

(No Model.)

2 Sheets--Sheet 1.

B. HINSLEY.

Differential Pulley Hoisting Apparatus.
No. 233,246.

Patented Oct. 12, 1880.

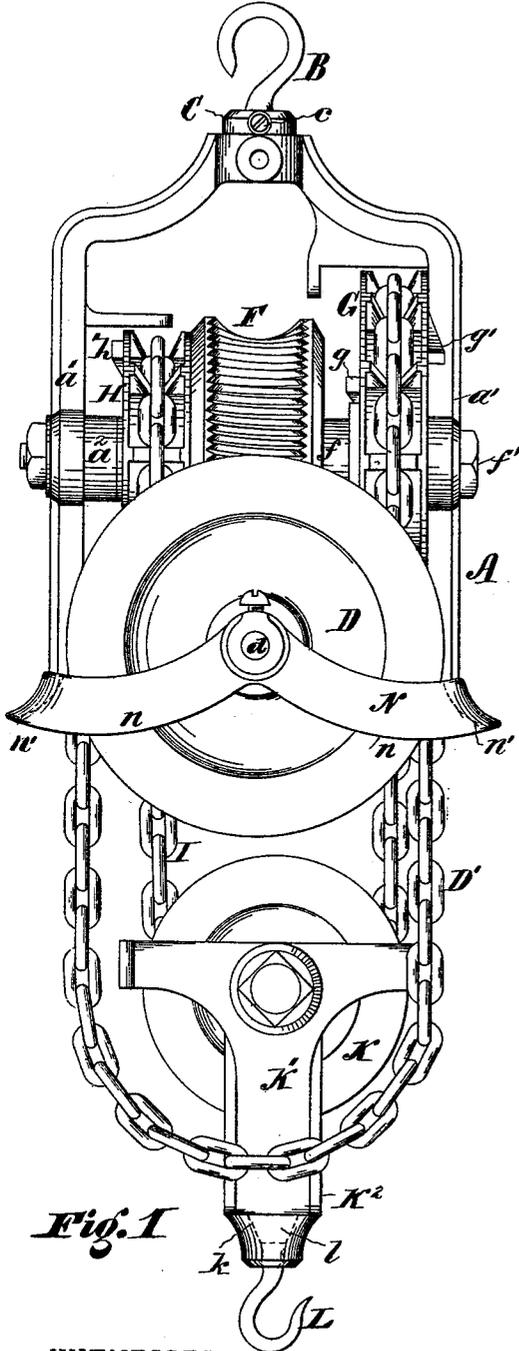


Fig. 1

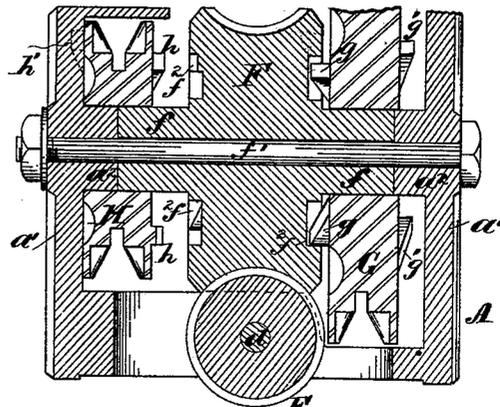


Fig. 2

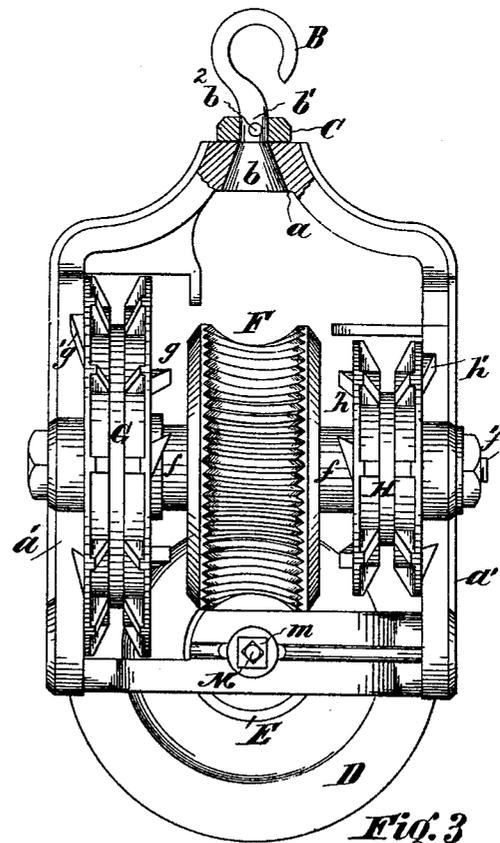


Fig. 3

WITNESSES:

S. J. Van Stavoren
Geo. R. Byington.

INVENTOR,

Benjamin Hinsley,

By Connolly Bros,
ATTORNEYS.

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B. HINSLEY. Differential Pulley Hoisting Apparatus.

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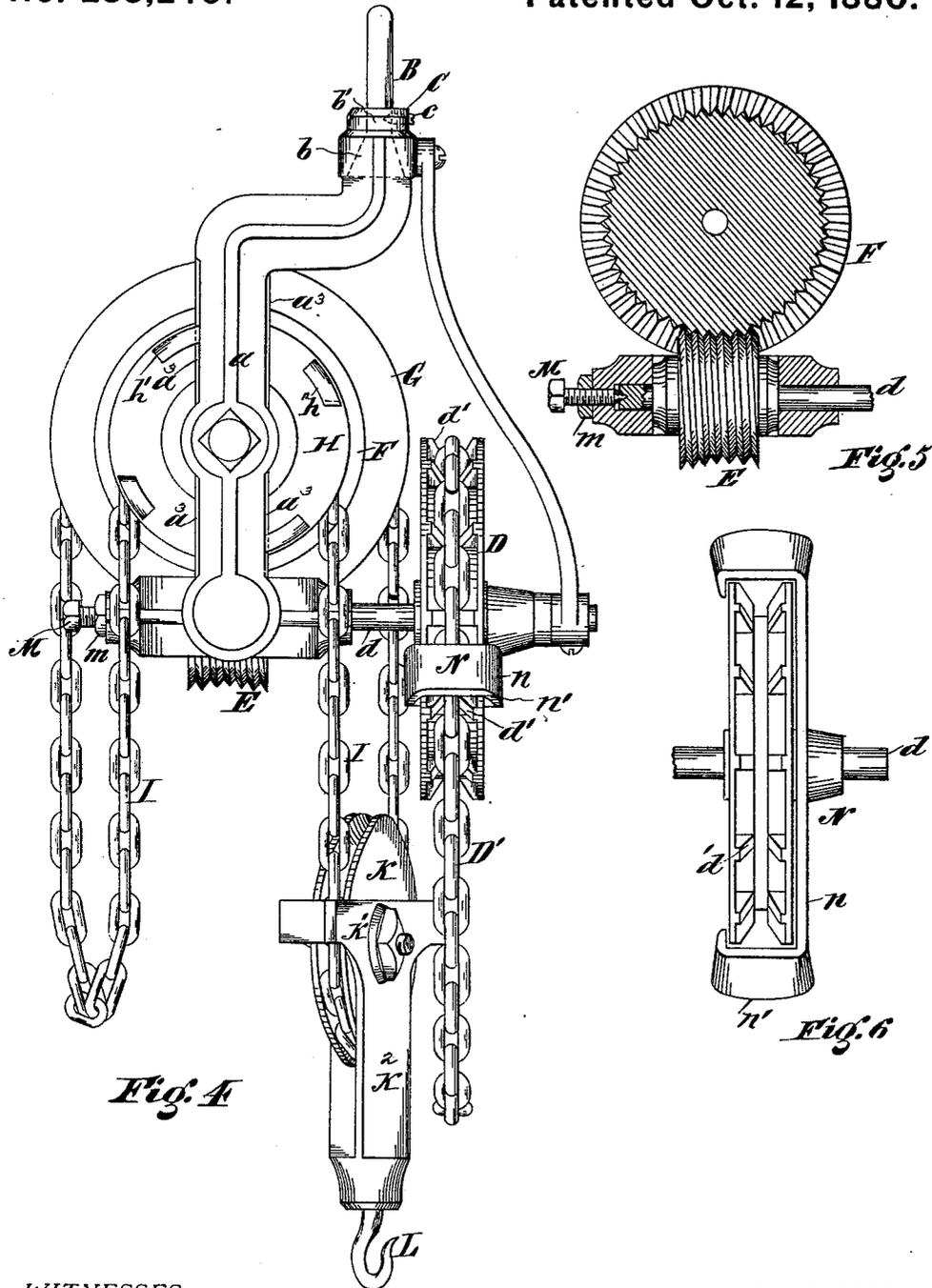


