Sept. 13, 1938. H. A. WOOD 2,130,170

SNUBBING CLAMP AND STAND

Filed Nov. 2, 1937 2 Sheets-Sheet 1

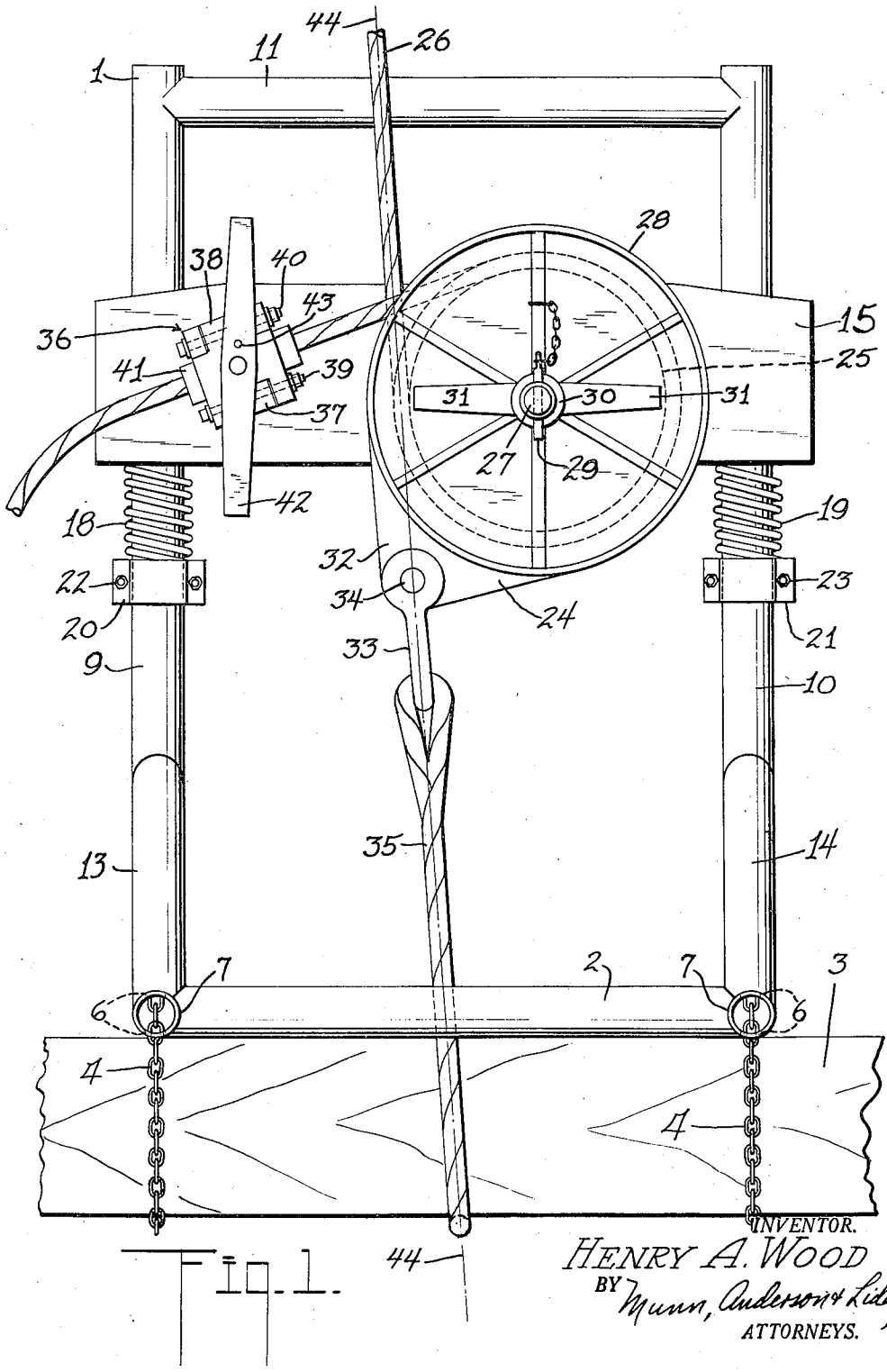


Fig. 1.

INVENTOR.
HENRY A. WOOD
BY Munn, Anderson & Liddy
ATTORNEYS.

