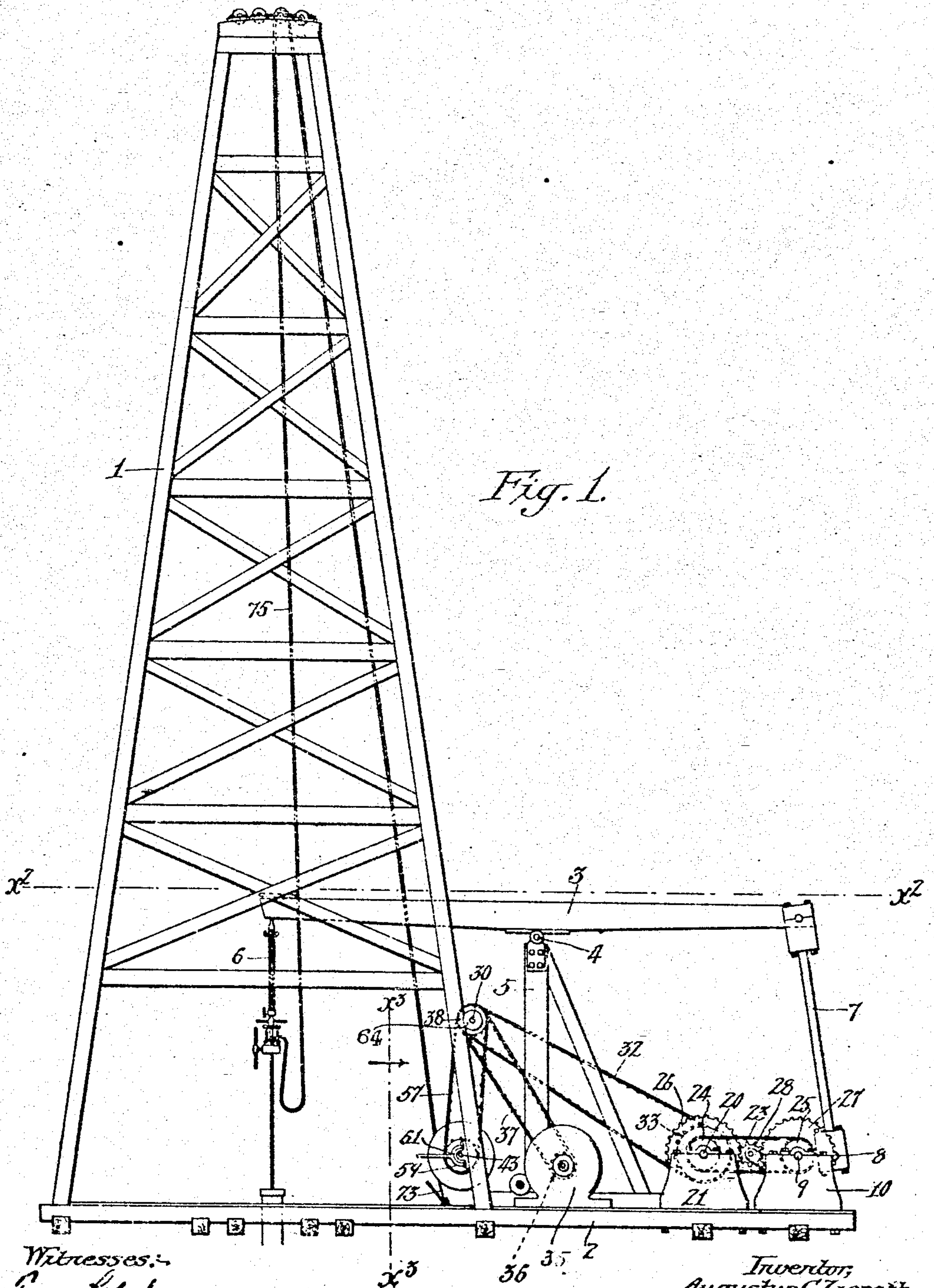


A. C. ZIERATH.  
 DRILLING RIG.  
 APPLICATION FILED MAY 25, 1909.

967,481

Patented Aug. 16, 1910.

