March 25, 1958 M. E. TRUE 2,828,024

PIPE POSITIONING DEVICE FOR A DRILLING DERRICK

Filed July 15, 1953

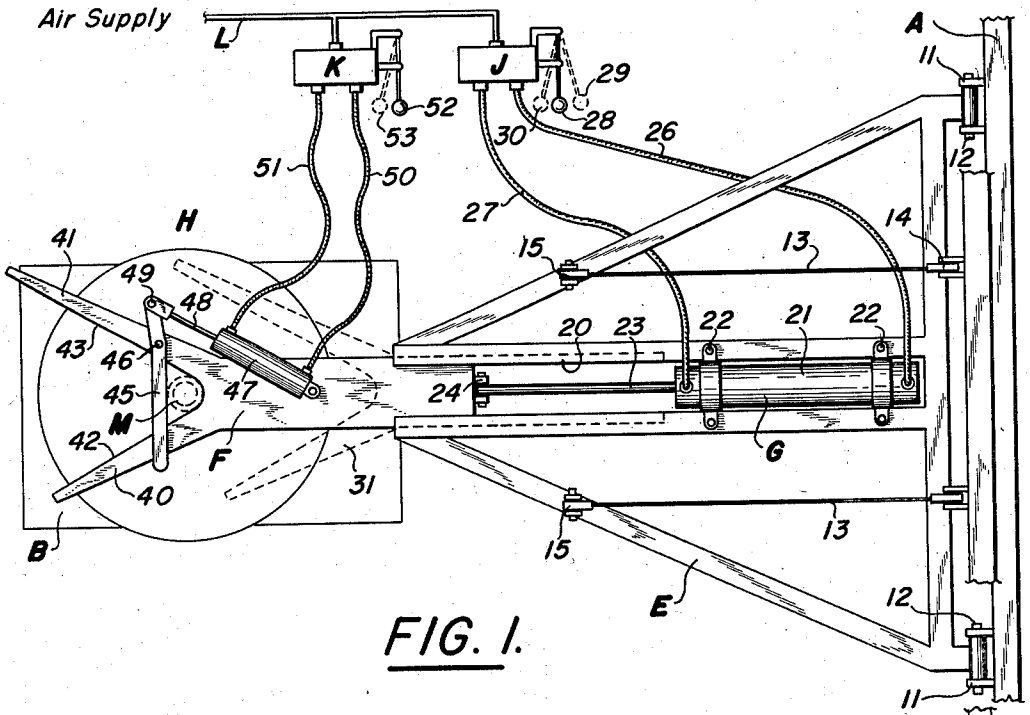


FIG. 1.

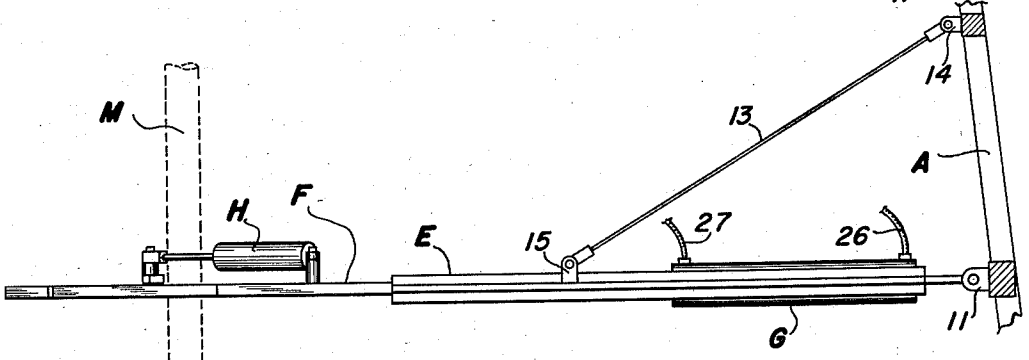
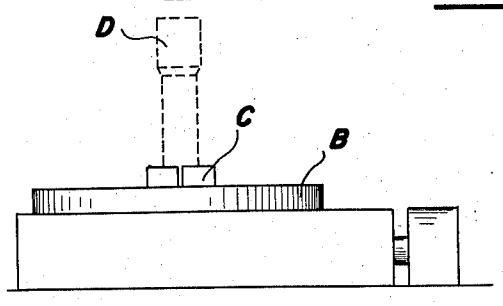


FIG. 2.



