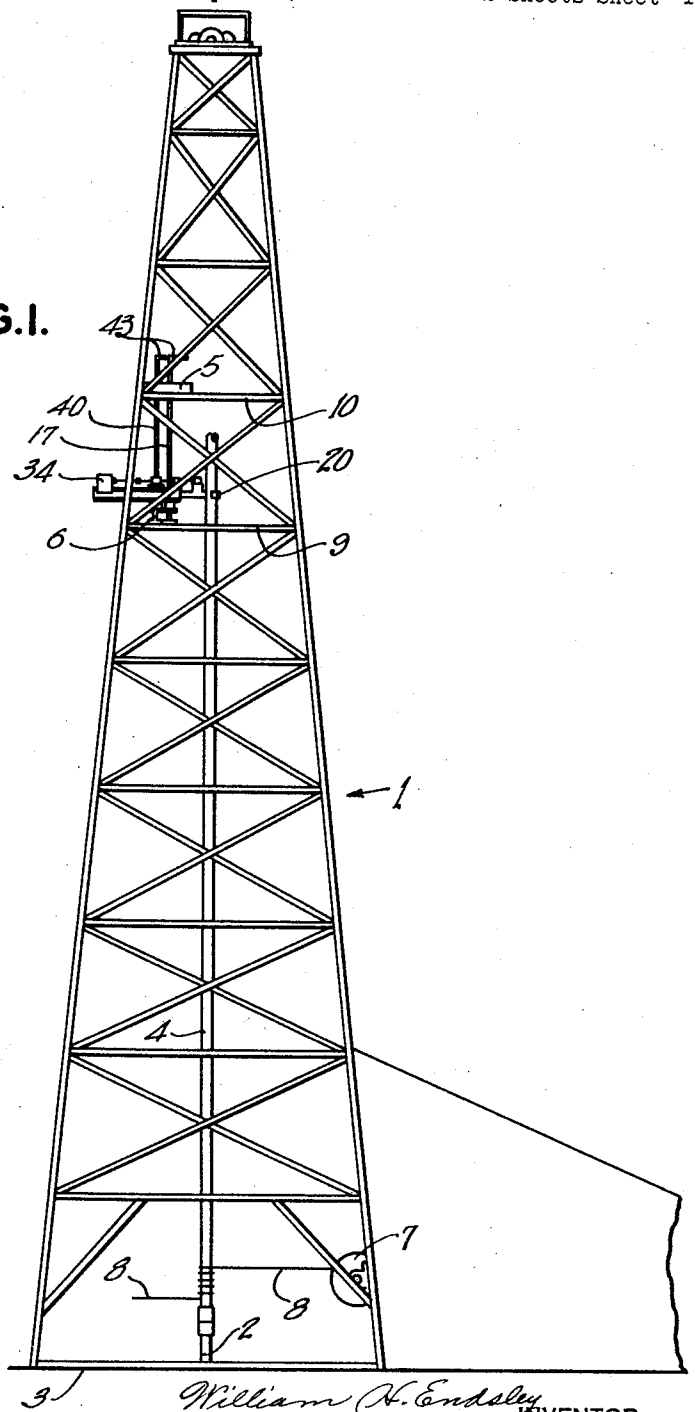
March 14, 1933. W. H. ENDSLEY 1,900,921

APPARATUS FOR GUIDING AND STEADYING DRILL STEM AND DRILL PIPE

Filed April 1, 1931 2 Sheets-Sheet 1

FIG. 1.



