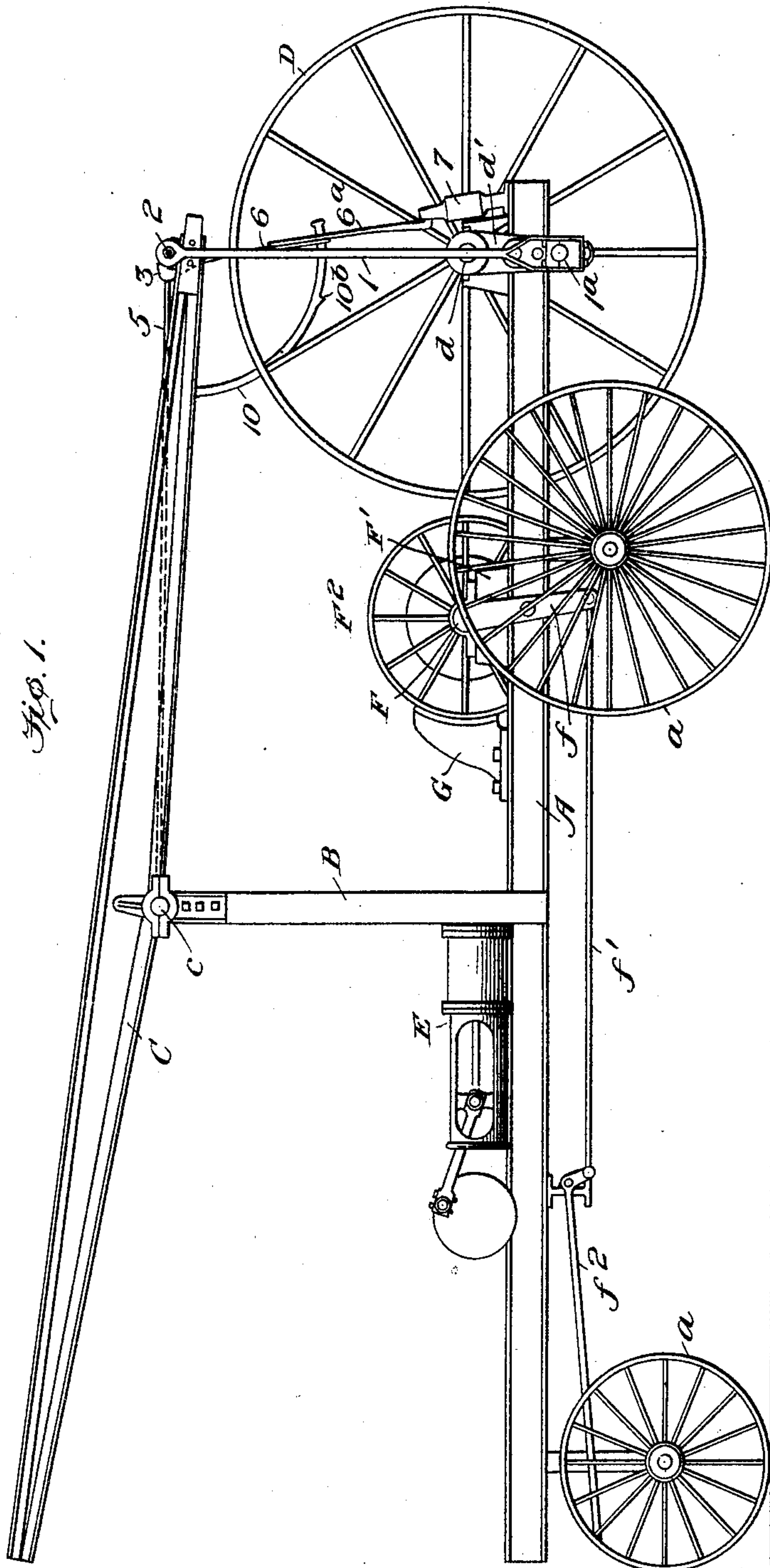


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WELL DRILLING APPARATUS.  
APPLICATION FILED JAN. 26, 1909.

931,101.

Patented Aug. 17, 1909.  
3 SHEETS—SHEET 1.



