

Nov. 8, 1932.

F. H. HUFF

1,887,306

REVOLVING SHEAVE FAIRLEAD

Filed Dec. 27, 1929

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Fig. 1.

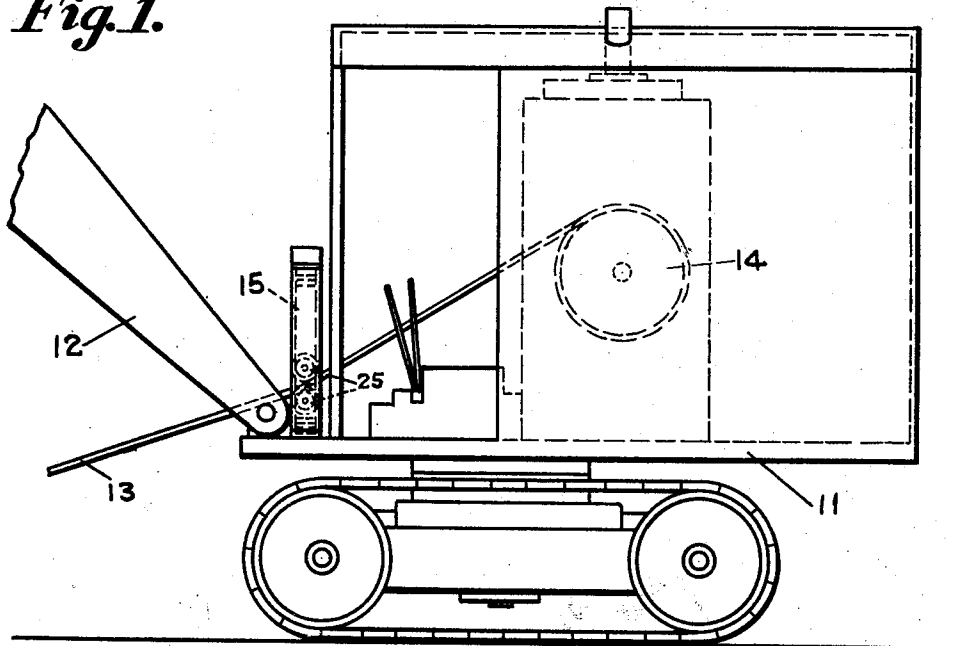
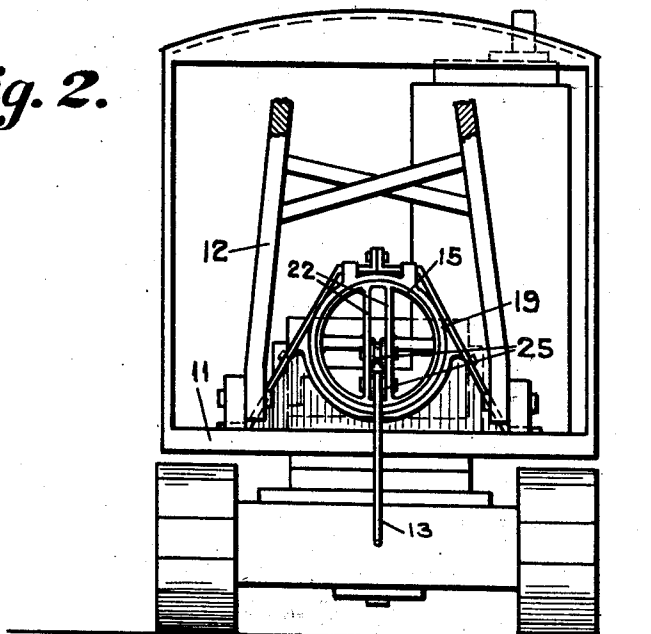


Fig. 2.



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Fig. 3.

