

No. 609,939.

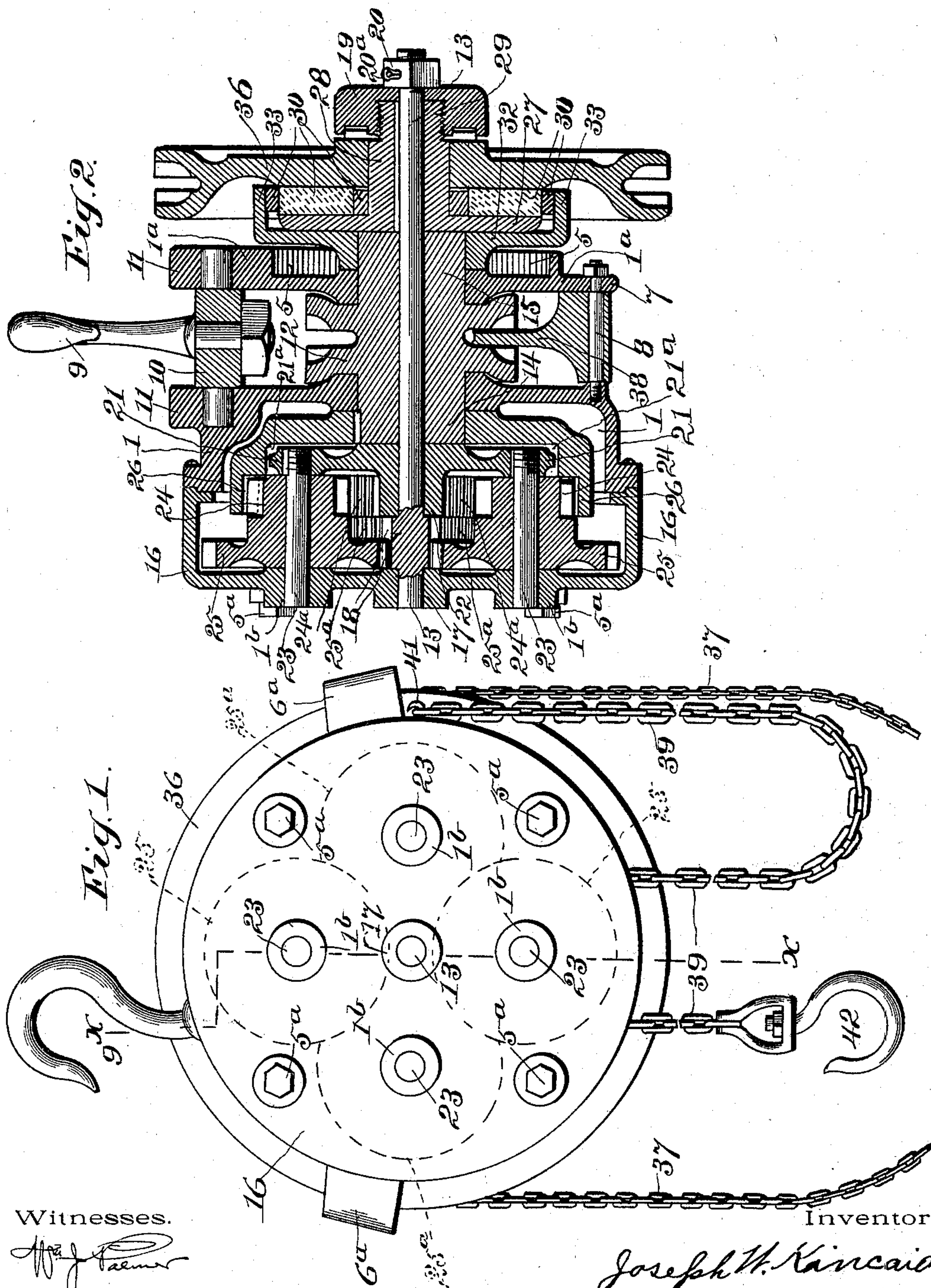
Patented Aug. 30, 1898.

J. W. KINCAID.
CHAIN HOIST.

(Application filed Oct. 27, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

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Geo. M. Copehaver.

