J. W. NORCROSS.
Tackle-Block.

No. 212,566. Patented Feb. 25, 1879.

Fig. 1.

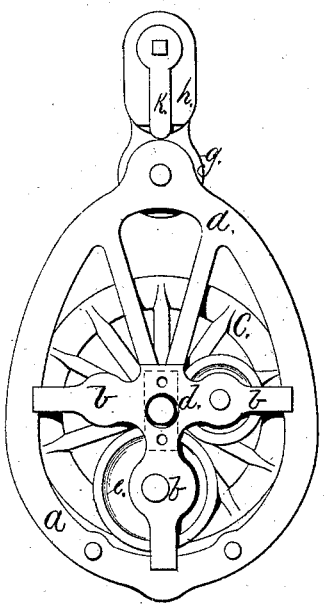


Fig. 2.

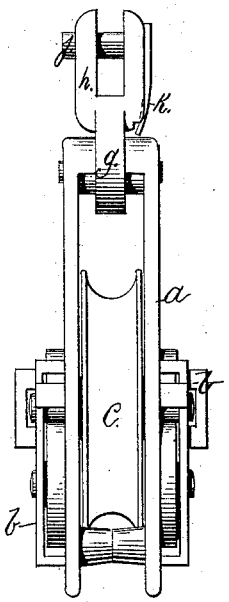


Fig. 3.

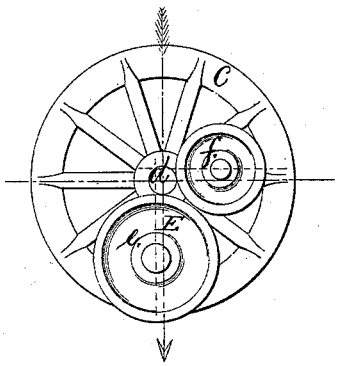
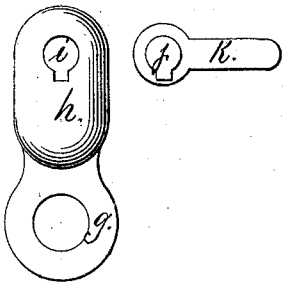


Fig 4.



WITNESSES:

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UNITED STATES PATENT OFFICE

JOSEPH W. NORCROSS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN TACKLE-BLOCKS.

Specification forming part of Letters Patent No. **212,566**, dated February 25, 1879; application filed May 27, 1878.

To all whom it may concern:

Be it known that I, JOSEPH W. NORCROSS, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Tackle-Blocks; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side view of my improved tackle-block. Fig. 2 is an end view of the same. Fig. 3 shows the relative positions of the sheave with its axle, the disk on which the axle rests, and the guide-disk. Fig. 4 is a view of the shackle and the locking-pin.

This invention has reference to improvements in power tackle-blocks, in which great strain is exerted on the axle of the sheave.

The object of this invention is to relieve the axle from such strain and reduce the friction in its bearings.

The invention consists in resting the sheave-axle on a large disk, so that the bearing of the axle shall be at a point but little below the top of said disk, and, as the disk is many times the diameter of the axle, to give a slow motion to the disk and its axle, and thus reduce the friction, all of which will be more fully set forth hereinafter, and pointed out in the claims.

In the drawings, *a* is a cast-metal block-frame, provided with side frames *b*, in which the anti-friction disks are secured. The sides of the block-frame, with the side frame for the anti-friction bearings, are cast in one piece, thus adding strength and stiffness to the frame.

C is the sheave of the pulley-block, and *d* the axle of the same. The axle rests on the disk *e*, and rolls on the periphery of the disk. *f* is a guide-disk.

The difference between this anti-friction device and the usual roller-bearing consists in the arrangement of the disks. On examination of Fig. 3, it will be observed that the axle *d* of the sheave rests on the disk *e* at a point near the top of said disk, but not quite at the top. The perpendicular line of the center of the axis *d* is on one side of the center of the axis of the disk *e*, and is maintained at this point by the disk *f*. The strain is therefore in the direction of the arrow, and entirely on the disk *e*. As the factors of friction are regardless of surface and depend on the pressure and speed, it is obvious that by reducing the speed of the bearing on which the weight moves friction is reduced, and that the friction on the axle of the disk *e* is much less than it would be on the axle of the sheave, as the diameter of the disk *e* is greater than the diameter of the axle *d*.

In a roller-bearing as heretofore constructed the speed is not thus diminished; but the frictional resistance of the axle is changed to the rolling resistance of the rolls.

The construction of my anti-friction device is simpler, cheaper, and stronger, and the compound leverage produced first by the difference in the diameter between the sheave and its axle and the diameter of the disk *e* and its axle reduces the frictional resistance on the axle of the disk *e* to the lowest possible fraction.

The frame *b* being cast in one piece with the side frame *a*, while increasing the strength, decreases the cost of the block and facilitates its construction, as all the axle-bearings are drilled at one time through all the frames, and the frame *b* cannot settle out of true under strain, as is the case when the same is secured by bolts or rivets.

To secure this block firmly to a chain-link or other suitable link or fastening, so that it cannot slip, get loose, or open, as is frequently the case with pulley-blocks of the old construction when subjected to severe strain. I use the locking-shackle shown in Fig. 4, consisting of the eye *g*, by which it is secured to the block-frame, the forked piece *h*, provided with the slotted holes *i*, and the removable pin *j*, provided with a projection fitting the slot in the holes *i*, and also with a spring-arm, K, by which it is turned, so that the projection on the pin *j* locks the bolt and prevents the withdrawing of the bolt. To prevent the bolt from turning, the spring-arm K is made to

enter a slot or other device, by which it is retained. The shackle is firmly locked and the block secured, so as to withstand the severest strains. It can be readily locked and unlocked, but cannot unlock itself.

The ends of the shaft *d* of the sheave are prevented from lateral play by means of stirrups secured to the side frames, as shown in Fig. 2, and indicated on Fig. 1.

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

1. The combination, with the sheave-axle *d* and disks *e* and *f*, of the frame *b*, cast in one piece with the side frame *a*, the whole being arranged to operate substantially as and for the purpose described.

2. The combination, with the block, of the lock-shackle, consisting of the eye *g*, the slot A, hole *i*, and locking-bolt, provided with the spring-arm and groove, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH W. NORCROSS.

Witnesses:
JOSEPH A. MILLER,
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