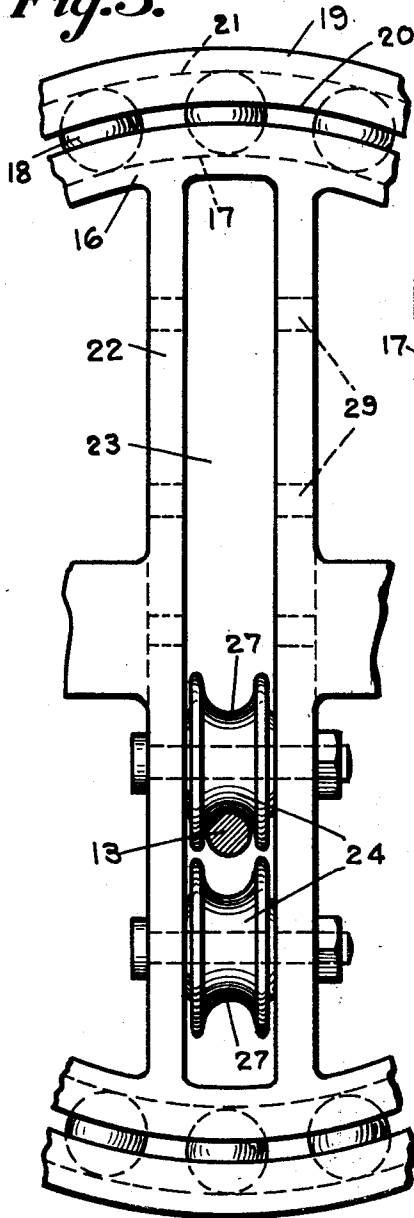


Fig. 4.

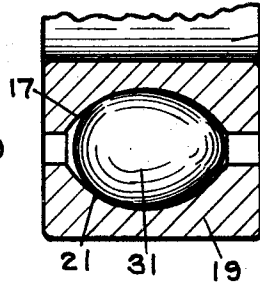
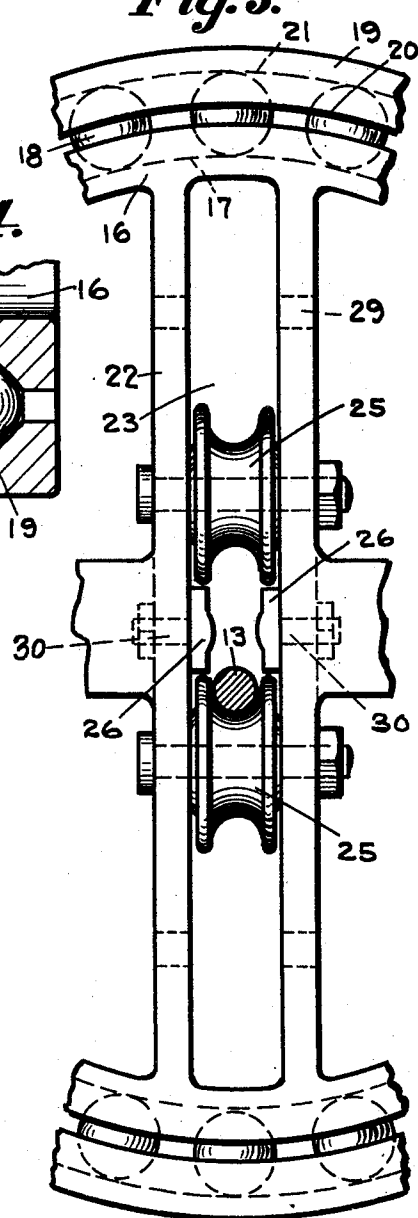


Fig. 5.