Sept. 13, 1938. H. A. WOOD 2,130,170

SNUBBING CLAMP AND STAND

Filed Nov. 2, 1937 2 Sheets-Sheet 2

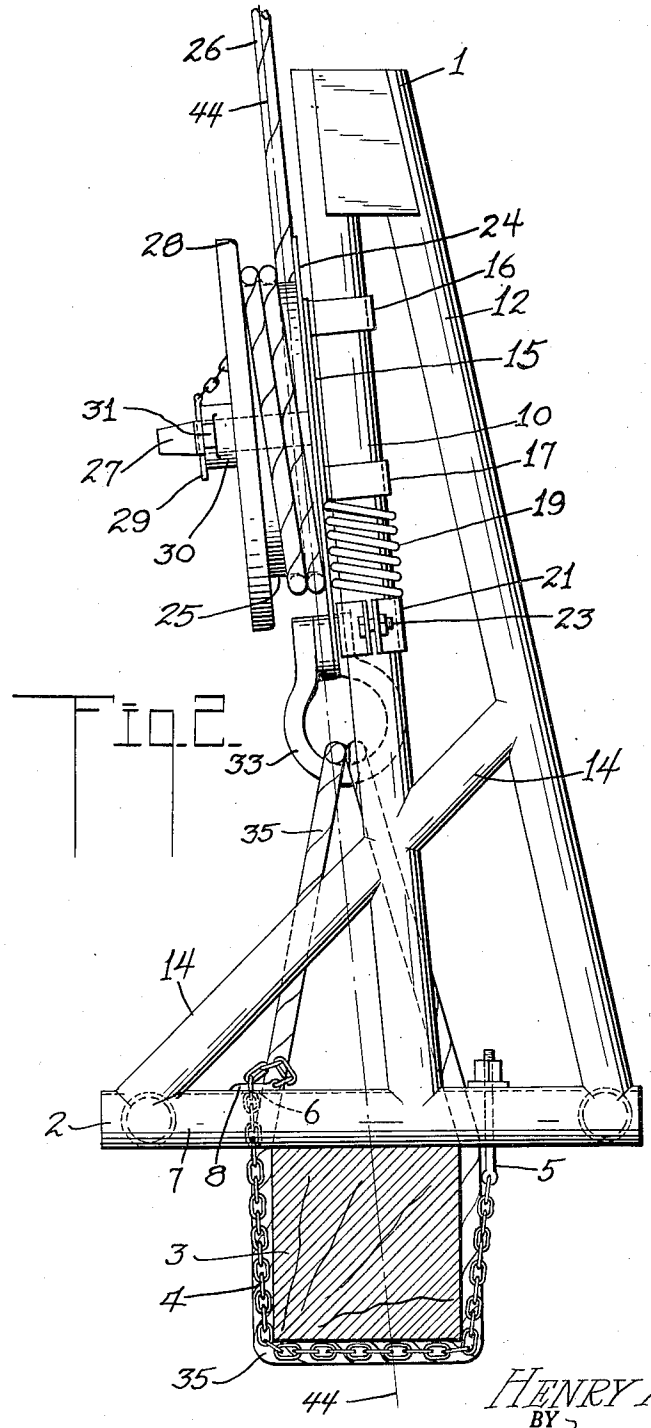


Fig. 2.

INVENTOR.
HENRY A. WOOD
BY
Munn, Anderson & Liddy
ATTORNEYS.

Patented Sept. 13, 1938

2,130,170

UNITED STATES PATENT OFFICE

2,130,170

SNUBBING CLAMP AND STAND

Henry Allyn Wood, Berkeley, Calif.

Application November 2, 1937, Serial No. 172,386

7 Claims. (Cl. 255—2)

My invention relates to improvements in a snubbing clamp and stand, and it consists of the combinations, constructions and arrangements hereinafter described and claimed.

It is well known and an established principle that the service of a rotary drilling line will be greatly increased by moving at regular intervals that portion of the line winding on the drum and traveling over the fast sheave. On rotary rigs equipped with calf wheels or auxiliary draw works this presents no problem. On bob-tailed rigs it is customary to purchase only enough line to string a sufficient number of blocks for drilling with possibly 100 or 200 feet of extra line. The disadvantage of such an installation is that the dead end of the line is usually tied around the sill of the rig and is clipped. The extra 100 or 200 feet of line are hung loosely in a coil or laid on the ground, with the result that it is difficult to get the drillers to move the extra portion on the fast sheave or the drum because it is inconvenient and awkward, and it takes a lot of time to undo the clips and to move the line. The spare line also is very often kinked or not in shape to use.

