(No Model.)

K. G. ROEBLING, Jr.

SHEAVE ATTACHMENT FOR OIL WELL APPARATUS.

No. 555,126. Patented Feb. 25, 1896.

Fig. 1.

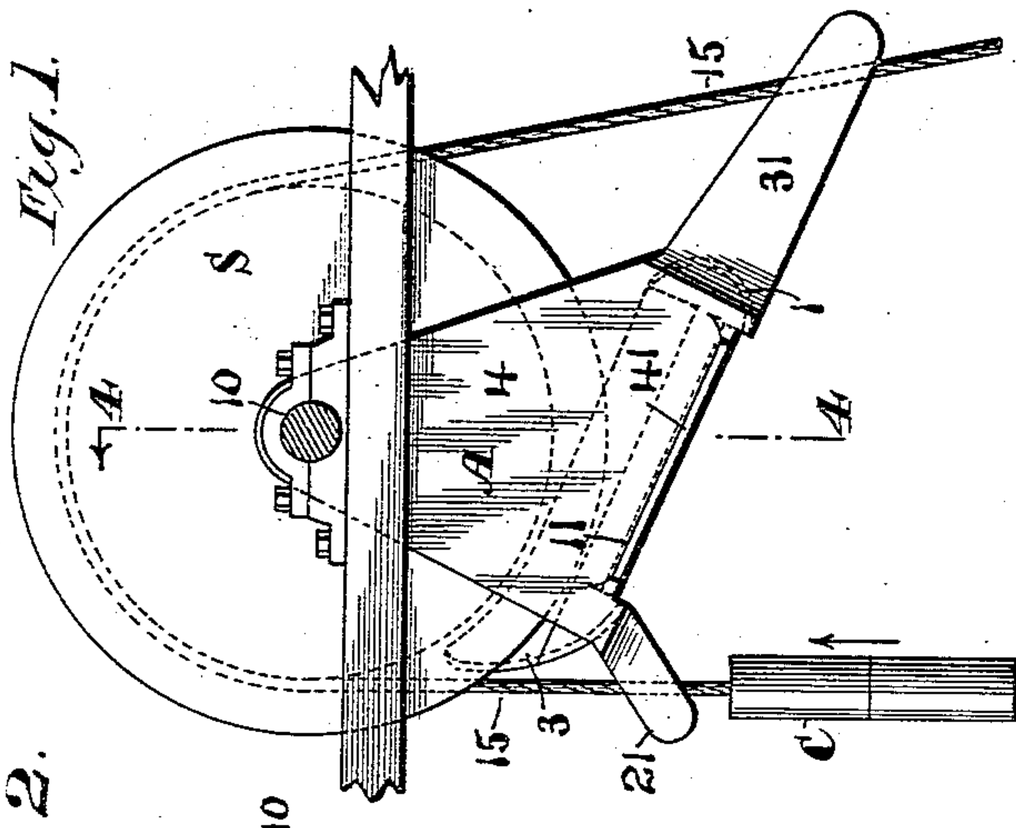


Fig. 2.

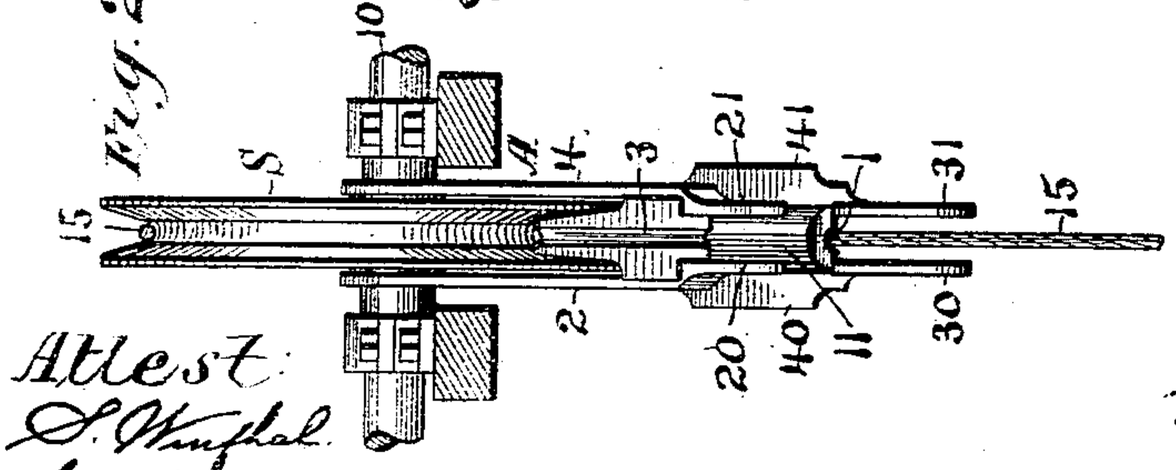


Fig. 3.

