A. B. COOK.

OSCILLATING PUMP.

APPLICATION FILED NOV. 11, 1919.

1,416,174.

Patented May 16, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

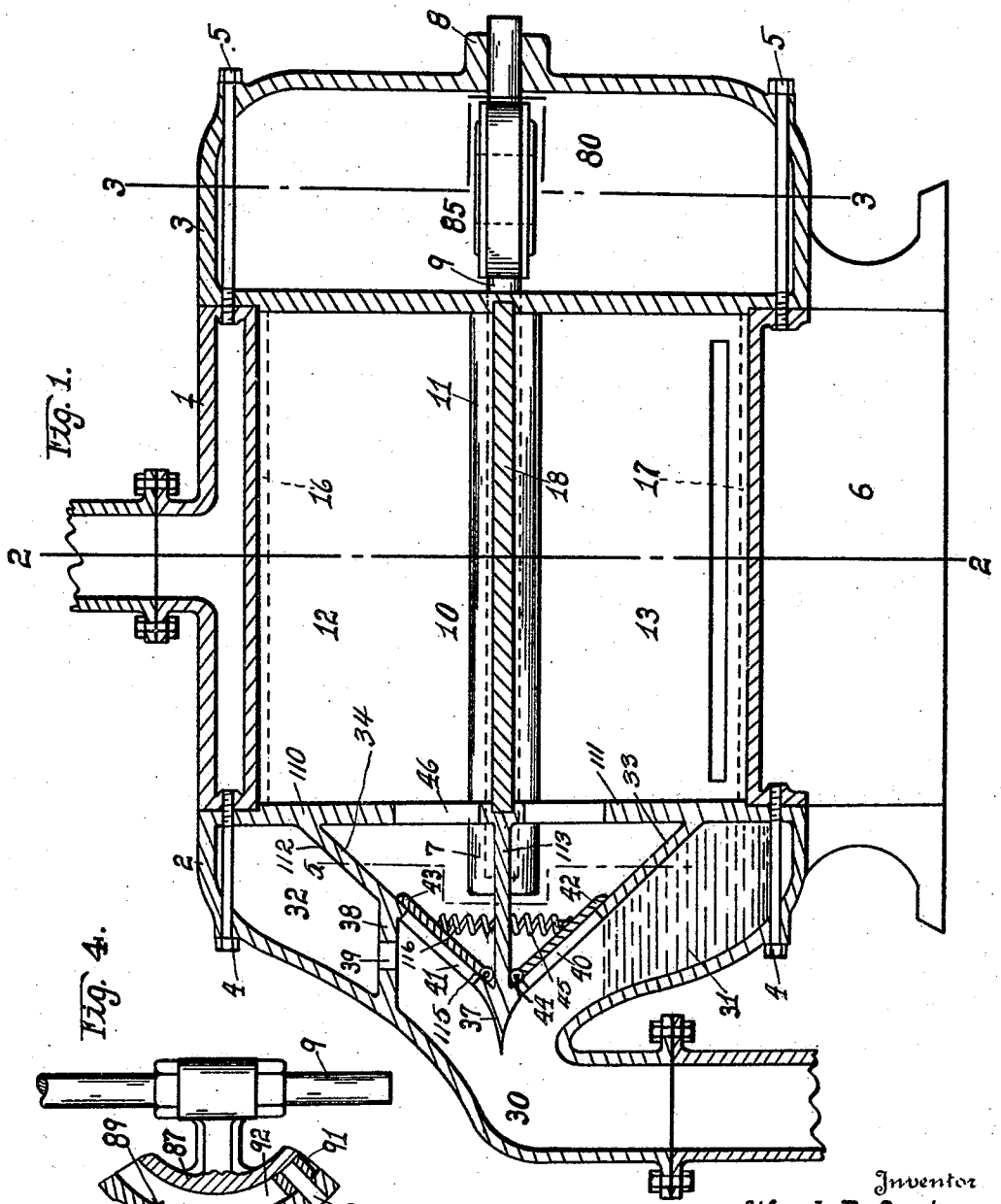
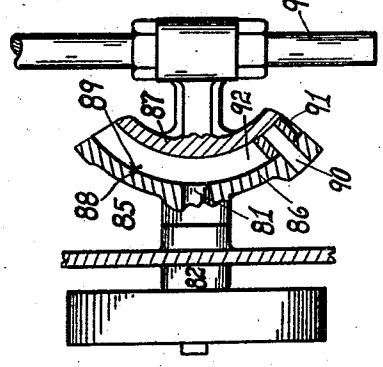


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 2.

