

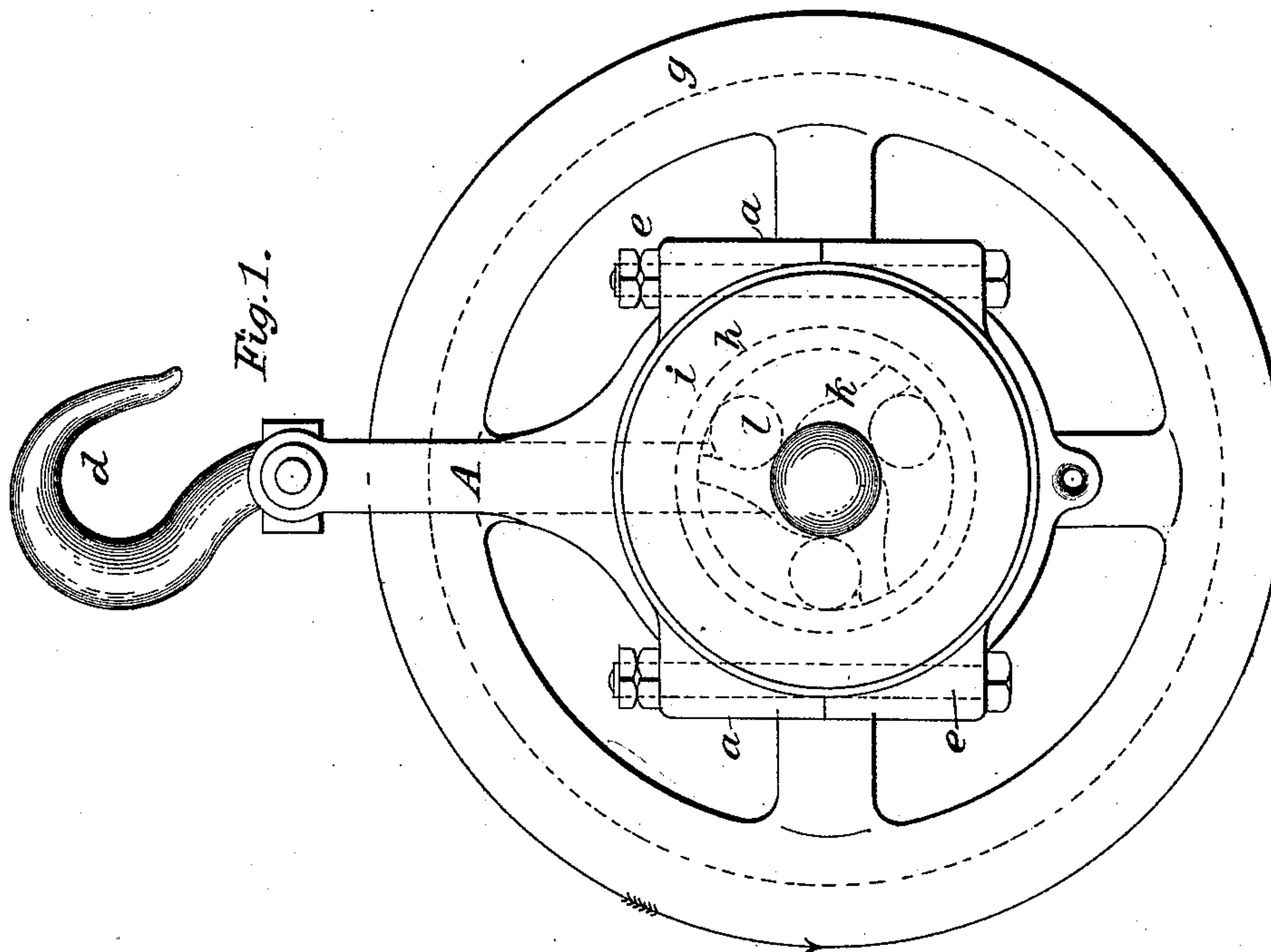
