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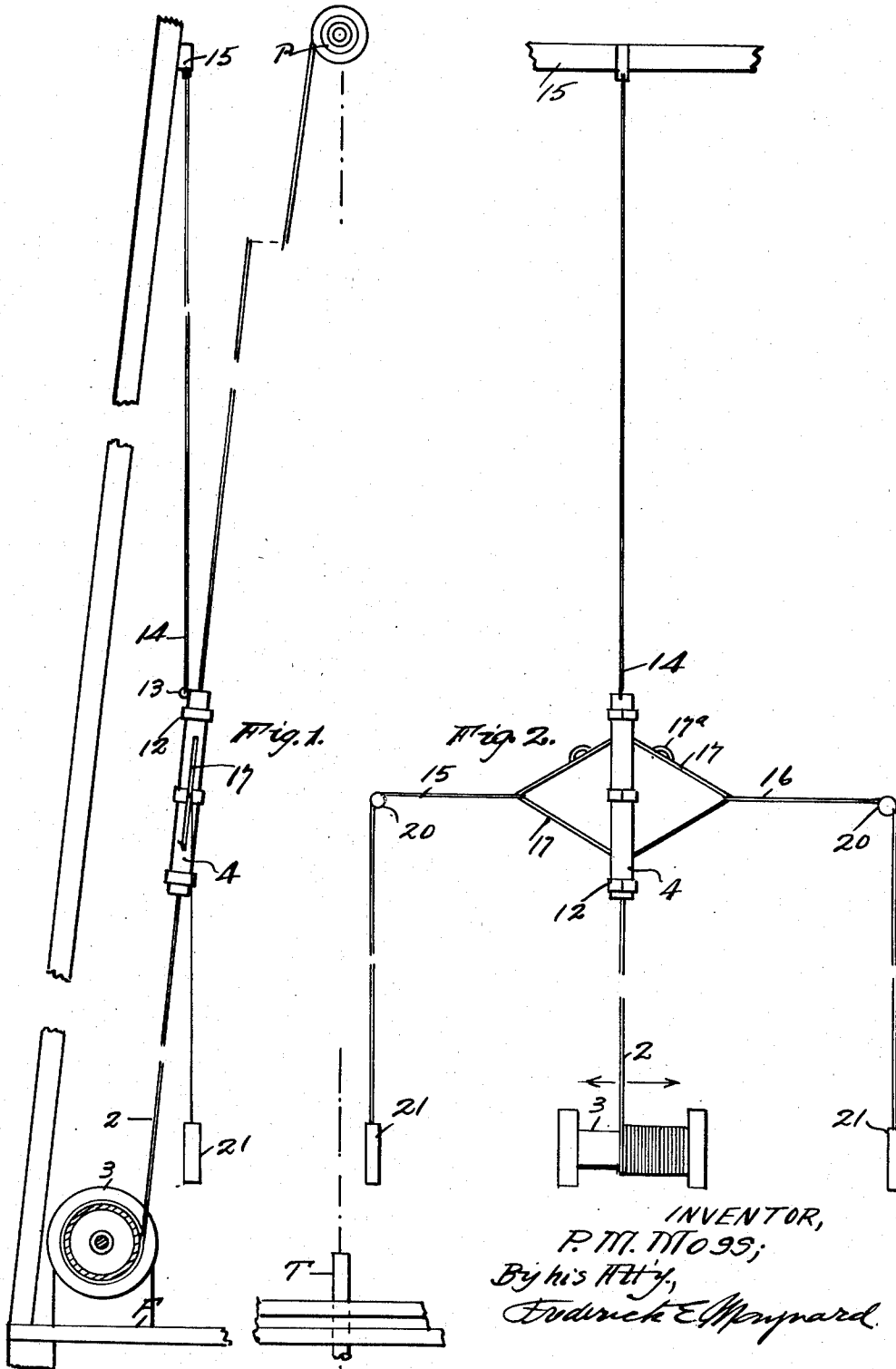
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DRAW WORKS LINE CONTROLLER