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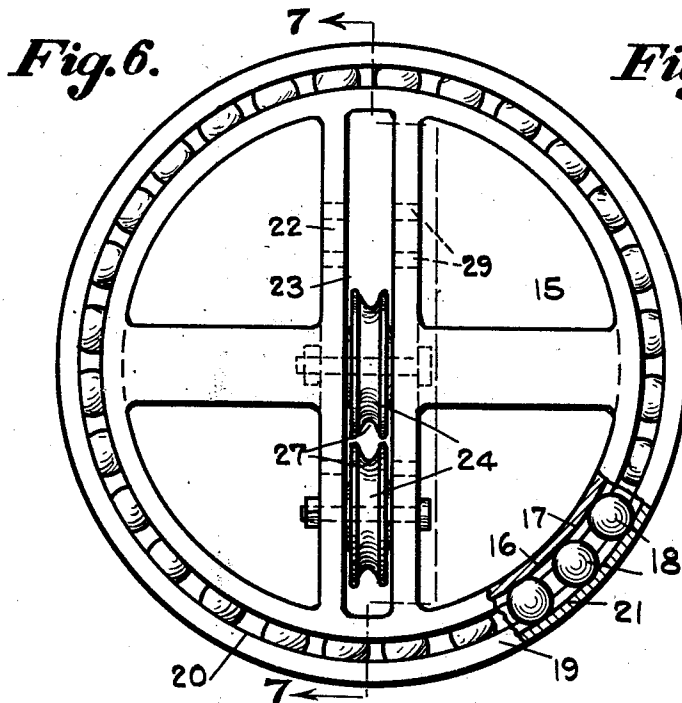
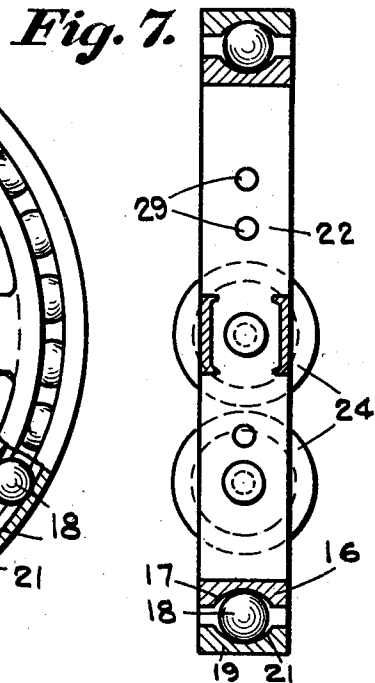
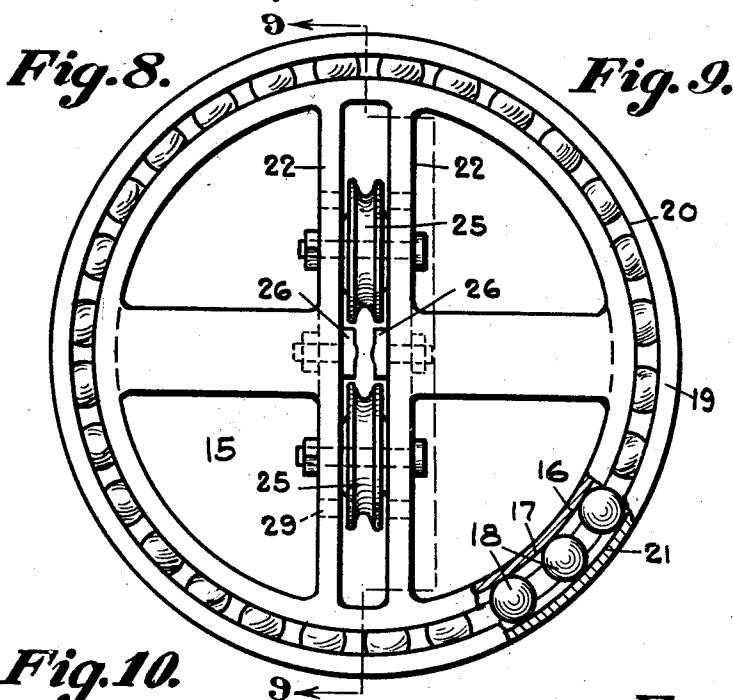
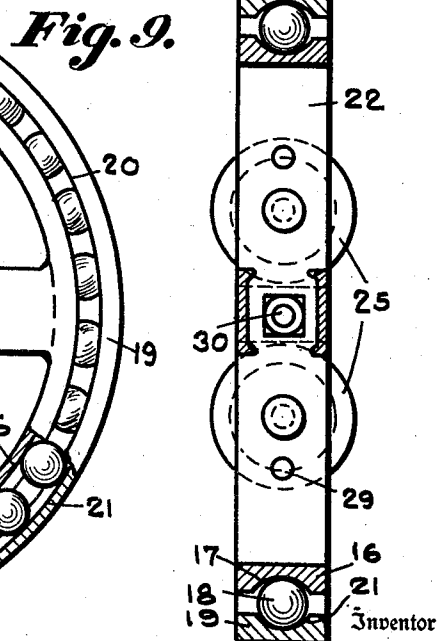
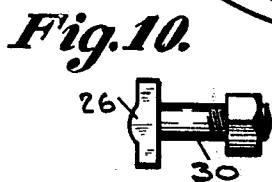
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REVOLVING SHEAVE FAIRLEAD

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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REVOLVING SHEAVE FAIRLEAD

Application filed December 27, 1929. Serial No. 416,879.

