May 9, 1939. M. W. SARSFIELD ET AL 2,157,500

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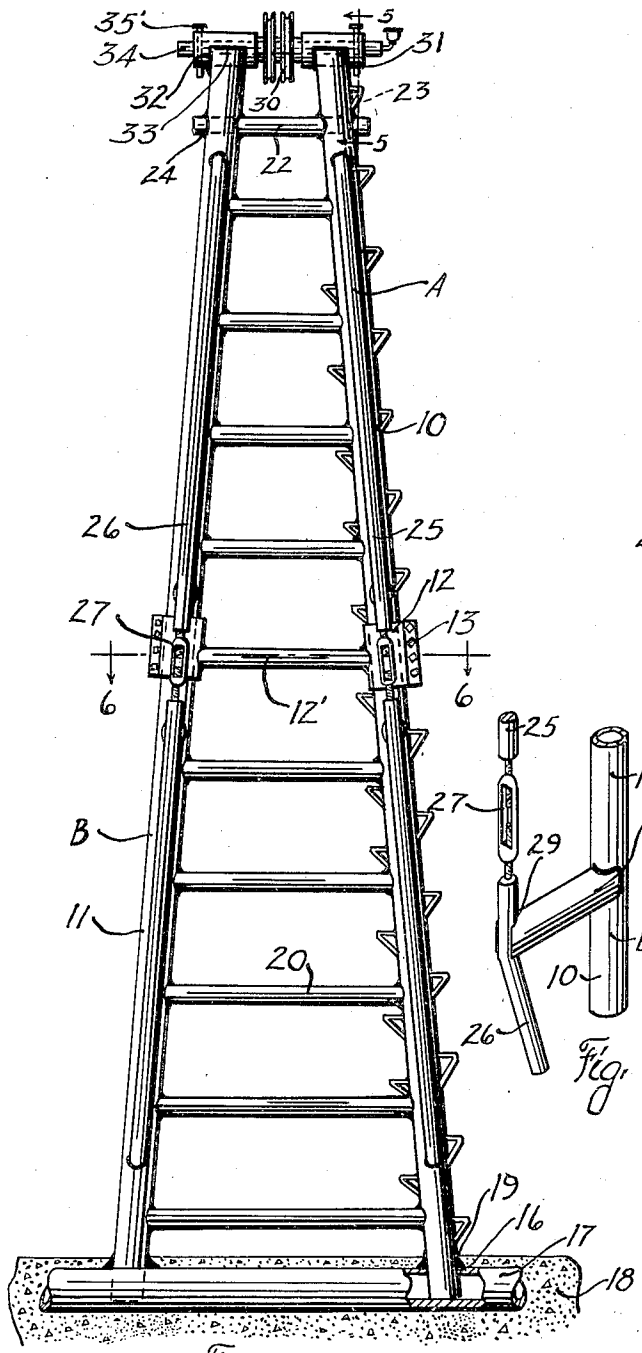


Fig. 1

Fig. 7

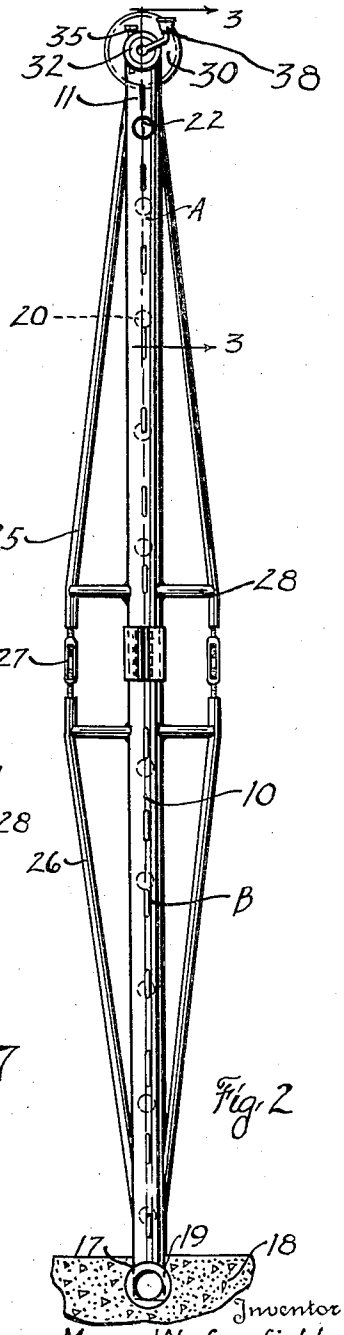


Fig. 2

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May 9, 1939. M. W. SARSFIELD ET AL 2,157,500