INVENTOR.
Martin E. True,
BY
J. S. McLean
ATTORNEY.

United States Patent Office 2,828,024 Patented Mar. 25, 1958

2,828,024

PIPE POSITIONING DEVICE FOR A DRILLING DERRICK

Martin E. True, Houston, Tex., assignor, by mesne assignments, to Esso Research and Engineering Company, Elizabeth, N. J., a corporation of Delaware

Application July 15, 1953, Serial No. 368,192

4 Claims. (Cl. 214—2.5)

This application is directed to a device for positioning a suspended section of drill pipe in a drilling derrick.

In the drilling of boreholes in the conventional method using a rotary drill rig, it is customary when returning the drill bit into the borehole to move sections of the drill pipe from racking position at the side of the derrick to the center of the derrick while supporting them from an elevator attached to the traveling block. Since the suspended section of drill pipe is in effect a pendulum, it tends to oscillate. In order to couple the lower end of the suspended pipe with the upper end of the drill stem in the borehole, it is essential to stop such oscillation and to position the suspended section of pipe so that its center line coincides with that of the drill stem in the borehole so that the screw threads on the end of the suspended pipe may engage with or stab the threads on the upper end of the drill stem.

The present invention is directed to an assembly for absorbing the shock as a suspended section of drill pipe swings from racking position to the center of the derrick and for positioning the suspended pipe so that its center line coincides with that of the drill pipe in the borehole.

Other objects and advantages of the present invention may be seen from the following description taken in conjunction with the drawing in which:

Fig. 1 is a top view showing an embodiment of the present invention, and

Fig. 2 is a side view of the embodiment of Fig. 1.

In the drawing a portion or side of a drilling derrick is shown as A, at the center of which is a conventional rotary table B. Slips C are arranged in the rotary table for suspending a portion of the drill stem in the borehole, the upper end of which is indicated by dashed lines D.

The main parts of the assembly of the present application are base member E, pipe receiving member F, cylinder and piston assembly G, latching assembly H and valves J and K. The lower end of a suspended section of drill pipe is indicated by dashed lines M as being engaged by the assembly with its center line coinciding with the center line of the drill stem D.

The base member E is hingedly attached to the side of derrick A by brackets **11, 11** secured to the side of the derrick and readily removable pins or bolts **12, 12.** This arrangement provides a hinged mounting so that the assembly may be turned up against the side of a derrick when it is desired to have the derrick floor clear. The device may also be readily removed from the derrick when desired. The base member is held in a horizontal position by two spaced cables **13, 13** each of which has one end secured by bracket to the side of the derrick above bracket **11** and its other end secured to base member E by a bracket **15.**

Base member E is provided with guide rails **20** for slidably receiving member F so that member F is free to move longitudinally along rails **20.** Cylinder and piston assembly G is of a conventional type and in order to simplify the drawing, the details of its construction are not shown. As seen in the drawing, a cylinder **21** is

mounted on member G and is fixed thereto by fastening members **22, 22.** A piston rod **23** projects from the end thereof and is secured to member F by a pin or a bolt **24.** It will be understood that a piston, not shown in the drawing, is arranged slidably within cylinder **21** and is attached to piston rod **23.**

Valve J may be a conventional 4-way bleeder type valve with a center neutral position. In order to simplify the showing of the drawing, the details of construction of this valve are not shown. Valve J is supplied with compressed air by a suitable means, such as an air compressor not shown in the drawing, connected to air main L and is provided with a delivery line **26** connected to the head end of cylinder **21** of assembly G and delivery line **27** connected to the piston rod end of cylinder **21.** For purpose of illustration, it will be assumed that when operating handle **28** is in the position as shown by solid lines that the valve J is in its neutral position and holds the compressed air pressure in both lines **26** and **27** so that the assembly G serves as a shock absorber. When the operating handle is moved to the position shown by dashed lines **29,** compressed air is supplied through delivery line **26** and is bled to the atmosphere by line **27,** thus positioning member F to the position shown by solid lines, and when the operating handle is moved to the position shown by dashed lines **30,** compressed air is delivered through line **27** and bled from line **26** and forces member F to the retracted position indicated by dashed lines **31** in Fig. 1.