Fig. 4

Fig. 5

Fig. 6

WITNESSES:

S. J. Van Stavoren
Chas. B. Kingston

INVENTOR,

Benjamin Hinsley,
By Connolly Bros.,
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

BENJAMIN HINSLEY, OF PHILADELPHIA, PENNSYLVANIA.

DIFFERENTIAL-PULLEY HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 233,246, dated October 12, 1880.

Application filed March 1, 1880. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN HINSLEY, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Differential-Pulley Hoisting Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a front elevation of a hoist with my improvements applied thereto. Fig. 2 is a broken vertical section of the clutch-pulleys and worm and gear mechanism. Fig. 3 is a rear elevation of the hoist; Fig. 4, a side elevation of the same. Fig. 5 is a sectional view of the worm and gear-wheel with adjusting-screw for worm-shaft, and Fig. 6 is a detail plan of the driving-wheel and chain-guard.

My invention has relation to, and my improvements consist in, the peculiar construction and combination of parts hereinafter fully set forth and specifically claimed.

Referring to the accompanying drawings, which illustrate a hoist with my improvements applied, A is the frame, which is sustained upon a hook, B, which latter fits in an opening, *a*, in the former. The shank *b* of said hook is conical and the opening *a* tapered to correspond, so as to take up lost motion.

The neck *b'* is cylindrical and formed with a socket, *b''*, which receives the end of a screw, *c*, in a collar, C, which surrounds said neck, and, resting on the frame A, prevents the hook from dropping out of said frame, while permitting it to freely swivel on the latter.

D is the power wheel or pulley, having pins, notches, or teeth *d'* in its grooved periphery, over which passes a chain, D'. On the same shaft with the pulley D is a worm, E, through the medium of which motion is communicated to a wheel, F, whose periphery is grooved and toothed, as shown.

The worm E is made with a concave periphery, as shown, so as to distribute the wear evenly over all its threads, instead of upon the two or three middle threads, on which such wear usually falls.

The wheel F is formed with two hubs, *f, f'*,

and upon either side of said wheel, and upon the shaft *f'*, are loose pulleys G H, of different diameters, the pulley G being double the diameter of the pulley H.

The shaft or spindle *f'* is fast on the frame A, and the wheel F revolves thereon. Said wheel and both pulleys are provided with clutches *f'' g h*, respectively, and the pulleys are both adapted to slide into and out of clutch engagement with said wheel, sliding onto the hubs of said wheel when moved into such engagement. Either of said pulleys may be in clutch engagement, the other being out, or both may be in such engagement at the same time. Said pulleys have also clutch teeth or stops *g' h'* on their outer sides, so that when not in engagement with the wheel F they may be stopped by the sides *a' a'* of the frame A.

