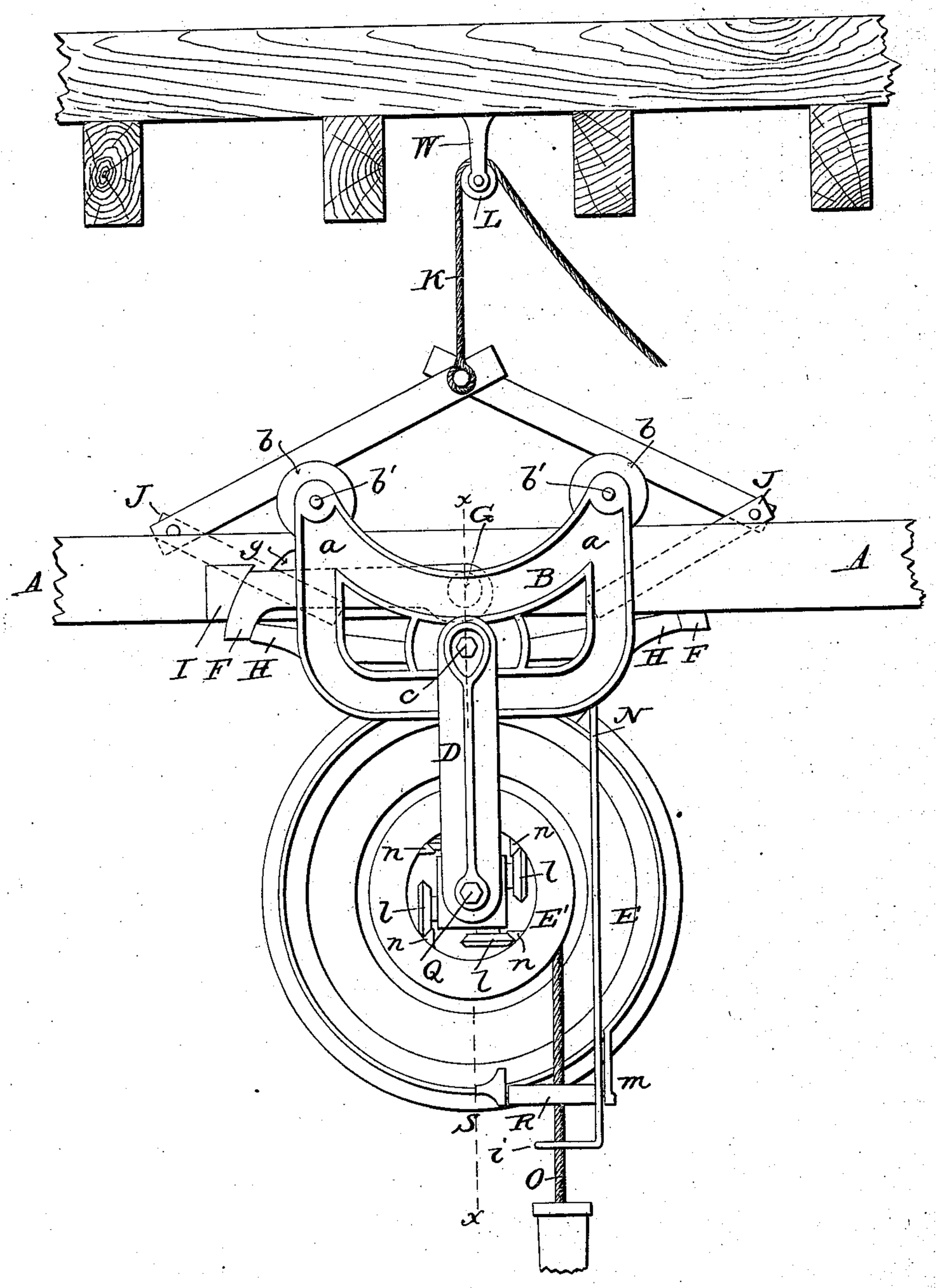
(No Model.) 4 Sheets—Sheet 1.

E. D. MEAD.

HAY OR GRAIN ELEVATOR.

No. 377,492. Patented Feb. 7, 1888.

Fig. 1.



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(No Model.)