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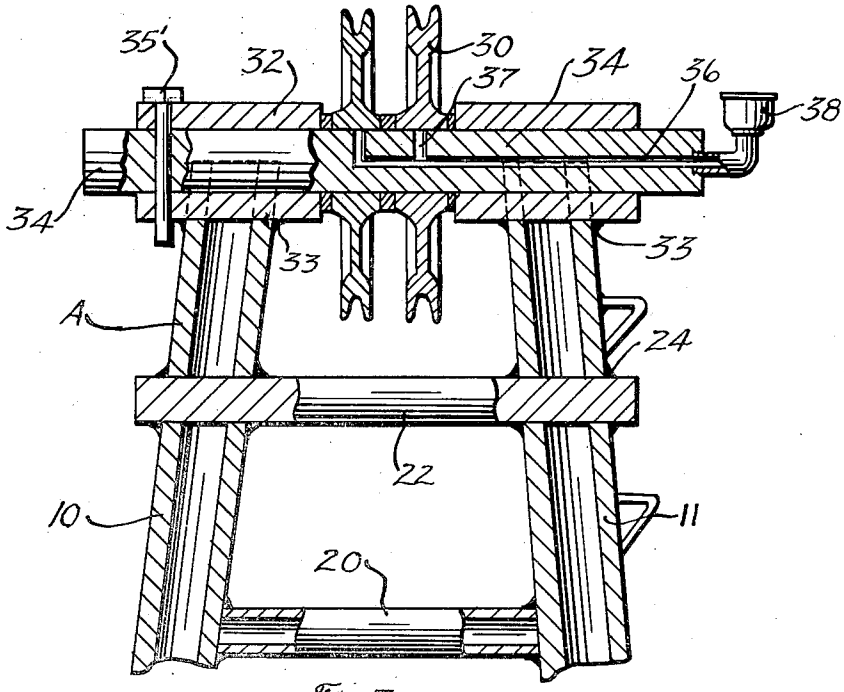


Fig. 3

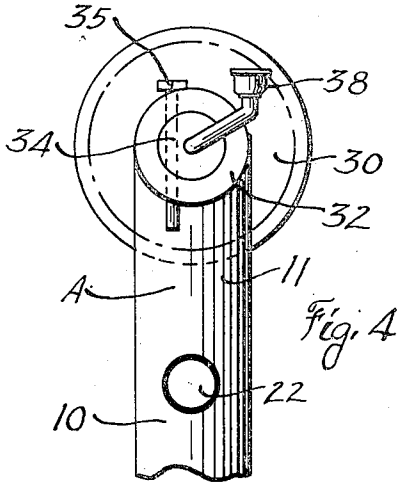


Fig. 4

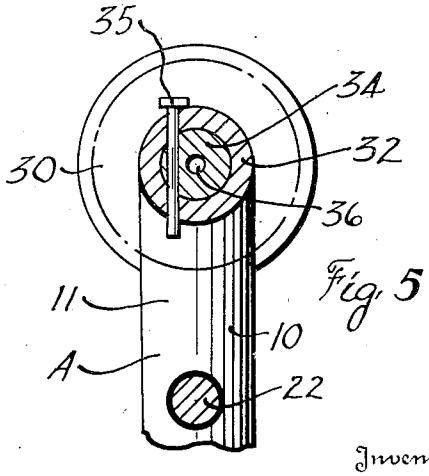


Fig. 5

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DERRICK

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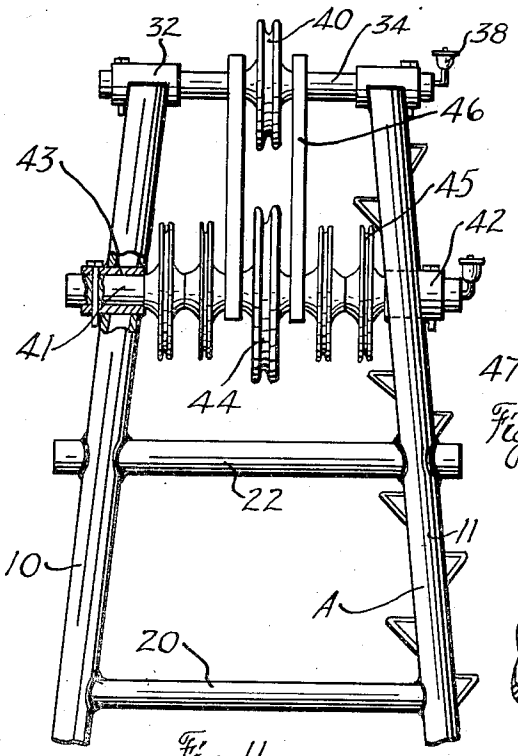


