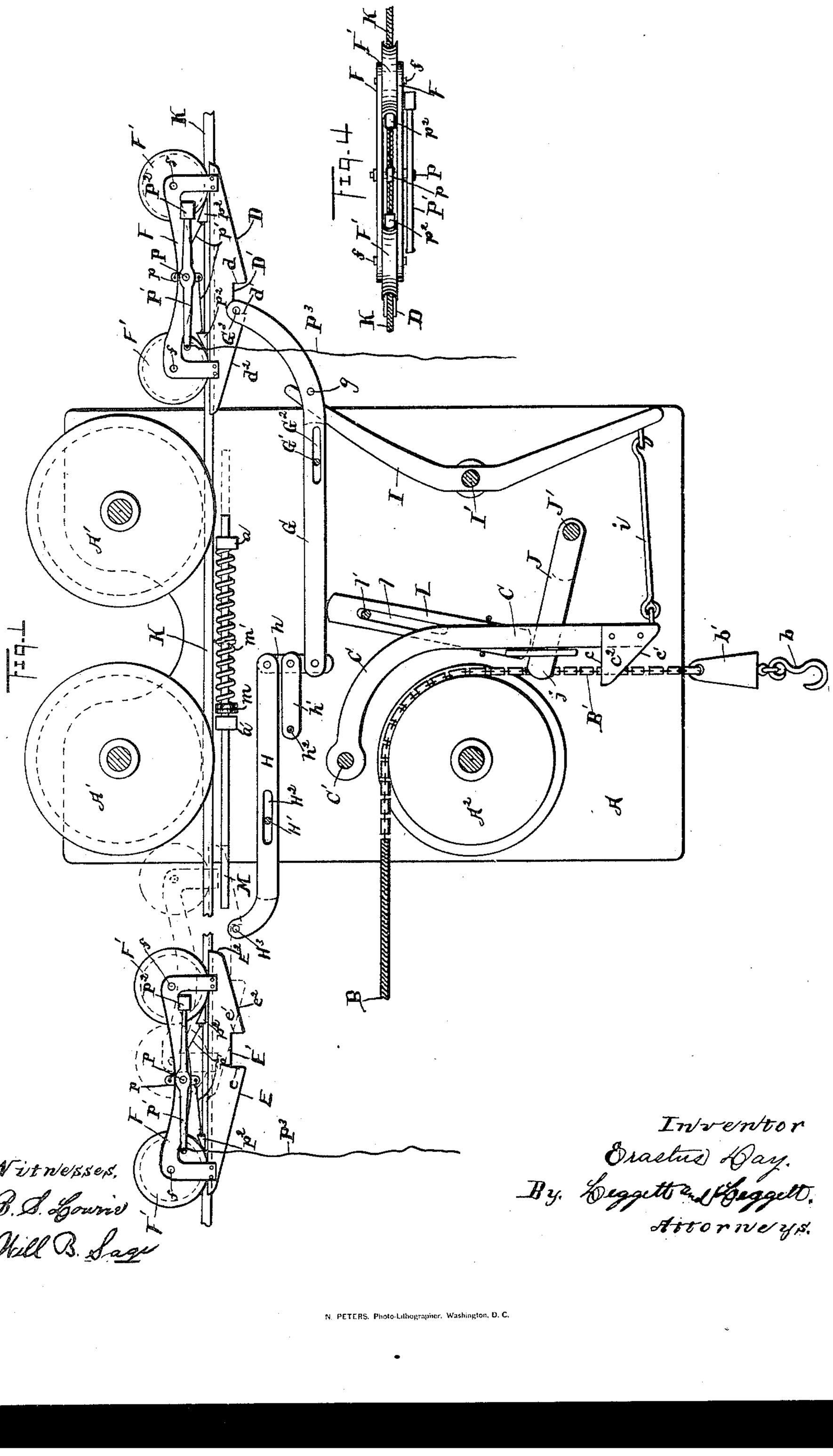
(No Model.) 3 Sheets—Sheet 1.

E. DAY.

HOISTING AND CONVEYING APPARATUS.

No. 419,004. Patented Jan. 7, 1890.