4 Sheets—Sheet 2.

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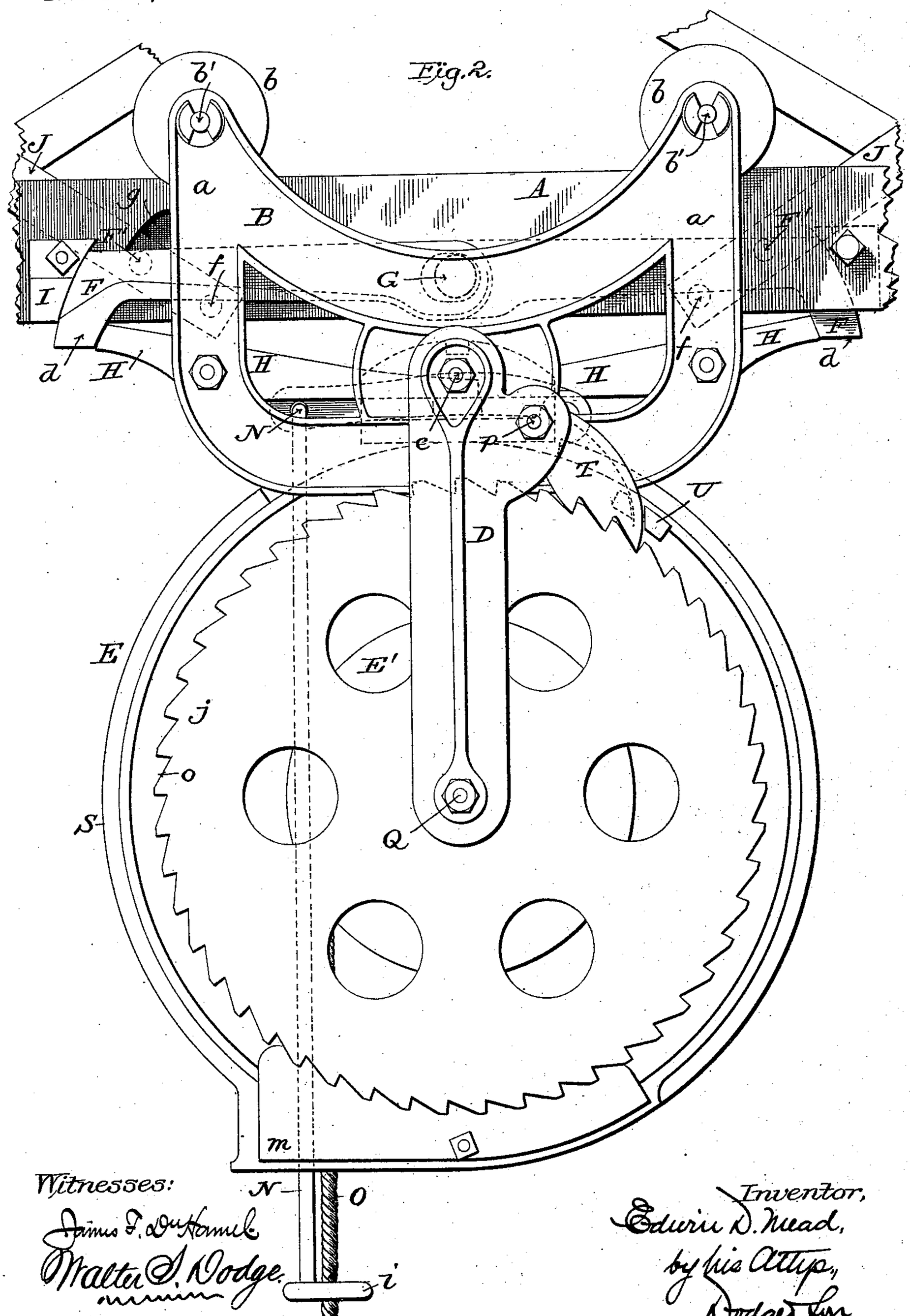
Fig. 2.



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(No Model.)

4 Sheets—Sheet 3.

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HAY OR GRAIN ELEVATOR.

