July 9, 1929. J. P. RATIGAN 1,720,056

ADJUSTABLE BEAM HANGER

Filed April 18, 1928 2 Sheets-Sheet 1

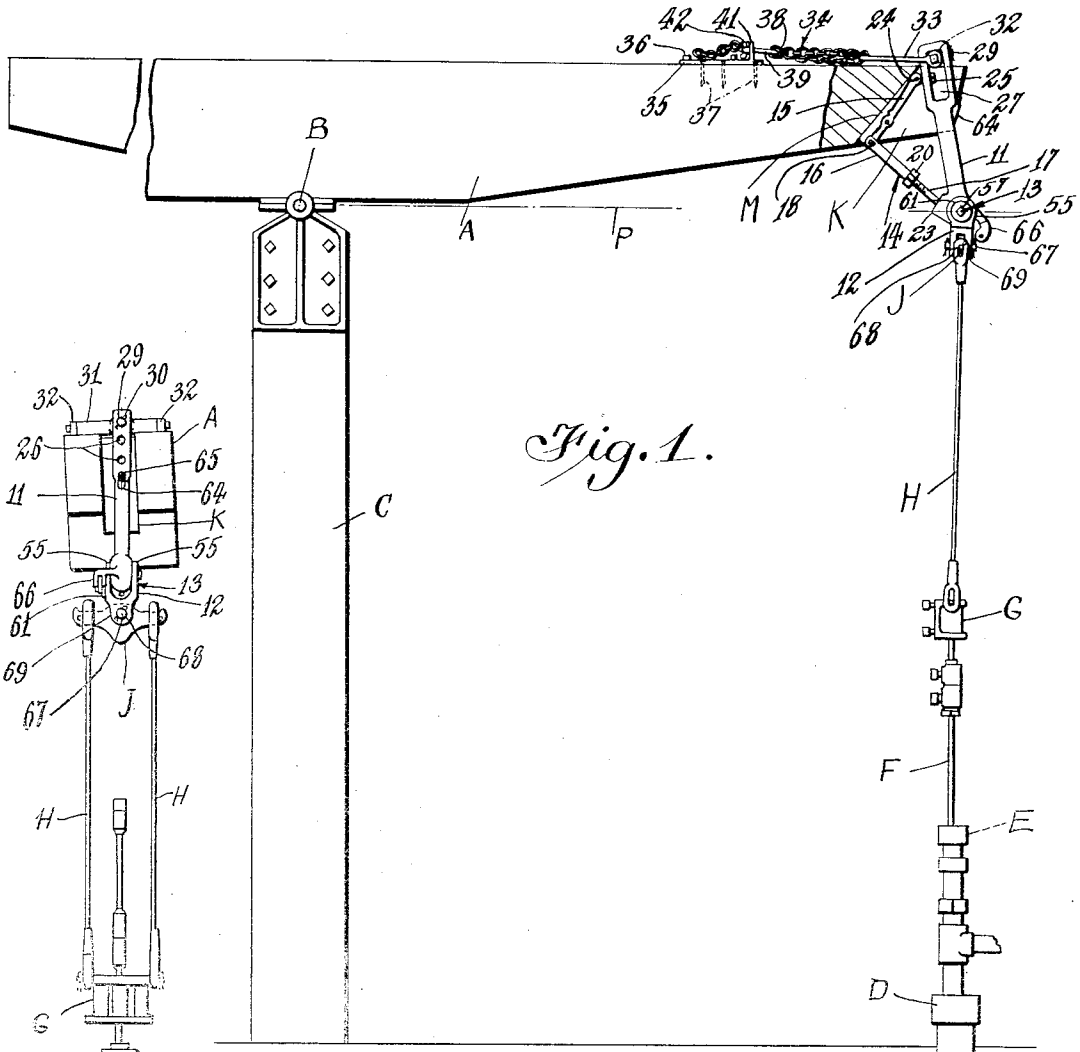


Fig. 1.

Fig. 2.