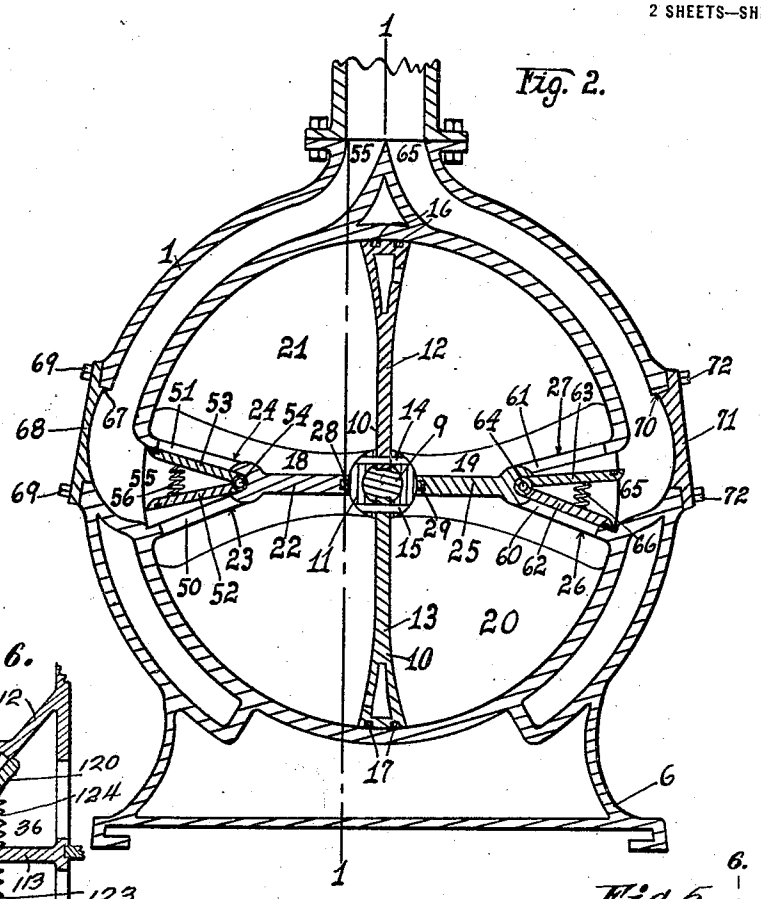


Fig. 6.

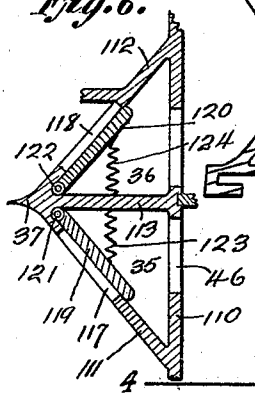


Fig. 3.

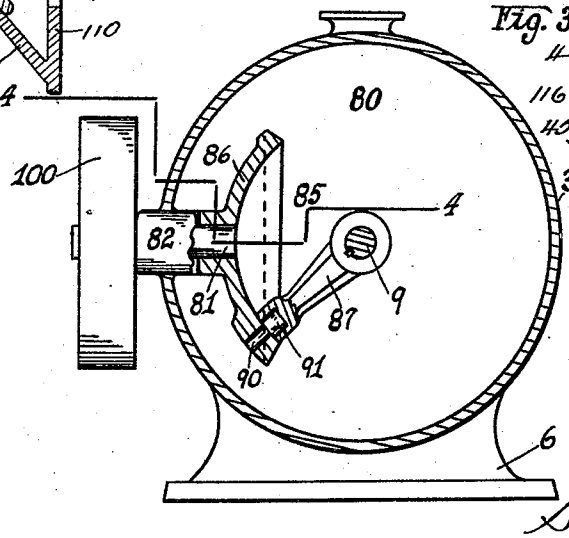
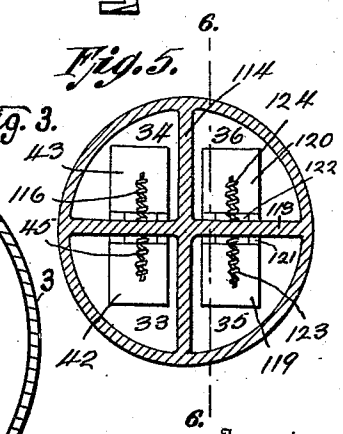


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALFRED B. COOK, OF STOCKTON, CALIFORNIA, ASSIGNOR TO TAYLOR-MAYHEW PUMP CO., OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

OSCILLATING PUMP.

1,416,174. Specification of Letters Patent. **Patented May 16, 1922.**

Application filed November 11, 1919. Serial No. 337,126.

To all whom it may concern:

Be it known that I, ALFRED B. COOK, a citizen of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Oscillating Pumps, of which the following is a specification.