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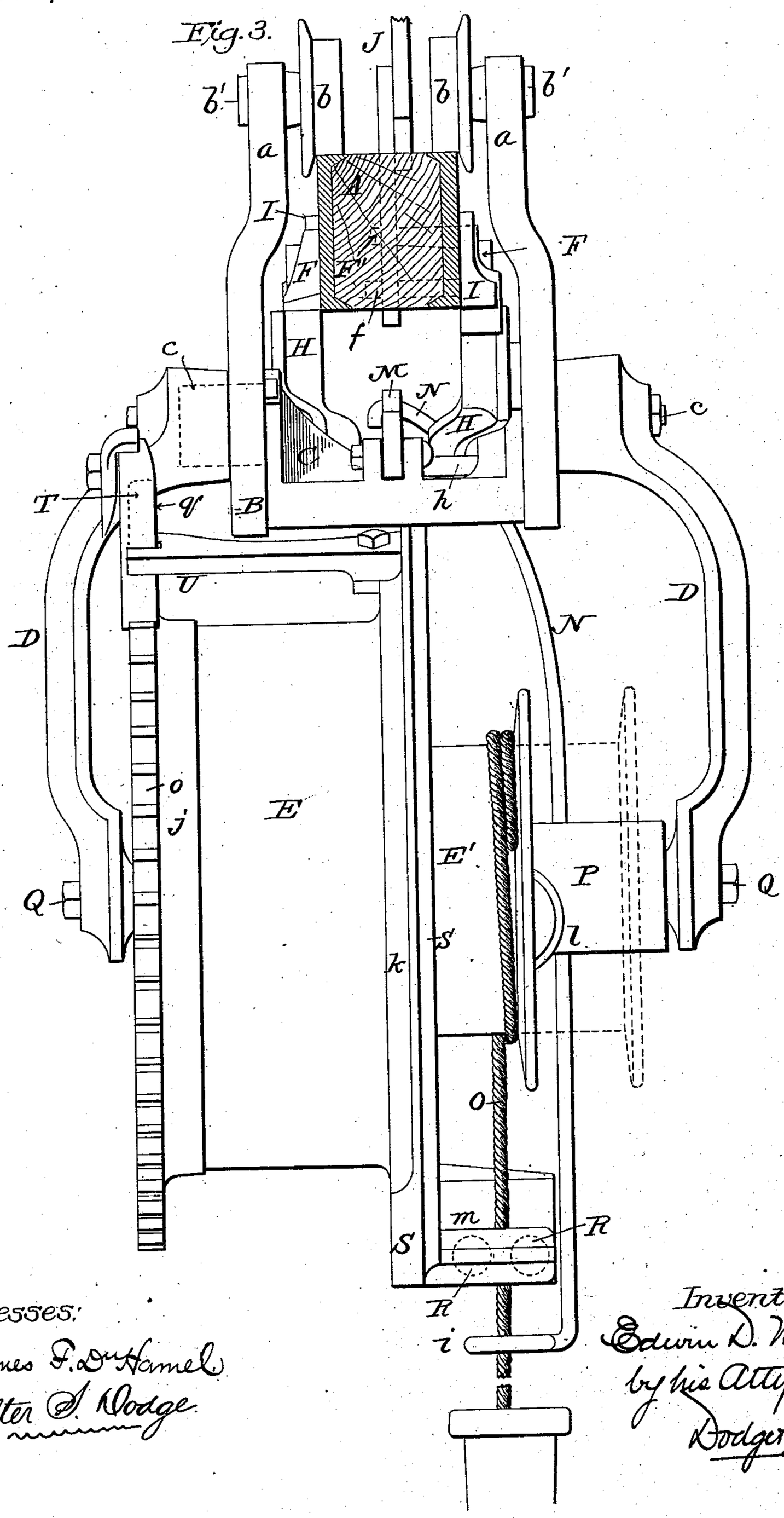
Fig. 3.



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E. D. MEAD.

HAY OR GRAIN ELEVATOR.

No. 377,492. Patented Feb. 7, 1888.

Fig. 4.

