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PATENTED AUG. 14, 1906.

D. C. McINTIRE.
PUMPING APPARATUS.
APPLICATION FILED MAR. 20, 1905.

Fig. 1.

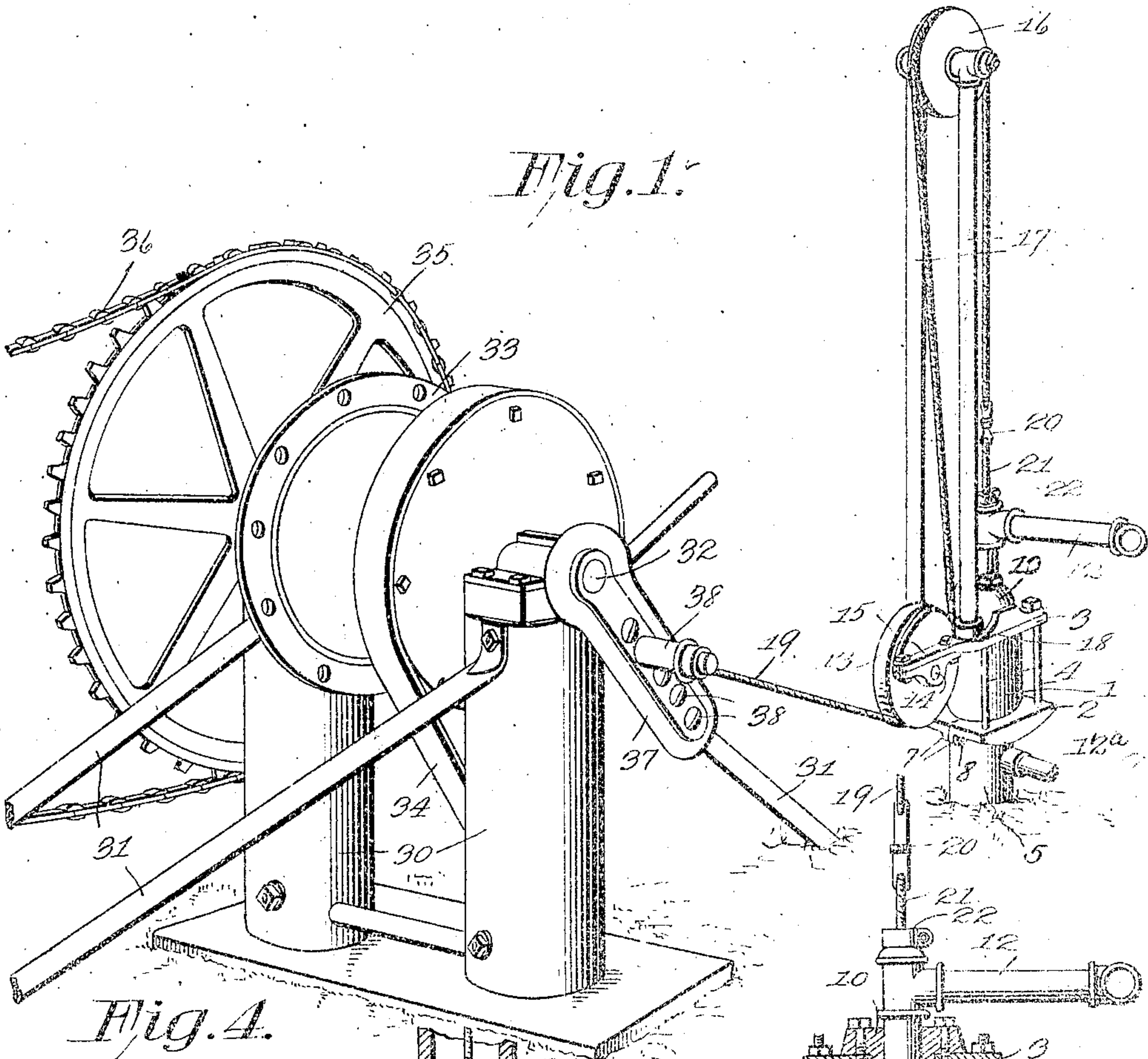


Fig. 4.