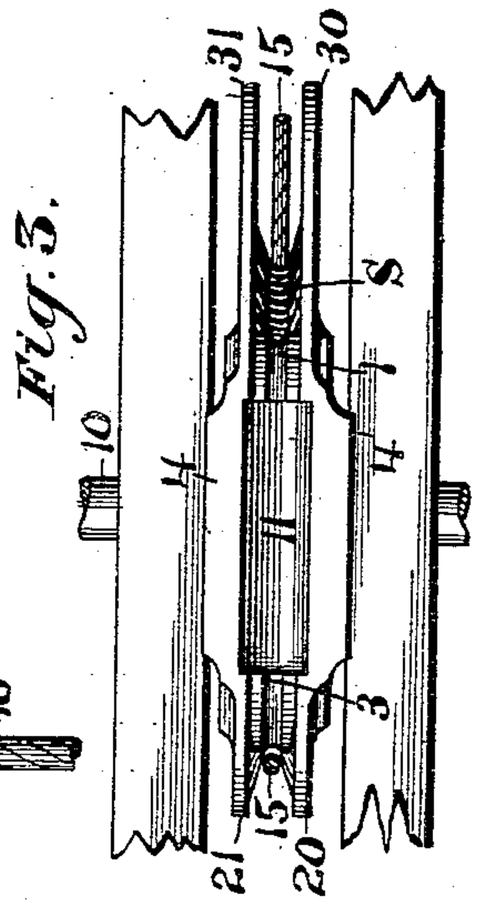


Fig. 4.

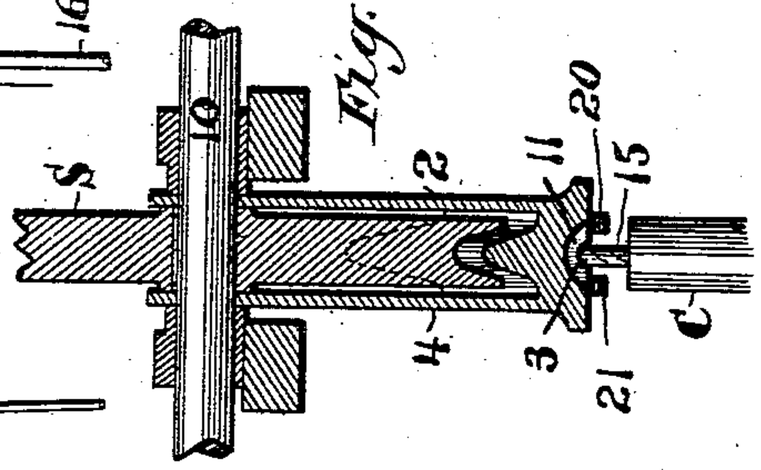


Fig. 5.

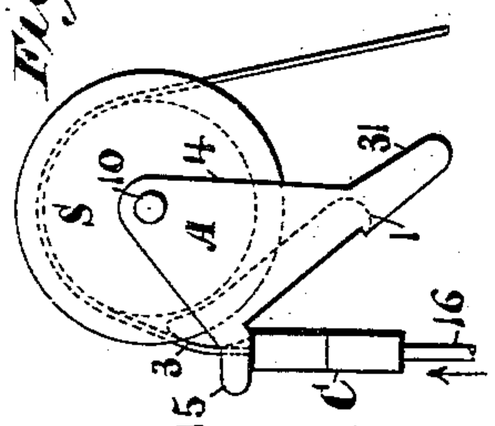


Fig. 6.

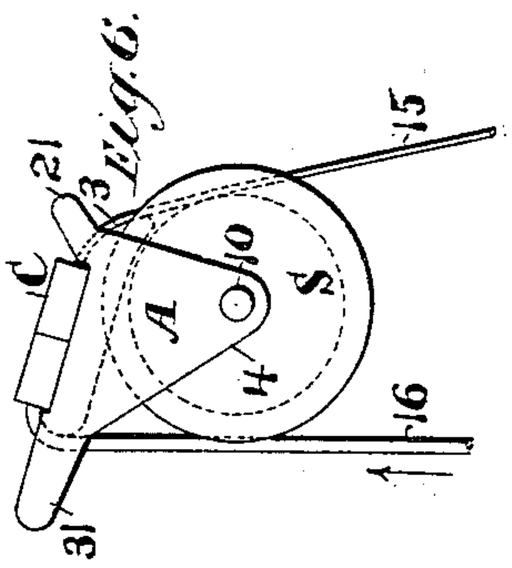


Fig. 7.