My invention is an improved oscillating pump.

Referring to the annexed drawings forming a part of this specification:

Figure 1 is a longitudinal section of my pump taken on line 1—1 of Figure 2.

Figure 2 is a cross section of my pump taken on line 2—2 of Fig. 1.

Figure 3 is a cross section of my pump taken on line 3—3 of Fig. 1.

Figure 4 is a fragmentary horizontal sectional view taken on line 4—4 of Figure 3.

Figure 5 is a cross section of the valve chambers taken on line 5—5 of Figure 1.

Figure 6 is a vertical section of the valve chambers taken on line 6—6 of Figure 5.

In the drawings 1 indicates a cylinder and 2 and 3 the heads of said cylinder. The heads are secured to the ends of the cylinder by bolts 4 and 5 respectively. The cylinder is formed with a base 6 which supports it in a horizontal position. In bearings 7 and 8 in heads 2 and 3 respectively is journaled a shaft 9 extending coaxially of the cylinder 1 and through head 3. On said shaft is secured an oscillative piston 10 which comprises a hub 11 fitting on said shaft and a pair of radial blades 12 and 13 pinned in said hub by pins 14 and 15 respectively, said blades being arranged one hundred and eighty degrees apart. Said blades are cored out in their outer end portions which increase outwardly in width. Packings 16 and 17 are provided in the outer ends of blades 12 and 13 respectively which wipe the inner surface of cylinder 1. Partitions 18 and 19 extending from the piston hub 11 to the wall of cylinder 1 divide the cylinder into a lower piston chamber 20 and an upper piston chamber 21. Partition 18 has a wall 22 extending radially and horizontally from one side of the piston hub 11 and two walls 23 and 24 diverging from wall 22 to one side of the cylinder wall. Partition 19 has a wall 25 extending radially and horizontally from the other side of the piston hub and two walls 26 and 27 diverging from wall 25 to the other side of the cylinder wall. Packings 28 and 29 are interposed between the ends of walls 18 and 19 and the piston hub 11 to prevent leakage between the lower and upper pump chambers 20 and 21. The head 2 is formed with an inlet 30, a lower priming water chamber 31, an upper air chamber 32 and four valve chambers 33, 34, 35 and 36. Said valve chambers are formed by head wall 110 which closes one end of the cylinder 1; angular walls 111 and 112 which converge from the wall 110 to a point 37 at the inner end of the inlet 30, on the projected axis of the cylinder 1; a horizontal partition 113; and a vertical partition 114. The wall 111 divides the priming water chamber 31 and the valve chambers 34 and 36. The wall 112 divides the air chamber 32 and inlet 30 from the valve chambers 33 and 35. A wall 38 divides the inlet 30 and air chamber 32 and prevents water from surging from the inlet into the chamber, said wall being provided with an aperture 39 through which air passes from said chamber into said inlet. The walls 111 and 112 are provided with ports 40 and 41 leading from the chamber 31 into valve chamber 33 and from inlet 30 into valve chamber 34 respectively, which ports are controlled by valves 42 and 43 respectively pivoted by pivots 44 and 115 to the meeting point of walls 111 and 113 and the meeting point of the walls 112 and 113 within the chambers 33 and 34. A spring 45 is interposed between the valves 42 and 43 for closing said valve, and a spring 116 is interposed between the valve 43 and wall 113 for closing said valve. The wall 110 is provided with a cylinder inlet 46 leading from valve chambers 33, 34, 35 and 36 into cylinder 1 through which water passes from the valve chambers into the cylinder. The walls 111 and 112 are provided with ports 117 and 118, leading from the chamber 31 into valve chamber 35 and from inlet 30 into valve chamber 36 respectively, which ports are controlled by valves 119 and 120 respectively pivoted by pivots 121 and 122 to the meeting point of the walls 111 and 113 and the meeting point of the walls 112 and 113 respectively within the chambers 35 and 36. A spring 123 is interposed between the valve 119 and the wall 113 and a spring 124 is interposed between the valve 120 and wall 113 for respectively closing said valves. The

walls 23 and 24 are respectively provided with ports 50 and 51 controlled by valves 52 and 53, pivoted by pivot 54, in the crotch between said walls within an outlet 55 formed in the cylinder and extending from between said walls around the cylinder to the top thereof. A spring 56 is interposed between the valves 52 and 53 for closing them. The walls 26 and 27 are respectively provided with ports 60 and 61 controlled by valves 62 and 63, pivoted, by pivot 64, in the crotch between said walls within an outlet 65 formed in the cylinder and extending from between said walls around the cylinder to the top thereof. A spring 66 is interposed between the valves 62 and 63 for closing them. An opening 67 is provided in the outer wall of inlet 55 opposite valves 62 and 63 which is closed by a door 68 bolted by bolts 69 to said wall. An opening 70 is provided in the outer wall of inlet 65 opposite valves 62 and 63 which is closed by a door 71 bolted by bolts 72 to said wall. Access may be had to valves 52 and 53 and to valves 62 and 63 upon opening doors 68 and 71 respectively.