Witnesses,
B. S. Lowrie
Hill B. Sage

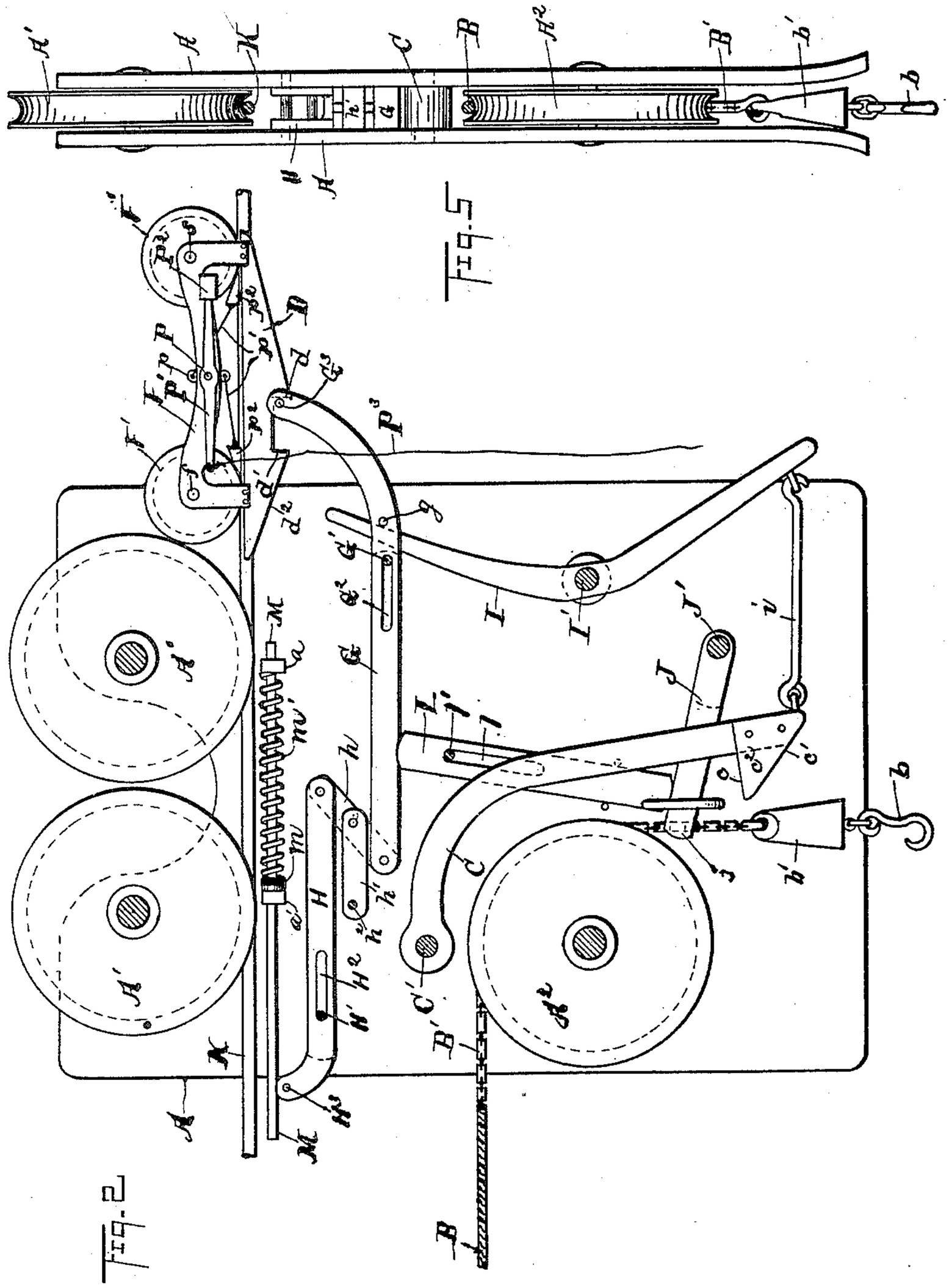
Inventor
Erastus Day.
By Leggett & Leggett.
Attorneys.

(No Model.) 3 Sheets—Sheet 2.

E. DAY.

HOISTING AND CONVEYING APPARATUS.

No. 419,004. Patented Jan. 7, 1890.



Witnesses.
C. L. Lewis
Will B. Sage

Inventor
Erastus Day.
By Leggett and Leggett.
Attorneys.

(No Model.) 3 Sheets—Sheet 3.

