

No. 860,353.

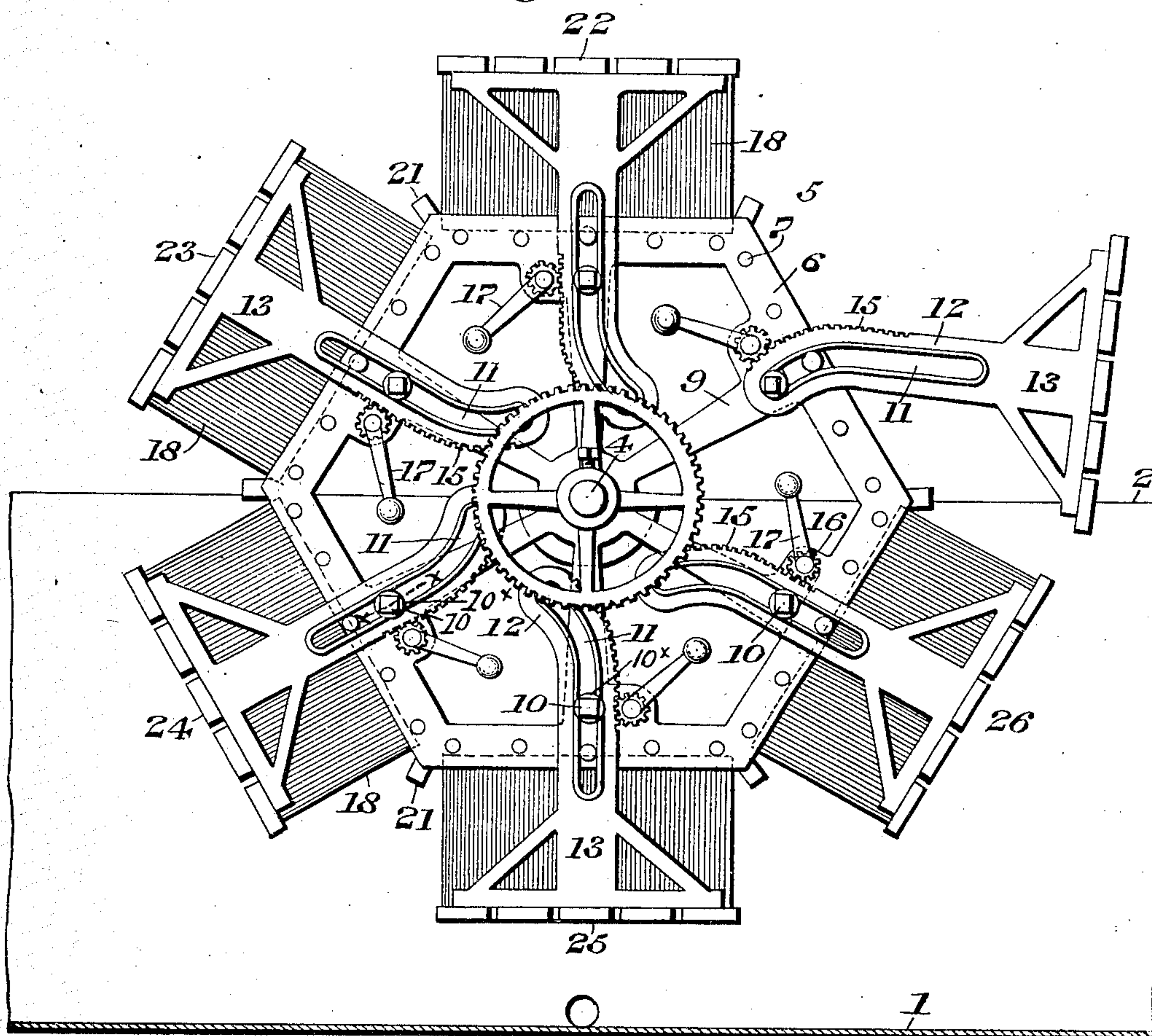
PATENTED JULY 16, 1907.

W. J. CUNNINGHAM.  
BOTTLE WASHING MACHINE.

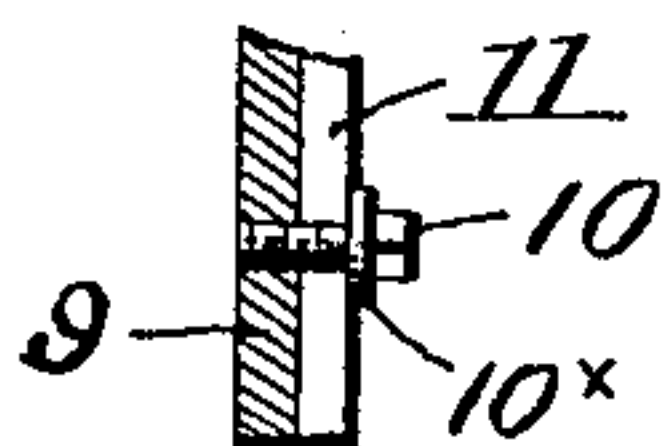
APPLICATION FILED FEB. 23, 1905.