Witnesses

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By

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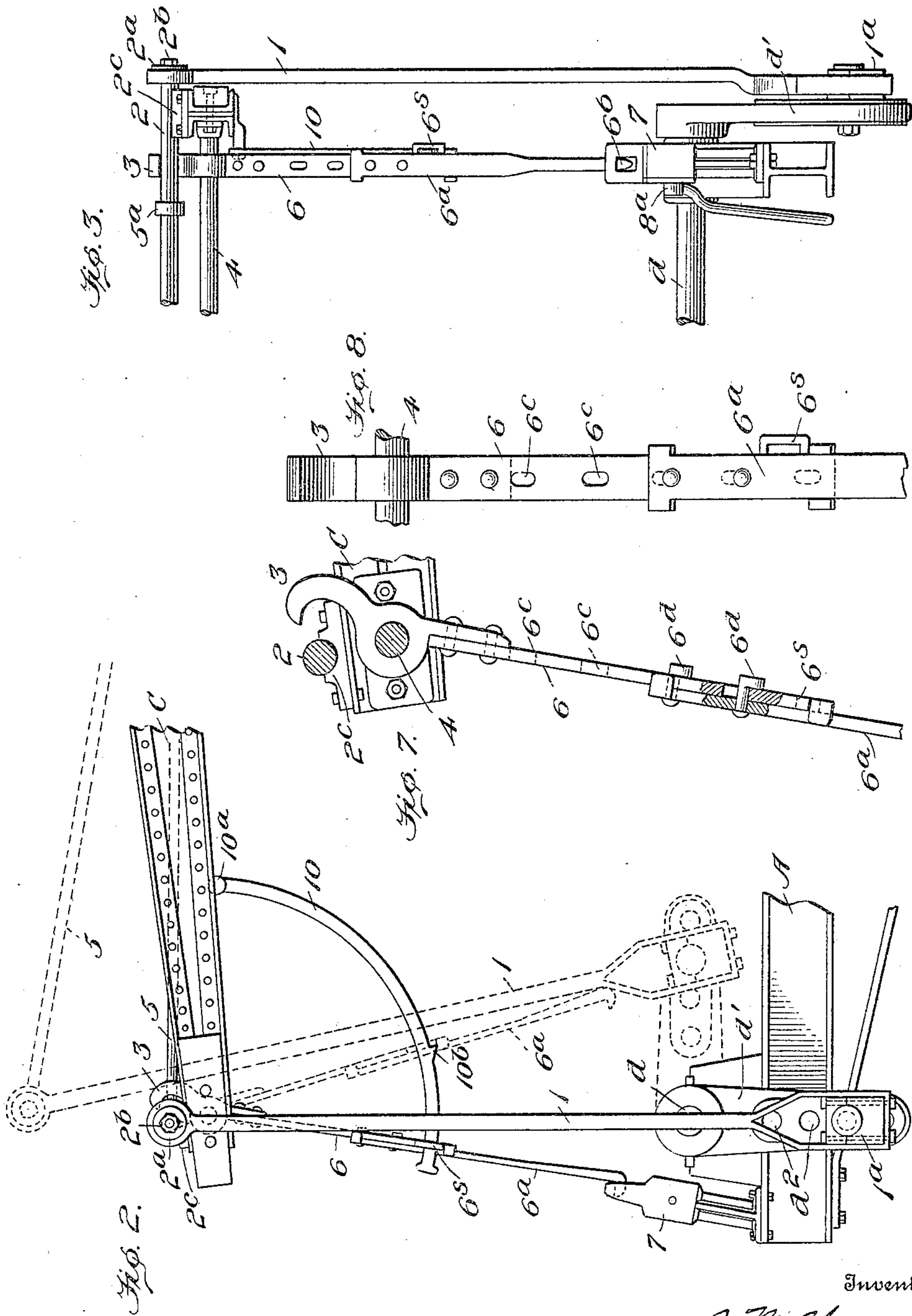