2 SHEETS—SHEET 1.



Witnesses:  
*Frank L. Johnson*  
*Louis A. Gatz*

Inventor:  
*Augustus C. Zierath*  
*Attorney*

967,481.

Patented Aug. 16, 1910.

2 SHEETS—SHEET 2.

Fig. 2.

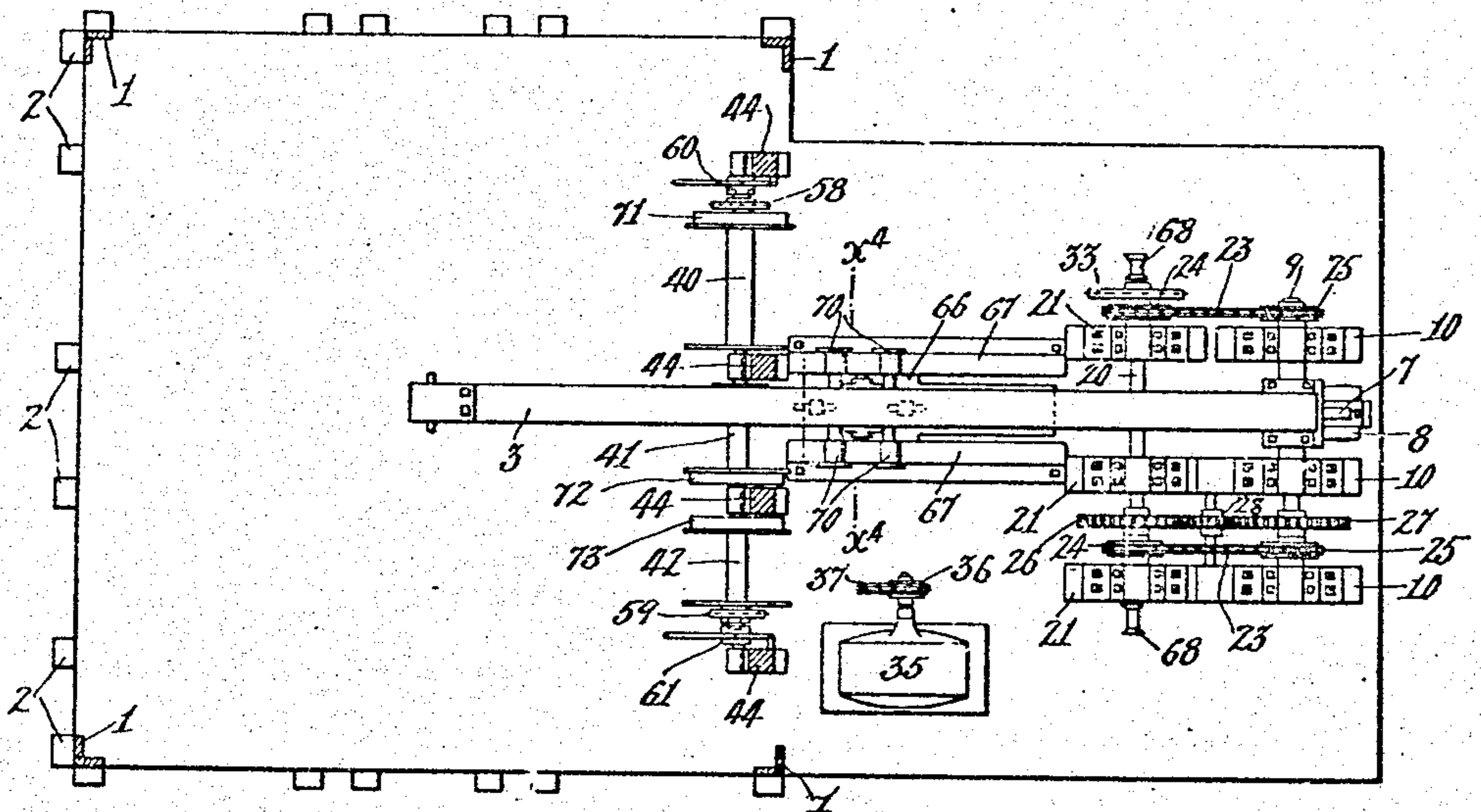


Fig. 3.

