

No. 771,005.

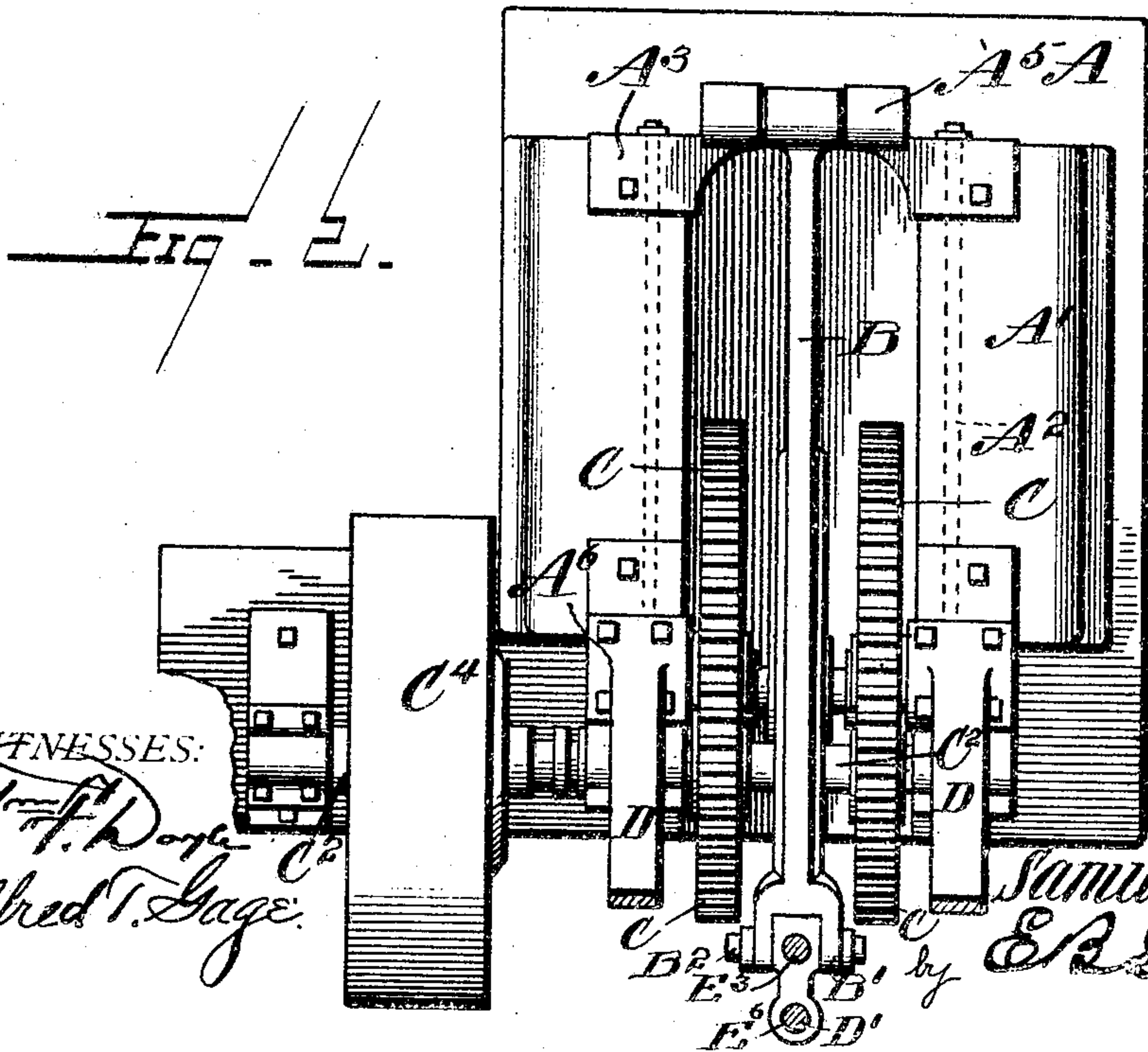
