

L. C. MOORE.
STEEL TOWER OR DERRICK.
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1,015,821.

Patented Jan. 30, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

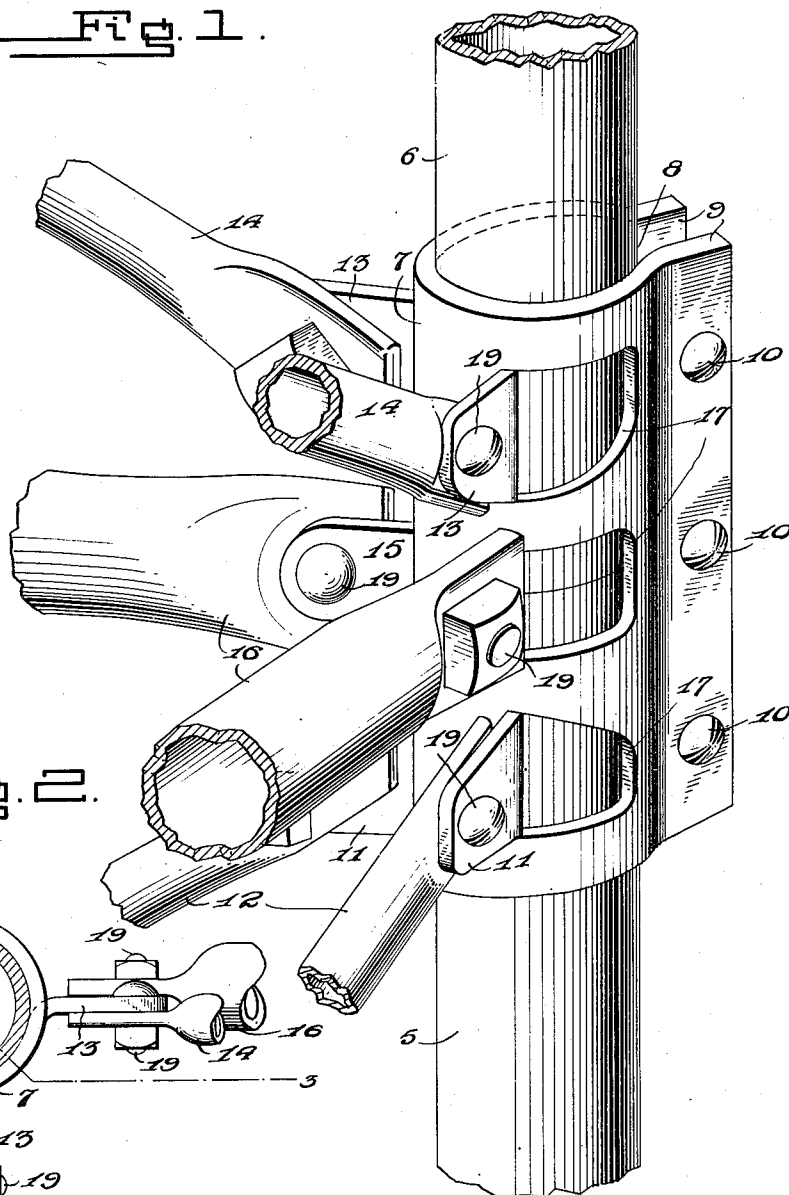
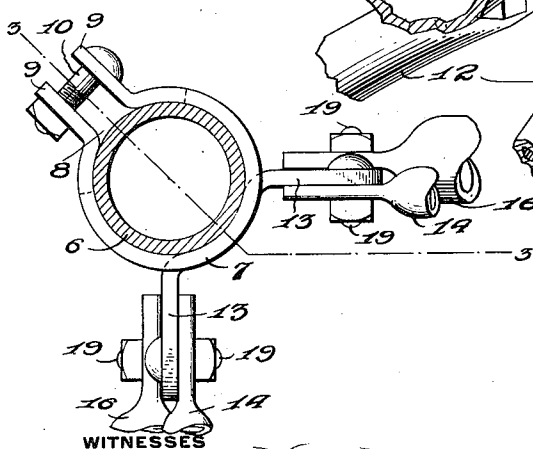


Fig. 2.



WITNESSES

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STEEL TOWER OR DERRICK.

1,015,821.

Specification of Letters Patent.

Patented Jan. 30, 1912.

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To all whom it may concern:

Be it known that I, LEE C. MOORE, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Steel Towers or Derricks, of which the following is a specification.

This invention relates to metal towers and the like, and more particularly to oil well derricks.

The object is to improve upon prior constructions of metal towers or derricks, and particularly by providing a clamp for uniting the meeting ends of the leg sections, which clamp is formed of forged metal, preferably plate metal, so that it is light and yet very strong, which can be fabricated at a minimum labor cost, and which can be very tightly clamped onto the leg sections, thereby preventing failure of the tower or derrick on account of looseness at the clamp.