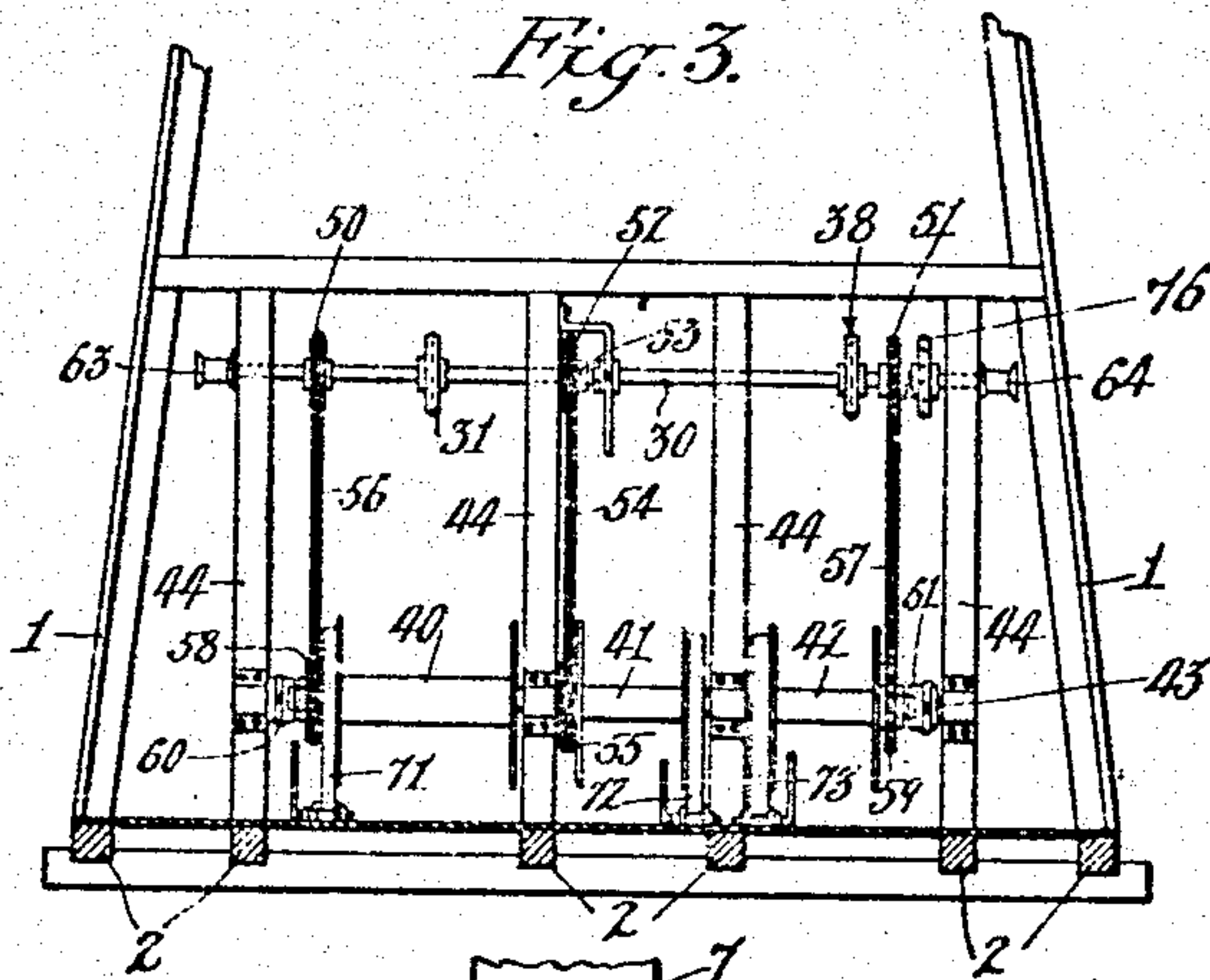


Fig. 4.