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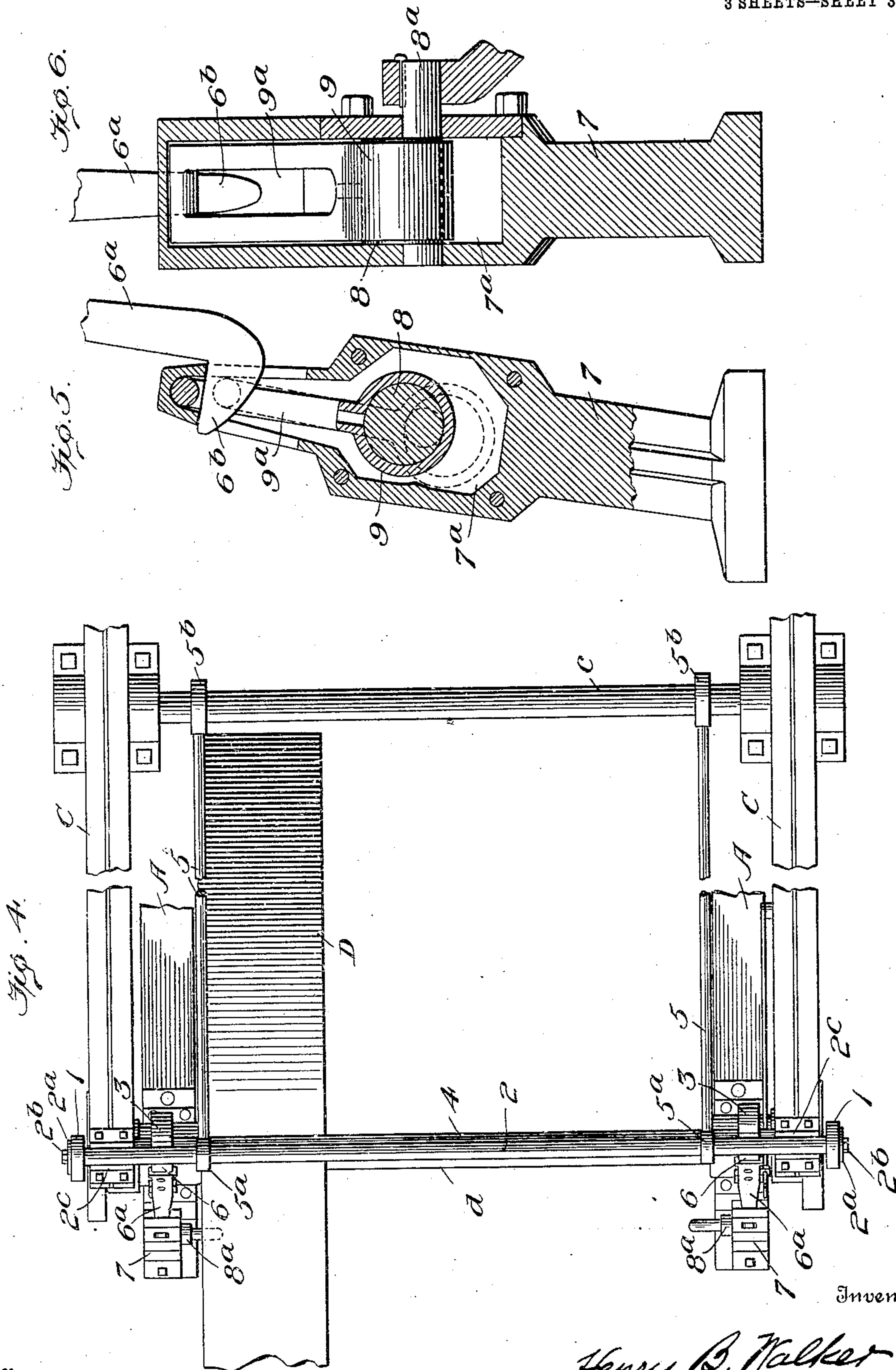
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