Filed Jan. 21, 1938

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2 Sheets-Sheet 2

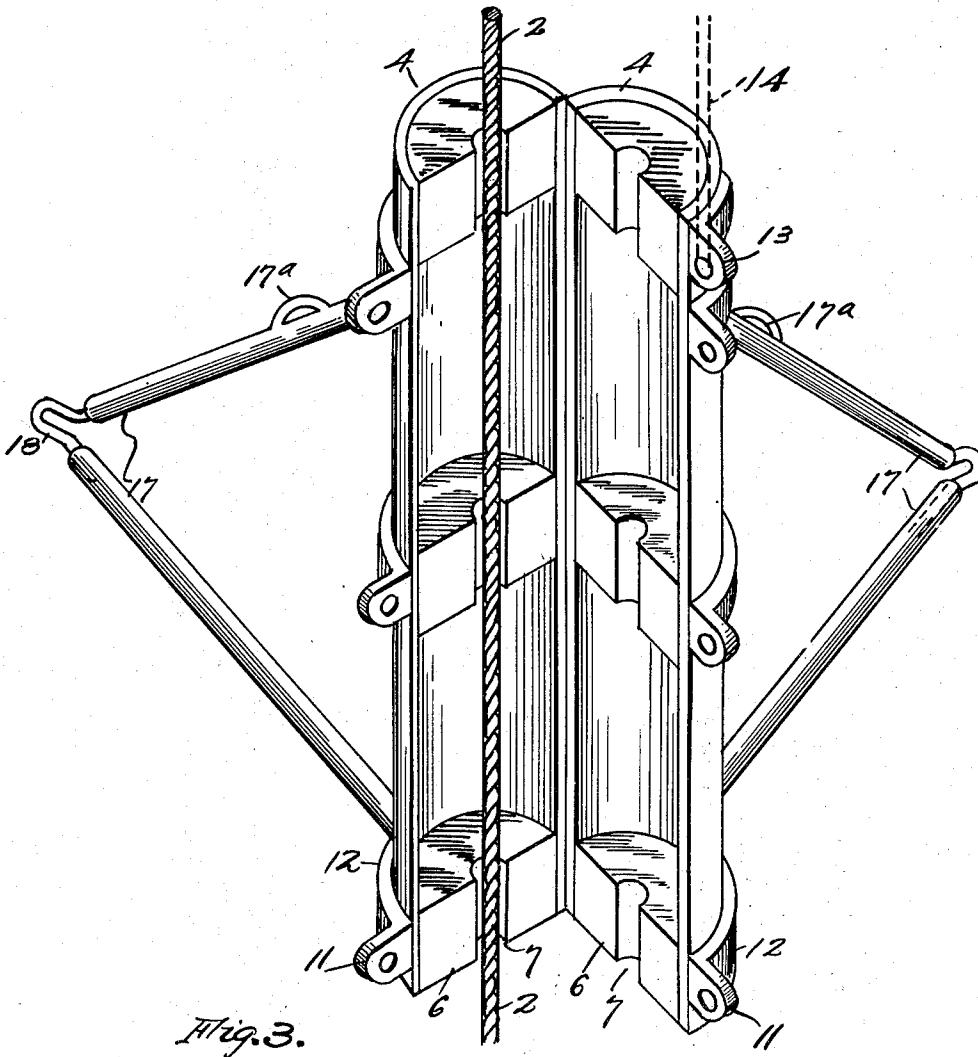


Fig. 3.

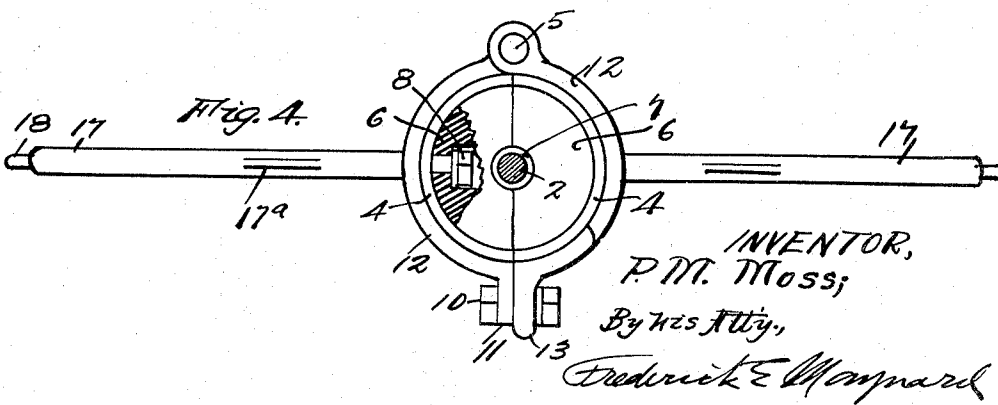


Fig. 4.

