

G. A. LARSON.  
CURRENT POWER PUMPING APPARATUS.  
APPLICATION FILED JULY 16, 1908.

917,464.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

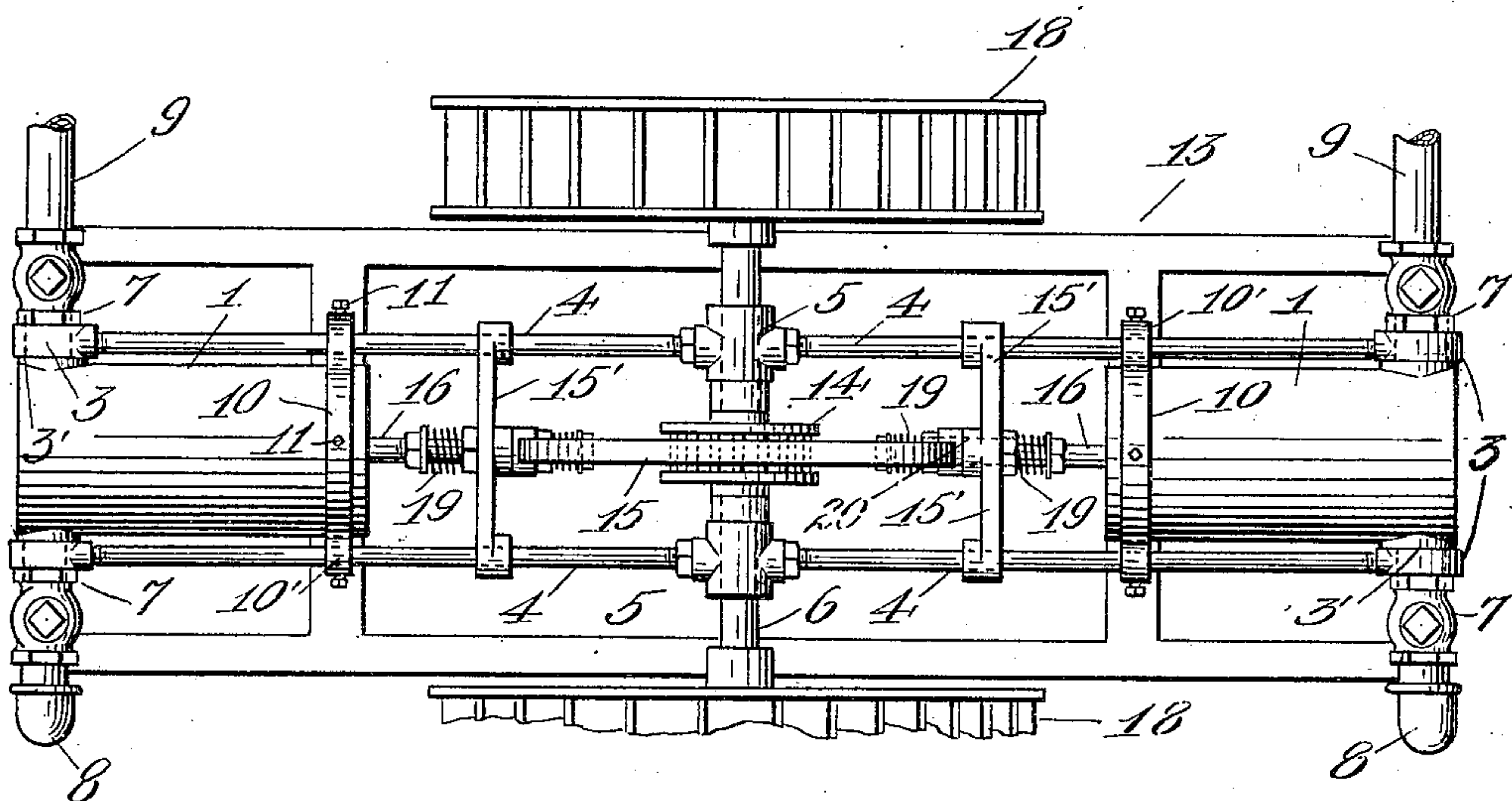
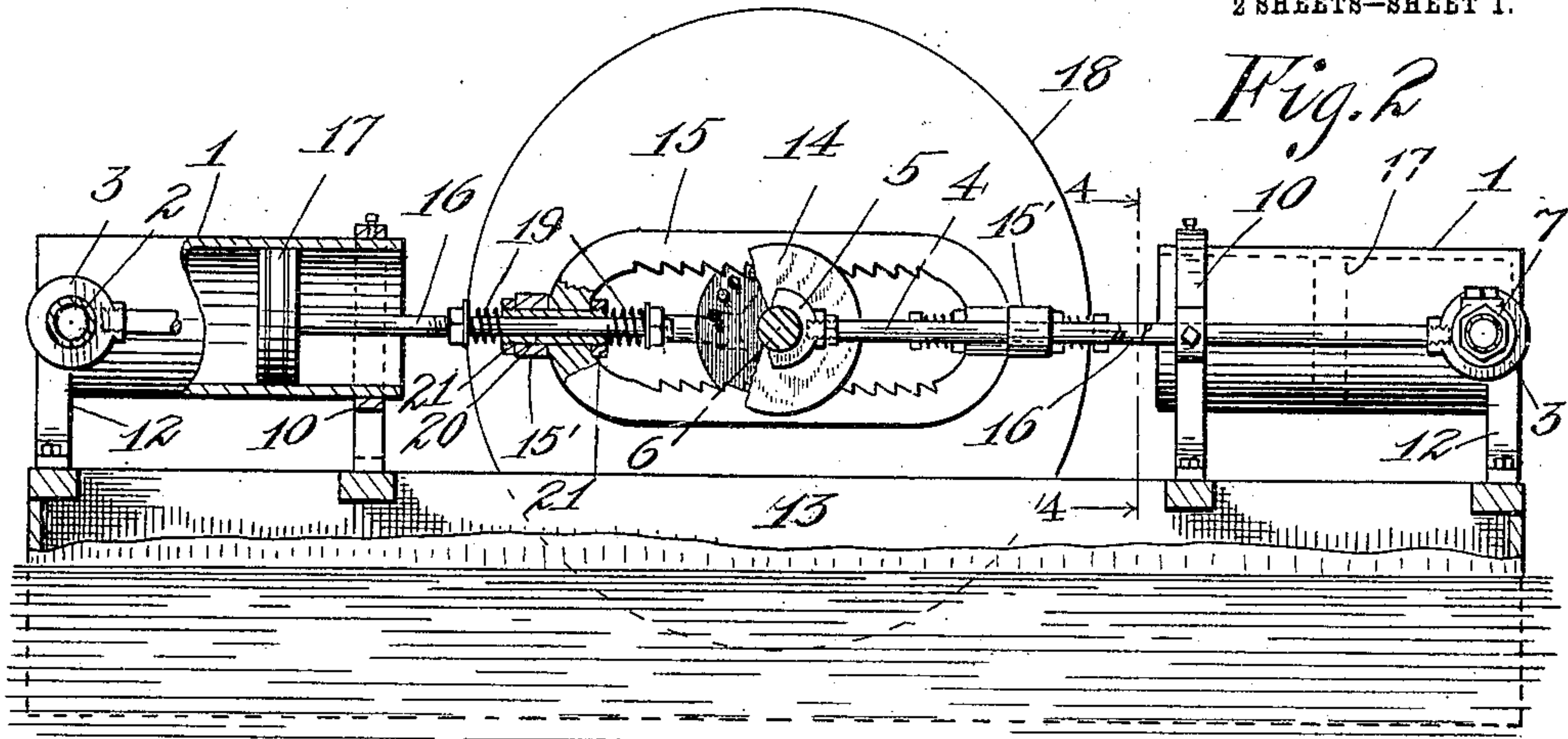