The principal object of the snubbing clamp and stand is to overcome the difficulties with the present equipment outlined above by dead ending the line at the desired place without cutting the line and thus permit the active part of the cable to be renewed as required. This will materially increase the rope life and will consequently decrease the cost of the rope per well because the points of wear can be moved by feeding in additional cable. The worn drum end of the rope may be cut off at given intervals.

The present invention is an improvement over the snubber and clamp shown in my co-pending application Serial No. 122,968, filed January 29, 1937. In the pending application, I show the snubbing wheel and clamp mounted on a single frame and this frame is suspended from a cross-piece on a derrick. In the present form of the device, I show the snubbing wheel and clamp mounted on a cross-head which in turn is slidably mounted on a pair of uprights forming part of a frame. The frame is secured to a sill of the rig by means of sill chains or other suitable fastening means. The cable is dead-ended by forming a few turns around the snubbing wheel and then securing the cable in the clamp. A dead line sling connected to the sill, limits the upward movement of the snubbing wheel and the cross-head, while springs mounted on the uprights yieldingly support the cross-head when the active portion of the cable is slackened. The line of pull on the active cable portion is such as to be transmitted directly to the deadline sling and sill, and therefore all of the pulling force is applied to the sill rather than to the cross-head. In this way the cross-head does not sustain a pulling strain, but merely acts as a floating support for the snubbing wheel and the clamp.

From the clamp, the unused portion of the cable or line is wound around a storage spool not shown, but which is described and claimed in my co-pending application Serial No. 162,589, filed September 7, 1937.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming a part of this application, in which

Figure 1 is a front elevation of the device; and

Figure 2 is a side elevation of the device.

In carrying out my invention, I provide a frame 1 that is preferably made from pipe sections welded together, although I do not wish to be confined to this particular construction. The frame 1 has a base 2 that is designed to rest upon a sill 3 of a rig. The frame may be set in any desired position in the rig, but it is preferably disposed in a corner where it may be easily attached to the frame of the rig by sill chains indicated generally at 4. These chains are passed around the sill and are used for steadying the frame. The chains do not take any of the pull exerted by the cable as will be hereinafter shown. Figure 2 shows how each chain 4 is secured at one end to the base 2 by a bolt 5 and how the other end of the chain is passed through openings 6 formed in the side horizontal pipe sections 7 of the base 2. The free end of each chain carries a pin 8 that may be slipped through one of the links in the chain after the chain has been pulled taut through the openings. In this way the pin 8 adjustably secures the other end of the chain to the base 2.

The frame 1 has two uprights or guides 9 and 10, see Figure 1. Figure 2 shows the uprights 9 and 10 inclined at a slight angle from the vertical for a purpose hereinafter described. A cross member 11 connects the upper ends of the uprights 9 and 10 together and reinforcing members 12 extend from the tops of the uprights 9 and 10 down to the rear corners of the base 2. Reinforcing struts 13 and 14 are also used and extend from the front corners of the base 2 to the up-

rights 9 and 10 and then from the uprights to the rear members 12.

On the uprights 9 and 10 I slidably mount a cross-head 15. Figure 2 shows the cross-head secured to brackets 16 and 17 and the brackets in turn slidably engage the uprights or guides. When the device is not in use, the cross-head 15 is yieldingly supported by coil springs 18 and 19 disposed on the uprights 9 and 10 and adjustably held in place by collars 20 and 21. The collars 20 and 21 are adjustable along the uprights and may be secured in the desired position by bolts 22 and 23 or other suitable fastening means.

The cross-head 15 carries a snubbing wheel which includes a back plate 24 attached to the cross-head. This plate carries an integral drum 25 around which a cable 26 is wrapped a few turns. A shaft 27 projects from the plate 24 and is concentrically disposed with respect to the drum 25. A ribbed front plate 28 is mounted on the shaft 27 and is held against the outer end of the drum 25 by means of a cotter pin 29 that is inserted through an opening in the shaft. The front plate carries a hub 30 that receives the shaft and the hub has radially extending release handles 31 by means of which the front plate may be removed if necessary.

