April 27, 1926. 1,582,465

G. A. HART

WALKING BEAM AND SUCKER ROD CONNECTION FOR DEEP WELL PUMPS

Filed July 13, 1925

Fig. 1.

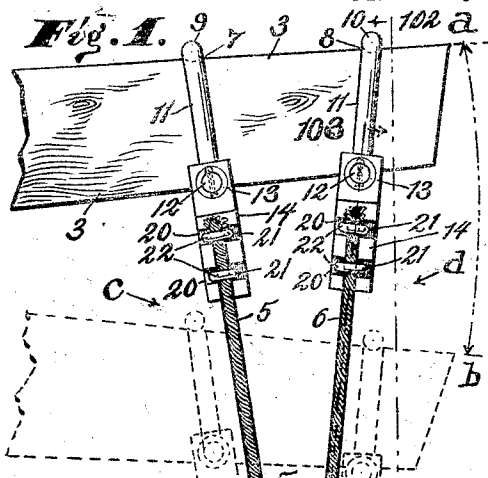


Fig. 2.

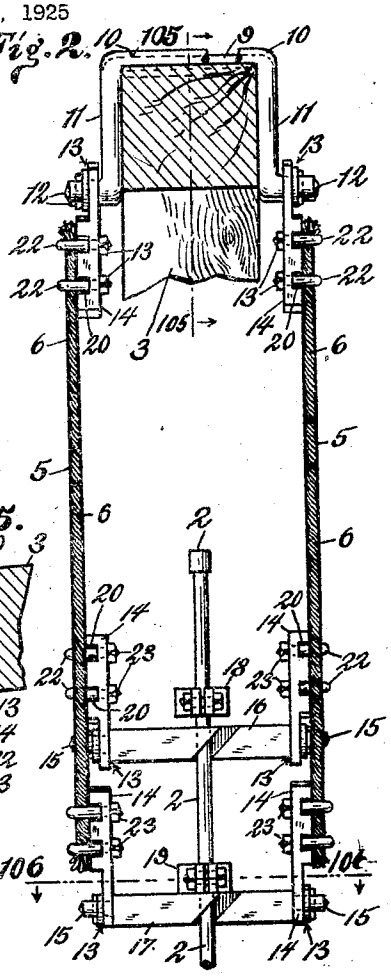


Fig. 3.

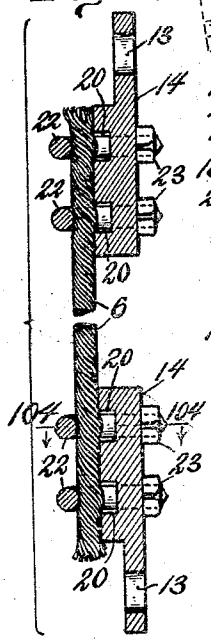


Fig. 5.

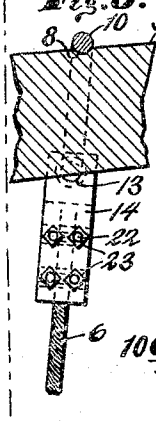


Fig. 6.

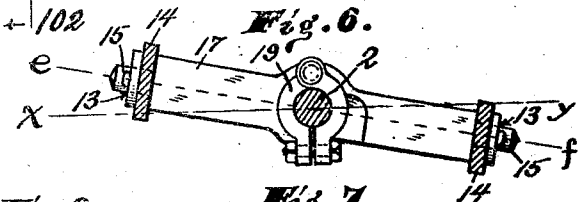


Fig. 4.

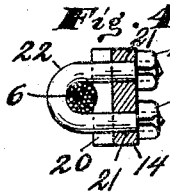


Fig. 8.

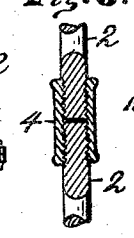


Fig. 7.



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Patented Apr. 27, 1926. 1,582,465

UNITED STATES PATENT OFFICE.

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WALKING-BEAM AND SUCKER-ROD CONNECTION FOR DEEP-WELL PUMPS.

Application filed July 13, 1925. Serial No. 43,242.

To all whom it may concern:

Be it known that I, GLENN A. HART, a citizen of the United States, and a resident of Bell, county of Los Angeles, State of California, have invented a certain new and useful Walking-Beam and Sucker-Rod Connection for Deep-Well Pumps; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to a connection between the walking beam and sucker rod of a deep well pump, and an object of this invention is to form a flexible connection between these parts that is simple to construct, operate and install; and that is very strong and durable in use.

Another object of the invention is to provide a flexible connection between a walking beam and sucker rod of a deep well pump that includes short cables that are arranged and connected so that they are held straight; so that substantialy all the weight and strain applied to them is lengthwise thereto.

Heretofore it has been customary to loop a cable either under or over appliances secured to a walking beam with the end of the cable connected to a cross bar on the sucker rod so that the weight and strain were crosswise to the cable adjacent its center; which arrangement of parts required long length of cable; and also the crosswise strain and weights caused the cable to be easily and quickly broken at the loop; and as stated an object is to avoid crosswise strains on the cables and also to use short lengths of cable.

