

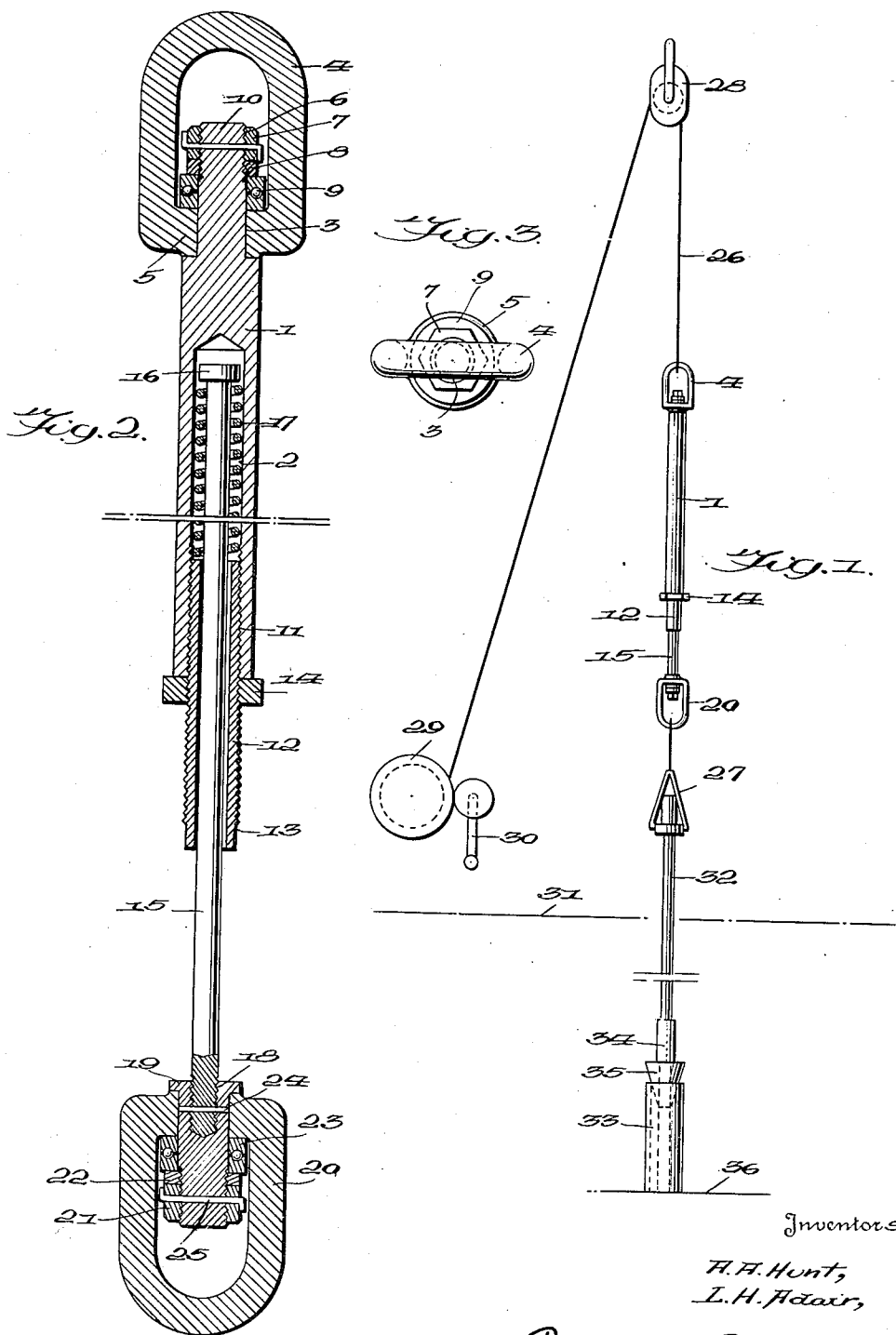
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SUCKER ROD ADJUSTER

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SUCKER ROD ADJUSTER

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Our invention consists in new and useful improvements in a sucker rod adjuster and has for its object to provide a device of this character which is simple in construction, economical to manufacture, and efficient in the operation of raising or lowering sucker rods or the like from wells.

In the operation of certain wells where the natural pressure in the formation has declined with continued production, the wells cease to flow of their own accord and pumping must be resorted to. During this pumping operation it is necessary from time to time to pull the tubing and/or rods for repairs or for the purpose of cleaning the well itself, after which said tubing and/or rods are run back into the well and the pumping operations resumed.

The derrick used in drilling the well is in some instances removed after the drilling operation, but when needed in the pumping of the well after drilling, said derricks are left in place. The present invention is adapted for use in connection with wells of this latter class wherein the derrick has been retained in place for use in the operation of the well.

These derricks usually extend one hundred feet, more or less, in height and are provided with a small platform at the top. The larger derricks on the deeper wells also have another platform at a suitable point above the middle, said second platforms being known as "double", "treble" or "fourble" board, depending upon the positioning of the same, to permit the breaking of the sucker rods as they are being pulled from the wells, into stands of two rods, three rods or four rods each.

