No. 792,768. PATENTED JUNE 20, 1905.

J. B. FORKER.

DERRICK SHEAVE OR CROWN PULLEY.

APPLICATION FILED NOV. 14, 1904.

Fig. 1.

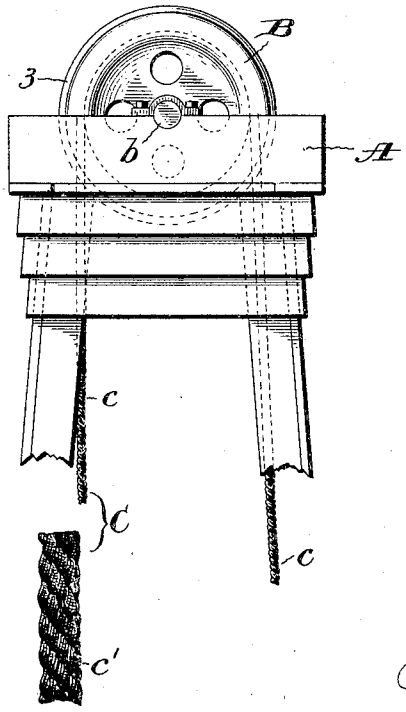


Fig. 4.

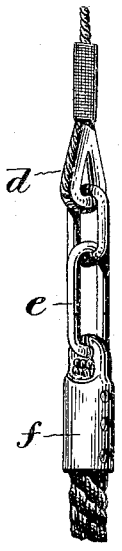


Fig. 2.

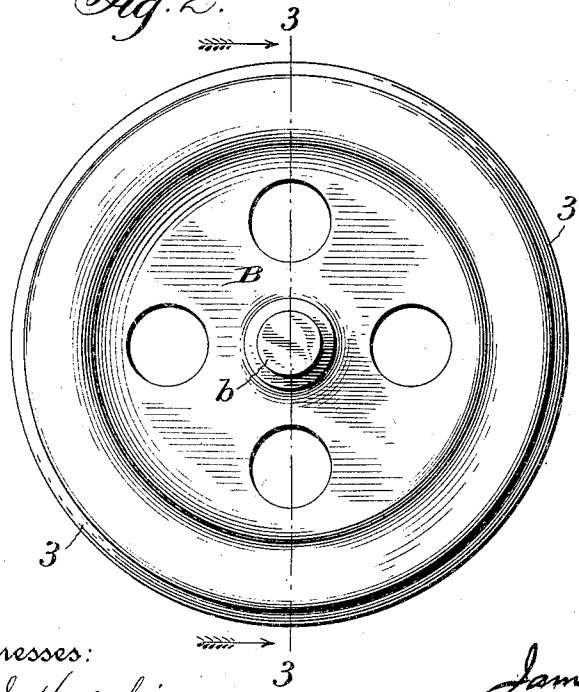
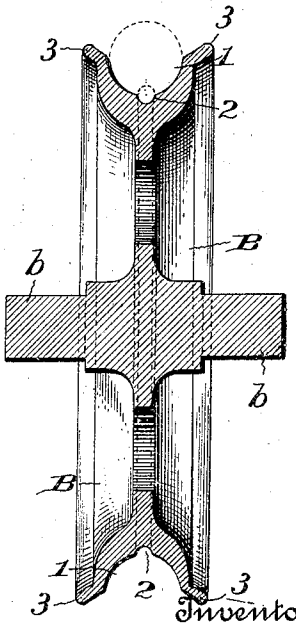


Fig. 3.



Witnesses:

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No. 792,768. Patented June 20, 1905.

UNITED STATES PATENT OFFICE.

JAMES B. FORKER, OF OIL CITY, PENNSYLVANIA, ASSIGNOR TO OIL WELL SUPPLY COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DERRICK-SHEAVE OR CROWN-PULLEY.

SPECIFICATION forming part of Letters Patent No. 792,768, dated June 20, 1905.

Application filed November 14, 1904. Serial No. 232,768.

To all whom it may concern:

Be it known that I, JAMES B. FORKER, a citizen of the United States, residing at Oil City, in the county of Venango and State of Pennsylvania, have invented new and useful Improvements in Derrick-Sheaves or Crown-Pulleys, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 is a side elevation of a portion of a derrick, showing a crown-pulley or derrick-sheave embodying the invention, together with portions of a composite drilling-cable with which said sheave or pulley is designed to be used. Fig. 2 is a detached enlarged side elevation of the derrick-sheave or crown-pulley. Fig. 3 is a transverse section of the sheave or pulley on the line 3 3, Fig. 2, the relation of the drill-cable to the pulley when traversing the same being indicated by dotted lines. Fig. 4 is a view of the adjacent ends of the wire and manila sections forming the composite cable and one means whereby the sections may be connected.

Like symbols refer to like parts wherever they occur.

Heretofore in drilling deep wells, such as oil or Artesian wells, the common practice has been to employ manila cables, because the spring or yield of the rope produced a "whip" stroke or quick lift of the tool, which greatly added to the efficiency thereof; but such cables have been found objectionable as liable to deteriorate from wear through contact with the rough walls of the well and as not economic of power by reason of the manila cable becoming water-soaked and when of considerable length thus adding to the weight to be lifted at each stroke of the tools. To overcome these objections, attempts have been made to employ wire cables in drilling deep wells; but these lacked the efficiency of the manila cable, as they were found to be deficient in spring or reaction, which affected the quick lift and added to the efficiency of the drill.