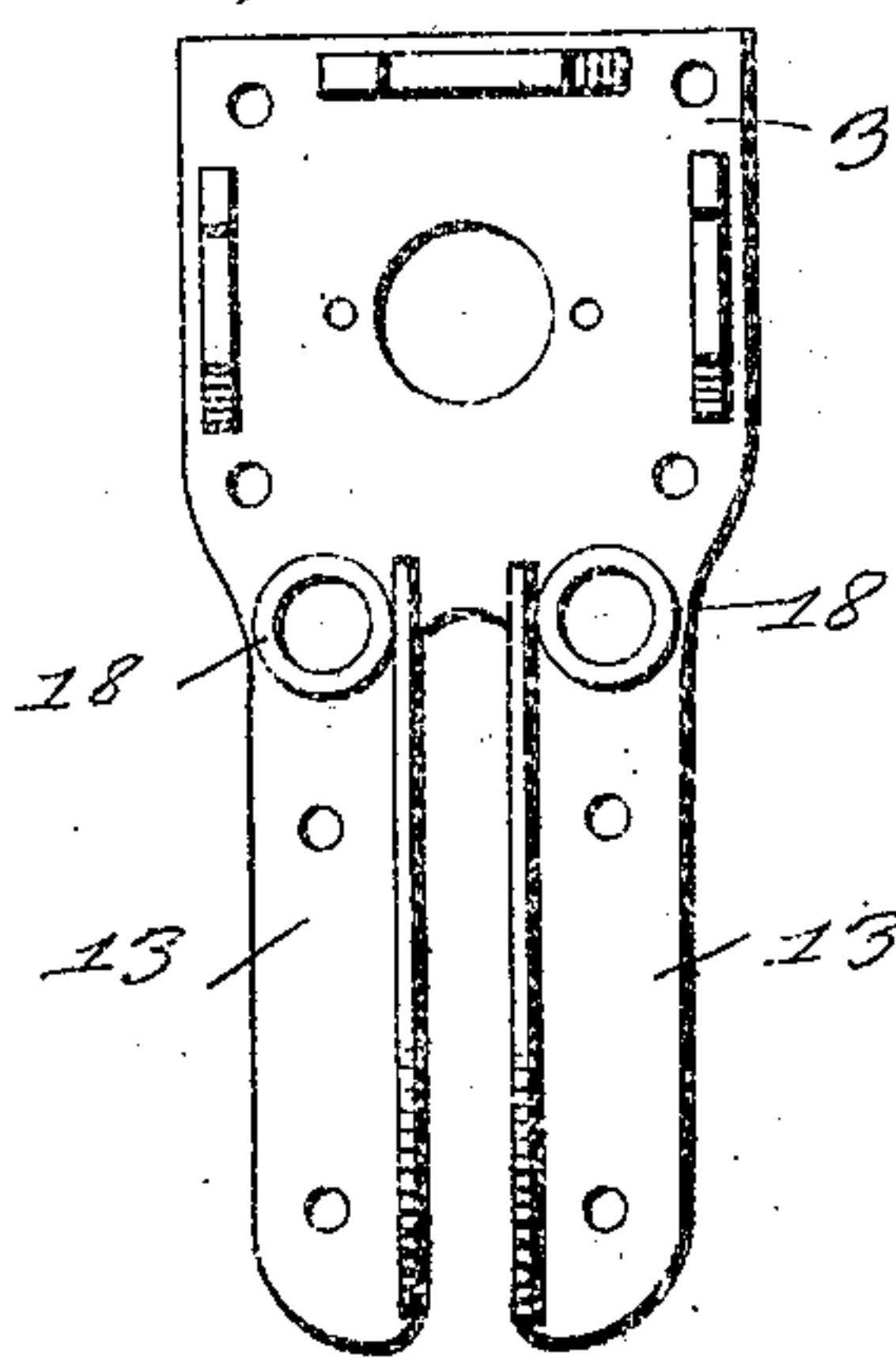


Fig. 3.