Fig. 1

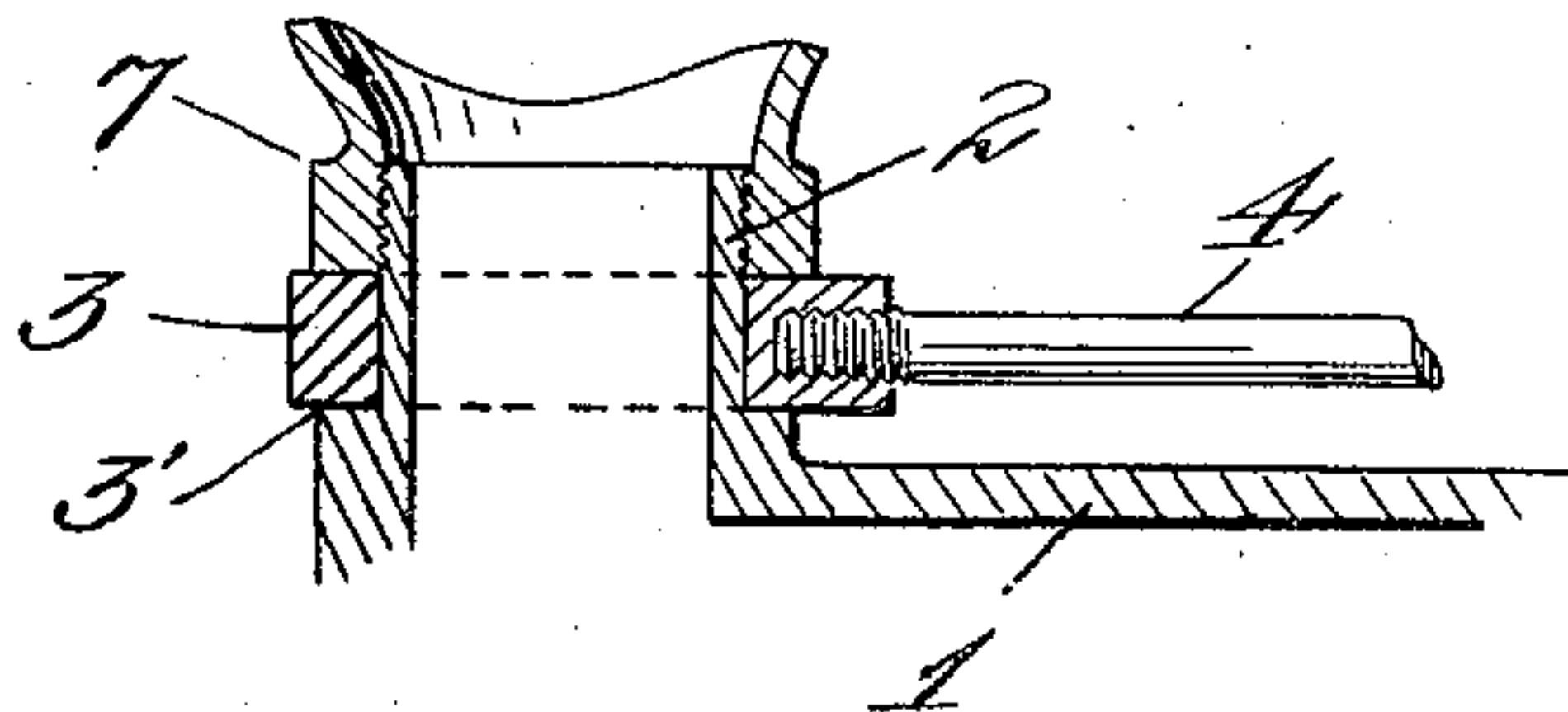


Fig. 3