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DRAW WORKS LINE CONTROLLER

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9 Claims. (Cl. 254—190)

This invention is a draw works line guide or controller for deep well rigs.

Such draw works are designed to wind and unwind powerful cables which lift and lower tackle and work strings of many tons weight. If the helices of the wire cable or line, as it is called, do not coil true along the drum cylinder in lateral lay and if they tend to build up in overlapped turns out of true the cable will, when subjected to tension by load, suddenly slip centripetally of the drum wraps with a very serious jar through the tense line to the crown pulley and rig, but the more immediate detriment is the disastrous chaffing and breaking of the wire strands of the costly cable. The off-true and overlap of windings is caused by lateral vibrations of the cable line between the drum and an overhead crown works.

Various devices have been proposed whereby to so control the running line that it will wind true along the drum but such devices have not been sufficiently successful to go into even moderate use in the oil fields, and such as have are not maintained in service.

It is an object of this invention to provide a line or cable control of such construction and combination as not only to eliminate the lateral whip or vibrations but also to so engage the cable that it will be least subjected to lateral surface contact and pressure incident to its use.

A further object of the invention is to provide a line controller having a cable receiving bore which in the normal working position of the controller forms a guide along the axis of the cable so that the latter may run quite free from bearing contact pressure except such as is incident to that which is caused by the normal, lateral shift of the line due to the laying of the helix as the line winds along the drum and, conversely, as it unwinds along the drum.

Another object is to provide a line controller not only hung along the line axis but which also is laterally trussed so as to be stabilized against oscillation in a vertical plane on its longitudinal center, and is firmly held against angular moments about its axis.

An additional object is to provide a whip-stopping bridle which provides for the ready and normal side shift as the cable winds and unwinds and provides for normal change of cable angle as the laps of the cable build up or unwind from the drum, all with as little resistance as possible to reduce friction on the cable.

A further purpose is to provide a line controller substantially free of wholly separable parts other

than a few common fastening bolts. And in this connection an object is to provide a controller of this type which, while sufficiently massive to meet the strains of heavy equipment, may be readily closed on the cable line or released by a single, unskilled tower helper, and to provide a line guide of this type incorporating a pair of constantly united but relatively movable body sections adapted to be quickly opened or closed.

Still further, an object is to provide a line guide which is substantial, simple and highly practical, and incorporates a set of hard rubber, or a suitable substitute, line engaging bearings constituting an elongate guide means for the running cable.

The invention consists in certain advancements in this art as set forth in the ensuing disclosure and having, with the above, additional objects and advantages as hereinafter developed, and whose construction, combinations and details of means, and the manner of operation will be made manifest in the description of the herewith illustrative embodiment; it being understood that modifications, variations and adaptations may be resorted to within the scope, principle and spirit of the invention as it is more directly claimed hereinbelow.

Figure 1 is a side elevation of the apparatus as applied between the draw works drum and a head works pulley, and showing the slant of the line from the vertical and as tangent to the drum. Figure 2 is a front or inside tower elevation of the guide in closed effective position. Figure 3 is an open-position, perspective of the guide or controller. Figure 4 is a plan of the top end of the closed guide.

While the device is sometimes herein called a guide the more accurate name is controller because the function is to stop whip or lateral vibrations of the line 2 as it moves to or from the drum cylinder 3; the actual guiding of the line being the result of the advance of the helix along the cylinder if the line is not thrown one way or the other by the whipping of the line endwise of the axis of the drum or helix.

The draw works drum is usually located on one side of the derrick floor F at a position to leave the floor clear around the axis of the vertical tool T, or other job structure, being run in or pulled from the well or hole. Therefore, the line 2 runs obliquely as a tangent from the inner side of the drum 3 high up to a pulley P in the derrick head works.

As the number of layers of cable helices in-

crease or decrease on the drum 3 the slant of the line will vary consequently.