6 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 1 1/2*



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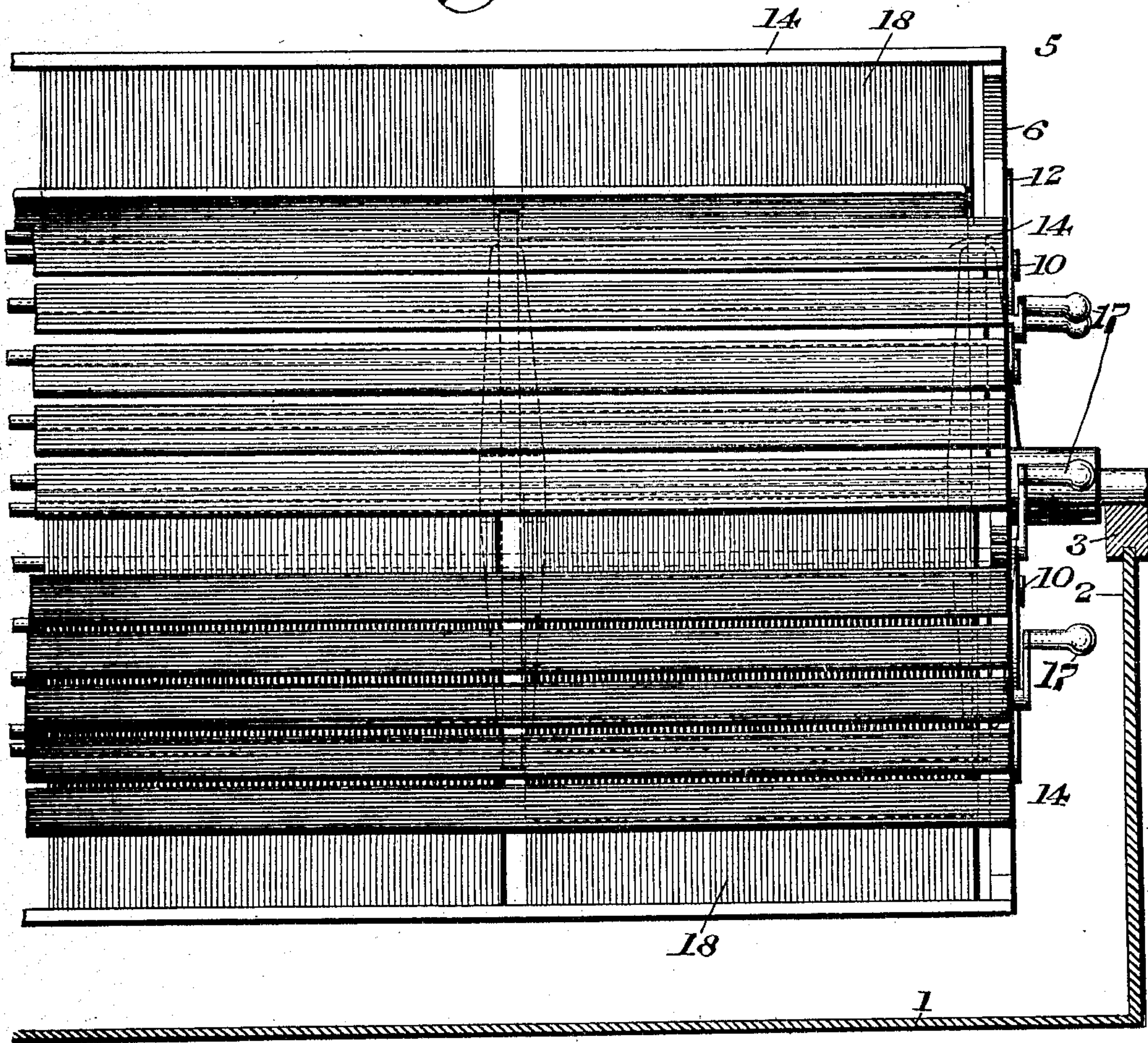
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6 SHEETS—SHEET 2.

*Fig. 2.*



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6 SHEETS—SHEET 3.

Fig. 3.