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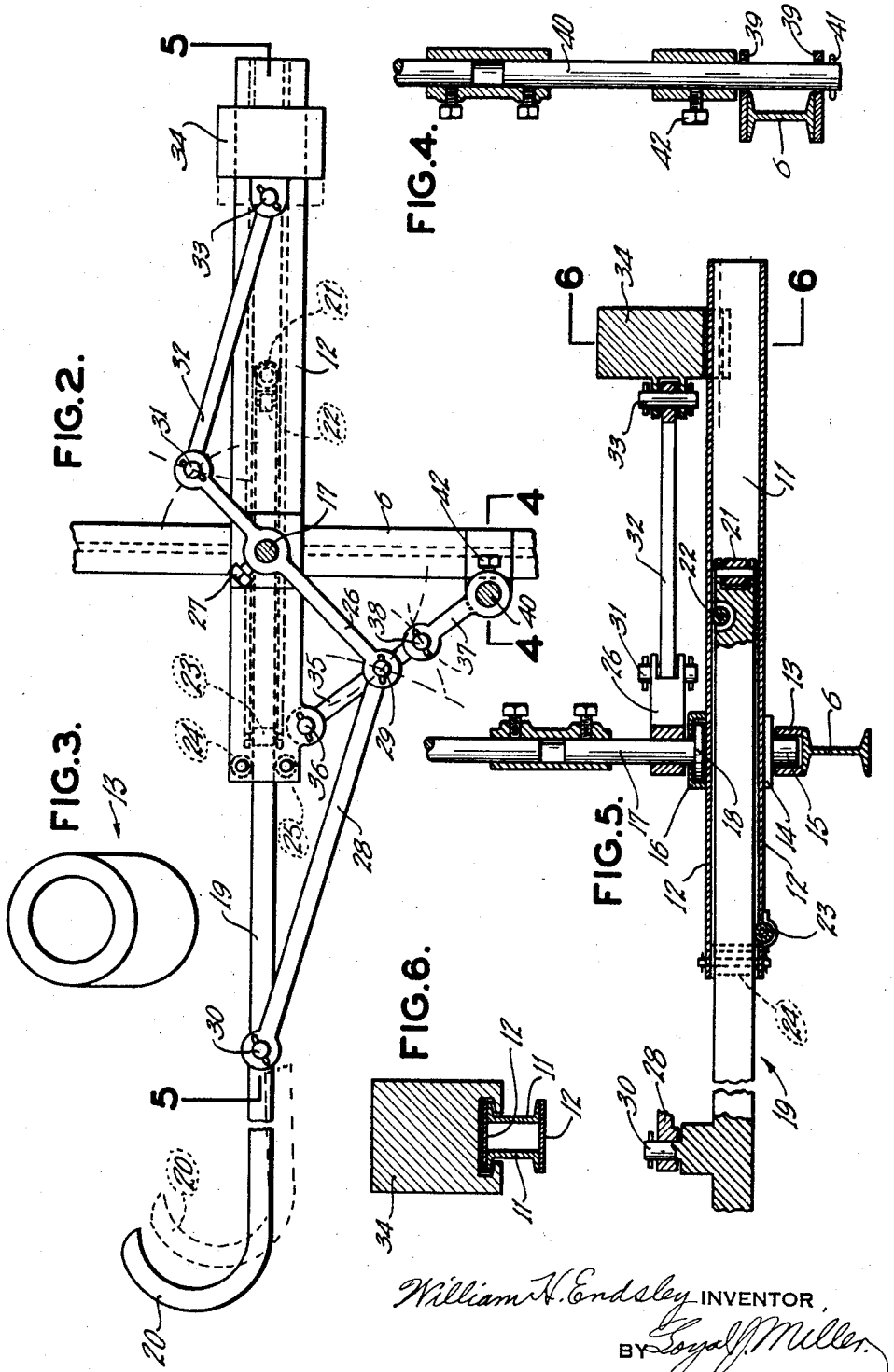

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UNITED STATES PATENT OFFICE

WILLIAM H. ENDSLEY, OF HENDERSON, TEXAS

APPARATUS FOR GUIDING AND STEADYING DRILL STEM AND DRILL PIPE

Application filed April 1, 1931. Serial No. 526,949.

My invention relates to deep well drilling apparatus, and more particularly to apparatus for guiding and steadying drill stem and drill pipe as it is being threaded together, previous to its being lowered into the well.