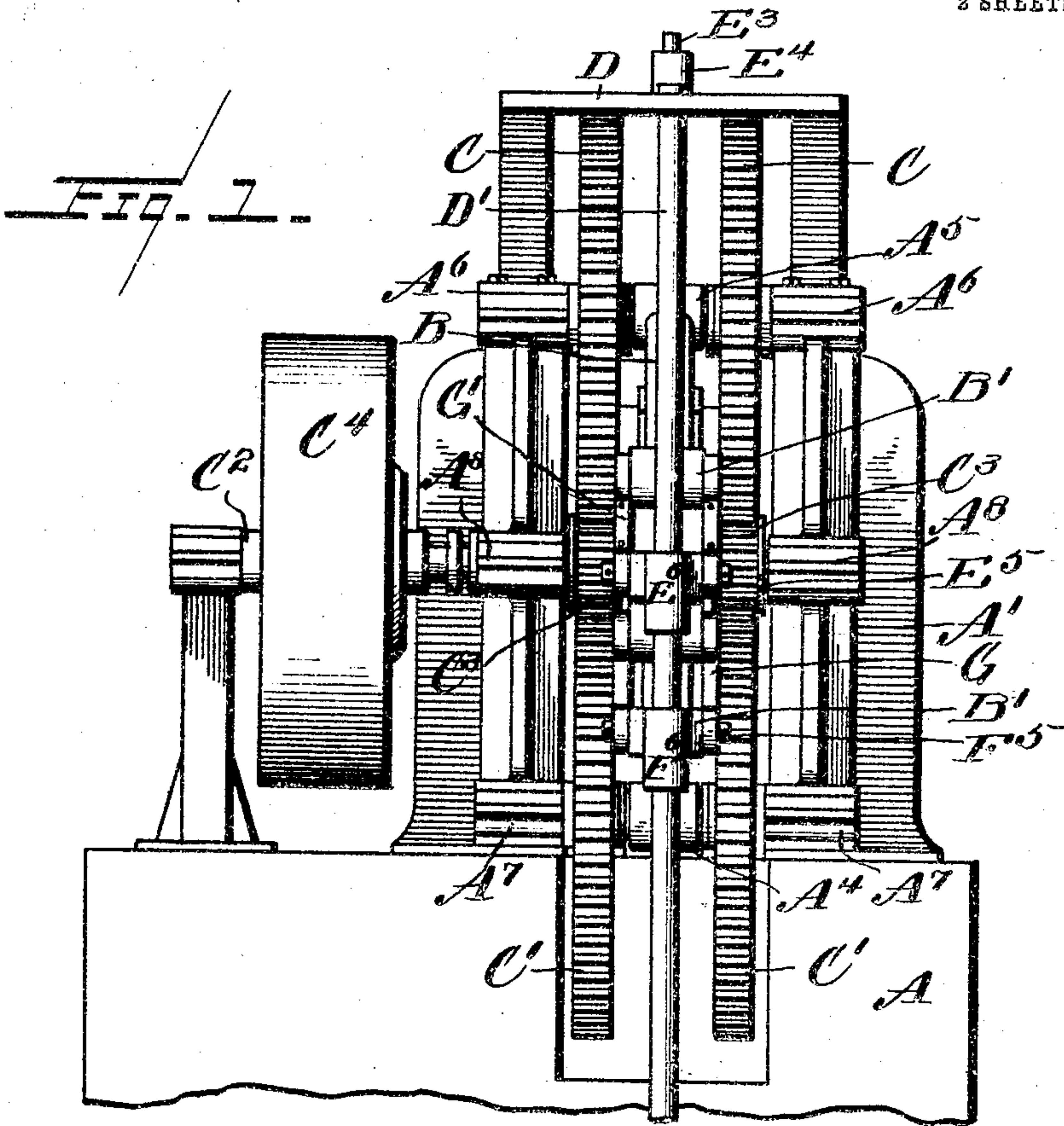
PATENTED SEPT. 27, 1904.