An important feature of this invention is to provide a line controller or guide having an elongate bearing effect and which is so mounted in the rig that the axis of the free bearing is substantially coincident or identical with that of the slanting line or cable from the drum 3 so that the line can move in either direction endwise with a minimum of pressure from the controller. That is, the normal or free and the applied position of the guide is such that no load or pressure, of notice, of the guide is burdened on the line, and further, an object is to provide a guide having a line engaging means with a bore sufficiently larger than the cable to permit the latter to run without any clamping pressure and with only such resistance as is incidental to vibrational contacts and to the positive resistance of the running line as this is caused to lead in either direction along the drum 3 as the helices lengthen or shorten endwise of the drum cylinder.

In other words, the invention includes a line controller having a normal or unapplied position such that its elongate bearing means will receive the introduced line 2 substantially free of mutual pressure between the bearing and the line with the result that it is possible to run the line with but little wear on the bearings.

The controller includes a pair of semi-cylindrical shell sections 4—4 economically of pipe of suitable size and length; the sections being joined along one side by suitable hinges 5 and openable along the opposite side so that the cable line 2 may be slipped into axial position centrally of a bearing device preferably consisting of a series of aligned, spaced semi-cylindrical blocks 6 of hard rubber or a suitable substitute and, having an axial bore 7 preferably slightly larger than the given line in the draw works.

The rubber blocks are snugly fitted and fastened by bolts 8 in their respective oppositional places in the shell sections 4 to mutually close in pairs as bearings to loosely confine the interposed cable line 2. The bolts 8 are radially countersunk in the bore of bearing block elements 6.

The closed section of the shell are securely fastened by any suitable, simple, substantial and reliable device as by bolts 10 passed through bolt lugs 11 formed on ends of band parts 12 fixed about the shell 4 and forming parts of the said hinges 5, for economical construction.

It will be seen that the bearing blocks 6 cooperate to form an elongate guide or bearing means for the line passing through the shell 4 and yet each block 6 is small as compared to the length of the shell and can be replaced at small cost when renewals are due.

To effect a substantially free, cable-actuated line controller the shell is provided with a suspending or shroud link or rope suitably attached to the shell 4 so that one end of this will be held upward and place the shell axis at a desired, normal angle equal to that of any given cable line tangent to a draw works drum 3. Therefore, at the upper end of the shell there is fixed an eye 13 at the opening or swinging side of the shell from the hinges 5 and to this eye is attached the shroud rope or suitable suspending element 14 the upper end of which is securely attached to a suitable stationary hanger, such as a girder 15 which may be a part of the tower derrick of the rig. The shroud attachment is made in such a position in the rig that the suspended shell 4 will be in a position as to axially coincide with the

slanting line 2 running from the top pulley P to the drum 3; that is so that the shell 4 and the cable line have a common coaxial position tangent to the drum. In other words, the draw-line shell 4 is hung with its center of gravity on the axis of a given line 2 and with its axis normally, that is while free, substantially coincident with the axis of the introduced cable body. In such position the shell 4 is balanced to tilt in a vertical plane on a transverse axis through its center of gravity and does not impose noticeable resistance on the line to hold its own obliquity.

The shell 4 is harnessed suitably to substantial supports to prevent its being whipped around by the enclosed cable line and to steady the line but at the same time provide for the side shift of the tangent along the drum 3 as the helices grow or decrease in length along the drum 3.

The harness includes single bridle ropes 15—16 leading away from opposite sides of the shell 4 in a common plane and preferably in alignment from the center of gravity of the shell. In order to obtain a good control purchase of the bridles 15—16 on the shell this latter has at each side V- or elbow-arms 17 whose divergent ends are suitably rigidly attached to upper and lower portions of the respective shell sections 4—4 and which arms are in a common plane through the axis of the shell and at a right angle to the meeting plane of the hinged sections, and the remote, convergent ends of the arms being about on the line of the center of gravity so as to exert equal efforts against rotation of the guide in a vertical plane when equal forces are applied to the ends of the arms, these being of equal length.

The arms 17 may be variously made and shaped but are economically composed of stout pipe sections butt-welded to the shell 4 and the outer, convergent ends of the arms are shown as completed by a bar 18 of V-shape telescoped in the arm-pipe ends and welded, riveted or otherwise secured therein.