Inventor.

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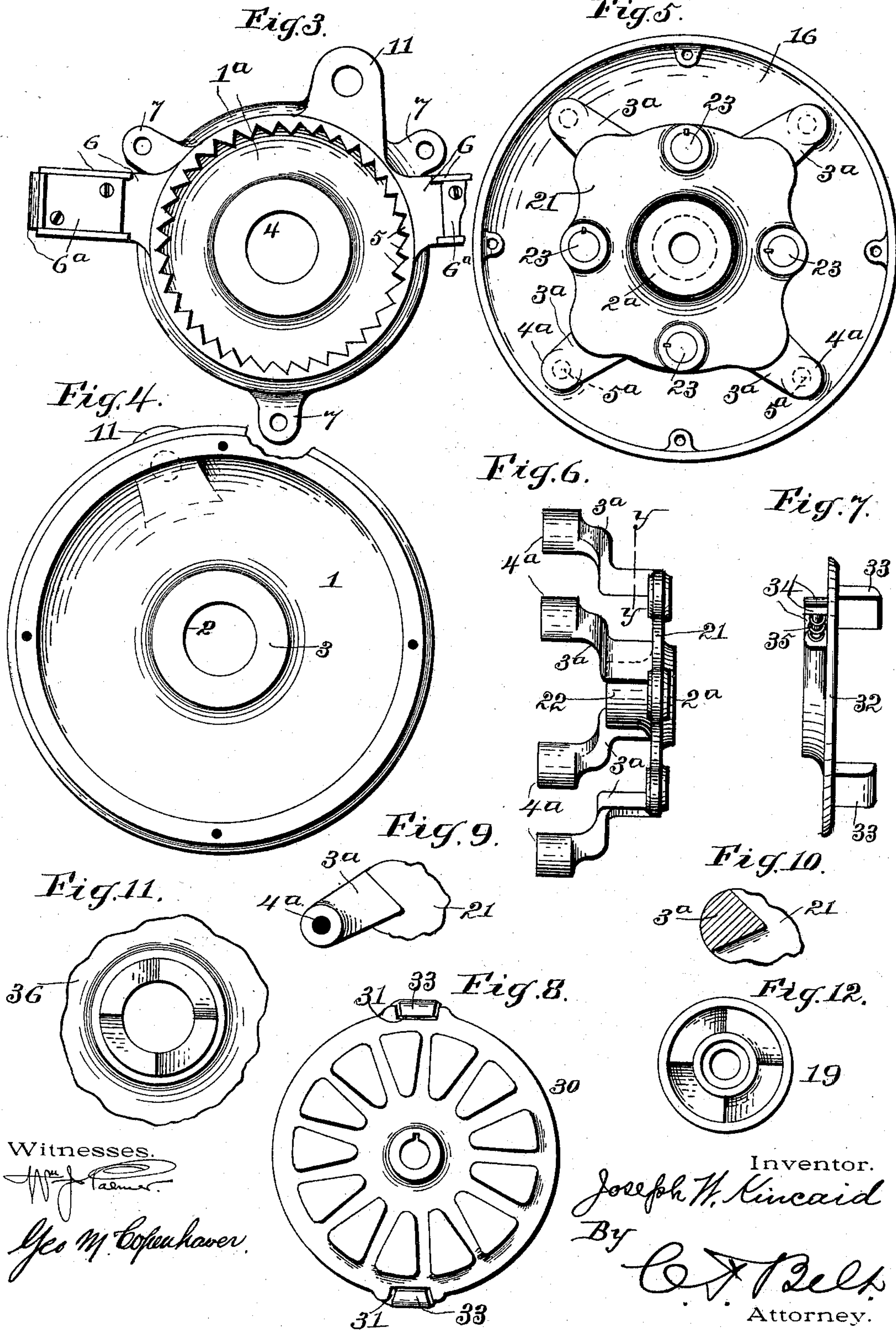
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UNITED STATES PATENT OFFICE.

JOSEPH W. KINCAID, OF READING, PENNSYLVANIA, ASSIGNOR TO THE
READING CRANE AND HOIST WORKS, OF SAME PLACE.