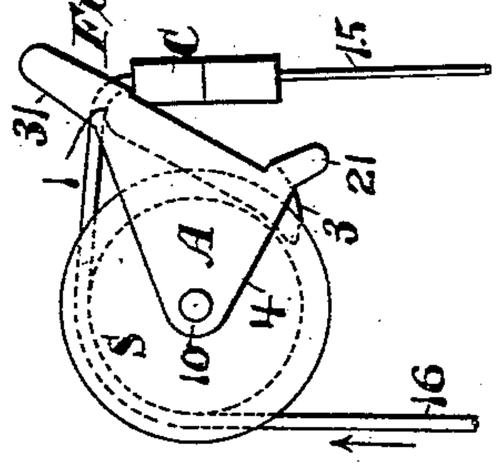
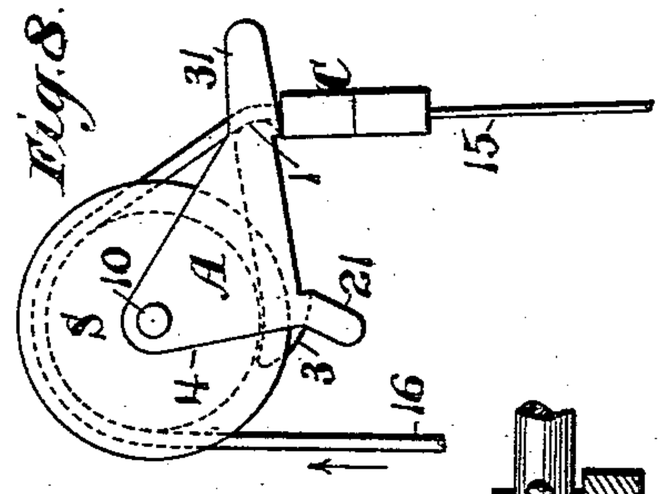


Fig. 8.



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UNITED STATES PATENT OFFICE.

KARL G. ROEBLING, JR., OF TRENTON, NEW JERSEY.

SHEAVE ATTACHMENT FOR OIL-WELL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 555,126, dated February 25, 1896.

Application filed January 8, 1896. Serial No. 574,674. (No model.)

To all whom it may concern:

Be it known that I, KARL G. ROEBLING, Jr., a citizen of the United States, residing at Trenton, county of Mercer, and State of New Jersey, have invented certain new and useful Improvements in Sheave Attachments for Oil-Well Apparatus, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to a novel sheave mechanism, more particularly designed for use in connection with deep wells, but capable of other uses where a compound rope is used, as one made of two sections of different sizes, and it may be of qualities, as wire and fibrous, which require to be provided with coupling attachments, the object being not only to enable the rope of two sizes to pass smoothly over the said sheave when running free thereon, but that the coupling device shall be so transported over the sheave as not to abruptly bend the rope near the coupling, and thus tend to strain, weaken or break the same.

The invention consists in a rotative carrier automatically operated by the rope and its coupling, the construction and operation of which will be more particularly hereinafter described in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of the sheave and carrier, showing the latter in its normal position. Fig. 2 is a face view of the same. Fig. 3 is an under plan view of the same. Fig. 4 is a vertical sectional elevation of the same, taken on the section line 4 of Fig. 1 as seen looking in the direction of the arrow. Figs. 5, 6, 7 and 8 are side elevations of the same drawn in reduced scale and showing the carrier in various positions of its operation.

In operating tools of deep wells, especially in oil-wells, it is desirable that the main part of the tool-carrying rope shall, for economic and other reasons, be a small metal rope, and it is essential that the lower section of the tool-sustaining rope shall be of a flexible character, as one made of hemp of similar fiber, and necessarily of larger dimensions in consequence of providing one of sufficient strength.

As the two ropes, metallic and fibrous, vary in size, being, at least, as one is to two, and form a continuous whole, they require to be secured together by a coupling, which must be so much larger than the hempen rope as will provide a socket within it of a size that will not only receive the large rope, but provide for the means of fastening it therein, so that it may be securely attached to the smaller or wire rope, said socket or coupling therefore being of considerable dimensions not only diametrically but lengthwise.

