

July 2, 1935.

E. A. TERRELL

2,006,779

PUMP

Filed Oct. 2, 1933

3 Sheets-Sheet 1

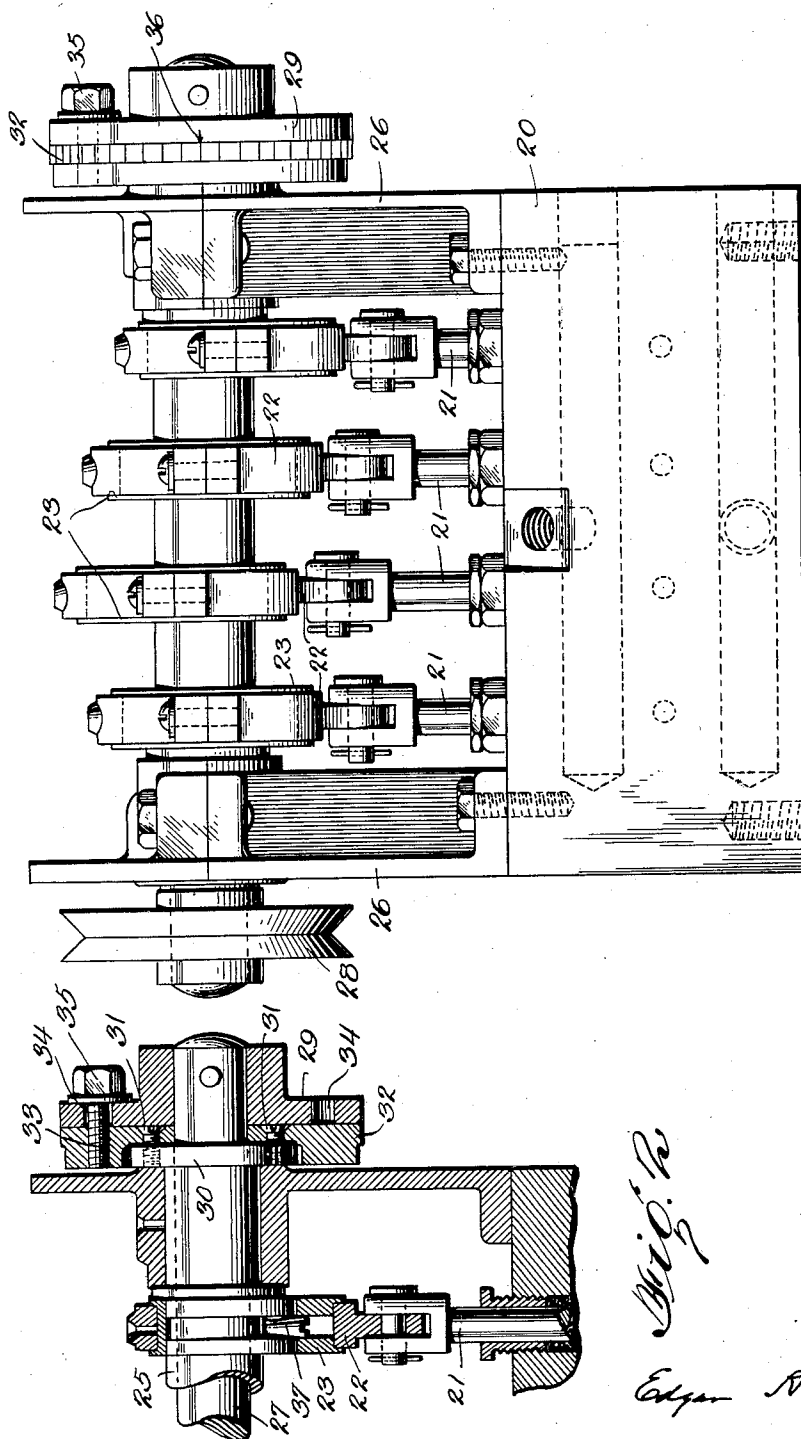


Fig. 1

Fig. 2

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