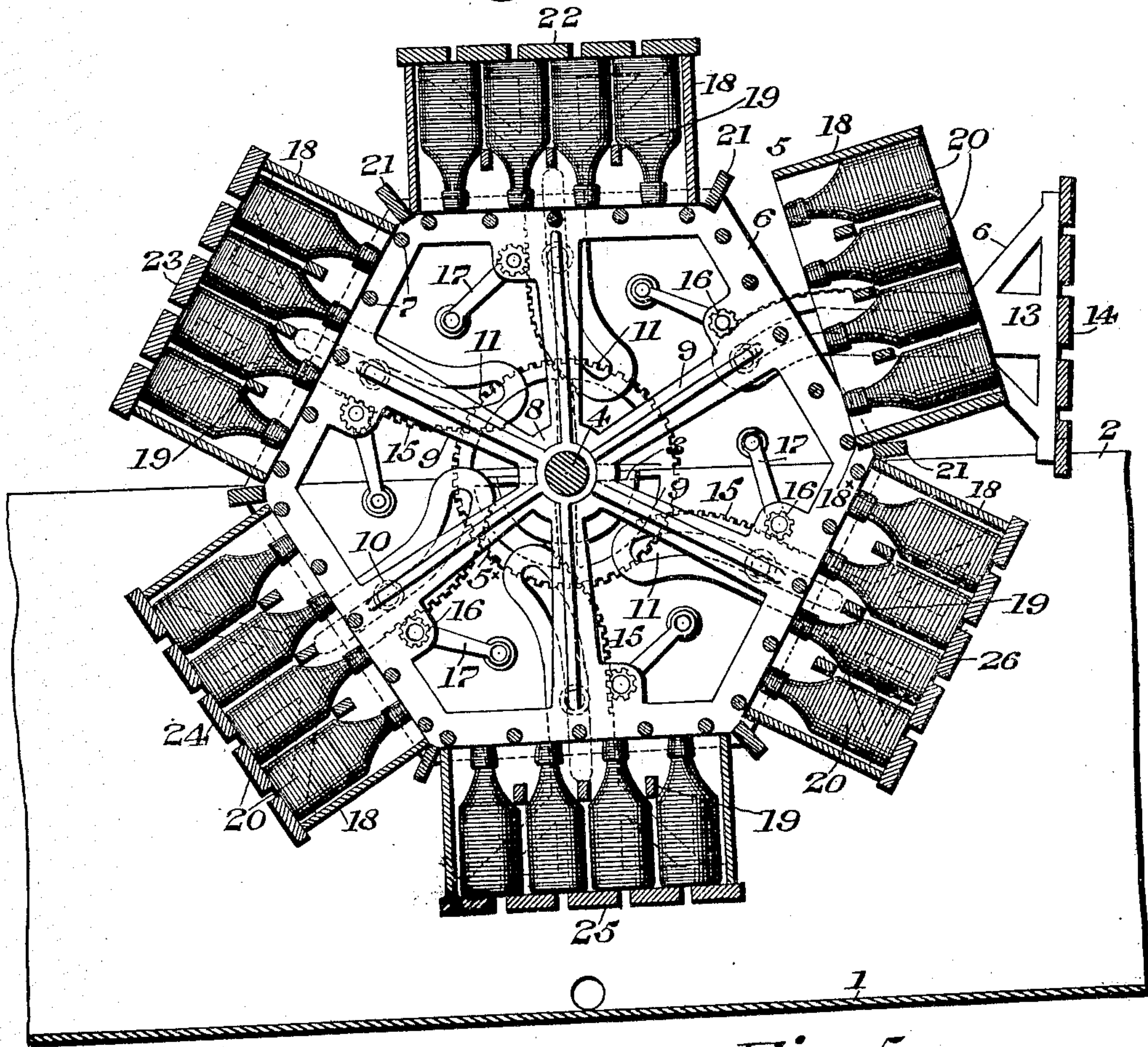
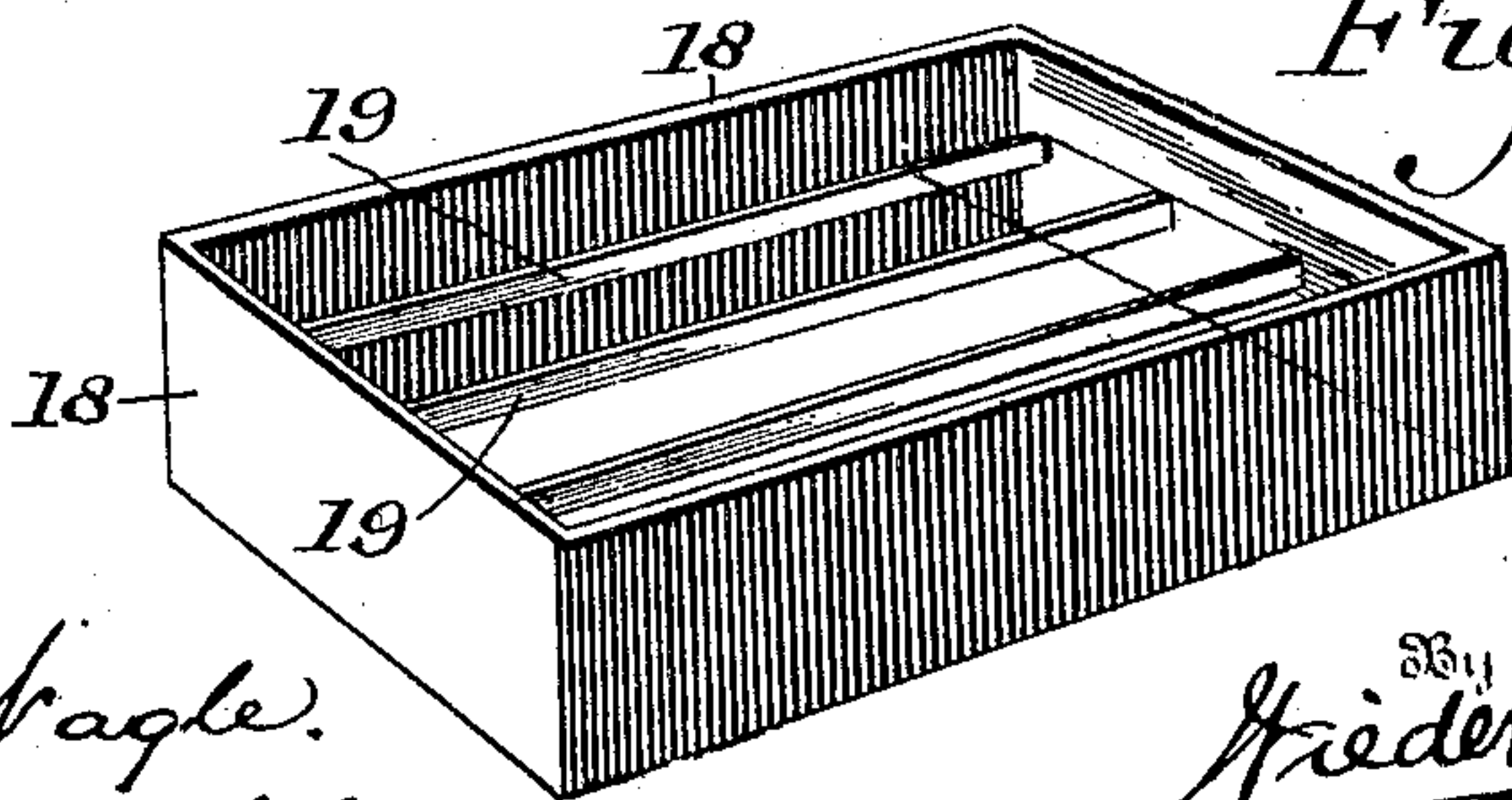


Fig. 5.



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