In rotary well drilling, at the present time, a platform is placed along one or two sides of the upper portion of a derrick, and within the derrick. This platform is used, among other things, for providing footing from which a person may manually guide and steady the upper portion of a section of drill stem or drill pipe as its lower end is being threaded into the upper end of a similar section which is protruding slightly from the well. The pipe or stem is extremely heavy, and due to the fact that the person upon the platform must necessarily lean over the platform's edge in order to steady and guide it, the threads are often damaged or ruined because the upper section is not held rigidly in axial alinement with the lower section as the upper section is being threaded into the lower section.

Not only does considerable damage often occur, but many serious, and even fatal accidents have happened to the person upon the platform, because of the fact that no mechanical means has been provided for steadying and guiding the pipe or stem.

The objects of my invention are to provide a device of this class which is new, novel, practical and of utility; which will positively engage and steady the upper portion of the drill stem or pipe without the necessity of a person leaning over the edge of the platform; which is designed to hold the upper portion of the pipe or stem in axial alinement with the section into which its lower end is being threaded; which will be speedy and positive in its operation; which will be simple in construction, installation and operation; which will be strong and durable; which will be comparatively cheap in manufacture; and, which will be efficient in accomplishing all the purposes for which it is intended.

With these and other objects in view as will more fully appear, my invention consists in the construction, novel features, and combination of parts hereinafter more fully described, pointed out in the claims hereto appended, and illustrated in the accompanying two-sheet drawing, of which:

Figure 1 is an elevational view of a usual derrick with the device installed thereon;

Fig. 2 is a plan view of the device;

Fig. 3 is a perspective of the bearing collar;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2;

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 2; and,

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5.

Like characters of reference designate like parts in all the figures.

It is understood that various changes in the form, proportion, size, shape, weight and other details of construction, within the scope of my invention may be resorted to without departing from the spirit or broad principle of my invention and without sacrificing any of the advantages thereof; and it is also understood that the drawings are to be interpreted as being illustrative and not restrictive.

One practical embodiment of the invention as illustrated in the drawings follows:

Refer now more particularly to Fig. 1 of the drawings, in which the reference numeral 1 indicates a usual well drilling derrick, 2 the upper end of a section of drill pipe or stem which is shown protruding above the drilling floor 3, and 4 indicates a section of stem or pipe the lower end of which is being threaded into said section 2. A usual platform in the upper portion of the derrick is shown at 5. My device is shown slightly below said platform 5, supported upon an I beam 6. The reference numeral 7 indicates a usual winch and 8 a cable connected to the winch and wrapped around the lower end of said section 4 for imparting rotary motion to said section 4. The free end of said cable 8 is usually held, manually, sufficiently taut to cause the section 4 to rotate. Said I beam is supported by a pair of the derrick's cross-frames 9 which lie next below the pair of

cross-frames 10 which support said platform 5.

The device consists of a pair of channels 11 secured rigidly together at their tops and bottoms by flat plates 12 which are welded to said channels 11. A cylindrical collar 13 is welded rigidly to the upper surface of said I beam 6 at its substantial mid-point. A plate 14, integral with or rigidly attached to a short shaft 15 is welded to the lower face of the lowermost one of said plates 12 at a longitudinal point of said plate 12 lying approximately one-half of the distance between its end and its middle. This end will hereafter be referred to herein as the inner end, and the other end as the outer end. Reference is made in this manner because when in operative position, the inner end extends toward the center of said derrick 1, while the outer end extends outwardly from the derrick.

Directly above said plate 14, the upper one of said plates 12 is provided with a cylindrical cap 16 which receives a vertical shaft 17 having a flat disk 18 integral with or securely attached to its lower end. Said cap 16 acts as a means for holding said shaft 17 against any movement in relation to said upper plate 12, with the exception of a rotative movement. The office of said shaft 17 will be more fully described hereinbelow.