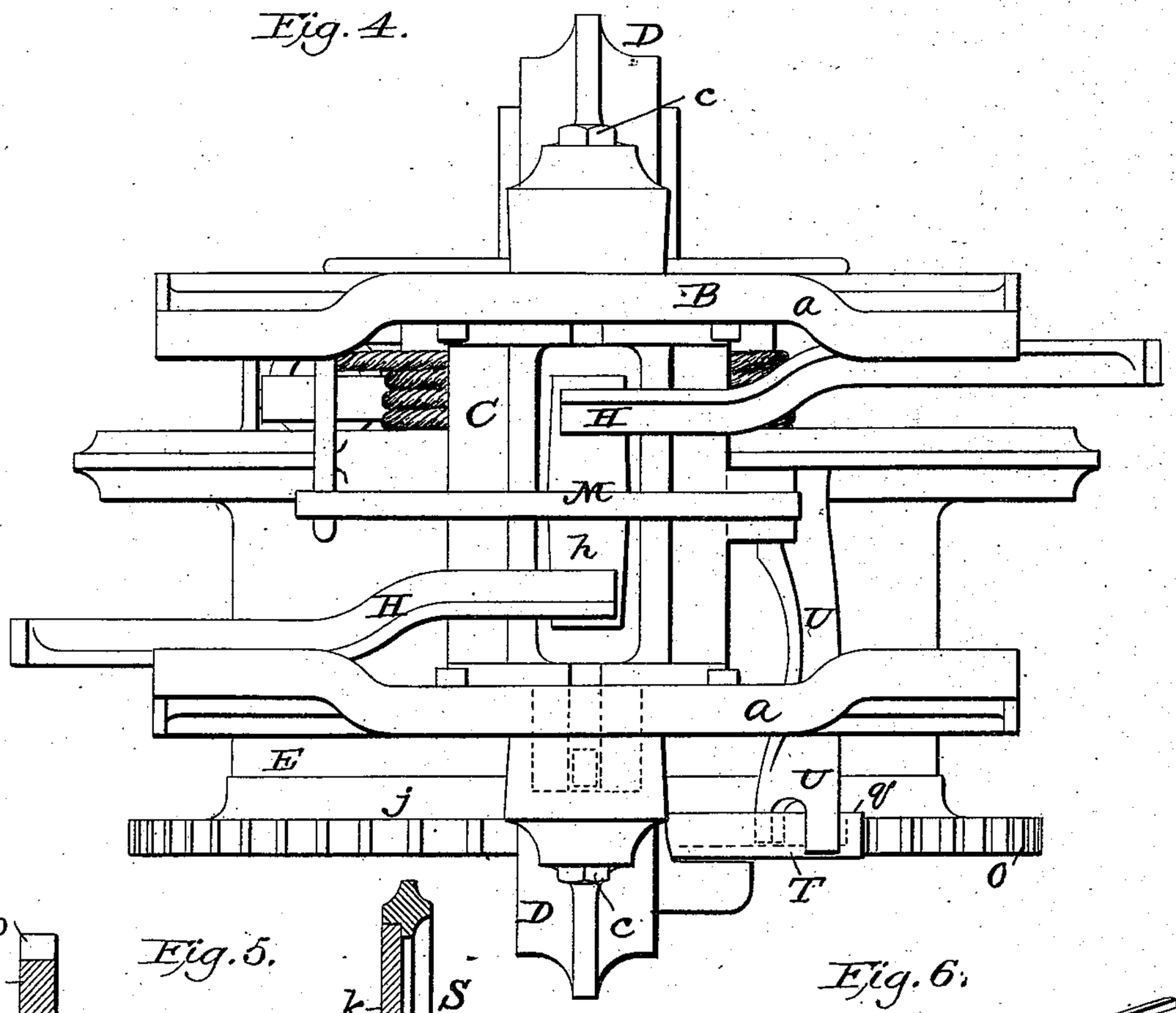


Fig. 5.

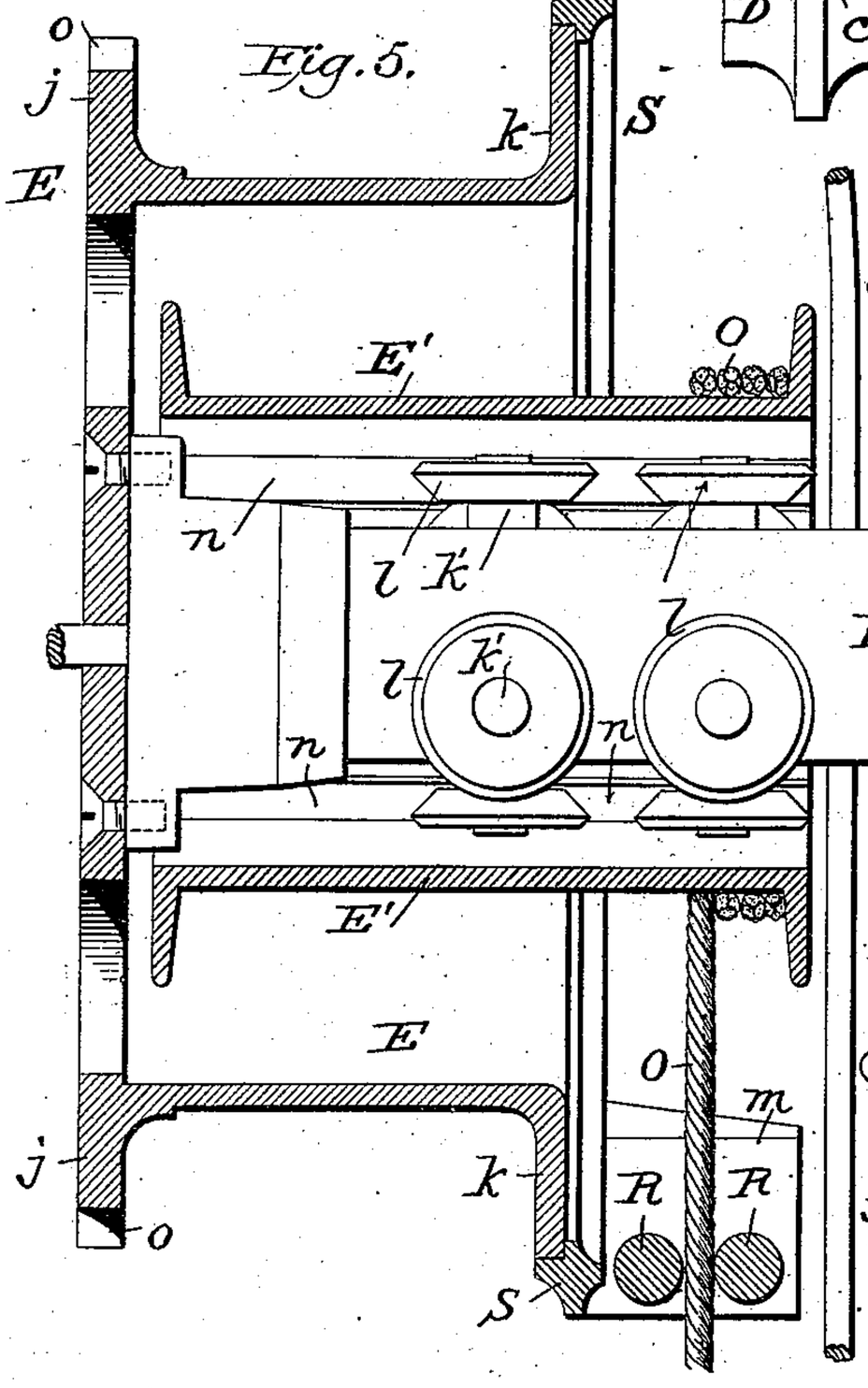
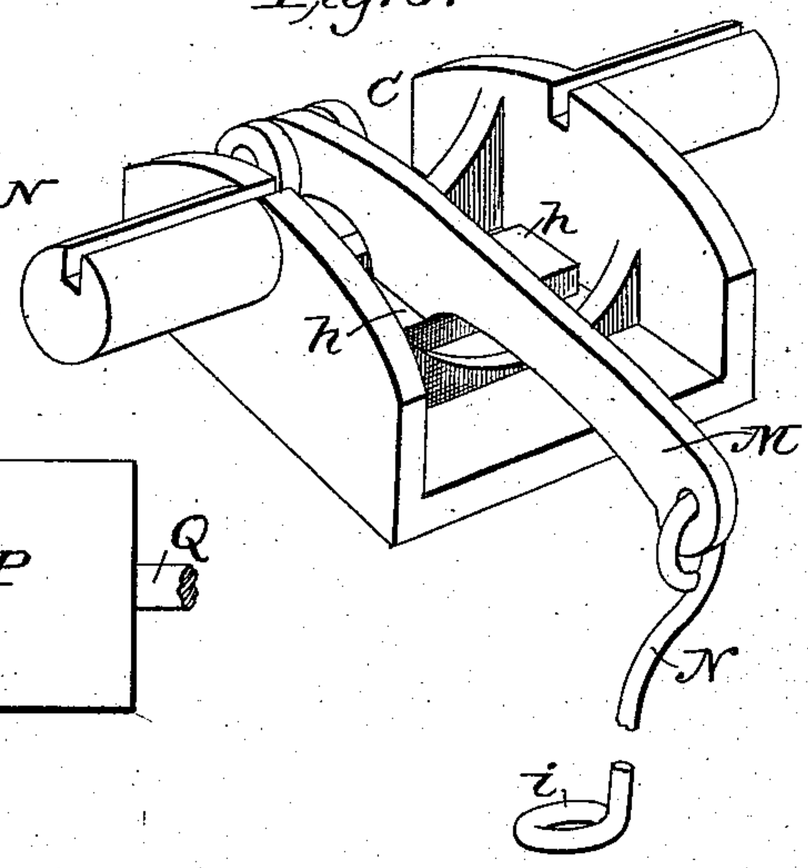


