

**No. 713,269.**

**Patented Nov. 11, 1902.**

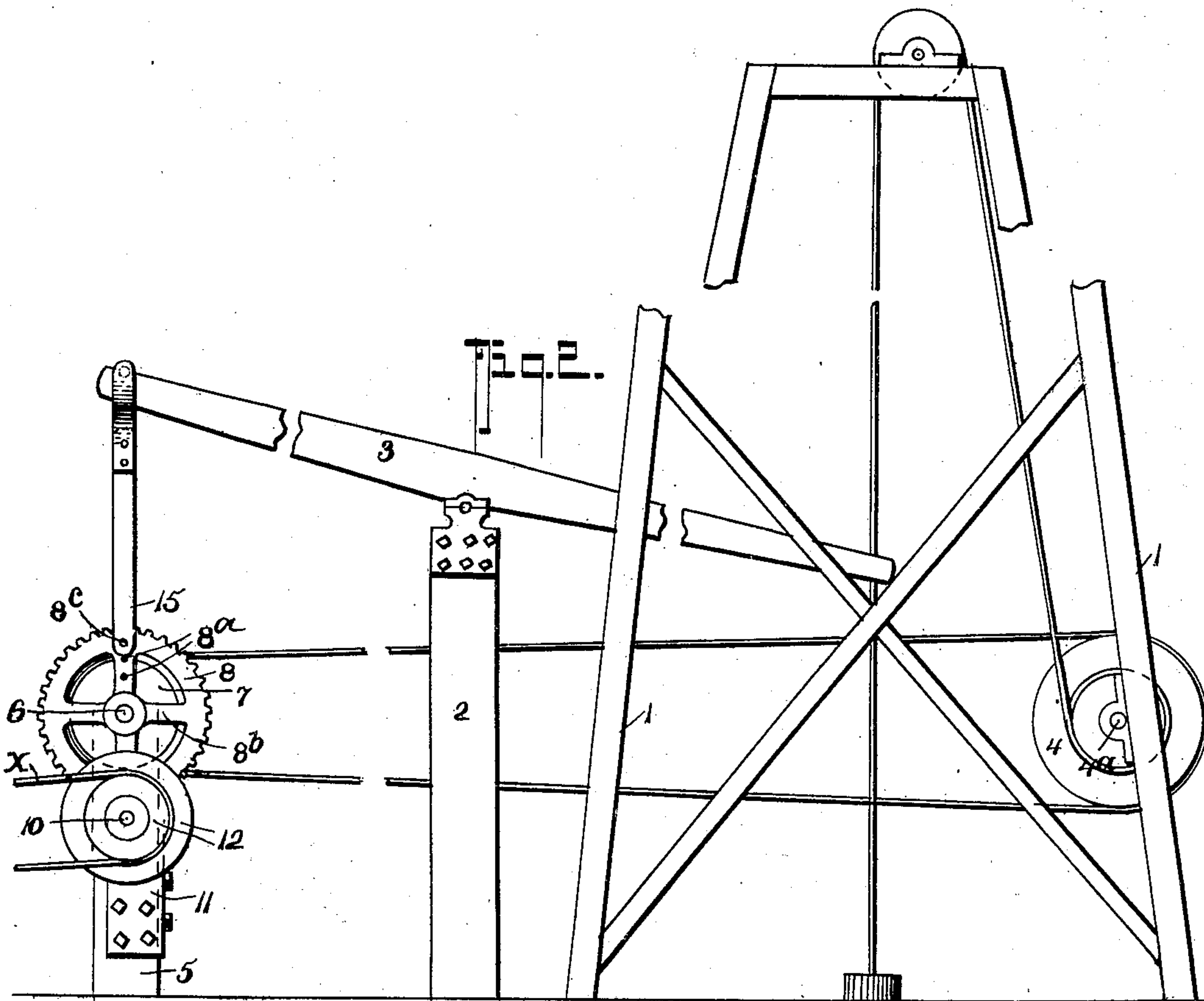
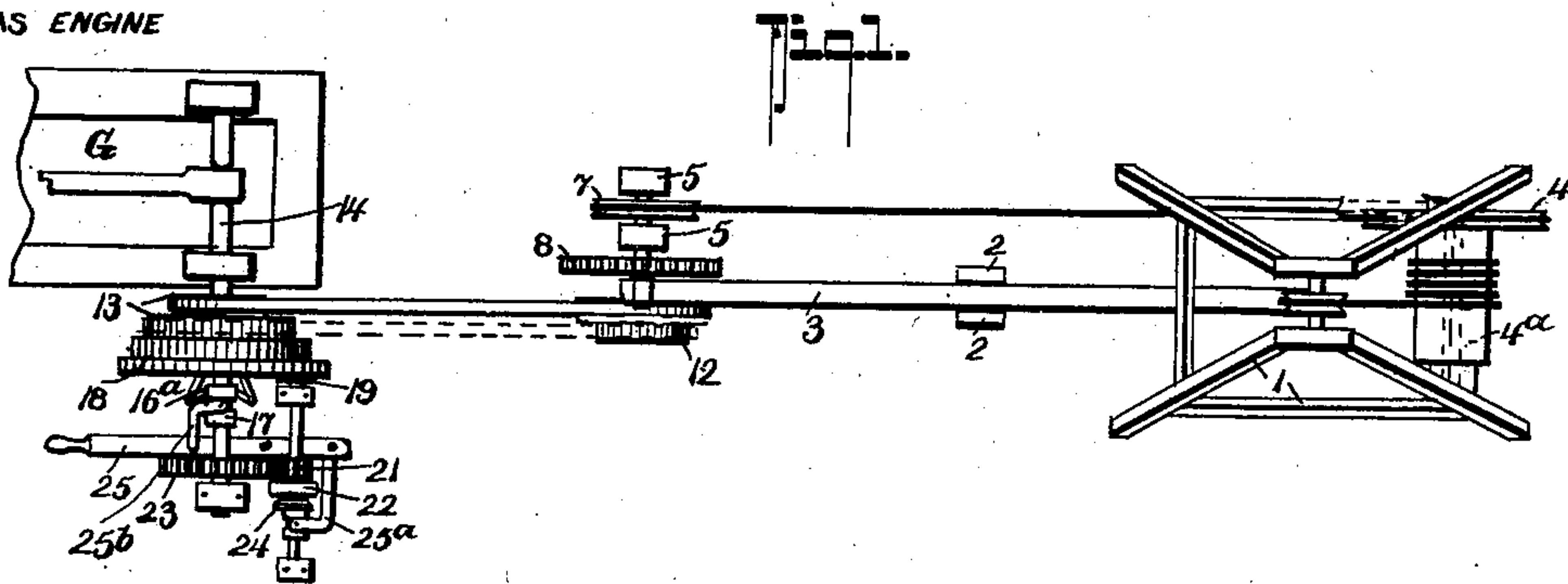
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# ROD AND TUBE ELEVATING AND PUMPING APPARATUS FOR OIL WELLS.

