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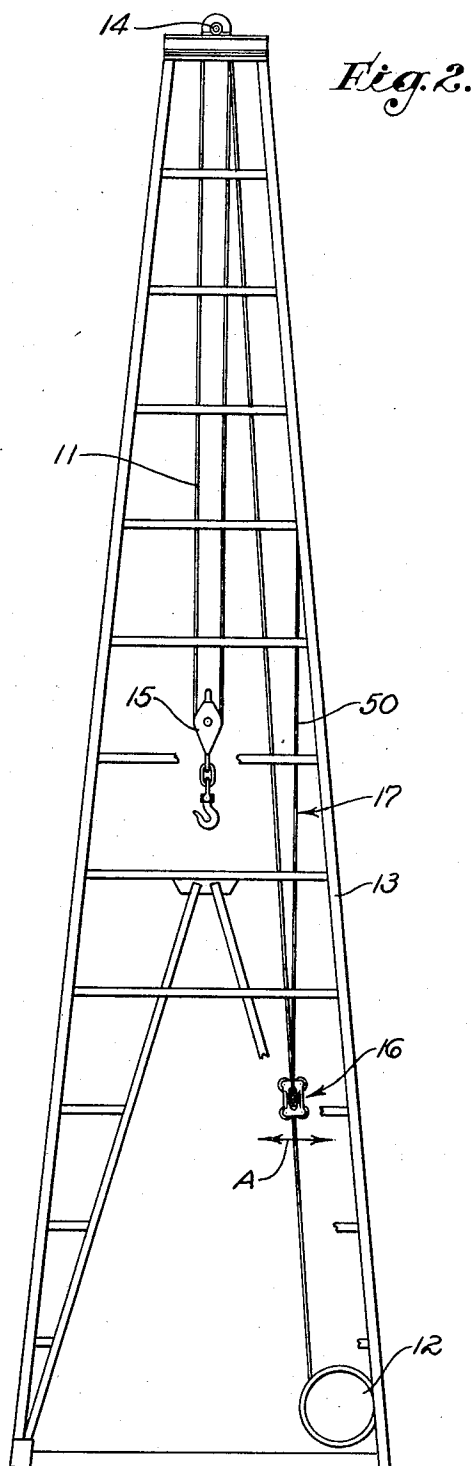
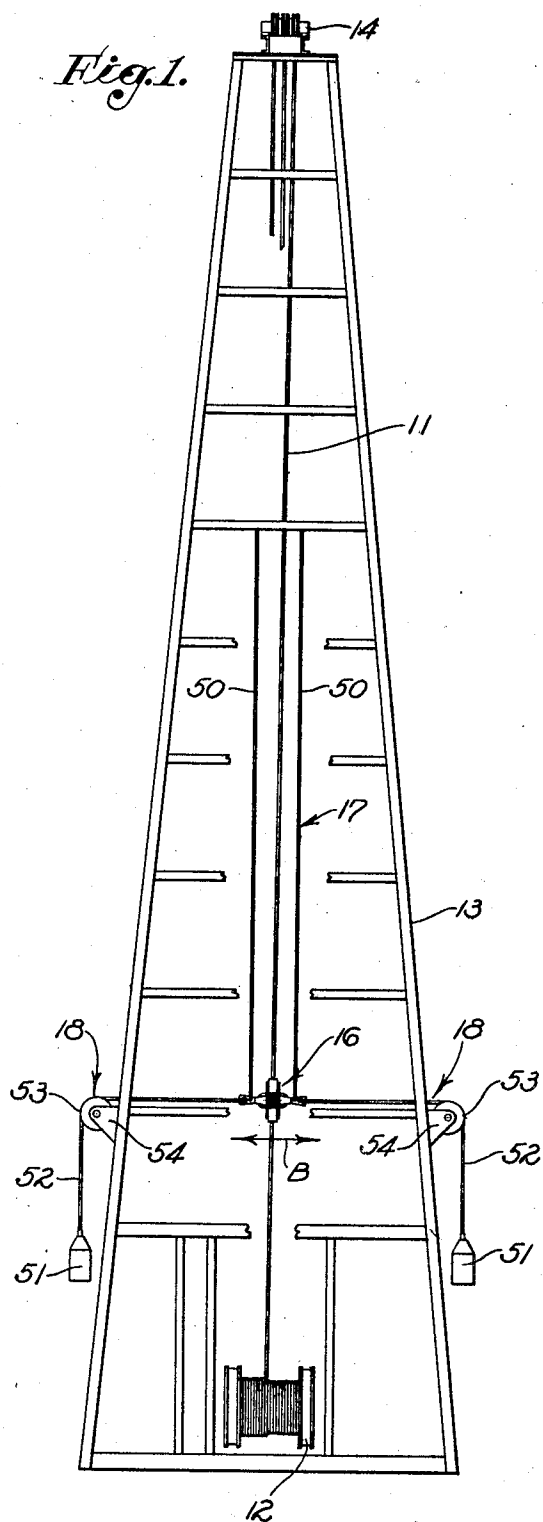
W. G. L. SMITH