Fig. 11

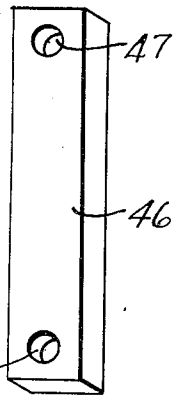


Fig. 12

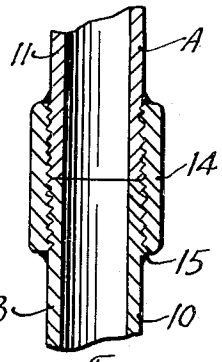


Fig. 10

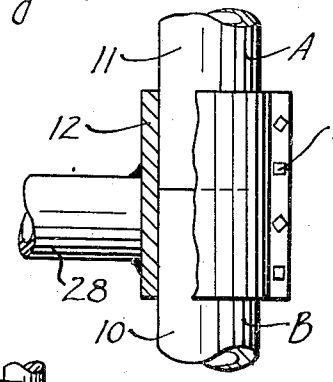


Fig. 8

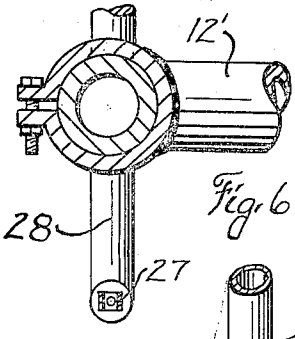
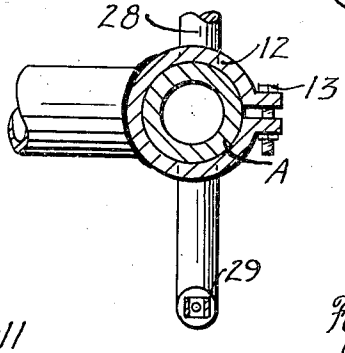


Fig. 6



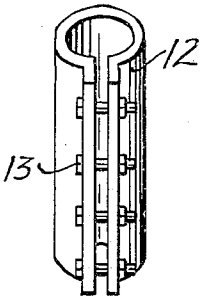


Fig. 9

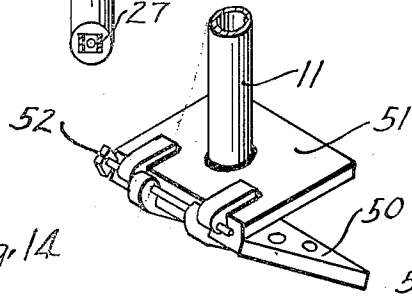


Fig. 14

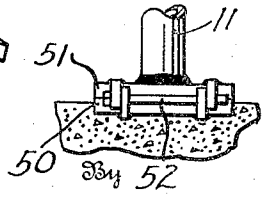


Fig. 13

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2,157,500

DERRICK

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Application January 24, 1935, Serial No. 3,299

3 Claims. (Cl. 189—12)

This invention relates to new and useful improvements in derricks.

One object of the invention is to provide an improved two-legged derrick of the gin-pole or stub derrick type, which may be used either in the usual manner, as well as for drilling or pulling casing, or for any other purpose.

An important object of the invention is to provide a single mast derrick constructed of tubular members welded together in such a manner as to not only eliminate bolts and clamps, but to reinforce and strengthen the structure to such an extent that it may be used for heavy duty work, not possible with the present type of single mast derricks.

Another object of the invention is to provide an improved derrick structure which is constructed of a plurality of sections connected together, whereby when dis-assembled, the sections may be readily transported; said structure being provided with trusses overlying the sections for bracing and trussing the entire structure, and give the effect of a unitary structure.

A further object of the invention is to provide an improved two-legged derrick structure which is constructed so as to carry increased loads, whereby an increased number of sheaves may be mounted at the upper end of said structure, thereby making the derrick adaptable for heavy duty work.