(Application filed Aug. 13, 1901.)

(No Model.)

2 Sheets—Sheet 1.



**WITNESSES:**

WITNESSES:  
Guy V. Worthington  
Louis Dieterich

Louis Dietrich

**INVENTOR**

*William J. Wright*

BY

BY  
*Fred G. Vieterich & Co.*  
ATTORNEYS

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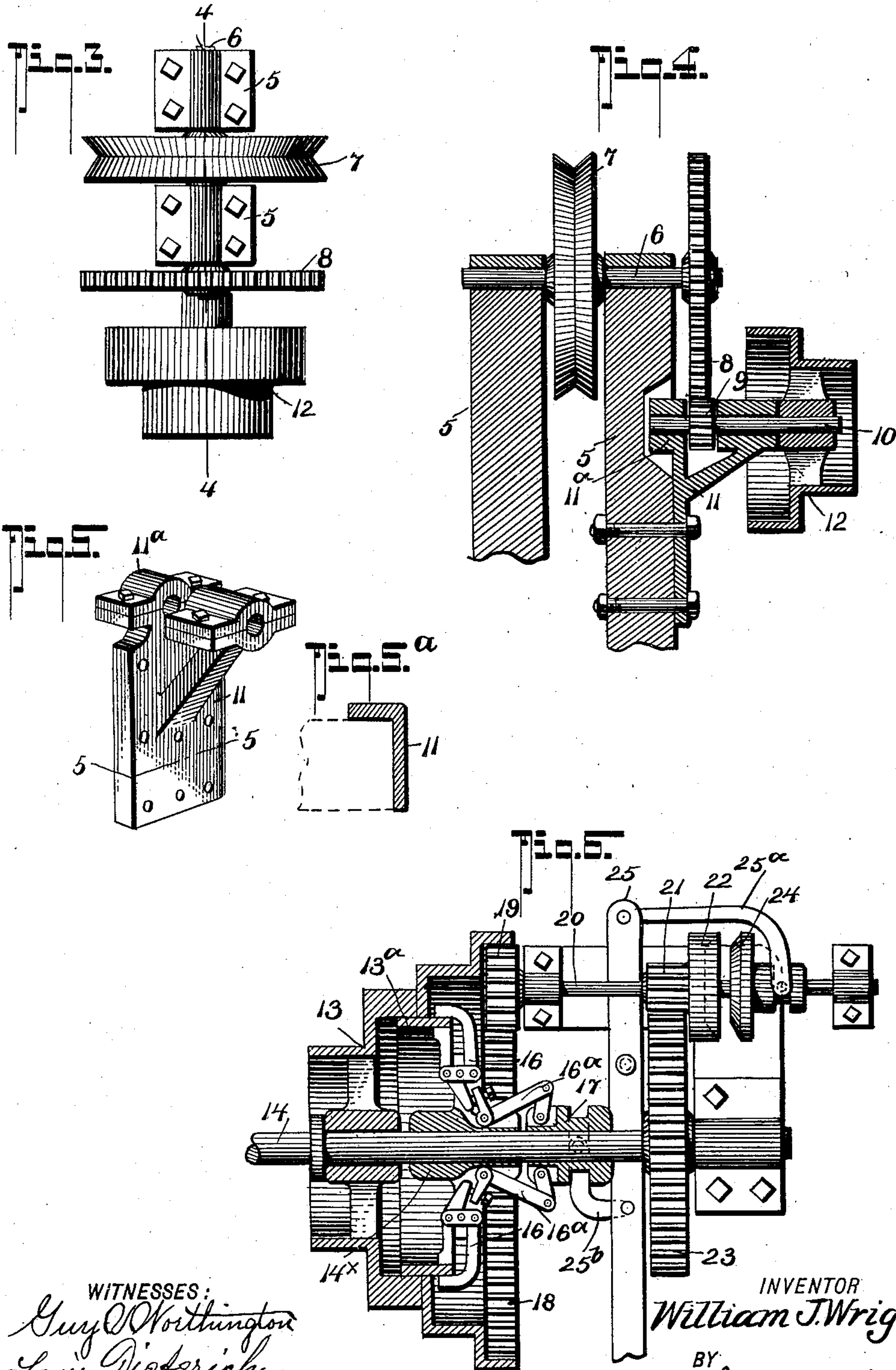
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*Louis Dieterich*

INVENTOR  
*William J. Wright.*

BY  
*Fred G. Dieterich*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

WILLIAM J. WRIGHT, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF THREE-SIXTEENTHS TO J. W. LEE AND FRED J. GALLOWAY, OF PITTSBURG, PENNSYLVANIA.

## ROD AND TUBE ELEVATING AND PUMPING APPARATUS FOR OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 713,269, dated November 11, 1902.

Application filed August 13, 1901. Serial No. 71,960. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM JAMES WRIGHT, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have  
5 invented a new and Improved Rod and Tube Elevating and Pumping Apparatus for Oil-Wells, of which the following is a specification.

In preparing and operating oil-wells it is  
10 usual to provide a steam-engine for imparting proper reverse motion to the band and bull wheels for effecting the lift of the rod and tube sections when it is desired to make the well ready for the pumping outfit and to  
15 then utilize the engine for operating the walking-beam. To effect the proper rotation of the bull-wheel, the same is joined by a crossed power-transmitting rope that connects it with the band or grooved wheel on the shaft that  
20 carries the crank for operating the walking-beam. From practical experience with oil-well apparatus of this character I have found that the crossing of the power-transmitting rope by reason of the frictional rubbing or  
25 contact of its several parts soon wears out the rope and causes it to break at times when a break in the operation of the several parts proves disastrous and one of great expense, and besides by reason of the frictional contact of the rope members requires more engine-power than is found necessary when the rope strands are held separated. Again, by  
30 reason of the necessary reverse operation required of the engine for properly manipulating the rod and tube lifting rope exacting care is required of the operator at the governor or brake wheel for controlling the speed of the bull-wheel and its rope-gathering shaft as well as constant attention of the operator  
35 who controls the reversing of the engine.