2,211,299

WIRE CABLE GUIDE

Filed Jan. 4, 1937

2 Sheets-Sheet 1



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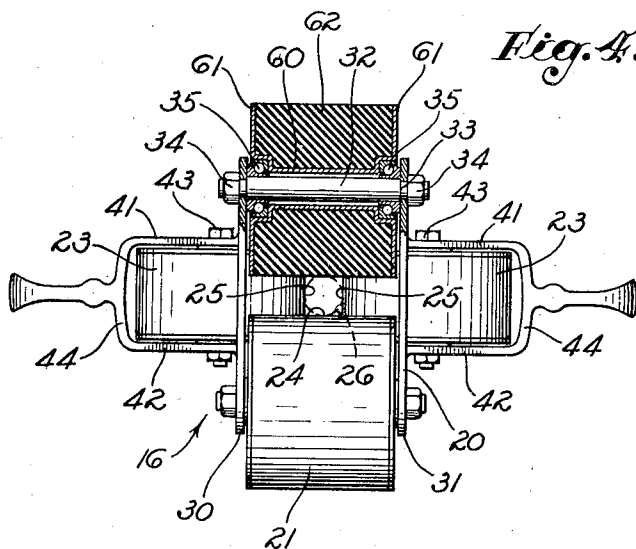
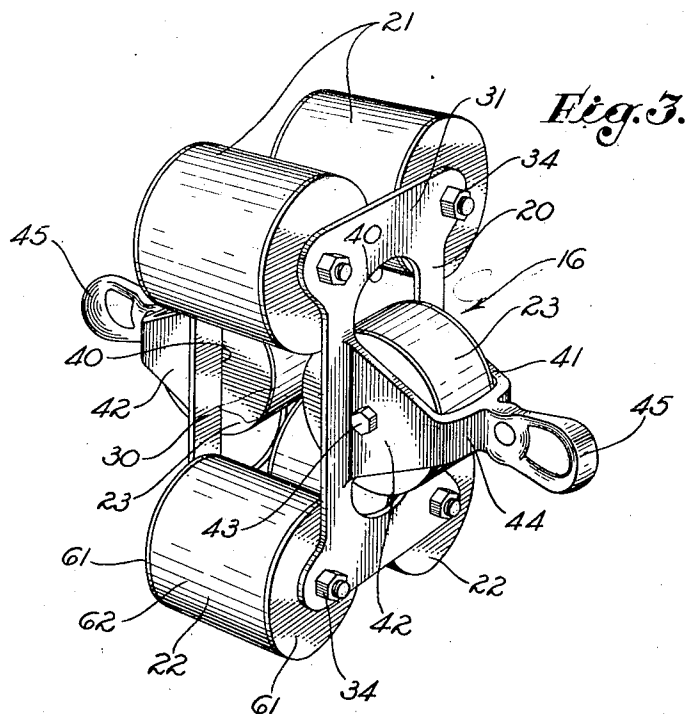
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WIRE CABLE GUIDE

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2 Sheets-Sheet 2



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2,211,299

WIRE CABLE GUIDE

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2 Claims. (Cl. 254—190)

My invention relates in general to the oil well drilling art and particularly appertains to that portion of a drilling apparatus which includes the hoisting apparatus, such as the rotary drum and drilling cable and the sand reel and sand line, ordinarily included in oil well equipment.

My invention comprises a novel device for guiding a drilling cable or sand line as the cable or line is wound on and off of its drum or reel, with the particular object of reducing wear on the line or cable.

In order that the importance of my invention to the well drilling industry may be better understood, I will as briefly as possible describe the equipment ordinarily used for handling drill pipe, bailers, and the like; and will explain the problem presented during operation of this type of hoisting apparatus, which led to the conception of my invention.

Mounted on an oil derrick floor is a draw-works which carries a rotary drum upon which a heavy cable is wound, which cable extends upwardly around a crown-block in the top of the derrick, the free end thereof being connected to a travelling block which in turn is connected to the upper end of the drill pipe by a swivel to support the weight of the drill pipe in the well. The rotary drum is driven through the draw-works from a suitable source of power.

Likewise provided in the derrick is a sand reel upon which a wire line is wound, the sand reel being a high speed hoist, ordinarily used for bailing purposes. The sand line extends from the sand reel over a block in the top of the derrick, and must be sufficiently long to enable a bailer to be lowered thereby to the bottom of the well.

