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R. R. BLOSS

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BAND WHEEL STRUCTURE

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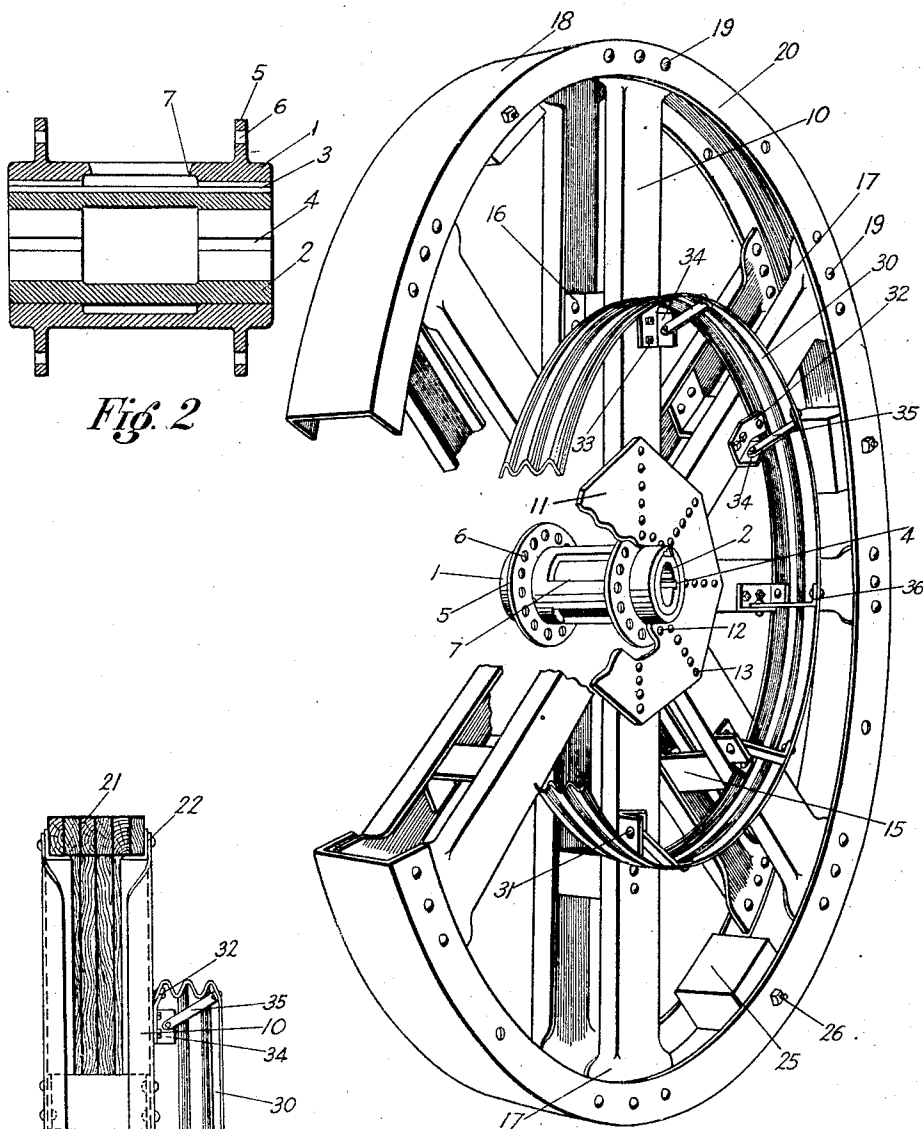


Fig. 2

Fig. 1

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Fig. 3

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BAND-WHEEL STRUCTURE.

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My invention relates to band wheel structures and has to do particularly with the provision of a band wheel adapted to be used in the drilling of oil wells, and in pumping of such wells after the drilling operation is finished.

In the past, it has been customary to provide band wheels wherein the hub of the wheel is made in two separate parts, these parts being secured to opposite sides of the wheel, and each part having an opening through which the shaft extends. In wheels having hubs of this character, the two bearings or openings become distorted or thrown out of alignment, and this may result from shipping the wheel or might occur in assembling the wheel.

There is no standard size of shaft upon which band wheels are mounted, and it has been necessary to provide band wheels with different sized hubs so as to fit various sized shafts. Also, there are a great number of manufacturers engaged in making oil drilling and pumping apparatus and it is customary for each different manufacturer to make the apparatus according to his own standards. For example, a shaft of one manufacturer, which is placed on the market as a 5" shaft, may vary slightly in size from a 5" shaft of another manufacturer. A number of shafts of as many different manufacturers, all of which are placed on the market as 5" shafts, may take as many slightly varying actual sizes. Moreover, the keyways in the shaft for locking band wheels thereto, vary, in that one manufacturer may have one keyway and others may have two keyways, and the keyways may vary in width and depth. Also, when more than one keyway is provided, the angular spacing of the keyways may vary. This varying in sizes and standards makes it impossible, from an economical and practical standpoint, to carry stocks of band wheels at widely separated distributing points in sufficient quantities to accommodate all these various shafts. It may be desirable at times for an operator of a drilling apparatus to transfer the band wheel from one location to another but because of the various sizes in shafts and difference in standards, such transfer and use of band wheels has been difficult and it has been necessary to purchase new band wheels or new hubs therefor.

