

**No. 677,610.**

**Patented July 2, 1901.**

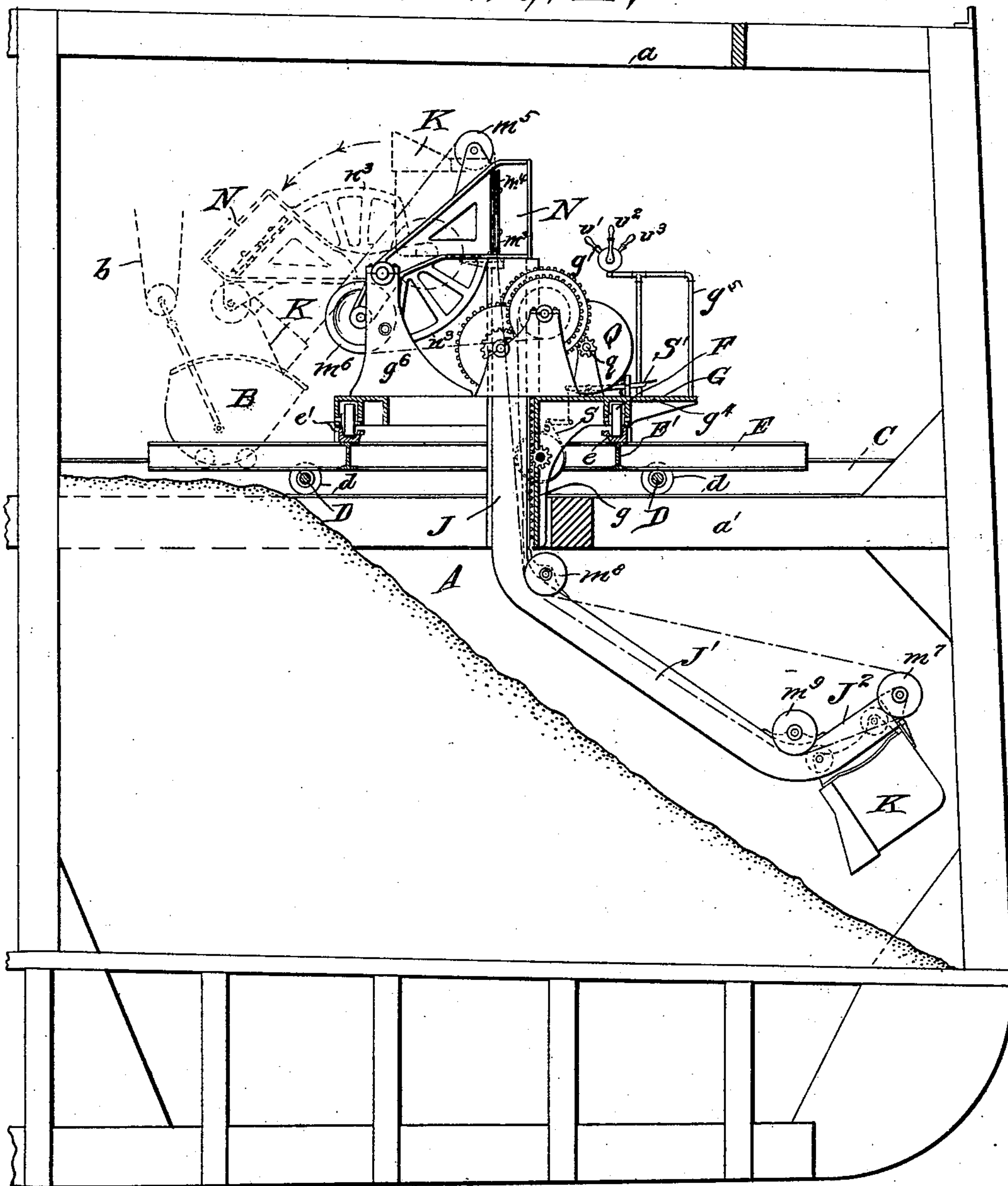
**R. THEW.**  
**UNLOADING APPARATUS.**

(Application filed Aug. 29, 1900.)

(No Model.)