To avoid objectionable features of both manila and wire drill-cables and to obtain the advantages of both, composite drill-cables, made up of sections of wire, and manila cables have been tried, the main length of the cable being of wire and the shorter section adjacent to the drill-tool being of manila, and this while found effective has been also found liable to deterioration by reason of the distortion and wear of the drilling-cable as it traverses the pulley or sheave, and, further, the sheave or pulley has been subject to deterioration by reason of the twist or binding of its journals where the cable has been permitted to slip or have a movement on the face of the pulley. To overcome these several objections and produce a derrick-sheave or crown-pulley which shall be efficient and durable and which shall not cause the deterioration of the drilling-cable when employed in conjunction with a composite cable is the object of the present invention, and to effect the same a pulley or sheave is provided on its periphery with a plurality of uninterrupted concentric grooves, one within the other, said grooves having different diameters corresponding with the diameters of the different sections of the cable, said grooves being substantially semicircular as to the cable-receiving sections and having their centers in the same plane, whereby the spreading and distortion of the drilling-cable are prevented as it traverses the pulley and any side slip of the cable which would tend to cause binding and unequal wear of the bearings of the pulley is overcome, and such a construction embodies the main feature of this invention.

In some instances the means for connecting the wire and manila sections of the composite cable will exceed in diameter the manila or larger section, and in order that the same may traverse the pulley without displacement of the cable and without cramping the pulley-bearings the pulley is provided at its periphery with curved flaring lips, constituting, in effect, an outer or supplementary groove for the connections of the cable-sections, and such a construction embodies a secondary feature of my invention.

I will now proceed to describe the invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the top section or crown of a derrick, and B the derrick-sheave or crown-pulley journaled therein and over which passes the drill-cable, which in the present instance is indicated by C and is composed of sections *c c'* of different diameter, the former, *c*, which constitutes the upper or main portion of the drilling-cable, being of wire, while the latter, *c'*, or tool-section, is of manila, the two sections being united in any suitable manner—as, for instance, by the thimble *d*, links *e*, and clamp *f*, as indicated in Fig. 4 of the drawings.

The crown-pulley B may be of the usual or any required diameter and width of periphery and is provided with suitable journals *b*, by means of which it is journaled in bearings on the crown of the derrick A. The periphery of the pulley is provided with a main groove 1 of curved cross-section, the diameter of which is such as to accommodate without lost movement a manila cable of the required diameter, and in the bottom of said groove 1 and centrally thereof is provided an inner groove 2, also of curved cross-section and of approximately one-fourth the diameter of the outer groove 1 or of such diameter as will accommodate the wire cable of desired size without cramping or binding, yet without lost motion. The groove 2 is of a depth substantially equal to the radius of its circle, and the grooves 1 and 2 are concentrically disposed and in the same plane as to their centers. Exterior to the main groove 1 the periphery of the sheave or pulley is formed with curved flaring lips 3 3, which in effect constitute when taken together a supplementary or outer groove on the arc of a circle of greater diameter than main groove 1, adapted to accommodate the connections which unite the sections of the composite cable at the instant they are traversing the sheave or pulley. While the main and inner grooves 1 and 2 are of different diameters, as before noted, yet each is of uniform diameter throughout its length.

When the pulley is in service, the inner groove 2 will accommodate the wire section of the composite cable and will prevent the flattening or distortion thereof under the weight of the drill-tools and at the same time prevent any lateral or transverse movement of the weighted cable, which would tend to bind the pulley and cause unequal wear of its journals, and when the drill-tools are drawn up the main groove 1 will accommodate and support the manila section of the cable, and in both instances the cable and its load are carried centrally of the sheave or pulley and binding or cramping of the pulley-bearings avoided.

As the depth of the inner groove 2 is equal to substantially half the diameter of the wire cable it is intended to carry, it is evident that the edges formed at the junction of grooves 1 and 2 will not be so presented to the manila cable, which is of greater diameter, as to fray the same when the manila cable is traversing the pulley.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A derrick-sheave or crown-pulley for composite drilling-cables, said sheave or pulley having a plurality of concentrically-disposed uninterrupted grooves of different widths and curved cross-section.

2. A derrick-sheave or crown-pulley, said sheave or pulley having a plurality of concentrically-disposed uninterrupted grooves of different widths and curved cross-section, the groove of lesser width having a depth substantially equal to the radius of its circle.

3. A derrick-sheave or crown-pulley, said sheave or pulley having a plurality of concentrically-disposed uninterrupted grooves of different widths and curved cross-section, the depths of each of said grooves being substantially equal to the radius of its circle.

4. A derrick-sheave or crown-pulley for composite drilling-cables, said sheave or pulley having two uninterrupted grooves of different diameters, one groove being located within the other, each groove being of uniform diameter throughout its extent, said sheave or pulley being provided with curved flaring peripheral lips exterior to the main groove of said pulley, substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two subscribing witnesses.

JAMES B. FORKER.

Witnesses:

JUDSON D. TRAX,

MABEL BOYER.