Also, band wheels in the past have been

constructed of a great many different parts, and, for instance, the spokes of the band wheels have been secured to the rim by the use of additional plates, which plates were fastened to the rim and spokes respectively. Band wheels of the past have also made use of a number of different parts and connections for attaching the tug rim to the band wheel.

In the drilling of a well, the drilling tools encounter various formations, some of which may be sticky, and into which the tools may become embedded so that it is difficult to disengage the tools therefrom. When this occurs, the natural rebound of the drill does not occur. Such a formation is difficult to drill in and requires a very heavy band wheel for the purpose of disengaging the stuck drill stem at each stroke.

In the pumping of a well, the weight of the sucker rods on the down-stroke tends to accelerate the rotation of the band wheel, and the weight of the sucker rods plus the weight of the fluid which is lifted, tends to decelerate the rotation of the band wheel on the up-stroke. In the past, it has been customary to attach a weight to the pitman end of the walking beam for the purpose of counterbalancing this action of the sucker rods.

One of the objects of my invention is the provision of a band wheel wherein the hub of the wheel is constructed so that the proper alignment of the shaft bearings will be insured when the wheel is assembled, and the distortion or disalignment of the bearings after assemblage will be positively prevented.

Another object of my invention is the provision of a band wheel wherein the hub is constructed so that it will strengthen the wheel and prevent spreading of the spokes of the wheel.

Still another object of my invention is the provision of a band wheel wherein the spokes of the wheel are constructed so that they can be secured directly onto the rim of the wheel without the use of additional securing plates.

A further object of my invention is the provision of a band wheel hub of such a nature that it can be used with shafts of various sizes, and with shafts constructed by various manufacturers and according to the standards of the various manufacturers.

A further object of my invention is the provision of a band wheel so constructed that the band wheel can be easily and quickly increased in weight when the drilling tools encounter a strata which requires a very heavy band wheel to disengage the drilling tools on each stroke.

A still further object of my invention is the provision of a band wheel which can quickly and easily be made heavier on one side to counterbalance any monocyclic unbalance either in pumping or in drilling.

A still further object of my invention is the provision of a band wheel having a tug rim secured thereto wherein the connection between the tug rim and the band wheel is strong and durable and wherein the connection is made with a minimum number of parts.

Other and further objects of my invention will become apparent as the following description progresses and my invention becomes better understood, and by reference to the accompanying drawings wherein similar characters of reference represent corresponding parts and wherein:

Figure 1 is a perspective view of my band wheel, with parts cut away, showing the hub construction, the spokes, and the detachable members for counterbalancing or governing the weight of the wheel.

Figure 2 is a sectional view of my novel band wheel hub showing how the hub may be used with a bushing.

Figure 3 is a sectional view showing how the spokes of my band wheel may be used with a band wheel which is provided with a wood cant rim.

Referring now to the drawings and particularly to Figure 1, I show a band wheel structure provided with a hub 1. The member 1 is preferably made in one piece, as shown, and is preferably designed to be used with a bushing 2 which may be keyed thereto by keys inserted in the keyways 3, although the bushing may be secured to the member 1 in any desired manner such as pressing the bushing into the member 1. The bushing 2 is preferably provided with a keyway 4 for keying the same to a shaft upon which the band wheel is to be mounted. It will be understood that, if desired, the hub member 1 may be designed to be placed upon a shaft without the use of the bushing 2. I prefer, however, to provide the member 1 of uniform inside diameter to be used with interchangeable bushings 2 of uniform outside diameter. Bushings 2 may be provided in various thicknesses so that the interior diameter thereof varies and so that a bushing which fits a particular shaft may be inserted into the member 1. It will also be understood that the keyways in the bushings may be of various depths and widths, and there may be two keyways in some bushings so that a bushing may be used which fits any particular shaft or a shaft

made according to the standards of any particular manufacturer.

The hub member 1 may be provided with circumferential flanges 5 on either side thereof and which flanges are provided with suitable holes 6. Also the hub member 1 may be cut away at its central portion, as shown at 7, and this central portion may have an inside diameter greater than the inside diameter near the ends of the member 1. This construction aids in the machining of the member 1 and reduces the surface to be machined and prevents the accumulation of water or moisture between the member 1 and a shaft when the device is in operation.

