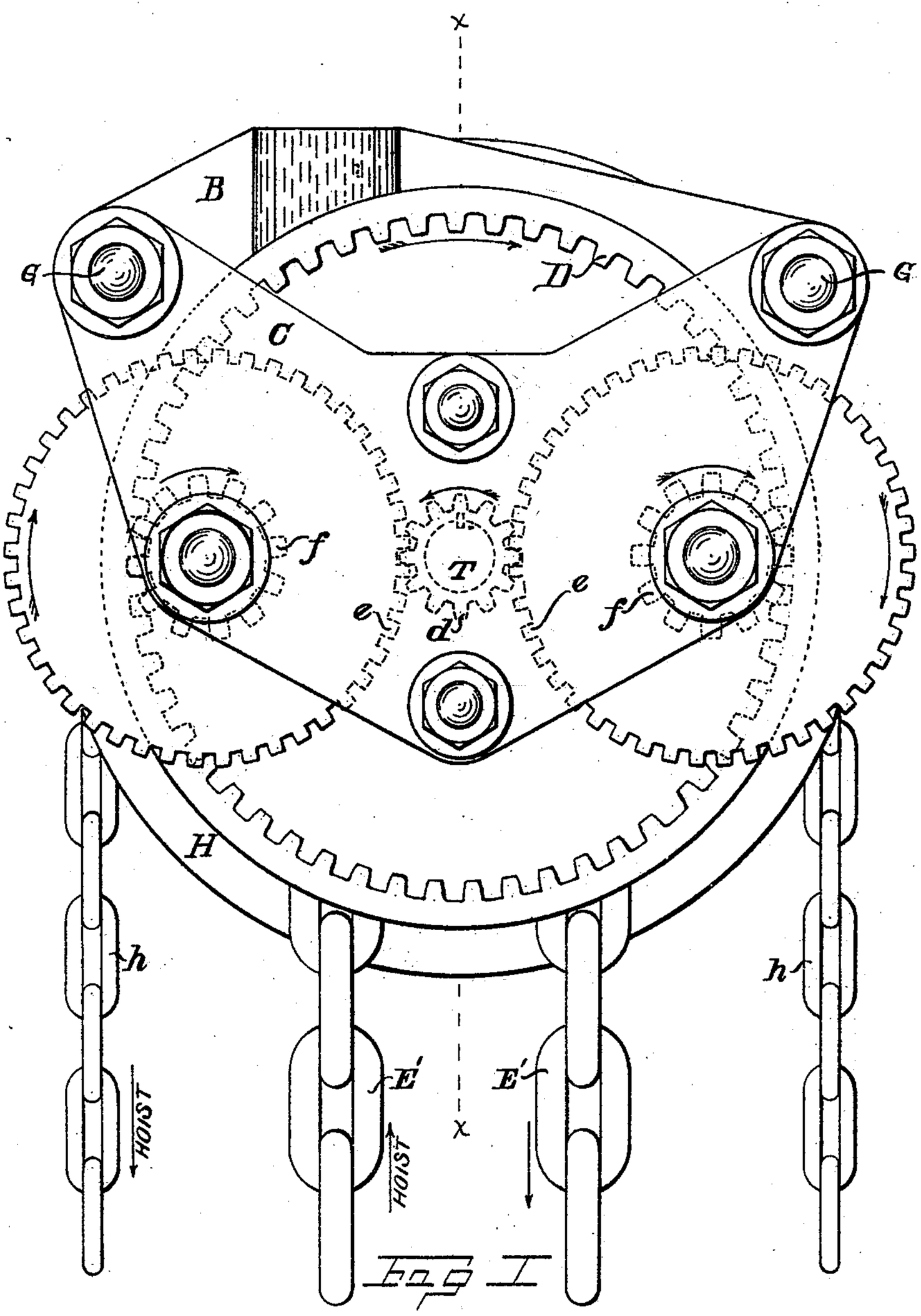
(No Model.) 3 Sheets—Sheet 1.

O. M. MOWAT.

PULLEY BLOCK.

No. 522,078. Patented June 26, 1894.



WITNESSES:

B. C. Brooks.

F. W. Tallcott

INVENTOR

Oliver Mowat Mowat

BY

William Macomber

ATTORNEY.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

O. M. MOWAT.

PULLEY BLOCK.