The back plate 24 has a triangular portion 32 to which a clevis or link 33 is pivotally secured at the apex by means of a pin 34. A cable sling 35 is connected to the clevis 33 and is passed around the sill 3.

The cross-head 15 also carries a quick acting rope clamp indicated generally at 36. The particular construction of the clamp is shown in my co-pending application Serial No. 122,968. Briefly, the clamp comprises two halves 37 and 38 hinged together by a bolt 39 and the free ends of the halves are removably secured together by a second bolt 40. Each half carries a replaceable jaw and in Figure 1 the half 38 is shown carrying a jaw 41. The portion of the cable leading from the drum 25 is laid between the jaws and the two halves are then closed. The jaws are now brought into engagement with the rope by turning a hand screw 42 that moves the jaw 41 down against the cable and forces the cable into frictional engagement with the other jaw, carried by the half 37 and not shown in the drawings. A locking pin 43 is used for securing the handle of the hand screw 42 against rotation after the jaws have once gripped the cable.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

Sufficient line is purchased initially to allow for one or two complete cuts of 300 to 500 feet from each line before all of the line is used. For example, a line 2000 to 2500 feet long may be purchased instead of one 1050 to 1500 feet long. The rotary line is then reeved in the regular way onto the drum of the derrick, not shown, and then is passed through the derrick blocks, also not shown. The excess line is then easily spooled by hand onto the storage reel, not shown, which is designed to carry about 1000 feet of extra line. The storage spool is preferably placed either on the floor of the rig or on the outside of the rig.

The frame 1 of the device is secured to the sill 3 in the manner already set forth and by use of a cat line or any other means desired, the cross-head 15 may be pulled up on the guides until the dead line sling 35 becomes taut. The stop collars 20 and 21 may now be raised on the guides into a position where the springs will just contact with the underside of the cross-head without being compressed. The collars are then fastened in their new positions.

The dead line 26 leading down from the crown block, not shown, to the floor of the rig is now looped around the snubbing wheel drum 25 two or three times. In doing this it is necessary to throw the loop around the drum with the same curvature as it comes from the storage reel or in other words to throw in the natural twist. With the dead-line placed around the snubbing wheel, the front plate is secured in place by means of the pin 29 and then the free portion of the cable is laid in the open clamp 36 and the clamp is closed and tightened and finally locked in position.

The draw works can now be started and will bring the tension on the line 26 which will pull this line into position and cause the cable sling 35 to become taut. No strain will be applied to the snubbing wheel and to the clamp because the snubbing wheel merely rides on the sliding plate or cross-head 15 which is freely movable on the guides. In Figure 1 I show a broken line 44 extending through the rope portion 26 and along the clevis 33 and the deadline sling 35. The pull on the rope 26 will be in the direction of this line 44 and therefore all of the pull will be applied to the sill 3 and none to the crosshead and clamp. Should the cross-head 15 be raised too far above the coil springs 18 and 19, the collars 20 and 21 may be raised and these collars in turn will raise the springs to a position directly beneath the cross-head 15 and this will prevent an undue bouncing effect on the cross-head when the rope portion is slackened.

Figure 2 shows the guides 9 and 10 inclined at a slight angle from the vertical and this will incline the drum 25 of the snubbing wheel at the same angle. The guides 9 and 10 are inclined in the manner shown in Figure 2 because this is the natural angle of the line from the crown block. The broken line 44 in Figure 2 indicates the line of pull exerted by the cable 26, and this pull is through the clevis 33 and the deadline sling 35 to the sill 3. The sill carries the pulling strain rather than the cross-head and frame 1. The deadline sling 35 may pass through the floor of the rig, not shown, and around the mud sill 3 or it may be secured to a suitable deadman under the rig. When the device is in the position shown in Figures 1 and 2, the drilling of the well may be proceeded with in the usual way.