CHAIN HOIST.

SPECIFICATION forming part of Letters Patent No. 609,939, dated August 30, 1898.

Application filed October 27, 1897. Serial No. 656,488. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. KINCAID, a citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Chain Hoists, of which the following is a specification.

This invention relates to hoisting machinery, and particularly to the class of hoisting blocks or chain hoists employing a single chain to lift a load attached to the end of such chain direct from the lift-sheave without passing said chain over a pulley-block and doubling the chain.

The object of the invention is to provide a single-chain double-spur-gear hoist to raise and lower a heavy load or weight quicker and with less exertion by the operator than has heretofore been accomplished.

A further object of the invention is to provide a lift-sheave the hub of which has bearings in the two frame portions of the hoist and an internal gear keyed to one of said hubs upon the outside of one of the frame portions.

A further object of the invention is to provide a casing having a series of double spur-gears journaled therein, a shaft having a pinion on one end meshing with one set of the spurs, the other spur-set meshing with an internal gear keyed to the lift-sheave upon the outside of one of the frame portions, a clutch device, and means for connecting a hand-wheel which is loosely mounted upon the hub of a friction-brake to the said shaft.

A still further object of the invention is to provide a fixed frame portion having internal ratchet-teeth, a pawl-plate loosely mounted upon the hub of the lift-sheave and carrying a pawl in engagement with said teeth, and a friction-disk held by and turned with the said pawl-plate.

The invention consists in the novel construction of parts, and resides, essentially, in an automatic brake or locking mechanism upon one end of the main shaft, a lift-sheave loosely mounted upon the shaft, a gear keyed to the said sheave, and a series of spur-gears certain of which mesh with said sheave-gear

and others of which mesh with a pinion on the other end of the said shaft.

In the accompanying drawings, Figure 1 is an elevation of my improved hoist, looking at the end opposite the hand-chain wheel. Fig. 2 is a section on the line X X, Fig. 1. Fig. 3 is an interior plan view of the frame portion having ratchet-teeth and carrying the hand-chain guides. Fig. 4 is a similar view of the other frame portion. Fig. 5 is a similar view of the casing, showing the spur-gear bracket secured thereto. Fig. 6 is an edge view of the gear-bracket. Fig. 7 is an edge view of the pawl-plate with the pawl in place. Fig. 8 is a plan view of the friction-disk, showing it held by the pawl-plate. Fig. 9 is a plan view of one of the bracket-legs. Fig. 10 is a sectional view of one of said legs on the line Y Y, Fig. 6. Fig. 11 is a plan view of the hand-wheel hub. Fig. 12 is an interior plan view of the clutch-nut.

The same numeral references denote the same parts throughout the several figures of the drawings.

The frame of the hoist is composed of two portions, one portion 1 being deeply concaved or recessed upon the outer face and having a central journal-bearing 2 and a raised bearing-surface 3. The other frame portion 1^a has a journal-bearing 4, ratchet-teeth 5 upon its outer face, lateral arms 6, to which are secured hand-chain guides 6^a, and lugs 7, through which bolts 8 are passed into the frame portion 1 to connect said frame portions. The suspending-hook 9 is swiveled in a block 10, the ends of the latter being journaled in ears 11 of the said two frame portions.

The lift-sheave 12 is located in the interval or space between the frame portions and loosely mounted upon the main shaft 13, and its hubs 14 and 15 extend through the journals 2 and 4 into the outer faces of the frame portions.

The casing 16 is suitably secured to the frame portion 1 and has a central bearing 17 for one end of the shaft 13, which has a long pinion 18 formed thereon. Upon the other end of said shaft is a clutch-nut 19, held

to the shaft by a lock-nut 20 and a cotter-pin 20^a.

The spur-gear bracket 21 has a central bearing 2^a, a series of legs 3^a, provided with countersunk ends 4^a to receive set-bolts 5^a, passed through the casing 16, apertures in which a series of spindles 23 are screwed and keyed, and a central hub 22, against which one end of the pinion 18 bears, the other end of said pinion having its bearing upon the inner face of the casing 16. The said bracket is loosely mounted upon the shaft 13 adjacent the sheave-hub 14 in a cavity 21^a of the internal sheave-gear 26.