Another object of the invention is to provide a flexible connection between the walking beam and sucker rod of a deep well pump that includes cables having end bearings that are adapted to be pivotally connected to pivots carried by the walking beam and another pivot on a cross bar connected to the sucker rod so that the bearings can move on their pivots to compensate for the difference between the arc movement of the walking beam and vertical movement of the rod.

Another object of the invention is to provide a simple, strong and durable rocking saddle for the walking beam that is adapted to reciprocate in its seat to aid in holding the cables straight, so that the weight or strain will not be applied crosswise thereto.

Another object is to provide the cables of the connection with detachable end bearings, that, in addition to reciprocating on their pivots so that the cables will remain straight in operation, also are interchangeable to expedite connecting or disconnecting the cables to the beam and rod.

Features of invention are shown in the construction, combination and arrangement of the parts whereby a flexible connection is provided that in operation is adapted to impart a slight intermittent rotary movement to the sucker rod to keep its joints tightly screwed together.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a fragmental side view of a deep well pump showing the flexible connection in use; and illustrating by full and dotted lines the extreme upper and lower positions of the beam and associated parts when in operation.

Fig. 2 is a fragmental cross section on line 102—102 of Fig. 1.

Fig. 3 is a fragmental longitudinal section on line 103—103 of Fig. 1 showing a detail of the end bearings of one of the cables.

Fig. 4 is a cross section on line 104—104 of Fig. 3 additionally illustrating the construction of the cable bearings and the means for detachably securing them to the cables.

Fig. 5 is a fragmental section on line 105—105 of Fig. 2 showing a detail of a rocking saddle in its seat.

Fig. 6 is a cross section on line 106—106 of Fig. 2; showing the normal position of a cross bar when first taking the weight or strain in reciprocating the sucker rod.

Fig. 7 is a cross section analogous to Fig. 6 illustrating the arc movement of the cross bar when subjected to the full weight or strain of the sucker rod when reciprocating it.

Fig. 8 is a fragmental section of a sucker rod joint that is kept tight by the turning movement of the cross bars.

The deep well pump 1 has a sucker or polish rod 2 above which a walking beam

3 is arranged to reciprocate in an arc *a*—*b* shown in Fig. 1.

The beam 3 is of usual construction and is mounted on a pivot not shown and operated in a way well understood in the art, it being understood that its purpose is to reciprocate the rod 2 vertically. And it is also understood that the flexible connection between the walking beam and sucker rod is for the purpose of slightly rotating the sucker rod to keep its joints 4 screwed tightly together as well as to operate the rod; and to accomplish the foregoing purposes I provide a connection comprising two units *c* and *d* that coact to reciprocate and simultaneously rotate the rod; and the parts of these units are constructed substantially alike except that the cables 5 of the unit *c* are slightly shorter than the cables 6 of the unit *d*.

The walking beam is provided with groove seats 7, 8 in which the rock saddles 9, 10 are loosely mounted.

Preferably the saddles 9, 10 are formed of cylindrical iron bars that are first bent to form side portions 11 that are arranged to extend down the sides of the beam; and then end portions 12 are bent outward to form pivots for bearings 13 of the bearing plates 14.

The bearing plates 14 are constructed substantially alike so that they can be fitted to any of the pivots 12 of the saddles 7, 8 or also to any of the pivots 15 of the upper and lower cross bars 16, 17 that are adapted to be loosely mounted on the sucker rod 2 and arranged to engage their respective clamps 18, 19 that are secured to the rod 2. In other words the bearing plates are interchangeable to expedite attaching them to or detaching them from the pivots on the saddles and cross bars.

Each of the bearing plates 14 is provided with parallel grooves 20 in one side thereof that extends crosswise to the longitudinal axis of the plates; and from the bottoms of these grooves there are pairs of bolt holes 21 that extend through to the other side of the plates.

The grooves 20 are arranged so that end portions of the pairs of cables 5, 6 can be laid across them lengthwise to the plates and secured thereto by U-bolts 22 that are arranged over the cables 5, 6 so that when the nuts 23 are tightened the cables will be drawn a sufficient distance into the cross grooves to secure the cable ends and bearing plates together so that they will sustain great strains and weight without separating or breaking.

The various parts of the connection between the walking beam and sucker rod are constructed and arranged so that the cables 5, 6 are held straight, so that the strain and weight thereon when reciprocating the sucker rod will be in lines parallel to the longitudinal axis of the cables and never crosswise thereto. In other words the saddles are constructed and arranged so that they can rock in the seats 7, 8 and the bearing plates 14 can turn on their pivots to compensate for the difference between the arc movement of the walking beam and vertical movement of the sucker rod as previously stated.

The unit *c* is shorter than the unit *d* and arranged with its saddle 9 nearer to the pivot (not shown) of the walking beam 2 so that it moves in a much shorter arc than the unit *d*; and the clamps 18, 19 are arranged on and secured to the rod 2 so that when the beam 3 is moved in the arc *a*—*b* the strain and weight of the sucker rod will be alternately shifted from unit *c* to *d* and vice versa.