The invention comprises the construction and arrangement of parts hereinafter described and claimed.

In the accompanying drawings Figure 1 is a perspective view of one of the improved clamps showing the ends of the derrick braces and girts connected thereto; Fig. 2 is a plan view of the same; Fig. 3 is a vertical section on the line 3—3, Fig. 2; and Fig. 4 is a perspective view of the blank after the punching and shearing and prior to bending the same into final form.

The present invention comprises an improvement upon the tower or derrick construction described and claimed in patent granted September 7th, 1909 to Thos. A. Neill, #933,386. The improvement relates to the clamp or socket for uniting adjacent leg sections.

The tower or derrick itself, except as to the clamp or socket, is intended to be constructed as shown and described in the aforesaid patent of Thos. A. Neill, that is to say is constructed entirely of metal tubes in order to get maximum strength with minimum weight, and with the specific clamp illustrated is intended to be provided with four legs, said legs being inclined so that the derrick tapers toward its top, these legs being composed of sections of tubes, all as is usual. In the drawing one of the leg sections is indicated by 5 and the other leg section by 6. In building up these derricks

it is customary to make the several leg sections of twice the length of the height of a panel, the meeting ends of adjacent leg sections being secured in clamp sockets to which the braces and girts are attached, and other clamps being secured about midway of each leg section for the attachment of intermediate girts and braces. Heretofore it has been the practice to provide the clamps or sockets which join the ends of adjacent sections with inwardly projecting ribs or bosses, which interfere with the use of such clamps at the middle of the leg sections. With my improvement the clamps are entirely free from inwardly projecting ribs or other means so that they can be used not only for securing together the meeting ends of adjacent leg sections but can also be slipped over the leg sections and used as the intermediate clamps. Heretofore these clamps have been constructed of cast metal, such as cast steel, and which for strength are made of considerable thickness of metal, thereby making them quite heavy, at the same time rendering them so rigid or stiff that they cannot be drawn sufficiently tight to clamp the leg sections immovably. Any looseness of the leg sections in the clamps or sockets, under the strain of pulling well casings for instance, causes movement of the leg sections and results in the ultimate failure of the derrick. According to my improvement these difficulties are overcome by forming the clamps of forged metal, preferably plate metal, which is not only lighter than cast metal, but is sufficiently yielding so that the clamps can be drawn very tightly onto the leg sections, thereby absolutely preventing movement of the leg sections and preventing failure of the derrick from this cause.

Each clamp or socket 7 is practically a tubular sleeve slit or open on one side, as at 8, from top to bottom and provided at the edges of said slit with radial flanges or ears 9 which are perforated for receiving compression bolts 10 by means of which said flanges or ears can be drawn together and the socket clamped onto the leg sections. The sleeve is also provided with two sets of flanges or ears for the attachment of the girts and braces, these two sets of ears being located substantially 90 degrees apart in the case of a four sided derrick, 60 degrees apart in the case of a three sided der-

rick, or only one set of ears in case of a two legged derrick or shear. As shown, each sleeve is provided with a pair of ears 11 near its lower end for the attachment of the lower
 5 braces 12, a similar pair of ears 13 for the attachment of the upper braces 14, and with a pair of intermediate ears 15 for the attachment of the girts 16. The ears 11, 13 and 15 of any one set are arranged in substantially vertical relation one with reference to the other, and are preferably arranged so as to stand exactly radially to the body of the sleeve in order that the girts and braces may be attached to either side
 10 of said ears, and preferably are attached one on one side and another on the other side, as shown, so as to balance the strains and prevent placing an eccentric strain on the clamp. These ears are formed by shearing or punching out a part of the metal forming the sleeve and bending such sheared out portion at the proper angle to form the ear. The punching out of these ears provides the clamp with three pairs of holes
 15 17, the holes of each pair being arranged substantially diametrically of each other and the middle pair of holes being substantially midway of the length of the clamp. The braces and girts are preferably tubes having their ends flattened and secured to the ears by means of bolts. To this end each ear is provided with a bolt hole 18, for receiving the bolt 19 for securing the brace or girt to the ear. The holes 18 as well as those for the
 20 compression bolts 10, preferably are non-circular, such as of elliptical shape as shown, and the bolts 10 and 19 have a portion 20 of their shanks of non-circular form fitting in the non-circular holes, and are thereby held from turning so that the nuts can be tightened up with the use of only a single wrench.