Opposite ends of each sucker rod are threaded and the rods are attached one to another by means of a coupling with female threads as they are run into the well originally, and are unscrewed one from another or in stands of two, three or four rods each as they are pulled from the well. These rods are re-run into the well in the same manner, that is, in singles or stands.

Both of these operations of running and withdrawing the rods are accomplished by the use of suitable machinery on the surface above the well and supported by the derrick. The usual method of pulling a string of rods is to attach a heavy derrick elevator below the upper shoulder on the string of rods in the well and lift the string to the proper height in the derrick by a steel cable attached to the elevator and extending through a block and pulleys in the top of the derrick, thence to a large reel known as a "bull wheel"

on the derrick floor and operated by an engine, or to the drum of a winch mounted on a tractor or truck operated by the engine of the tractor or truck. The string is then held in lifted position by attaching another derrick elevator beneath a shoulder on the string at the mouth of the well on the derrick floor. At this point a small hanger elevator is attached to the top of the string and the derrick elevator thereon is then disengaged. The stand is then unscrewed at the derrick floor and slightly elevated. The hanger elevator is attached to a steel cable known as a "winch line" which extends through a light block and pulleys in the derrick, thence to a reel operated by a hand winch, said reel and winch being clamped to the side of the derrick. By operating the hand winch the stand is placed on end on the derrick floor and leaned against one side of the derrick; whereupon, another stand is detached in like manner. By reversing the operations, the string of rods is re-run into the well.

It is of vital importance when these rods or stands are being screwed together in running them into a well, that the threads shall not become crossed. Otherwise, not only would much time be lost in completing the re-running operation with the resultant delay in production, but also the rods whose threads are marred or crossed may be so damaged that they must be discarded and replaced with new rods. In actual practice heretofore, thousands of rods have been ruined in this way. This is also true in the unscrewing operations, when pulling a string of rods, where equal care must be taken to avoid damaging the threads.

Heretofore, no satisfactory or effective means has been developed for preventing cross threading, due to the difficulty of gently and smoothly contacting the threads at the bottom of the stand with the threads on the top of the string of rods in the well, and also because of the difficulty in holding the stand in a steady vertical position during the lifting or re-running operations. Blowing winds often augment the tendency caused by the turning of the stand as it is being screwed on, to wobble back and forth, or to swing about in a circle.

It is therefore the primary object of the present invention to overcome these disadvantages and to this end we have provided a sucker rod adjuster adapted to be interposed in the winch line adjacent the hanger elevator whereby the movement of the stand upwardly or downwardly is easily hand-controlled by the operator on

the derrick floor, a suitable tension adjuster being provided for this purpose.

With the above and other objects in view which will appear as the description proceeds, our invention consists in the novel features herein set forth, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims.

Referring to the drawing in which numerals of like character designate similar parts throughout the several views,

Fig. 1 is a diagrammatic view showing the sucker rod adjuster in position for operation.

Fig. 2 is an enlarged broken section showing the details of structure of the rod adjuster, and

Fig. 3 is an end view of the device shown in Fig. 2.

In the drawing, 1 represents the main body portion of our improved sucker rod adjuster which consists of an elongated cylindrical member provided with a central longitudinal bore 2 which extends from one end of the body portion to within a substantially short distance from the opposite end to form a cylindrical spring chamber. The closed end of the body portion 1 is reduced as at 3 to form a spindle for a bail member 4. This bail member comprises a loop portion which terminates in an integral circular boss 5 drilled centrally to rotatably engage the spindle 3. The end of the spindle 3 is threaded as at 6 to receive a hex nut 7, and between the nut 7 and the boss 5 are provided a washer 8 and a roller thrust bearing 9 to facilitate said rotary engagement. When the parts are assembled as shown in Fig. 2, a lock pin 10 is inserted through corresponding openings in the nut 7 and threaded end of the spindle 3.

In the opposite end of the body member 1 the bore 2 is internally threaded as at 11 to receive the complementary external threads of a sleeve 12, the free end of said sleeve being squared as at 13 to receive a suitable wrench or the like, whereby the sleeve is screwed into or out of the spring chamber 2. A lock nut 14 is screwed onto the threads of the sleeve 12 and adapted to abut the adjacent end of the body member 1 for retaining the sleeve 12 in a predetermined position in the bore.

A spring tension rod 15 provided with an enlarged head 16 and carrying a compression spring 17 interposed between the head 16 and the inner end of the sleeve 12, is disposed in the chamber 2 in sliding engagement with the central bore of the sleeve 12. The opposite end of the spring tension rod is threaded as at 18 to engage complementary threads in a rod adapter 19. This rod adapter is reduced and threaded to receive a second bail 20 which is similar in all respects to the bail 4 and retained in place by a hex nut 21, a washer 22 and thrust bearing 23 being interposed between the nut and the boss of the bail. A lock pin 24 extends through complementary holes in the adapter and threaded end 18 to prevent the rod 15 from becoming unscrewed, and a similar lock pin 25 is employed in connection with the nut 21.