HENRY B. WALKER, OF MOUNT VERNON, OHIO, ASSIGNOR TO OIL WELL SUPPLY COMPANY,  
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## WELL-DRILLING APPARATUS.

No. 931,101.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed January 26, 1909. Serial No. 474,196.

*To all whom it may concern:*

Be it known that I, HENRY B. WALKER, a citizen of the United States, residing at Mount Vernon, in the county of Knox and State of Ohio, have invented certain new and useful Improvements in Well-Drilling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the construction of pitman and walking beam connections of well drilling apparatus whereby the walking-beam may be readily connected with the band-wheel shaft or power shaft when the walking beam is to be operated, and as readily disconnected therefrom when it is desired to independently operate the bull-wheel, sand-reel, or other element of the organized apparatus.

Well drilling rigs as usually organized, are constituted, broadly stated, of a band-wheel and its shaft driven directly from the engine or power shaft, a walking beam operated from the crank on the band-wheel shaft by an intermediate pitman, a bull-wheel for reeling the drill rope, a casing-reel for handling the casing, and a sand-reel for reeling the sand-line, the last named devices also operated either directly or indirectly from the band wheel shaft. As these several elements constituting the rig are alternately and separately operated from the band wheel shaft, it becomes necessary to provide means for disconnecting and connecting up the band wheel shaft with each of said elements. This has been accomplished in case of the standard or stationary rigs, where a single pitman is used, by disconnecting the pitman from the crank of the band wheel shaft, and throwing off the tug rope which drives the bull-wheel from a pulley on the band wheel shaft; the sand reel being driven from the band wheel by means of a friction drum on the sand-reel shaft adapted to be moved into and out of contact with the band-wheel.

In the case of drilling rigs having such a construction of walking beams as necessitates the use of two pitmen, as sometimes occurs in portable rigs, there has heretofore been no feasible means of readily detaching the pitman from either the walking beam or

the cranks of the band wheel shaft, and therefore in such constructions the bull-wheel, casing-reel and sand reel have been driven from the band-wheel shaft through the intervention of gearing and clutch mechanism, which construction has not in all respects proved satisfactory so far as the sand-reel is concerned.

It has, in practice, been found desirable to locate the sand-reel adjacent to the band-wheel and operate it from the band-wheel by the usual friction drum on the sand-reel shaft. As however, the walking-beam must be at rest when the sand-reel is in operation, this location and operation of the sand-reel can not be effectively accomplished unless a clutch is interposed between the band-wheel and its shaft—which is neither desirable nor practical—or the walking-beam be disconnected from the band-wheel shaft. The main feature of my invention, therefore, broadly stated, embraces the combination with a walking-beam, a pitman, and a shaft for actuating the pitman, of a coupling for connecting the pitman and walking-beam, and means for actuating said coupling for readily and rapidly connecting and disconnecting the walking-beam and pitman. In carrying out this feature of my invention, I prefer to connect the walking-beam ends of the pitmen by a connecting or cross-rod, and to provide the walking-beam with seats or bearings for said rod, and with latches or equivalent means for confining the said pitmen connecting rod to the walking-beam, and such a construction embodies a secondary feature of my invention.

A further feature of my invention embraces the provision of means for controlling the movement of the pitmen when released from the walking-beam. In carrying out this feature of my invention, I prefer to employ links or radius rods extending from the connecting rod of the pitmen to the hinge line of the walking-beam, and such a construction embodies a minor feature of my invention.

A further feature of my invention embraces the provision of means for retaining the walking-beam out of operative position, and also below its lowest operative position when disconnected from the pitmen. In carrying out this feature of my invention, I



prefer to employ hook-straps adapted to connect and disconnect the main frame of the rig and the walking-beam, and such a construction embodies another minor feature of my invention.

There are other features of invention involved in both the elemental construction, and particular combinations of the several elements, all as will hereinafter more fully appear.

In the drawings chosen for the purpose of illustrating my invention, the scope whereof is pointed out in the claims, Figure 1 is a side elevation of a drilling-rig frame, and so much of the apparatus as embodies my invention. Fig. 2 is a detail view in side elevation of the devices embodying my invention. Fig. 3 is a detail end view of the devices shown in Fig. 2. Fig. 4 is a detail top view of the devices embodying my invention, parts broken out. Fig. 5 is a detail sectional view of the beam-hook standards for securing the walking-beam, when disconnected from the band-wheel shaft. Fig. 6 is a detail sectional view of the devices shown in Fig. 5, taken at right angles to Fig. 5. Fig. 7 is a detail side view of one of the latches for confining the pitmen connecting rod to the walking-beam and one of the hook-straps for confining the walking-beam when disconnected from the pitmen, and, Fig. 8 is a detail view of said latch and hook-strap, at right angles to Fig. 7.