This invention relates to a revolving sheave fairlead for use in connection with the operation of steam shovels, dredging and hoisting of all kinds where cables are used for controlling the movements of booms or cranes. In all such instances the booms or cranes are swung to positions at various angles from a common center, rotatable drums being provided at said common center upon which the cables are wound.

The sheaves heretofore used for controlling the direction of movement of the cables which are wound upon the drums have caused the cables to become unduly worn and on account of their construction the sheaves have added materially to friction and resulting waste of power.

One of the objects of the invention is to provide a device of such construction that it will control the direction of movement of a cable without appreciable friction.

Another object is to provide such a construction for the device that the cable will not become unduly worn.

The invention broadly includes a pair of sheaves disposed in a slot and axially mounted therein, the groove of one sheave opening on the groove of the other sheave to permit a cable to be disposed therebetween and to be shifted from one sheave to the other without appreciable friction or injury to the strands of the cable, said slot being formed in a rotor or wheel-member diametrically thereof, and said rotor or wheel-member being freely rotatable in a frame or stationary support so that the device will sustain all stresses directed thereto to advantage.

Another object is to provide a device for controlling the direction of movement of cables to or from a winding-drum which may be conveniently manufactured and will be durable in use.

With the foregoing objects in view and others to be mentioned the invention presents a new and useful construction combination and arrangement of parts as described herein and claimed, and as set forth in the accompanying drawings, it being understood that changes may be made in size, form, proportion of parts and minor details, said changes

being within the scope of the invention as claimed.

In the drawings, Fig. 1 is a side view of a turn table showing the device mounted thereon. Fig. 2 is a front view of the same. Figs. 3, 4 and 5 are broken away enlarged views. Fig. 3 is a detail relating to Fig. 6 showing parts of two sheaves having grooves opening one upon the other. Fig. 4 is a detail showing a side view of a roller or ball of oval shape mounted in a raceway. Fig. 5 is a detail relating to Fig. 8 showing a pair of slide-plates disposed between two sheaves.

Fig. 6 is a front view of a revolving sheave fairlead embodying the invention. Fig. 7 is a sectional view on line 7—7 of Fig. 6. Fig. 8 is a view similar to that shown in Fig. 6, the sheaves being disposed near the center of the rotor. Fig. 9 is a sectional view on line 9—9 of Fig. 8. Fig. 10 is a side view of a slide-plate.

Referring now to the drawings for a more particular description, the invention is shown and described in connection with a turn table 11 provided with a boom 12 and a cable 13 adapted to be wound upon a drum 14 rotatable by any suitable means, and it will be understood that the boom is adapted to have horizontal and vertical movements by means not shown, and that the load carried by the boom is controlled by cables, only one of which is shown in the drawings.

The invention consists, in part, of a rotor or wheel-member 15 having a tire 16 having a peripheral groove 17 to provide a part of a raceway adapted to receive balls or rollers 18.

Numerals 19 indicates a stationary frame or support having a circular aperture 20 and an annular groove 21 opening on said aperture, this groove and the groove 17 providing the raceway mentioned when the wheel-member is disposed in the aperture of the frame.

The wheel-member 15 is provided with a pair of parallel supporting-bars 22, said bars being disposed diametrically of the wheel-member and connected at their ends with opposed parts of the tire and disposed side by side in spaced relation to provide a slot 23 for a mounting therein of a pair of sheaves 24 shown in Fig. 6 of the drawings, or the pair

of sheaves 25 and a pair of slide-plates 26 shown in Fig. 8.

While the frame or stationary support 19 is of circular form as shown in the drawings, this is not necessary, and said member 19 may be a part of a wall or other structure, the important feature being that it is provided with a circular aperture for receiving the wheel-member 15, and that it shall be provided with the annular groove 21 opening on its aperture to provide part of the race-way mentioned.

By referring to Figs. 3 and 6 of the drawings it will be seen that the sheaves 24 are disposed closely adjacent, and it may be said that their grooves 27 open upon each other, and this is an important feature.

In operation, the boom and load carried by the boom have swinging movements and the cable 13 will have similar movements,—that is to say the cable 13 will swing upwardly and downwardly as well as horizontally. Since the wheel-member, rotor or sheave 15 may revolve freely in the frame 19 its slot 23 may, without any resistance, be disposed in line with the transverse movement of the cable 13 and friction will not be appreciable; also since the sheaves 24 are disposed with their peripheries very near to each other the cable 13 when moving from one of the sheaves to the other will not become injured or unduly worn.