Slidably disposed in the space bounded by said channels 11 and said plates 12 is one end of an arm 19, the other end of which extends considerably past the inner ends of said channels 11 and plates 12, and is bent to form a hook 20. The portion of said arm 19 which lies within said space, is rectangular in cross-section and is provided adjacent its end with rollers 21 and 22. Adjacent the inner end of said channels 11 and plates 12, are provided rollers 23, 24 and 25. Said rollers 21, 22, 23, 24 and 25 act as a means of decreasing friction between said arm 19 and said channels 11 and plates 12 when said arm 19 is moved longitudinally.

Said arm 19 is provided for the purpose of engaging the upper end of said pipe or stem section 4 and holding it while its lower end is being threaded into said section 2. Obviously then a means must be provided for causing said arm 19, channels 11 and plates 12 to swing horizontally with said shaft 15 as a pivotal axis, and also for imparting longitudinal movement to said arm 19. The means must be such that the arm 19 may be moved inwardly past said section 4, swung horizontally into contact with the section, and then moved outwardly far enough to cause said hook 20 to partially envelop said section 4. The movement must also be permitted in reverse order to disengage said hook 20 from said section 4.

As a means for controllably causing the desired movement of said arm 19, the following structure is provided:

Directly above said cap 16, said shaft 17 is provided with a perpendicular arm 26 held rigidly thereto by a set-screw 27. A link 28 has one of its ends pivotally connected to one end of said arm 26 by a pin 29. The other end of said link 28 is pivotally attached to said arm 19 by a pin 30 at a point adjacent said hook 20. It may be seen that any rotation of said shaft 17 will impart a longitudinal movement to said arm 19. Said arm 26 extends past said shaft 17, and its free end is connected pivotally by a pin 31 to one end of a link 32, the other end of which is pivotally attached by a pin 33 to a weight 34. Said weight 34 is slidably mounted upon the outer end portions of said channels 11 and the upper one of said plates 12, as may best be seen in Fig. 6. It may thus be seen that when said arm 19 is moved longitudinally in one direction, said weight 34 will be moved in the opposite direction, and consequently a balance will at all times be maintained.

The means for swinging said arm 19 and said channels 11 and plates 12 consists of a link 35 one end of which is connected pivotally to the inner end of said channels 11 and plates 12 by a pin 36. The other end of said link 35 is pivotally attached to one end of a link 37 by a pivot pin 38. Said I beam 6 is provided with a pair of plates 39 which are welded or otherwise attached rigidly to its top and bottom. Said plates extend outwardly from said beam 6, and their outwardly extending portions pivotally embrace a vertical shaft 40 having a transverse pin 41 therethrough. The free end of said link 37 is rigidly connected to said shaft 40 by a set screw 42. It may be seen that any rotation of said shaft 40 will cause said arm 19 to be swung in a horizontal plane.

By reference to Fig. 1 of the drawings it may be seen that said shafts 17 and 40 are extended upwardly through said platform 5, and that their upper ends are each provided with a handle or crank 43.

From the description thus far it may be seen that a means has been described whereby the upper end of said section 4 may be firmly held in position while it is being threaded into said section 2.

Due to the fact that a description of the operation has been made herein it is not deemed necessary to elaborate further as to the operation of the device.

Obviously, the invention is susceptible of embodiment in forms other than that which is illustrated in the accompanying drawings and described herein, and applicable, for uses and purposes other than as detailed, and I therefore consider as my own all such modifications and adaptations and other uses of the form of the device herein

described as fairly fall within the scope of my invention.

Having thus described my invention, what is claimed and desired to be secured by Letters Patent, is:

1. A pipe stabilizer for well drilling, embodying a pivotally mounted substantially horizontal member, a single hook ended pipe engaging member slidably supported by said horizontal member, link and crank means for moving both members in an arc, link and crank means for selectively moving said pipe engaging member longitudinally with relation to said horizontal member, and means for maintaining both of said members in a substantial balance upon a supporting member.