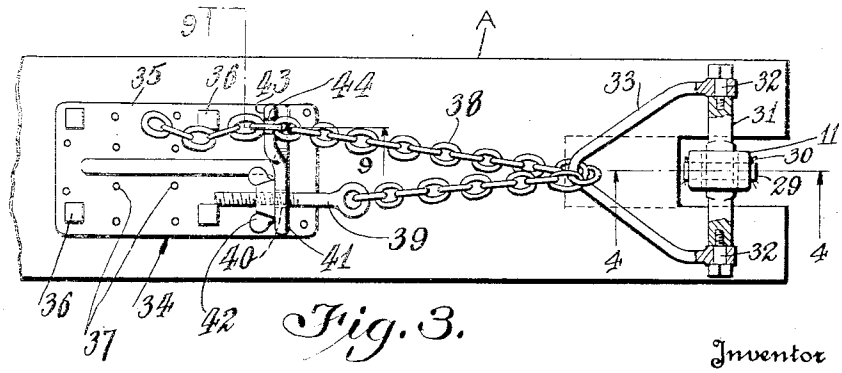


Fig. 3.

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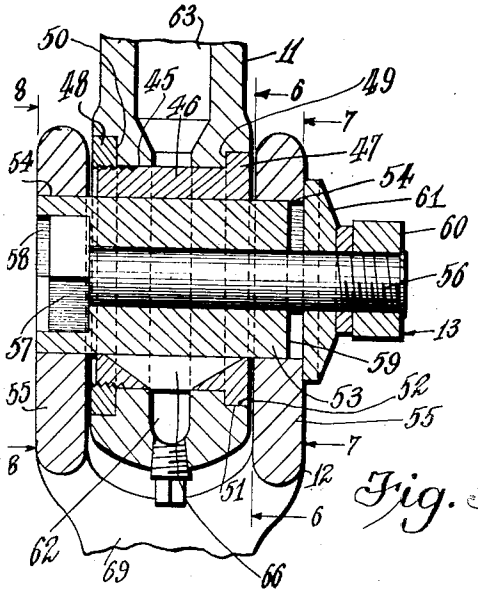


Fig. 5.

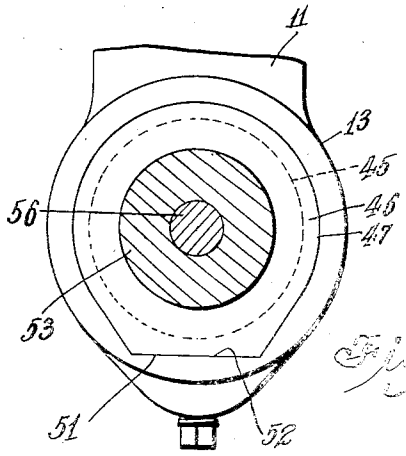


Fig. 6.

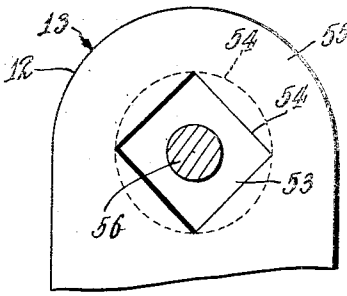


Fig. 7.

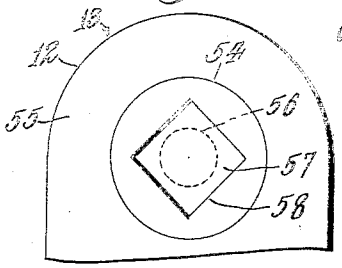


Fig. 8.

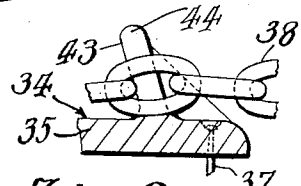


Fig. 9.

Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES P. RATIGAN, OF LOS ANGELES, CALIFORNIA.

ADJUSTABLE BEAM HANGER.

Application filed April 18, 1928. Serial No. 270,883.

This invention relates to adjustable beam hangers of the type employed, for example, for operatively connecting the polish rod of an oil well pump to the operating member. The operating member is usually a walking beam and is sometimes a, so termed, pumping jack.

