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PUMP.

APPLICATION FILED APR. 23, 1912.

Patented July 23, 1912.

2 SHEETS—SHEET 1.

1,033,679.

Fig. 2.

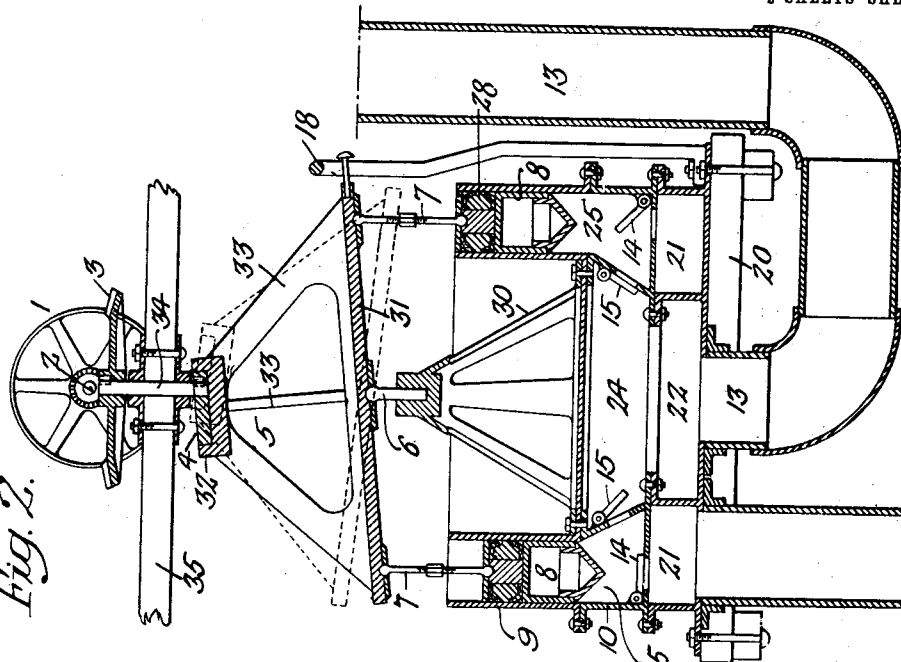
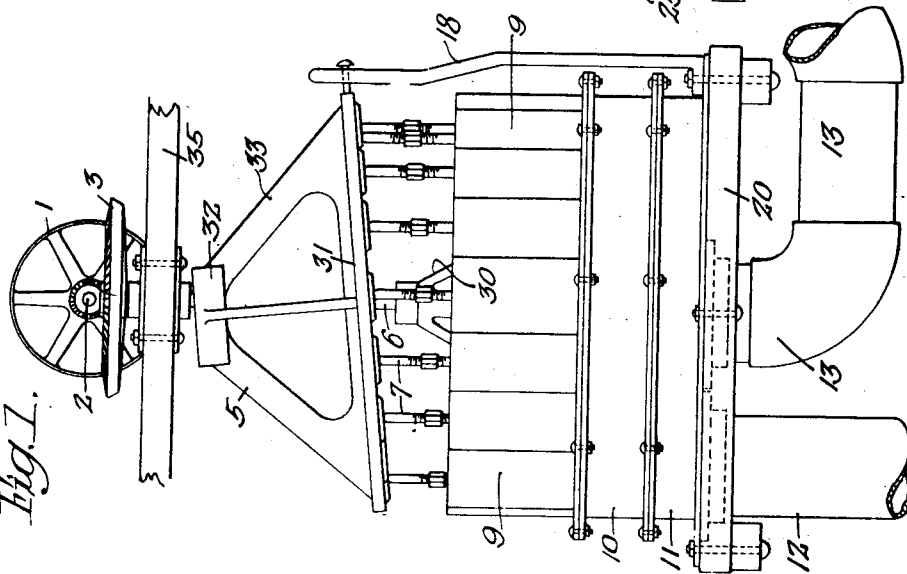
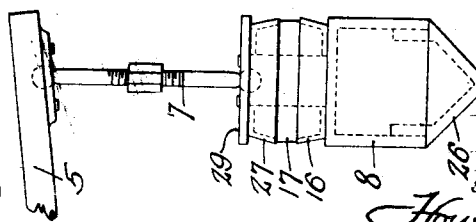


Fig. 1.



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Fig. 3



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2 SHEETS-SHEET 2

Fig. 6.

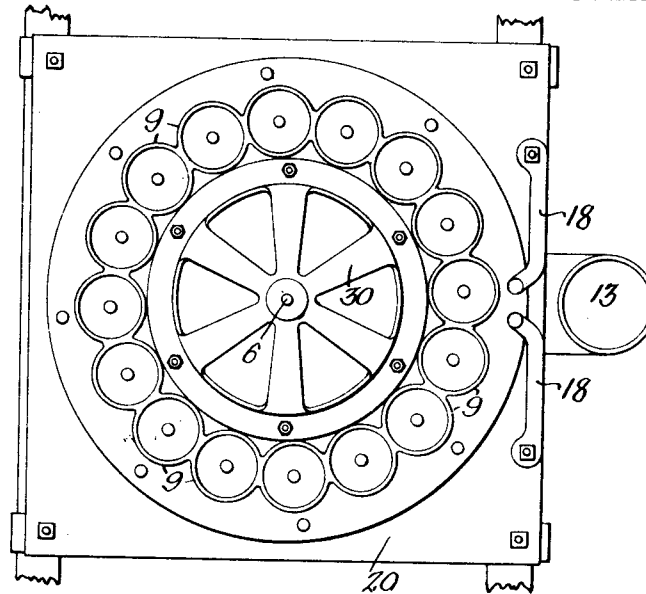


Fig. 4.