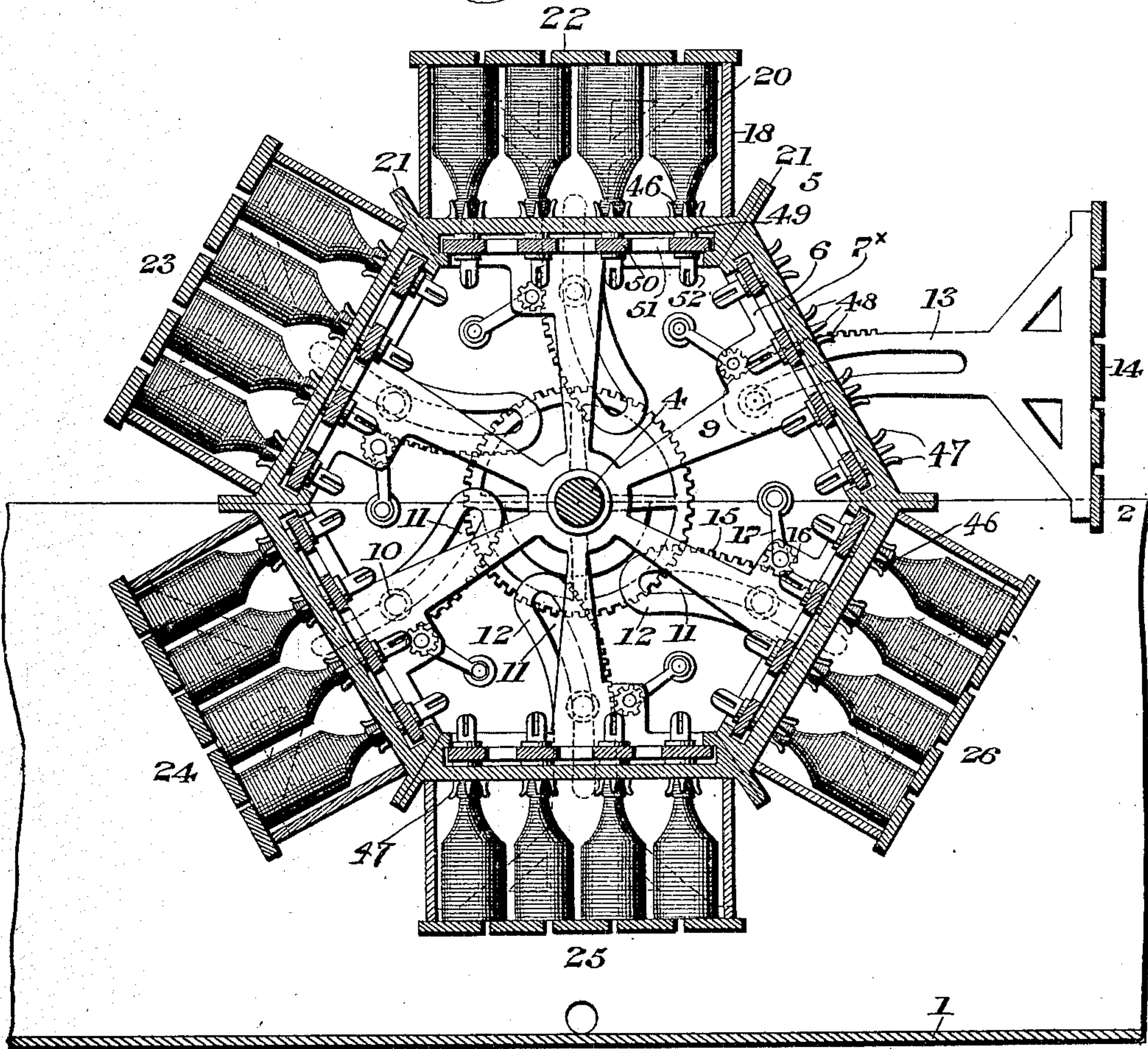
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6 SHEETS—SHEET 4.