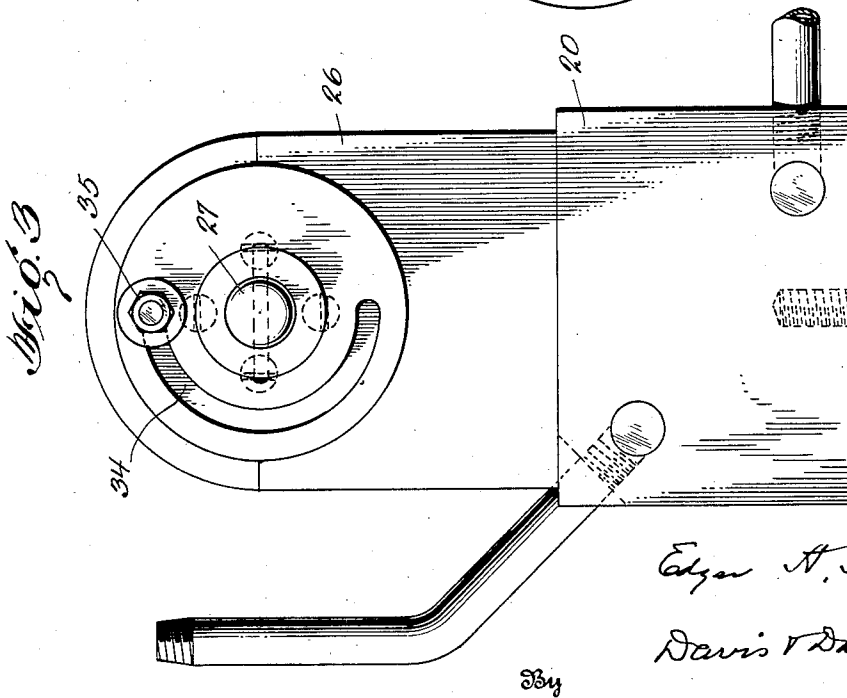
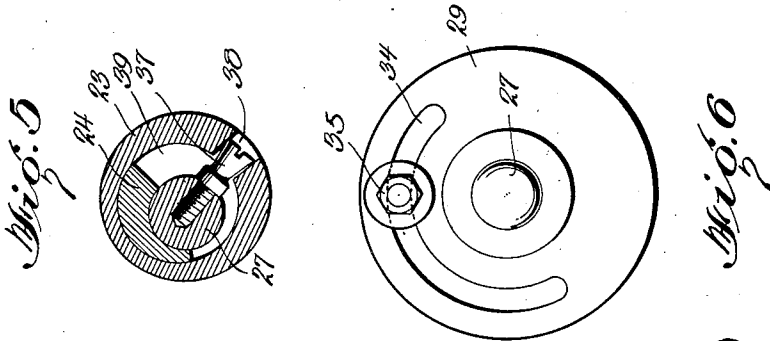
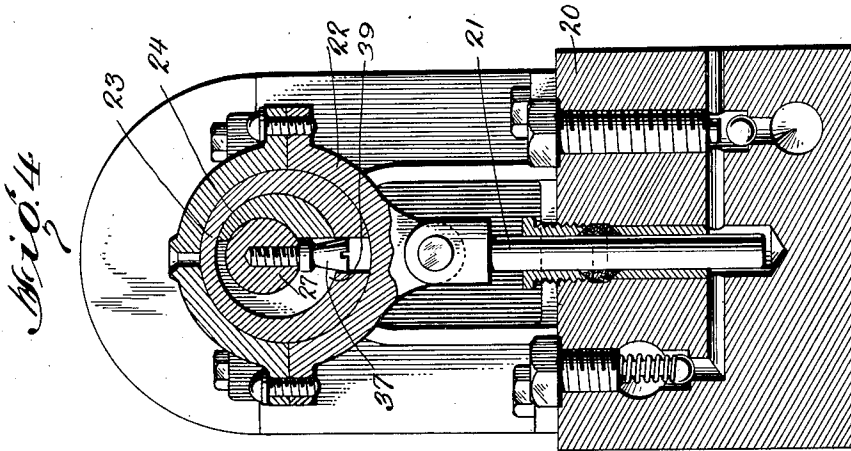
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Fig. 7 Fig. 8 Fig. 9 Fig. 10