Fig. 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

EDWIN D. MEAD, OF SHORTSVILLE, NEW YORK.

HAY OR GRAIN ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 377,492, dated February 7, 1888.

Application filed April 18, 1887. Serial No. 235,220. (No model.)

To all whom it may concern:

Be it known that I, EDWIN D. MEAD, of Shortsville, in the county of Ontario, and State of New York, have invented certain new and useful Improvements in Hay or Grain Elevators, of which the following is a specification.

My invention relates to grain or hay unloaders, elevators, and carriers, and more especially to that class in which slings are employed.

The invention is designed to obviate the necessity of clamping the rope for the purpose of holding the load when elevated, to permit the car to be released with the load at any height, to give increased power for lifting, and generally to improve the construction and operation of the apparatus.

In the accompanying drawings, Figures 1 and 2 are side elevations of my improved apparatus, taken from opposite sides. Fig. 3 is an end or front view. Fig. 4 is a top plan view; Fig. 5, a vertical central section on the line *x x*, Fig. 1; and Fig. 6, a detail view.

Heretofore it has been the more general practice to hold the load at the desired elevation by means of a clamp acting directly upon the rope, and this has resulted in the rapid wear and injury of the rope, besides being unsatisfactory in operation. I obviate this difficulty by using a windlass or drum, to which the hoisting-rope is secured and upon which it is wound, and I lock the drum to prevent the descent of the load. I also provide a tripping or releasing device under the control of the attendant, by which the car may be released regardless of the height of the load.

The construction may be better understood upon referring to the drawings, in which—

A indicates a beam constituting the track for the car B, which beam will be secured as usual at a convenient height in the barn or other structure in which the device is to be used.

The car or carriage consists of two side plates, *a a*, each provided with two rollers, *b b*, preferably flanged, as indicated in Fig. 3, the rollers being carried by short studs or axles *b'*, projecting inward from the inner faces of the side plates, *a a*. By this arrangement a space is left between the opposing faces of the rollers *b b*, which permits the car to clear any devices which may be arranged at the top of the track—a construction rendered necessary by the use of certain devices hereinafter explained.