*Fig. 4.*



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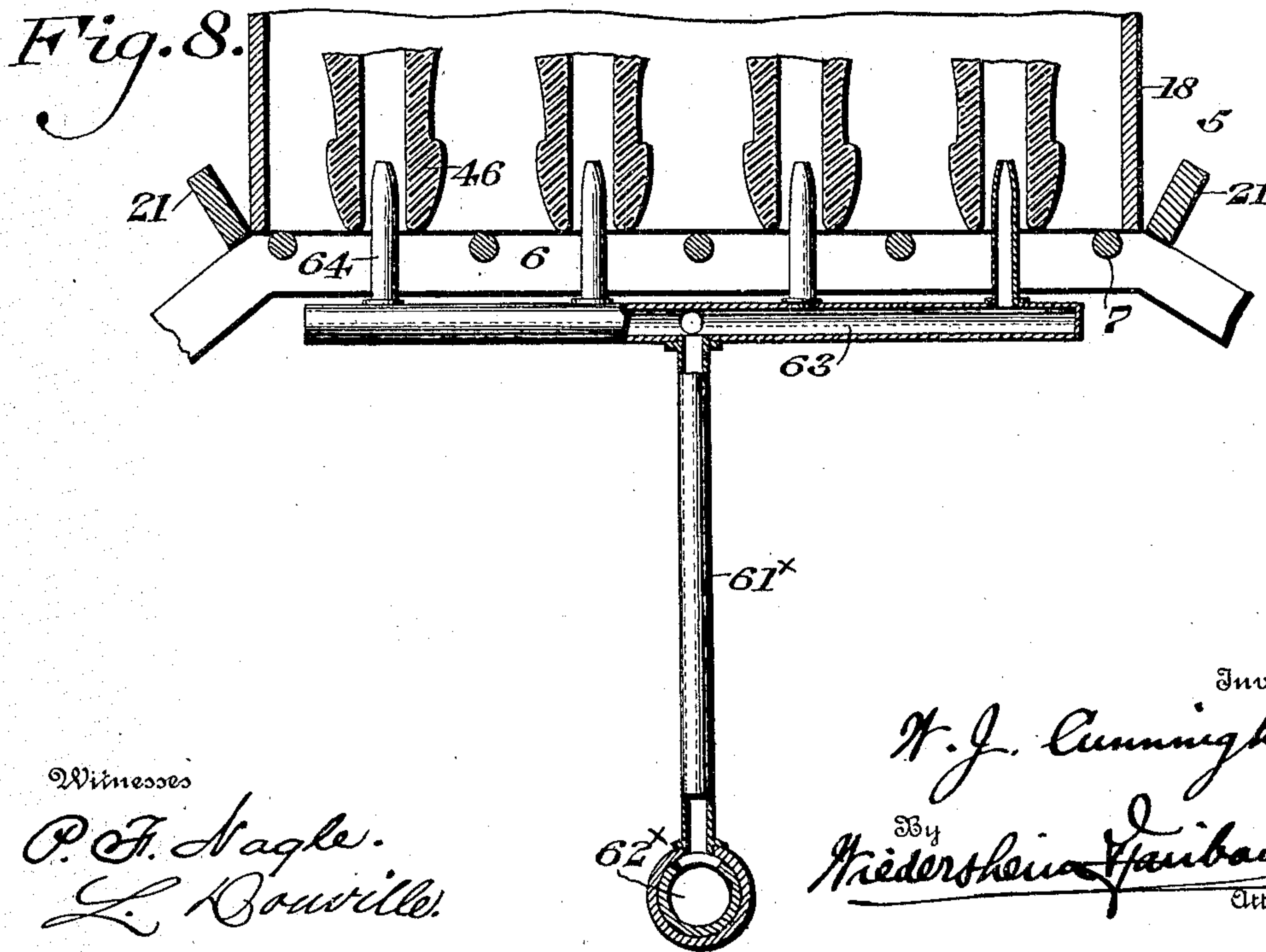
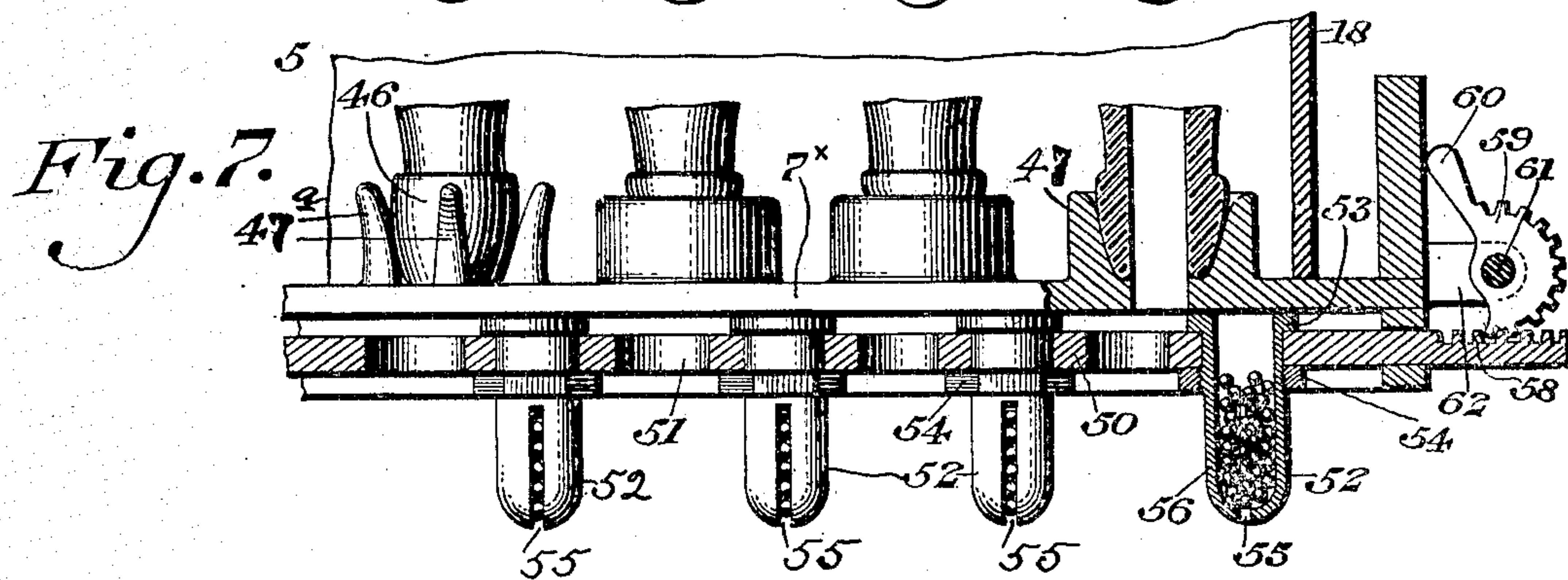
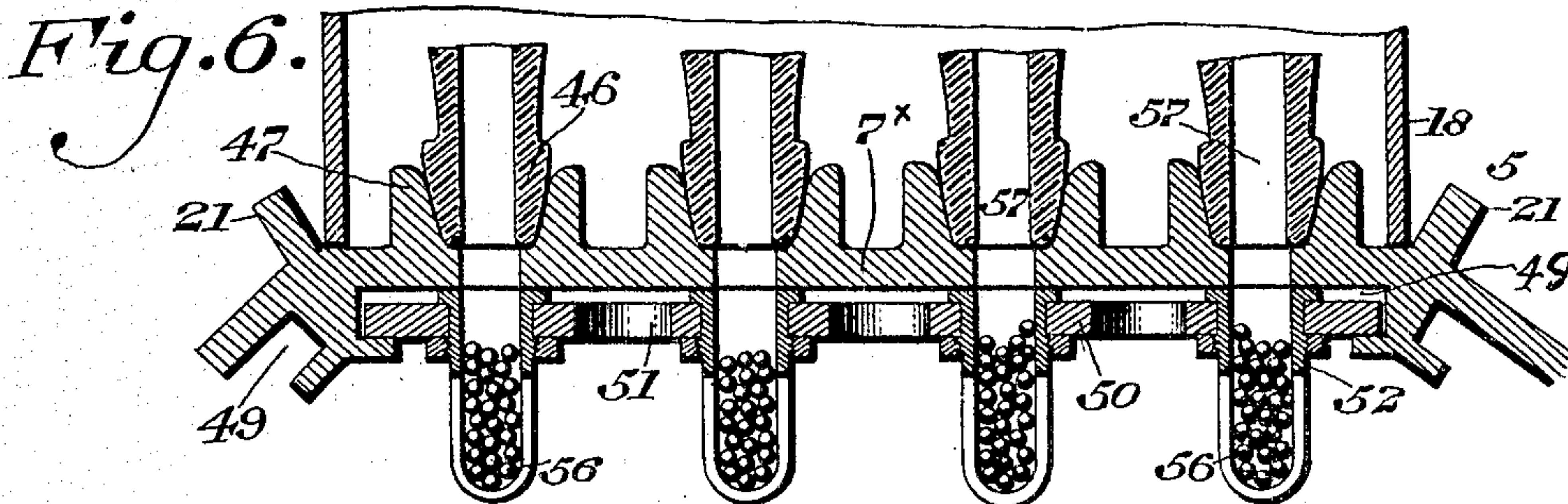
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6 SHEETS—SHEET 5.