By this attachment of the bridles 15—16 at points remote from the shell body the latter is firmly held by the leverage of the arms 17 against any material rotational movement due to contact of the twisted cables running in the shell bearings 6. The harness bridles 15—16 are rove over guide pulleys 20 hung in the derrick and are provided with appropriate, equal weights 21 of sufficient heaviness to amply damp the objectionable vibrations setting up in an unrestrained draw works line. The equalized draft exerted by the aligned, opposite bridles 15—16 and the centrally arranged shell arms 17 produces a stabilizing balance against angular oscillations in the plane of the arms, but the entire suspension allows of ready drift front and back as the cable layers lap or unlapp as to each other.

The upper limb portions of the arms 17 are provided with eyes 17^a for the attachment of suspending lines if such an arrangement is more adaptable to given cases of operation.

What is claimed is:

1. A wire or draw line guide and controller, including an elongate body comprised of a pair of longitudinally opening and abutting, complementary sections with side arms having bridle hitch means angularly about 90° from the section abutting plane location and at a transverse plane about mid length of the body, and a hitch device to receive a suspending element at a point adjacent one end of the body and about on the same diametral plane along the body as the abutting faces of the sections and the hitch de-

vice being eccentric of the body axis at a point to cause the body to hang tilted to conform to the draw line angle.

2. A draw works drum line controller body having an elongate, line receiving bore, a pair of opposite lateral control devices each including parts diverging toward the opposite ends of and connected to said body to stabilize it against vibration on its minor axis in the plane of said devices, and a suspension means connected to said body at a point eccentric to the major axis and adjacent to one end of the body to support the body in normal position with the bore substantially parallel and contiguous to the line for reception thereof substantially without load of the body on the line when this is in a vertical plane transverse to the axis of the draw works drum.

3. The controller device of claim 2, and in which the body is longitudinally split along its axis and the suspension means is contiguous to the line of split and the devices are each at a right angle to the plane of split.

4. A draw line control apparatus including a shell having relatively movable, semi-cylindrical halves openable from and abutting longitudinally on a diametrical plane and fastening means readily operable to connect the sections in closed position, and cooperative, draw line bearing members respectively secured to the body sections to open or close therewith to receive and retain the line, a suspending device hitched to one shell part adjacent to the abutment plane thereof, and bridles and arms connected to the shell in a plane at a right angle to the radial plane of the suspension hitch.

5. In a draw works line guide including a sectional shell; a bearing element complementary to the inner face of one shell section of the guide and having a radial bolt for rigidly attaching the bearing element to its shell section and in which element the inner end of the bolt is countersunk from the effective, line bearing face of the element.

6. A draw line control apparatus including a shell having sections hinged along one side and fastening means for securing the sections closed, cooperative draw line bearing members respectively secured to the sections to open and close therewith to receive the draw line; the shell hav-

ing hitch means connected thereto and arranged adjacent to the side thereof remote from the hinge axis, a suspending device attached to said means, and lateral control devices on the shell at a right angle to the radial plane of the hitch and suspension means.

7. A draw line control apparatus including a shell structure, bearing means mounted in the shell, means for suspending the shell to receive and pass the said draw line, bridle means extending toward opposite sides of the shell, and oppositely directed arms rigidly secured to the shell and to which the said bridle means are respectively connected; said suspending means including a device hitched to the shell at a point eccentric to its bore to cause the shell to hang at a desired angle from the vertical; and said shell consisting of elongate opposed sections, and band parts secured to said sections and having connected hinge eyes at one side of the shell and opposed lugs for fastening means at the opposite side of the shell.

8. A wire or draw line guide and controller, including an elongate body comprised of a pair of hinged sections with side arms having bridle hitch means angularly about 90° from the hinge location and at a transverse plane as to the body axis about midlength of the body, a hitch device to receive a suspending element at a point adjacent one end of the body and about on the same diametrical plane along the body as the hinge, and the hitch device being diametrically opposite the hinge side to cause the body to hang tilted to conform to the draw line angle from the vertical.

9. A wire or draw line guide and controller including an elongate body comprised of longitudinally hinged sections with side arms having bridle hitch means angularly about 90° from the hinge location and at a plane transverse to the body axis about midlength of the body, and a hitch devices to receive a suspending element at a point adjacent one end of the body and about on the same diametrical plane along the body as the hinge, and said arms being in the general form of triangular frames rigidly joined at diverged ends to their respective body sections; with the hitch means at the apices of the frames.

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