No. 522,078. Patented June 26, 1894.

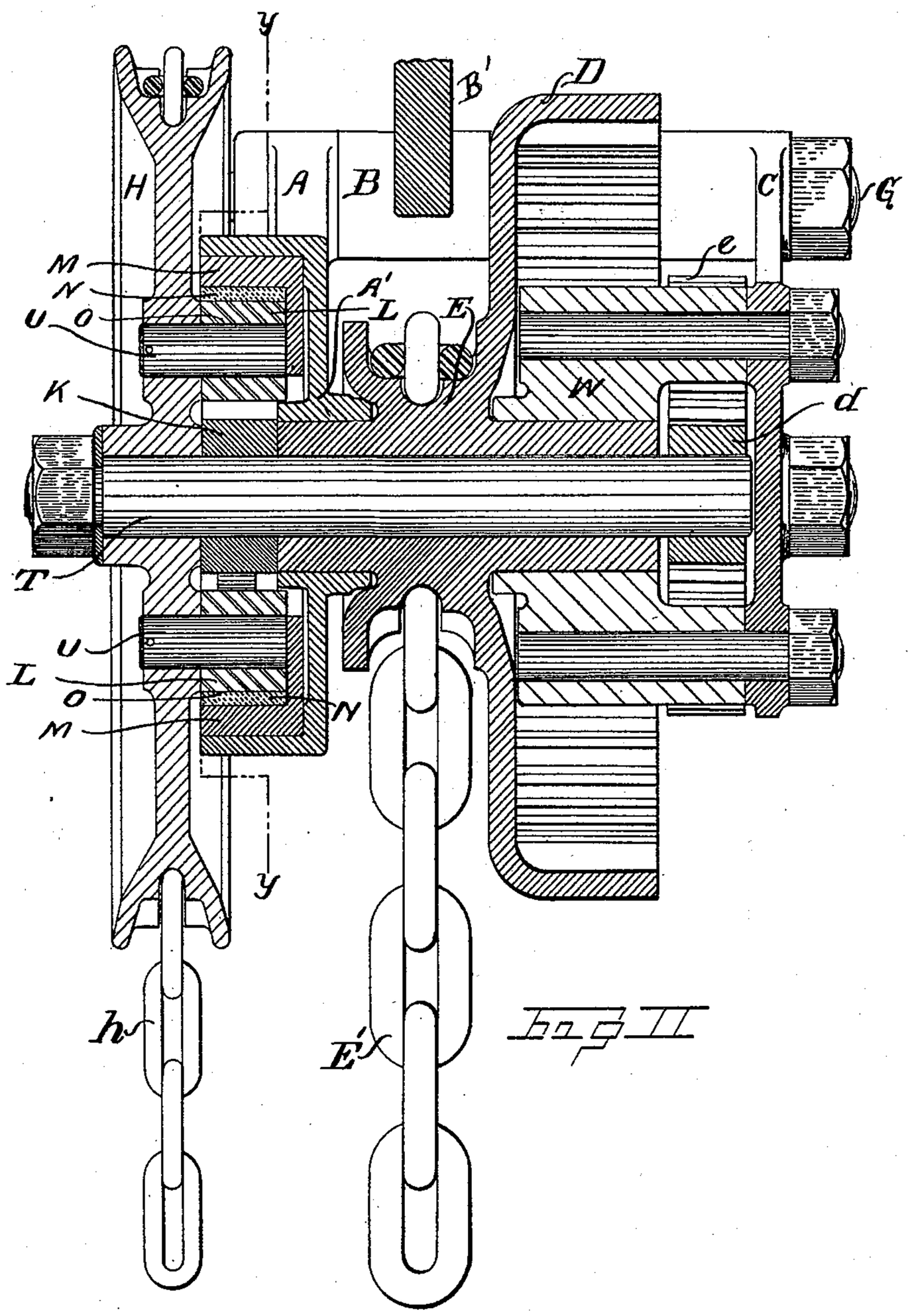


Fig. 1.

WITNESSES:
B. B. Anderson.
F. W. Hawkins.

INVENTOR
Oliver Mowat Mowat
BY
William Macomber
ATTORNEY.