Connecting the side plates, *a a*, journaled therein and projecting outward beyond the outer faces of each, is a plate or block, C, from the projecting arms *c* of which are hung two arms or hangers, D, by which the compound windlass E E' is suspended and carried, a bolt, Q, passing through said arms and windlass and forming an axle for the latter.

As shown in Fig. 6, the projecting arms *c* of the block or plate C are grooved or slotted to receive a spline or feather of the hangers, by which the plate or block is caused to maintain a fixed relation to the arms or hangers and is prevented from tipping appreciably out of the horizontal position, the weight of the windlass and hangers and the load carried thereby being below the block or plate C and the latter being journaled in the car.

The car or frame is free to adapt itself to any inequalities or irregularities in the track, rising and falling freely at either end, while the block or plate C, by reason of the weight suspended from it, maintains its horizontal position.

Secured to each side of the beam A is a pivoted locking-bar, F, one end of which is slotted to receive a pivot pin or bolt, G, and the opposite end of which has a downwardly-turned portion, *d*, against the inner face of which a locking-lever, H, of the car engages. The locking-bars F, at opposite sides of the beam, have their locking ends *d* turned away from each other, while their inner ends are carried by pivot pin or bolt G, as indicated in Fig. 2, and the same is true of the locking-levers H, which are placed one at each side of the car B in the proper position to engage with one of the locking-bars F. The outer end of each of the locking-bars F is curved on the arc of a circle, as indicated in Figs. 1 and 2, and bear against a similarly-curved face of a fixed block, I, bolted or otherwise made fast to the side of the beam A. The curvature of the outer face of bar F and of the inner face of block I is or may be slightly eccentric to the pivot pin or bolt G, so that in rising the bars F shall be forced backward toward their pivot and in

falling shall move outward, but in all cases bear directly against the block I, so as to relieve the pivot G of any considerable portion of the strain brought upon the locking-bars. Each bar F is formed with an inwardly-projecting lug or stud, F′, as shown in Fig. 3, which extends through a hole or opening in a lever, J, pivoted in the beam at *f*, Figs. 1, 2, and 3, the arm F′ of the locking-bar F extending through a slot, *g*, in the beam A to the lever J, as indicated in Figs. 2 and 3. A lever, J, is provided for each of the locking-bars F, and the upper end of each lever J is connected, either by a bar or by a wire cord or equivalent means, to a cord or rope, K, which passes upward through a guide, W, and over a pulley, L, above the beam, and thence down to the floor of the barn or to such other point as may be convenient to the attendant. From the foregoing description and by reference to Figs. 2 and 3 it will be seen that if this cord K be pulled so as to raise the levers J the locking-bars F will be raised flush with the lower face of the beam A and the locking-levers H will meet with no obstruction; hence the car B may be drawn in either direction at will, and this regardless of the elevation of the load. Ordinarily, however, it is desirable to raise the load up to a point near the car and to have the locking-levers H automatically trip when the load reaches its highest elevation, so that no care of the attendant shall be necessary to secure the release of the car at the proper time; hence I provide the plate or block C with an arm or lever, M, Figs. 3, 4, and 6, pivoted at one end to said block and provided with laterally-projecting arms *h*, which extend beneath the inner ends or tails of the locking-levers H and serve, when lifted, to elevate the inner ends and depress the outer ends of the locking-levers H, so that they shall clear the depending ends of the locking-bars F and allow the carriage to move forward or backward as required.

From the free end of the arm or lever M is suspended a wire or rod, N, the lower end of which terminates in a ring or loop, *i*, through which the hoisting-rope O passes. This ring *i* is smaller than the head of the shir-pulley block or other sling-holding device, and consequently when the load reaches its highest elevation it is struck by such pulley-block or other device and lifted, thereby lifting the lever M and the tails or inner ends of the locking-levers H, and causing the disengagement of said locking-levers from the locking-bars F, leaving the car free to move along its track.

It is desirable to provide greater leverage or power for lifting than has heretofore been usual or practicable for the slings, in order that large quantities of hay or heavy loads of any kind may be taken out when hauled, and for this purpose I construct the windlass or hoisting-drum of two parts differing in diameter, the draft-rope being wound upon the drum or section of larger diameter and the elevating-rope being carried by the drum or section of smaller diameter. By this means I am enabled to get an increase of lifting power proportionate to the difference in diameter of the two drums or sections of the windlass—a result which has not been attainable under previous constructions for a simple shir, so far as I am aware.

The construction of the windlass will be better understood on referring to the several figures of the drawings, in which E indicates the larger or draft-rope section, and E′ the smaller or hoisting-rope drum. As shown in Fig. 5, the larger section, E, is formed with one head or disk, *j*, from which the drum E projects in the form of an annular cylinder with a radial flange or rim, *k*.

P indicates a central post or stem projecting from the disk or head *j* of the drum E in the direction of the axis of the drum and beyond the open end thereof, as plainly shown in Fig. 5, this post being centrally bored for the passage of the bolt or axle Q.