The pipe receiving portion of member F consists of two arms **40** and **41** which have pipe receiving surfaces **42** and **43** respectively which form a V shaped opening for receiving a section of pipe. The clamping or latching means H serves to restrain the pipe in the position shown by dashed lines M in Figs. 1 and 2.

The pipe latching assembly H consists of a latching member **45** attached by pivot **46** to member F and a cylinder and piston power assembly shown as cylinder **47** and piston rod **48** which is attached to member **45** by pivot **49.** The cylinder and piston power assembly of the assembly H is conventional to the art, and in order to simplify the drawing, details of construction are not shown. A piston, not shown in the drawing, is slidably arranged within cylinder **47** and is attached to piston rod **48.**

Valve K may be a conventional 4-way bleeder type valve and in order to simplify the drawing, the details of construction of the valve are not shown. The inlet of the valve is connected to compressed air line L. Delivery line **50** connects the valve to the head end of cylinder **47** and delivery line **51** connects it to the piston rod end of cylinder **47.** For the purpose of explaining the invention it will be assumed that when the operating handle **52** is shown in the position indicated by solid lines, air is delivered through the valve to delivery line **50,** and is bled to the atmosphere from line **51,** thus biasing the piston, not shown in the drawing, in cylinder **47** away from the head end of cylinder **47** and causing latching member **45** to engage section of pipe L as shown in the drawing. It will also be assumed that when the operating handle of valve K is moved to the position shown by dashed lines **53,** compressed air is delivered through valve K to delivery line **51** and is bled to the atmosphere from line **50,** thus biasing the piston, not shown in the drawing, in cylinder **47** to the head end of the cylinder and causing the latching member **45** to swing open, thus releasing a section of pipe, if there be one, in the V-shaped opening of member F and placing the latching assembly H in position for engaging with another section of pipe.

It will be seen that the present invention is directed to a pipe positioning member adapted for absorbing

the shock of a section of pipe as it is swung from its racking position to the center of the derrick and which positions the pipe at the center of the derrick so that its center line will coincide with the center line of drill pipe in the borehole, thus allowing the suspended section of pipe to be readily engaged or stabbed in the threads of the upper end of the drill stem. The device of the present invention is connected to the side of the derrick through releasable hinged mounting so that it may be readily removed from the derrick if desired, or alternatively so that it may be rotated upwardly about said hinged mounting to rest against the side of the derrick to clear the derrick floor.

I claim:

1. A device for receiving and centering a vertical section of pipe being swung from a racked position on a derrick floor to the center of the derrick, comprising, in combination, a horizontal supporting frame member hingedly attached to one side of the derrick, flexible means attached to said supporting frame member and suspended from an upper portion of said derrick for supporting said frame member, a pipe receiving member slidably arranged on said supporting frame member whereby said pipe receiving member is movable horizontally in a single plane from a single pipe receiving position in the center of the derrick to a non-pipe receiving position away from the center of the derrick on one side of the derrick only, said pipe receiving member having a pair of fixed extending fingers defining a horizontal V-shaped opening, said fingers extending outwardly toward and extensible beyond the center line of the derrick whereby pipe is received in said V-shaped opening when said pipe is swung from any of its racked positions toward the center of said derrick, a releasable latch arm pivotally mounted on one of said fingers releasably latching said pipe in said V-shaped opening, means mounted on said pipe receiving member for operating said latch arm, and means connected to said supporting frame member and to said pipe receiving member for horizontally moving said pipe receiving member and absorbing shocks transmitted to said pipe receiving member on swinging said section of pipe into said V-shaped opening and against said pipe receiving member.