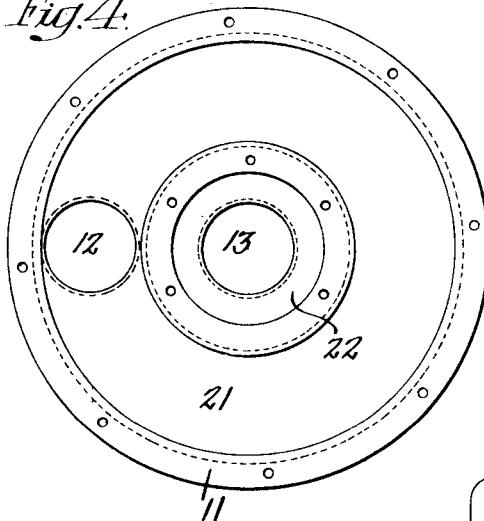


Fig. 5.

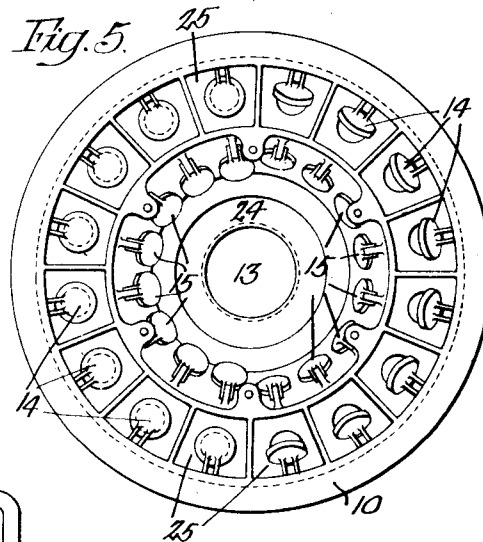
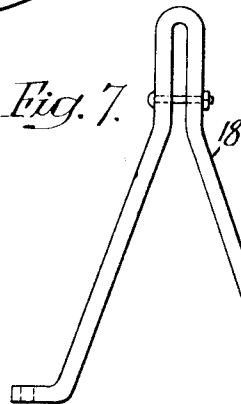


Fig. 7.



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1,033,679.

Specification of Letters Patent.

Patented July 23, 1912.

Application filed April 23, 1912. Serial No. 692,556.

To all whom it may concern:

Be it known that we, CHARLES FEBLES DIAZ, a citizen of the Republic of Mexico, residing in Philadelphia, Pennsylvania, and MIGUEL FEBLES DIAZ and LUIS FEBLES DIAZ, citizens of the Republic of Mexico, residing in the city of Mérida, Yucatan, Mexico, have invented certain Improvements in Pumps, of which the following is a specification.

One object of our invention is to provide a pump which shall include novel mechanism for reciprocating its pistons, of such a design as to efficiently transmit the power from a driving shaft to said pistons.

We further desire to provide piston actuating mechanism having the above noted characteristics which shall be substantial, compact and not likely to require attention or repair except at long intervals of time.

These objects and other advantageous ends, we secure as hereinafter set forth, reference being had to the accompanying drawings in which,

Figure 1 is a side elevation of a pump constructed according to our invention; Fig. 2 is a central vertical section of the pump shown in Fig. 1; Fig. 3 is an enlarged side elevation of one of the pistons and certain of its associated parts; Figs. 4, 5, and 6 are plans of the upper, intermediate and lower parts of the pump casing, of which the first is partly in section and Fig. 7 is a side elevation of the yoke piece or guideway.

In the above drawings 20 represents a supporting structure on which are mounted two flat cylindrical casings 11 and 10 placed one over the other and supporting a series of cylinders 9. The casing 11 has an annular chamber 21 and a separate central chamber 22 within the same which communicates with the interior of the casing 10, as does also the chamber 21. Said casing 10 has an annular series of valve chambers 25 and a central chamber 24 and there are between the chambers 21 and the chambers 25 a series of upwardly opening valves 14. An inlet pipe 12 opens into said chamber 21, while an outlet pipe 13 communicates with the chamber 22. The central chamber 24 of the casing 10 opens directly into the chamber 22, while between the valve chambers 25 and the chamber 24 are a series of

valves 15 arranged to permit the flow of fluid from the former into the latter chamber though preventing its return.