S. M. FULTON.
PUMP HEAD.

APPLICATION FILED FEB. 10, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



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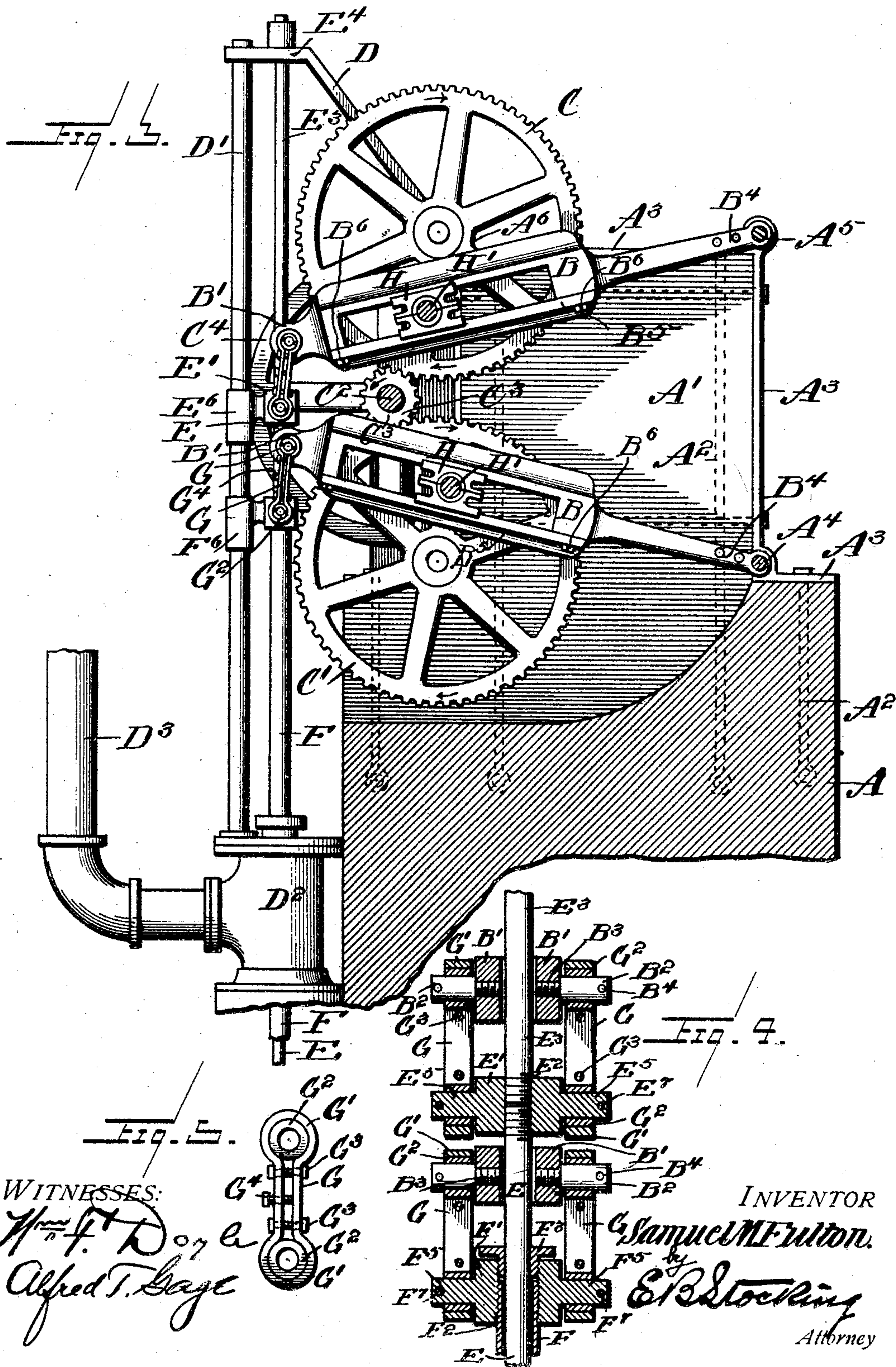
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

SAMUEL M. FULTON, OF POMONA, CALIFORNIA.

PUMP-HEAD.

SPECIFICATION forming part of Letters Patent No. 771,005, dated September 27, 1904.

Application filed February 10, 1904. Serial No. 193,002. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. FULTON, a citizen of the United States, residing at Pomona, in the county of Los Angeles, State of California, have invented certain new and useful Improvements in Pump-Heads, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to pump-heads, and particularly to a structure for driving a plurality of plungers by a variable motion to secure a continuous flow.

The invention has for an object to improve the construction of driving mechanism for a plurality of plungers whereby a slow upward stroke is imparted to one plunger while the other is effecting a quick downward stroke.

A further object of the invention is to so construct and arrange the driving means that a lap of the plungers at the end of each stroke is secured—that is, one plunger will start upward and take the load prior to the completion of the downward stroke of the other plunger, whereby the column of water is kept in motion and the hammer or jar due to stopping and starting of the column of water entirely obviated.