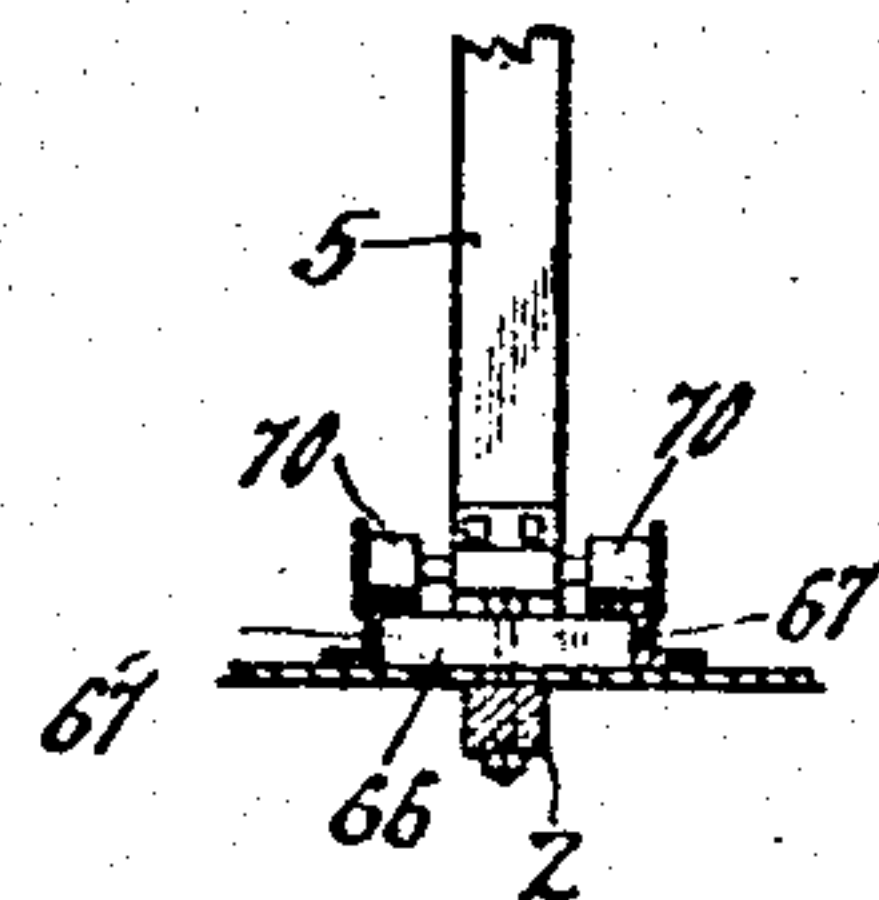