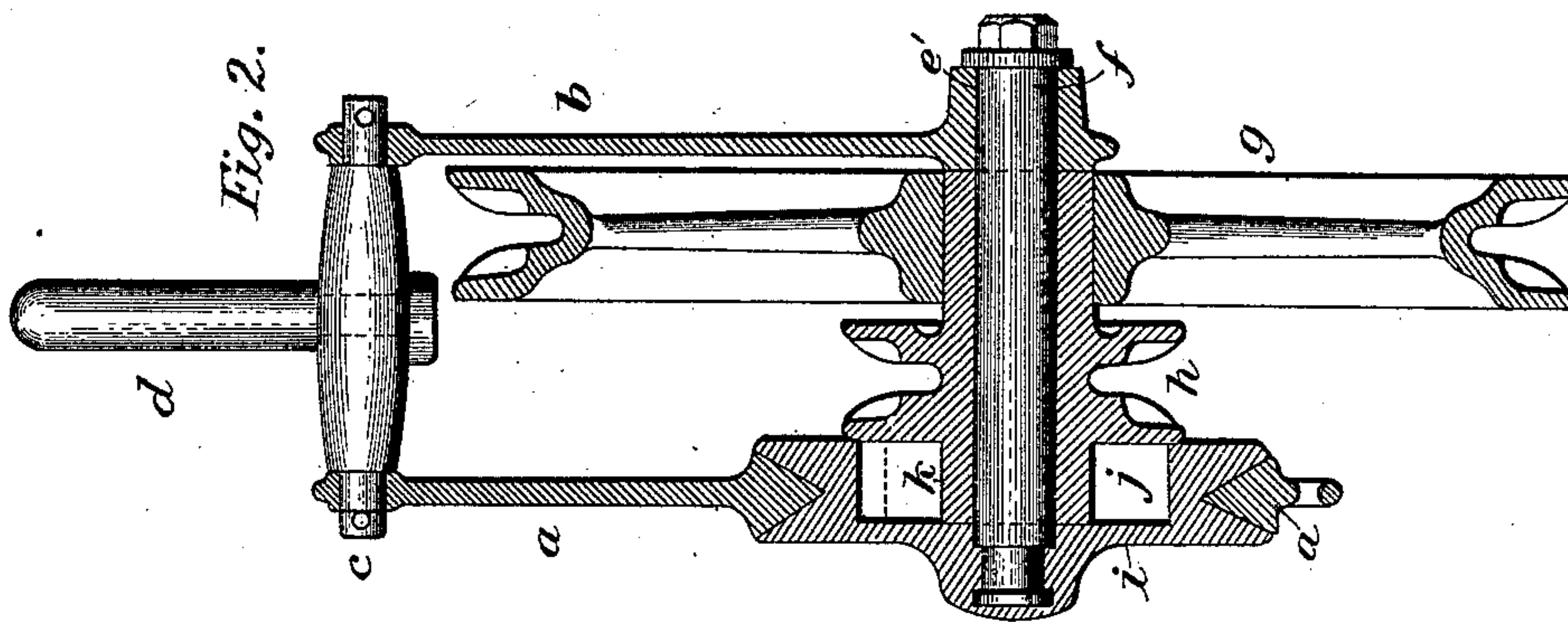
(No Model.)