Each engineering department or each superintendent can decide how often it is best to move the line in order to relieve the wear on certain portions of the line that are continually engaging with sheaves. The changing of the line can be readily done by laying the sheave blocks on the floor and loosening the handle 42 on the clamp 36. Twenty or thirty feet of line from the storage spool may be fed through the loosened clamp and then the line reclamped. This excess of line is now fed around the snubbing wheel so that the twenty or thirty feet may be added to the portion 26 of the line. This will give an excess of line to the drum end of the line and this excess portion may be wound on the drum and then the drilling operation again started. When one hundred feet or so of line has been pulled over in the manner just indicated, the drum portion of the line may be unwound and the used end of the line cut from the remaining line whereupon the new end may be wrapped around the drum and the operations

proceeded with as usual. The feeding of new portions of line into the blocks will change the positions in the line where the sheaves will contact, and therefore the wear on the line will take place at points removed from where wear was formerly taking place. In this way the life of the line will be greatly increased.

Some superintendents may decide to feed a new portion of line into the blocks without putting the blocks on the floor. This may be done by holding the deadline **26** with a cat line, not shown, and then release the necessary footage from the storage spool through the clamp **36** which has been temporarily released. It will be seen that the snubbing wheel used in combination with the clamp makes the changing of the line very simple. The change can be quickly and safely made and the added life given to the rotary line by these changes will quickly pay for the cost of the installation and will also bring about a tremendous saving in wire rope costs.

It should be noted that the front plate **38** of the snubbing wheel is only removed from the shaft **27** when the coils of rope around the drum become jammed and a loosening effect is desired when moving an additional portion of rope from the storage reel into the active portion of the line. Usually the feeding of the line through the loosened clamp will free the coils on the drum **25** so that this additional portion of line may be quickly fed into the active portion **26** of the line.

While I have shown only the preferred form of my invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. In combination, a stand removably secured to a rig, a cross-head slidable on the stand, a snubbing wheel designed to receive a few turns of cable and being carried by the cross-head, a clamp carried by the snubbing wheel and adapted to grip the cable, a link secured to the snubbing wheel and extending in the direction of pull of the cable, and a deadend sling secured to the link and rig, said deadend sling also extending in the direction of the cable pull, whereby the force of the pull is transmitted to the rig instead of to the cross-head and frame.

2. In combination, a stand removably secured to a rig, a cross-head slidable on the stand, a snubbing wheel designed to receive a few turns of cable and being carried by the cross-head, a clamp carried by the snubbing wheel and adapted to grip the cable, a link secured to the snubbing wheel and extending in the direction of pull of the cable, and a deadend sling secured to the link and rig, said deadend sling also extending in the direction of the cable pull, whereby the force of the pull is transmitted to the rig instead of to the cross-head and frame, collars adjustably mounted on the frame, and springs carried by the collars and yieldingly supporting the cross-head when the cable is slackened.

3. The combination with a rig having a sill, of a frame removably secured to the sill, said frame having a pair of guides extending at substantially the same angle as the deadend of a cable, a cross-head slidable on the guides, collars adjustably carried by the guides, springs carried by the collars and designed to yieldingly support the cross-head, a snubbing wheel and a clamp carried by the cross-head, a link secured to the snubbing wheel, and a deadend sling secured to the link and the sill, said link and sling extending in the same direction as the line of pull on the deadend of the cable.

4. In combination, a frame, a cross-head slidably carried thereby, a snubbing wheel and a clamp carried by the cross-head.

5. In combination, a frame, a cross-head slidably carried thereby, a snubbing wheel and a clamp carried by the cross-head and adjustable and yielding means for supporting the cross-head, said cross-head being adapted to be lifted above the yielding supporting means.

6. In combination, a frame having a base designed to rest upon a rig sill, a pair of guides carried by the frame and being inclined slightly from the vertical, a cross-head slidably carried by the guides, collars adjustable on the guides and being disposed under the cross-head, coil springs slidable on the guides and being carried by the collars for yieldingly supporting the cross-head, a snubbing wheel carried by the guide, and a clamp carried by the guide.

7. In combination, a frame having a base designed to rest upon a rig sill, a pair of guides carried by the frame and being inclined slightly from the vertical, a cross-head slidably carried by the guides, collars adjustable on the guides and being disposed under the cross-head, coil springs slidable on the guides and being carried by the collars for yieldingly supporting the cross-head, a snubbing wheel carried by the guide, and a clamp carried by the guide, a link connected to the snubbing wheel, and a deadend sling connected to the link.

HENRY ALLYN WOOD.