

No. 744,272.

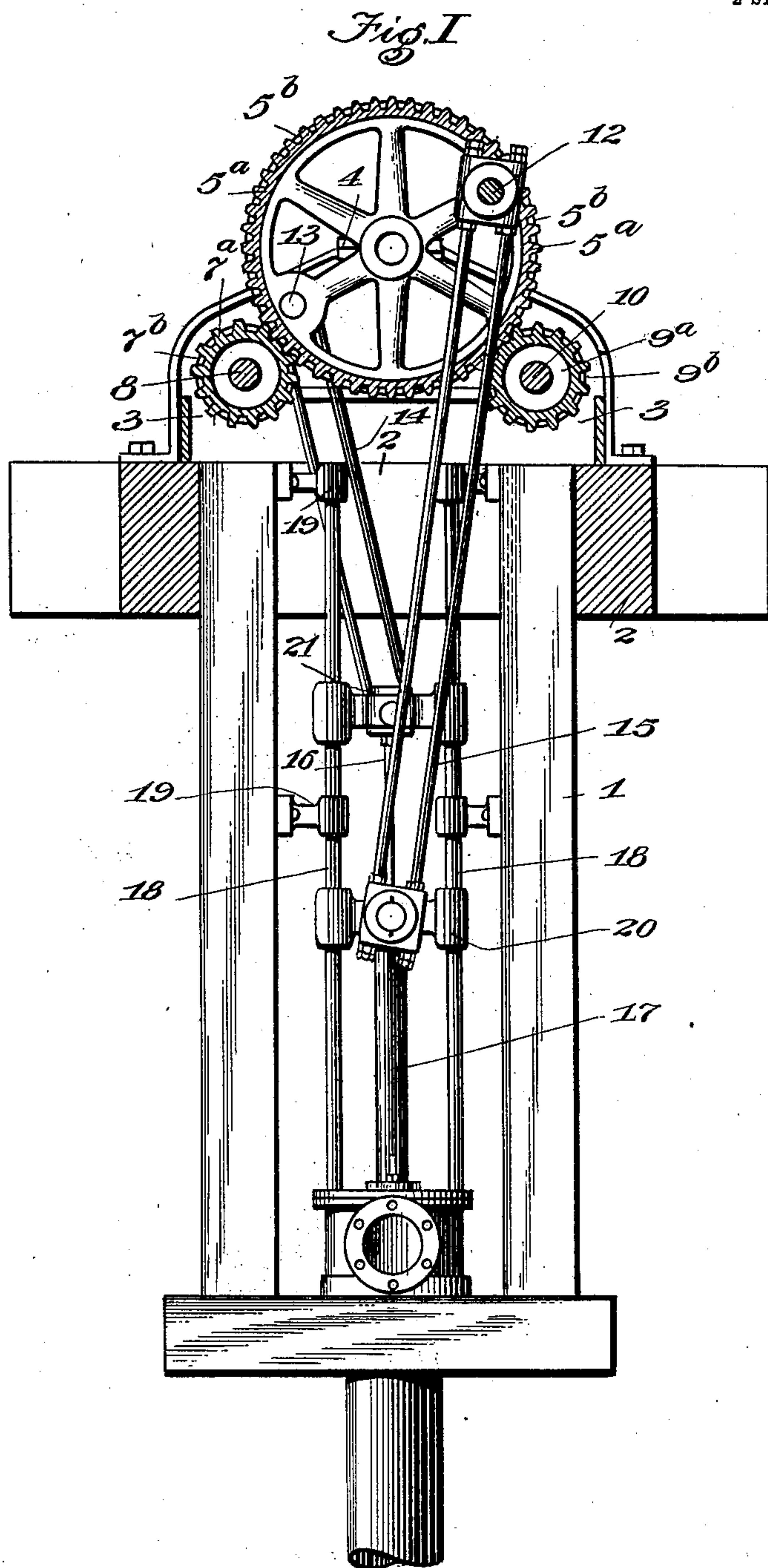
PATENTED NOV. 17, 1903.

R. ADDISON.
DOUBLE PLUNGER PUMP.

APPLICATION FILED DEC. 9, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

Samuel A. Strawn.
J. T. Hackley

Inventor

Robert Addison

by Townsend Bro.
his atty.