E. DAY.

HOISTING AND CONVEYING APPARATUS.

No. 419,004. Patented Jan. 7, 1890.

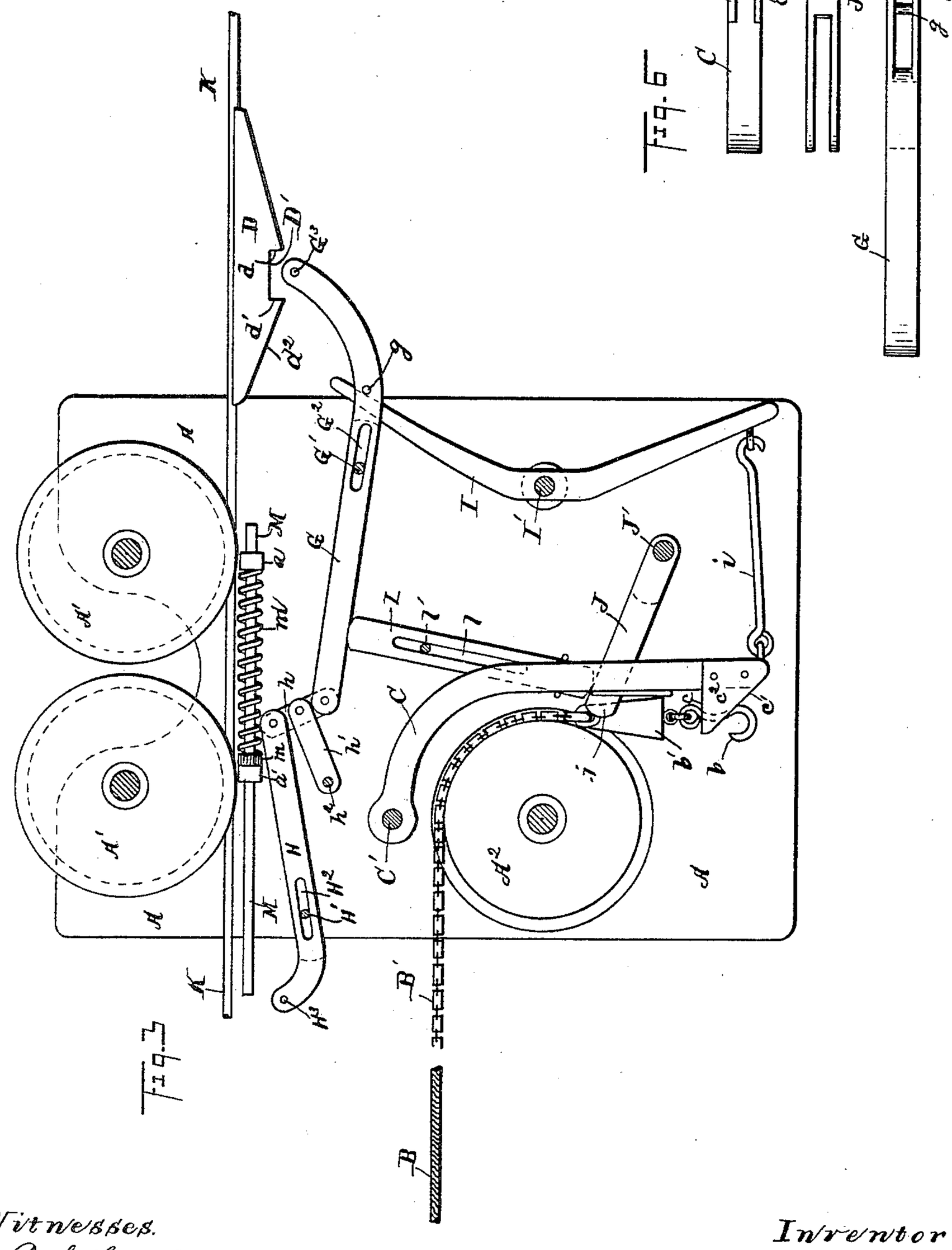


FIG. 7.

FIG. 6.

Witnesses.
C. L. Lowrie
Will B. Sage

Inventor
Erastus Day.
By Leggett and Leggett
Attorneys.

UNITED STATES PATENT OFFICE.

ERASTUS DAY, OF LAKEWOOD, OHIO.

HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 419,004, dated January 7, 1890.

Application filed September 3, 1889. Serial No. 322,815. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS DAY, of Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hoisting and Conveying 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 the same.

My invention relates to improvements in hoisting and conveying apparatus; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

Figures 1, 2, and 3 are side elevations showing different working positions, the front plate being removed. Fig. 4 is a plan in detail of one of the stop-blocks and attachments. Fig. 5 is an end elevation. Fig. 6 shows plans in detail of arm C and levers G and J.

A A represent metal plates constituting the frame or body of the carrier, these plates being rigidly connected by suitable studs, but are separated far enough to accommodate the internal mechanism, including wheels A′, adapted to travel on cable K. By arranging the carrier-wheels outside the plates, together with other slight changes that would readily be suggested to any workman skilled in the art, the carrier can just as well be adapted to travel on the tracks of a truss. We will, however, describe the device as shown for traveling on a supporting-cable K.

A^2 is a sheave, preferably of large size, on which the hoisting rope or cable B operates, this rope or cable terminating, preferably, in a short link or cable-chain B′, the end of the chain being provided with hook *b* or other appliance for attaching to the bail of the hoisting-bucket, the chain just above the hook being also provided with cone *b′*.

C is an arm of the curved variety shown, the same being pivoted to the one side of the center of gravity at C′ to and between plates A A. The free end of this arm is forked, as shown in Fig. 6, the two prongs thereof c^2 having square shoulders *c* above and having inclined edges *c′* below. The chain is embraced by prongs c^2, the arrangement being such that in elevating the bucket, when cone *b′* engages inclines *c′*, arm C is snubbed back by such engagement, but after the upward passage of the cone arm C returns by gravity to its normal position, whereby shoulders c^2 are carried under the base of the cone for holding the loaded bucket suspended from the carrier ready for conveying.

The mechanisms for drawing back arm C to release the load and for fastening and releasing the carrier at the respective terminals of the latter are as follows:

D and E are similar blocks adapted to engage the under side of cable K, block D being located at the hoisting-station and block E being located at the dumping-ground, and hence these blocks may be located any distance apart, but are placed in the reverse order shown. Block D has a notch D′ on the under side thereof, the end walls of this notch being vertical, presenting square shoulders *d* and *d′*, together with inclines d^2, leading to the notch. Block E has a notch E′, shoulders *e* and *e′*, inclines e^2, and a square end E^2 at the terminus of the incline. Each block D and E has side frames F attached, such frames extending up on either side and past cable K, with lateral studs *f* connecting the side frames, and on which studs are journaled wheels or sheaves F′, the latter resting on cable K, by means of which the respective blocks are held in position underneath the cable. A spindle P extends through lateral holes in side frames, and on the one end of the spindle outside these frames is mounted lever P′. The one end of this lever has attached a weight P^2, and the other end of the lever has attached a cord P^3, this cord extending to near the ground. Between the side frames a short lever *p* is mounted midway thereof on the spindle, the extremes of this lever, respectively above and below the spindle, being connected with rods *p′*, these rods in turn connecting, respectively, with wedges p^2. These wedges are adapted to enter between the sheaves of the cable K, whereby the sheaves are prevented from turning, and whereby the blocks D and E are respectively held firmly against cable K. The gravity of weights P^2 is sufficient to thrust and hold the wedges in such position, locking the blocks; but by pulling down on the respective cords the wedges are withdrawn or backed out,

thus releasing the blocks, so that they may be moved lengthwise of cable K, and in such movements, as the blocks are supported by sheaves traveling on the cable, it requires but a nominal power to shift the blocks. When the blocks shall have been respectively shifted to the desired position, by releasing the cords the wedges are again thrust under the sheaves by the gravity of weights P^2. The blocks D and E may, as will hereinafter be shown, be moved along cable K by means of the carrier.