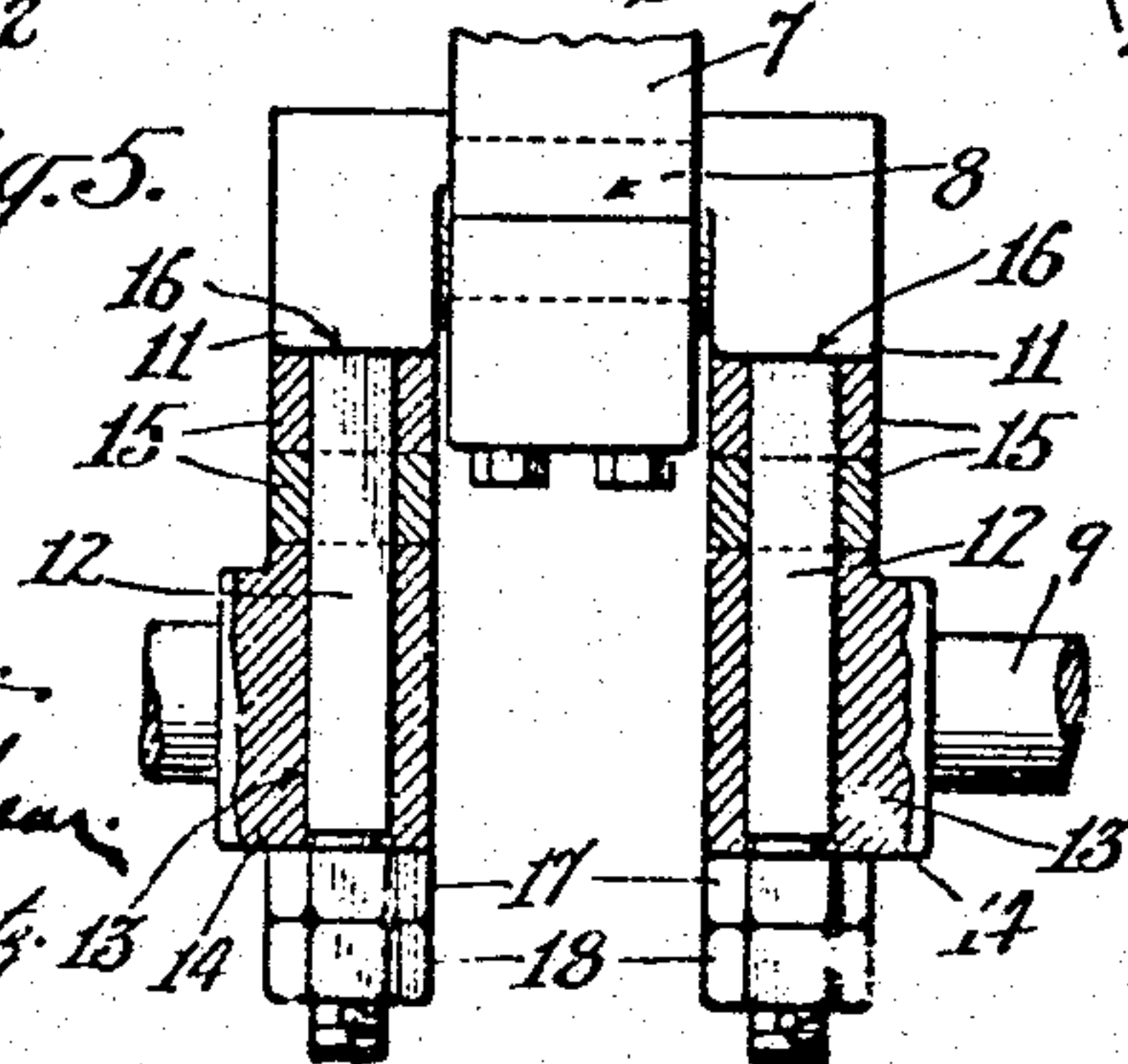