2 Sheets—Sheet 1.

J. G. SPEIDEL.
HOISTING APPARATUS.

No. 362,328.

Patented May 3, 1887.



Witnesses
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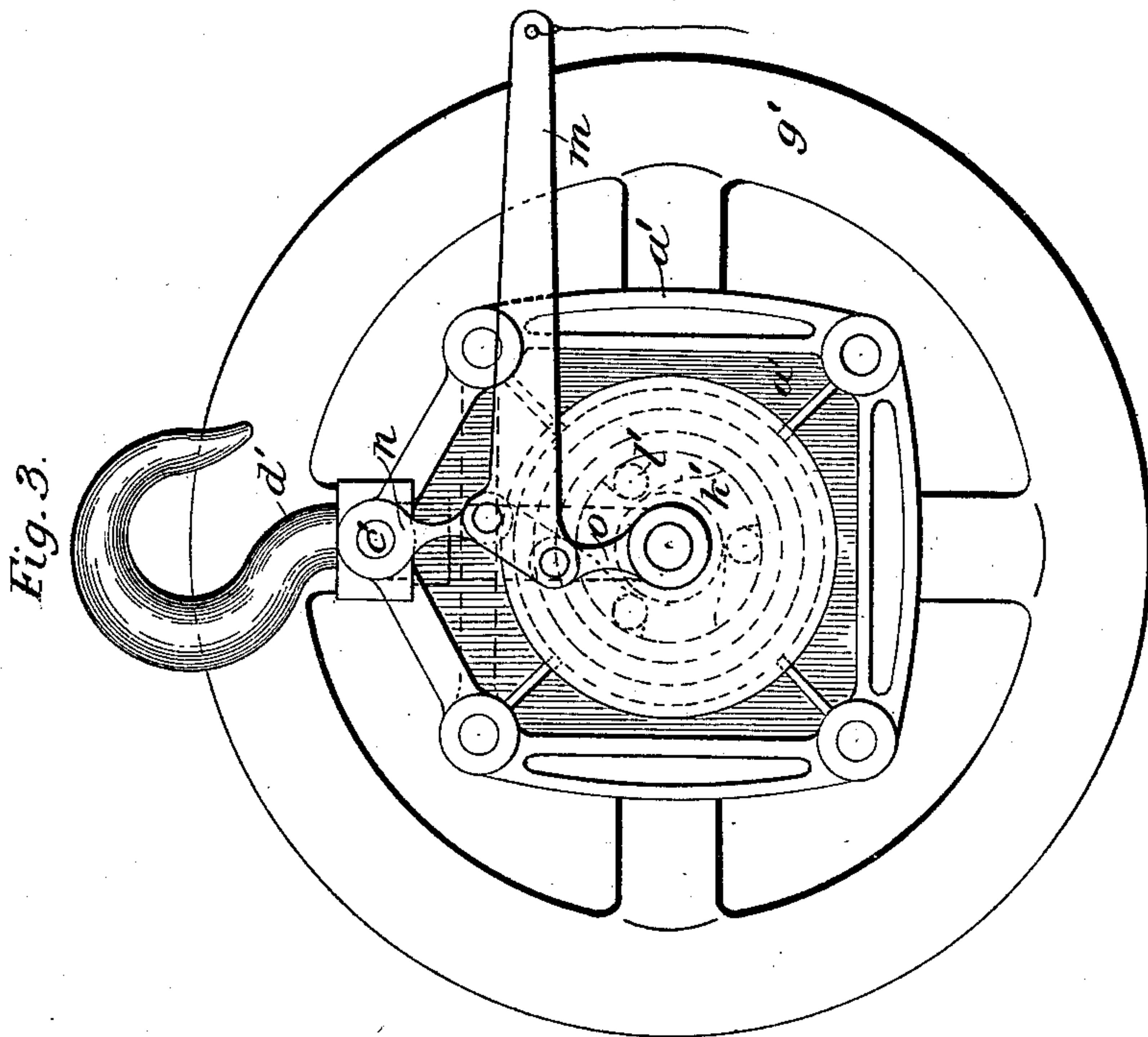
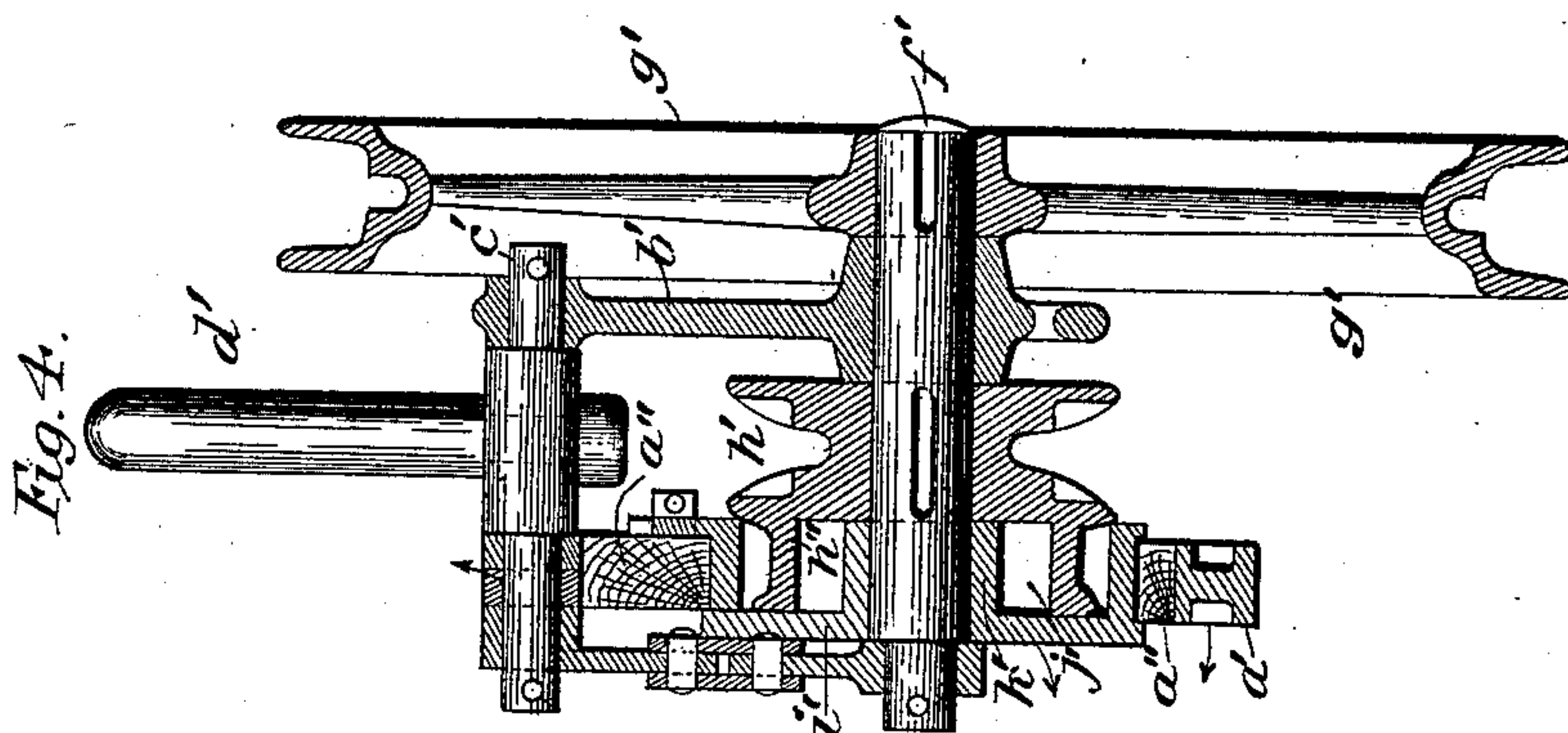
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2 Sheets—Sheet 2.