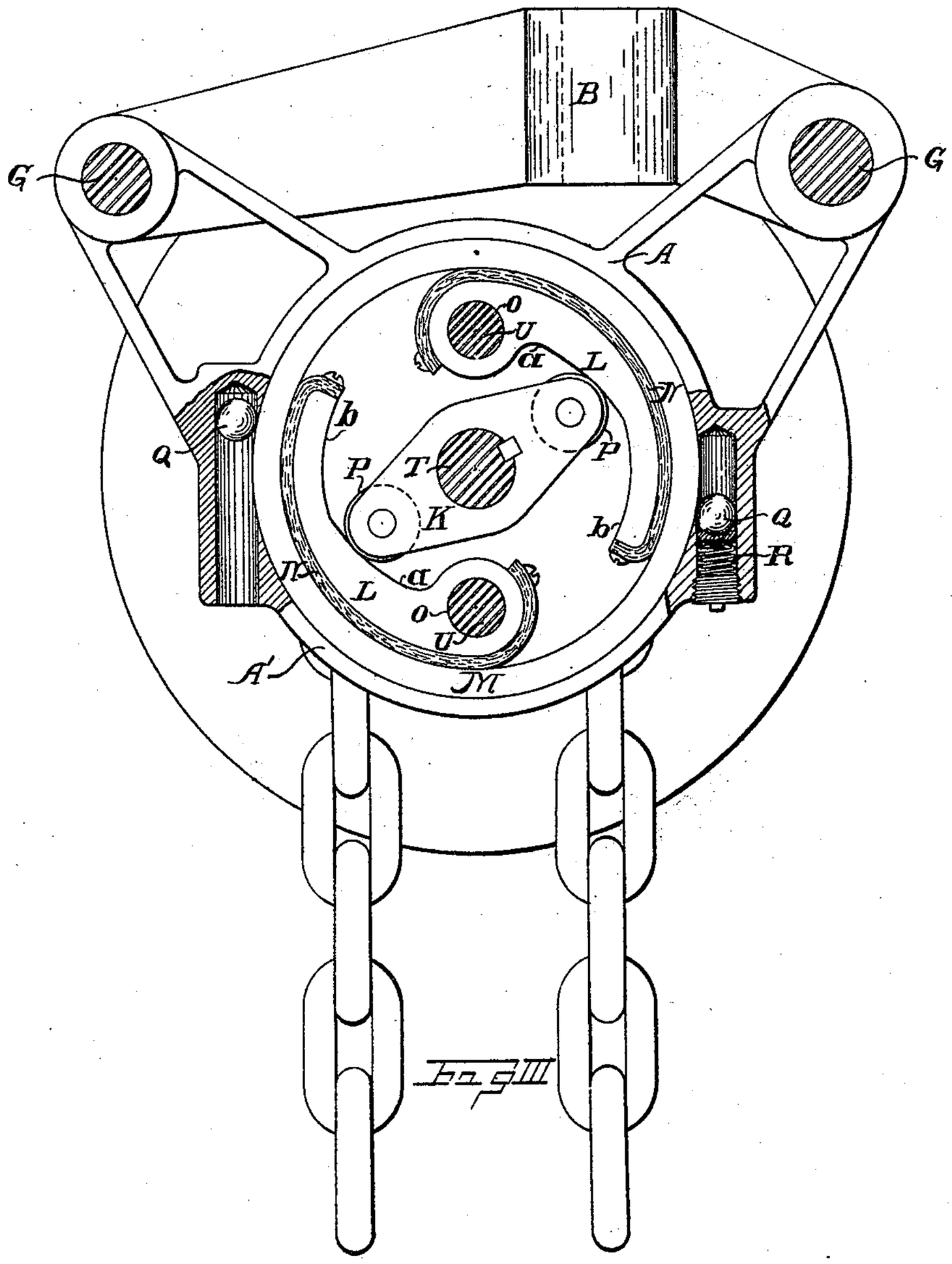
THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

O. M. MOWAT.

PULLEY BLOCK.

No. 522,078. Patented June 26, 1894.



WITNESSES:

B. C. Sandee.

F. W. Caulkins

INVENTOR

Oliver Mowat Mowat

BY

William Macomber

ATTORNEY.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OLIVER MOWAT MOWAT, OF DETROIT, MICHIGAN.

PULLEY-BLOCK.

SPECIFICATION forming part of Letters Patent No. 522,078, dated June 26, 1894.