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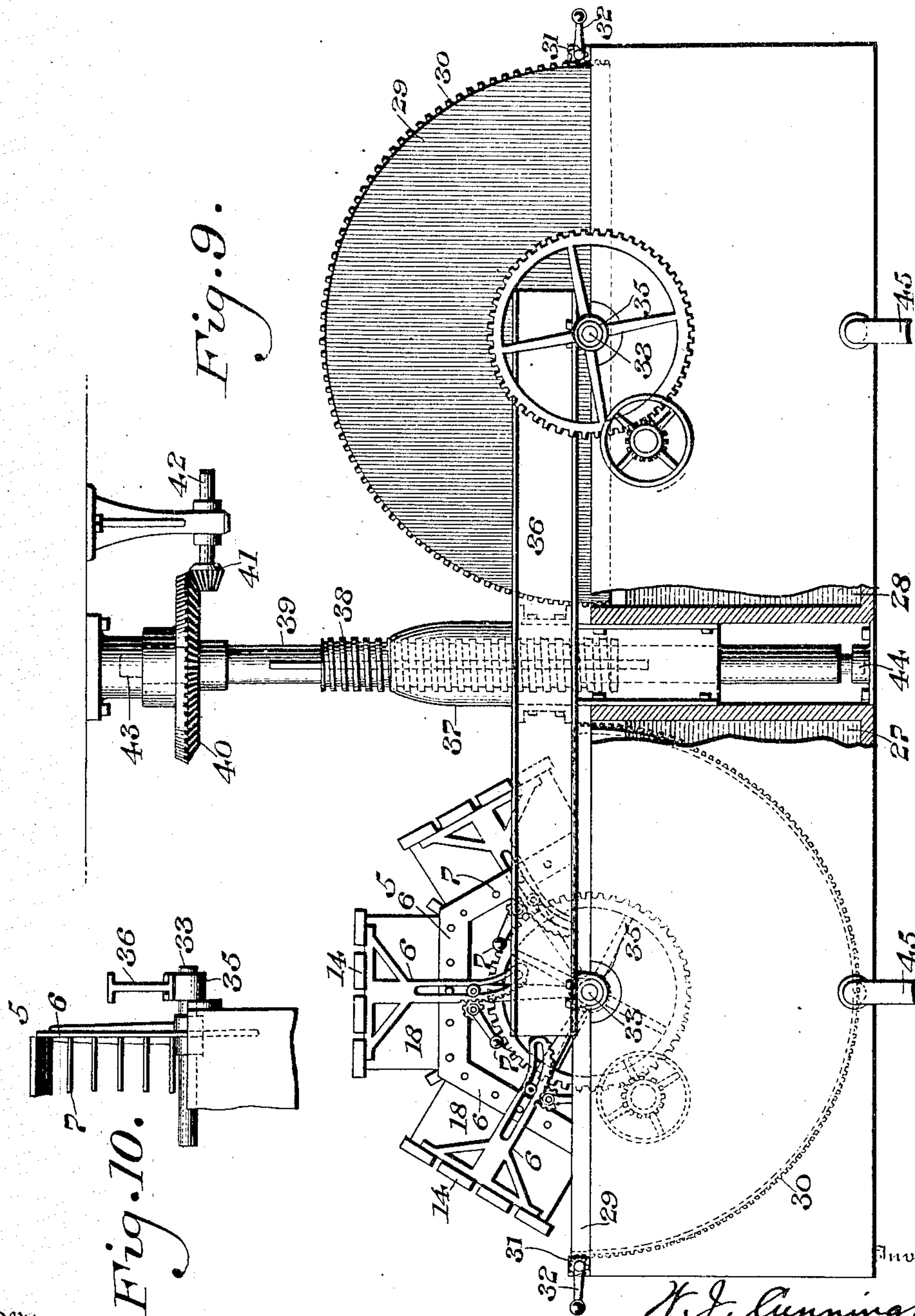
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6 SHEETS—SHEET 6.





# UNITED STATES PATENT OFFICE.

WILLIAM J. CUNNINGHAM, OF PHILADELPHIA, PENNSYLVANIA.

## BOTTLE-WASHING MACHINE.

No. 860,353.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed February 23, 1905. Serial No. 246,845.

*To all whom it may concern:*

Be it known that I, WILLIAM J. CUNNINGHAM, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Bottle-Washing Machine, of which the following is a specification.

My invention consists of a novel construction of a bottle washing machine, which is adapted to thoroughly cleanse and rinse interiorly and exteriorly any shape of bottle, and which comprises a novel construction of appliances for introducing shot or finely comminuted material to the inside of the bottle.

It also consists of novel means for securing the bottle in position during the cleansing and rinsing operations.

It also consists of a novel construction of an apparatus, comprising a plurality of tanks having a raising and a lowering device arranged between said tanks, whereby a washing and rinsing apparatus may be simultaneously operated, the bottles after being initially cleaned being elevated, turned and then lowered into a rinsing tank.

It also consists in novel means for rendering the interior cleaning devices temporarily inoperative if desired.

It further consists of other novel features all as will be hereinafter fully set forth.

Figure 1 represents an end elevation of a portion of a bottle washing machine embodying my invention. Fig. 1½ represents a section on line  $x-x$ , Fig. 1. Fig. 2 represents a front elevation of Fig. 1. Fig. 3 represents a vertical sectional view of Fig. 2. Fig. 4 represents a sectional view of a slightly modified form similar to Fig. 3 but showing the internal washing device in position. Fig. 5 represents a perspective view of the box or cage for retaining the bottles in position during the washing operation, said box being shown in detached position. Fig. 6 represents a sectional view showing, on an enlarged scale, the portion of the apparatus provided with shot or its equivalent, for effecting the cleaning of the interior of the bottles. Fig. 7 represents a side elevation of Fig. 6, showing certain of the parts in elevation and also the slide operating mechanism. Fig. 8 represents a sectional view, partly in elevation, showing another embodiment of the principle of my invention, wherein I may employ streams or jets of water to effect the cleaning and rinsing of the interior of the bottles. Fig. 9 represents a side elevation of another modified form showing a plurality of tanks adapted for draining or rinsing and mechanism for raising and lowering and effecting the turning of the washing apparatus, according to requirements. Fig. 10 represents an end elevation of a portion of Fig. 9 showing the manner of supporting the shaft which carries each bottle washing apparatus.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings which illustrate the preferable forms of devices for carrying out my invention, and which forms I have found in practice to give superior results and wherein 1 designates a tank adapted to contain a cleansing or rinsing solution, said tank having walls 2, wherein are provided suitable bearings 3 for the shaft 4, which supports the washing apparatus proper, which latter consists of a carrier 5 which I have shown in the present instance as composed of hexagonal frames 6 joined by the cross rods 7 or their equivalents, said frames being supported from the hub 8 by means of the radial arms or spokes 9.

10 designates pins or guides, which project from the outer surface of the arms 9, said guides passing through the slots 11 of the extensions 12, which terminate in the frame 13, which is attached to the slotted bottom 14.

15 designates a rack on the side of the frames 12, which is adapted to be engaged and actuated by the pinion 16, which is rotated by means of the crank or handle 17, so that it will be apparent that the proper rotation of the handle 17 and the pinion 16 will cause the box or cage retainers composed of the frame 13 and bottle 14 to assume either of the extreme positions seen in Figs. 1 and 3.

In Fig. 5, I have shown in detached position the cage or box for retaining the bottles in position, said box having the side and end walls 18 and the longitudinally extending strips 19 and having no bottom, as will be understood from Figs. 3 and 5, said box being shown in inverted position in said latter figure. It will be understood that the strips 19 are a distance apart less than the greater diameter of the bottles so that when the box is inverted from the position seen in Fig. 5 the bottles cannot drop out.