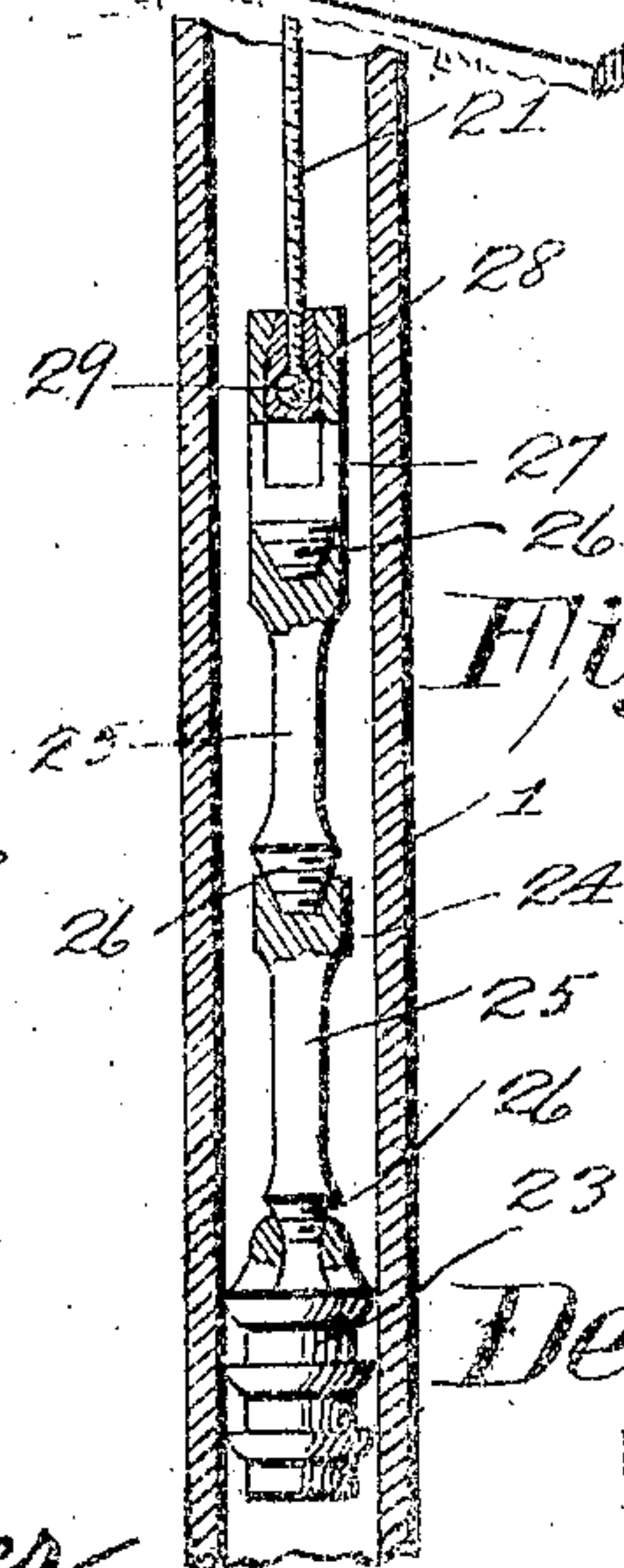
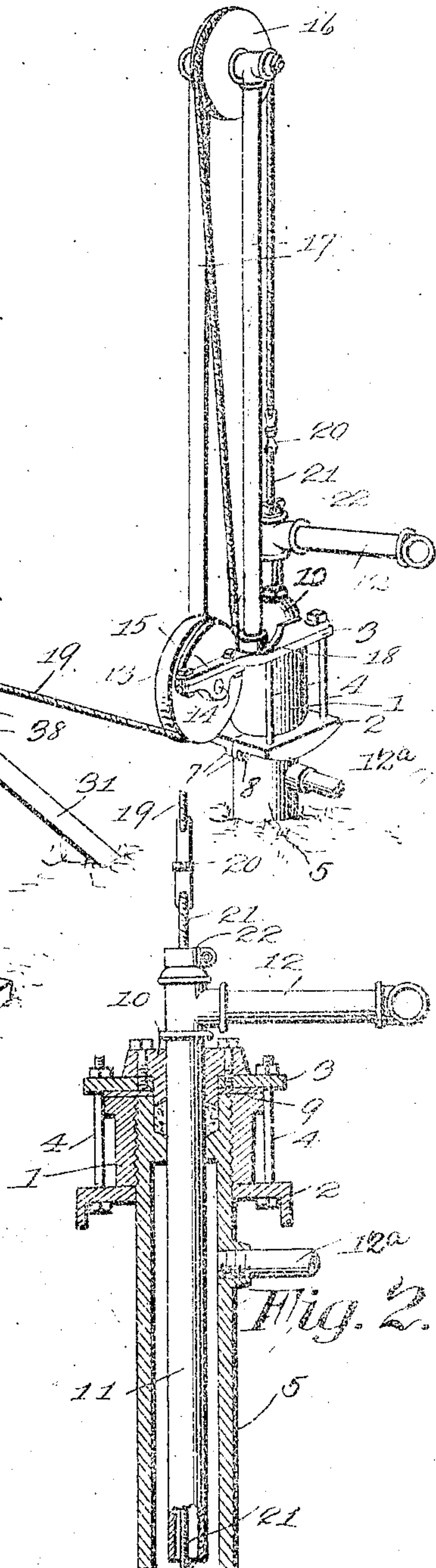


Fig. 2.