Still another object of the invention is to provide an improved two-legged derrick of the gin-pole type so constructed as to possess the stability and strength of the ordinary two and four legged derricks, and yet being capable of inexpensive manufacture.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Figure 1 is a front elevation of a derrick constructed in accordance with the invention,

Figure 2 is a side elevation of the same,

Figure 3 is a transverse, vertical, sectional view, taken on the line 3—3 of Figure 2,

Figure 4 is an enlarged side elevation of the upper end of the derrick,

Figure 5 is an enlarged, vertical sectional view, taken on the line 5—5 of Figure 1,

Figure 6 is an enlarged horizontal, cross-sectional view, taken on the line 6—6 of Figure 1,

Figure 7 is an enlarged, perspective view of one of the legs and showing its connection with its bracing truss,

Figure 8 is an enlarged detail, partly in elevation and partly in section of one of the coupling collars secured to the leg of the derrick,

Figure 9 is an isometric view of said coupling collar,

Figure 10 is an enlarged sectional view of another form of said collar,

Figure 11 is an enlarged front view, partly in elevation and partly in section, of the upper end of the derrick having a plurality of drilling sheaves mounted thereon,

Figure 12 is an enlarged isometric view of one of the reinforcing plates for the added sheaves shown in Figure 11,

Figure 13 is a side elevation of another form of base for the derrick, and

Figure 14 is a perspective view of the same.

In the drawings, the numeral 10 designates an elongated, tubular length of well casing, or other pipe. The derrick is constructed of two sections A and B, superimposed one above the other, and each section is composed of a pair of the tubular lengths 10, which are inclined toward each other at their upper ends. The lengths are connected to each other by transverse, tubular, brace members 20 which have their ends welded thereto. The braces are positioned at spaced points along said pipe lengths. When the sections A and B are superimposed one above the other, they form the derrick structure, the inclined tubular lengths 10 forming the legs 11 of said derrick.

The sections A and B are rigidly secured together by split clamping or coupling collars 12, provided with the usual tightening bolts 13. The collars 12 are preferably connected by a transverse strut 12' which has its ends welded to said collars. If desired, one end of each length 10 may be screw threaded, and screwed into a coupling sleeve 14 (Figure 10). A weld 15 around the ends of said collar holds said lengths therein.

The lower end of each leg 11 extends through an opening 16 formed in a horizontally extending pipe 17, which is embedded in concrete 18, or otherwise rigidly supported at ground level. The bottom of each leg rests on the inner periphery of the pipe 17 and a weld 19 which surrounds each opening 16 and leg, securely fastens said legs to the pipe. It is pointed out the diameter of the pipe 17 is preferably larger than the diameter of the tubular legs 11, because said pipe carries the entire weight of the derrick.

However, the particular size of these parts are subject to variation.

At the upper end of the derrick, a transverse solid shaft **22** passes through openings **23** in the legs and is welded at **24** to the inner and outer side of each leg. This cross shaft forms a positive brace to prevent both inner and outer movement of the legs with relation to each other. If desired, a pulley (not shown) may be mounted on this shaft.

To further brace each leg **11** and also to securely hold the ends of each section A and B within the clamping collar **12**, trusses **25** are provided on the front and rear sides of each leg. Each truss comprises struts **26** which are connected to each other at one end by a turnbuckle **27**. The struts are disposed contiguous to, and overlie each leg **11** and the upper strut has its other end welded to the upper end of the section A, while the lower strut has its other end secured to the lower end of the section B. The turnbuckle **27**, connecting the struts, is located substantially opposite the clamping collar **12** and this end of each strut is held outwardly from the leg **11** by outwardly extending guides **28** which are secured to the leg **11**. The guides comprise a short length of tubing which has its outer end cut out at **29** to receive the strut. It is obvious, by observing Figure 2, that by tightening the turnbuckle, the struts are drawn together to pull the two sections A and B together within the collar **12**. Since the trusses extend substantially the vertical length of the derrick, they also serve to strengthen and brace the entire structure.

For supporting sheaves **30** at the top of the derrick structure, the upper ends of the legs **11** are cut-out at **31** to form saddles. Sleeves **32** are seated in the saddles and are welded thereto at **33**. A transverse sheave shaft **34** has its ends extending through the sleeves, and pins **35** and **35'** pass through the sleeves and the shaft to hold the latter in position. The sheaves **30** are journaled on the shaft between the inner ends of the sleeves. It is pointed out that since the sleeves are secured to the legs **11** and the shaft **34** fastened in the sleeves, said shaft aids in bracing the upper end of the derrick structure.