The head 3 is formed with a closed compartment 80. A drive shaft 81 is journaled in a bearing 82 in the wall of head 3 which shaft extends from the outside into the head compartment 80. The drive shaft 81 and the piston shaft 9 are connected by an oscillatory crank movement 85 within the compartment 80. Said movement includes two crank members 86 and 87, secured respectively on drive shaft 81 and piston shaft 9. Said crank members have spherical meeting surfaces 88 and 89 respectively described from the intersection of the axis of shafts 81 and 9. On a pin 90 secured in crank member 86 is journaled a roller 91 which travels in a groove 92 in the spherical surface 89 of crank member 87, the inner surface of which groove is described from the intersection of the axis of shafts 81 and 9. A pulley 100 is secured on shaft 81 for driving the same.

The operation of my invention is as follows:

Rotation of shaft 81 causes crank member 86 to rotate and the roller 91 to travel from one end of groove 92 to the other, which in turn causes crank member 87, shaft 9 and piston 10 to oscillate. When the piston swings in a clock-wise direction, valves 43 and 119, and valves 52 and 63 are opened and water is taken into the cylinder rearwardly of the piston, through inlet 30, ports 41 and 117, chambers 34 and 35 and inlet 46, and is forced out of the pump through ports 50 and 61 and outlets 55 and 65, while valves 53 and 62 close and prevent the water from flowing in behind the blades through ports 51 and 60 and valves 42 and 120 remain closed. When the piston swings in a counter-clockwise direction valves 120 and 42, and valves 51 and 62 open and water is taken into the cylinder rearwardly of the piston through inlet 30, ports 40 and 118, chambers 33 and 36 and inlet 46, and is forced out of the pump through ports 51 and 60 and outlets 55 and 65, while valves 52 and 63 close and prevent the water from flowing in behind the blades through ports 50 and 61 and valves 43 and 119 remain closed.

The air from chamber 32 forms a cushion which prevents pounding of the valves 42 and 43 upon closing. When the pump stops water remains in the chamber 31 which, assisted by the pressure of the air from chamber 32, enters the pump cylinder and primes the pump upon starting.

Having described my invention I claim:

1. In a pump, a cylinder provided with an inlet and an outlet, an oscillative piston mounted in said cylinder, means for admitting water through said inlet into said cylinder, one of the cylinder heads being hollow, a drive shaft extending into said head, and an oscillative movement within said head connecting said shaft and the piston shaft.

2. A pump including a casing provided with an inlet and an outlet, an oscillating piston in said casing for pumping water through said inlet and casing and out through said outlet, an oscillatory crank movement including a crank member secured on the piston shaft, a second crank member adjacent said first crank member, a drive shaft on which said second crank member is secured, said drive shaft being arranged at right angles to the piston shaft, the meeting surfaces of said crank members being spherical, the center of which being the intersection of the axis of said drive shaft and said piston shaft, said first crank member being formed with a groove in its spherical meeting surface extending transversely of the axis of said drive shaft, the inner surface of said groove being described from the intersection of the piston shaft and the drive shaft, and a roller journaled on the second crank member in said groove.

3. In a pump, a cylinder provided with an inlet and an outlet, means for admitting water through said inlet into said cylinder, an oscillative piston in said cylinder, a partition extending from the hub of said piston to the cylinder wall, two diverging walls on said partition connecting with the cylinder wall, a port in each diverging wall, two valves pivoted in the crotch of said diverging walls for respectively controlling said ports, said outlet leading from between said diverging walls, and a door in the outer wall of the cylinder to permit access to said valves.

4. In a pump, a cylinder provided with an outlet, an oscillative piston in said cylinder, one head of said cylinder being formed with

a main inlet, four valve chambers and cylinder inlets leading from said valve chambers, each valve chamber being provided with an inlet port communicating with said main inlet, and a valve controlling the inlet port of each valve chamber.

5. In a pump, a cylinder provided with an outlet, an oscillating piston in said cylinder, one head of said cylinder being formed with a main inlet, four valve chambers, an air chamber and a priming chamber outside said valve chambers, and cylinder inlets leading from said valve chambers, said valve chambers being respectively provided with inlet ports communicating with said main inlet, and a valve controlling each of said ports.

In testimony whereof I affix my signature.

ALFRED B. COOK.