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UNITED STATES PATENT OFFICE.

DEWITT CLINTON MCINTIRE, OF BRADFORD, PENNSYLVANIA.

PUMPING APPARATUS.

No. 828,824.

Specification of Letters Patent.

Patented Aug. 14, 1903.

Application filed March 20, 1905. Serial No. 251,083.

To all whom it may concern:

Be it known that I, DEWITT CLINTON MCINTIRE, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented a new and useful Pumping Apparatus, of which the following is a specification.

This invention relates to pumping apparatus for oil-wells and other deep wells; and it has among its objects to simplify and improve the construction and operation of this class of mechanism.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that the right is reserved to any changes, alterations, and modifications to which recourse may be had within the scope of the invention and without departing from the spirit or sacrificing the efficiency of the same.

In said drawings, Figure 1 is a perspective view showing as much of the improved pumping apparatus as appears above ground; Fig. 2 is a vertical sectional view illustrating the upper end of the well-tubing and related parts. Fig. 3 is a vertical sectional view of a portion of the lower end of the tubing, which constitutes the working barrel, and related parts. Fig. 4 is a detail plan view of the top plate of the frame which constitutes the support for the pumping-jack.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

In carrying this invention into practical operation there is clamped upon the head member 1, which may be specially constructed for the purpose and which is threaded or otherwise secured upon the upper end of the well-tubing 5, a frame which has been illustrated as comprising a bottom plate 2 and a top plate 3, connected by means of clamping-bolts 4, the bottom plate 2 being shown as bearing against the lower edge of the head. The bottom plate 2 is preferably composed of two separate pieces, each provided with

lugs 7, connected by means of a bolt 8, in order to enable said bottom plate to be conveniently mounted in position. Between the top plate 3 and the upper edge of the head member 1 is placed a packing-sheet 9, of rubber or other suitable material, to prevent the escape of gases and to form in every respect a tight joint.

The top member of the well-tubing 5 has a packing-gland 10, through which extends a tube 11, having near its upper end, which is located above the packing-box, a lateral extension forming an outlet 12, which may be connected by hose with a pipe leading to a storage-tank, (not shown,) or the lead-pipe may be connected direct to an outlet 12^a of the well-tubing located below the packing-box.

The top plate 3 of the frame supported upon the well-casing is provided with forwardly-extending brackets 13, affording bearings for a shaft 14, carrying a guide wheel or pulley 15. A similar pulley 16 is supported for rotation at the upper ends of a pair of uprights 17, rising from the top plate 3, which latter is provided with sockets 18 for the reception of the lower ends of said uprights.

A flexible member, such as a wire cable 19, passes under the guide-pulley 15, over the guide-pulley 16, and is connected detachably, as by a swiveling device 20, with a similar flexible member or cable 21, which latter extends downwardly through the tube 11 into the well. The flexible member 21 is connected with the tube 10, at the upper end of the latter, by means of a clamping-band 22. The flexible member 21 carries the piston 23, which operates in the part of the well-tubing which constitutes the working barrel 24. The connection between the piston and the flexible member 21 is established by means of a plurality of sinkers 25, which are connected with each other and with the piston by means of screw-joints, as 26. The uppermost sinker is connected by a similar joint with a socket 27, in which the lower extremity of the flexible member 21 is firmly secured by means of a plug 28, which is preferably composed of lead or other readily-fusible metal, which is poured in a molten state around a knot or other suitable enlargement 29 previously formed upon the lower end of said flexible member.

It will be readily understood that the purpose of the sinkers 25 is to assist the downward movement of the piston into the well.

cubing, and that said sinkers, of which any desired number may be employed, practically constitute a rigid rod which, without obstructing the pump-tubing, will be very efficient for the purpose set forth. The presence of these sinkers is necessitated by the substitution for the rigid pump-rods usually employed of the flexible member 21. The advantages of using the latter are numerous and will be readily appreciated by those who are practically acquainted with the art with which this invention is associated. The ordinary pump-rods are constructed in lengths or sections which have to be laboriously connected as the piston is being inserted into the well, or disconnected when it is desired to remove the piston from the well. The expense and delay of this labor may be entirely dispensed with under my present invention, which permits the piston to be raised or lowered by simply winding the flexible member 21 upon a reel, as will be presently more fully described. The initial expense is also very much less than that of pump-rods of the kind heretofore usually employed.