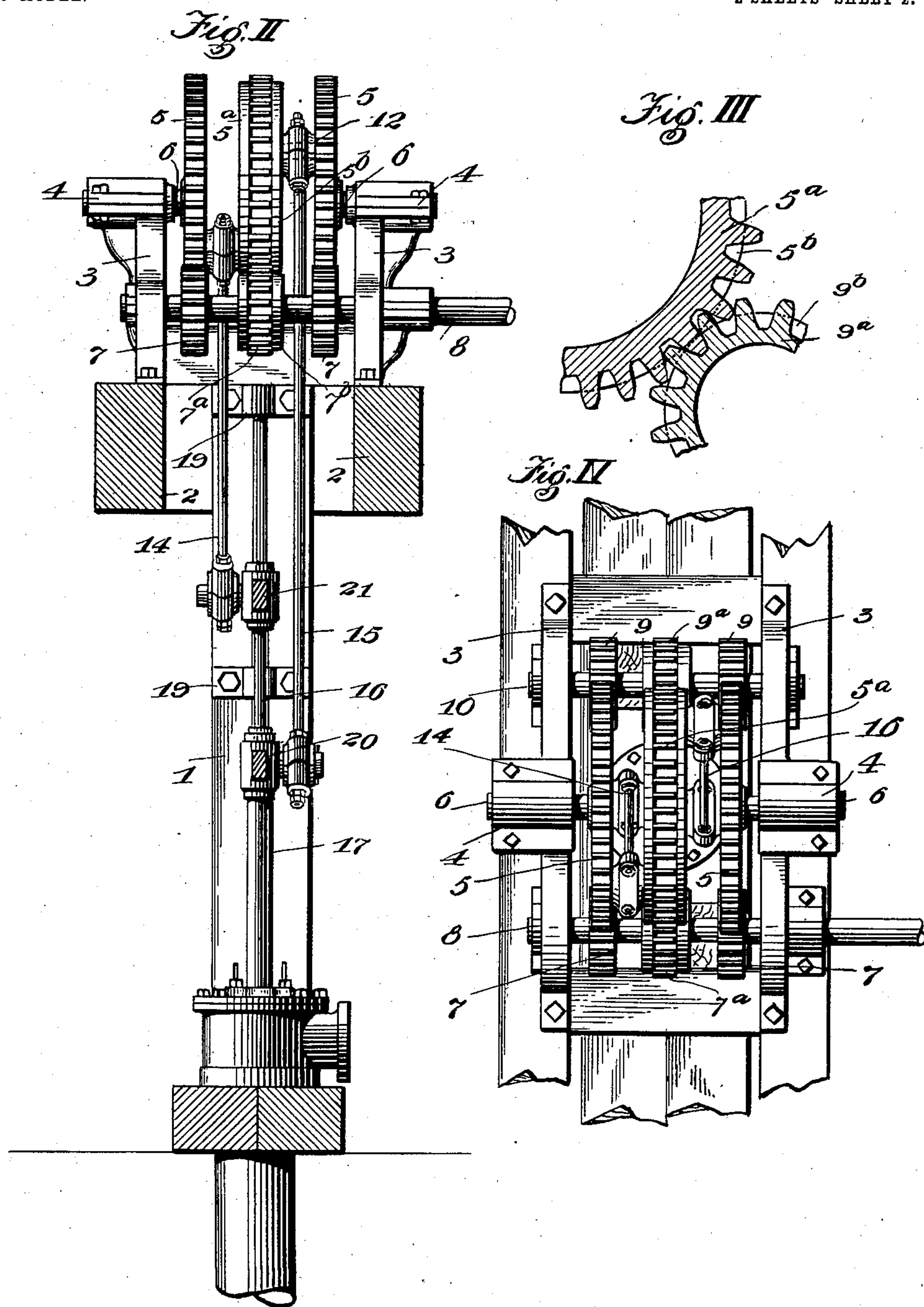
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UNITED STATES PATENT OFFICE.

ROBERT ADDISON, OF PASADENA, CALIFORNIA, ASSIGNOR TO LINDSAY & ADDISON FOUNDRY AND MACHINE WORKS, OF POMONA, CALIFORNIA, A CORPORATION OF CALIFORNIA.