Fig. 5.



Witnesses:  
 Frank C. Baker  
 Louis A. Galt

Inventor:  
 Augustus C. Zierath  
 by  
 Edmund H. Harkness  
 atty



# UNITED STATES PATENT OFFICE.

AUGUSTUS C. ZIERATH, OF LONGBEACH, CALIFORNIA.

## DRILLING-RIG.

967,481.

Specification of Letters Patent.

Patented Aug. 16, 1910.

Application filed May 25, 1909. Serial No. 498,364.

### *To all whom it may concern:*

Be it known that I, AUGUSTUS C. ZIERATH, a citizen of the United States, residing at Longbeach, in the county of Los Angeles and State of California, have invented a new and useful Drilling-Rig, of which the following is a specification.

The main object of the present invention is to provide a drilling rig in which the various instrumentalities for operation of the drilling tools and for removal of the drilling tools, etc., are provided in a compact unitary structure.

In well drilling rigs of California type, it is usual to provide walking beam mechanism at one side of the derrick, a bull wheel at the other side for raising or lowering the tools and a calf wheel at the same side as the walking beam mechanism for pulling the casing when required, a sand wheel being also provided at this side. In the present invention all of these instrumentalities are brought into a compact unitary structure at one side of the derrick, thereby simplifying the construction, eliminating belting and also dispensing with any housing for the operating mechanism.

Further objects of the invention will appear hereinafter.

Accompanying drawings illustrate the invention and referring thereto, Figure 1 is a side elevation of the derrick and drilling rig. Fig. 2 is a horizontal section on line  $x^2-x^2$  in Fig. 1, part of the apparatus being broken away. Fig. 3 is a vertical section on line  $x^3-x^3$  in Fig. 1. Fig. 4 is a vertical section on line  $x^4-x^4$  in Fig. 2. Fig. 5 is a vertical section of the crank shaft mechanism.

1 designates the derrick which may be of usual construction and is provided with the base frame or sills 2 which extend laterally therefrom and carry the operating mechanism hereinafter described. The walking beam 3 pivoted at 4 on the samson-post 5 is connected at one end to the temper-  
aw 6 and at the other end to the pitman 7, whose lower end is connected to the crank pin 8 of the crank shaft 9. Said crank shaft is made in two parts journaled in separate bearings or standards 10 at each side of the machine, said shaft members 9 having crank portions 11 connected at their outer ends by the crank pin 8 so that the crank pin is supported and operated from each side, thereby eliminating all twisting

strains such as arise with the usual crank pins extending from one end of the main shaft. To provide for adjustment of the stroke of the crank, the crank members 11 are preferably made with shanks 12 extending through transverse bores 13 in cross heads 14 on the respective shaft members 9 and washers or distance pieces 15 are interposed between the cross head 14 and a shoulder 16 of the crank member, the lower end of each shank 12 being screw threaded to receive a fastening nut 17 and a lock nut 18. By removing these nuts and transferring one or more of the washers 15 from a position between the cross head 14 and the shoulder 16 to a position on the other side of the cross head between said cross head and the nut 17, the crank may be correspondingly shortened or by a reverse operation the crank may be lengthened. Any desired number of these washers may be used.

Means are provided for operating the crank shaft members 9 at each side so as to give a balanced or equalized operation. For this purpose a driving shaft 20 mounted in bearings 21 and extending parallel to the shaft members 9 is connected thereto by a sprocket chain 23 running over sprockets 24, 25, on the shaft 20 and on the shaft members 9 respectively, and by gears 26, 27, on said shaft meshing with an intermediate gear 28. By the provision of this sprocket and gearing all looseness of transmission is avoided and a steady smooth drive is insured. The driving shaft 20 is operated from the counter shaft 30 journaled in bearings on the side of the derrick 1, and carrying a sprocket wheel 31 connected by a sprocket chain 32 with sprocket wheel 33 on the shaft 20. Said sprocket shaft 30 is operated by a motor 35 mounted on the base 2 and connected by sprocket wheel 36, sprocket chain 37 and sprocket wheel 38 with the said shaft 30. Motor 35 may be an electric motor, gas engine or steam engine. The same motor 35 also serves to operate the other devices of the rig including the drum 40 for the standard rig, drum 41 for the bailing line and drum 42 for use with the rotary rig. The drums 40, 41 and 42 are mounted on a shaft 43 extending transversely of the derrick and supported on posts 44 so as to turn independently of one another. A counter shaft or jack shaft 30 mounted in bearings on said post 44 above the shaft 43 is driven from the motor 35 by sprocket wheel 36.



sprocket chain 37 and sprocket wheel 38, and said jack shaft carries two fast sprockets 50, 51, and a loose sprocket 52, a clutch 53 being provided to clutch the loose sprocket 52 to the jack shaft. Sprocket wheel 52 is connected by sprocket chain 54 with a sprocket wheel 55 on the bailing line drum 41, sprocket wheels 50 and 51 are connected by sprocket chains 56, 57, respectively to the sprocket wheels 58, 59, loosely mounted on the lower shaft 43. Brakes 71, 72, 73, are provided for drums 40, 41, 42.