Application filed January 17, 1894. Serial No. 497,207. (No model.)

To all whom it may concern:

Be it known that I, OLIVER MOWAT MOWAT, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Pulley-Blocks, of which the following is a full, clear, and exact description.

My invention relates in general to pulley blocks, and more particularly to that class of pulley blocks wherein spur gearing is used, whereby a heavy weight may be raised or lowered at a slow speed by means of a comparatively small amount of power moving through a greater space and at a greater velocity.

The objects which I attain in my invention are: first, to make the hoisting mechanism highly efficient; second, to provide means for automatically sustaining the load at any point when the operation of hoisting ceases; and, third, to provide means for automatically lowering the load.

Referring to the drawings herewith, consisting of three sheets, Figure I is an end view of my invention. Fig. II is a vertical cross section upon the line *x*—*x*, Fig. I. Fig. III is a vertical view upon the line *y*—*y*, Fig. II, partly in elevation and partly in cross section and looking toward the central portion of the machine.

Like letters refer to like parts throughout the drawings.

The brackets A, B and C, securely bolted together by bolts, G, G, constitute the frame of the machine within and upon which the mechanism is mounted, and by means of which the device is suspended. The bracket A has convergent arms which unite with a cylindrical central portion A′, which constitutes the bearing for one end of the sleeve of the chain-wheel, E, as hereinafter more fully described. The bracket C has a bearing, W, securely bolted to it, which constitutes the bearing for the other end of the sleeve of the chain-wheel, E. The bracket B is provided with a hook or eye, B′, by means of which the device is suspended.

D is an internal gear made in one piece with the driven chain-wheel, E.

e, *e*, and *f*, *f*, are gears which are mounted rotatably upon the bracket C, the gears *f f* meshing with the internal gear, D, diametrically opposite each other, and the gears *e e* meshing in common with a pinion *d* on the driving shaft, T.

H is a hand chain wheel, carrying a hand chain, *h*.

E′ is the driven chain which sustains the load.

The hand chain wheel, H, is free to rotate upon the driving shaft, T. Mounted diametrically opposite each other upon the spokes or upon the hub extensions of the wheel H are studs U, U, which extend inwardly and carry pivotally the shoes L, L, of the brake.

Referring now more particularly to Fig. III, K is a cross-head keyed to the driving shaft, T, and is provided upon its extremities with rollers, P, P, which rotate freely upon their trunnions.

L, L, are shoes, which are provided with frictional faces, N, N, which may be of leather or other suitable material. The inner faces of the shoes, L, L, at *a*—*b*, *a*—*b*, have angular inclinations to the circular path of the point of contact with the rollers, P, P.

M is a clutch-ring, which is mounted within an annular opening in the bracket A, and which has an internal flange taking over the inner ends of the studs U, U, to hold it in place. Upon the inner surface of the ring M the shoes, L, L, are free to slide or to be held in frictional contact when pressed outwardly by the rollers, P, P. Externally the ring M fits freely into the annular space in the bracket, A; but may rotate therein in one direction only. Upon opposite sides of the annular opening of the bracket, A, I provide chambers which carry ball or roller ratchets, Q, Q, one of which is held up to its work by a spring, R, the other coming to place by gravity. From this construction as shown, it is apparent that the clutch-ring, M, is free to rotate in the one direction, but is held against rotation in the opposite direction by the balls or roller, Q, Q.

The bearing W, secured to the bracket C, and the central cylindrical portion A′, of the bracket A, support the sleeves or hub extensions of the chain-wheel E, the hub in turn affording a bearing for the driving shaft, T, which passes through it.

Having thus described generally the construction of my machine, I will now show the relation of the several parts in operation.

In order to hoist a load suspended by the hoisting chain, E′, the operator pulls down

the right hand side of the driving chain, *h*, which rotates the chain-wheel, H, in the same direction. By reference to Fig. III it will be seen that this motion in rotation, communicated to the shoes L, L, through the studs U, U, will cause the shoes L, L, to bind against the ring M, and against the rollers P, P, of the cross-head K, mounted upon the driving shaft T, and compel the driving shaft T to rotate in the same direction. In this operation the chain-wheel H and the driving shaft T act, through said clutch mechanism, as if rigidly mounted one upon the other. The ratchet rollers or balls permit rotation in this direction; and by means of the gearing, motion in rotation is communicated to the driven chain-wheel, E, and the chain, E′, is raised with its load.