The series of spindles 23 project outwardly from the bracket 21 through sockets 1^b in the casing 16, and upon which spindles are loosely mounted four spur-gears. These gears comprise small members 24 and 24^a and large members 25 and 25^a. The small gears 24 are all in the same plane and mesh with the internal gear 26, keyed to the hub 14 of the sheave upon the outside of the frame portion 1. The larger gears 25 are out of the plane of the like gears 25^a, and said gears 25 and 25^a mesh with the pinion 18, which is of sufficient length to engage all the gears 25, whereby the motion of the shaft 13 is imparted to the sheave 12.

A disk 27, having a sleeve or hub 28, keyed to the shaft 13, which sleeve or hub is provided with a reduced screw-threaded end 29, engaged by the clutch-nut 19. A friction-disk 30, having peripheral notches 31, is loosely mounted on the sleeve or hub 28. One face of said friction-disk engages the said disk 27, and the other face engages the inner face of the hand-wheel 36. A pawl-plate 32 is loosely mounted upon the hub 15 of the sheave 12 and has fingers 33 to engage the notches 31 of the friction-disk to prevent the latter from being independently moved. A pawl 34, carried by the pawl-plate and controlled by a spring 35, keeps the pawl in engagement with the ratchet-teeth 5. The wheel 36 is loosely mounted on the disk sleeve or hub 18 and has an outer clutch-hub to engage the clutch-nut 19 and is provided with a suitable hand-chain 37.

A chain-divider 38 is secured between the frame portions by one of the bolts 8 to keep the lift-chain 39 divided or separated. A lift-chain keeper is secured between the frame portions and has a hook 41, which is supported by one of the bolts 8 and to which is connected one end of the lift-chain 39, the other end of said chain being provided with a swivel-hook 42, to which the load or weight is attached.

The driving mechanism consists of the lift-sheave and its internal gear, the shaft and its pinion, the hand-chain wheel, the spur-gears, and the hub or sleeve of the disk 27.

The brake mechanism comprises the friction-disk, the ratchet-teeth, the pawl-plate, and its pawl.

The reversing and locking mechanism is

composed of the clutch-nut, the clutch-hub of the hand-wheel, and the disk 27.

The operation of the hoist is as follows: In raising a load or weight the hand-wheel is turned to the right by a pull on the hand-chain, which turns the hub of the hand-wheel upon the highest part of the clutch-nut, forcing the wheel away from said nut and causing it to make a frictional clutch with the friction-disk and the latter with the disk 27, thus locking all of said parts together. Then by a continued pull on the hand-chain in the same direction the said parts, the pawl-plate, and the shaft 13 are all turned in a body, with the pawl sliding over the ratchet-teeth, and the sheave is turned in the opposite direction to the hand-wheel by the shaft-pinion meshing with the large spur-gears and the small gears meshing with the internal sheave-gear.

To lower a load, (the pull on the hand-wheel being stopped,) the load will reverse the movement of the above-mentioned revoluble parts, and by turning the hand-wheel to the left all of said parts except the friction-disk and pawl-plate are rotated together, leaving the friction-disk idle and the pawl-plate locked to the fixed frame by the pawl engaging the ratchet-teeth of the said frame. The spur-gears, the pinion, and the internal sheave-gear are simply turned in the opposite direction from that in hoisting a load. A load is suspended in lowering by stopping the pull on the hand-wheel. Whereupon the weight of the load will turn the sleeve-disk to force the friction-disk against the face of the hand-wheel, which makes a friction-brake between the friction-disk, sleeve-disk, and hand-wheel, said elements being held in this position by the pawl-and-ratchet device until the hand-wheel is turned to either hoist or lower the load, as hereinbefore described.

It will be observed that the hoist is always self locked or checked against backward motion or dropping the load during both operations, and that the friction-disk is at all times locked with or held by the pawl-plate and cannot be turned independently, and the sleeved disk, being keyed to the shaft, is turned independent of the friction-disk and of the pawl-plate in lowering; but in hoisting all of said parts are locked and turned together.