A further object of the invention is to improve the details of construction of the driving mechanism and the connection therefrom to the plunger-rods.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is a front elevation of the invention; Fig. 2, a plan thereof with parts in section. Fig. 3 is a vertical section taken at one side of the walking-beams. Fig. 4 is an enlarged vertical section through the connection for the plunger-rods, and Fig. 5 is a detail side elevation of one of the connecting-links.

Like letters of reference refer to like parts in the several figures of the drawings.

The letter A designates a foundation, which may be of any desired character of material—for instance, concrete, as indicated at A—and is provided at opposite sides with sup-

porting-walls A', having tie-rods A² embedded therein for the purpose of retaining the bearing-plates A³ in position. These plates are provided with a bearing A⁴ at the upper portion of the base for one of the walking-beams B and a similar bearing A⁵ at the upper portion of the wall A' to receive the upper walking-beam. At the forward portion of this wall bearing A⁶ is provided for the upper gear C, while a similar bearing A⁷ is provided at the front lower portion of the walls A' to receive the lower gear C'. Intermediate of the bearings A⁶ and A⁷ bearings A⁸ are provided to receive the driving-shaft C², which carries the pinion C³ and also the driving-pulley C⁴.

Extending forwardly from the walls A' are supporting-brackets D, adapted to retain the vertically-disposed guide-rod D' in position, which rod is secured in any desired manner at its lower end—for instance, to the pump-top D², as shown in Fig. 3—from which the discharge-pipe D³ extends. Extending through the packing-box of this top are the separate and independent plunger-rods E and F, the latter surrounding the former. The form of foundation or support just described has been found to be very efficient in use; but any other desired construction may be used, as found most convenient.

The plunger-rod E is provided with a cross-head E', secured thereto in any desired manner—for instance, by threading the end of the rod into an aperture E² therein. Into this same aperture a guide-rod E³ is also threaded and extends upward through a bearing-sleeve E⁴, carried by the bracket D. At opposite ends of the cross-head E' pintles E⁵ are provided and adapted to receive the connecting-links G, extending from the walking-beam B. This cross-head is provided at one side with a collar E⁶, adapted to slide upon the guide-rod D'. The tubular plunger-rod F is also provided with a cross-head F', having an aperture F², into which the rod is threaded, and which aperture is also provided with a packing cap or box F³. The opposite sides of the cross-head F' are provided with pintles to receive the links G. These links are provided at opposite ends with eyes G',

carrying bushings G^2 , which are clamped in position by means of the bolts G^3 , the adjustment of which may be regulated by a set-screw G^4 , as shown in Fig. 5. This provides
 5 a strong construction and one in which the bushings can be easily removed and replaced by loosening the clamping-bolts.

Each of the walking-beams B is provided at its free end with forked arms B' , carrying
 10 pintles B^2 , adapted to fit within the bushings G^2 , carried by the links. These pintles may be secured to the arms in any desired manner—for instance, by threading therein, as shown at B^3 —while the links may be retained
 15 upon the pintles by a cotter-pin or similar device B^4 , inserted in the ends of the pintles, as shown in Fig. 4. Similar pins E^7 are provided upon the pintles of the cross-head E' and pins F^7 upon the cross-head F' from the
 20 plunger-rod F . This latter cross-head is provided with a guide-collar F^6 , disposed upon the rod D' , similar to the collar E^6 , already described. Each of the walking-beams may be provided at its pivoted end with a plurality
 25 of pivotal points, so that the pivot may be changed so as to give the plungers any desired lap in their travel. Each of these beams is also provided with a removable wall at its
 30 slotted end, as shown at B^5 , which may be secured in position by screws B^6 and forms one wall of the slideway within which the two-part bearing-box H , carried by the wrist-pin
 35 H' , is adapted to travel. By the removal of the part B^5 the wrist-pin box H can be readily placed in position.

The invention may be used with a single set of gears C C' and driving-pinion C^3 ; but for the purpose of securing an even motion and properly distributing the weight and pull
 40 these parts have been duplicated at opposite sides of the walking-beams, and the wrist-pins H' extend from one of the gears to the opposite one, while the driving-pinion C^3 is likewise duplicated on the shaft C^2 to impart
 45 power to the opposite sets of gears.

