

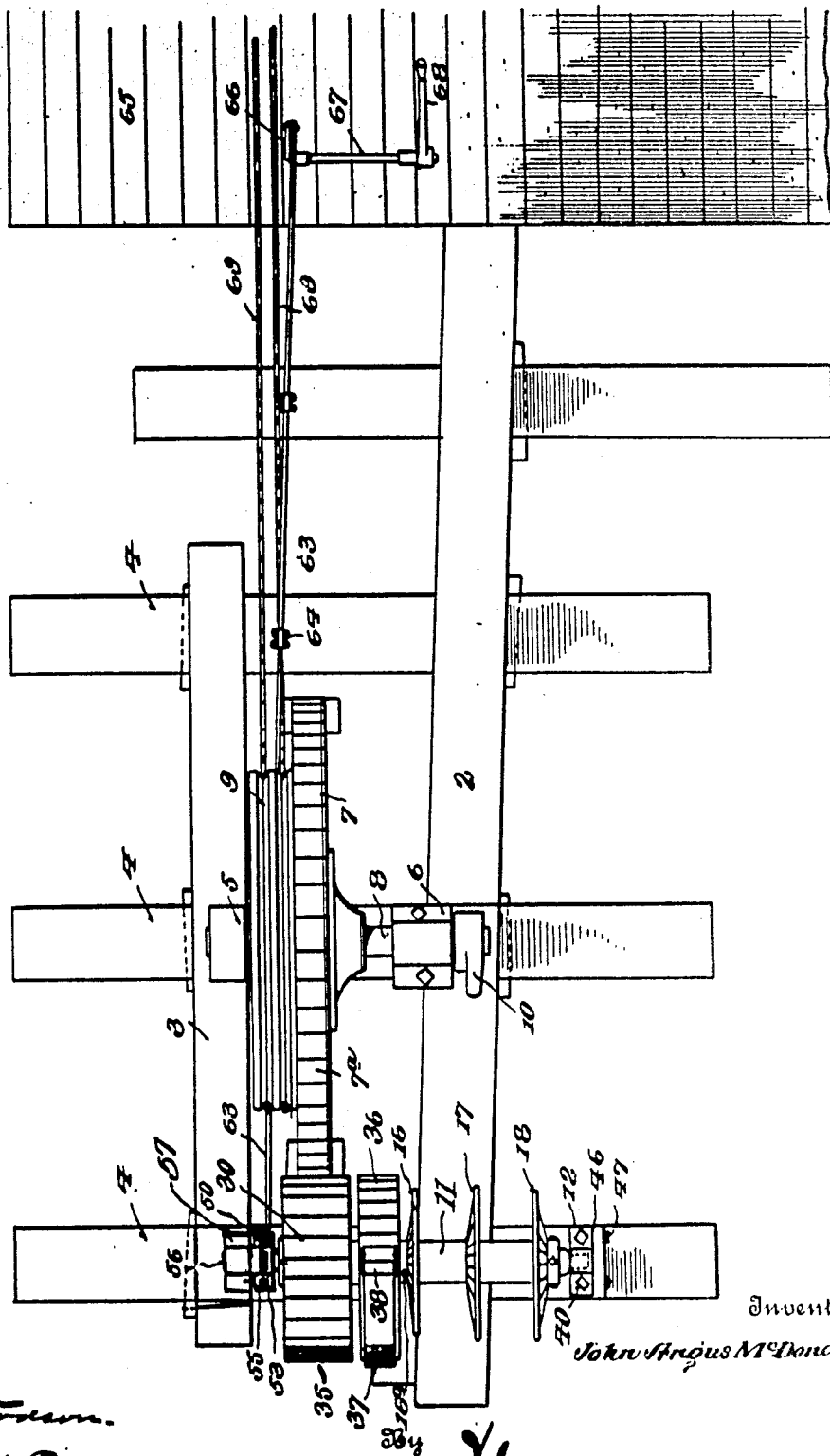
J. A. McDONALD.
SAND REEL FOR WELL DRILLING RIGS.
APPLICATION FILED SEPT. 20, 1910.

1,055,408:

Patented Mar. 11, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS-SHEET 2.