In the use of sheaves now in general use the wire strands of cables become worn and injured for the reason that they become caught upon the edges or flanges of the groove. By use of the present invention this objectionable feature will be avoided since the edges or flanges of the grooves of the pair of sheaves are disposed in such close proximity that the strands will not engage the flanges. In operation when the cable 13 is shifted, by movements of the boom or load carried thereby, the wheel-member or sheave 15 will rotate in a direction corresponding to the shifting movement of the cable 13 and said cable will engage in the groove of one of the sheaves 24 or may be shifted to the other sheave of said pair, and this last movement will not cause injury or appreciable wear for the reason stated.

By referring to Figs. 5 and 8 of the drawings, it will be seen that the pair of sheaves 25 are disposed equi-distant from the center of the wheel-member or sheave 15. It is obvious that if the cable 13, during operation, was maintained at the center of the device the wheel or sheave 15 would not rotate and that the stresses might be directed to the supporting-bars 22 instead of sheaves 25, and therefore the last named sheaves are disposed near and equi-distant from the center of said wheel.

Numerals 26 indicate a pair of side-plates which are disposed between the pair of

sheaves 25 to prevent injury to or undue wear of the cable 13 when shifted from one sheave 25 to the other sheave of said pair. For this purpose the thickness of said plate 26, at its edges, corresponds to the thickness of the edges of the grooves of the sheaves 25, and in operation the strands of the cable will not become cut or injured when the cable is shifted, but will slide on the smooth surface of the plates 26.

In some instances the work of excavating is at the front of the turn table, and on other occasions it is necessary to cause the boom to have extensive swinging movements and in such instances the sheaves should be mounted remote from the center of the wheel-member 15 as shown in Fig. 6 of the drawings.

The sheaves 24 and 25 are preferably of uniform size. Since threaded pivot-pins or bolts are used for their mountings they may be mounted in apertures 29 nearer to or further from the center of the wheel-member 15.

The side-plates 26 are each provided with a threaded stem 30, and they are not used when the parts are arranged as shown in Fig. 6 of the drawings.

In the modified form of bearing shown in Figure 4, the bearing is of oval cross section with its longitudinal axis transverse to the frame and the wheel so that the rounded ends of the bearing will provide anti-friction surfaces which are capable of sustaining the edgewise stresses imposed upon the wheel.

Since stresses directed to the wheel 15 of the cable 13 must be sustained by the anti-friction balls or rollers, the balls 31, Figure 4, are preferred for the reason that they are capable of sustaining axial stresses to a greater advantage than spheres and are durable in use, the grooves in the wheel member 15 and the frame 19 conforming in cross sectional area to that of the opposite side portions of the balls or rollers 31.

It will be noted that the pair of side-plates 26 are each curved outwardly at its center portion, and therefore the cable 13, when the wheel-member 15 is rotated, will never be maintained at the axis of said wheel-member, but may be shifted readily from one sheave to the other sheave.

I claim as my invention,—

1. In a revolving sheave fairlead, a frame having a circular aperture, a radially slotted wheel mounted to permit rotation in the circular aperture of the frame, a pair of rotatably mounted grooved sheaves disposed closely adjacent each other in the slot of said wheel, said grooves opening upon each other, and a pair of opposed side-plates disposed in said slot between the sheaves and secured to the frame.

2. In a rotary sheave fairlead, a frame having a circular aperture, a radially slotted wheel mounted to permit rotation in the circular aperture of the frame, a pair of rotat-

ably mounted grooved sheaves disposed closely adjacent each other in the slot of said wheel, said grooves opening upon each other in the slot of said wheel, and a pair of side plates whose edge thickness corresponds to that of the grooves in said slot between the sheaves.

3. In a rotary sheave fairlead, a frame having a circular aperture and a groove opening on said aperture, a wheel member in said aperture provided with a peripheral groove and having a diametrical slot formed therein, a pair of grooved sheaves equi-distant from the axis of the wheel member and opening upon each other journaled in said slots, and a pair of side plates disposed opposite to each other, each side plate being curved outwardly at its center portion.

In testimony whereof, I have affixed my signature.

FRED H. HUFF.