When the application of power to the driving chain ceases, it is clear that the cross-head, K, would at once tend to rotate in the opposite direction if not resisted. But when the application of power ceases, the tendency of the cross-head, K, to rotate in the opposite direction is arrested by the action of the rollers, P, P, holding the shoes, L, L, out and in frictional contact with the ring, M, which is held against rotation in that direction by the ratchet rollers or balls, Q, Q.

When it is desired to lower the load, the hand-chain is pulled down on the left hand side, and the chain-wheel, H, rotated in that direction. This motion in rotation being communicated to the shoes, L, L, the frictional contact will be reduced and the shoes will slip around in the ring, M, and the cross-head, K, will follow in like rotation, and the motion in rotation of the cross-head, K, being communicated by the gravity action of the load through the gearing, the load will be steadily and slowly lowered, or stopped at any point when the power applied to the driving-chain ceases.

The ease with which a load may be lowered will depend upon the angular inclination of the surfaces, *a*—*b*, *a*—*b*, of the shoes, L, L; and as these surfaces may be so inclined as to allow the shoes to slip easily, it is evident that but little force will be consumed in lowering the load. As all parts of the brake revolve freely during the operation of hoisting, it is evident that with an efficient gear-train little power will be wasted in friction. It is also apparent that as the action of releasing the friction clutch is gradual, the load will be lowered with steadiness and with entire freedom from jarring or slipping of any kind.

Having thus described my invention and its method of operation, what I claim is—

1. In a pulley-block, a hoisting automatic sustaining and lowering brake comprising a driving shaft, gearing, a driving-chain-wheel mounted on and free to rotate upon said shaft, a driving-chain, a friction-ring retained from rotation in one direction, shoes pivoted on the driving-chain wheel and adapted to engage the inner face of the friction-ring, and a cross-head the ends of which engage the inner faces of the shoes, substantially as set forth.

2. A hoisting, automatic-stopping and lowering mechanism, comprising a driving-chain-wheel mounted on and free to rotate upon the driving shaft, shoes pivoted to said driving-chain-wheel, a ratchet ring capable of rotation in one direction only, a cross-head keyed to the driving shaft, the inner faces of said shoes having an angular inclination to the path of rotation of the extremities of said cross-head, a driving-chain, gearing, and hoisting chain, substantially as set forth.

3. In a pulley-block, a driving-wheel free to rotate upon the driving shaft, a friction-ring mounted within the frame of the machine, ratchet balls or rollers chambered within the frame of the machine, a spring holding one of said balls or rollers up to its work, the other being held down by gravity, a cross-head mounted rigidly upon the driving shaft, shoes mounted upon studs upon the driving-wheel, having external frictional surfaces to engage against the inner surface of said friction-ring and internal angular inclinations to the path of said cross-head, gearing mechanism, driving and driven chain, substantially as set forth.

4. In a pulley-block, a hoisting, automatic-sustaining and lowering brake, comprising a driving-wheel free to rotate upon the driving shaft, shoes pivoted to said driving-wheel, a friction-ring mounted within the frame of the machine, a cross-head keyed to the driving shaft, said driving-wheel being adapted to be locked to said driving shaft by means of said shoes, which engage frictionally with said ring and against the ends of said cross-head by means of angular inclinations upon the inner faces of said shoes, which progressively intercept the path of rotation of the extremities of said cross-head, substantially as set forth.

5. In a pulley-block, a driven chain and driven chain-wheel, a gear train, driving shaft, and a cross-head keyed to said driving shaft, a driving chain-wheel, shoes pivoted thereto, a friction-ring, and ratchet mechanism, said gear train being actuated by said driving shaft and automatically controlled by means of said cross-head, the extremities of which are intercepted in rotation by said shoes, which are adapted to automatically lock the driving shaft to the frame by means of said friction-ring and ratchet mechanism, and which release the driving shaft to lower the load by rotation of said driving-wheel, which carries the shoes forward in the path of rotation of the extremities of said cross-head, substantially as set forth.

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

OLIVER MOWAT MOWAT.

Witnesses:
CHARLES L. O'CONNOR,
W. S. MOWAT.