Considerable difficulty has always been experienced in the operation of hoisting equipment of this character for the reason that equipment prior to my invention has not included any means for guiding the cable or line so that it will spool evenly on the drum or reel. The tendency for the cable to spool unevenly on the reel is particularly troublesome at high speed; for instance, when a well is being bailed and the bailer is dropped into the well and raised to the surface repeatedly at extremely high speed.

I have found that the tendency for cable to pile up on the reel or drum when being wound or unwound at high speed results from the tendency of the portion of the cable between the drum and the block to whip back and forth, especially at high reel speeds. I have also found that this whip in the cable occurs back and forth in a

direction or plane perpendicular to the axis of rotation of the reel.

It is therefore a primary object of my invention to prevent whipping of the drilling cable or sand line of an oil well derrick and thus obviate the tendency for the cable or line to pile up on its reel, an occurrence which not only causes excessive wear of the cable frequently resulting in breakage of the cable after a very short period of use, but also results in danger to workmen when the line piles up on the reel to the extent that it may run completely off of the end flange of the reel.

In overcoming the transverse whip of a cable; for instance, by pressurally engaging the cable between the spool and the top of the derrick, it is essential that the cable is not confined against free movement longitudinally of the spool which movement occurs as the cable is wound on and off of the spool.

It is another object of my invention to provide a device to be utilized in combination with a cable spooling apparatus, such as a rotary drum or sand reel of an oil well drilling apparatus, which device is adapted to pressurally engage a portion of the cable extending from the spool, and includes means associated therewith exerting a force thereon causing the device to resist the whipping of the cable transversely of the axis of rotation of the spool while offering no resistance to the movement of the cable along the axis of the spool as the cable is wound and unwound.

It is an important feature of my invention that I provide means for pressurally engaging the cable to resist transverse whipping thereof, which means comprises anti-friction rollers formed of cushioning material, such as rubber. I have found by tests that the provision of rubber rollers in my device increases the life of both the cable and the rollers materially over the life of the cable and rollers if metal rollers are used.

These and other objects will be made apparent in the following part of the specification taken in connection with the accompanying illustrative drawings.

Figs. 1 and 2 are utility views illustrating one application of my invention in connection with the hoisting apparatus of an oil well derrick.

Fig. 3 is a perspective view of the cable engaging member of my invention; and

Fig. 4 is a plan view thereof with a portion broken away in section to show the details of construction and manner of journalling one of the rollers of the device.

Referring to Figs. 1 and 2 I have shown one installation of my invention in connection with a drilling cable 11, which, as explained above, is wound on a rotary drum 12 mounted in a derrick 13. The cable 11 extends upwardly over a crown block 14 at the top of the derrick and is looped downwardly to support a travelling block 15, substantially in the manner shown for a purpose well known in the art.

It should be understood, that the indication of the hoisting apparatus just described, ordinarily used for handling the drill string during the drilling of an oil well, is purely illustrative and serves only to indicate one form of cable spooling apparatus including a cable spool and a cable wound thereon having a portion extending therefrom to a remote point, whether it be a rotary drum with a drilling cable or a sand reel and sand line, or other hoisting apparatus of a similar nature.

The invention includes a cable engaging member, generally designated by the numeral 16, means 17 for supporting the member 16 to engage a portion of the cable 11 extending from the drum or cable spool 12, and means generally designated by the numeral 18 operating to exert a force on the cable engaging member causing the member to resist whipping of the cable 11 transversely of the cable spool 12 while offering no resistance to movement of the cable along the axis of the spool as the cable is wound and unwound.

Referring particularly to Figs. 3 and 4, the cable engaging member 16 comprises a body 20 journalling upper and lower pairs of relatively spaced rollers 21 and 22, and an intermediate pair of relatively spaced rollers 23 disposed perpendicular to the upper and lower pairs of rollers, so that when the cable 11 is extended between the relatively spaced surfaces 24 of the upper and lower pairs of rollers and the relatively spaced surfaces 25 of the intermediate pairs of rollers, the cable 11 is engaged on four sides as indicated by the dotted circle 26 of Fig. 4.

In my preferred form of construction the body 20 comprises a pair of plates 30 and 31 which are held in spaced relation by spacer rods 32 which likewise serve as journalling members for the relatively spaced pairs of rollers 21 and 22. As best shown in Fig. 4, the spacer rods 32 are provided at their opposite ends with shoulders 33 which abut the inward faces of the plates 30 and 31, the rods having reduced diameter portions extending through the plates and the plates being secured thereon by nuts 34 threaded on the rods, substantially in the manner shown.

