2 Sheets—Sheet 1.

J. R. WESTON.

Safety Pulley-Block.

No. 210,281. Patented Nov. 26, 1878.

Fig. 2

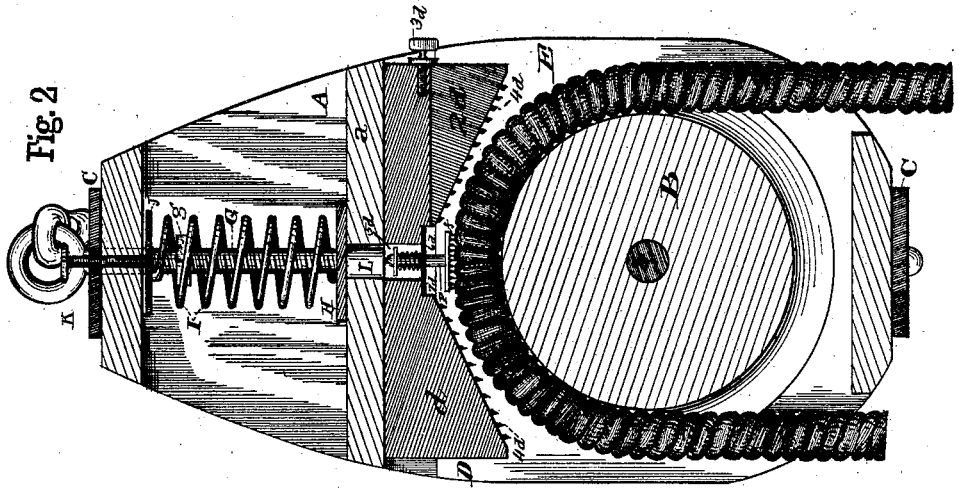
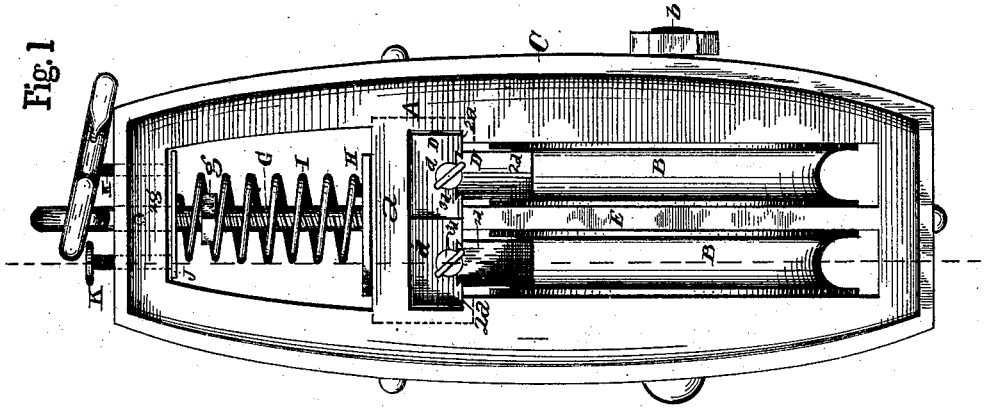


Fig. 1



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John W. Strehli.

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2 Sheets—Sheet 2.

J. R. WESTON.

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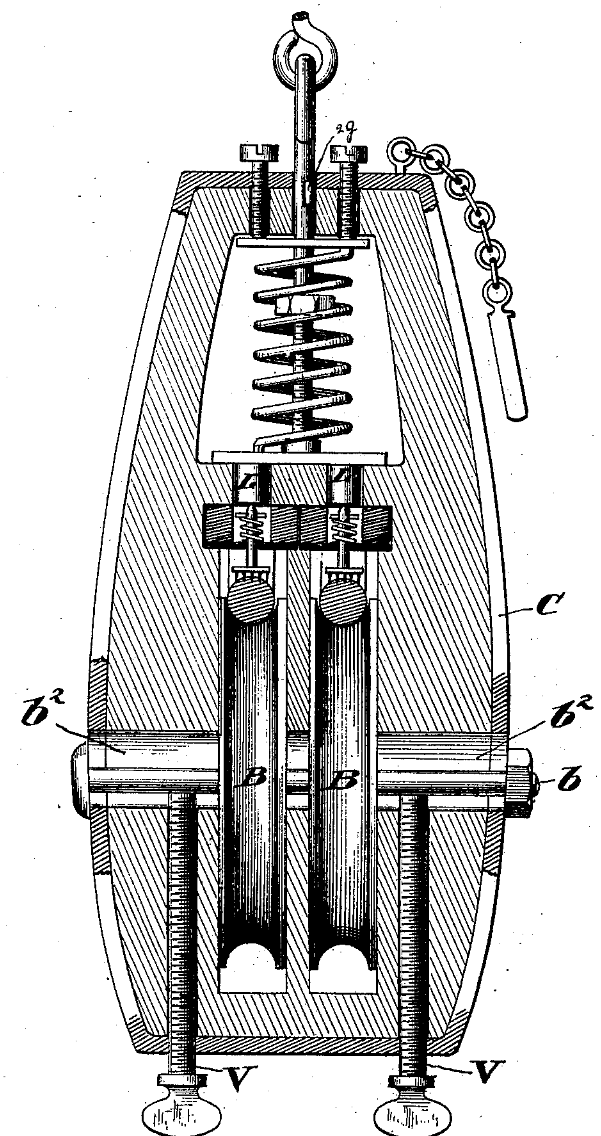

Fig3

Attest.