An important object of the present invention is to minimize side thrust or flexing of the polish rod as it ascends and descends so as to avoid pressing the sucker rods against the pump tubing, thus minimizing wear on the sucker rods and pump tubing. Minimizing of side thrust on the polish rod also reduces wear on it and on the stuffing box through which it passes.

The invention relates more particularly to a jointed beam hanger comprising sections that are hinged together. In my former Patent Number 1,646,558, dated October 25, 1927, there was disclosed a jointed beam hanger provided with a connection between the operating member and one of the sections of the beam hanger so as to induce swinging of one of the sections relative to the other as the operating member moved up and down. In other words, there was provided a device for kicking out the upper beam hanger section as the operating member moved on its up stroke, and an object of this invention is to improve the device for effecting the kick out of the upper section.

Another object is to provide a construction which will admit of adjustment of the kick out means so that the desired results can be secured when the beam hanger is hung from longer or shorter walking beams.

Another object is to make provision for lateral swinging between the beam hanger and the operating member on which it rests so that, in event of the upper face of the operating member not being horizontal transversely of the operating member, the beam hanger will self-align itself so that a bending strain will not come upon the beam hanger.

Another object is to make provision for convenient securing of the beam hanger to, and removal thereof, from the operating member.

Another object is to provide for adjustment of the beam hanger into different positions along the walking beam so as to properly center the joint of the beam hanger with respect to the polish rod of the pump.

Another object is to provide for adequate lubrication of the beam hanger joint.

Other objects and advantages will appear in the subjoined detailed description.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation of a beam hanger constructed in accordance with the provisions of this invention, an operating member, a polish rod, and the connections between the beam hanger and polish rod also being shown. A portion of the operating member is broken away to contract the view.

Fig. 2 is an elevation of Fig. 1 from the right thereof.

Fig. 3 is an enlarged fragmental plan view of Fig. 1, portions of the bail and cross member being shown in section.

Fig. 4 is an enlarged vertical section on the line indicated by 4—4, Fig. 3.

Fig. 5 is an enlarged fragmental vertical section on the irregular line indicated by 5—5, Fig. 4.

Fig. 6 is a fragmental view, partly in section, from the line indicated by 6—6, Fig. 5.

Fig. 7 is a vertical view, partly in section, from the line indicated by 7—7, Fig. 5.

Fig. 8 is a fragmental elevation from the line indicated by 8—8, Fig. 5.

Fig. 9 is an enlarged sectional detail on the line indicated by 9—9, Fig. 3.

An operating member is indicated at A, being fulcrumed at B on a standard C. Pump tubing is indicated at D, and on the upper end thereof is a stuffing box E through which operates a polish rod F. A grip G engages the polish rod F, and is suspended by reins H from a cross member J. This newly-invented beam hanger connects the operating member A which, in this instance, is in the form of a walking beam, to the cross member J that supports the reins H.

The beam hanger comprises hingedly connected upper and lower sections 11, 12 the hinge being indicated at 13. The section 11 passes through the slot K in the operating member A, said slot extending longitudinally of the operating member in one end thereof in the customary manner. The rear wall of the slot K extends aslant inwardly and downwardly as indicated at M.

The kick-out device, indicated in general by the character 14, for kicking out the section 11 on the upstroke of the operating member A, is engaged by the rear wall M of the slot K. The section 11 is sufficiently long so that, when it is swingingly mounted on the upper face of the operating member A and said op-

erating member is approximately horizontal, the axes of the hinge 13 and of the fulcrum B will approximately lie in a horizontal plane.

The kick-out device 14 comprises hingedly jointed upper and intermediate sections 15, 16 and a lower section 17 which is adjustably connected to the section 16. The hinge pin connecting the sections 15, 16 is indicated at 18. The adjustment between the sections 16, 17 is effected, in this instance, by a screw-threaded portion 19 of the section 17 screwed into the section 16. A locking nut 20 on the threaded portion 19 engages the lower end of the section 16.