For lubricating the sheaves, the shaft is provided with an elongated axial opening **36** which extends from one end of the shaft to a point opposite the sheaves **30**. Radial ports **37** extend from the inner ends of the opening to the periphery of the shaft, and a lubricating cup **38** of the usual construction, is connected with the outer end of said opening, whereby lubricant is supplied to the rotatable sheaves. Since the lubricating opening is located axially of the shaft, the pin **35** which passes through one of the sleeves **32** (Figure 5) is disposed slightly off center so as not to block said opening.

It is obvious from the above that a most rigid and inexpensive derrick is provided. The tubular sections, of which the entire structure is formed, may be sections of well casing and tubing which are always available around an oil field. All of the parts are of comparatively short lengths and may be easily handled. The construction of the derrick in sections increases ease of assembling and dissembling. The welding of the various members of each section eliminates the usual bolts and makes for an integral structure which increases strength and rigidity. It is pointed out that although only two sections are shown any desired number may be employed in building the derrick.

In Figures 11 and 12, I have shown a plurality of drilling sheaves mounted at the upper end of the derrick structure. Instead of the sheaves **30**, a single sheave **40** is mounted centrally of the shaft **34**. A second sheave shaft **41** is mounted below the shaft **34**, having its ends fastened in sleeves **42** extending through and welded in openings **43** in the legs. A drill sheave **44** is mounted centrally of the shaft **41** and a pair of casing sheaves **45** are mounted on each side of the drill sheave. The lower shaft **41** is braced by vertically extending flat brace straps **46** which have openings **47** at their upper and lower ends. The shafts **34** and **41** extend through these openings, whereby said shafts are connected. This form may be used for heavy duty work, such as drilling, pulling casing, etc.

In Figures 13 and 14, I have shown another form of base for the vertical legs **11** of the derrick. In this form the horizontal pipe **17** is eliminated and a base plate **50** provided for each leg **11**. The plate is embedded in concrete or secured to a wooden sill, and a complementary plate **51** is hinged to said plate. The legs **11** are secured to the plate **51** and it is obvious that each leg is capable of swinging movement, whereby it may be swung to a horizontal position, which makes for easier assembly Also, by removing the hinge pin **52**, the plates may be separated, so that the entire derrick may be readily moved from place to place after assembly.

What we claim and desire to secure by Letters Patent is:

1. A unitary derrick structure comprising a plurality of tubular sections, said tubular sections each comprising a pair of legs permanently connected by cross bracing members and the legs of one section adapted to be positioned in endwise relation with respect to the legs of an adjacent section, coupling means between the ends of sections, and truss means for the sections comprising a pair of longitudinal truss rods extending along opposite sides of each leg in planes normal to the plane defined by the connected leg members of the sections, means adjacent the connected ends of the sections spacing said rods from the legs, and tie means between the corresponding meeting ends of the truss rods for drawing the sections together

2. A unitary derrick structure comprising a plurality of tubular sections, said tubular sections each comprising a pair of legs permanently connected by cross bracing members and the legs of one section adapted to be positioned in endwise relation with respect to the legs of an adjacent section, coupling means between the ends of sections comprising a cross brace having socket clamping means at its ends into which the adjacent ends of the sections are secured, and truss means for the sections comprising a pair of longitudinal truss rods extending along opposite sides of each leg in planes normal to the plane defined by the connected leg members of the sections, means adjacent the connected ends of the sections spacing said rods from the legs, and tie means between the corresponding meeting ends of the truss rods for drawing the sections together.

3. A unitary derrick structure comprising a plurality of tubular sections, said tubular sections each comprising a pair of legs permanently connected by cross bracing members and the legs of one section adapted to be positioned in end-

wise relation with respect to the legs of an adjacent section, a transverse tie member extending between and entirely through the legs of the uppermost section and welded to each leg on opposite sides thereof whereby the upper end is rigidly braced, coupling means between the ends of sections, and truss means for the sections comprising a pair of longitudinal truss rods extending along opposite sides of each leg in planes normal to the plane defined by the connected leg members of the sections, means adjacent the connected ends of the sections spacing said rods from the legs, and tie means between the corresponding meeting ends of the truss rods for drawing the sections together.

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