in their horizontal and tilted positions, means for rotating the brushes, means for imparting reciprocating sliding movement to the bottle carriers, and water supply conduits for feeding the jets, substantially as described.

5. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of rotary outside brushes extending radially outward on said frame, rotary inside brushes extending in pairs below each of the outside brushes and parallel thereto, bottle carriers each mounted to slide on two parallel radial arms on said frame into and out of operative engagement with said brushes, each carrier consisting of a slide embracing the said two radial arms and of a pair of movable arms fulcrumed thereto for supporting a pair of bottles in alinement with the corresponding pairs of inside brushes, means for supporting said carrier arms in a substantially horizontal position in part of the sliding movement, other slides movable on the same pairs of radial arms and carrying pairs of bottom brushes in alinement with the bottles on said carrier arms, means acting on the said bottom brush slides for moving them while in engagement with the bottles toward the center of the said frame during part of the rotary movement thereof, means acting on the bottle carrier slides for moving them together with the other slides toward the circumference of the frame during another part of its rotary movement, means for positively tilting the carrier arms

in part of the rotary movement of the frame and for positively returning them into a substantially horizontal position in another part of the rotary movement of the frame, water jets for injecting water into the bottles on their carrier arms in their horizontal and tilted positions, means for rotating the brushes, means for imparting reciprocating sliding movement to the bottle carriers, and water supply conduits for feeding the jets, substantially as described.

6. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of rotary outside brushes extending radially outward on said frame, rotary inside brushes extending in pairs below each of the outside brushes and parallel thereto, bottle carriers each mounted to slide on two parallel radial arms on said frame into and out of operative engagement with said brushes, each carrier consisting of a slide guided on said two radial arms and of a pair of movable arms fulcrumed thereto for supporting a pair of bottles in alinement with the corresponding pairs of inside brushes, means for supporting said carrier arms in a substantially horizontal position in part of the sliding movement, other slides movable on the same pairs of radial arms and carrying pairs of bottom brushes in alinement with the bottles on said carrier arms, two curved members extending parallel with the line of circular travel of the bottle-carrier slides and lower brush slides, respectively, for engagement therewith at opposite ends, driving mechanism for reciprocating said curved members in a substantially radial direction, means for positively tilting the carrier arms into a substantially vertical position in part of the rotary movement of the frame and for positively returning them into a substantially horizontal position in another part of the rotary movement of the frame, water jets for injecting water into the bottles on their carrier arms in their horizontal and tilted positions, means for rotating the brushes, means for imparting reciprocating sliding movement to the bottle carriers, and water supply conduits for feeding the jets, substantially as described.

7. In a bottle cleaning machine the combination, with a frame and means for rotating the same in a horizontal plane, of rotary brushes extending substantially radially outward on said frame, bottle carriers mounted to slide radially on said frame into and out of operative engagement with said brushes and embodying pivoted supporting arms for the bottles, engagement members projecting from the pivots of said supporting arms, other engagement members fulcrumed on a stationary part in the line of radial outward sliding movement of the

first-named engagement members, shafts and gear mechanism for imparting turning movement to the fulcrumed members by rotation of said shafts, star wheels on said  
5 shafts, stationary racks mounted in the line of movement of said star wheels for engagement therewith on alternating sides thereof in the rotary movement of the frame, water jets for injecting water into the bottles in  
10 their different positions, means for rotating

the brushes, and water supply conduits for feeding the jets, substantially as described.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

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Witnesses:

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