**4 Sheets—Sheet 1.**

Fig. 1,



Witnesses  
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J. D. Ammer

Inventor:  
Richard Thew,  
By his Attorneys,  
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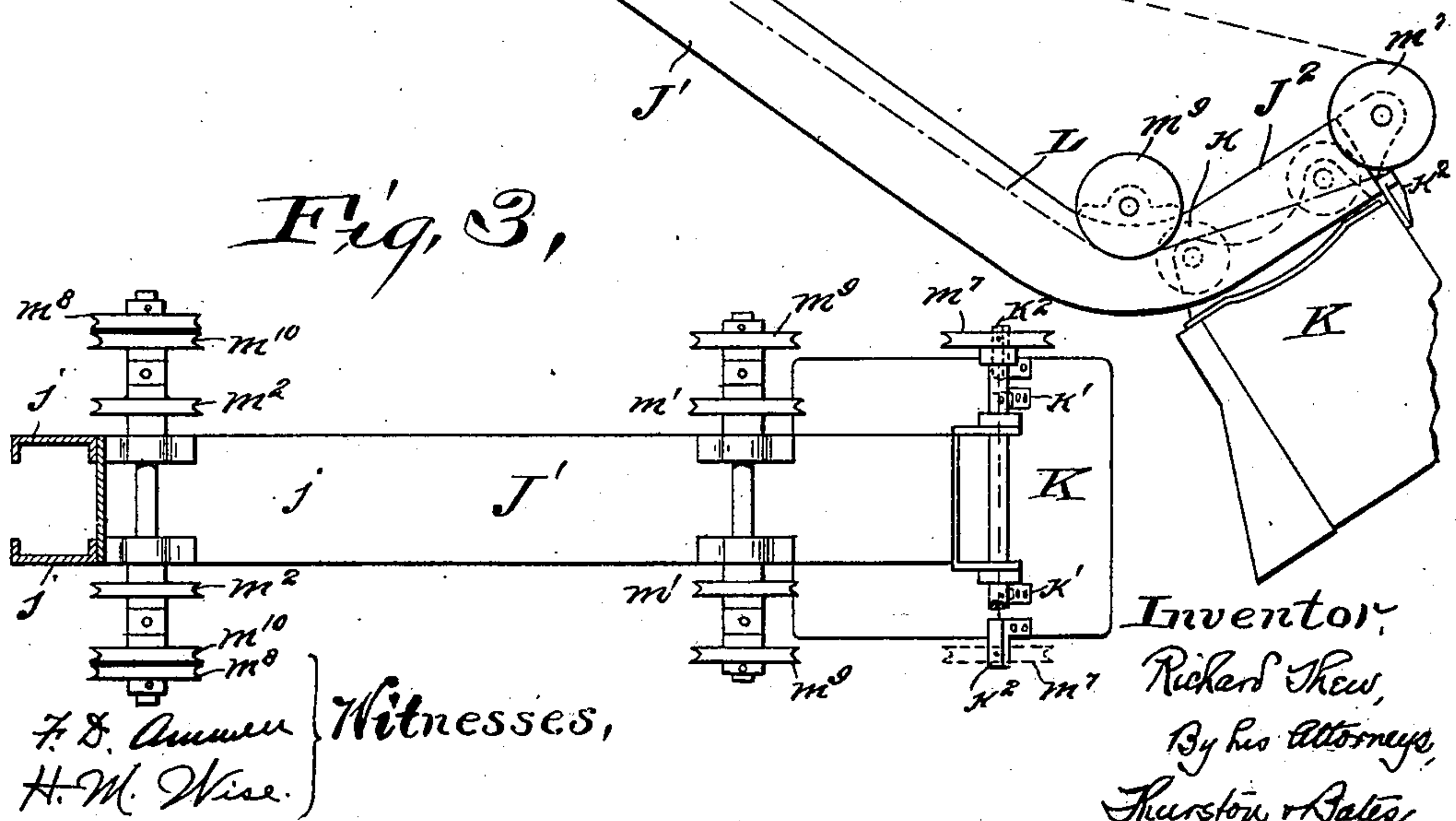
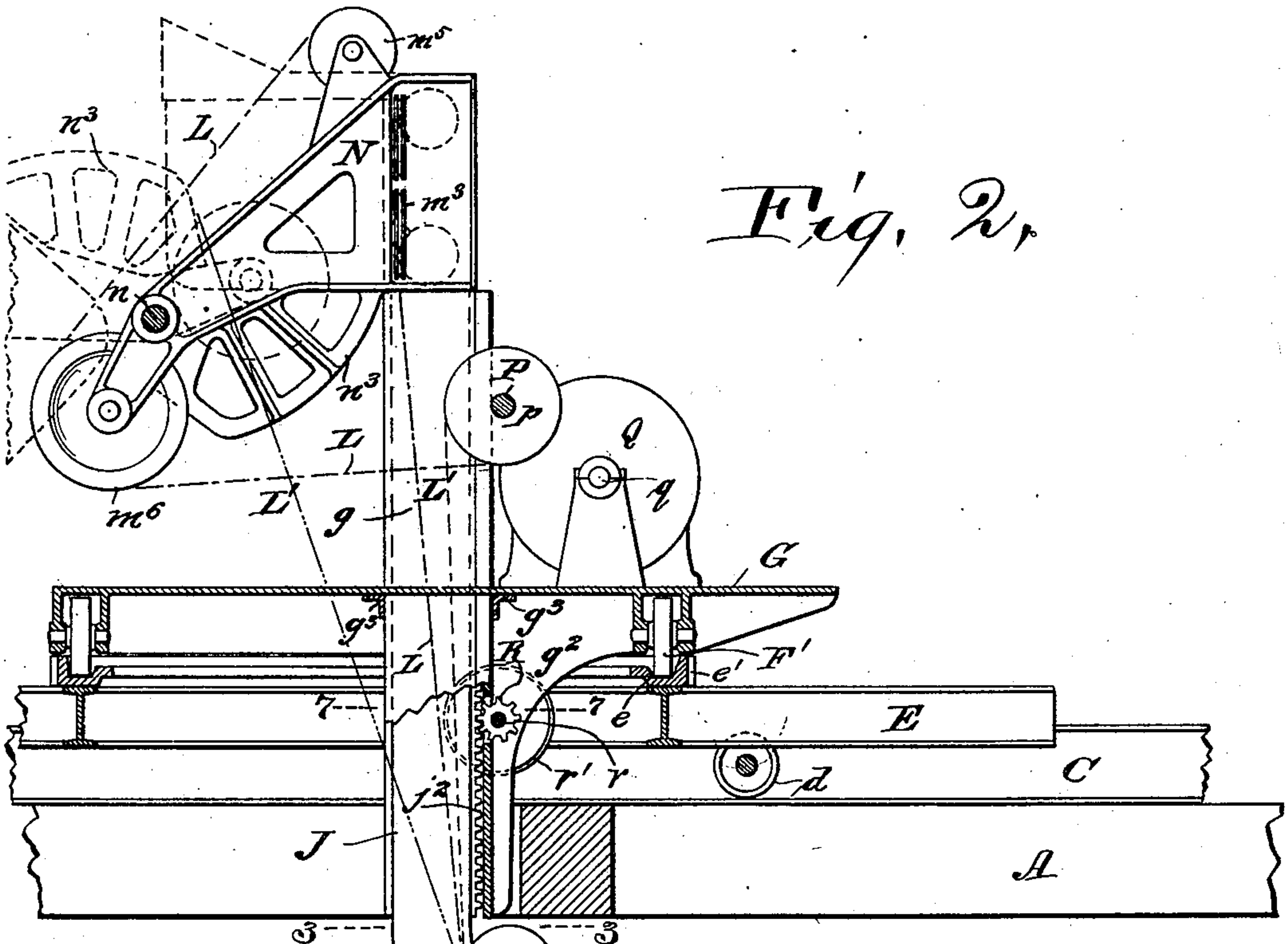
**R. THEW.**

