July 23, 1929. F. W. STORK 1,721,718

OIL FIELD JACK

Filed June 4, 1927

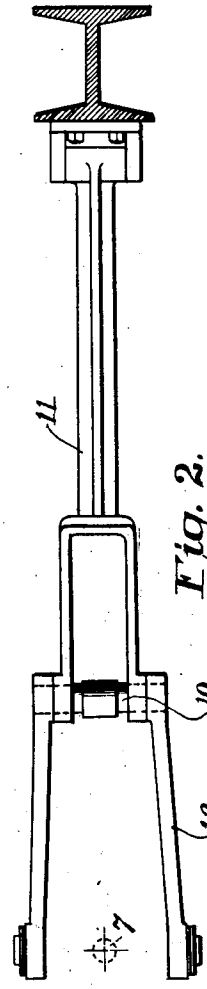


Fig. 2.

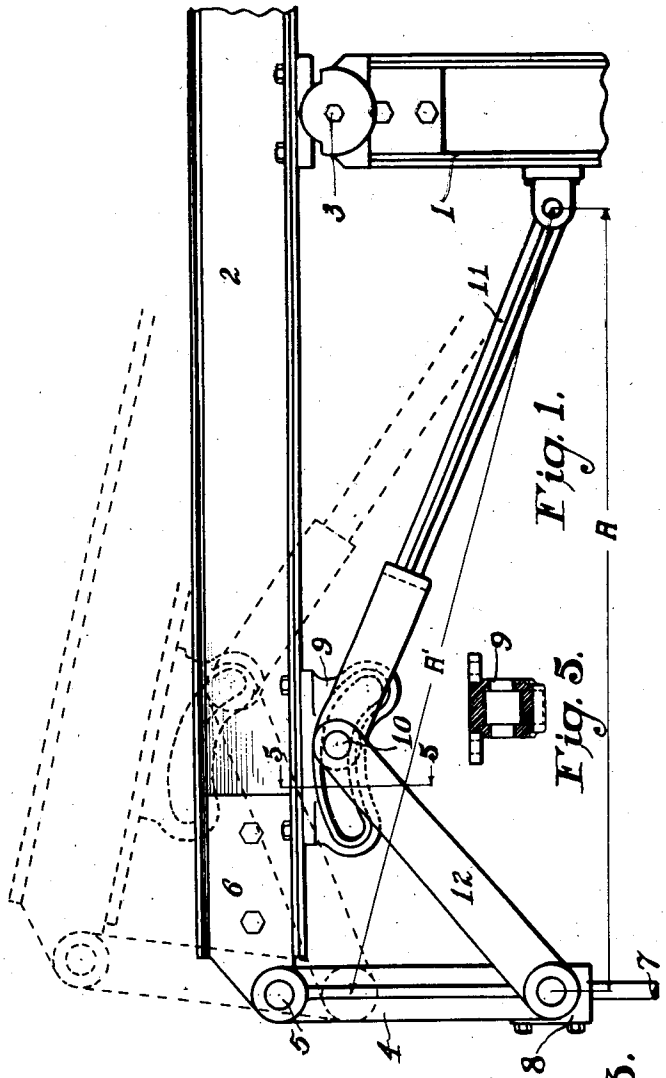


Fig. 1.

Fig. 5.

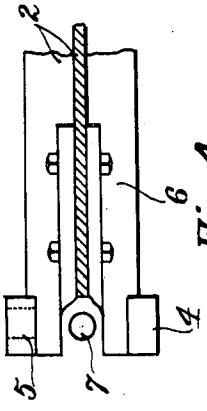


Fig. 4.

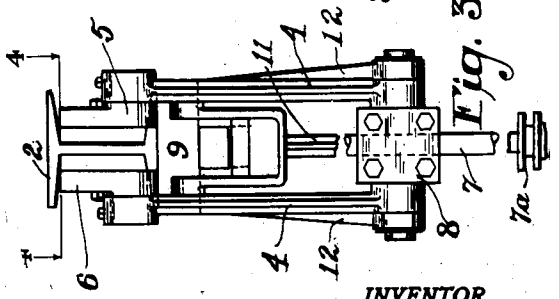


Fig. 3.

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UNITED STATES PATENT OFFICE.

FRED W. STORK, OF SAGINAW, MICHIGAN, ASSIGNOR TO STORK ENGINEERING COMPANY, INCORPORATED, OF SAGINAW, MICHIGAN, A CORPORATION OF MICHIGAN.

OIL-FIELD JACK.

Application filed June 4, 1927. Serial No. 196,586.

This invention relates to oil field jacks and machines of like character, in which a walking beam is employed to actuate a drill rod, cable or the like which must be made to travel in a straight line and as nearly as possible without any sidewise movement.

An object of my invention is to provide on the walking beam a device which while traveling up and down with the beam will constrain the well rod to travel in a straight line, although the end of the beam travels in the arc of a circle.

A further object is to avoid wear on the packing box at the top of the well casing and thereby prevent leakage, unnecessary friction and noise.

The means by which I attain these objects is illustrated in the accompanying drawings, in which Fig. 1 is a side view, partly broken away, showing the working end of a well jack embodying my invention.