DOUBLE-PLUNGER PUMP.

SPECIFICATION forming part of Letters Patent No. 744,272, dated November 17, 1903.

Application filed December 9, 1902. Serial No. 134,548. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ADDISON, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Double-Plunger Pumps, of which the following is a specification.

My invention relates particularly to the gearing or driving mechanism of the pump, and has for its object to produce a gearing which is strong, equably supported, and relatively noiseless in action.

An object of my invention is to provide means whereby the strain caused by the weight or pull of the plungers and attached parts upon the main gears is partly taken off by the shafts supporting the main gears and also to provide means whereby the twisting and cramping effects are equalized, the strain being counterbalanced and the stress being distributed at eight points, the gears meshing at six different points. In this embodiment the main or "crank" gears are triple and coaxial, and the middle gear is provided with annular bearing-faces or shrouds and which are supported by suitable antifriction devices. In this embodiment shrouded pinions are arranged on opposite sides of the main gears and at points somewhat below a horizontal line drawn through the axis of the main gears, so that the main or crank gears are locked to prevent upward jumping by the pinions. Thus the upward strain of the main gears is not wholly carried by the journals which support the main shaft, as the pinions serve to lock or hold the main gears down in position.

By the improved mechanism which I provide it is possible to construct the gears of cast-iron and secure an action of the gears which is practically as still and smooth running as gearing in which the teeth are cut by more expensive process, as by milling or using planer-cut teeth.

Referring to the drawings, Figure I is a side elevation of my invention with the nearest supporting-frame and nearest gear removed. One of the timbers which supports the cast-iron framework is also removed, the rim of the gear being in section. Fig. II is a side elevation looking at the device in the di-

rection of the arrow, Fig. I, the nearest vertical timber being removed, together with the nearest guide-rod. Fig. III is a detail of a portion of the shrouded gears. Fig. IV is a plan view of the gearing and supporting means.

1 designates a framework, preferably of timber, which may be formed of a pair of vertical posts, secured to the top of which are cross-timbers 2.

3 designates cast-iron frames, which are arranged opposite each other and mounted upon the timbers 2. The upper end of each frame 3 is provided with a journal 4. Mounted between the frames 3 are three gears, the two outside gears being designated 5 and the middle gear being designated 5^a.

The gears 5 are provided with shafts 6, which are mounted in opposite bearings 4 of the frames 3.

A pair of driving-pinions 7, mounted on a shaft 8, mesh with one side of the gears 5, while the shaft 8 is carried in suitable journals in the frame 3. 7^a designates another driving-pinion, which is intermediate the driving-gears 7 and is also carried by the shaft 8.

9 designates a pair of idler-pinions, which are mounted on a shaft 10, the shaft 10 being mounted on suitable journals on the frame 3. Intermediate of the idler-pinions 9 is a pinion 9^a, which meshes with the gear 5^a. The gear 5^a is shrouded—that is, provided with opposite annular bearing-faces 5^b. The peripheries of these bearing-faces register with the pitch-line of the gear-teeth. The driving-pinion 7^a is also shrouded, being provided with opposite annular bearing-faces 7^b, the peripheries of the bearing-faces 7^b registering with the pitch-line of the pinion-teeth. The pinion 9^a is likewise shrouded, being provided with bearing-faces 9^b similar to the pinion 7^a.

Referring to Figs. I and III, it will be observed that the peripheral bearing-faces 5^b of the gear 5^a rest upon the peripheral bearing-faces 7^b of the driving-pinion 7^a and upon the peripheral bearing-faces 9^b of the shrouded pinion 9^a, and inasmuch as the distance between the center of the pinions 7^a and 9^a is less than the diameter of the gear 5^a the

weight of the latter is partially carried by said pinions, and the crank-gears are locked by the pinions—that is, they are prevented from jumping up.

5 Fig. III very clearly shows the manner in which the annular peripheral bearing-faces contact.

A pulley may be mounted on the shaft 8 for driving the same.

10 12 is a crank-pin carried by the gears 5 and 5^a, while 13 is a crank-pin carried by the gears 5 and 5^a and arranged diametrically opposite the crank-pin 12.