My invention seeks to provide a certain novel and economical arrangement of parts adapted when combined with the ordinary  
45 bull-wheel and rope-winding shaft and the band-wheel standards to effect the required operation of rod and tube raising and pumping in a more expeditious, convenient, and economical manner than has heretofore been accomplished and in which a small-power

gas-engine can be readily substituted in place  
50 of a greater-power steam-engine and in which the band and bull wheels can be joined by a straightway endless belt or rope.

My invention also comprehends in its complete make-up a novel and simple reversing  
55 mechanism connected, preferably, to the shaft of the gas-engine for quickly reversing the movement of the band and bull wheel shafts and for holding them inert and also for quickly shifting the direction of motion to assist the  
60 brake or governor devices in controlling the descending or ascending movements of the rods and tubes during the operation of lowering or raising said parts in the well.

My invention in its complete nature also  
65 includes certain novel details of construction and peculiar combination of parts, all of which will hereinafter be fully described, and particularly pointed out in the appended claims, reference being had to the accompanying  
70 drawings, in which—

Figure 1 is a diagrammatical plan view illustrating the general arrangement of my complete apparatus. Fig. 2 is a side elevation illustrating an oil-well derrick, the walking-  
75 beam, the band-wheel, shaft and supports, the bull-wheel, and the connections between the several parts. Fig. 3 is a top plan view of the walking-beam, operating-shaft, and the grooved or band wheel that connects  
80 with the bull-wheel. Fig. 4 is a vertical section on the line 4 4 of Fig. 3. Fig. 5 is a detail view of one of the stub-shaft-holding brackets, hereinafter referred to. Fig. 5<sup>a</sup> is a view on the line 5 5 of Fig. 5; and Fig. 6 is a  
85 top plan view, on an enlarged scale, of the reversing mechanism, hereinafter specifically described.

Referring now to the accompanying drawings, in which like numerals and letters indicate like parts in all the figures, 1 designates  
90 an oil-well derrick, 2 the samson-post, 3 the walking-beam, 4 the bull-wheel, and 4<sup>a</sup> the bull-wheel shaft, all of which may be of the well-known construction, as they *per se* form  
95 no part of my invention.

5 5 designate the posts, upon which the usual type of band-wheel shaft is mounted.



On these posts is journaled the shaft 6, which is belted with and driven reversibly from the engine, as will presently be more fully explained. Upon this shaft is mounted a groove or band wheel 7, which serves as a substitute for the grooved rim usually a part of the ordinary band-wheel, and this wheel is connected by an endless rope with the bull-wheel 4, the rope in my arrangement being a straight-way one and not crossed. Upon one end of the shaft 6 is mounted a large gear 8, preferably of the same diameter as the wheel 7. (See Fig. 3.) The gear 8 meshes with a cog-pinion 9 on a stub-shaft 10, one end of which has a bearing in member 11<sup>a</sup> of the bracket 11 on the adjacent post 5, and the other end is journaled in the outer end of the angle-bracket 11, the special form of which is shown in detail in Fig. 5.

By providing a bracket of the character described the stub-shaft 10 can be conveniently supported on the usual post 5 without requiring any material change thereof. Upon the shaft 10 is mounted a differential pulley 12, and the two different-diameter band-surfaces are held in alinement with a corresponding differential pulley 13 on the gas-engine drive-shaft 14.

The large gear-wheel 8 has one of its arms 8<sup>b</sup> provided with a series of apertures 8<sup>a</sup> for adjustably joining with it the lower end of the pitman 15, the upper end of which is pivotally connected to the outer end of the walking-beam in the usual manner. The lower end is attached to the arm 8<sup>b</sup> by the usual pin device 8<sup>c</sup>, as shown.

G designates a gas-engine of any approved type. In my complete construction of well preparing and pumping apparatus the band-pulley 13 is loosely fitted upon the drive-shaft 14, and it has a clutch-flange 13<sup>a</sup>.

14<sup>x</sup> is a hub-piece fixedly held on the shaft 14, with which a set (four, more or less) of clutch-arms 16 16 are pivotally joined, and said arms have a toggle connection 16<sup>a</sup> with a clutch-sleeve 17, slidably held on the shaft 14, by proper shifting of which the arms 16 are made to engage with the flange 13<sup>a</sup> to lock the pulley or wheel 13 to turn with the shaft 14 or disengage said flange 13<sup>a</sup> to permit the pulley 13 turning loosely on said shaft.