As previously stated, the cables 5, 6 can be slightly twisted so that when free of weight or strain they normally hold the cross bars 16, 17 at an acute angle relative to a line parallel to the longitudinal axis of the saddles as illustrated by the dotted lines *e*—*f* and *x*—*y* in Fig. 6; and this twist is taken out of the cables when they are placed under the strain and weight of lifting the sucker rod so that the cross bars are turned into lines parallel to the longitudinal axis of the saddles and when turning they frictionally engage their respective clamps on the sucker rod and give it a slight rotation that keeps the joints 4 of the sucker rod screwed tight together. That is the twist in the cables normally holds the bars 16, 17 when free from engaging their respective clamps 18, 19 parallel with the line *e*—*f*: and when they are forced into engagement with their clamps and the weight of the sucker rod comes on them they are turned from a line parallel with *e*—*f* to *x*—*y*, thereby imparting a slight rotation to the sucker rod to keep its joints tight.

I claim:

1. The walking beam and sucker rod connection for a deep well pump including a saddle adapted to be loosely mounted on a walking beam; a cross bar loosely mounted on a sucker rod and arranged to engage a clamp secured to the rod; cables interposed between said saddle and bar; and means for pivotally connecting the ends of said cables to said saddle and bar so that weight and strain applied to the cables will be lengthwise thereto.

2. The walking beam and sucker rod connection for a deep well pump including a saddle adapted to be mounted on a walking beam; pivots on said saddle; a cross bar adapted to be loosely mounted on a sucker rod and arranged to engage a clamp secured to said rod; pivots on the ends of said bar; cables interposed between said saddle and bar; and means for pivotally connecting the

ends of said cables to said pivots so that the cables are held relatively straight, and so that weight and strain applied to said cables will be lengthwise thereto.

3. The walking beam and sucker rod connection for a deep well pump including a saddle adapted to be loosely mounted in a seat on a walking beam; pivots integral with said saddle; a cross bar loosely mounted on a sucker rod and arranged to engage a clamp secured to said rod; pivots integral with the ends of said bar; cables interposed between said saddle and bar; and bearings secured to the ends of said cables that are adapted to be pivotally mounted on said pivots, said bearings adapted to oscillate on said pivot to compensate for the difference between the arc movement of the walking beam and vertical reciprocation of the sucker rod so that said cables can be held straight.

4. The walking beam and sucker rod connection for a deep well pump including a rocking saddle formed of a cylindrical iron bar that is bent to extend over the top and down the sides of a walking beam and arranged in a seat thereon and adapted to reciprocate with the beam; pivots integral with said saddle; a cross bar loosely mounted on a sucker rod and arranged to engage a clamp secured to the rod; pivots integral with the ends of said bar; wire cables interposed between said saddle and bar; and interchangeable bearings detachably connected to the ends of said cables that are adapted to be pivotally and detachably connected to said pivots, said saddle adapted to rock in the seat of said beam and said bearings oscillate on said pivots to compensate for the difference between the arc movement of the walking beam and vertical reciprocation of the sucker rod for the purpose specified.

5. The walking beam and sucker rod connection for a deep well pump including wire cables; bearings adapted to be connected to the ends of said cables and detachably secured to pivots connected to the walking beam and sucker rod, each of said bearings having parallel cross grooves in one side thereof over which end portions of the cables are adapted to be extended so that the cable ends are crosswise to the grooves, and each bearing having pairs of bolt holes extending from the bottoms of the grooves through the bearings; and pairs of U-bolts for each bearing by means of which the ends of the cables are detachably secured to said bearings, said bolts adapted to be arranged and tightened so as to force the end portions of the cables into the cross grooves.

6. The walking beam and sucker rod connection for a deep well pump including an inner and outer rocking saddle adapted to be mounted in seats on a walking beam and arranged to be rocked and reciprocated in an arc above a jointed sucker rod that is adapted to reciprocate vertically; upper and lower cross bars loosely mounted on the sucker rod and arranged to engage their respective clamps secured to the rod; a pair of short cables interposed between said inner saddle and upper cross bar; means for detachably and pivotally connecting the ends of said cables to said inner saddle and upper cross bar; a pair of longer cables interposed between said outer saddle and lower cross bar; and means for detachably and pivotally connecting the ends of said longer cables to said outer saddle and lower cross bar, said parts arranged so the weight of the sucker rod is alternately shifted from saddle to saddle and said cables are adapted to be slightly twisted so that when free from strain they normally hold their respective bars at acute angles to the longitudinal axis of said saddles so that when first under strain the cables frictionally engage their cross bars with their respective clamps so that when taking the full weight of the sucker rod the heavy strain will overcome the twist in the cables and turn the bars from acute angles to positions parallel to the longitudinal axes of the saddles so that the frictional engagement and turning of the bars with their respective clamps will cause a slight intermittent rotation of the sucker rod to keep its joints screwed tightly together.

In witness whereof, I have hereto affixed my signature.

GLENN A. HART.