## UNLOADING APPARATUS.

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(No Model.)

**4 Sheets—Sheet 2.**



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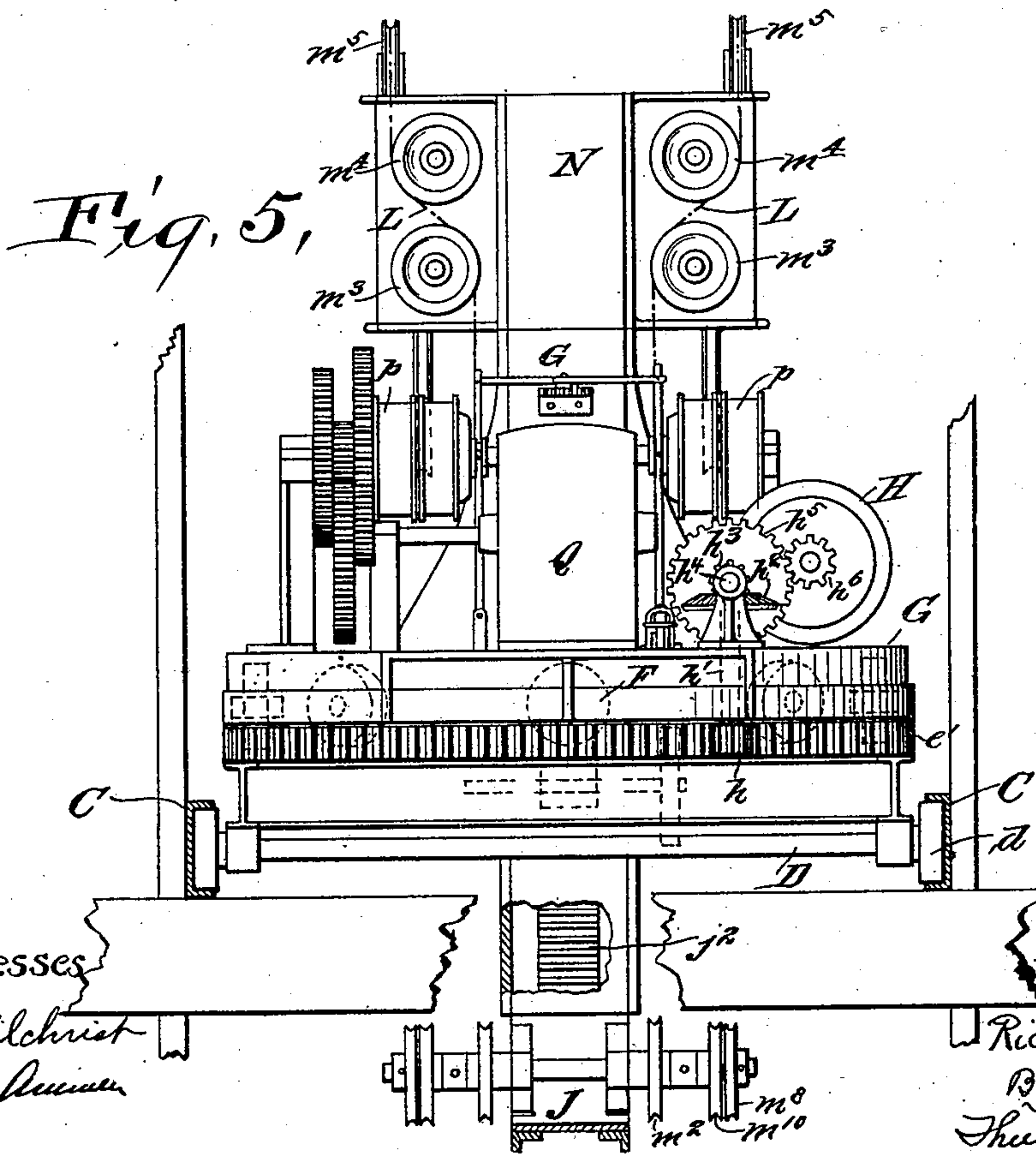
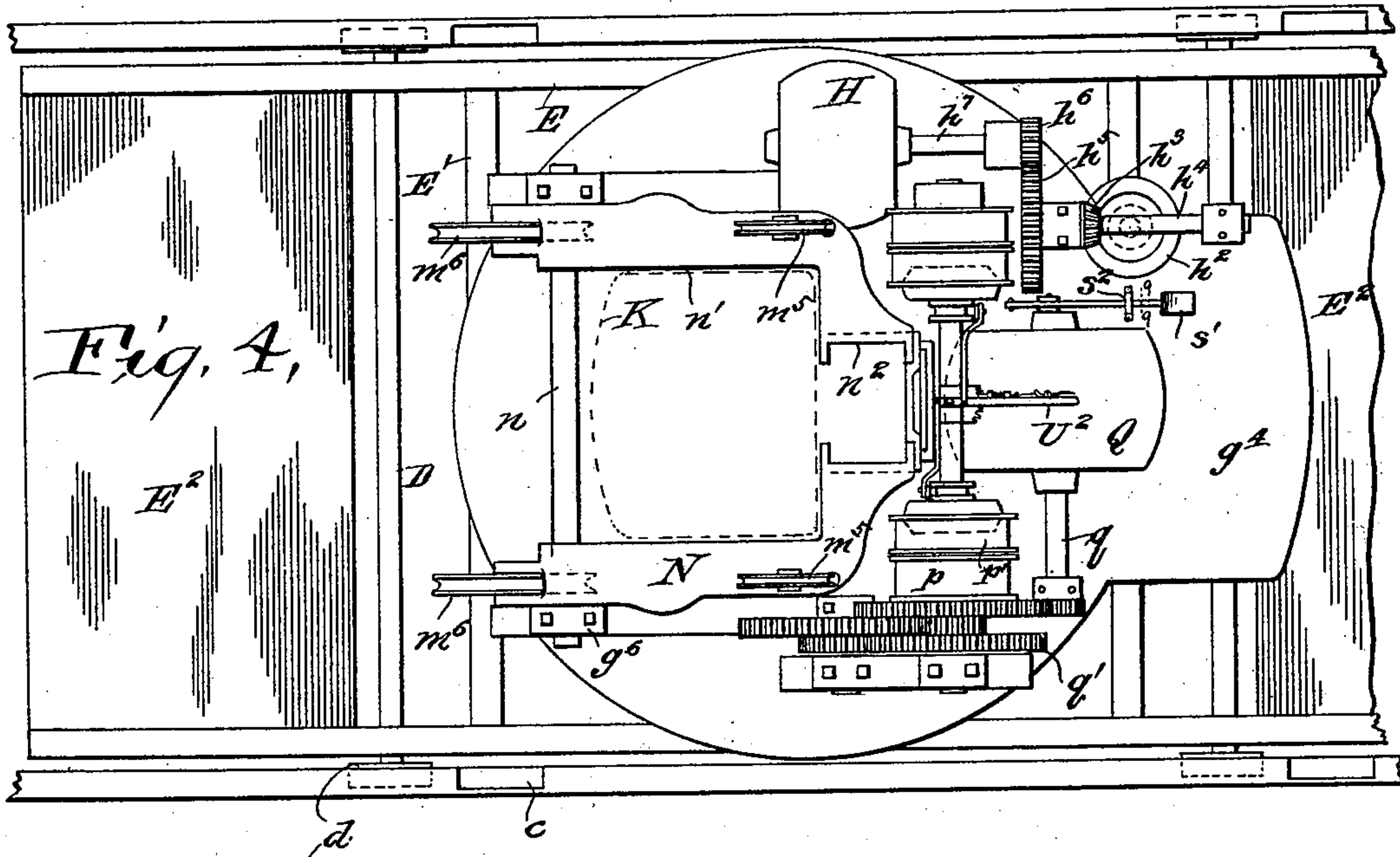
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(No Model.)