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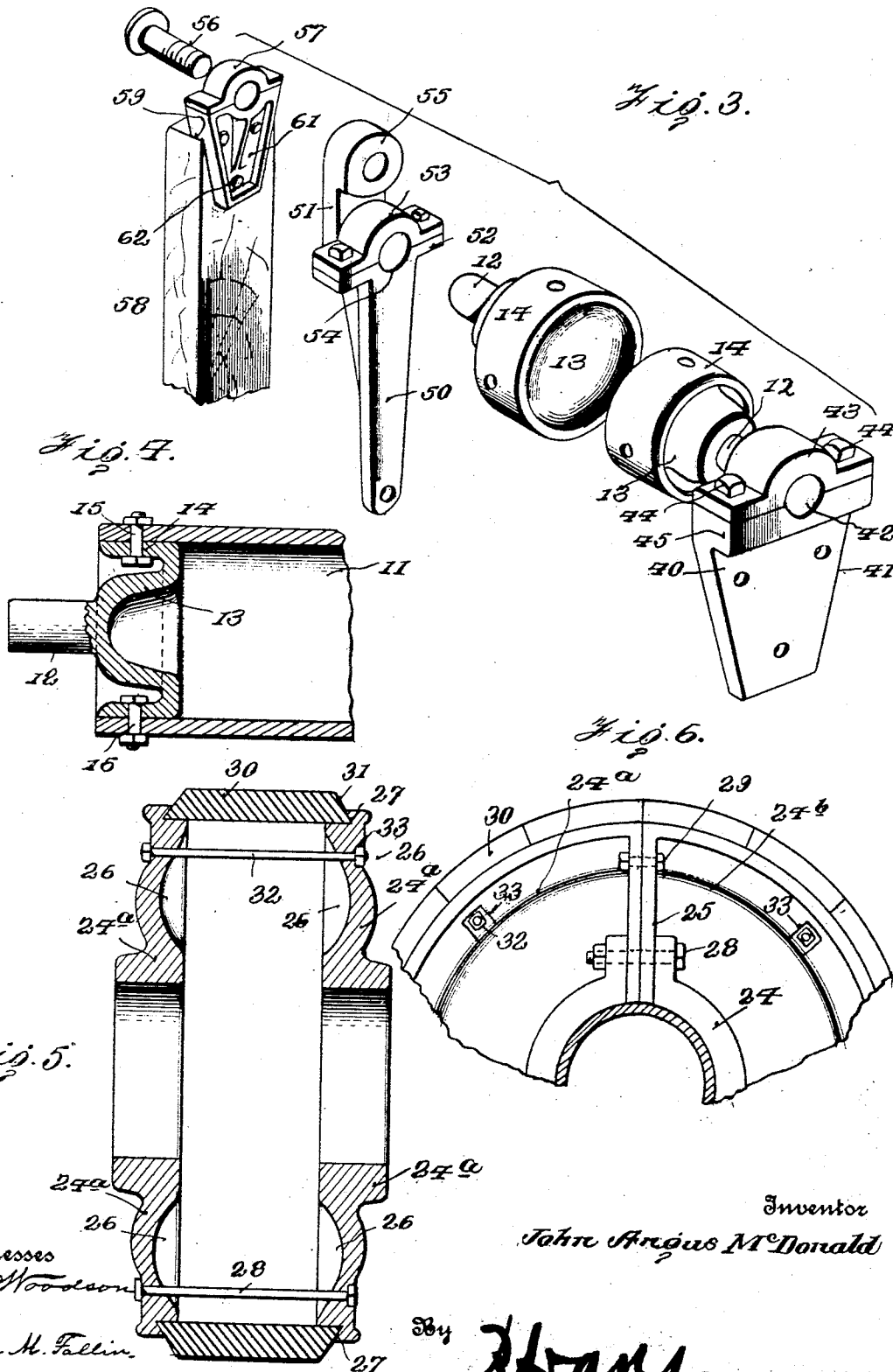
By John H. Macy, Attorney.

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UNITED STATES PATENT OFFICE.

JOHN A. McDONALD, OF CLARKSBURG, WEST VIRGINIA.

SAND-REEL FOR WELL-DRILLING RIGS.

1,055,408.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed September 20, 1910. Serial No. 582,951.

To all whom it may concern:

Be it known that I, JOHN A. McDONALD, a citizen of the United States, residing at Clarksburg, in the county of Harrison and State of West Virginia, have invented certain new and useful Improvements in Sand-Reels for Well-Drilling Rigs, of which the following is a specification.