To obtain the greatest power the small pulley H should be clutched with the wheel F. For greater speed the large pulley G should engage with said wheel. By bringing both pulleys into clutch engagement with the wheel F the speed will be three times that resulting from having the pulley H alone clutched with said wheel. Whenever one of the pulleys is out of engagement with the wheel F such pulley will be stopped by the frame A.

The sides *a' a'* of said frame are formed with inwardly-projecting bosses *a'' a''*, onto which the pulleys slide when out of clutch with the wheel F. Said sides are also cut away or beveled, as shown at *a''' a'''*, to form inclines which will operate to draw the pulleys toward said sides when the teeth or stops *g' h'* impinge on said inclines.

The clutch-teeth are beveled, as shown, forming wedges, so that when the pulleys are caused to turn backward they will be moved out of engagement with the wheel F. As soon as the clutch-teeth clear the latter the stops on the opposite sides of the pulleys meet the sides *a' a'* of the frame A, and the inclines on the latter draw them on, reversing the motion toward said sides, as already explained. In like manner, when stopped against the sides *a' a'* of the frame A, the pulleys will, on a backward movement, be slid toward the wheel F, and then, on turning said wheel F forwardly, they will be drawn into complete clutch engagement with the latter. The movement of

the pulleys G H toward and from the wheel F is accomplished by draft on the lifting-chain I, which passes around both said pulleys, as shown, and engages with studs or pins on their grooved peripheries, the lateral throw of the chain being effected by hand—that is, by drawing or pulling the chain toward the worm-wheel or frame, as may be required.

K is the weight or idle-pulley, around which the chain I also passes, said pulley having a smooth grooved periphery unprovided with studs or pins. Said pulley is sustained in a block, K', which is independent and apart from the frame A, and is provided with an eye or strap, K², having an opening, k, in which is inserted a hook, L, for attaching the weight, the shank l of said hook being conical, like that of the hook B, and the opening k being tapered to correspond. The shaft d of the power wheel or pulley D and worm E is sustained in bearings in the lower bar of the frame A.

M is a pivot-screw, with nut m, whereby any endwise lost motion in said shaft d may be taken up.

N represents the chain-guard for pulley D, consisting of two arms, n n, which radiate from said shaft and extend around the periphery of said pulley. The arms n n are beveled on their under sides, as shown at n' n', so as to permit draft on said chain at an angle to the perpendicular. The arms n n on the inner or back side of the pulley D terminate before reaching the shaft d, thus permitting the chain I to hang between their ends and said shaft, thus allowing the pulley D to be brought close up to pulley H and rendering the tackle very compact.

It is to be understood, of course, that the operation of shifting the pulleys toward and from the worm-wheel by means of the chain is

performed when no weight is suspended; but the pulleys having been moved while the chain is slack the weight afterward aids in retaining them in place.

What I claim as my invention is—

1. In a hoisting machine or tackle, and in combination with the wheel or pinion F, fitted on the shaft f', the loose pulleys G H, of different diameters, mounted on said shaft and provided with clutches, whereby they can be clutched alternately with said wheel, substantially as shown and described.

2. The gear-wheel F, having hubs f f, in combination with pulleys G H, said wheel and pulleys having clutches, as shown, and said pulleys being laterally adjustable, so as to slide onto said hubs when moved into clutch engagement, as set forth.

3. In combination with the frame A and gear-wheel F, mounted on a shaft, f', having its bearings in said frame, the pulleys G H, provided with clutches for engaging with said wheel, and having teeth or stops on their outer sides for impingement against the sides of said frame, substantially as and for the purpose set forth.

4. In combination with the pulley D, the chain-guard N, consisting of arms n n, extended around or bent over the grooved periphery of said pulley, but stopping short of meeting on the inner side of said pulley, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of February, 1880.

BENJAMIN HINSLEY.

Witnesses:

WM. M. MCKNIGHT,
S. J. VAN STAVOREN.