20 designates the bottles which may be of any size or shape, and are placed within the box substantially bottom side up, as will be understood from the right hand portion of Fig. 3 and from Fig. 5. The side walls 18 of the box are supported in position upon the transverse rods 7 or their equivalents, as 7 $\times$  in Fig. 4, as will be understood from Figs. 3 and 4 and the box or cage is prevented from improper movement or displacement by means of the strips 21 or their equivalents.

The manner of loading the apparatus will be understood from the right hand portion of Figs. 1, 3 and 4, wherein I have shown the retaining device for the bottle cage, which is composed of the frame 13 and the base 14, as moved to its extreme outer position by the proper manipulation of the pinion 16 and handle 17. The attendant stands usually about on a line with the top wall 2 of the tank 1 and the bottles in an inclined or substantially inverted position are then placed in the



cage and the latter is then turned into the position seen at the right of Fig. 3, the lower edge 18× resting upon the contiguous strip 21. The handle 17 and the pinion 16 are now rotated in the desired direction, whereupon the base 14 is moved inwardly so as to contact with the bottoms of the bottle 20 and holds the same tightly in the desired position as indicated at 22, 23, 24, 25 and 26; the bottle being held from falling by means, as the strips 19 upon which the shoulders of the bottles rest. The pinions 16 are prevented from improper rotation by means of a lock-nut or other equivalent device. It will be apparent that the clamping device for the boxes or cages containing the bottles may be locked in position in various ways, one form of which I have shown in Figs. 1 and 1½, wherein the pins or guides 10 are threaded and provided with flanges 10× so that as the pins are received into their supports the flanges will engage the walls of the slots 11 and thus lock the frame 13 in the desired position. The shaft 4 is now rotated by power applied thereto by any convenient source and the bottles are moved through the tank 1, which may contain a caustic solution to the desired extent. When it is desired to remove the cage containing the bottles, the retaining device composed of the frames 13 and 14 is unlocked and moved outwardly by means of the handle and pinion 16, meshing with the rack 15 in the position indicated at the right of Figs. 1 and 3, whereupon the washed bottles can be readily removed, as is evident.

In the construction seen in Fig. 9, I have shown another adaptation of my invention, wherein I combine a cleansing device and a rinsing device, and novel means for raising, lowering and manipulating a pair of carriers, wherein 27 designates a tank adapted to contain a caustic solution and 28 designates a tank adapted to contain clean water. Within each of the tanks is contained a hood 29 which is provided at its outer periphery with a rack or gear teeth 30, which are engaged with the pinion 31 which may be operated by the handle 32.

In the construction seen at the left of Fig. 9, the hood 30 is shown as being revolved into the lower portion of the tank 27, so that the different parts of the carrier 5 are readily accessible. In the right hand portion of Fig. 9, I have shown the hood 30 as being rotated into its uppermost position, so as to retain within the tank sufficient temperature for positively sterilizing and destroying the organic matter and the like contained in the bottles or tanks. 33 designates the shafts or axles of a pair of carriers the same revolving in a suitable strap or bearing 35, which is secured to the I-beam or other device 36, it being understood that the opposite ends of the shafts 33, seen in Fig. 9, are similarly supported and that the beams 36 are suitably joined to a nut 37 which is internally threaded so as to be engaged by the threads 38 of the shaft 39, which has the bevel gear 40 thereon, which is adapted to mesh with the bevel gear 41, which is rotated by the shaft 42, said upright shaft 39 being mounted in suitable upper and lower bearings 43 and 44 respectively.

In the construction seen in Fig. 9 it will be apparent that I may employ either the form of carrier seen in Figs. 2 and 3, or the form of carrier seen in Fig. 4. It will also be understood that in this construction, each hood is revolved into the position seen at the left in said Fig. 9 before the carriers, the beams 36 and their adjuncts are raised. 45 designates the drain pipes from

the tanks 27 and 28 which may be placed in any convenient location. The bottle washing devices seen in Fig. 9 may each embody the construction seen in Fig. 3 or Fig. 4. In each of these figures the devices for washing the exterior of the bottles are substantially the same but in Fig. 4, I have shown a slight amplification of the broad principle of my invention, wherein I dispense with the strips 19, seen in Figs. 3 and 5, and support the bottles by clamping their mouths 46 against the slotted plate 7×.

By a comparison of Figs. 6 and 7, with Figs. 1, 2 and 3, it will be seen that the apertured plate 7× performs substantially the same function as the transverse rods 7, since each serves to support the cage containing the bottles.

In Figs. 4, 6 and 7 I have shown the mouths 46 of the bottles as held in position between the walls 47 which may be constructed as seen in Fig. 6 or if desired the mouth of the bottle may be held between three or more projections 47<sup>a</sup> as shown at the left hand portion of Fig. 7. 49 designates ways or guides within which is movably mounted the slide 50, the latter having therein the apertures 51 and having secured therein the shot boxes 52, the construction of the latter being understood from Figs. 6 and 7 wherein it will be seen that said shot boxes are composed of shot nipples having shoulders 53 thereon, said nipples being held in position by means of the lock nuts 54 and provided with the slots 55. 56 designates the shot contained within the boxes, the same being fine bird shot or other fine or comminuted mineral or metallic substances, which are adapted when the parts are in the position seen in Fig. 6 to drop into the interior 57 of the bottles as the carrier rotates. The slide 50 is provided with a rack 58 at one end thereof, which is engaged by the pinion 59 having the handle or operating piece 60 thereon, said pinion or segment being rotatably mounted at 61 upon a suitable support as 62.

It will be apparent from Figs. 6 and 7, that when the parts are in the position seen in Fig. 6, that as the carrier rotates the shot will drop at intervals into the interior 57 of the bottles and after the interior of the bottles has been cleaned to the desired extent by manipulation of the pinion 59 into the position seen in Fig. 7, the slide 50, shot boxes 52 and their adjuncts are moved into the position seen in Fig. 7, the mouths of the shot boxes being closed by their contact with the contiguous surface of the strip 7× as will be understood from Fig. 7, the slots 55 permitting the water and impurities removed from the interior of the bottles to drop into the tank, and when it is desired to have the shot boxes 52 discharge with the mouths of the bottles again the same is readily effected by the proper manipulation of the pinion 59 as is evident.