My invention relates to well drilling apparatus and particularly to a short iron sand reel therefor adapted to be used with a standard rig such as ordinarily provided for drilling oil, gas or Artesian wells.

One object of my invention is to provide a short sand reel made of iron, capable of doing the work required of a sand reel in an easy manner and not requiring any changes to be made in the general construction of any ordinary and standard rig.

A further object is to provide a sand reel in which all of the objectionable features incident to the present sand reels in use are eliminated, such sand reel being of very simple construction, substantially made and easily operated, the parts being made in duplicate so that in case of any part being destroyed another part of the same character can be easily and conveniently placed in position, the reel being so constructed that all parts are easily accessible.

My invention is shown in the accompanying drawings, wherein,

Figure 1 is a plan view of a standard rig showing my improvements in place thereon, the derrick, samson post and other parts not connected with my invention not being shown. Fig. 2 is an elevation of a portion of the foundation for the rig and the band wheel, whereby power is communicated to the sand reel, the sand reel being shown in elevation at brake partially in section. Fig. 3 is a perspective view, disassembled, of the inverted sand reel lever and bearing therefor. Fig. 4 is a fragmentary sectional view of one end of the sand reel showing the manner of holding the gudgeon in place. Fig. 5 is a diametrical sectional view of the friction wheel whereby power is transmitted to the sand reel. Fig. 6 is an enlarged fragmentary elevation of a portion of the friction wheel. Fig. 7 is a face view of one of the flanges of the reel, and Fig. 8 is a perspective view of one section of the middle flange.

Referring now particularly to Figs. 1

and 2, 2 designates the main sill and 3 the subsill of a well drilling rig. 4 designating the transverse mud sills usually used for supporting the main sill and subsill, 5 designating the front jack post, and 6 the rear jack post. Mounted upon the jack posts is the usual band wheel 7 constructed in any desired manner and mounted upon a transverse shaft 8 which is supported in bearings in the jack posts 5 and 6. This band wheel 7 is usually about 10 or 11 feet in diameter. Also mounted upon the shaft 8 and moving with the band wheel 7 is the tug rope wheel 9 which is about 7 feet in diameter. The shaft 8 is provided at its end with a crank 10 of any usual construction whereby power is communicated to a walking beam 7. These parts are all old and may be constructed in any desired manner. In order to secure sufficient friction, between the band wheel and the friction wheel on the sand reel, the circumference of the band wheel 7 is provided with lagging strips 7^a, thus affording a wooden periphery so as to secure good frictional contact between the band wheel and the sand reel.

The sand reel drum is composed of an iron pipe 11 about 11 inches in diameter. The ends of this pipe are provided with gudgeons 12 having the peculiar form shown in Fig. 4. The base of the gudgeon is outwardly flared as at 13 and the margin then returned upon itself toward the end of the gudgeon so as to provide a flange 14 which fits snugly within the end of the pipe 11 and which may be attached to the pipe in any desired manner, preferably by the bolts 15. One of these gudgeons is provided at each end of the drum 11. Mounted upon the tubular drum 11 are 3 flanges, designated 16, 17 and 18. These flanges are constructed as shown in Fig. 7 and are preferably made of two sections, having the radial flanges 19 at the ends of the sections. These two sections are adapted to be clamped by bolts 20 to the drum and are provided on their exterior faces with the radial ribs 21 extending out from the hub 22. It will be seen that flanges constructed in this manner, may be easily removed from the drum and replaced thereon and that the flanges may be easily shifted when desired.

The middle flange 17 divides the drum into two sections or spools, one of them,

that section lying between the flanges 17 and 18, forming the working spool, while that portion between the flanges 16 and 17 forms the spool for the reserve or surplus wire, this wire passing through the segmental opening 23. It will thus be seen that one continuous wire is used, the working portion of which is wrapped upon the working spool while the remainder of the wire is passed through the segmental opening and wrapped upon the drum between the ribs 16 and 17.