The pumping mechanism proper includes a frame or stand, which has been illustrated as being composed of two tubular uprights 30, the lower ends of which may be sunk into the ground, although they are preferably set in a cement or concrete foundation, brace-rods 31 being employed to make the construction exceedingly durable and firm. The upper ends of the uprights 30 have bearings for a transverse shaft 32, carrying a reel 33, one flange of which is provided with a tread of sufficient width to form a friction-surface, which is engaged by a flexible friction-brake 34. The brake-operating means are not shown in detail, but the construction thereof is well understood. One end of the shaft 32 carries a sprocket-wheel 35, which is connected by a chain 36 with the source of power. The other end of the shaft 32 carries a crank 37 provided with a plurality of apertures 38 at various distances from the axis of the shaft 32, said apertures being for the reception of an adjustable wrist-pin 38, which is suitably connected with the free end of the flexible member 19, which passes over the guide-pulleys of the pumping-jack.

It is obvious that the operating mechanism is to be erected in the vicinity of the well and that it is to be suitably aligned with relation to the latter. I would have it further understood that the said pumping apparatus may be located intermediately between two wells, each equipped in the manner herein described, and the flexible operating member 19 of each being extended to the wrist-pin 38, thus enabling a single operating mechanism to be utilized for pumping two wells. It is further evident that other means than a chain and sprocket may, if desired, be employed for transmitting motion to the shaft

32 from the source of power, which latter may be a motor or engine of any description.

The operation of this invention will be readily understood from the foregoing description, taken in connection with the drawings. The stroke of the pump is regulated by the distance of the wrist-pin 38 from the axis of the shaft 32, the stroke being increased by increasing the distance between the wrist-pin and the axis of the shaft. As the latter revolves, the flexible member 19, operating under the pulley 15 and over the pulley 16, will alternately hoist and lower the flexible member 21, which is connected therewith. When said member is hoisted, the valve is raised and the tubular member 11, which is connected with the flexible member 21 and which operates as a guide or polish rod, is likewise elevated. On the downward movement of the flexible member 21 the piston is lowered into the well by the sinkers connected therewith. The liquid being forced upwardly through the well-casing by the operation of the piston escapes through the tubular member 11 and its branch 12. In the event of stoppage of the lead-pipes, caused by freezing or by obstructions of any kind, the liquid being forced upwardly into the well-tubing will force or float the tube 11 in an upward direction; thus indicating to the operator the existing trouble and enabling the pumping machinery to be stopped before damage can be done. This feature of the invention is considered to be one of great importance, inasmuch as it oftentimes happens that one or more sections of a well-tubing are split by the continued forcing of liquid while the pipes are obstructed. In such case it is sometimes found necessary to draw a considerable portion of the well-tubing before the injured section of said tubing can be reached and repaired or a new one substituted.

When it shall be desired to withdraw the piston from the well, the flexible members 19 and 21 are disconnected and the latter, after being guided over the pulley 16 and under the pulley 15, is connected directly with the reel. The tube 11 is also obviously detached. By simply winding the flexible member 21 upon the reel the piston may be very easily and quickly extracted from the well.

The operating mechanism herein described may be utilized for other purposes than those herein indicated—for instance, for the purpose of withdrawing the well-tubing—in which latter event a derrick of ordinary construction will be erected over the well and furnished with clamping mechanism, such as is well known in this connection.

When ordinary pump-rods are used in lieu of the flexible member herein described, the apparatus may also be usefully employed for withdrawing such rods, as will be readily understood.

By the use of the flexible member 21, as herein described, in lieu of the ordinary pump-rods I find that the accumulation of "rod-wax" or paraffin in the well is largely prevented, and necessity for frequently cleaning out the well is thus obviated.

Having thus described the invention, what is claimed is—

1. A head member mounted securely upon the upper end of a well-tubing, a frame including top and bottom plates clamped upon said head and positively secured thereby against upward and downward movement, said upper plate being provided with upwardly and forwardly extending brackets, guide-pulleys journaled between said brackets, and a pump-operating flexible member guided over said pulleys and into the well-tubing.

2. A well-tubing, a head member mounted securely upon the upper end thereof, a frame

including top and bottom plates clamped upon said head and positively secured thereby against upward and downward movement, brackets connected with the upper plate and having guide-pulleys, a packing-gland connected with the upper plate, a tubular member extending through the packing-gland and into the well-tube, and a flexible piston-carrying member guided over the pulleys supported by the brackets and extending through and connected with the tubular member.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DEWITT CLINTON McINTIRE.

Witnesses:

FRANK

E. L. AI