Nov. 9, 1948. T. H. BERRY 2,453,184

CABLE SPOOLING DEVICE FOR WELL DRILLING RIGS

Filed Dec. 29, 1947 2 Sheets-Sheet 1

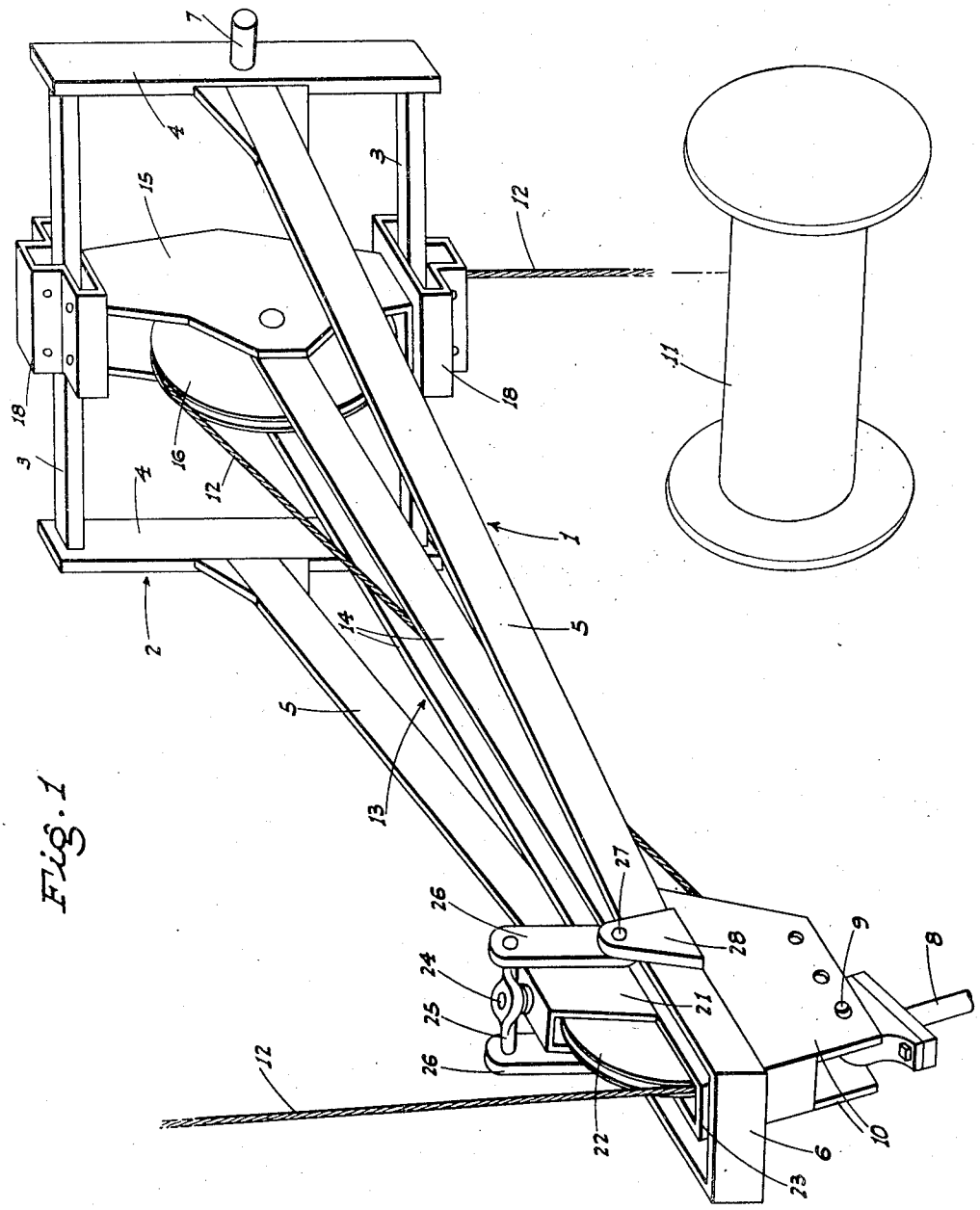


Fig. 1

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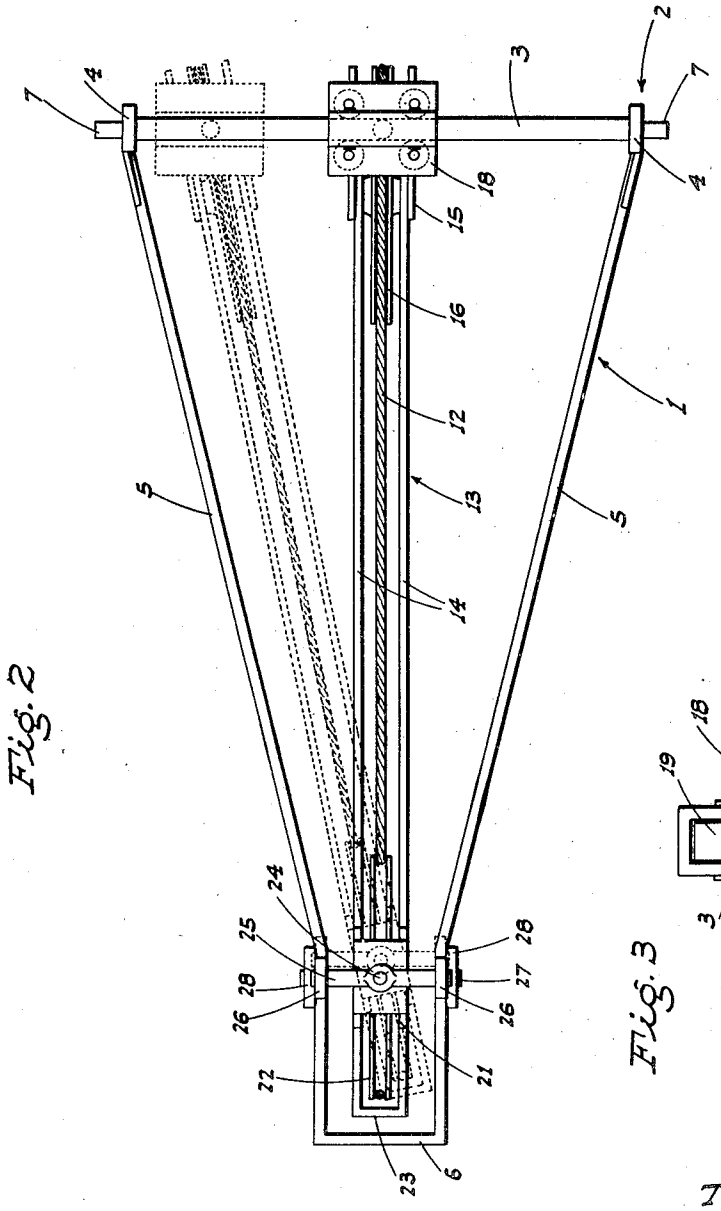


Fig. 2

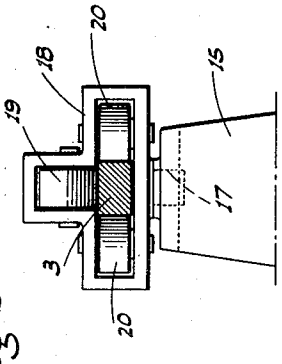


Fig. 3

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CABLE SPOOLING DEVICE FOR WELL DRILLING RIGS

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10 Claims. (Cl. 254—190)

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This invention is directed to, and it is an object to provide, an improved device for automatically spooling the cable to and from the winch drum of a well drilling rig; the device being operative to level wind the cable onto the drum, or to permit the cable to run freely therefrom.

Another object of the invention is to incorporate the cable spooling device in combination with the walking beam of a well drilling rig wherein the winch drum is below the rear end portion of said beam.

A further object of the invention is to provide a cable spooling device, as above, which comprises, in novel combination, a cable guide beam mounted in laterally shiftable relation on the walking beam, and such guide beam including pulleys about which the drilling cable leads; the guide beam floating laterally for level winding or unwinding of the cable from the adjacent winch drum.

A further object of the invention is to produce a practical, reliable, and efficient cable spooling device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a perspective view of a well drilling rig walking beam embodying the present invention and illustrating, diagrammatically, its relationship to the winch drum.

Fig. 2 is a plan view of the walking beam with the invention incorporated therein.

Fig. 3 is a fragmentary cross section illustrating one of the roller carriages.

Referring now more particularly to the characters of reference on the drawings, the invention is embodied in connection with the walking beam, indicated generally at 1, of a well drilling rig. This walking beam includes, at its rear end, an upstanding rectangular mounting frame, indicated generally at 2; such frame having upper and lower guide bars 3, and end posts 4. A pair of transversely spaced beams 5 project forwardly from corresponding end posts 4 in converging relation, and said beams are connected together at their free ends in adjacent but spaced relation by a cross member 6.