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UNITED STATES PATENT OFFICE.

JOSEPH R. WESTON, OF CINCINNATI, OHIO.

IMPROVEMENT IN SAFETY PULLEY-BLOCKS.

Specification forming part of Letters Patent No. **210,281**, dated November 26, 1878; application filed September 16, 1878.

To all whom it may concern:

Be it known that I, JOSEPH R. WESTON, of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Automatic Safety Pulley-Blocks, of which the following is a specification:

The object of my invention is to provide a pulley which will automatically hold the rope which passes over it when the weight on the rope is removed therefrom.

The advantages of such a pulley are obvious. When used by painters in connection with their scaffolds it will prevent the scaffold from falling when the rope breaks, an event of too frequent occurrence. Its use in various places on shipboard, in derricks, elevators, steeple-climbing apparatus, will prevent many deplorable accidents.

My invention consists, in general, in a device which, when the weight is removed from the pulley, will jam the rope between the pulley-wheel and some part of the block.

In particular, my invention consists, first, in a sliding wedge for holding the rope when the weight is removed therefrom; secondly, in a novel device for operating the said sliding wedge; thirdly, in a means for retracting the device which operates the sliding wedge; fourthly, in a device for regulating the amount of weight to be placed on the rope in order to allow the pulley-wheels to work freely; and, fifthly, in certain means for enabling the use of various-sized ropes, or for compensating for the wear of the rope already provided, and thus furnishing an automatic pulley under all circumstances that might arise.

In the accompanying drawing, forming part of this specification, Figure 1 represents a front elevation of a pulley-block embodying my improvements, the parts thereof being in the position they assume when no weight is attached to the pulley. Fig. 2 is a sectional elevation of the device shown in Fig. 1, the section being taken at the line X X, a rope being also shown in position. Fig. 3 is an axial section of the pulley-block, or one taken at right angles to the one shown in Fig. 2.

A is a pulley-block, provided with a cross-piece, *a*. The wheels B B rotate in this block on the shaft *b*, which latter passes through the block and the strap C. This strap C is preferably of metal.

The sliding wedge D consists of two portions, *d* 2*d*, the latter being dovetailed into the former, as shown in Fig. 1, and held there by the clamping-screw 3*d*.

The piece 2*d* and the corresponding opposite portion of piece *d* are narrower than the upper portion of the wedge D, so that a projection is formed on each side of the wedge, which rests on shoulders 2*a* of the block A, or on the top of web E of the block.

The lower edge of the wedge D is made in the shape shown in Fig. 2, so that if it slides in either direction it can jam between the rope and the cross-piece *a*. The bottom side of this wedge is provided with teeth 4*a*, which point on each side from the median line of the block, as shown in Fig. 2.

The wedge D is perforated with a hole, 5*d*, and on its under surface is a recess, 6*d*. In the bottom of this recess is placed a plate, 7*d*. Passing through a hole in the plate 7 *d* is a stem, F, to the lower end of which is attached a plate provided with sharp slender teeth *f*. A small collar projects from the upper part of the stem F, and encircling stem F between this collar and the plate 7*d* is a spring, which tends to elevate the stem F and its appendages. The upper end of stem F is preferably rounded off, as shown.

The stem G, to which is attached the hook or other device for holding up the pulley, passes loosely through the strap C, upper part of block A, and is firmly attached to the plate H.

The stem G is provided with a screw-thread, on which works the nut *g*. Through the upper portion of the stem G a hole, 2*g*, passes. (Shown in dotted lines in Fig. 1.) A spring, I, surrounds the stem G, and is secured at its lower end to plate H, and at its upper end to the plate J. The stem G passes loosely through the latter. Two set-screws, K, work in the top of block A against plate J, which they separate from the top of block A to any desired extent.

From each side of plate H a pin, L, extends downwardly through the cross-piece *a*, and is

equal in length to the thickness of cross-piece *a*. These pins L are so placed that the stems F pass immediately under them.

Instead of spiral springs in the places mentioned, any other style of spring may be used and still fall within the scope of my invention.