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HOISTING APPARATUS.

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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN G. SPEIDEL, OF SCRANTON, PENNSYLVANIA.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 362,328, dated May 3, 1887.

Application filed June 19, 1886. Serial No. 205,689. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. SPEIDEL, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in 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 appertains to make and use the same.

My invention relates to improvements in hoisting machinery—such as pulley-blocks, cranes, windlasses, &c.—and more especially to a brake mechanism for such devices, capable of automatic application, for holding the load in suspension at any point, or for permitting it to be gradually lowered.

The essential features of my invention comprise a frame-work which supports the winding-drum or the sprocket-wheels of the hoisting mechanism, and which is so constructed as to form a brake-shoe for frictional contact with a brake-wheel which remains stationary during the operation of hoisting, and is by a cessation of that operation actuated by the load and automatically coupled to the winding-drum or sprocket-wheels.

My invention consists, also, in means for relieving a portion of this frictional resistance, so that the suspended weight may gradually overcome it, causing the brake-wheel to revolve in the frame and the weight to descend at any desired speed under perfect control of the operator.

It consists, further, in various details of construction, which need not be enumerated here, but are fully hereinafter described.

In the drawings, Figure 1 is a side elevation of a portable hoist. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a modified form of hoist shown in side elevation, and Fig. 4 a cross-section thereof.

Referring to Figs. 1 and 2, A represents the supporting-frame for a suspended pulley-block, composed of two side plates, *a b*, united at the top by a cross-head, *c*, and having a hook, *d*, for suspending it from any suitable support. The side *a* of the frame is made in two parts or halves, each having a semicircular internal bearing, which, when secured together by the bolts *e*,

form a circular central opening. The side *b* of the frame is cast solid, and has at its lower end a bearing, *e'*, for a traverse-shaft, *f*, which may turn directly in such bearing, or within a bushing or sleeve inserted therein. Anti-friction rollers may also be interposed at this point between the shaft-journal and the bearing, if desired. The hoisting devices shown in these figures are composed of a large sprocket-wheel, *g*, which receives the endless hand-chain, and a smaller sprocket-wheel, *h*, which supports the lifting-chain and load. Both these wheels are connected rigidly together and turn loosely upon the shaft *f* within the frame. The shaft *f* extends through the circular opening in the side *a* of the frame, and has cast with or otherwise secured to its end the brake-wheel *i*. This wheel is shown as having a V-grooved periphery to fit a corresponding projection of the frame, which latter acts as a brake-shoe. The bearing-faces of the brake wheel and shoe may, however, be of plane or any other conformation, the object being to insure sufficient friction to keep the load from running down. It should also be understood that a device of the kind may be used for gear-wheels, pulleys, &c., wherever power is to be transmitted only in one direction.

A circular recess, *j*, is formed in the inner face of the brake-wheel, into which projects a series of inclines, *k*, formed with or secured to the sprocket-wheel *h*, between each of which inclines and the inner rim of the brake-wheel is a roller, *l*, which bears against the inner face of the brake-wheel at this place. If desired, a small brake-shoe may be interposed between each roller and the inner face of the brake-wheel to save wear on the wheel. It will be readily understood that as the shaft and brake-wheel remain stationary during the operation of hoisting, the sprocket-wheels are free to move in the direction of the arrow, without bringing the coupling into operation, and the load will be continuously elevated. If the hand-chain is released and the sprocket-wheel allowed to give slightly backward, the rollers are instantly pinched between the inclines and the inner rim of the brake-wheel, which locks the sprocket-wheel, shaft, and brake-wheel firmly together, the brake wheel and shoe being of such size and material as to cause suffi-

cient friction to hold the load in suspension. The load may be lowered now by continuously pulling backward and turning on the hand-chain, causing the shaft to move backward, and turning the brake-wheel against the frictional resistance of the shoe.

It will be apparent that by using a lower block and suspending the load therefrom the hoisting-power is doubled, while by using a block such, for instance, as that shown in my Patent No. 240,782, dated April 26, 1881, two speeds may be obtained when desired. It should also be understood that as the device is capable of application to cranes, windlasses, and other forms of hoisting apparatus, a winding-drum may be substituted for the lifting-wheel, and a crank or other mechanical device instead of the hand-chain wheel. In this case the side *b* of the frame would also be constructed to form a brake-shoe, and a brake-wheel applied to that side also, which, however, may also be done if a sprocket-wheel is used.

The operation of lowering the load may be performed at all times in the manner before described—that is, by a continuous pulling backward on the hand-chain; but I may prefer to use an independent releasing device, which for convenience I have shown in Figs. 3 and 4 in connection with a somewhat modified form of block and brake, though it will be understood that such device may be applied to the block heretofore described without any essential change in construction. The purpose of this device is to partly relieve the friction, so as to permit the weight to gradually overcome it, and thus allow the load to descend at a regulated speed.