14 and 15 designate pitmen, the pitman 14 actuating the plunger 16, the pitman 15 actuating the plunger 17. The pitman 15 is connected at its upper end to the crank-pin 12, while the pitman 14 is connected at its upper end with the crank-pin 13.

20 18 designates guide-rods, which are supported by suitable brackets 19, carried by the timbers.

20 is a cross-head slidably mounted on the guide-rods 18 and connected to the pitman 15.

25 21 is a cross-head slidably mounted on the guides 18 and connected to the pitman 14.

In operation the three driving-pinions 7, 7^a, and 7 transmit motion to the gears 5, 5^a, and 5, the latter gears operating the plungers 16 and 17 through the medium of the pitmen 14 and 15. The middle gear 5^a is supported

30 by reason of its annular bearing-faces rolling upon the annular faces of the middle driving-pinion 7^a and upon the annular bearing-faces of the middle idler-pinion 9^a and is held to its axis of rotation by the locking action of the pinions, as before explained. The friction between these bearing-faces is such that backlash and rattling of the gears is avoided and the gears run smooth and evenly.

35 The strains on the gears 5, 5^a, and 5 are distributed, part being carried by the shafts 6 and part by the pinions and by the shafts 8 and 10. The two sets of pinions might both be considered as driving-pinions, in that both sets really drive the crank-gears. For instance, assuming that there might be some inequality in the teeth of the center "driving-pinion," whereby the center driving-pinion failed to

40 contact the driving-faces of its teeth with the teeth of the center crank-gear, the power would be transmitted through one or both of the two outside crank-gears to the outside "idler-pinions," and from the shaft of the

45 latter gears the middle idler-pinion would derive power and drive the middle crank-gear. This driving action of the idler-gears would take place in other combinations if either of the other driving-pinions failed to make good

50 contact.

55 Having described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

60 1. In a double-plunger pump, the combination of a frame, three crank-gears mounted thereon, a set of driving-pinions mounted on the frame and meshing with the crank-gears,

the middle crank-gear being provided with an annular smooth bearing-face and a crank-pin on each side thereof, one of said driving-pinions being provided with an annular smooth bearing-face which bears upon the annular bearing-face of said crank-gears, plungers, and pitmen connecting the plungers and crank-gears. 70

2. In a double-plunger pump, the combination of a pair of frames, a plurality of crank-gears, two of said crank-gears being pivotally connected to the frames, two sets of pinions meshing with the crank-gears, the middle pinions in each set meshing with the middle crank-gear, the middle crank-gear being provided with annular bearing-faces, and the middle pinions being provided with annular bearing-faces, said faces of said pinions bearing against the faces of said middle crank-gear and supporting the same, plungers, and pitmen connecting the plungers and crank-gears. 75 80 85

3. In a double-plunger pump, the combination of a pair of frames, a set of crank-gears mounted thereon, two sets of pinions below the axis of said crank-gears and meshing with the crank-gears, the distance between the centers of the shafts of said two sets of pinions being less than the diameter of the crank-gears. 90 95

4. In a double-plunger pump, the combination of a pair of frames, three crank-gears, two of which are pivotally mounted on said frames, the middle crank-gear being connected with the two outer crank-gears by crank-pins, means for supporting said middle gear embracing a driving-pinion and an idler-pinion both of which are mounted on said frames and both being provided with annular smooth bearing-faces which contact with the annular smooth bearing-faces on the middle crank-gear, plungers, and pitmen connecting the plungers and crank-gears. 100 105 110

5. In a double-plunger pump, the combination of a pair of opposite frames, three crank-gears between said frames, a set of driving-pinions meshing with said crank-gears, a set of idler-pinions meshing with said crank-gears, the distance between the centers of the shafts of said pinions being less than the diameter of the crank-gears, two plungers, a pitman connecting one plunger with the middle crank-gear and an outside crank-gear, another pitman connecting the other plunger with the middle pinion and the opposite outside gear, the connections of said pitmen to the gears being at points which are diametrically opposite. 115 120 125

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 29th day of November, 1902.

ROBERT ADDISON.

Witnesses:

G. T. HACKLEY,

JAMES R. TOWNSEND.