It will be noted that the walking-beams are connected to the gears upon opposite sides thereof, so as to cause the plunger-rods to move alternately in opposite directions and
 50 to produce a variable motion thereof—that is, one plunger will travel slowly upward while the other is making a quick downward stroke, and vice versa. The walking-beams are also adjusted so that during this variable move-
 55 ment a lap of the plungers at the top and bottom of the stroke is secured—that is, one plunger reverses its direction of travel while the other plunger continues in the direction which it has been traveling, thus keeping the column
 60 of water in motion and preventing the hammering and jarring incident to stopping and starting the column of water. It also requires a minimum of power to operate a pump hav-
 65 ing this variable motion as compared with pumps which have a uniform motion and

where a column of water stops at the end of each stroke of the pistons.

In the operation of the invention it will be seen that when the driving-pinion C^3 is rotated in the direction of the arrow in Fig. 3
 70 it causes a rotation of the gears C and C' in the same direction. With the parts in the position in Fig. 3 this causes the upper walking-beam to rise slowly and the wrist-pin box to move in the slot of the beam away
 75 from the pivoted end thereof, thus raising the plunger-rod E slowly and steadily. At the same time the lower walking-beam is raised in the movement of the gear C toward the beam-pivot, while the wrist-pin box travels
 80 in its slot in the same direction, thus producing a quick downward movement of the plunger-rod F . It will be observed that the disposition of the beams and wrist-pins is such that the wrist-pin in the lower gear is at the
 85 top of the stroke and has passed a center line extending through the axis of the gears when the wrist-pin in the upper gear has passed the lower center point and is on its upward movement, and this while the lower wrist-pin
 90 is passing its center line. By this means one plunger is caused to pass the point of reversal in direction and take the load prior to the completion of the stroke of the other plunger, and the amount or extent of this lap of the plungers
 95 may be adjusted by shifting the pivotal point of the beams. It will also be seen that all of the parts of this pump-head are placed at one side of the well, so that in making dis-connections it is not necessary to remove the
 100 frame or any part thereof, except the connections to the plunger-rod, while all the working parts are located above the ground where they are easily accessible and not disposed in a pit beneath the pump-frame, as frequently
 105 occurs. The variable motion of the plungers produces a continuous stream through a pump-column or discharge-pipe by the use of the two sets of gears coöperating, as described, with the alternating plungers, one of which
 110 moves upward with a slow steady motion when carrying a load, while the other is traveling downward with much more speed to receive a load. The invention is also designed to prevent what are known as “overhanging bear-
 115 ings”—that is, the load is equally divided by the use of the duplicate gears upon each side of the beams, thus preventing any side pull and providing a pump-head which can be placed at one side of the well, so as not to interfere with
 120 lowering buckets or material therein and also furnishing a convenient means for disconnecting the plunger-rods when it is necessary to make repairs of any character. It will also be observed that the forked ends of the walking-
 125 beams and the link connection with the plunger-rods at both sides of the cross-heads carried thereby permit an equal distribution of the power on both sides of the plunger, thereby preventing springing them out of line,
 130

which often happens where the power is applied to one side of the plunger only. The lap in the stroke of the plungers, whereby one reverses its direction of movement prior to the completion of the stroke of the other, keeps the column of water in constant motion and prevents the jar and injury due to stopping and starting the column of water, while it also requires a minimum of power to operate the pump under such conditions.

It will be obvious that changes may be made in the details of construction and configuration of the several parts of the invention without departing from the spirit thereof as defined by the appended claims.

Having described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is—

1. In a pump-head, a plurality of plunger-rods, a plurality of independent gears provided with wrist-pins thereon, independent walking-beams pivoted at one end and provided with a sliding connection with said pins between the ends of the beams, means connecting the free end of each beam with a plunger-rod, and a single driving-shaft geared to rotate said gears in unison and in the same direction to alternate the oscillation of the beams.

2. In a pump-head, a plurality of plunger-rods, a plurality of independent gears provided with wrist-pins thereon, independent walking-beams pivoted at one end and provided with a sliding connection with said pins between the ends of the beams, means connecting the free end of each beam with a plunger-rod, and a single driving-shaft having a pinion thereon meshing with each of said gears to simultaneously drive them in the same direction.