Like symbols refer to like parts wherever they occur.

I will now proceed to describe my invention more fully so that others skilled in the art to which it appertains may apply the same.

The drawings accompanying this specification show only such parts of the well-drilling rig as pertain to my invention, and their relation to each other and to the main frame, but it is to be understood that, a derrick with its crown pulley, a bull-wheel, a casing-wheel, the necessary gearing and clutch mechanism and pulleys, or like adjuncts which go to make up any form of an organized well drilling rig may and will be used in conjunction therewith; as for instance as illustrated in the patent to H. S. and C. E. Glenn, #806,886 of December 12, 1905.

In the drawings, A indicates the main frame, which may consist of two longitudinally disposed beams or girders properly cross braced and connected to obtain the necessary strength and stiffness. In case of a portable machine said frame A will be supported on suitable wheels  $a, a$ , but in case of a stationary-rig, other suitable means, or a subframe support may be provided to afford the desired elevation.

B indicates the samson post or upright for affording the pivotal support of the walk-

ing-beam C. In a portable rig there may be two of these uprights, one extending up from each sill or side girder A of the main frame. The walking-beam C is likewise comprised of twin members, properly cross braced or rigidly connected and pivoted at mid-length on the tops of the samson posts or uprights B, preferably by means of a cross shaft  $c$ , or in other suitable member. The members of the walking-beam C will also preferably be formed of I beams or girders tapering in both directions from the fulcrum-point.

D indicates the band-wheel having its shaft  $d$  properly journaled in bearings on the main frame A, said shaft  $d$  having at its opposite ends crank arms  $d'$  provided with the usual series of crank pin holes  $d^2$  whereby the length of stroke of the walking-beam may be varied. This band-wheel and its shaft is driven by means of the usual belt from a suitable pulley on the power shaft actuated by an engine E mounted on the main frame A, or in any other of the well known ways of operating the band-wheel of a well-drilling rig.

F indicates the shaft of the sand-reel journaled at one end in a fixed journal bearing on the frame A, and at the opposite end in a sliding bearing  $F'$ , which latter bearing is movable to and from the band-wheel by means of a pivoted lever  $f$  and rods  $f', f^2$ , or in other suitable manner.

On the sand-reel shaft F adjacent to the movable end thereof is secured a friction drum  $F^2$  which can be thrown into and out of contact with the band-wheel by means of the lever  $f$  and rods  $f', f^2$ , for rotating the sand-reel when desired.

To the rear of the friction drum  $F^2$  and secured to the main frame A is a brake-block G against which the friction drum F may be pressed to arrest the rotation of the sand reel when it is thrown out of action.

1 indicates a pitman, of which there are two, pivotally connected with the crank arms at the opposite ends of the band-wheel shaft  $d$ , by the usual stirrup and bearings  $1^a$ , or in other suitable manner. The opposite or walking-beam ends of the pitmen 1 are pivotally connected with a cross-rod, or pitman connecting-rod 2, the ends of said rod being preferably passed through eyes on the upper ends of pitmen 1, and secured by washers  $2^a$  and nuts  $2^b$ , or in other suitable manner. This cross-rod, or pitman connecting-rod 2 is provided with seats or bearings  $2^c$  on the upper surface of the walking-beam, and means are provided to confine the rod to the walking-beam, and to release said rod therefrom, accordingly as the walking beam is to be operated, or remain at rest. Said means for securing and releasing the cross rod 2 of the pitmen, is preferably in the form of two latches 3, 3 connected by a latch bar 4, so as to be simultaneously operated, and by means



of said bar also pivoted on and connected to the twin members of the walking-beam C.