The hinge pin 18 may be selectively engaged with one of a number of holes 21 in the section 15 so as to provide for relatively great adjustments in the angle of the section 15 relative to the section 11. The lower end of the section 17, which is in the form of a rod, is preferably rounded, as indicated at 22 and engages in a socket 23 formed in one side of the section 11, the axis of said socket being aslant relative to the longitudinal axis of the section 11, and the angle of said slant being approximately 45° relative to the longitudinal axis of the section 11. The diameter of the socket 23 is considerably greater than the diameter of the member 17 so that the section 17 may be adjusted to different angles relative to the axis of the socket. Thus, it will be readily seen that the kick-out device is loosely connected at its lower end to the section 11.

The upper end of the section 15 is pivoted or hinged at 24 to a stud 25 that may be selectively positioned lengthwise of the section 11 in any one of a number of holes 26 which extend transversely of the upper portion of said section 11. The holes 26 extend entirely through the section 11 and through the axis of said section extends a slot 27 so that the opposite end portions of the holes 26 communicate with said slot. The stud 25 is just sufficiently long to project into the slot 27 and the inward projecting end of said stud 25 is provided with a dowel pin 28 to prevent the stud from being pulled out of the hole in which it is seated. In this instance three holes 26 are provided, though a greater or less number may be employed, if desired.

In order to pivotally support the section 11 on the operating member A, there is provided a pin 29 adapted to be selectively engaged in any of the holes 26 not occupied by the stud 25. The ends of the pin 29 project beyond the section 11 and the projecting ends are provided with dowel pins 30 to prevent the pin becoming detached from the section 11. The pin 29 passes through a bar 31 adapted to rest on the upper face of the operating member A, said bar passing through the slot 27. Thus the bar 31 can rock in a vertical plane about the axis of the pin 29 so that if the upper face of the operating member A be inclined to the horizontal, as shown in Fig. 2, the load carried by the section 11 will be uniformly distributed to both ends of the bar 31, thus preventing tendency to canting to one side of the sections 11 and 12 and thus avoiding bending and breaking strains in said sections.

To the ends of the bar 31 is pivoted at 32 a bail 33 which is adapted to rest upon the upper face of the operating member A when the beam hanger is in use. When it is desired to lift the beam hanger off of the operating member, the hoisting tackle will be attached to the bail 33 and the bail can be secured to the operating member by any suitable means. The securing means is preferably adjustable so that the bail 33 can be secured in slightly different positions so as to properly center the hinge 13 over the polish rod.

This centering of the hinge 13 over the polish rod will preferably be accomplished when the operating member is in the position which it occupies at the time the polish rod is at the lower end of its down stroke. When the polish rod is in mid stroke, the hinge 13 will be slightly offset from a point directly over the axis of the polish rod, as shown in Fig. 1. But at the upper end of the stroke of the polish rod the hinge 13 will again be positioned directly over the axis of the polish rod.

A device, indicated in general by the character 34, is employed for adjustably securing the bail 33 to the operating member. This fastening device will not be claimed, per se, herein, but will be described in order to make clear how the adjustment of the bail 33 is effected. This fastening device 34 comprises a plate 35 secured by bolts 36 and/or nails 37 to the upper face of the operating member A, and it also comprises a chain 38 adjustably connected at both ends to the bolt 35. For this purpose one end of the chain 38 connects with an eye bolt 39 which passes through a hole 40 in an upstanding flange 41 of the plate 35. A wing nut 42 is threaded on the eye bolt 39 and bears against the flange 40 so as to limit outward movement of the eye bolt. Small adjustments may be made by screwing or unscrewing the wing nut 42. The flange 40 is provided with a rearwardly and upwardly slanting face 43 provided with a vertical slot 44 opening at the upper edge of the flange so that any link of the chain can be dropped into said slot to hold the chain in any desired position for adjustment.