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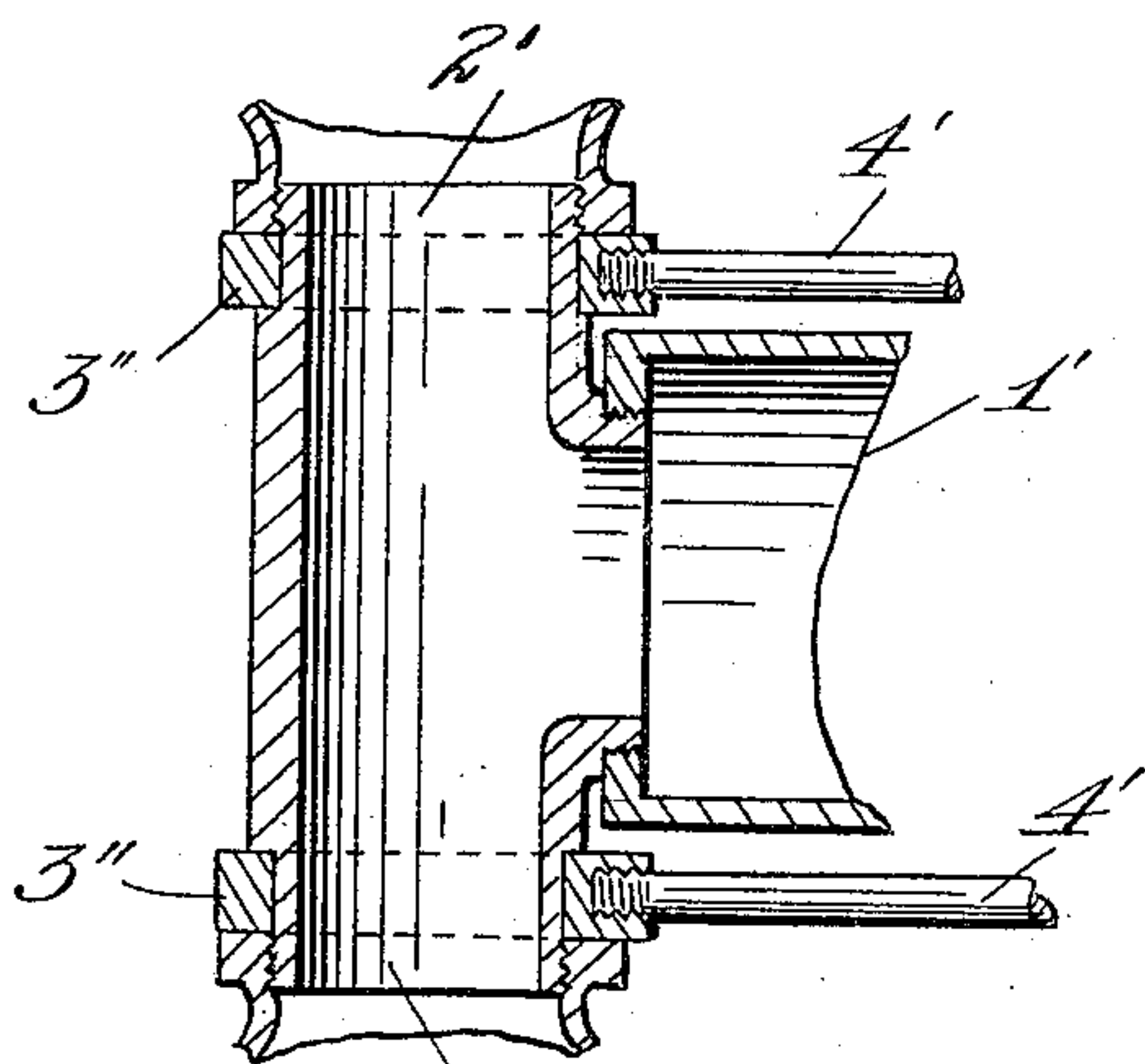