G and H are tilting levers fulcrumed, respectively, on studs G′ and H′, these studs operating in slots G^2 and H^2 of the respective levers, so that these levers, besides their tilting movement, may slide endwise on their fulcrums as far as the slots thereof will admit. The inner or adjacent and overlapping ends of the levers are connected by link *h*, this link being pivotally attached at the center thereof to arm *h*′, the latter in turn being pivoted at h^2 to plate A, by which arrangement link *h* has a moving fulcrum, and the two connected levers G and H simultaneously move in reverse order endwise, and the gravity of the parts will hold the inner or connected ends of these levers depressed. The free upturned end of lever H is slotted for a short distance, so that the prongs thereof may pass astride blocks E, these prongs, near the ends thereof, being connected by transverse stud H^3, this stud being adapted to engage successively shoulders *e e*′ and inclines e^2. Lever G, at the free end thereof, has a similar but longer slot g^3, with stud G^3 at the end of the lever and studs *g* midway of the slot, but far enough removed from the end walls of the slot to admit loosely the upper end of lever I, the latter having considerable play between the stud and the end walls of the slot. Lever I is fulcrumed midway thereof at I′. The lower end of the lever is connected by link *i* with arm C aforesaid.

J is a lever pivoted at J′, the free end thereof *j* being forked to embrace chain B′, these prongs being sufficiently near together to engage the upper or middle section of cone *b*′. Resting upon lever J in the upright position shown is a sliding bar L, the upper end of this bar engaging the under side of lever G, near the left-hand end of the latter. Bar L is slotted at *l* for receiving stud *l*′, by which stud the lever is held in position, the length of the slot also limiting the end movement of this bar. Pins are also provided, such pins being fastened to one of plates A and extending astride the lower end of bar L to hold it in place, the upper end being held in position by the slot and stud aforesaid.

In operating the device, suppose the carrier bearing an empty bucket to be descending the grade of cable K—that is, moving to the right hand toward the hoisting-station. As the carrier approaches the hoisting-station, first stud G^3 will engage inclines d^2, and will pass from thence into notch D′ and engage shoulders *d*, by which engagement lever G will be shifted endwise toward the left hand, whereby stud *g* in engaging the lever I will tilt the latter, and by means of the connecting-links *i* will draw back lever C toward the right hand, thus causing shoulders *c* to be withdrawn from under the base of the cone *b*′, whereupon the bucket will descend, the hoisting-cable of course having been slacked off for the purpose. The empty bucket having been removed and a loaded bucket substituted, the draft of the cable in hoisting the load will first draw the carrier to the right hand, causing stud G^3 to engage shoulders *d*′, by which engagement lever G is shifted to the right hand, thus backing off stud *g* from lever I and leaving this lever free, whereupon arm C returns by gravity to its normal position ready to engage cone *b*′, the engagement of stud G^3 with shoulders *d*′ meantime holding the carrier from moving farther to the left hand. As the loaded bucket is drawn up and arm C is snubbed back, as aforesaid, by engagement with the cone, the cone next engages lever J, thereby tilting this lever upward and elevating bar L. The latter in turn tilts lever G, thereby causing stud G^3 to be disengaged from shoulder *d*′, thus releasing the carrier. The draft of the hoisting-cable instantly moves the carrier to the left hand, the weight of the loaded bucket meantime causing cone *b*′ to descend sufficiently to rest on shoulder *c*, which position of parts is retained until the dumping-ground is reached. As the carrier approaches block E stud H^3 rides inclines e^2 and enters notch E′, and the stud, by engaging shoulder *e*, shifts lever H to the right hand, thereby causing lever G to move to the left hand, whereby arm C is drawn to the right hand and the bucket is released for lowering. The bucket having been dumped, it becomes necessary for stud H^3 to engage shoulder *e*′ in order to shift lever H to the left hand, and thereby release arm C, so that when the bucket shall have been drawn up shoulder *c* may engage the base of the cone to hold the bucket elevated; but the draft of the hoisting-cable in elevating the bucket is toward the left hand, and consequently stud H^3 would remain in position engaging shoulder *e*, thus holding back arm C in its position to the right hand. To remedy this difficulty, I provide a horizontally-sliding bar M, located between plates A, just underneath cable K, bar M fitting loosely in holes in blocks *a* and *a*′, these blocks being secured to and between plates A. Bar M is provided with a collar *m*, and between the collar and block *a* is a strong spring *m*′, coiled around the bar and bearing against the collar and block *a*. The left-hand end of bar M protrudes beyond the carrier and engages the square end E^2 of block E, by which engagement bar M is moved toward the right hand and spring *m*′ is compressed, and simultaneously with the shifting of lever H to the right hand, caused by the engagement of stud H′ with shoulder *e*, bar M reaches its full