2. A pipe stabilizer for well drilling, embodying a beam horizontally supported by usual cross-members of a well drilling derrick, a second beam pivotally supported in a substantially horizontal position by the first mentioned beam, said second beam having one end extending inwardly of the derrick, means for moving the second beam in an arc, a pipe engaging hook mounted for longitudinal movement with relation to and carried by the second beam, and means for selectively moving said hook longitudinally

3. A pipe stabilizer for well drilling, embodying a beam horizontally supported by usual cross-members of a well drilling derrick, a second beam pivotally supported in a substantially horizontal position by the first mentioned beam, said second beam having one end extending inwardly of the derrick, means including links and a crank for moving the second beam in an arc, a pipe engaging hook mounted for longitudinal movement with relation to and carried by the second beam, and link and crank means for selectively moving said hook longitudinally.

4. A pipe stabilizer for well drilling, embodying a beam horizontally supported by usual cross-members of a well drilling derrick, a second beam pivotally supported in a substantially horizontal position by the first mentioned beam, said second beam having one end extending inwardly of the derrick, means for moving the second beam in an arc, a pipe engaging hook mounted for longitudinal movement with relation to and carried by the second beam, means for selectively moving said hook longitudinally, and, means for maintaining said hook and the second beam in a substantial balance upon the first mentioned beam.

5. A pipe stabilizer for well drilling, embodying a beam horizontally supported by usual cross-members of a well drilling derrick, a second beam pivotally supported in a substantially horizontal position by the first mentioned beam, said second beam having one end extending inwardly of the derrick, means including links and a crank for moving the second beam in an arc, a pipe engaging hook mounted for longitudinal movement with relation to and carried by the second beam, link and crank means for selectively moving said hook longitudinally, and means for maintaining said hook and the second beam in a substantial balance upon the first mentioned beam.

6. In a pipe stabilizer for well drilling, the combination with usual horizontal frame members of a well drilling derrick, of a beam within the derrick rigidly supported by said frame members, a substantially horizontal member pivotally carried by said beam, a pipe engaging element slidably supported by said pivotally mounted member for longitudinal movement in relation thereto, remote controlled means for selectively moving the element longitudinally, and remote controlled means for selectively swinging the pivotally mounted member in an arc.

7. Organization as described in claim 6, in which the first mentioned means consists of an upstanding shaft having a projecting arm rigidly keyed thereto, said shaft pivotally carried by the beam at a point remote from the pivotal axis of said first mentioned member, a link pivotally connected at one end to the free end of said arm and having its other end pivotally connected to the pivotally mounted member at a point remote from its pivotal axis, and a crank rigidly connected to the upper end of the shaft whereby the shaft may be rotated at will.

8. Organization as described in claim 6, in which the last mentioned means consists of an upstanding shaft pivotally carried by the pivotally mounted member, an outstanding arm rigidly keyed to the shaft, a link pivotally connected at one end to the free end of said arm, and pivotally connected at its other end to the pipe engaging element, and a crank rigidly connected to the upper end of the shaft whereby the shaft may be rotated at will.

9. In a stabilizer for well drilling, the combination with usual horzontal frame members of a well drilling derrick, of a beam within the derrick rigidly supported by said frame members, a substantially horizontal member pivotally mounted intermediate its ends upon said beam, a pipe engaging element slidably supported by the inner end portion of said pivotally mounted member for longitudinal movement in relation thereto, a counter-balance weight slidably carried by the outer end portion of the pivotally mounted member, and complemental means for selectively and simultaneously moving said element and said weight in opposite directions.

10. Organization as described in claim 9, in which said means consists of an upstanding shaft pivotally carried by the pivotally mounted member, an arm rigidly attached in-

termediate its ends to said shaft and extending outwardly past both sides of the pivotally mounted member, a link pivotally connected at one end to one end of said arm, and pivotally connected at its other end to the pipe engaging element, a second link pivotally connected at one end to the free end of said arm, and pivotally connected at its other end to the counter-balance weight, and a crank rigidly connected to the upper end of the shaft whereby the shaft may be rotated at will.

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