By the use of an ordinary sheave, even though its periphery is double grooved to suit the gage of the two ropes and the larger groove is of dimensions equal to the transport of the socket or coupling, the short bend which would be imparted to the wire rope 15, where it joins the socket or coupling, would, as the coupling rested upon the sheave, necessarily be at such an angle as to impart a short bend to that rope and weaken it, if not cause its fracture or complete severance, while the like bend given the fibrous rope 16 would greatly strain it. To avoid this I provide the sheave S with a rotative carrier A, preferably so constructed as to gravitate into a normal position, as shown in Fig. 1, which adapts it to be contacted with by the coupling or socket C, so that the same will, when moved upward, engage the carrier and propel it in a rotative circuit, which will cause it to transport said coupling over the sheave without unduly bending the ropes in the manner illustrated in Figs. 5 to 8, inclusive. This carrier A consists, in the structure shown, of two side plates 2 4, by which it is pivotally hung on the shaft 10 of the sheave, and free to rotate thereon, which plates have their outer ends joined together by a cross-plate that provides, about centrally, a straight seat 11, adapted to receive the socket or coupling C, in which it may snugly rest and be supported while being transported over the sheave. The leading end wall of this seat 11 is a solid mass extended forward and inwardly to such an extent as to provide a rest 3, curved in an arc adapted to support the wire rope 15 in an unstrained position when it bears it, which rest 3 is preferably provided with a central groove for the reception of the wire rope. On each side of this wire-rope rest 3 said side plates have outward continuations forming angular

arms 20 21, which constitute rope-guides and act as bearers in the operation of actuating the carrier. The opposite or rearward end wall of this seat is a similar solid mass extended rearward and curved inward to provide a curved rest 1 for the flexible or fibrous rope 16, which rest may be grooved, if desired. On each side of this flexible-rope rest 1 said side plates have outward continuations forming angular arms 30 31, which form rope-guides and constitute bearers in the operation of actuating the carrier. These arms 20 21 and 30 31, respectively, project across the path of travel of the rope and receive the rope between them, operating not only as guides keeping the rope in proper position relative to them, but act as bearers that are engaged by the socket C in its actuating movement of causing the carrier to make its rotation. The operation of this carrier A is illustrated in four stages of its rotative movement in Figs. 5 to 8. As shown, the rope and the socket 10, joining the two ropes, are supposed to be moving in the direction indicated by the arrows. Normally the carrier A rests by gravity in the position shown in Fig. 1, when the smaller or wire rope 15, which has been running freely between the guide-arms or bearers, raises the leading end of the coupling C to a point where it contacts with the guide-arms or bearers 20 21. Its movement thereafter progressively causes it to lap onto the curved rest 3 and swings the carrier upwardly until it has raised the same to the position shown in Fig. 5, whereupon the coupling and seat 11 in the carrier move concertedly and the coupling is progressively laid into the socket until it rests in the same as a bed or support, and thereafter, upon further movement, as in Fig. 6, the larger or flexible rope 16 will lap onto the rest 1 of the carrier, so that the relative positions of the carrier, coupling, and the ropes it connects (shown in Fig. 6) will be attained, neither rope being in a strained condition, and thereafter, as the movement progresses, the wire rope will bear away from its rest 1 and the coupling will swing away from the carrier, as in Fig. 7, the wire rope will be carried out of the embrace of the arms 20 21, and the hempen rope embraced by the arms 30 31, resting upon the curved rest 1, will leave the same, and, finally, at a later stage, (shown in Fig. 1,) the coupling will have, in descending, moved away from the carrier, and finally the carrier will return to its normal position. (Shown in Fig. 1.)

When the compound rope is traveling in the opposite direction precisely the reverse movements will take place, though the opposite end of the coupling will then first engage the arms 30 31 and cause the carrier to perform one revolution in the opposite direction, the reverse of the movements first described taking place, and the preservation of the rope from undue strain being accomplished in precisely the same manner, though in reverse order, as the movement first described.

The carrier A is provided with side flanges 40 41 along the edges of the seat 11 for the purpose of strength, but this is not essential. The seat 11 is preferably a continuous and curved seat, neither of which is essential. The sheave S is grooved to suit or seat both ropes, but this is only a desirable expedient.

What is claimed is—

1. The combination with a sheave, of a rotative carrier for the transport of a rope-coupling over said sheave, and, means whereby the moving coupling actuates said carrier, substantially as described.

2. The combination with a sheave, of a rotative carrier for the transport of a rope-coupling over said sheave, which carrier is provided with a seat for the coupling and a curved rest for the wire rope, substantially as described.

3. The combination with a sheave, of a rotative carrier for the transport of a rope-coupling over said sheave, which carrier is provided with a seat for the coupling, a curved rest for the wire rope and bearers for engagement by the coupling, substantially as described.

4. The combination with a sheave, of a rotative carrier for the transport of a rope-coupling over said sheave, which carrier is provided with a seat for the coupling, a curved rest for the wire rope and a curved rest for the flexible rope, substantially as described.

5. The combination with a sheave, of a rotative carrier for the transport of a rope-coupling over said sheave, which carrier is provided with a seat for the coupling, a curved rest for the wire rope, a curved rest for the flexible rope and bearers for engagement by the coupling, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

KARL G. ROEBLING, JR.

Witnesses:
B. C. MORRIS,
E. W. TAYLOR.