The clamp described is preferably formed from plate metal, although it may be formed
 45 by forging or partly by rolling and then by pressing or bending. The preferred method of manufacture consists in punching a flat plate with the holes for the compression bolts 10 and the holes 18 for the bolts 19, then partly shearing out the portions of metal forming the ears 11, 13 and 15 as shown in Fig. 4, after which the plate is heated and then subjected to suitable die processes to bend the ears radially with reference to the opening in the sleeve, and bend the entire plate into substantially tubular form with the flanges 9 projecting radially therefrom. This sleeve is entirely free on its interior from inwardly projecting portions and therefore can be slipped over a leg
 50 section and used as an intermediate clamp as well as for securing the meeting ends of adjacent leg sections. In erecting a tower, derrick or shear with this clamp, an open
 55 clamp is slipped over the upper end of an

erected leg section, and held from sliding down by inserting a small piece of wood 23 or the like through the oppositely arranged openings 17 at the middle of the sleeve, which inserted piece of wood rests on top of
 70 the erected leg section and holds the sleeve from falling down. The lower compression bolts 10 can then be tightened up to fasten the sleeve onto the lower leg section, after which the cross piece of wood or the like is removed, and the upper leg section inserted in the sleeve, which can be freely done as the tightening of the lower compression bolts does not close the upper end of the sleeve sufficiently to prevent this, after which the
 75 upper compression bolts 10 are tightened to clamp the upper leg section. In this manner the same sleeves can be used for both the intermediate clamps and for the end clamps, making it unnecessary to carry in stock and transport to the place of erection two different types of sleeves as has heretofore been necessary, and also preventing loss of time which is occasioned by workmen taking the wrong sleeve for any one part of the tower
 80 or derrick.

The wrought metal of the clamps possesses maximum strength and therefore the clamps can be made lighter than the cast clamps heretofore used. On account of this reduction of weight it is possible to make the sleeves much longer than has heretofore been the practice, thereby obtaining a more secure fastening for the leg sections and also bracing and reinforcing said leg sections for material parts of their lengths. At the same time the metal is sufficiently resilient so that the tightening of the compression bolts 10 clamps the sleeve tightly against the leg sections, absolutely preventing relative
 85 movement and preventing failure of the tower or derrick on this account. Furthermore by the absence of any inward rib or projections, the two ends of adjacent leg sections abut directly one upon the other, giving a direct compression support one on the other from the top to the bottom of the derrick or tower. With cast sockets as heretofore used the inwardly projecting rib is not always of the same thickness, due to imperfections in the metal or of the mold, so that there has not been a broad bearing of the same upon the ends of the leg section in all cases. This has had a tendency to unnecessarily elongate one leg at the expense of the others, with the result that the derrick is liable to be thrown slightly out of the true vertical position. With my improvement this is not possible since the tubular leg sections can be fabricated at the
 90 factory to secure uniformity in length and with perfectly square ends so that they will abut one against the other without any intermediate metal, thereby insuring a broad bearing of one leg section upon another and
 95 100 105 110 115 120 125 130

legs of absolutely uniform length, with the result that the derrick is perfectly vertical if the foundation is level.

Various changes may be made in the shape and relation of the parts without departing from the spirit of the invention.

What I claim is:

1. A clamp for towers, derricks and the like, comprising a resilient split sleeve having perforated longitudinal flanges for receiving compression bolts, said sleeve being free from interior projections or ribs and having a plurality of ears turned outwardly from the body of the sleeve and providing oppositely disposed apertures therein.

2. A clamp for towers, derricks and the like, comprising a split sleeve having a smooth cylindrical interior surface and being provided with outwardly bent flanges to receive compression members, and sets of longitudinal and aligned ears punched out from the body portion of the sleeve and arranged to stand radially thereof and providing oppositely disposed apertures for the insertion of a temporary supporting member.

3. A clamp for towers, derricks and the like, comprising a resilient split cylindrical member, said member having longitudinal oppositely disposed flanges, a set of radially disposed ears punched out from one side of the body portion and bent in one direction, and a second set of radially disposed ears punched out from the other side of the body portion and bent in the opposite direction, the whole being arranged to provide

oppositely disposed openings for the insertion of a temporary supporting member, and the flanges and ears being provided with apertures, those of the flanges for receiving compression bolts and those of the ears for clamping girts and braces thereto.

4. A clamp for towers, derricks and the like, comprising a resilient split sleeve having perforated longitudinal flanges and having a smooth interior and being provided with two sets of plural radially arranged ears punched out of the metal of the sleeve and turned radial to the axis thereof, an intermediate pair of said ears being arranged to provide oppositely disposed apertures for the insertion of a temporary supporting member.

5. A tower, derrick and the like, comprising leg sections arranged to directly abut each other at their ends, a clamp surrounding the leg portions and having a smooth interior, said clamp being provided with adjacent flanges perforated for the reception of clamping bolts and being formed of resilient material, a plurality of ears punched and bent outwardly from the body portion of the clamp and providing oppositely disposed openings, and girts and braces connected to the ears.

In testimony whereof, I have hereunto set my hand.

LEE C. MOORE.

Witnesses:

F. W. WINTER,
MARY E. CAHOON.