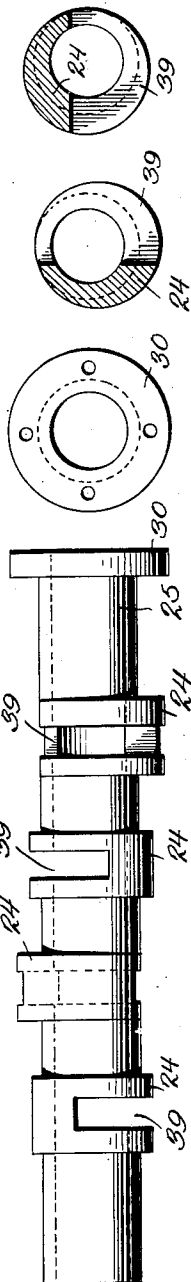


Fig. 11 Fig. 12 Fig. 13

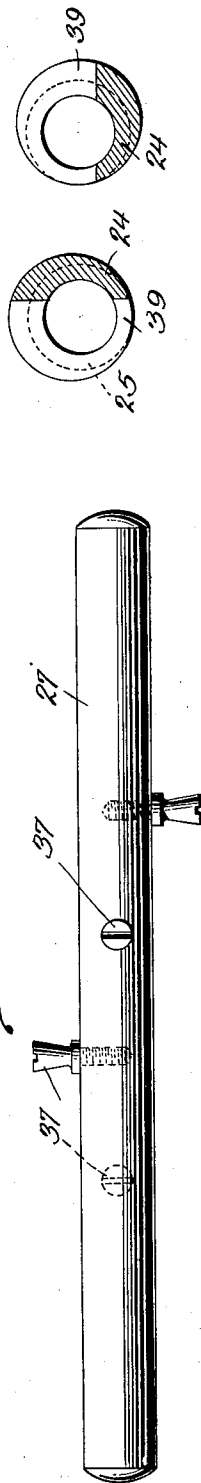


Fig. 14

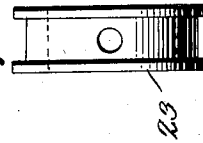


Fig. 15

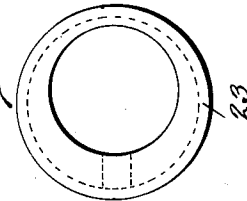
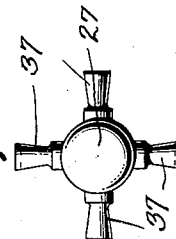


Fig. 16



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UNITED STATES PATENT OFFICE

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PUMP

Edgar Allen Terrell, Charlotte, N. C.

Application October 2, 1933, Serial No. 691,843

8 Claims. (Cl. 74—50)

This invention has relation to piston pumps and the object is to provide simple and efficient means whereby the strokes of the pistons may be uniformly and simultaneously varied by suitable adjusting devices to vary the output of the pump from zero capacity, without varying the speed of the pump, and also whereby pulsations in the delivered stream are virtually eliminated, as more fully hereinafter set forth.

10 In the drawings annexed,

Fig. 1 is a side elevation of a preferred form of my pump.

15 Fig. 2 is a vertical sectional view taken through one end of the pump structure to show particularly the adjusting and locking mechanism.

Fig. 3 is an end elevation of the pump.

Fig. 4 is a vertical transverse sectional view thereof.

20 Fig. 5 is a transverse section taken through one of the operating-eccentrics and its companion adjusting-eccentric showing a piston stroke different from that shown in Fig. 4.

25 Fig. 6 is an end elevation of the locking devices carried by the power-shaft, showing approximately the position of the locking devices when the eccentrics are adjusted to the position shown in Fig. 5.

Figs. 7 and 8 are detail views of the sleeve-shaft carrying the adjusting-eccentrics.

30 Figs. 9, 10, 11 and 12 are transverse sections of the four adjusting eccentrics showing the positions they relatively assume in one adjustment.

Figs. 13 and 14 are detail views of the power-shaft.

35 Figs. 15 and 16 are detail views of the piston-actuating-eccentric.

Referring to the drawings annexed by reference characters, 20 designates a block of metal in which the pump cylinders are formed, this block being bored in any suitable manner to provide a common inlet for the cylinders and a common outlet for the cylinders, suitable check valves being provided for each cylinder. No claim is made for the particular manner in which these supports and passages are formed; therefore a specific description thereof is not necessary. In each cylinder works a reciprocating piston 21, which at its upper end is pivotally connected to an eccentric-strap 22 which surrounds and works in a circumferential groove of the usual formation formed in an eccentric 23. Each of the stroke-eccentrics 23 is rotatively supported on an adjusting eccentric 24 formed integral with a sleeve shaft 25.