The rollers 21 and 22 are journaled on the spacer rods 32, preferably by means of roller bearings 35 recessed in the body of the rollers, the bearings abutting the plates 30 and 31 to take side thrust of the rollers.

Formed in each of the plates 30 and 31 is a central aperture 40, and extending outwardly from each plate on opposite sides of the apertures are parallel walls 41 and 42 between which the pair of rollers 23 are respectively journaled on pins 43 which support roller bearings in a manner similar to that described in connection with the rollers 21 and 22. The walls 41 and 42 of each plate are preferably integrally connected at their outer ends by transverse walls 44 which extend across the outer faces of the rollers 23, as shown, these walls having eye portions 45 serving as means for connection of the

supporting means for the member 16, in a manner which will now be described.

In practice, the engaging member 16 is supported so as to be moved with the cable 11 longitudinally of the cable spool 12 as the cable is wound on and off of the spool.

The preferred manner of supporting the member 16 to allow this function comprises a pair of cables 50 respectively secured to the eye portions 45 of the member 16, the upper ends of the cables 50 being secured to an upper cross member of the derrick 13 so that the member 16 is suspended at a substantial height above the cable spool 12, as indicated in Figs. 1 and 2.

The means of the invention for exerting a force on the member 16 resisting the whipping action of the cable 11 preferably comprises a pair of balanced weights connected to the member 16 in such a manner that no resistance is offered thereby to movement of the cable longitudinally of the spool. Thus, in Fig. 1 I show a pair of weights 51 connected to the eye portions 45 of the member 16 by cables 52 which extend around pulleys 53 supported in any suitable manner, such as bracket members 54 secured to the derrick 13 at an elevation preferably at the same plane at which the member 16 is supported by the cables 50.

It will be seen that in operation the weights 51 connected to the member 16, as shown, exert a force on the member 16, causing it to resist movement of the cable 11 in the direction of the arrow A of Fig. 2, thus preventing whipping of the cable transversely of the cable spool 12. Likewise, it will be clear that the suspension of the member 16 by the cables 50 will allow free movement of the member 16 in the direction of the arrows B of Fig. 1, the weights 51 being balanced so that no resistance is offered thereby to movement of the member 16 in this direction as the cable 11 moves longitudinally of the cable spool 12.

One of the important features of my invention is the provision of cable engaging rollers having engaging surfaces of cushioning material, such, for instance, as rubber, which prolongs the life of both the cable 11 and the rollers of the cable engaging members 16. The preferred manner of providing rollers of this character comprises providing a core member having a cylindrical portion 60 through which the journal rods or pins extend, the cylindrical portion having integrally formed end flanges 61 between which is confined a body of rubber 62. The rubber body 62 is preferably of wear-resistant composition which may be conveniently molded directly to the core.

It will be noted that the cable guide as shown has six rollers and that these rollers are so placed that they jointly receive any thrust of the cable at right angles to the axis of the cable. As shown in Fig. 4, they receive and resist thrust of the cable 11 in any direction parallel to the plane of the paper. At the same time it should be realized that the cable guide floats on the cable and exerts only a very limited guiding effect, its principal function being to reduce cable slap.

Referring to Figs. 1 and 2, it will be noted that the guide has almost unrestrained free motion parallel to the paper in each view. The weights 51 counterbalance each other and exert no force on the cable as long as the equalizing cables 52 are in the same straight line between pulleys 53. Due to the length of the cables 50 any possible de-

parture of the guide from the central position shown in Fig. 1 results in very little lifting of the guide and consequent displacement of the cables 52.

5 As previously stated, there is a substantially free movement in the direction of the arrow B of Fig. 1, but any movement in the direction of the arrow A is resisted and corrected by the weights 51. The guide is free to move in all directions but is biased to return to a line connecting the tops of the two pulleys 53, thus dampening and correcting cable slap.

10 Although I have shown my invention in only one simple practical form, it should be understood that I am fully aware of various modifications thereof that might be devised without departing from the spirit and scope of my invention which should be interpreted by the appended claims and not limited to the detailed description in the specification of the form of the invention shown for illustrative purposes.

I claim as my invention:

1. In combination with a structure containing a winding drum: a cable guide for the cable leading from said drum; a pair of supporting cables fastened at their upper ends to said structure, extending downwardly substantially parallel to the cable to be guided, and secured at their lower ends to said cable guide; and means acting in a plane substantially perpendicular to the guided cable for resisting vibrations of said cable.

2. In combination with a structure containing a winding drum: a cable guide for the cable leading from said drum; a pair of supporting cables fastened at their upper ends to said structure, extending downwardly substantially parallel to the cable to be guided, and secured at their lower ends to said cable guide; and a pair of damping cables secured to opposite sides of said cable guide, each of said damping cables being held taut by suitable means.

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