In order to control the movement of the cross-rod 2, and the pitmen, when said cross-rod is disconnected from the walking-beam, links or radius rods 5 are provided, said rods preferably having at their ends eyes 5<sup>a</sup>, 5<sup>b</sup> through the former of which the cross-rod 2 passes, and through the latter of which passes the cross shaft *c* constituting the pivot or fulcrum-pin of the walking-beam. In case a cross-shaft *c* is not employed, an equivalent center for the attachment of the ends of the links or radius rods 5 may be provided. The latches 3 are readily manipulated, either to secure or release rod 2, by means of a dependent rod, which in the present instance, and preferably, is in the form of a strap or straps adjustable as to length, so as to conform to the varying stroke of the pitman, and said straps may be used to secure the walking-beam when disconnected from the pitmen. The adjustable straps are each comprised of two members 6 and 6<sup>a</sup>, one of which, 6, is riveted or otherwise secured to a latch 3, and the other, 6<sup>a</sup>, is provided at its free end with a hook 6<sup>b</sup> or equivalent means of engaging a beam-hook standard on the main frame. The adjustment of the straps as to length, which must correspond to the length of stroke of the pitmen, is accomplished by providing one of said members with a series of slots or button holes 6<sup>c</sup>, and the other with hooks or buttons 6<sup>a</sup> adapted to engage in said slots 6<sup>c</sup>, and bind the two members 6 and 6<sup>a</sup> securely together.

7, 7 indicate beam-hook standards secured to the frame A adjacent to the bearings of the band-wheel shaft *d* and provided with means for the engagement of the hook 6<sup>b</sup> of the walking-beam strap.

As it is desirable, not only to secure the walking-beam when released from the pitmen, but also to retain it in such a position that it will not be struck or hammered by the pitmen connecting-rod 2 which continues to travel with the pitmen, said means should, preferably, be of a character not only to hold the walking-beam but also to retain it slightly below its lowest operative position. Although this may be accomplished manually, yet to effect it, I prefer to slot and core out the beam-hook standard as at 7<sup>a</sup> and arrange therein a cam 8 whose shaft 8<sup>a</sup> projects from the standard 7 and to employ a yoke 9 having a hook eye 9<sup>a</sup> for the engagement of the hook 6<sup>b</sup> of the walking beam strap, whereby when the strap engages the yoke and the cam is rotated the walking-beam may be readily drawn down and held below its lowest operative position.

In order to hold the beam strap 6, 6<sup>a</sup> out of engagement with the beam hook standard, as well as to hold the latches 3 in locked

position so as to secure the pitmen-connecting rod 2 to the walking-beam, some means must be provided, and I prefer to use a single means for both purposes, said means consisting of an arc bar 10 pivoted at one end on the walking-beam, as at 10<sup>a</sup>, and passed through a slot 6<sup>s</sup> on one side of the strap member 6, said arc bar having a projection 10<sup>b</sup> adapted to engage the strap 6 and hold the latch 3 in position over the pitmen connecting rod 2, and the hook 6<sup>b</sup> of the strap out of engagement with the yoke 9 of the beam hook standard 7.

The construction being substantially such as hereinbefore pointed out, the operation of the devices will be as follows: On reference to Fig. 2 of the drawing it will be noted that the latches 3 are thrown back so as to release the pitmen-connecting rod 2 from the walking beam, the beam straps 6, 6<sup>a</sup> have been made to engage the yoke 9 of the beam-hook standard and the walking-beam is held at rest, while, as indicated by dotted lines, the pitmen 1, 1, and pitmen connecting-rod 2 continue their movement with the cranks of the band-wheel shaft, being guided by the links or radius rods 5, 5. At this time the sand-reel may be operated from the band-wheel by so manipulating the rods *f*<sup>2</sup>, *f*<sup>1</sup> and lever *f* as to move the sliding bearing *F*<sup>1</sup> of the sand-reel shaft *F* toward the band-wheel shaft *d*, which will bring the friction drum *F*<sup>2</sup> of the sand-reel in contact with the band-wheel *D* and thus rotate the sand-reel directly from the band-wheel. A reverse movement of the rods *f*<sup>2</sup>, *f*<sup>1</sup> and lever *f*, will withdraw the friction drum *F*<sup>2</sup> from contact with the band-wheel *D*, and the walking-beam may then be coupled to the pitmen 1, 1 by releasing the beam straps 6, 6<sup>a</sup> from the beam-hook standard and pushing said straps back so as to bring the latches 3, 3 forward over the pitmen connecting rod 2 to confine the same to its seats 2<sup>c</sup> on the upper surface of the walking-beam C. When the straps 6, 6<sup>a</sup> have been pushed back to bring the latches 3, 3 over the pitmen connecting rod 2, the catch projection 10<sup>b</sup> on arc bar 10 will engage one of the straps 6, 6<sup>a</sup> and not only hold it out of engagement with the standard 7 but also hold the latches 3, 3 in position to lock the pitmen to the walking-beam.