The hub, being of one piece construction, positively ties the spokes of the band wheel together, and presents the spreading of the spokes and prevents movement of the spokes toward each other. Moreover, the one piece hub insures accurate alignment of the shaft bearings adjacent each end thereof when the wheel is assembled and prevents disalignment of the bearings in shipping the wheel or while the wheel is in use.

The band wheel comprises spokes 10 and the hub structure may be secured to such spokes through the medium of plates 11. There are two plates 11 and one plate may be secured to each end of the hub member, the plates 11 having a central opening which fits over the end of the hub, and being provided with holes 12 which align with the holes 6 in the flanges of the hub for the reception of a fastening means such as bolts or rivets. Each plate 11 is provided with radially arranged holes 13, which holes align with similar holes in the spokes 10, and the plates 11 may be secured to each spoke by bolts or rivets extending through the aligned openings. There may be as many spokes in the band wheel structure as desired, and the plates 11 may be provided with a corresponding number of radially arranged holes 13.

The spokes 10 are preferably of channel formation and, two spokes are preferably used parallel to each other, and placed so that the channel formation extends to the interior of the wheel structure, so that the spokes present a flat surface on the exterior of the wheel. Separating and bracing elements 15 may be provided, the member 15 having inwardly bent ends 16 which ends may be bolted or riveted to the spokes 10. The member 15 maintains the accurate spacing of the spokes 10 and strengthens the band wheel structure.

The spokes 10 are preferably provided with the channel formation flattened as at 17, which flattened portion 17 may be secured to the rim 18 of the wheel by means of bolts or rivets 19. In a wheel structure, as shown in Figure 1 wherein the wheel is provided with a metal rim, the spokes 10 are preferably placed inside of the flange 20 of the rim. As

shown in Figure 3, the spokes 10, when used with a wheel structure provided with a wood cant rim 21, the spokes may extend on the outside of the rim 21 and be secured thereto as shown at 22.

As best shown in Figure 1, I provide weights 25 which may be provided with holes for alignment with holes in the flange 20 of the rim so that the weights may be secured thereto by suitable means such as bolts 26. The weights 25 are preferably placed near the extreme periphery of the wheel so that they may give as great a balancing effect as possible. It will be understood that the weights 25 may vary in size and number if desired, and that they are readily attachable to or detachable from the wheel structure so that the wheel structure may be readily and easily made heavier or lighter as desired. Also, by securing the members 25 only to one side or portion of the wheel, the wheel may be counter-balanced to act against forces delivered to the band wheel from the drilling or pumping apparatus.

The band wheel structure also comprises a tug rim 30 which is preferably corrugated to accommodate a rope, and which rim is preferably capable of being easily attached to or detached from the wheel structure. The rim 30, on one edge thereof, may be provided with a series of angular plates 31. The angular members 31 have one portion 32 extending at an angle so that the portion 32 may be secured, as by means of a bolt or rivet, to one edge of the rim, and preferably on the under side of the rim. The member 31 further comprises a portion 33 adapted to abut against spokes of the wheel. The member 31 has an outwardly projecting portion 34 to which portion a brace 35 may be secured and which brace is preferably bent as at 36, which bent portion 36 is secured to the outside edge of the rim 30. I preferably provide the rim 30 with the angular members 31 and braces 35 secured thereto so that the rim may be easily attached to the band wheel structure by bolt-

ing or otherwise securing the portions 33 to the spokes of the wheel. I have shown, for the sake of clearness, as many angular members 31 on the tug rim 30 as there are spokes 10 on the band wheel structure, but it is to be understood that the tug rim need not be secured to each spoke but may be secured only to as many spokes as desired, in which case, a corresponding number of angular members 31 is to be provided.

It will be seen that I have provided a band wheel structure which is strong and durable and which is composed of a minimum number of parts. It will also be seen that I have provided a band wheel structure of sufficient strength to be used in the drilling of wells and which band wheel may be increased or decreased in weight for such service, and which also may be altered in weight to be suitable for pumping the well after the drilling operation is completed.

Moreover, I have provided a band wheel having a hub structure which can be used on shafts of various sizes and on shafts made according to the standards of various manufacturers by merely changing the bushing in the hub. While I have described my invention as relating to band wheel structures adapted to be used in the drilling and pumping of wells, I do not desire to so limit my invention, but it is to be understood that my invention is to apply broadly to wheel structures and may be employed wherever such wheels are applicable.

Having thus described my invention, I claim:

In a wheel structure for well drilling rigs, a band wheel comprising spokes, a tug rim, angular plates secured to one edge of said tug rim and to said spokes, and bracing members extending from the opposite edge of said tug rim and secured to said angular plates.

In testimony whereof I hereby affix my signature.

RICHARD R. BLOSS.