Referring, then, to Figs. 3 and 4, *a'* and *b'* represent the side plates of the frame, and *c'* and *d'*, respectively, the cross-head and suspension-hook. The transverse shaft *f'* in the case passes through and beyond the side *b'* of the frame, and the hand-chain wheel *g'* is keyed on the shaft outside of the frame. The lifting-wheel *h''* is also keyed on the shaft within the frame, and is surrounded with a rim, *h''*, which projects into the recess *j'* in the brake-wheel *i'*, which is loose in the shaft and serves as a bearing therefor. The checking device is reversed, the inclines *k'* being cast with the brake-wheel, while the rollers, when the brake is applied, are clamped between said inclines and the projecting rim *h''* of the lifting-wheel. The brake-shoe in this case is composed of sections of wood, *a''*, built within the open side *a'* of the frame and fitting the brake-wheel closely, which is here shown as having a plane or smooth periphery. The operation of this device is substantially like that first described. The brake-wheel remains stationary during the process of hoisting, while the shaft turns in it as a bearing, and the checking of the motion and consequent application of the brake take place on ceasing to hoist in precisely the same way.

The device for relieving the friction, and

thus permitting the weight to overcome it and descend gradually, is operated by a cord attached to a lever, *m*. The lever is connected to a toggle-joint composed of two arms, *n* *o*, one pivoted upon the cross-head and the other upon the end of the shaft. By depressing the lever the shaft and brake-wheel are slightly lifted, thus relieving them of portion of the weight and decreasing the friction upon the lower part of the brake-shoe. The tendency of the weight is of course to run down, which it will do as soon as the friction is overcome, though its speed is regulated accurately or instantly checked by releasing the cord. Should the cord break, the load would be instantly held in suspension without the possibility of further descent, except by means of a direct pull on the hand-chain. This relieving device need not necessarily be of the construction shown in Figs. 3 and 4, and other mechanical arrangement may be substituted for it, or it may be altogether omitted.

The brake mechanism described is applicable to all forms of hoisting machinery, and it is evident that the construction may be widely varied within the limits of my invention.

Instead of the coupling shown, a pawl and ratchet, or any equivalent checking device, might be employed, and the size and shape of the brake wheel and shoe may vary according to the different requirements of different kinds of work.

What I claim is—

1. In a hoisting apparatus, the combination of a frame forming a brake-shoe, a brake-wheel supported by said frame in constant frictional contact therewith, a shaft carrying hoisting-wheels, and an automatic coupling for connecting the hoisting-wheels to the brake-wheel, substantially as described.

2. The combination of the frame constructed to form a brake-shoe, a transverse shaft carrying a hand-wheel and a lifting-wheel, a brake-wheel fixed on the shaft and in constant frictional contact with the frame, and an automatic coupling for connecting together the brake-wheel, hoisting-wheels, and shaft, substantially as described.

3. A frame for a pulley-block carrying a hoisting-shaft and made in sections to form a brake shoe, in combination with a brake-wheel on the shaft and in frictional contact with said brake-shoe, substantially as described.

4. The combination of the main frame constructed to form a brake-shoe, the shaft, a brake-wheel having an internal circular recess, a lifting-wheel on the shaft extending within the said recess, and rollers in the said recess interposed between the brake-wheel and the lifting-wheel, substantially as described.

5. The combination, with the main frame constructed so as to form a brake-shoe, of a hoisting-shaft and wheels, a brake-wheel in constant frictional contact with said shoe and adapted to hold the load in suspension, and a lever for raising the brake-wheel and shaft, so

as to permit the load to overcome the friction of the brake, substantially as described.

6. The combination, with the frame and shaft, of the brake-wheel on the shaft, adapted
5 to be actuated by the load, a pair of arms connected, respectively, to the frame and shaft, and a lever connected to both of said arms, whereby the shaft may be raised and the friction of the brake-wheel thereby reduced, sub-
10 stantially as described.

7. In a hoisting apparatus, the combination,

with the frame formed of sections bolted together, of a wooden brake-shoe clamped between the sections, and a brake-wheel on the hoisting-shaft and supported by the brake-
15 shoe and frame, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN G. SPEIDEL.

Witnesses:

A. B. WILLIAMS,

WM. A. WILCOX.