18 designates an internal gear-rim fixedly connected to the pulley 13, with which is held to mesh a gear-pinion 19 on a short counter-shaft 20, mounted in suitable bearings and which carries a small cog-gear 21, loosely mounted thereon, which meshes with a larger cog-wheel 23, fixedly mounted on the outer end of the engine-shaft 14. The wheel 21 has a clutch-face 22, adapted to be engaged by a clutch-sleeve 24, slidably held in the shaft 20 and held under control by a clutch-lever 25, which lever has two arms 25<sup>a</sup> 25<sup>b</sup>, one of which connects with the clutch on the main shaft 14 and the other with clutch 24 and is pivotally mounted in such manner so that

when shifted to the limit of movement in one direction it will set the clutches 16 to engage and lock the pulley 13 to turn with shaft 14 and disengage the gear 21 to allow the gear 21 to run loose, and when shifted to the other direction it will reverse the position of the clutches and provide for imparting a reverse motion to the pulley 13 through the shaft 20, gear 19 21, and the internal gear 18 on the pulley 13. When shifted to a central position, the lever 25 sets both clutches to an intermediate or an inoperative position, and thus cuts out the shaft 6 and the pumping or tube-lifting devices to leave them at rest while the engine still runs, thereby avoiding the loss of time and the inconvenience of having to start the engine every time the pumping mechanism has been stopped.

From the foregoing, taken in connection with the accompanying drawings, it is thought the complete operation of my invention and its advantages will be readily apparent. By reason of the straightway connection between the bull-wheel and the wheel 7 wear on the drive-rope and danger of breakage are reduced to the minimum, and by reason of the reduction of friction at this part of the apparatus less power is required for operation.

By joining the shaft to the engine in the manner shown and described the band X can be shifted to impart a high or low speed to shaft 6, and by reason of the simple and convenient manner in which a reverse motion can be imparted to the shaft 6 during the unidirectional motion of the engine-shaft the operation of reversing the movement of the tube and rod lift-rope can be effected quickly and with greater positiveness than is possible with the old method before referred to. Again, by reason of the reversibility of the shaft 6 or cutting it out entirely the reverse action of the shaft 6 can also be readily utilized to assist in retarding the movement of the lift-rope in either direction. One of the essential advantages of my invention lies in the novel manner in which the several parts constituting my invention are arranged, so that they may be readily attached to the ordinary pump-rigging and to an ordinary gas-engine without materially changing their present construction.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a mechanism for oil-wells of the character described, the combination with the band-wheel-driving devices, consisting of the pulley 12, the shaft 10, the bracket 11, the gear 9, on shaft 10, the gear 8 meshing there-with, and carried by the shaft 6, and the band-wheel 7, also carried by shaft 6; of the engine-shaft 14, the pulley 13, loosely mounted thereon, belted with the pulley 12, gear connections, connecting the pulley 13 with shaft 14, and clutch mechanism for shifting the said gear connections into an operative position to



rotate the pulley 13 on the shaft 14, and for locking the said pulley 13 to rotate with the shaft.

2. In an apparatus as described, the combination with the engine-shaft 14, and the drive-pulley 13, loosely mounted thereon; of a supplemental drive-gearing engaging the pulley 13 and shaft 14, said supplemental gearing consisting of the pulley 12 and the pinion 9, both carried by the shaft 10, and the shaft 6 carrying the drive-wheel 7, and the gear 8 meshing with the pinion 9, and clutch mechanism for alternately shifting the pulley 13 into a locked engagement with the drive-shaft 14, to turn therewith or to shift the supplemental gearing into a locked engagement with the drive-shaft and pulley 13, for the purposes described.

3. In a mechanism for the purposes de-

scribed, the combination with the drive-shaft 14, having a fixedly-held gear 23, and the pulley 13, loosely mounted on said shaft 14, said pulley having a clutch-flange 13<sup>a</sup>, and an internal gear 18; of the supplemental shaft 20, having a gear 19, held to engage the pulley-gear 18, the clutch-faced gear 21, loosely mounted on shaft 20, and held to mesh with drive-gear 23, the clutch 24 on shaft 20, the clutch devices on shaft 14, for coöperating with the clutch-flange 13<sup>a</sup>, on pulley 13, and an operating-lever for shifting the clutch devices on the shafts 14 and 20 in unison but in reverse directions, for the purposes described.

WM. J. WRIGHT.

Witnesses:

FRED G. DIETERICH,  
LOUIS DIETERICH.