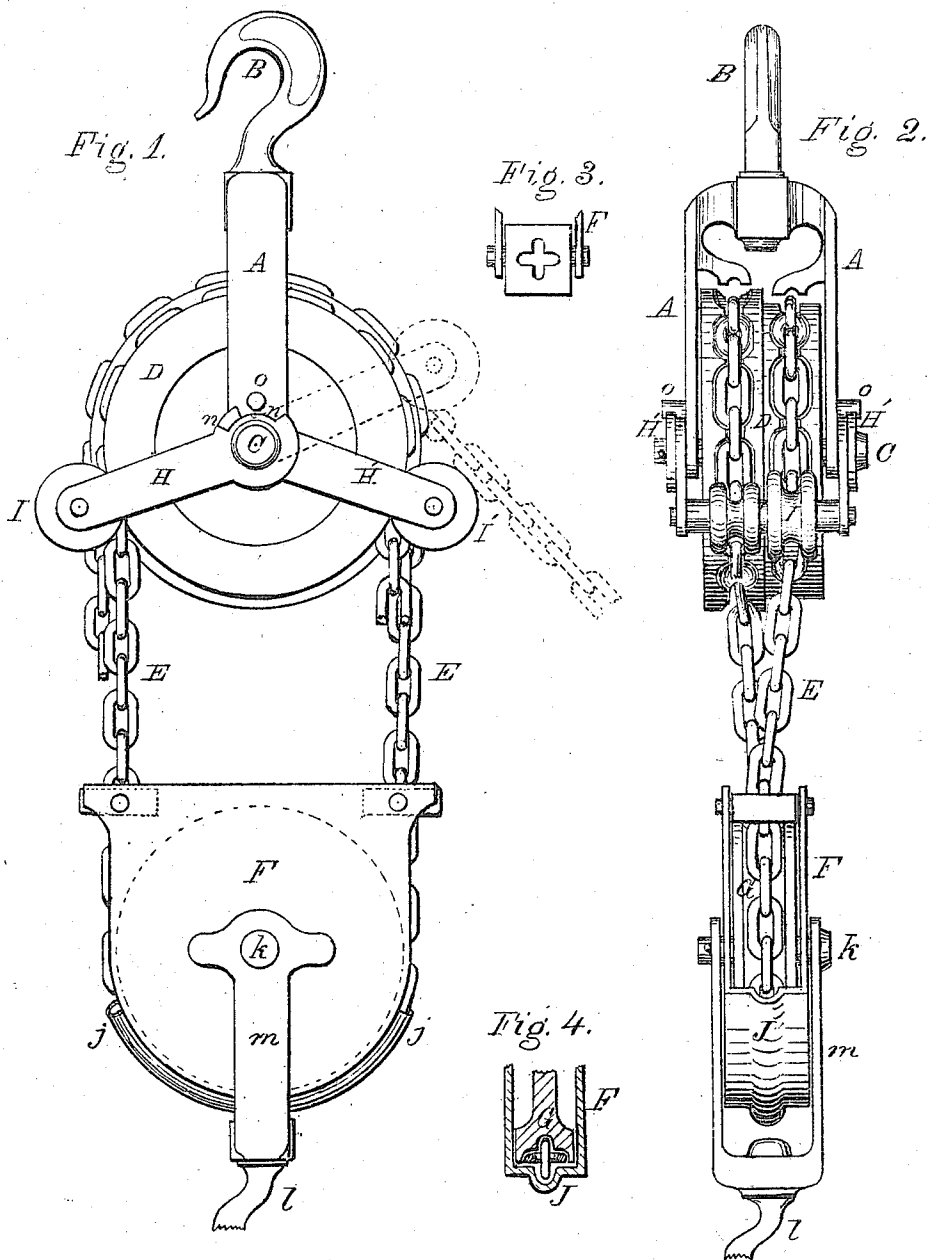


T. A. WESTON.
Differential Pulleys.

No. 134,337.

Patented Dec. 24, 1872.



Witnesses:

J. Traser
Charles M. Higgins

Inventor:

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UNITED STATES PATENT OFFICE.

THOMAS A. WESTON, OF RIDGEWOOD, NEW JERSEY.

IMPROVEMENT IN DIFFERENTIAL PULLEYS.

Specification forming part of Letters Patent No. 134,337, dated December 21, 1872.

To all whom it may concern:

Be it known that I, THOMAS A. WESTON, engineer, of Ridgewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Differential-Pulley Blocks, of which the following is a full specification:

My invention is an improvement upon the differential-pulley block for which Letters Patent were granted to me August 6, 1867; and has for its object to retain the chain in its appropriate position within the grooved faces of the upper and lower sheaves more effectively than by the means known or used prior to my invention, and to diminish friction and save power when the operator is placed at a distance horizontally from the pulley; and it consists, first, in providing the upper block with radial vibrating or oscillating arms pivoted upon the ends of the central shaft which sustains the differential sheave, the said arms carrying at their outward or vibratory ends a small grooved pulley or pulleys, (or equivalent fixed segments or keepers,) which confine the chain to the grooves of the differential sheave, at the same time, by the vibratory motion of the arms, permitting the hoisting-chain to be led off from the sheave at various angles without deflecting it, as is the case when the guide pulleys and arms are affixed to the pulley-block frame or yoke; second, in providing the lower block with a keeper or guide affixed to the frame side or yoke, vertically under the sheave, in the same relative position to the hook and yoke as that of the keepers of the upper pulley in my aforesaid patent, and in extending the grooved face of the said keeper around the lower side of the pulley, forming a concave sheath or pocket for retaining the chain in contact with the grooved face of the pulley, and for other purposes, as hereinafter set forth; third, in making the casing of the lower block capable of partial rotation on the axle of the pulley, independent of the hook and yoke, so that the latter may swing freely upon the axle in attaching to a load without disturbing the normal position of the said casing or frame and the sheave within it.

In the drawing, Figure 1 is a side elevation of my improved differential-pulley block and suspended lower block, the unoccupied loop

of the chain-band being broken away; Fig. 2 is an edge view of the same; Fig. 3 is a detached plan view of one of the chain-guides of the lower block; and Fig. 4 is a fragmentary vertical section of the guide or keeper of the lower block, the chain, and a portion of the pulley.

Similar letters of reference indicate corresponding parts.

The differential pulley-block thus represented is essentially the same as that described in my aforesaid patent, consisting of the frame A with its connected hook B, said frame carrying the axle C of the differential sheave D, the latter having two grooves adapted to receive the link-chain E, said chain being endless and coiled around each diameter of the sheave, and hanging in two depending loops therefrom, in one of which the lower block F is suspended, the latter having a single sheave, G, with a grooved face adapted to receive the chain E. Upon the opposite ends of the axle of the differential pulley D I attach two pairs of radial arms, H H' H' H', each pair embracing the pulley and carrying, at their outer ends, grooved guides or keepers I I', which, preferably, consist of a pulley or pulleys of different diameters, conforming to the faces of the differential sheave, said keepers being situated on opposite sides of the differential pulley. These arms have a free vibratory or oscillating motion upon the said axle to the extent permitted by the segmental slots *n* and fixed pin *o*, enabling the keeper to assume any position upon the face of the pulley which may be required by leading the chain off at a tangential line, in the manner represented in the dotted lines in Fig. 1. The lower block is provided with a keeper or guide, J, affixed to the frame or yoke F vertically underneath the pulley, which guide may consist of metal, formed with its inner side or face grooved or concave to approximate to the general shape of the chain in cross-section, said metal being extended from the lower side of the pulley in both directions, as seen at *j j*, a sufficient distance to form an efficient guide or pocket to retain the chain in contact with the pulley, and prevent its leaving the surface thereof when slack. This guide I prefer to affix to the frame F, but it may be connected with the hook-yoke *m*, if desired, with substantially the

same effect. The casing of the lower block is so connected with the axle *k* of the pulley, being loosely hung thereon, that it is capable of partial rotation, independent of the hook *l* and yoke *m*, so that the latter may swing freely upon the axle in attaching to a load without varying the position of the casing and of the sheave within it.

The action is as follows: Upon leading off the hoisting-chain obliquely from the pulley-block, when the operator stands at a distance horizontally from the pulley, the small guide pulleys *I I'* are raised by the tension upon the chain, and the chain can, freely and without deflection, assume a tangential line from the differential sheave, avoiding the wear and friction arising from fixed guide-pulleys or keepers, or from contact with the fixed arms of the yoke, as shown in my aforesaid patent; at the same time, the radial arms *H H'*, in every position, effectively retain the guide-pulleys, chain, and differential sheave in their true relative position with each other.

The effect and purpose of the keeper *J* of the lower block are to prevent the formation of a slack loop of chain below the sheave, and to retain the chain from dropping out of the lower portion of the groove in the same.

The purpose of connecting the lower block to an independent yoke, *m*, swinging from the central shaft of the pulley, is to give greater freedom in attaching it to a load. If desired, still further freedom of motion may be obtained by interposing, as a connector between

the hook *l* and its yoke *m*, a ring or loose shackle.

I do not claim the use of grooved guide-rollers, carried upon lateral arms fixed horizontally, as they are plainly shown upon a differential-pulley block, Figs. 20, 22, and 23, Sheet No. 5, of my English patent No. 263, January 29, 1863; neither do I claim lateral guide-blocks or rigid keepers similarly placed, as they are mechanical equivalents for the rollers, being so described and represented in my United States patent No. 67,470, August 6, 1867; but

I do claim—

1. In the upper pulley-block, the radial vibratory arms *H H H' H'*, carrying rollers *I I'*, substantially as and for the purposes described.

2. In the lower pulley-block, the curved keeper *J*, affixed either to the yoke *m* or to the independent frame *F*, as shown, substantially as set forth.

3. In combination with the lower block, the frame *F*, hung loosely on the axis of the sheave, and capable of partial rotation independent thereof and of the yoke *m*, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS ALDRIDGE WESTON.

Witnesses:

J. FRASER,

CHARLES M. HIGGINS.