From the foregoing description it will be noted that the pitmen can be readily and quickly uncoupled from the walking-beam, and the walking-beam brought to a state of rest, by a simple movement of the pendent straps 6, 6<sup>a</sup>, or their equivalent, and thereafter the walking-beam may be released and again coupled to the pitmen by a simple reverse movement of said straps 6, 6<sup>a</sup>, and that this ability to so readily and rapidly couple and uncouple the pitmen and walking-beam renders it perfectly practicable to



locate the sand-reel adjacent to and operate it from the band-wheel through the medium of a friction drum on the sand-reel shaft.

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

1. In a well drilling rig, the combination of a walking-beam, a pitman, a shaft for actuating the pitman, a coupling for connecting the pitman and walking beam, and means for actuating said coupling to connect and disconnect the pitman and walking beam.

2. In a well drilling-rig, the combination with a walking-beam and a pitman for actuating the walking-beam, of a pivoted member mounted on one of the first two named members and rotatable into and out of connection with the other of said first two named members to connect and disconnect said walking beam and pitman.

3. In a well-drilling rig, the combination of a walking-beam, a pitman, a cast-off coupling for the walking-beam and pitman, and a link for controlling the movement of the pitman when released from the walking-beam.

4. In a well-drilling rig, the combination of a walking-beam, a pitman, a pivoted latch to connect the pitman to the walking-beam, means for controlling the movement of the pitman when disconnected from the walking beam, and means for retaining the walking beam out of operative position.

5. In a well-drilling rig, the combination of a walking-beam and pitman, a coupling therefor, means for controlling the movement of the pitman when disconnected from the walking-beam, means for retaining the walking beam out of operative position when released from the pitman, and mechanism operating on the strap whereby the walking-beam may be caused to assume a position below its lowest operative position.

6. In a well-drilling rig, the combination of a walking-beam, a pitman, a latch adapted to connect the walking-beam and pitman, and a strap to actuate the latch and to retain the walking-beam out of operative position.

7. In a well-drilling rig, the combination of a walking-beam, a pitman, a latch for coupling the walking-beam and pitman, a strap for actuating the latch and for retaining the walking-beam out of operative

position, and means for confining the strap to maintain the connection between the walking-beam and pitman.

8. In a well-drilling rig, the combination with a walking-beam, of pitmen, a rod for connecting the pitmen, and pivoted latches for connecting the rod to the walking beam.

9. In a well-drilling rig, the combination with a walking-beam of pitmen, a rod for connecting the pitmen, latches for securing the connecting-rod to the walking-beam, and links for controlling the movement of the connecting-rod and pitmen when released from the walking-beam.

10. In a well-drilling rig, the combination with the walking-beam, of pitmen, a rod for connecting the pitmen, latches for connecting the rod with the walking-beam, straps for retaining the walking-beam out of operative position when released by the latches, and a cam and yoke for acting on the straps to cause the walking-beam to assume and maintain a position below its lowest operative position.

11. In a well-drilling rig, the combination with a walking-beam, a pitman, a cast-off coupling for connecting the walking-beam and pitman, a guide link for controlling the movement of the pitman when disconnected from the walking-beam, a strap for actuating the coupling and retaining the walking-beam out of operative position when released from the pitman, and a cam and yoke for operating the strap to cause the walking-beam to assume a position below its lowest operative position.

12. In a well-drilling rig, the combination with a walking-beam, and pitman and a cast-off coupling therefor, of a strap to retain the walking-beam out of operative position when released from the pitman, said strap being adjustable as to length to provide for varying strokes of the pitman.

13. The combination of a walking beam, a pitman, a shaft for actuating the pitman, a coupling for connecting and disconnecting the pitman and walking beam, and means for controlling the movement of the pitman when disconnected from the walking-beam.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

HENRY B. WALKER.

Witnesses:

A. G. HEGGEM,

W. W. ANDERSON.