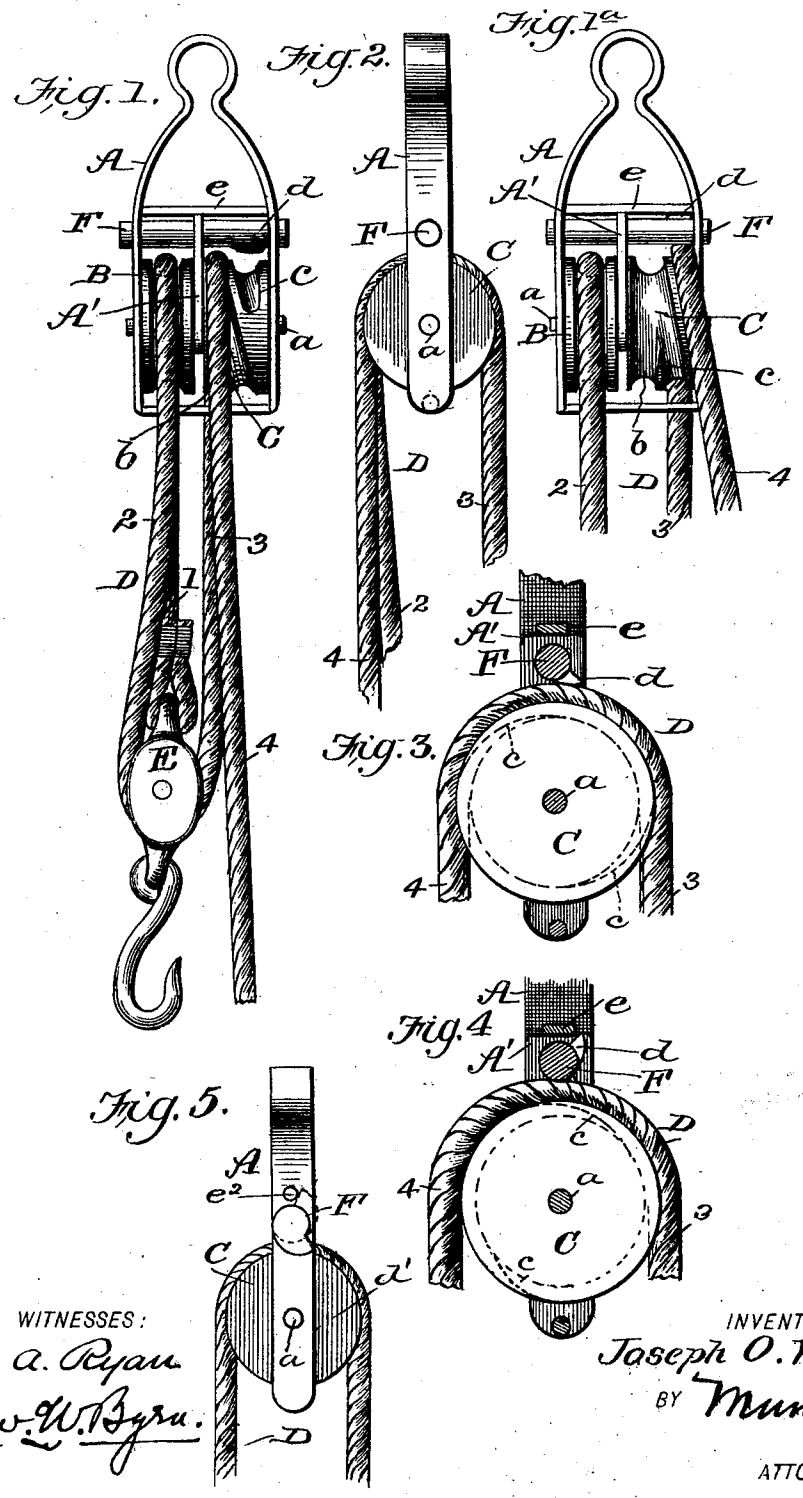
No. 668,594. Patented Feb. 19, 1901.

J. O. WALTON.

SELF LOCKING PULLEY BLOCK.

(Application filed Oct. 29, 1900.)

(No Model.)



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JOSEPH O. WALTON, OF TITUSVILLE, FLORIDA.

SELF-LOCKING PULLEY-BLOCK.

SPECIFICATION forming part of Letters Patent No. 668,594, dated February 19, 1901.

Application filed October 29, 1900. Serial No. 34,780. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH O. WALTON, of Titusville, in the county of Brevard and State of Florida, have invented a new and useful Improvement in Self-Locking Pulley-Blocks, of which the following is a specification.

My invention relates to pulley-blocks of that form in which the sheave or pulley is formed with a spiral and eccentric groove into which the rope may be thrown by a lateral movement to cause said rope to be caught and pinched by a cam-like action between the eccentric portion of said pulley and the block or frame for the same. Such devices are quite common and have gone into use for many domestic purposes—such as for suspending curtains or window-shades, for raising and lowering mosquito-canopies, &c.; but they have not attained any considerable application to the raising of heavy weight for reasons which will be hereinafter explained. Two kinds of these self-locking pulley-blocks have been used—one in which the binding of the rope was effected by a stationary or immovable portion of the frame and the other in which the binding of the rope is effected by squeezing it between the rotary surface of the cramping-pulley and a superposed roller by a principle of rolling friction. Both types have their advantages and both their disadvantages. Where the binding is against a stationary surface, it strips the fibers of the rope or cord and wedges it, so as to make it unsafe for heavy loads, and, furthermore, the rope when locked sticks, so that it is difficult to release it. When the binding is against a rotating surface, the rope passes between the two rotating surfaces more or less, according to the weight of the load, and the rope is by the two rolling surfaces flattened and damaged and is not positively held.