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

1. A pulley block or hoist comprising a friction-disk, and a revoluble pawl-plate carrying a pawl and holding the disk against independent movement, as set forth.

2. A pulley block or hoist comprising a fixed frame having teeth, a loosely-mounted revoluble pawl-plate, and a pawl on the plate to engage said teeth, as set forth.

3. A pulley block or hoist comprising a frame having teeth, a revoluble plate, a pawl on the plate to engage said teeth, a friction-

disk held by said plate, and a disk between the friction-disk and the pawl-plate, as set forth.

4. A pulley block or hoist comprising a fixed frame provided with internal ratchet-teeth, a pawl-plate, and a pawl carried by said plate and adapted to be revolved in engagement with said teeth, as set forth.

5. The combination, with the casing, of a spur-gear bracket provided with spindles for the gears, and legs adapted to receive suitable bolts for securing the bracket to the casing, as set forth.

6. A fixed hoist-frame having ratchet-teeth formed therein, a lift-sheave journaled in the frame, a driving-shaft, a sleeved disk keyed to the driving-shaft, a revoluble plate loosely mounted on the hub of the sheave, and a pawl engaging said teeth.

7. A fixed hoist-frame having ratchet-teeth formed therein, a lift-sheave journaled in the frame, a revoluble pawl-plate loosely mounted on one hub of the sheave, a pawl engaging said teeth, and an internal gear secured to the other hub of the said sheave.

8. The combination, with a hoist-frame composed of two parts suitably joined together with a space between them, one part having internal ratchet-teeth, and the other part having a recessed outer face, of a lift-sheave journaled in and between the frame portions, an internal gear secured to one hub of the sheave in said recess, a revoluble pawl-plate loosely mounted on the other sheave-hub, and a spring-controlled pawl carried by said plate, as set forth.

9. The combination of a driving mechanism comprising a shaft, a hand-wheel connected to one end of the shaft, a pinion on the other end of the shaft, an internal gear keyed to the hoist-sheave, and the spur-gears composed of integral large and small members, two of the large members being out of the plane of the other two and all meshing with the pinion, and the small members all being in the same plane and meshing with the internal gear, as set forth.

10. The combination of the spur-gears, the bracket, the internal gear, the sheave, the gear-spindles having one end secured to the bracket, the fixed casing having the bracket

secured thereto and carrying the other end of the spindles, and means for driving the gears to operate the sheave, as set forth.

11. The combination, with the frame, the lift-sheave, the shaft, the shaft-pinion, and the casing secured to the frame, of the bracket having legs attached to the casing, the spur-gears, the spur-gear spindles fixed to the bracket and projecting into the casing, and means for operating the said shaft, as set forth.

12. The combination of the bracket, the spur-gears carried by the bracket and composed of large and small members, a driving-shaft, a hoist-sheave, a gear on the sheave, a pinion on the shaft of sufficient length to engage the large members, two of which are out of the plane of the other two, the small members all being in the same plane and meshing with the sheave-gear, and means for operating the shaft, as set forth.

13. The combination, with the shaft, and means for driving it, of the frame, the lift-sheave having the shaft extending through it and journaled in the frame, a gear keyed to the sheave, a pinion on the shaft adjacent the said gear, a casing secured to the frame, a bracket held by the casing, and the spur-gears each composed of two members carried by the bracket, one member meshing with said pinion and the other member meshing with said sheave-gear, as set forth.

14. The combination, with the frame composed of two portions suitably joined together with an interval or space between them, one of said portions having internal ratchet-teeth in its outer face, the other of said portions having a dished or recessed outer face, of the lift-sheave loosely mounted in said interval or space and having hub portions bearing in and extending through said frame portions into said faces, a driving-shaft extending loosely through the sheave, a hand-wheel, and means for imparting motion to the said sheave and to the said shaft, as set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

JOSEPH W. KINCAID.

Witnesses:

ISAAC N. KEYSER,

CHAS. A. Z. GRIESEMER.