As shown diagrammatically in Fig. 1, the rod adjuster is interposed between the end of a winch line 26 and the short cable of a hanger elevator 27, said winch line running over the pulleys of a block 28 supported at the top of the derrick (not shown), and running down to a hand winch 29 operated by a handle 30 by an operator standing, for example, on the fourble board 31. The hanger elevator 27 supports a rod or stand

of rods 32 ready for connection to the upper end of a string of rods in the well casing 33. As shown in Fig. 1, the shoulder 34, formed by the coupling of the top rod of the string in the well, is supported by a derrick elevator shown diagrammatically at 35 adjacent the derrick floor 36.

With our invention, in running a string of rods, a stand thereof is removed in the usual manner from the rod hanger (not shown) by attaching the hanger elevator 27 to the top of the stand and lifting the stand off of the rod hanger and suspending it directly over the hole. Then instead of pursuing the former practice of transferring the stand to the derrick elevator, it is retained in the hanger elevator 27 and, by operating the hand winch 29 with the handle 30, it is lowered to within a short distance of the top of the string of rods supported in the casing 33 by the derrick elevator 35. Thereupon the hand winch 29 is locked and a limited movement of the stand 32 upwardly or downwardly is easily hand-controlled by the operator on the derrick floor 36, due to the functioning of the spring 17 in the adjuster. The operator on the floor of the rig places a wrench on the square at the bottom of the stand, the weight of which, augmented by the operator gently pulling downwardly on the stand, effects smooth contact of the threads in advance of the screwing operation. Then as the screwing proceeds, the rod adjuster maintains the proper tension on the stand to prevent a sudden pressure downwardly or a sudden pulling upwardly, thus holding the stand in a steady vertical position.

The use of this device eliminates the possibility of the threads being marred or becoming crossed and damaged during the running of a string of rods, and it is obvious that in pulling rods from a well, the adjuster is of equal value.

Our improved adjuster is preferably constructed of heavy steel materials of ample strength to withstand any load to which it may be subjected in running stands of rods into a well, or pulling the same from a well.

By changing the tension of the spring 17 through manipulation of the threaded sleeve 12, the device is adjustable to accommodate any number of rods in a stand from one to four or more.

The thrust bearings adjacent the mounting of each bail facilitate the turning of the stand of rods in the screwing or unscrewing operations without in any way twisting the cable.

From the foregoing it is believed that the construction and advantages of our invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of our invention as set out in the following claims.

What we claim and desire to secure by Letters Patent is:—

1. An adjuster for sucker rods and the like comprising an elongated body member, a spring chamber extending longitudinally in said body member, a spring in said chamber, a spring tension rod disposed in said chamber and extending therefrom at one end, a spring adapter at the opposite end of said rod for engagement with one end of said spring, a tension regulating sleeve adjustably mounted in said chamber and engaging the opposite end of said spring, and bails rotatably mounted at the outer ends of said body member and said spring tension rod respectively, whereby said adjuster may be interposed in a

winch line to yieldingly support a rod hanger or the like.

2. An adjuster for sucker rods and the like comprising an elongated body member, a spring chamber extending longitudinally in said body member, a spring in said chamber, a spring tension rod disposed in said chamber and extending therefrom at one end, a spring adapter at the opposite end of said rod for engagement with one end of said spring, a tension regulating sleeve adjustably mounted in said chamber and engaging the opposite end of said spring, bails rotatably mounted at the outer ends of said body members and said spring tension rod respectively, whereby said adjuster may be interposed in a winch line to yieldingly support a rod hanger or the like, and thrust bearings adjacent the mountings of said bails.

3. An adjuster for sucker rods and the like comprising an elongated cylindrical body member, a spring chamber extending substantially the entire length of said body member, a coil spring in said chamber, a spring tension rod extending through said coil spring and projecting from said chamber at one end, a spring adapter at the opposite

end of said rod for engagement with one end of said spring, a threaded sleeve slidably embracing said rod and adapted to be screwed into said chamber in engagement with the other end of said spring, a lock nut on said sleeve, and bails rotatably mounted at the other ends of said body member and said spring tension rod respectively, whereby said adjuster may be interposed in a winch line to yieldingly support a rod hanger or the like.

4. An adjuster for sucker rods and the like as claimed in claim 3 wherein said bails are rotatably mounted on spindles at the respective ends of said body member and tension rod, and thrust bearings carried by said spindles.

5. An adjuster for sucker rods and the like as claimed in claim 3 wherein one end of said body member is reduced to form a spindle for one of said bails, an adapter secured to the opposite end of said spring tension rod to form a spindle for the other of said bails, and thrust bearings carried by said spindles.

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