It may in some instances be desired, in lieu of employing the shot boxes seen in Figs. 4, 6 and 7, to employ the spraying device for cleansing the interior of the bottles, said spraying device comprising a supply pipe 61× which communicates with a hollow axle 62×, said supply pipe having a branch 63 from which extend the nipples 64 which discharge into the interior of the bottles.

It will be apparent that suitable regulating and controlling devices may be employed for regulating the flow of the water through the pipe 61×; the central



shaft being made hollow as indicated at 62 if desired for the purpose specified.

I have deemed it unnecessary to describe in detail the specific devices for operating and controlling the flow of water through the pipe or hollow shaft 62, as it is apparent that various means may be employed to this end, as will be apparent to those skilled in the art.

The operation is as follows: When the construction seen in Figs. 1 to 3 inclusive is used, it will be apparent that the bottles having been placed in position, as will be clearly understood from the right hand portion of Fig. 3, the cages seen in Fig. 5 are securely clamped in place and rotation imparted to the carriers 5. Both the exterior and interior of the bottles will be readily cleaned by passing through the cleansing solution and after the carriers have been revolved to the desired extent, each retaining device composed of the frame 13 and base portion 14 having been first unlocked can be moved into the position seen at the right of Figs. 1 and 3, and the cages 18 containing the bottles readily removed.

The foregoing description applies to the broad principle of my invention, but in case it is desired to employ in one apparatus the devices for cleansing the interior of the bottles, I preferably employ the constructions seen in Figs. 4, 6 and 7, it being understood that the slides 50 are in the position seen in Fig. 6, whereupon as the carrier 5 revolves and each cage of bottles assumes the position seen at 24, 25 and 26 in Fig. 4, the shot will drop into the interior of the bottles and as each cage revolves into its uppermost position as indicated at 22 or 23 in said Fig. 4, the shot will fall from the interior of the bottle into the shot boxes 52, whereupon both the interior and the exterior of the bottles will be effectively cleaned.

The tank 27 may contain a caustic solution and the tank 28 a rinsing solution, whereupon the carrier at the left of Fig. 9, having been rotated to the desired extent, power is applied to the shaft 42 and the entire apparatus embodying the beams 36, the bearings 35 and the shafts 33 are raised and the bottles which have been washed in the caustic solution in the tank 27 are turned so as to be over the rinsing solution in the tank 28, the shaft 42 is now rotated in the opposite direction and the entire apparatus permitted to descend whereupon the bottles which have been washed in the caustic solution are finally rinsed in the rinsing tank 28.

It will be apparent from the foregoing, that I have produced a novel construction of bottle washing machine adapted for the effective cleansing interiorly and exteriorly for bottles of any size and shape, which device may be employed in its simplest form without the interior cleaning devices all as seen in Figs. 1 and 3, or if desired it may be employed in conjunction with the interior devices seen in Figs. 4, 6 and 7, or if desired a battery or a pair of the washing devices may be coupled up as shown in Fig. 9.

By the use of the hoods 29, and 30, seen in Fig. 9, it will be apparent that the carrier containing the bottles may be effectively covered and thus retain sufficient temperature for positively sterilizing the bottles and destroying organic matter and the like.

It will be seen that the shot boxes seen in Fig. 4, 6 and 7 are so arranged and constructed that they automatically relieve themselves of the water and when

the bottles are removed from the cylinder having the shot boxes, all the shot boxes are cut off from the bottles by moving the slide into the position seen in Fig. 6, so that if it is desired to use the machine for rinsing the shot is prevented from dropping out.

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

1. In a bottle washing machine, a carrier, a plurality of clamping devices for clamping a cage containing bottles to said carrier, means operable from between the said devices and the axis of the carrier for moving said clamping devices towards and away from the axis of the carrier, means for locking said clamping devices on the carrier, and means for preventing movement of the bottle necks.

2. In a bottle washing machine, a polygonal carrier, means for rotating said carrier, clamping devices, for clamping a cage containing bottles on said carrier, means for preventing lateral motion of the mouth ends of the bottles, devices for cleansing the interior of the bottles and means for locking the clamping devices on the same.

3. In a bottle washing machine, a polygonal carrier, means for rotating said carrier, clamping devices, for clamping a cage containing bottles on said carrier, means for preventing lateral motion of the mouth ends of the bottles, devices for cleansing the interior of the bottles, means for locking the clamping devices and rack and pinion mechanism for operating said clamping devices.

4. In a bottle washing machine, a polygonal carrier, devices for clamping a cage containing bottles on said carrier and means operable from between the axis of the carrier and said devices for clamping bottles in position with respect to said carrier, means for locking the clamping devices on the carrier, a slide mounted on said carrier, and shot boxes secured to said slide and adapted to register with the mouths of the bottles.

5. In a bottle washing machine, a polygonal carrier, devices for clamping a cage containing bottles on said carrier, and means operable from between the axis of the carrier and said devices for clamping bottles in position with respect to said carrier, means for locking the clamping devices on the carrier, a slide mounted on said carrier, shot boxes secured to said slide and adapted to register with the mouths of the bottles, a rack on said slide and a pinion suitably supported and meshing with said rack, whereby said shot boxes may be moved into and out of alignment with the mouths of the bottles and means for locking the clamping devices on the carrier.

6. The combination of a tank, a shaft mounted in bearings thereon, a carrier supported on said shaft, bottle supporting devices mounted on said carrier, clamping devices therefor secured to the carrier, means operable from between the said devices and the axis of the carrier for moving said clamping devices towards and away from the axis of said carrier and means for locking said clamping devices in position.

7. In a bottle washing machine, a rotatable carrier, means for supporting a plurality of bottles, means for clamping a cage containing bottles to said carrier, means operable from said means and the axis of the carrier for moving said clamping means toward and away from the axis of the carrier, a tank having cleansing material therein and in which said carrier may rotate, adjustably mounted shot boxes having openings, and means for moving said boxes for permitting shot in the latter to enter said bottles when the carrier is in rotation.

8. In a bottle washing machine, a rotatable carrier, clamping devices actuating means therefor operable from between the said devices and the axis of the carrier for retaining a cage containing the bottles to be washed in position relative to said carrier and adjustable shot supporting devices for cleansing the interior of the bottles when said carrier is in rotation.

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