4 Sheets—Sheet 3.



Witnesses

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R. THEW.  
UNLOADING APPARATUS.

(Application filed Aug. 29, 1900.)

(No Model.)

4 Sheets—Sheet 4.

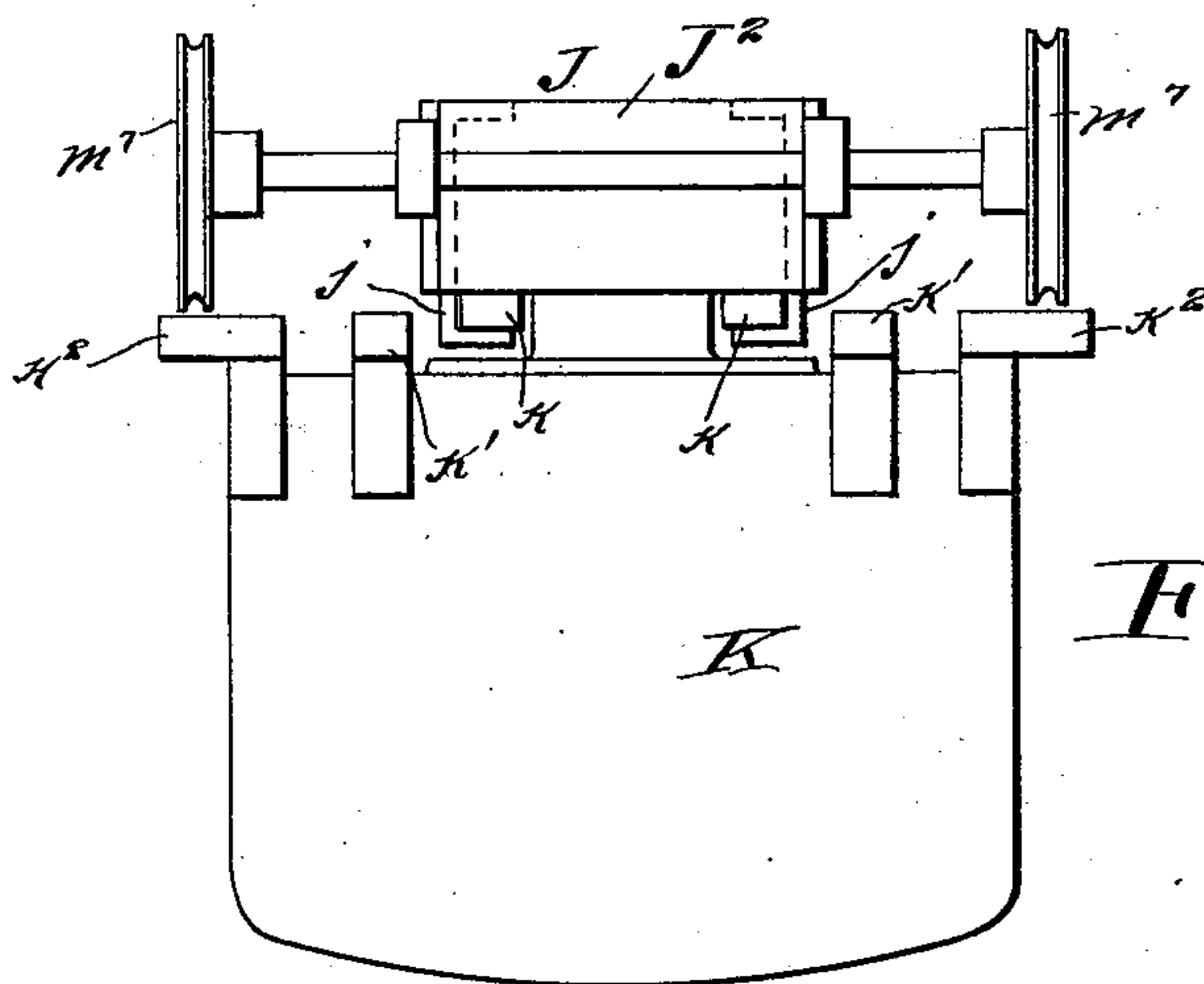


Fig. 6,

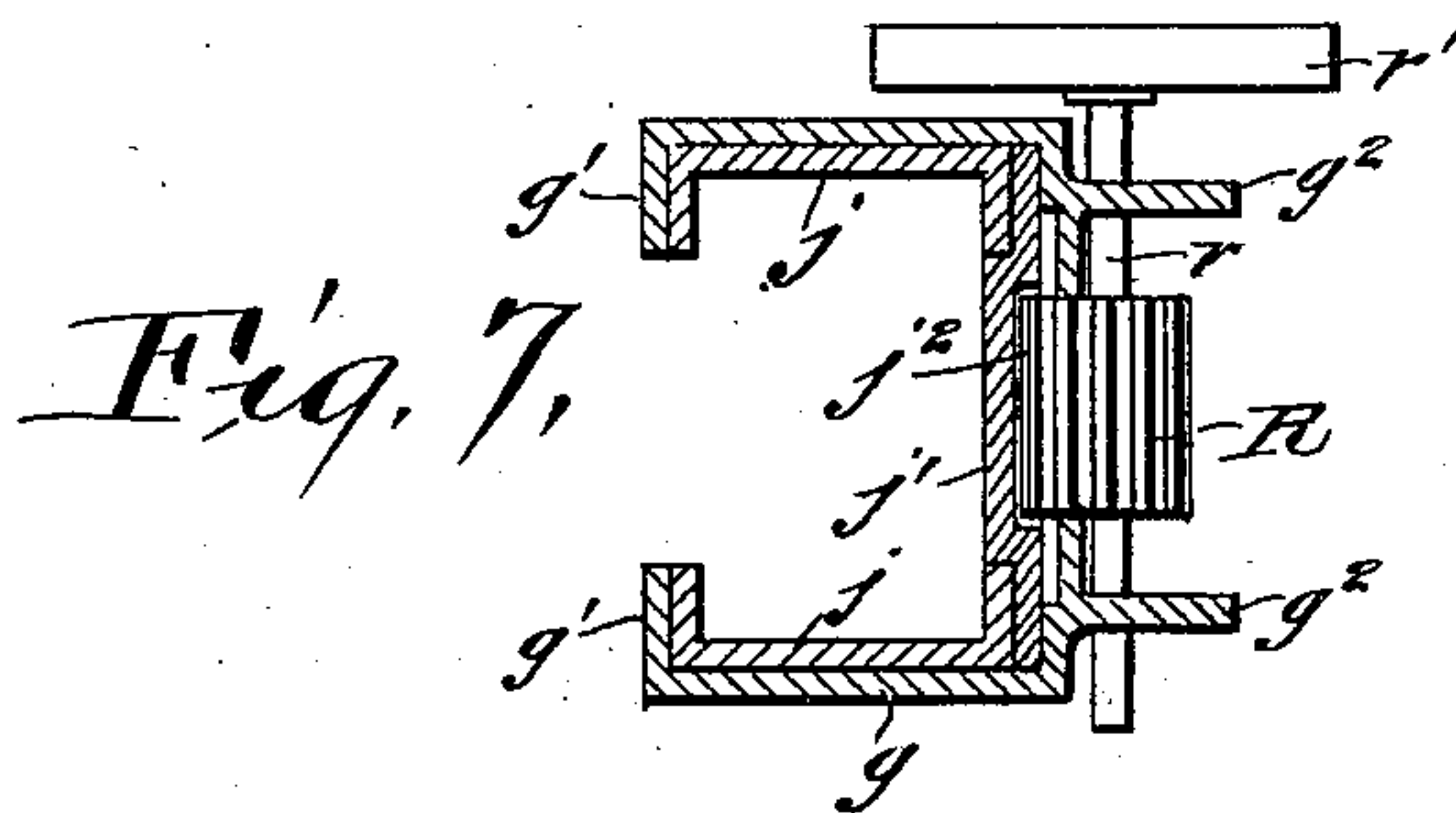


Fig. 7,

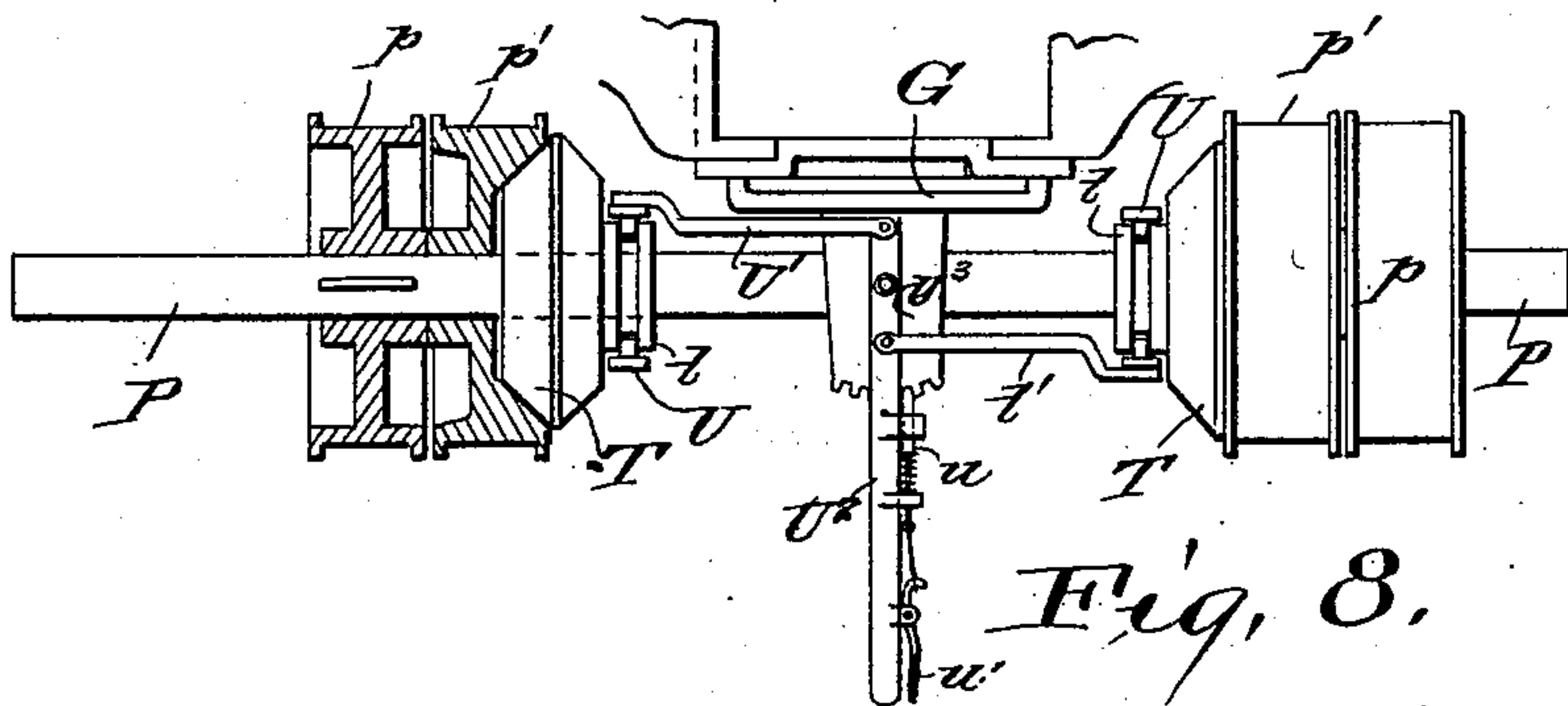


Fig. 8,



Fig. 9,

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# UNITED STATES PATENT OFFICE.

RICHARD THEW, OF LORAIN, OHIO, ASSIGNOR TO THE THEW AUTOMATIC SHOVEL COMPANY, OF SAME PLACE.

## UNLOADING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 677,610, dated July 2, 1901.

Application filed August 29, 1900. Serial No. 28,398. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD THEW, a citizen of the United States, residing at Lorain, in the county of Lorain and State of Ohio, have invented a certain new and useful Improvement in Unloading Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 This invention relates particularly to unloading apparatus adapted to be placed at the hatchway of a vessel and serve to elevate its load in bulk, as ore, coal, &c.

15 The general object is to provide a simple and efficient machine for accomplishing this purpose, and more specifically a self-contained removable machine which forms no part of the permanent equipment of the vessel, but is adapted to be conveniently placed in the hatchway and cooperate with the present unloading devices.

20 A common method of unloading at present in use is simply to lower a bucket from a suitable track or derrick-arm into the hatchway, which is manually filled. My invention is calculated to displace this manual labor by mechanically filling such bucket.