Each face of the post P, which is preferably, though not necessarily, of rectangular form in cross-section, is furnished with two or more short cylindrical studs, *k′*, which form axles for rollers *l*, which overhang one face of the post, as indicated in Fig. 5. These rollers are preferably beveled inward or toward their rear faces, as shown in Fig. 5, and form bearings for ribs *n*, extending longitudinally along the inner face of the smaller drum or section, E′, of the windlass.

It is obvious that the rollers may be placed in the smaller drum on suitable bearings, and the post or stem be the track or way for the rollers to run upon. Under this construction the section E′ is free to move longitudinally back and forth into and out of the hollow section E of the windlass, but is compelled to turn with the same about its axis. This longitudinal movement is provided, in order to compensate for the winding of the hoisting-rope O upon said section E′, in order that the hoisting-rope may always descend from the center of the apparatus, or practically so, and thus prevent the tipping of the car or carriage, which would otherwise occur and which would materially interfere with its proper travel along the track.

From the drum E′ the hoisting-rope O, which has one end attached to said drum, passes between guide-rollers R which are mounted between two plates, *m*, projecting from a band or hoop, S, which encircles and is free to move upon the rim *k* of drum E, within which the drum may rotate, the movement of the band or hoop S being limited by contact or engagement with the block C.

The periphery of the head or disk *j* of the drum E is formed with ratchet-teeth *o*, with which a locking-dog, T, pivoted to one of the arms or hangers D, engages to prevent the backward rotation of the drum or windlass. This dog is formed, preferably, with three teeth, one of which is arranged to stand as nearly under its pivot *p* as practicable when in en-

gagement with the teeth, whereby it is caused to rotate with great power and to engage promptly with the teeth when a backward motion begins, and thereby to lock the ratchet before it acquires any considerable speed by backward rotation. The pawl or dog T is formed with a lateral flange, *q*, which is straddled by the forked end of the arm U, projecting from the band or hoop S, and serving to lift the pawl or dog T out of engagement with the ratchet when the windlass is turned in the direction to elevate the load and to throw the same into engagement when the rotation is in the opposite direction. The hoop or band S, while free or loose upon the rim of the drum, will turn therewith to the extent of movement allowed by reason of the friction between the two parts, which is considerable because of the weight of the hoop and the large amount of surface in contact. It will thus be seen that so long as the draft-rope is under tension and the load is being elevated the dog T will be lifted and held out of engagement with the ratchet and will consequently make no noise nor interfere with the free movement of the parts, but that the instant said rope is slackened and the backward rotation of the drum caused by reason of the weight of the load the band or hoop S, moving backward with the drum or windlass, causes the dog T instantly to engage with and lock the ratchet, and thus prevent descent of the load.

If it is desired to only partially elevate the load and then to release the car and permit it to travel to a point at which the load is to be deposited, it is only necessary to permit the draft-rope to be drawn until the load reaches its desired elevation, and then to draw the cord K and thereby release the car or carriage, when the load will at once move off in answer to the strain upon the draft-rope, the movement of the cord requiring much less power than the elevation of the load. When the car moves off, the load will be at once locked in the manner just explained.

To release the load and permit it to descend, the shir-sling will ordinarily be released and the load allowed to fall without permitting the hoisting-rope to unwind and descend; but when it is desired to lower the hoisting-rope it may be done by drawing said rope against the guide-rollers R farthest from the axis of the windlass, and thereby causing the hoop or band S to rotate upon the drum E and to lift the dog or pawl T out of engagement with the latter, for which purpose the trip rope or cord attached to the shir-pulley is used by the attendant.

It will be seen from the foregoing description that the device is applicable for unloading, elevating, and transporting hay, grain, or other matters, and that it is consequently susceptible of various applications other than merely unloading and elevating hay.

It is obvious that the guide carried by the ring or hoop S, and through which the hoisting-rope passes, may be of any suitable construction, the rollers shown and described being preferred, for the reason that they do not materially impede the movement of the rope and do not wear or cut said rope.

I am aware that it has been proposed to provide a track with two stops, either of which was arranged to act in conjunction with one of a pair of levers upon the carriage in such manner as to prevent the latter from riding over the stop when moved in one direction, but not prevent it from moving away therefrom in the opposite direction.

Under the construction shown and described by me the carriage is prevented from moving in either direction, as both of the stops on the rails engage with the levers on the carriage, and thereby lock it against movement upon the track.

Having thus described my invention, what I claim is—

1. In combination with a car or carriage, a windlass carried thereby, consisting of two parts, one movable within the other, whereby the rope wound upon the movable portion may be caused to draw always in a given line, and thus prevent the tipping of the car by the load.

2. In a hay loader and unloader, the combination, with a fixed rail or track, of a car movable thereon and provided with rigid depending arms D, and a windlass or drum suspended from the arms, substantially as and for the purpose set forth, whereby the windlass is adapted to maintain at all times a given position, regardless of the rising and falling of the car in traversing the track.