3. In a pump-head, a plurality of plunger-rods, a plurality of gears disposed one above another and provided with wrist-pins thereon, independent walking-beams disposed one above another in a common vertical plane, a pivot for one end of said beams, a connection between the opposite end of said beams and the plunger-rods, and a connection between said gears and beams between the ends of the latter.

4. In a pump-head, a plurality of plunger-rods, a plurality of gears disposed one above another and provided with wrist-pins thereon, independent walking-beams disposed one above another in a common vertical plane, a pivot for one end of said beams, a connection between said gears and beams between the ends of the latter, a bifurcated portion at the free end of each beam adapted to embrace one of the plunger-rods, and a pivotal connection from said portion to each of the plunger-rods.

5. In a pump-head, a plurality of plunger-rods, a plurality of gears disposed one above another and provided with wrist-pins there-

on, independent walking-beams disposed one above another in a common vertical plane, a pivot for one end of said beams, a connection between said gears and beams between the ends of the latter, a bifurcated portion at the free end of each beam adapted to embrace one of the plunger-rods, a pivotal connection from said portion to each of the plunger-rods, and a single driving-shaft provided with a pinion disposed between said gears and meshing with each thereof.

6. In a pump-head, a plurality of plunger-rods, a plurality of independent gears provided with inwardly - extending wrist-pins thereon, independent walking-beams pivoted at one end and slidingly connected with said wrist-pins between their ends, independent shafts for each of said gears, and a single driving-shaft geared to simultaneously drive each gear in the same direction.

7. In a pump-head, a plunger-rod, parallel gears disposed upon independent shafts and provided with a wrist-pin extending between the same, a walking-beam pivoted at one end and disposed upon the wrist-pin between said gears, and a connection between the outer end of the beam and said plunger-rod.

8. In a pump-head, a plurality of plunger-rods, two sets of gears each set being connected by a wrist-pin, means for rotating said sets in the same direction, walking-beams disposed between the gears of each set and provided with a slideway to receive said wrist-pins, a pivotal support for one end of said beams, a removable wall for said slideway, and a wrist-pin box disposed in said way.

9. In a pump-head, two sets of gears each set being connected by a wrist-pin, means for rotating said sets in the same direction, walking-beams disposed between the gears of each set and provided with a slideway to receive said wrist-pins, a pivotal support for one end of said beams, a removable wall for said slideway, a wrist-pin box disposed in said way, a plurality of plunger-rods, forked ends upon said beams to embrace said rods, a cross-head carried by said rods, and links connecting said rods and beams.

10. In a pump-head, two sets of gears each set being connected by a wrist-pin, means for rotating said sets in the same direction, walking-beams disposed between the gears of each set and provided with a slideway to receive said wrist-pins, a pivotal support for one end of said beams, a removable wall for said slideways, a wrist-pin box disposed in said ways, a plurality of plunger-rods, forked ends upon said beams to embrace said rods, a cross-head carried by said rods, links connecting said rods and beams, a guide-rod parallel to the plunger-rods, and a sleeve disposed on said guide-rod and carried by said cross-heads.

11. In a pump-head, a plurality of plunger-rods, a plurality of driving-gears disposed at one side of said rods, means for driving said

gears in unison, a plurality of independently-pivoted walking-beams disposed one above another in a common vertical plane, and connections between the outer end of the walking-beams and each of the plunger-rods.

12. In a pump-head, a walking-beam, means for oscillating the same, pintles extending from the opposite sides of the free end of said beam, a plunger-rod, a cross-head secured thereto and having pintles at opposite sides, links extending from the beam-pintles to the cross-head pintles, bearing-boxes carried by the opposite ends of said links, clamping-screws extending through said links, and a set-screw threaded into one wall of the link to bear against the opposite wall.

13. In a pump-head, a plunger-rod, a foun-

dation having parallel walls rising therefrom, bearing-plates secured to said walls by tie-rods embedded therein, and driving mechanism mounted in said bearings and connected with said rod.

14. In a pump-head, a plunger-rod, a walking-beam provided with a pivoting-aperture at one end and a slideway at its opposite end, a removable wall for said way, and pintles carried at the opposite sides of the free end of said beam.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL M. FULTON.

Witnesses:

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J. E. McCOMAS.