At its rear end the walking beam 1 is pivoted, for vertical oscillation, by means of trunnions 7 carried in suitable bearings (not shown) on the well drilling rig.

A crank actuated connecting rod 8 is adjustably attached, at its upper end, as at 9, between attachment flanges 10 depending from the free or outer end portion of the walking beam; reciprocation of the connecting rod 8 causing vertical oscillation of said walking beam.

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The power actuated winch drum 11 of the well drilling rig is mounted on said rig in a position below the inner end portion of the walking beam 1, with the axis of said drum horizontal and transverse.

The cable 12 runs from the drum 11 through the walking beam 1 in threaded relation to the hereinafter described cable spooling device, thence extends upwardly to pass over a mast-supported sheave (not shown), and then depends into the well being drilled; the well drilling tool being on the lower end of said depending portion of the cable.

The cable spooling device which comprises the essence of the present invention is constructed and functions as follows:

A cable guide beam, indicated generally at 13, which comprises spaced beams 14, extends lengthwise in the walking beam 1 between the beams 5 thereof.

At their inner ends the beams 14 are fixed in connection with opposite sides of an upstanding, forwardly opening yoke 15 between the sides of which a pulley 16 is journaled.

At its upper and lower ends the yoke 15 is pivoted, as at 17, to corresponding roller carriages 18 for turning of said yoke 15 about a vertical axis.

The roller carriages 18 run on corresponding ones of the guide bars 3 and include top rollers 19 and side rollers 20.

At their outer ends the beams 14 are fixed with a yoke 21, and a pulley 22 is journaled between the beams 14 within said yoke. The forward ends of the beams 14 are connected together by a cross member 23 to maintain proper spacing of said beams, with the pulley 22 therebetween.

At its upper end the yoke 21 includes a vertical spindle 24 journaled centrally in a cross bar 25; the latter being in turn journaled, at opposite ends, in connection with the upper ends of upstanding links 26. A their lower ends the links 26 are pivoted, as at 27, to ears 28 on the beams 5.

With the above structure the cable guide beam 13 is capable of lateral shifting movement within the walking beam 1; the yoke 15 and carriages 18 permitting of such movement relative to the upstanding mounting frame 2, while the assembly of yoke 21, spindle 24, cross bar 25, and links 26 permit of responsive pivotal motion of the

forward end portion of said cable guide beam. Additionally, the links 26 compensate for the differential in effective length of said cable guide beam 13 as it shifts laterally with the yoke 15 and roller carriages 18.

The cable 12 is reeved as follows:

From the winch drum 11 the cable leads upwardly over pulley 16 from the rear, and thence extends forwardly, under pulley 22, and upwardly to the mast sheave (not shown) of the rig.

When the power actuated winch drum 11 is run in a direction to wind the cable 12 thereon, such cable has a natural tendency to level wind, and this is permitted by the floating or laterally shiftable cable guide beam 13 which carries the pulley 16. In other words, as the cable 12 runs onto the drum 11 in level winding relation, the cable guide beam 13 will track, vertically, relative thereto; the roller carriages 18 and the yoke 15 shifting along the mounting frame 2. With each layer of cable on the drum 11, the cable 12 automatically reverses its direction of level winding, whereupon the cable guide beam 13 will shift laterally in a corresponding direction.

When the cable 12 is paid off or is unwinding from the winch drum 11, the pulley 16 travels in alinement with the unwinding point, by reason of the laterally shiftable cable guide beam 13; the cable thus escaping the drum 11 readily and freely.

It will be obvious from the structure that the described cable spooling device does not in any way affect the normal operation of the walking beam 1, which is oscillated vertically by the connecting rod 8 when the rig is in use.

While the cable spooling device is here described as embodied in a well drilling rig, the invention may nevertheless be put to other uses to which it may be adapted.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired.

1. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, elements guiding the cable along the guide beam, and a structure mounting the cable guide beam for shifting motion laterally of the walking beam and in a direction lengthwise of the axis of the winch beam.

2. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, elements guiding the cable along the guide beam, and a structure mounting the cable guide beam for shifting motion laterally of the walking beam and in a direction lengthwise of the axis of the winch beam; said elements being pulleys in longitudinally spaced relation on the cable guide beam.

3. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, elements guiding the cable along the guide beam, and a structure mounting the cable guide beam for shifting motion laterally of the walking beam and in a direction lengthwise of the axis of the winch beam; said structure including an upstanding frame at one end of the walking beam, the winch drum being generally below said upstanding frame, and a roller carriage movable transversely of said frame and supporting the adjacent end of the cable guide beam.

4. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a pair of transverse axis pulleys on the cable guide beam in longitudinally spaced relation, the winch drum being generally below one of said pulleys, said pulleys guiding the cable from the drum along the cable guide beam, and a structure mounting the cable guide beam for shifting motion laterally of the walking beam and in a direction lengthwise of the axis of the winch drum.

5. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a pair of transverse axis pulleys on the cable guide beam in longitudinally spaced relation, the winch drum being generally below one of the pulleys, said pulleys guiding the cable from the drum along the cable guide beam, a carriage assembly mounting the cable guide beam at the end adjacent said one pulley in connection with the walking beam for shifting motion laterally thereof and in a direction lengthwise of the drum axis, and a pivot unit between the opposite end portion of the cable guide beam and walking beam.

6. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a pair of transverse axis pulleys on the cable guide beam in longitudinally spaced relation, the winch drum being generally below one of the pulleys, said pulleys guiding the cable from the drum along the cable guide beam, a carriage assembly mounting the cable guide beam at the end adjacent said one pulley in connection with the walking beam for shifting motion laterally thereof and in a direction lengthwise of the drum axis, and a pivot unit between the opposite end portion of the cable guide beam and walking beam; the walking beam including an upstanding end frame having a transverse guide

bar, said carriage assembly including a roller carriage running on the guide bar.

7. A cable spooling device for a well drilling rig having a vertically oscillating walking beam, and a transverse axis winch drum vertically spaced from the walking beam with a cable leading from the drum to and lengthwise of the walking beam, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a pair of transverse axis pulleys on the cable guide beam in longitudinally spaced relation, the winch drum being generally below one of the pulleys, said pulleys guiding the cable from the drum along the cable guide beam, a carriage assembly mounting the cable guide beam at the end adjacent said one pulley in connection with the walking beam for shifting motion laterally thereof and in a direction lengthwise of the drum axis, and a pivot unit between the opposite end portion of the cable guide beam and walking beam; said pivot unit including double pivots, one to permit the cable guide beam to shift laterally, and the other to permit it to shift lengthwise.

8. A cable spooling device for a well drilling rig having a vertically oscillating walking beam including an upstanding mounting frame at one end, and a transverse axis winch drum vertically spaced below said frame with a cable leading from the drum to and lengthwise of the walking beam from adjacent said frame, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a carriage assembly connecting the adjacent end of the cable guide beam to the mounting frame for shifting motion laterally of the walking beam and in a direction lengthwise of the drum axis, a pivot unit between the walking beam and the other end of the cable guide beam to permit of said lateral shifting motion of the latter, and transverse axis cable guide pulleys on the cable guide beam adjacent the carriage assembly and pivot unit.

9. A cable spooling device for a well drilling rig having a vertically oscillating walking beam including an upstanding mounting frame at one end, and a transverse axis winch drum vertically spaced below said frame with a cable leading from the drum to and lengthwise of the walking beam from adjacent said frame, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a carriage assembly connecting the adjacent end of the cable guide beam to the mounting frame for shifting motion laterally of the walking beam and in a direction lengthwise of the drum axis, a pivot unit between the walking beam and the other end of the cable guide beam to permit of said lateral shifting motion of the latter, and transverse axis cable guide pulleys on the cable guide beam adjacent the carriage assembly and pivot unit; said carriage assembly including upper and lower transversely shiftable carriages on the mounting frame, a yoke extending between and pivoted at opposite ends to the carriages for turning about an upstanding axis, the cable guide beam being fixed to the yoke and the corresponding pulley being journaled in the latter.

10. A cable spooling device for a well drilling rig having a vertically oscillating walking beam including an upstanding mounting frame at one end, and a transverse axis winch drum vertically spaced below said frame with a cable leading from the drum to and lengthwise of the walking beam from adjacent said frame, said spooling device comprising a cable guide beam extending lengthwise of the walking beam, a carriage assembly connecting the adjacent end of the cable guide beam to the mounting frame for shifting motion laterally of the walking beam and in a direction lengthwise of the drum axis, a pivot unit between the walking beam and the other end of the cable guide beam to permit of said lateral shifting motion of the latter, and transverse axis cable guide pulleys on the cable guide beam adjacent the carriage assembly and pivot unit; said pivot unit including a vertical spindle mounted in connection with the cable guide beam, a cross member journaled on the spindle, and longitudinally swingable links pivotally secured between the ends of the cross member and the walking beam.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
657,689	Behr	Sept. 11, 1900
2,228,346	Downie	Jan. 14, 1941
2,387,245	Davidson et al.	Oct. 23, 1945