The various cylinders 9 are arranged in an annular series upon the casing 10 and their lower ends open respectively into the valve chambers 25. In each cylinder is a reciprocable piston 8 preferably having a conical lower end 26 and at its upper portion provided with two oppositely disposed cup packings 16 and 27 so arranged that the first of them prevents leakage of air into the cylinder on an outstroke of the piston, while the packing 27 prevents leakage of liquid past the piston on the instroke thereof. These two cup leathers or packings are held in place on a central extension 28 of the piston by means of a ring 17 mounted between them and the leather is in turn held to this ring by a cover or retaining plate 29. This latter serves also to confine the ball shaped end of a piston rod 7 within a suitably formed socket provided by the extension 28 and said plate 29.

Within the series of cylinders 9 and carried by the casing 10 is a centrally mounted standard 30 projecting in the present case above the tops of said cylinders and carrying a central stud or pivot 6, upon whose ball shaped upper end is mounted a casting 5 formed by a disk or frame 31 immediately over the series of cylinders, a top member 32 and a suitable web 33 joining said member to the lower plate or frame 31. The upper ends of all the various rods 7 are connected to the said plate 31 by a suitable ball and socket joint and while said plate is free to wobble on the pivot stud 6, it is prevented from rotating therewith by a suitable device such as the yoke piece or guideway 18 (Fig. 7) carried on the supporting structure 20 and extending upwardly along the sides of the cylinder.

There is formed in the upper face of the member 32 of the casting 5 a flat cylindrical recess in which is rotatably mounted an eccentric 4, and it is to be noted that said eccentric is so fixed to the lower end of the shaft 34 that it lies in a plane not at right angles to the line of said shaft. This latter is mounted in suitable bearings carried by a supporting structure 35 and is driven from

any suitable source of power, in the present instance having fixed to its upper end a beveled gear wheel 3 whose teeth engage the teeth of a beveled pinion 2 fixed to a shaft to which is also fixed a driving pulley 1.

With the above described arrangement of parts, if the pulley 1 is turned, the shaft 34 and with it the eccentric 4 are rotated, with the result that the structure 33, while prevented from turning, has imparted to it a wobbly motion which causes any given point on its under surface to be moved up and down in a straight line. As a consequence the piston rods 7 and with them the pistons 8 are reciprocated in their respective cylinders, one after the other, so that at any given moment half of the pistons are moving upwardly in their cylinders so as to draw liquid from the intake pipe 12 through the annular chamber 21 of the casing 11, past the valves 14, into the chambers 25. At the same time the remainder of the pistons are at various stages of their down strokes so that they are forcing liquid from their various chambers 25 past the valves 15 into the chambers 24 and 22, and into the outlet or delivery pipe 13. Inasmuch as the various pistons pass successively through the different parts of their cycles of movement there is a substantially constant and uninterrupted stream or current of liquid flowing into and from the pump.

By reason of the peculiar power transmitting mechanism between the shafts 34 and the pistons these latter are reciprocated in straight lines without any but a minimum of side pressure on their cylinder walls and even this tends to cause the pistons to wear on different parts of said cylinder walls, especially in view of the fact that the said pistons are of relatively great length as compared with their diameter and at their body portions closely fit their cylinders. Said transmission mechanism is relatively inexpensive and as it consists of a few parts has but little tendency to get out of order. Moreover it is relatively inexpensive to build and maintain.

It may be noted that any desired and suitable number of cylinders and their pistons may be used in a pump constructed according to our invention and the capacity of said pump may be varied within wide limits by varying the number of such units, regardless of whether or not the speed of the driving shaft is varied.

We claim:

1. The combination in a pump of a series of cylinders; pistons respectively operative in said cylinders; a rod for each piston; a pivotally mounted plate connected to each rod; and means for giving a wabbling motion to the plate, consisting of an eccentric operative thereon; and a driving shaft for the eccentric extending in a line at an angle other than 90 degrees to the plane thereof.

2. The combination in a pump of a plurality of cylinders; a piston for each cylinder; a rod for each piston; a plate operatively connected to said piston rods; means for preventing rotation of the plate; a driving shaft; and an eccentric connected to the shaft so as to lie in a plane at an angle other than 90 degrees to the line thereof; with means for operatively connecting the eccentric to the plate.

3. The combination in a pump of a supporting structure having a pivot stud; a plurality of cylinders arranged in an annular series substantially concentric with said pivot stud; a piston for each cylinder; a rod for each piston; a plate movably mounted on the pivot stud and movably connected to each of the piston rods; means for preventing rotation of the plate while permitting an up and down movement of a given point thereon; and means for giving said plate a wabbling movement, the same consisting of a driving shaft with an eccentric connected thereto and operative on the plate.

4. The combination in a pump of a plurality of cylinders; a piston in each of the cylinders; a rod for each piston; a frame consisting of an upper member, a lower member, and a connecting web between said members; the lower member being connected to the piston rods; a driving shaft; and an eccentric on said driving shaft at an angle to the line thereof other than 90 degrees; said eccentric being rotatable in a recess in the upper of said members.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

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LUIS FEBLES DIAZ.

Witnesses:

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