My invention is designed to secure the advantages of the rolling surface above the cramping-pulley by which the rope is freely fed into the cramping groove, and also the advantages of the stationary binding-surface for making the positive lock.

To this end my invention consists in combining with the cramping-pulley a binding-surface which rotates through the first part of the cramping action to allow the rope to be freely fed into the cramping-groove and which locks and becomes stationary at the last part of the cramping movement, so as to form a positive lock, thus securing the advantages of both forms of the device without the disadvantages of either, as will be hereinafter more fully described.

Figure 1 is a front view of the pulley-block, showing the free-running position. Fig. 1ª is a similar view showing the locked position. Fig. 2 is a side view of the same. Fig. 3 is a sectional view showing the beginning of the cramping action. Fig. 4 is a similar view showing the end of the cramping action terminating in a positive lock, and Fig. 5 is a detail of a modification.

In the drawings I have shown my invention applied to a double pulley-block adapted for raising heavy weight, since my invention is adapted for this purpose; but it is to be understood that I may employ only one of the pulley-wheels or sheaves—that is to say, only the cramping-pulley—around which one bight of rope passes, going from the object to be raised up to and around the cramping-pulley, and thence to the hand of the operator. I will, however, describe the double form, in which A is the main frame, B an ordinary simple-grooved pulley, and C the cramping-pulley, which latter are separated by a middle bar A'. The rope D passes from a point 1, at which it is hitched to a subjacent block E, up to and around the plain pulley B, thence at 2 down to and around the sheave of the subjacent block E, thence at 3 up to and around the cramping-pulley C, and thence at 4 to the hand of the operator.

It will be understood that the pulley B, the subjacent block E, and the sections of rope 1 and 2 are for the purpose of extending my invention to the raising of heavy weights, to which, as before stated, it is rendered applicable by my improvements.

The cramping-pulley C and plain-groove pulley B are arranged to revolve loosely upon the same axial shaft *a*, which is fixed in the side bars of the main frame. The cramping-pulley C is formed with a concentric groove *b* around its periphery, in which the rope plays when it is running free, and on the other side its circular face is wrought into one or more spiral grooves *c*, which lead out from the bottom of the groove *b*, and as said groove winds

spirally around the pulley it gets shallower, its bottom surface departing farther and farther from the axial center as it forms an eccentric cam-surface designed to give a pinching action on the rope when held on said groove, as is well known. Immediately above the two pulleys is arranged a roller F, of relatively small diameter, which is journaled in the main frame about parallel with the axis of the subjacent pulleys. This roller passes above both pulleys, as shown; but as it coacts only with the cramping-pulley it may pass only above the cramping-pulley. Said roller freely turns in its bearings in the frame and has on one side, within the housing or inclosure of the cramping-pulley, a bulge or projection *d*, whose gravity holds it in a pendent position or normally on the lower side of the roller, the latter accommodating itself to this position by the gravity of this projection. This projection is very near the end of the roller and is just above the cramped groove *c*. Immediately above the roller there is arranged on the pulley block or frame a fixed bar *e*, which forms a cross-bar of the frame and acts also as a stop against which the projection *d* strikes and by it is stopped whenever the roller has turned about a half a revolution. The construction and arrangement of this roller with a limited rotary motion is an important feature of my invention, and its action is as follows: After the load has been raised to the desired height by the travel of the rope sections 3 and 4 in the groove *b* and it is desired to lock the rope, with its load, in this position the rope section 4 is moved to the right, as seen in Fig. 1ª, and is slightly relaxed. As the cramping-pulley C turns back a little the rope feeds out of groove *b* and into the spiral cam-groove *c* and is by its face thrown against the projection on the lower surface of the superposed roller F. The latter turning with a rolling friction along with the rope allows the latter to feed freely onto the more eccentric part of the pulley until it is finally jammed between the following three surfaces—*i. e.*, the eccentric face of the pulley, the side of the main frame, and the lower side of the roller—and at the same moment the projection *d* strikes the cross-bar *e* and stops the further rotation of the roller, changing the rolling friction on the rope to a positive and stationary lock, as in Fig. 4, and yet at the same time when the rope is to be unlocked a pull on its section 4 allows the roller to instantly respond with a rolling friction, which renders the release of the rope free and easy and without damaging strains.

As a modification of my invention I may arrange the projection on the roller outside the pulley-block, as seen at *d'* in Fig. 5, and provide a stationary lug e^2 on the outside of the pulley-frame, which coacts with and stops the rotation of the roller at the moment of final cramping and binding of the rope.

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

1. A self-locking pulley-block comprising a cramping-pulley having a concentric groove with one or more spiral eccentric grooves leading from the same to one side, and a cramping-surface opposite said eccentric groove said surface having an initial rotary movement and a locking-stop adapted to render the rotary clamping-surface rigid at the locking-point substantially as described.

2. A self-locking pulley-block comprising a cramping-pulley having a concentric groove with one or more spiral eccentric grooves leading from the same to one side, and a roller having a projection on the same arranged above the eccentric groove, and a stop-bar arranged above the roller and adapted to be struck by the projection on the roller substantially as and for the purpose described.

3. A self-locking pulley-block, comprising a main frame, a single axis, a plain concentric grooved pulley on said axis, and also beside it an independently-rotating cramping-pulley having both a concentric groove and an eccentric cramping-face substantially as and for the purpose described.

4. A self-locking pulley-block comprising a main frame, a single axial shaft, a plain-grooved pulley arranged on one end of said shaft, and a cramping-pulley arranged on the other end of said shaft, and a roller arranged above the cramping-pulley and having a stop device for a limited rotary action substantially as and for the purpose described.

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Witnesses:
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