50 The sleeve shaft 25 is journaled in bearings

in the standards 26 bolted to the block 20, and within the sleeve shaft is mounted the power shaft proper 27 whose ends extend beyond the ends of the sleeve shaft and are respectively provided with a driving element, such as pulley 28, and a lock plate 29, these elements being affixed to said power shaft. The end of the sleeve shaft 25 which is adjacent the lock member 29 is provided with an annular flange 30 which lies outside of the adjacent standard 26 and to which is secured, rigidly, by screws 31 a companion lock disc 32. Tapped into the outer face of the disc 32 is a bolt 33 whose outer end extends through an arcuate slot 34 formed in the disc 29, the outer end of this bolt being provided with a nut 35 whereby the two discs 29 and 32 may be locked rigidly together so as to rotate together and as one with the two shafts 25, 26. For convenience the peripheral surface of the adjusting disc 32 may be provided with graduations, as shown in Fig. 1 and to cooperate with these graduations the companion disc 29 may be provided with a mark such for instance as the line 36.

As shown, I have adapted my invention to a four-piston pump but it will be understood that a fewer or greater number may be used if desired. When a four-piston pump is used the four adjusting-cams 24 are set 90° apart so that at all times two of the pistons will be making their working strokes. These adjusting cams 24 are all formed integral with the sleeve shaft 25 so that when said shaft is rotatively adjusted by means of the adjusting disc 32 affixed thereto all the cams will be simultaneously and equally adjusted so that the adjustment of the piston strokes will be equal and simultaneous. When the stroke-adjusting sleeve is rotated (which of course can be done only when the nut 35 is loosened) the power shaft proper 27 is held against rotative movement either by hand or a tool or the driving belt, and after the desired adjustment is made the two shafts are again locked together by tightening up the nut 35. When the adjusting-eccentrics are thus rotatively adjusted the stroke-eccentrics 23 are not rotated but are simply moved radially inwardly or outwardly through the medium of the adjusting-eccentrics 24, one of which, as stated, is embraced by each one of the stroke-eccentrics. The stroke-eccentrics are thus prevented from rotating about the power-shaft 27 by means of radial pins 37 affixed to the power-shaft 27, one being provided for each eccentric. In the four-piston type of pump illustrated these pins will of course be positioned 90° apart around the shaft. Each

binding while sliding back and forth in said holes.

7. An apparatus embodying a plurality of guide elements and rods, a power-shaft, a sleeve-shaft surrounding and rotatively mounted on said power-shaft and carrying fixedly a plurality of stroke-adjusting-eccentrics, one for each rod, a stroke-eccentric mounted on each of the afore-said adjusting-eccentrics and means operatively associating it with its companion rod, means attaching each stroke-eccentric to the power-shaft so that the stroke-eccentric shall rotate with the power-shaft, and devices for rotatively adjusting said sleeve-shaft on the power-shaft and locking it in its adjusted position, said devices embodying an adjusting disc affixed to the sleeve-shaft, a companion disc affixed to the power-shaft adjacent the aforesaid adjusting disc, and means for adjustably clamping said discs together in their various rotative adjustments.

8. An apparatus embodying a plurality of guide

elements and rods, a power-shaft, a sleeve-shaft surrounding and rotatively mounted on said power-shaft and carrying fixedly a plurality of stroke-adjusting-eccentrics, one for each rod, a stroke-eccentric mounted on each of the afore-said adjusting-eccentrics and means operatively associating it with its companion rod, means attaching each stroke-eccentric to the power-shaft so that the stroke-eccentric shall rotate with the power-shaft, and devices for rotatively adjusting said sleeve-shaft on the power-shaft and locking it in its adjusted position, the means for connecting the stroke-eccentrics to the power-shaft consisting of pins radially projecting from the power-shaft and having a sliding movement in holes formed in the stroke-eccentrics, said adjusting-eccentrics each being provided with a slot in which its companion pin works during adjusting movements.

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