My device operates as follows: When the pulley-block is hung up and weight put upon it by means of the rope the block A is depressed, sliding over stem G and compressing spring I. The cross-piece *a* slips away from the pin L, and the stem F enters the hole in cross-piece *a* left open thereby. The pulley-block now operates as any ordinary one. Now, suppose the rope to break. The weight is removed from the pulley; the spring I raises the block A; the pin L forces the stem F downward; the teeth *f* are forced by this downward motion into the rope, which carries the stem F, and with it the whole of wedge D, toward the edge of the pulley. This brings the teeth 4*d* against the rope. The teeth 4*d* sink into the rope, and the latter carries the wedge D forward, forcing it between itself and the piece *a* until the motion ceases. The form of the wedge D enables it to operate in whichever direction the rope may be running.

The above operation will be secured only in case the distances between the ropes and the lowest possible position of the under surface of the pins L do not exceed the entire length of stems F and teeth; but it is obvious that this distance would not continue uniform in case the rope became shrunken by wear and extended by tensile strain. Neither would the distance continue uniform in case various-sized ropes were employed. Hence, in order to enable the operator to at any time correct or adjust the distance between the under surface of pins L and the rope upon the sheaves B, I provide slots b^2 in the block, to permit the travel of the journal *b* toward and from the pins L, and provide set-screws V to engage with the strap C and press against the journal to force it, when operated, in the direction of the pins L.

It is obvious that the journal may be provided with boxes to receive the pressure of the screws.

It will readily be seen that the above arrangement provides the necessary means for regulating the distance between pins L and the ropes, so that various-sized ropes may be used.

The greatest depth of the wedge is preferably greater than the distance between the bottom of cross-piece *a* and the top of wheel B, so that it can never pull through. On account of this construction it is necessary to make one end of it in sections, as shown, so that it may be inserted into the block; also, the rope is more easily put over the wheel when the piece 2*d* is removed.

The spring I is preferably made quite stiff, so that it will not fail to quickly elevate the pulley and slack rope. When desired it may be stiffened by screwing down the set-screws K.

It is sometimes desirable to use the pulley-block when there is but a slight weight upon it. In this case the stem G is pulled through the block, and a pin put through the hole 2*g*. The ends of this pin will rest on the top of strap C, and prevent the spring I extending itself; hence the teeth *f* will remain elevated above the rope. The nut *g* is placed at such a point on the stem G that the plate J will rest thereon when the block A has lowered sufficiently, and thereby relieve the pressure on the spring I.

It may be here remarked that any certain number of wheels in the block is not essential to my invention; but the greater the number of wheels the greater will be the safety.

My device is applicable to one or more pulley-wheels.

It may further be here remarked that it is not essential to my invention that the block A or its parts be made of wood. It may be made of one material, or of two or more kinds of material, as it may be found necessary in order to produce the best results. For example, I preferably make the cross-piece *a* and the parts of the block surrounding the wedges of a single piece of iron, as shown by dotted lines in the drawing.

It may be here further remarked that, when desired, the thread on stem G may be dispensed with, and a collar, solidly affixed to the stem G, take the place of nut *g*. As soon as the rope is repaired, and the weight again added to the pulley-block, the spring I will be compressed, and the stem G and pin L will be retracted. The wedge is then moved back to the position shown in Fig. 2, when the stem F will be forced by its spring into the hole vacated by pin L, and the teeth *f* will be retracted from the rope. The pulley will now again operate as any ordinary pulley until the rope again breaks, when it will catch and stop the rope, as aforementioned.

It will be apparent that as the invention consists in operating the clamping device by appliances thrown into action on the breaking of the rope or removal of the weight, other forms and arrangements of appliances and devices than those shown may be used without departing from the main features of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a safety pulley-block, the combination of a rope, wheel, and sliding wedge.

2. A pulley-block provided with a wheel, a clamp for securing the rope, and appliances, substantially as described, whereby the clamp is brought toward the wheel when the weight is removed, substantially as set forth.

3. The combination, with a pulley-block, of a double wedge, as D, having teeth on its under surface, substantially as and for the purposes set forth.

4. The combination, with a pulley-block, of a wedge, D, consisting of portions *d* and 2*d*, substantially as and for the purpose set forth.

5. In a pulley-block, the combination of

wedge D, stem F, having teeth *f* and a retracting device, stem G, spring I, and plate H, substantially as and for the purposes specified.

6. In a pulley-block, the combination of set-screws K, plate J, and spring I, substantially as specified.

7. The combination of stem G, nut *g*, spring I, and plate J, substantially as and for the purposes specified.

8. In a pulley-block, a device, consisting of a double wedge, for stopping the pulley-cord in either direction it may run when the latter breaks.

9. In an automatic safety-pulley, having abrading surfaces to bear against the rope when broken, the adjustable sheave-journal secured in slot f^2, and supported by set-screws V, substantially as and for the purpose specified.

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Attest:

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