25 The invention consists, broadly, of an apparatus adapted to be placed in the line of the hatchway and having a traveling bucket and a suitable guide therefor which extends downward into the hold, whereby the load may be scooped up and elevated to a desired point. The invention includes the means in which I have found it desirable to embody this operation, as hereinafter described, and pointed out with various specificness in the claims.

30 The drawings clearly disclose the invention as used in a vessel.

35 Figure 1 is a side elevation through the hatchway of such vessel, showing my unloading apparatus. Fig. 2 is an enlarged side elevation of the apparatus alone. Fig. 3 is a horizontal section on the line 3 3 of Fig. 2. Fig. 4 is a plan, and Fig. 5 a rear elevation, of the apparatus. Figs. 2 to 5 are on substantially the same scale. The remaining figures are details on an enlarged scale, Fig. 6 being a bottom plan of the bucket, Fig. 7 a horizon-

tal section on the line 7 7 of Fig. 2, Fig. 8 a plan of the winding-drum clutches shown in Fig. 4, and Fig. 9 a vertical section on the line 9 9 of Fig. 4.

The same letters of reference designate the same parts in each figure.

Referring to the parts by letters, A represents the hold of a vessel at the hatchway, *a* being the upper deck, and *a'* the hold-beams or lower deck.

60 My apparatus, as stated, is adapted to mechanically fill the bucket of the usual derrick or hoisting apparatus. Such bucket is shown in dotted lines in Fig. 1 and designated B and is adapted to be elevated by the cables *b* in the usual manner.

65 My apparatus is supported on a suitable track, that shown consisting of a pair of channel-irons C, supported by the hold-beams. In this track take the wheels *d* on the ends of axles D, journaled in bearings carried on the under side of a truck built up of longitudinal I-beams E and suitable cross-beams E'. The truck may be put in place by passing the wheels *d* through openings *c*, Fig. 4, in the upper flanges of the channels. This truck is adapted to travel along the track and may be moved by any suitable means. It carries at each end a platform E<sup>2</sup>, preferably resting on the lower flanges of the I-beams E, either of which platforms may support the derrick-bucket B.

75 Carried by the wheel-truck on its upper surface is a circular track *e*, in which take wheels F, carried by the horizontal table G, wherefore this table may be rotated upon the truck. Around the outside vertical edge of the circular track *e* are gear-teeth *e'*, with which meshes a pinion *h* on the lower end of a vertical shaft *h'*, on the upper end of which is a bevel-gear *h*<sup>2</sup>. This bevel-gear meshes with a bevel-pinion *h*<sup>3</sup> on a shaft *h*<sup>4</sup>, which carries a spur-gear *h*<sup>5</sup>, engaged by the pinion *h*<sup>6</sup> on the armature-shaft *h*<sup>7</sup> of a motor H. Thus when this motor is operated the pinion *h* is rotated, which, cooperating with the stationary gear *e'*, rotates the table as desired.

90 Rigidly carried by the table is a vertical housing *g*, located, preferably, with its front side about on the axis of rotation of the ta- 100



ble. This housing is open at its top and bottom, is closed on its rear and its sides, and at its front has flanges  $g'$ , Fig. 7, leaving an open space between them. The housing is braced  
 5 and secured to the table as desired, the drawings showing vertical webs  $g^2$  and angle-clips  $g^3$  for this purpose. Occupying the housing and extending downward and laterally therefrom is the guide member or beam J. This  
 10 member is also closed on its rear and on its two sides and has flanges at its front side, leaving an opening corresponding to that of the housing. The construction is preferably two channel-beams  $j$ , forming the sides, and a  
 15 plate  $j'$ , forming the back. This guide member J guides and in certain positions supports the bucket K, which travels up the guide member and scoops up the load. The member J is vertically adjustable through the housing,  
 20 as hereinafter explained, to take a different depth in the vessel-hole, though during the digging movement of the bucket it is virtually rigid with the housing and table G. The guide member is laterally extended at its  
 25 lower portion  $J'$ , so that by the rotation of the table G it may bring the bucket into action on a large range of material to be elevated. The extreme lower end of the guide member is inclined upward, as at  $J^2$ , to give the bucket  
 30 at first a downward movement, causing it to pass into the ore or load.

The bucket K carries guide-wheels  $k$ , preferably four in number, which ride within the tracks furnished by the two channel-beams  $j$   
 35 of the member J. At the upper end of the housing is a cradle N, pivoted on an axle  $n$  to suitable standard  $g^6$ , carried by the table. This cradle is a yoke-like frame, open at  $n'$  to receive the bucket-body K, and having a  
 40 tubular opening  $n^2$ , adapted to substantially align with the housing or the member J and receive and guide the bucket-wheels. When the bucket is within the cradle, the two are adapted to turn over together into the position shown in dotted lines in Fig. 1, wherefore the contents of the elevating-bucket K are dumped into the derrick-bucket B.

The bucket K is elevated by means of a pair of raising-cables L, which lie on opposite  
 50 sides of the member J, being secured to the bucket at the points  $k' k'$ . These cables take beneath the guide-pulleys  $m' m^2$ , carried by the member J, and then pass on the inner side of the guide-pulleys  $m^3$  on the rear side  
 55 of the cradle N and then onto the outer side of the guide-pulleys  $m^4$  just above them, then over the sheaves  $m^5$ , carried by the cradle parallel with its sides, and then down beneath the sheaves  $m^6$ , carried by the cradle in line with the sheaves  $m^5$ , but beneath the pivot of the cradle, and finally to the lower sides of the winding-drums  $p$ , which are keyed to the drum-shaft P. This shaft P is suitably rotated from an electric motor  
 65 Q through suitable intermediate gearing  $q'$ , leading from its armature-shaft  $q$ .