Fig. 6

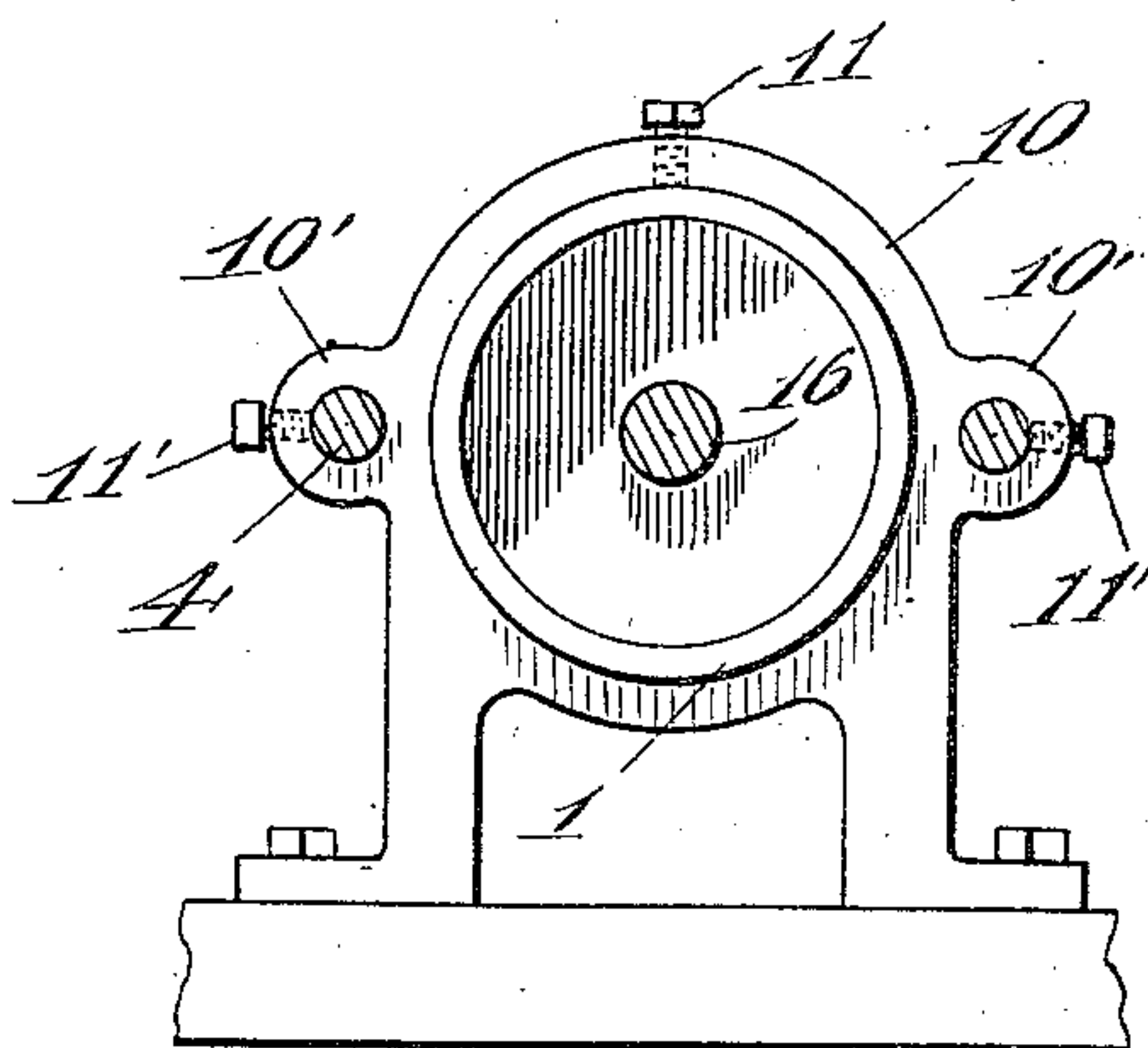


Fig. 4

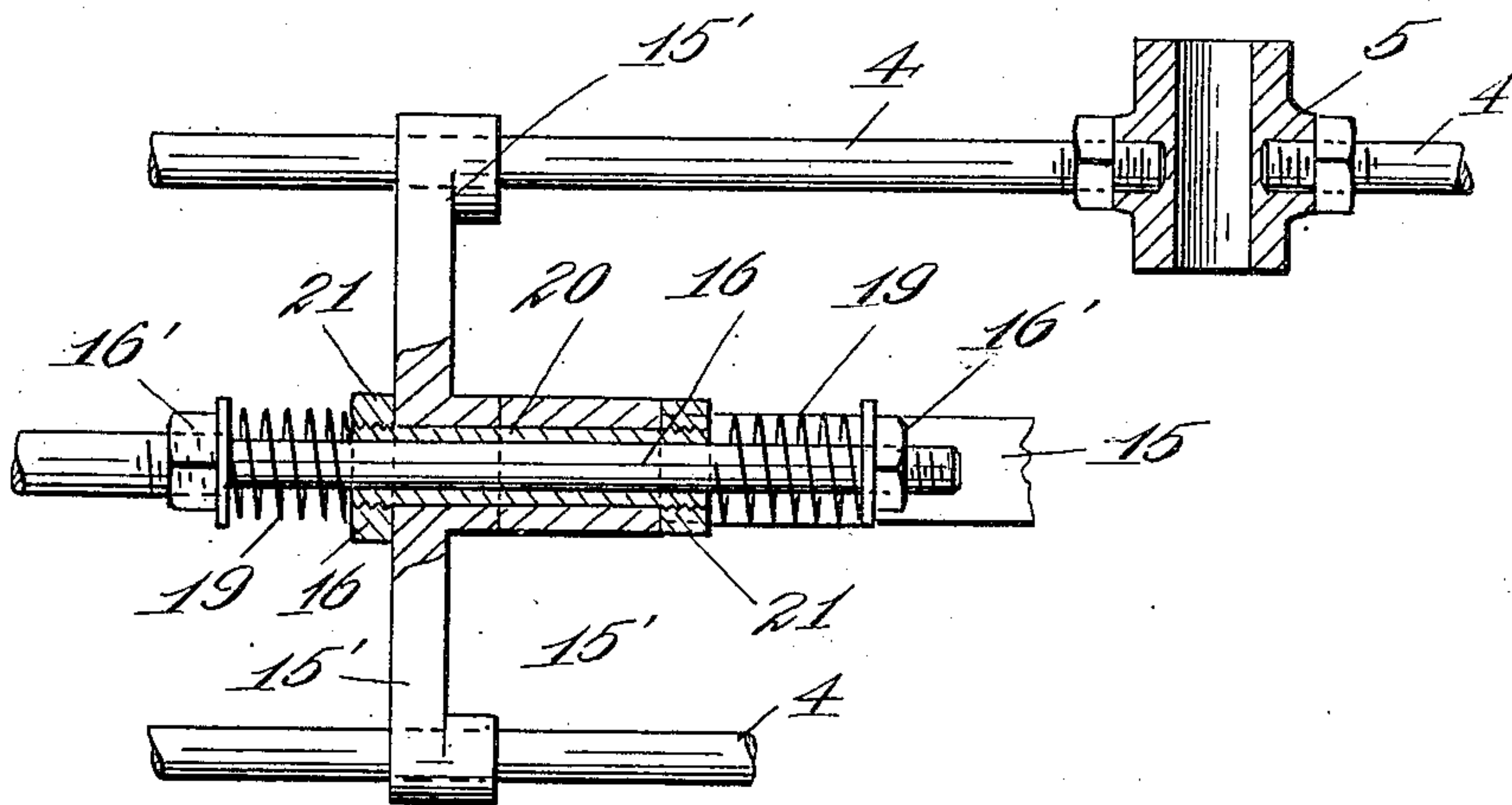


Fig. 5

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# UNITED STATES PATENT OFFICE.

GUSTAF A. LARSON, OF SEATTLE, WASHINGTON.

## CURRENT-POWER-PUMPING APPARATUS.

No. 917,464.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed July 16, 1908. Serial No. 443,902.

*To all whom it may concern:*

Be it known that I, GUSTAF A. LARSON, a citizen of the United States of America, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Current-Power-Pumping Apparatus, of which the following is a specification.

My invention relates to pumping apparatus of the above type wherein reciprocating pumps are combined with a rotary drive, and the primary object thereof is to provide an efficient pumping apparatus of simple construction and positive operation.

Further objects and advantages will be set forth as the description progresses and those features on which I desire protection defined in the following claims.

In the accompanying drawings I have disclosed my invention in such form as now preferred by me.

With reference to the accompanying drawings wherein like reference numerals designate corresponding parts throughout: Figure 1 is a plan view of a pumping apparatus embodying my invention, a portion of one of the water wheels being broken away. Fig. 2 is a side elevation thereof in partial section. Fig. 3 is a fragmentary view in horizontal section taken at the active end of one of the pump cylinders. Fig. 4 is a vertical section taken on line 4—4 of Fig. 2. Fig. 5 is a fragmentary plan view in partial section, and Fig. 6 is a fragmentary sectional view similar to Fig. 3 illustrating a modification.

My improved apparatus includes opposing cylinders 1, 1 which at their active ends are provided with tubular side extensions, as 2, communicating with respective cylinders and engaging in collars 3 of a tie frame comprising opposite rod sections 4 disposed longitudinally of the cylinders. These sections have screw threaded engagement with respective collars 3 and with intermediate heads 5 suitably formed to provide journals for a shaft 6 of the driving mechanism.