Clutches 60, 61, are provided for connecting or disconnecting the sprocket wheel 58 with the main drum 40 and for connecting the sprocket wheel 59 with the drum 42 for the rotary rig. The jack shaft 45 is provided at each end with a cat head or small winding drum 63, 64, for use in spudding.

To adapt the rig for use as a combination rig the samson-post and walking beam are mounted to be movable out of the way when the rotary rig is in operation. For this purpose the samson-post 5 is mounted on a supplementary base 66 which slides in a way or track formed by the guide rails 67 on the base 2, wheels 70 being provided to reduce the friction. A cat head 68 may be provided at each end of the driving shaft 20 to receive a line for drawing the samson-post frame 66 rearwardly out of the way when desired.

The operation is as follows: In spudding the spudding line is thrown over either of the cat heads 63, 64, enough turns thereon being taken to provide a grip and the line being passed over a fall and attached to the standard rig line. The spudding is effected by intermittently pulling the free end of the line to tighten the same on the cat head. At each tightening the cat head winds up the line and then on release of the tension the line falls under the weight of the tool, etc. The regular drilling operation is effected by rotation of the driving shaft 20 and driven shaft 9 from the motor 35 through the sprocket connections 37, 32 and 23, and the gearing wheels 24 in such manner as to give a smooth, steady, positive drive. For lifting the tools the standard rig drum from main drum 40 will be brought into use, the main line 75 being fastened around said drum; for lifting the case the same drum may be used. In sand-bailing the drum 41 is used. When the rig is to be used as a rotary, frame 66 with the walking beam and samson-post is drawn out of the way by attaching a line to the said frame and throwing said line over one of the cat heads, 68, on the driving shaft 20,

taking sufficient turns thereon to grip the line to the shaft so that in the rotation of said shaft the line will be wound on the cat head and will draw the frame 66 away from the derrick, leaving the space within the derrick free for operation of the rotary rig. The rotary can then be operated by a chain from sprocket wheel 76 on shaft 30.

What I claim is:

1. A drilling rig comprising a derrick having a base extending laterally therefrom, walking beam mechanism supported on said laterally extending base, a shaft journaled on the derrick adjacent to said lateral extension, a standard rig drum, and a bailing-line drum mounted to rotate independently on said shaft, a counter shaft journaled above the first named shaft, independent sprocket chain connections from the said counter-shaft to the said drums, clutches in said connections, and means for driving said counter-shaft.

2. A drilling rig comprising a derrick having a base extending laterally therefrom, walking beam mechanism supported on said laterally extending base, a shaft journaled in the derrick adjacent to said lateral extension, a standard rig drum, and a bailing-line drum mounted to rotate independently on said shaft, a counter-shaft journaled above the first named shaft, independent sprocket chain connections from the said counter-shaft to the said drums, clutches in said connections, means for driving said counter-shaft, and a motor and driving connections therefrom to the walking beam mechanism and to the said counter-shaft.

3. A drilling rig comprising a derrick having a base extending laterally therefrom, walking beam mechanism supported on said laterally extending base, a shaft journaled in the derrick adjacent to said lateral extension, a standard rig drum, and a bailing-line drum mounted to rotate independently on said shaft, a counter-shaft journaled above the first named shaft, independent sprocket chain connections from the said counter-shaft to the said drums, clutches in said connections, means for driving said counter-shaft, and cat-heads on the ends of the said counter-shaft.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 17th day of May, 1909.

AUGUSTUS C. ZIERATH.

In presence of—

ARTHUR P. KNIGHT,  
FRANK L. A. GRAHAM.