2. A device for receiving and centering a vertical section of pipe being swung from a racked position on a derrick floor to the center of the derrick, comprising, in combination, a horizontally extending supporting frame member hingedly attached to one side of the derrick, elongated flexible means attached to said supporting frame member and suspended from an upper portion of said derrick for supporting said frame member, a pipe receiving member slidably arranged on said supporting frame member for horizontal movement in a single plane to and away from the center of the derrick on one side of the derrick only, said pipe receiving member having a pair of fixed projecting fingers forming a horizontal V-shaped opening extending outwardly toward and extensible beyond the center line of the derrick for receiving a swung section of said pipe, a releasable pipe latch arm pivotally mounted on one of said fingers to latch said pipe releasably in said V-shaped opening, means operably connected to said latch arm and to said pipe receiving member for operating said releasable latch arm, and means connected to said pipe receiving member and to said frame member for moving said pipe receiving member on said frame member from a single fixed pipe receiving position in the center of said derrick to a non-pipe receiving position in the same horizontal plane away from the center of the derrick and

absorbing shock transmitted to said pipe receiving member on swinging said section of pipe into said V-shaped opening and against said pipe receiving member.

3. A device for receiving and centering a vertical section of pipe being swung from a racked position on a derrick floor to the center of the derrick, comprising, in combination, a horizontal supporting frame member hingedly and releasably attached to one side of the derrick, a cable attached to said supporting frame member and suspended from an upper portion of said derrick for supporting said frame member, a pipe receiving member slidably arranged on said supporting frame member whereby said pipe receiving member is movable horizontally in a single plane from a single pipe receiving position in the center of the derrick to a non-pipe receiving position away from the center of the derrick on one side of the derrick only, said pipe receiving member having a pair of fixed extending fingers defining a horizontal V-shaped opening, said fingers extending outwardly toward and extensible beyond the center line of the derrick whereby pipe is received in said V-shaped opening when said pipe is swung from any of its racked positions toward the center of said derrick, a releasable latch arm pivotally mounted on one of said fingers releasably latching said pipe in said V-shaped opening, means mounted on said pipe receiving member for operating said latch arm, and means connected to said supporting frame member and to said pipe receiving member for horizontally moving said pipe receiving member and absorbing shocks transmitted to said pipe receiving member on swinging said section of pipe into said V-shaped opening and against said pipe receiving member.

4. A device for receiving and centering a vertical section of pipe being swung from a racked position on a derrick floor to the center of the derrick, comprising, in combination, a horizontally extending supporting frame member hingedly attached to one side of the derrick, a cable attached to said supporting frame member and suspended from an upper portion of said derrick for supporting said frame member, a pipe receiving member slidably arranged on said supporting frame member for horizontal movement in a single plane to and away from the center of the derrick on one side of the derrick only, said pipe receiving member having a pair of fixed projecting fingers forming a horizontal V-shaped opening extending outwardly toward and extensible beyond the center line of the derrick for receiving a swung section of said pipe, a releasable pipe latch arm pivotally mounted on one of said fingers to latch said pipe releasably in said V-shaped opening, means operably connected to said latch arm and to said pipe receiving member for operating said releasable latch arm, and means connected to said pipe receiving member and to said frame member for moving said pipe receiving member on said frame member from a single fixed pipe receiving position in the center of said derrick to a non-pipe receiving position in the same horizontal plane away from the center of the derrick and absorbing shock transmitted to said pipe receiving member on swinging said section of pipe into said V-shaped opening and against said pipe receiving member.

References Cited in the file of this patent

UNITED STATES PATENTS

1,467,262	Barker	Sept. 4, 1923
2,184,051	Moise	Dec. 19, 1939
2,206,185	Graham et al.	July 2, 1940
2,416,815	Calhoun	Mar. 4, 1947
2,450,934	Calhoun	Oct. 12, 1948
2,478,486	Holleron et al.	Aug. 9, 1949
2,690,847	Crookston	Oct. 5, 1954