3. In combination with a rail or track, as A, a car or carriage consisting of side frames, *a*, provided with wheels or rollers *b*, a cross bar or plate, C, journaled in said frames, hangers D, carried by the plate C, and a drum or windlass carried by the hangers D, all substantially as described and shown.

4. In combination with a car, as B, a compound windlass suspended therefrom and consisting of drums E E′, concentric with each other, the drum E′ being movable within and relatively to the drum E, substantially as shown and described, whereby the hoisting-rope O is caused to draw always from a point at or about the center of the car, substantially as set forth.

5. In combination with a car adapted to traverse a rail or track, a drum, E, carried by a shaft or axle suspended from the car, a post, P, carried by the drum E, and a hollow drum, E′, mounted and movable upon the post P, substantially as shown.

6. In combination with a car, a drum, E, suspended therefrom and provided with an axle-post, P, having rollers *l*, and a hollow drum, E′, provided with ribs *n* to rest and travel upon said rollers.

7. In combination with a car, as B, hangers D, extending downward therefrom, a cross bolt or shaft, Q, connecting said hangers, a drum, E, provided with a central post or stem, P,

and having a ratchet-rim, *o*, a dog, T, pivoted to a portion of the car and adapted to engage with the ratchet-rim, a hoop or rim, S, fitting and free to move a limited distance upon the smooth rim of drum E and provided with an arm, N, in engagement with the pawl T, a guide carried by said rim or hoop, a hollow drum, E′, mounted and movable upon post P, and a hoisting-rope, O, attached to drum E and passing downward through the guide, substantially as shown and described.

8. In a car for hay elevators and carriers, the combination of independent side plates, a cross-plate journaled therein, and a windlass suspended from said cross-plate, substantially as set forth, whereby each of the side plates is enabled to move independently of the other and of the windlass and thus to accommodate itself to any irregularities in the track or rail.

9. The combination of a car, as B, hangers D, extending downward therefrom and connected by a cross rod or bolt, Q, a drum, E, mounted and free to rotate upon said rod or bolt, and provided with a ratchet-rim, a dog, T, arranged to engage with said ratchet-rim, a hoop or ring, S, mounted and free to rotate a limited distance upon the smooth rim of said drum, and an arm, U, carried by said hoop and engaging with the dog T, whereby the rotation of the ring or hoop in one direction is caused to lift the dog out of engagement with the ratchet-rim, and its rotation in the other direction is caused to throw the dog into engagement therewith, substantially as explained.

10. In a hay elevator and carrier, the combination, with a car, of a windlass consisting of two sections connected one with the other, substantially as described, whereby they are caused to rotate in unison, but one is permitted to move longitudinally relatively to the other.

11. In combination with car B and drum E, suspended therefrom, drum E′, longitudinally movable relatively to drum E, a hoop or ring, S, mounted loosely upon the rim of drum E, and a guide carried by said hoop or ring and adapted to receive the hoisting-rope O.

12. In combination with a rail or track, as A, a car, as B, movable upon said rail or track, locking-bars F, pivoted to said rail or track, locking-levers H, carried by the car and arranged to rise between and engage with the locking-bars F, a plate, C, pivoted in the car B and extending beneath the levers H, and a lifting-rod extending from said plate downward to a point below the car and encircling the hoisting-rope, whereby the locking-levers may be drawn out of engagement when the load is elevated to or nearly to the car.

13. In combination with a supporting rail or track and with a car having locking-levers to hold the car at a given point on said track, locking-bars pivoted to the rail or track and arranged to be carried into or out of position between the ends of the locking-levers, substantially as shown, whereby when the carriage is locked in position it is prevented from moving in either direction.

14. In combination with a rail or track, A, and with a car, as B, provided with hoisting mechanism, locking-bars F, pivoted to the supporting rail or track and separated a distance at their inner ends, and locking-levers H H, carried by the car and arranged to rise between and engage with the bars F, substantially as shown, whereby the car when locked in position is prevented from moving in either direction.

15. In combination with a rail or track, as A, and a car, as B, provided with hoisting mechanism and with locking-levers, as H, locking-bars F, pivoted to the rail or track A and provided with projecting arms F′, levers J, pivoted to the track or rail and engaging with the arms F′, and a lifting-cord, K, connected with the levers J, whereby said levers, and with them the locking-bars, may be raised to permit the release of the car.

16. In combination with rail A, provided with blocks I, locking-bars F, slotted at one end to receive a pivot, G, and curved at their opposite ends to conform to the curvature of the blocks I.

17. In combination with a rail and a car mounted movably thereon, hangers D, extending downward from said car, a drum, E, carried by said hangers and provided with a ratchet-rim, and a dog, T, provided with a series of teeth and arranged to engage with the ratchet-rim, substantially as set forth.

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

EDWIN D. MEAD.

Witnesses:

OLIVER S. TITUS,

RICHARD B. SHELDON.