One end of the drum is provided with a friction wheel 35, shown in Figs. 5 and 6. This friction wheel comprises the oppositely disposed sectional end pieces 24 and peripheral lagging 30. The end pieces each consist of two sections 24^a and 24^b having end radial flanges 25 whereby the sections are adapted to be clamped to each other and around the drum 11. These end pieces of the friction wheel are about 38 inches in diameter and have an internal diameter slightly larger than the external diameter of the drum. The inner face of each of the sections is provided with radial ribs 26 and the circumference of each of the ends is formed with the circumferential recess 27, this recess being undercut. The sections 24^a and 24^b are held together by bolts 28 which are disposed close to the hub of the friction wheel and by bolts 29 which are disposed near to the circumference of the wheel. Mounted between the ends 24 and spacing them apart are the lagging strips 30. These are preferably of maple and have beveled ends 31 which fit in the recess 27. The end pieces of the friction wheel are held in engagement with the ends of the lagging and in rigid relation to each other by transversely extending bolts 32 which pass through the ends of the sections and are each provided with a head on one end and a nut upon the other. All bolt holes on one of the end pieces have a square recess 33 in which the head of the bolt is received and the other end piece has a smooth surface against which the nut on bolt 32 bears. A friction wheel constructed in accordance with this description I have found to be very durable. The construction of the wheel permits the lagging to be replaced at any time, and also permits the friction wheel to be shifted along the drum so as to easily adjust it to its proper position or to permit it to be removed.

While one friction wheel can be used for transmitting power from the band wheel to the sand reel and also for braking the sand reel, I preferably provide two friction wheels 35 and 36, as shown in Fig. 1. One of these friction wheels contacts with the band wheel 7 while the other engages the brake band 37 as shown in Fig. 2. This brake band is about 10 inches in width and

is attached at one end to any suitable support and at its other end to a transverse beam 38. It will be seen that when the sand reel is moved toward the band wheel the friction drum 35 will contact with the band wheel and thus the power will be transmitted to the sand reel. When, however, the drum is moved in an opposite direction and away from the band wheel the friction wheel 36 will contact with the brake band 37 and the motion of the sand reel will be checked.

For the purpose of moving the sand reel to bring the friction wheels 35 and 36 into contact with the band wheel and brake band respectively, I mount the gudgeon 12 at one end of the sand reel in a bearing 40, this bearing being shown in detail in Fig. 3, and the gudgeon located at the other end of the sand reel is mounted in bearings in an inverted lever 50. The bearing 40 for the relatively fixed end of the sand reel, as shown in Fig. 3, comprises a plate 41, the upper end of which is recessed at 42 and provides part of a journal bearing for the gudgeon, a cap 43 rests upon the end of the plate 41 and forms the other half of the journal bearing for the gudgeon. It is to be understood that the gudgeon 12 which rotates within the bearing 42 is slightly smaller than said bearing so as to permit of lateral movement of the drum. The cap 43 is held upon the member 41 by means of the bolts 44. The plate 41 at its upper end is laterally enlarged as at 45 so as to form a shoulder fitting over the post 46 upon which the journal bearing is supported. The plate 41 is held to the post 46 by means of the bolts 47 or in any other suitable manner. The opposite end of the sand reel and drum 11 is supported by means of the gudgeon 12 in a bearing formed in an inverted lever 50, illustrated in detail in Fig. 3. This lever 50 is offset at one end as at 51 so as to form a shoulder 52 upon which the cap 53 is mounted, the face of the shoulder 52 being also formed with one half of the journal bearing 54. The offset end 51 of the lever 50 is formed with a thickened head 55 through which passes a pivot pin 56 which projects from a bearing plate 57 mounted upon the post 58. This bearing plate 57 is shouldered as at 59 to fit over the post, the face of the plate being formed with the recess 61 into which the heads of the bolts 62 which hold the plate to the posts are received. The downwardly extending end of the lever is connected by connecting rod 63 to a hand lever whereby it may be actuated. The connecting rod 63 passes beneath the tug rope wheel 9 and is disposed between the longitudinally extending sills 2 and 3 so as to be entirely out of the way. This connecting rod 63 moves preferably in guides 64 which are attached

to the belt house floor. At its rear end the connecting rod 63 extends back to the usual platform 65 and is pivotally connected to the arm 66 and connected to a rock shaft 67, this shaft being connected at its end to lever 68. It will be seen that by operating the lever in one direction the rock shaft 67 will be turned thus moving rod 63, throwing over the lever 50. The lever, turning upon the pivot 56, carries the adjacent end of the sand reel outward and thus carries the friction wheel 35 away from the band wheel 7 and friction wheel 36 into contact with the brake band 37. A reverse movement of the lever 68 will shift the lower end of lever 50 toward the band wheel 7 thus moving the friction wheel 36 out of contact with the brake band 37 and moving friction wheel 35 into contact with the band wheel 7. By this arrangement the friction wheel 35 is prevented from being worn smooth by contact with the brake band 37 and thus a better frictional engagement is secured between the friction wheel 7 and the friction wheel 35 than if the brake band turned upon the friction wheel 35.