throw toward the right hand. Now, when the draft on the hoisting-cable is in the main relieved by dumping the load, the recoil of spring *m'* forces the carrier toward the right hand, thus causing stud H^3 to engage shoulder *e'* and thereby shift lever H to the left hand, thus releasing arm C, and when this shall have been accomplished spring *m'* will have expended only a part of its force. When, therefore, the bucket shall have been raised so that cone *b'* shall have engaged and tilted lever J, and thereby depressed stud H^3, so that the latter is disengaged from shoulder *e'*, the further recoil of spring *m'* will start the carrier to the right hand on its way down the incline of cable K, meantime the hoisting-cable having been slacked off, the first effect of which is to lower the bucket until the base of cone *b'* rests on shoulder *c*. The descent of the carrier toward the hoisting-station is of course controlled by the speed with which the cable is unwound from the hoisting-drum at the power-station. Either block D or E may be moved toward the right hand—that is, down the grade of cable K—by simply drawing down on cord P^3 to back the wedges, as aforesaid. If it is desired to move block E upgrade—that is, toward the left hand—it may be done by drawing down on the attached cord P^3 just as stud H^3 engages shoulder *e*, whereupon block E will be moved along with the carrier until such time as cord P^3 is released, whereupon the wedges will fasten the block, after which lever H will be shifted, as aforesaid. It may be added that it requires some little force to shift levers G and H and withdraw arm C from under the cone, and consequently the blocks D and E are much more easily moved when the wedges are withdrawn. Block D is moved to the left hand by drawing down on the connected cord P^3 while stud G^3 is bearing against shoulder *d'*.

The loaded bucket may be drawn by the hoisting-cable from under the deck of the vessel where the buckets are being loaded, the cone *b'* presenting no obstacle, as the cone will readily draw past the lower edge of the coamings. Chain B' will of course receive no injury from such practice, and is therefore substituted for a rope or cable for a distance, say, of fifty feet, more or less, or long enough to reach from the hold of the vessel past sheave A^2; second, the whirling of the bucket and the consequent twisting of the chain do no harm, as the chain in hoisting the bucket is always embraced by the prongs of arm C, and these prongs are so near sheave A^2 that the swaying of the chain as the bucket reaches this point will be quite insignificant and will do no harm, and of course, as the sides of the cone are alike, whether the chain is twisted or not will make no difference with the operation of the cone.

What I claim is—

1. In hoisting and conveying apparatus, the combination of a carrier with stop-blocks mounted on wheels and located, respectively, at the termini of the carrier, wedges for blocking the wheels of the stop-blocks, a lever, a weight, and connecting mechanism for normally blocking the wheels of the stop-blocks, such lever having connected therewith cords for backing the wedges by hand, substantially as set forth.

2. In hoisting and conveying apparatus, the combination, with stop-blocks having notches, of a carrier having tilting and longitudinally-movable levers adapted to engage such notches at the termini of the carrier, a hoisting-cable and a cone connected therewith, and connecting mechanism for shifting the tilting levers by the upward movement of the cone, substantially as set forth.

3. In hoisting and conveying apparatus, the combination, with stop-blocks having notches, a carrier, and tilting levers connected with the carrier for engaging such notches at the termini of the carrier, of a cone connected with the hoisting-cable for tilting such levers, whereby the levers are disengaged from the notches of the stop-blocks, such tilting levers having end movement, and connecting mechanism whereby the load is released by the end movement of such tilting levers, caused by their engagement with the stop-blocks, substantially as set forth.

4. In hoisting and conveying mechanism, the combination, with a carrier, tilting and longitudinally-movable levers, and stop-blocks, substantially as indicated, of a spring-actuated push-bar connected with the carrier and adapted to engage the stop-block at the dumping-ground terminus of the carrier, substantially as set forth.

5. In hoisting and conveying apparatus, the combination, with stop-blocks and a carrier, of tilting levers connected with and projecting from each end of the carrier for engaging the respective stop-blocks at the termini of the carrier, such tilting levers having end movement on their respective fulcrums, and a link connecting the opposing ends of the tilting levers, such link having a movable fulcrum, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 15th day of July, 1889.

ERASTUS DAY.

Witnesses:
CHAS. H. DORER,
ALBERT E. LYNCH.