Thus, relatively large adjustments of the chain may be effected by engaging different links with the slot 44, and the smaller adjustments will be made by turning the wing nut 42. It will be clear from the foregoing that after the device 34 is secured to the operating member, the bail 33 may be shifted lengthwise of the operating member and then secured by the device 34 against outward movement along the operating member. In any event, adjustments of very great magnitude of the

bail 33 will not be necessary. The adjustment of the bail 33 may be such, in some instances, as to remove the upper end of the kick-out section 15 from contact with the rear slot wall M, but the lower end portion of said section 15 will, in all instances, engage said rear slot wall so as to hold the axis of the hinge 13 the desired distance from the fulcrum B.

The hinge 13 will now be described. The lower end of the section 11 is provided with an approximately cylindrical bore 45 in which is mounted a bushing 46 provided at its opposite ends with flanges 47, 48. In this instance, the flange 47 is integral with the body of the bushing and the flange 48 constitutes a nut screw-threaded onto said bushing body. The flange 47 bears against a shoulder 49 in the bore 45 and the flange 48 bears against a shoulder 50 in said bore. The outer face of the bushing 46 is provided with a flat side 51 which engages a flat face 52 of the bore 45 so as to prevent turning of the bushing in the bore.

Fitting in and extending through the bore of the bushing 46 is a hollow shaft 53, the ends of which project beyond the flanges 47, 48. The projecting ends of the shaft 53 extend into circular holes 54 in furcations 55 that terminate the upper end of the section 12. Through the shaft 53 extends a bolt 56, the head 57 of said bolt lying within a recess 58 in one end of the shaft 53. The other end of the shaft 53 is provided with a square head 59 and the hole 54 is square to fit said head. Aside from the head 59, the shaft 53 is cylindrical in cross section and the head 59 limits endwise movement of the shaft 53 to the left in Fig. 5. The bolt 56 is provided with a nut 60 and between said nut and the adjacent furcation 55 is a washer 61. The nut 60, washer 61 and bolt 56 limit shifting of the shaft 53 to the right in Figure 5.

The wall of the bore 45 is provided with an annular groove 62 which communicates with an oil reservoir 63 in the section 11, said reservoir being provided with a filling opening 64 that is closed by a removable plug 65 screwed into said opening. The bushing 46 is provided with a port 66 that communicates with the groove 62 so that oil can pass from said groove through the port 66 to the surfaces that are to be lubricated.

The invention being mounted, as illustrated in Figs. 1 and 2, operates as follows:

Assuming that the right end of the operating member A is moved upwardly, the kick-out device 14, resting against the rear slot wall end, prevents the hinge 13 from swinging toward the fulcrum B, thus maintaining said hinge approximately in alignment with the axis of the polish rod. When the operating member A moves on its down stroke, to permit the polish rod to lower, the pull of the polish rod on the beam hanger will maintain the hinge joint 13 approximately in position directly over the axis of the polish rod, and this pull may even result in swinging the kick-out device 14 out of engagement with the rear slot wall end. Thus, on the down stroke of the polish rod the beam hanger is free to swing into such position as will prevent bending or lateral deflection of the polish rod, and on the up stroke of the polish rod the beam hanger operates to maintain the center of the pull, represented by the hinge 13, approximately directly over the axis of the polish rod.

In installing the invention, the hoisting tackle will be secured to the bail 33 and the beam hanger will then be swung into position to rest the bar 31 on the upper face of the operating member. The chain 38 will then be passed through the bail and pulled as taut as possible and the appropriate link of the chain will be dropped into the slot 44.

The operating member A will then be swung with its right end, in Fig. 1, at the lower end of its stroke and the hinge 13 will be accurately aligned with the polish rod by adjusting the bail 33 toward or from the adjacent end of the operating member, the chain 38 being taken up or let out to admit of the bail being so adjusted. The final minute adjustment will be effected by turning the wing nut 42. After thus adjusting the beam hanger on the operating member, the section 17 will be screwed in or out of the section 16 until at least the lower end of the section 15 rests against the rear slot wall M, when the section 17 is engaged in the socket 23. It will be readily seen that if, on account of the fulcrum B of the operating member being not absolutely horizontal, or of the upper face of the operating member being aslant to the horizontal, the section 11 will swing in a direction transversely of the operating member so as to lie in a vertical plane that cuts through the operating member. Thus there will be no bending strains on the beam hanger tending to break it.