The bull ropes which pass over the tug wheel and extend to bull wheels (not shown) in the rear of the derrick are designated 69.

It will, of course, be understood that I have not shown a large part of the mechanism of the rig inasmuch as this mechanism is not a part of my invention and is such as is commonly in use.

Preferably the bearings for the gudgeons formed in the journal 41 and in the inverted lever 50 are lined with Babbitt or other metal which would give a satisfactory and serviceable bearing. Heretofore sand reels have been mounted in wooden bearings and have not been at all satisfactory.

It will be seen that the sand reel is made entirely of iron with the exception of the face of the friction wheel which is made of the transversely extending lagging strips 30. It is not practical to make the face of the friction wheel of iron as it does not produce the desired amount of friction between the band wheel and the friction wheel.

The shaft or drum 11, as illustrated in the drawing, has a thickness of $\frac{3}{4}$ inches and is about 11 inches inside diameter which gives a correct size for spooling the line in use and has a greater strength and durability than the shafts ordinarily used for sand reels.

It will be seen that the gudgeons being removable may be easily replaced when worn without destroying the body of the drum and that the drum or shaft 11 may be made of ordinary pipe such as is easily procurable.

It will be seen that the peculiar form of

flanges 16, 17 and 18, illustrated in detail in Fig. 7 provides a flange made in two sections and bolted together so as to permit it to be clamped on the drum thus eliminating the use of keys or set screws. The flange 16 will have a hole drilled through it at 16^a for the purpose of clamping the end of the rope to a rib of the flange to hold the rope in position when about to spool the rope on the sand reel preparatory to using.

A sand reel constructed in accordance with my invention is of minimum length and yet of such construction that it will do the work successfully and properly at any depth of drilling. The sand reel should be set with its axis about 6 feet 3 inches from the axis of the shaft for the band wheel shaft. Such position will bring the spooling in perfect alinement with the usual sheave carried at the top of the derrick.

An important advantage of my sand reel is that it only extends a relatively short distance over the sill 2 and therefore does not form an obstruction at the point where the casing and tubing for the well have to be handled. In the ordinary rig the iron sand reel is a foot longer than the sand reel shown in my construction and very greatly obstructs the work necessary to be done at this point.

The inverted sand reel lever 50 being of iron, cast or otherwise formed, having a babbitted bearing insures a smooth running of the sand reel and provides a bearing which will permit the machine to be used for several wells.

The improved lever is very much superior to the clumsy swing lever and knuckle post heretofore in use, particularly because of the fact that at the point where the lever is located room is quite an object and furthermore because it permits the connecting rod to be located below the sand reel instead of above the same and thus carries the connecting rod out of a position where it would interfere with the movement of the bull ropes. The connecting rod passes under the tug wheel and in this way does not interfere with any other part of the standard rig.

Having thus described the invention, what is claimed as new is:—

In a well drilling rig, spaced posts of unequal height, a bearing plate seated against the inner face of the taller post and having an offset shoulder at its upper end seating upon the top of the post, the face of the plate being recessed to form a marginal rib having a smooth bearing face lying in a vertical plane, bolts passed through the plate and post to secure the plate in place, the heads of the bolts seating in the recess of the plate, a pivot fitted in the bearing, a lever hung from said pivot and bearing closely against the smooth bear-

ing face of the rib of the plate, the lower free end portion of the lever being offset to provide a transverse shoulder spaced below and extending away from the pivot, a bearing on said shoulder, a bearing mounted upon the upper end of the shorter post and in horizontal alinement with said shoulder bearing, and a sand reel shaft journaled by one end in said shoulder bearing and by

its other end in the bearing on the shorter post.

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

JOHN A. McDONALD. [L.S.]

Witnesses:

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C. BUTCHER.