Fig. 2 is a top plan view of the pair of links that constitute the flexing connection of Fig. 1, the walking beam removed.

Fig. 3 is an end view of the parts shown in Fig. 1.

Fig. 4 is a horizontal section on line 4—4 of Fig. 3.

Fig. 5 is a sectional view of the cam on line 5—5 of Fig. 1.

As is clearly shown in the drawings, the jack structure consists in the usual beam stand 1, the walking beam 2 mounted thereon by means of a walking beam saddle pin 3, and an arc link, or as shown in Fig. 3, a pair of arc links 4, 4 pivotally suspended from gudgeons 5, 5 on a bracket 6 bifurcated to permit the polished plunger rod 7 to pass.

The upper end of link 4 travels in the arc of a circle with saddle pin 3 as a center. Heretofore the lower end of the link, connected by means of clamp 8 to plunger rod 7, has been guided only by a suitably packed gland 7^a in the well head, and the resulting sidewise pull on the rod caused the wear on the gland and the leakage, noise and undesirable friction which are avoided in machines embodying the present invention.

The lower part of the arc links 4, 4, the clamp 8 and plunger rod 7 are constrained to travel in a straight line without any guiding assistance from the gland, or, if for any purpose it is desired to guide the rod in a predetermined line, which need not necessarily be an exactly straight line, it can be done by a slight modification of structure of a single cam without departing from my invention as herein set forth and claimed.

The means by which the rod 7 is guided consists primarily of a flexing connection hinged at one end to the beam stand 1 and at the other end to the lower part of the arc link 4, and a suitable guiding device, such as a curved way or cam 9 fixed to the walking beam, preferably beneath it, as shown in the drawings.

The flexing connection comprises preferably a pair of links hinged together by a pivot pin 10 which is guided in cam 9. One of the links, 11, is hinged at one end to the beam stand and the other link, or preferably a pair of links 12, 12 are hinged at one end to the lower part of the arc link 4, and to the clamp 8, as shown in Figs. 1 and 3.

The dotted lines in Fig. 1 indicate the position of the walking beam and cam at the top of the stroke. The radial distance from the point where link 11 is hinged to stand 1 to the center of clamp 8 when the walking beam is raised is indicated by A′, and when the beam is half-way down this radial distance is shorter, as at A. Still further below the middle of the stroke the radial distance again increases if the rod 7 is to travel in the true up and down straight line.

Thus the radial distance A must be subject to constant variation during the up and down movement of the pitman. The pivot pin 10 is, therefore, provided with a suitable guiding means which will permit the pin to have a combined movement lengthwise the walking beam and toward or away from it as the walking beam and the links 11 and 12 travel up and down. The exact path of this curved way or cam 9 depends upon the proportions of the various parts, such as the walking beam, the arc link 4 and the links 11 and 12, but the shape of the cam for any given conditions of size and proportion and length of travel can be easily obtained by means of suitable movable gauges or forms representing the various parts, either full size or to scale. The shape and size of cam 9 is obtained by means of a scribing pin representing the center of pin 10, when the center line of clamp 8 is made to travel up and down along a straight edge which represents the line of travel of the well rod 7. If desired, the rod can be made to travel at a slight angle from the vertical, or if for any purpose a slight sidewise move-

ment is desired it can be easily obtained by employing a suitably shaped cam 9.

The pin 10 rides in and is guided by the cam and the end of rod 11 is bifurcated for that purpose, as shown in Fig. 2.

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

1. The combination of a beam stand, a walking beam thereon, an arc link pivotally suspended from an end of said beam, a flexing connection comprising a pair of links, a pivot pin hinging said links together, one of said links hinged at one end to the beam stand, the other link hinged at one end to the lower part of the arc link, and a cam fixed upon the walking beam and slidingly engaged by said pin for flexing said connection during the up and down movement of said beam to constrain the lower part of the arc link to travel in a straight line.

2. The combination of a beam stand, a walking beam thereon, an arc link pivotally suspended from an end of said beam, a flexing connection comprising a pair of links, a pivot pin hinging said links together, one of said links hinged at one end to the beam stand, the other link hinged at one end to the lower part of the arc link, and a curved guide carried by the walking beam and engaging said pin for flexing said connection to constrain the lower part of the arc link to travel in a straight line.

3. The combination of a beam stand, a walking beam thereon, an arc link pivotally suspended from said beam, a flexing connection comprising a pair of links, a pivot pin hinging said links together, one of said links hinged at one end to the beam stand, the other link hinged at one end to the lower part of the arc link, and means carried by the walking beam and applied upon the flexing connection intermediate its ends for flexing it to constrain the lower part of the arc link to travel in a predetermined line.

4. The combination of a beam stand, a walking beam thereon, an arc link pivotally suspended from an end of said beam, a flexing connection hinged at one end to the beam stand and at the other end to the lower part of the arc link, and means carried by the walking beam and applied upon the flexing connection intermediate its ends for flexing it to constrain the lower part of the arc link to travel in a predetermined line.

In testimony whereof, I affix my signature.

FRED W. STORK.