The extensions 2 are provided on their outer end portions with suitable screw threads for engagement with correspondingly screw threaded binders 7 which are adapted to press the collars 3 firmly against shoulders 3' of said extensions as indicated in Fig. 3. These binders are conveniently in the form of check valves which are suitably arranged

in connection with pipes, as 8 and 9, for intake and discharge relatively to respective cylinders.

In connection with the tie frame I have shown stands 10 which embrace respective cylinders 1 and are provided with apertured lugs 10' through which adjacent rod sections 4 pass. These stands are rigidly secured to the cylinders 1 and rod sections 4 by means of set screws 11 and 11' respectively and are adapted to serve conjointly with legs 12 of the cylinders to support the apparatus in position on a suitable structure as a float 13.

In Fig. 6 I have illustrated a modified construction wherein extensions 2' are provided in a form of T connection having connection through its stem portion with the head of cylinder 1' and connected with collars 3'' of the tie rods 4' in substantially the same manner as heretofore described for the extensions 2.

Secured to shaft 6 is a pin-wheel 14 engaging with a mangle-rack 15 connected with rods 16 of the pump pistons 17, and rotatable with said shaft are wheels 18 adapted to derive power from the current of the stream.

For a more perfect operation of the driving mechanism I aim to cushion the effective force thereof in transmittal and thereby offer suitable leeway to the current power to overcome the set back tendency incident to pulsations of the pumping mechanism. For this purpose I provide give-and-take connections between the mangle-rack and piston rods. The said connections comprising springs or cushions 19 lying about respective rods 16 and confined between collars 16' thereof and adjacent ends of sleeves 20 secured to the mangle rack and slidably engaging each its respective piston rod.

In connection with the mangle-rack and tie frame I provide equalizing devices for insuring proper mesh of said rack with pin wheel 14. The said devices consisting of arms 15' secured to said rack and slidably engaging with respective rod sections 4 whereby any tendency of the rack to ride said wheel will be corrected by the arms 15' bearing downwardly or upwardly on the rods, as the case may be, to adjust bearings 5 accordingly.

In the construction shown the adjacent arms 15' are formed integral and embrace respective sleeves 20 which have screw thread-



ed engagement with nuts 21 serving to clamp the arms against the mangle rack and secure the sleeves in place as clearly shown in Fig. 5.

The collars 16' are preferably in the form of nuts and have screw threaded connections with respective rods 16 for adjustment to regulate the tension of springs 19 as may be desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, of America, is:

1. An apparatus of the character described comprising a support, opposing cylinders thereon, a shaft extending across said support between said cylinders and having water wheels fixed on its end portions, a pin wheel on said shaft, pistons in said cylinders, a mangle rack connected to the rods of said pistons and arranged for engagement with said pin wheel, and tie rods connecting said cylinders and provided with bearings in which said shaft is journaled.

2. An apparatus of the character described comprising a support, opposing cylinders thereon, reciprocatory pistons in said cylinders, stands in which said cylinders are supported, tie rods secured to said stands and provided with bearings, a shaft journaled in the bearings of said tie rods, a water wheel fixed to said shaft, and means for transmitting power from said shaft to said pistons.

3. An apparatus of the character described comprising a support, opposing cylinders thereon provided with extensions, collars removably secured on the extensions of said cylinders, stands in which said cylinders are mounted, tie rods removably secured to said collars and stands, heads connected to said tie rods, a shaft journaled in said heads, reciprocatory pistons in said cylinders, a water wheel fixed to said shaft, and means for transmitting power from said shaft to said pistons.

4. An apparatus of the character described comprising a support, opposing cylinders thereon, reciprocatory pistons in said cylinders, a shaft provided with a water wheel, tie rods connected to said cylinders and formed with bearings in which said shaft is journaled, said pistons being provided with rods, means for transmitting power from said shaft to said pistons including a mangle rack, means yieldingly connecting said piston rods to said mangle rack, and guide means fixed to said mangle rack slidably engaged with said tie rods.

Signed at Seattle, Washington, this 30th day of June, 1908.

GUSTAF A. LARSON.

Witnesses:

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