In the drawings, the section 11 is illustrated as provided at its lower end with an arm 66 which may be used to carry a pawl, not shown, for rotation of a ratchet member as illustrated in Patent No. 1,608,001 issued to me on November 23, 1928.

It is to be noted that the slanting face 43 prevents the chain 38 from accidentally sliding out of engagement with the flange 41 when the beam hanger is in operation.

If relatively great adjustments in the angle of the section 15 are necessary, the stud 25 will be removed from the holes 26 which it occupies and be placed in another of said holes. Also, the pin 29 may be positioned in a different hole 26, when that is necessary to bring the axis of the hinge 13, when the operating member A is substantially horizontal, nearest to the horizontal plane P, in Fig. 1, that passes through the axis of the fulcrum B.

The cross member J may be pivotally con-

nected by a pivot pin 67 to the stem section 12, the stem comprising besides the section 12, the section 11 and the hinge joint that connects said sections. The pivot pin 67 passes through holes 68 in furcations 69 of the section 12 so that the cross member J will be positioned between said furcations.

It is to be noted that the pump and rods may be pulled without removing the beam hanger from the beam. To accomplish this, the beam is tilted with its hanger-supporting end up and the section 17 is then removed from the socket 23 so as to permit collapsing of the kick-out device, thus permitting the stem to swing toward the beam and away from a position axially of the polish rod.

I claim:

1. An adjustable beam hanger comprising hingedly connected sections, a means to pivotally support one of said sections on an operating member, other pivotally connected seetions, one of the last mentioned sections pivotally connected with the first mentioned section, and the other of the last mentioned sections adjustably connected with the first mentioned section.

2. An adjustable beam hanger comprising hingedly connected sections, a means to pivotally support one of said sections on an operating member, other pivotally connected sections, one of the last mentioned sections pivotally connected with the first menioned section, another section having screw-threaded connection with the other of the last mentioned sections and engaging the first mentioned section.

3. An adjustable beam hanger comprising hingedly connected sections, a means to pivotally support one of said sections on an operating member, other pivotally connected sections, one of the last mentioned sections pivotally connected with the first mentioned section, a socket on the first mentioned section, and a means loosely engaging the socket and adjustably connected with the other of the last mentioned sections.

4. An adjustable beam hanger comprising hingedly connected sections, one above the other, the upper section provided with a number of transversely extending holes, a stud adapted to be selectively engaged in the holes, a section pivoted at its upper end to the stud, another section pivoted to the lower end of the last mentioned section, and means adjustably connecting the last mentioned section with the upper section.

5. An adjustable beam hanger comprising a stem, a bail pivotally connected to the upper end of the stem and adapted to rest on the upper face of the operating member, and a means to adjust the bail lengthwise of the operating member.

6. An adjustable beam hanger comprising a stem provided with a transversely extending hole, a pin secured in said hole, and a bearing mounted to rock on said pin.

7. An adjustable beam hanger comprising a stem provided with a transversely extending hole, a pin secured in said hole, a bar rockably mounted on said pin, and a bail pivoted to the ends of said bar.

8. An adjustable beam hanger comprising hingedly jointed sections, one above the other, the upper section provided with an oil reservoir and provided with an annular groove surrounding the hinge joint, said groove communicating with said reservoir, and a means to pivotally support the upper section on an operating member.

9. An adjustable beam hanger, comprising hingedly jointed sections, one above the other, the upper section provided with an oil reservoir and provided with an annular groove surrounding the hinge joint, said groove communicating with said reservoir, and a means to support the upper section on an operating member.

10. An adjustable beam hanger comprising hingedly connected sections, one above the other, a third section, a means pivotally and adjustably connecting the upper end of the third section with the upper end of said upper section, a fourth section pivoted to the lower end of said third section, and means adjustably connecting the fourth section with said upper section.

11. An adjustable beam hanger comprising a stem provided with a transversely extending hole, a pin secured in said hole, and a bar rockably mounted on said pin.

Signed at Los Angeles, California, this 4th day of April, 1928.

JAMES P. RATIGAN.