A pair of backing-cables  $L'$  are secured to

brackets  $k^2 k^2$ , carried by the bucket at points outside of the points where the raising-cables are secured. These backing-cables when the  
 70 bucket is in the bottom position (shown in Figs. 1 and 2) pass around the guide-pulleys  $m^7$  and beneath the guide-pulleys  $m^8$  and thence to the upper sides of the winding-drums  $p'$ . These drums are loose on the  
 75 shaft P, but are in operation rigidly clutched thereto, as hereinafter explained, wherefore when this shaft is rotated one set of cables is paid out and the other is wound up. If the shaft P be rotated to wind in the raising-  
 80 cables L, the bucket is elevated up the guide member J and into the cradle N until the brackets  $k^2$ , projecting from the bucket, impinge the lower side of the cradle, whereupon the continued winding up of the cable  
 85 L swings the whole cradle, with the bucket, over, as shown in dotted lines in Fig. 1, the load dumping into the derrick-bucket B. A pair of grooved segments  $n^3$  are carried on the under side of the cradle, and these re-  
 90 ceive the backing-cables  $L'$  as the cradle turns over, wherefore these cables hold that cradle and prevent the same dropping over suddenly after the load is swung beyond the pivot  $n$ . In this operation the backing-  
 95 cables  $L'$  are paid out considerably; but the sheaves  $m^6$  being beneath the pivot  $n$  approach the drums  $p$ , so that the cables L are taken in correspondingly. Thus the two  
 100 pairs of cables are kept with the desired tautness at all times, the sheave  $m^6$  being so placed that the amount which it reduces the length of the path of the cable L is just equal to the amount which the turning over of the cradle increases the path of the cable  $L'$ . As  
 105 the bucket is being thus elevated the backing-cables at the rear of the bucket travel up the member J, passing beneath the guide-pulleys  $m^9$  and the pulleys  $m'$  alongside of the pulleys  $m'$ . The length of the cable be-  
 110 tween these pulleys  $m^8 m^{10}$  and the winding-drum or the other guide-pulleys is great enough so that the slight amount they are out of alinement is of no importance. After the bucket has been dumped the motor Q is  
 115 reversed and the pull of the backing-cables  $L'$  on the lever-arms afforded by the segments  $n^3$  returns the cradle and bucket. For example, Fig. 1 shows a load of ore in the hold of a vessel. The motor Q now being op-  
 120 erated, the bucket K travels first downward into the ore and then up the lateral extension of the member  $J'$ , scooping up a bucket-load of ore, and then is elevated vertically into the cradle and turned over to dump its load  
 125 into the derrick-bucket B, after which the reverse rotation of the armature returns the bucket to its normal position. While the bucket is returning from the dumping position the table may be rotated as desired to  
 130 bring the lateral extension  $J'$  of the guide member into a different position, and after the bucket has cleared the load the table may be rotated back, so that the bucket will dump



into the derrick-bucket resting on the platform  $E^2$ . This, as stated, is conveniently accomplished by the motor H.

As the load decreases in height in being scooped up, it is necessary to allow the member J to move downward. This I accomplish simply by releasing it and letting it descend by gravity, controlling it by a suitable brake. Thus on the rear side of the member J within the housing is a vertical rack  $j^2$ , with which meshes a pinion R, rigid on the shaft  $r$  and journaled in webs  $g^2$ , carried by the table and carrying on its end a brake-wheel  $r'$ . Around this wheel takes a band-brake S, operated by a foot-lever  $S'$ .

Lowering the member J extends the path of the cables, to provide for which I have extra turns of the backing-cables on the drums  $p'$  when the member J is in its elevated position, and suitable means allow these drums to be unlocked from the shaft, wherefore these cables pay out as the member J descends. The locking and unlocking of the drums  $p'$  may be accomplished in any suitable manner, a convenient way being to have the two drums  $p'$  loose on the shaft P, but clamped thereto by simultaneously-operated clutches. This is shown in the drawings, more particularly in Figs. 4 and 8. A pair of clutch-cones T are splined to the shaft P and have collar  $t$ , in the groove of which take pins extending from the yoke-lever U. These levers are suitably pivoted at their lower ends, and at their upper ends are connected by links  $U'$  with the hand-lever  $U^2$ , on opposite sides of the pivot thereof. This hand-lever may be locked in position by the bolt  $u$ , releasable by the finger-lever  $u'$  and normally engaging a notch in the segmental rack  $U^3$ , secured to the housing  $g$ . In normal operation these clutches are both in engagement, as shown in Fig. 8, and the drums  $p$  and  $p'$  operate as if rigid; but a simple throwing of the lever releases both drums  $p'$ .

The member J is latched to the housing by suitable means, that shown being a guide-yoke  $S^2$ , which takes over the foot-lever  $S'$ , operating the brake-band, and has an offset notch into which that lever is adapted to be shoved and kept. When, however, the member J is to be lowered, it is only necessary for the operator to press the foot-lever  $S'$  downward and sidewise, releasing it from the yoke  $S^2$ , and to release the lever  $U^2$  from the segment  $U^3$ , releasing the clutches and the drums  $p'$ . The control of the descent is governed by the band-brake S as desired. When the member has descended the proper amount, the lever  $S'$  is shoved into the notch of the yoke  $S^2$ , preventing further descent, and the clutches T lock the drums  $p'$  to the driving-shaft P, and the elevating operation is resumed.

The table G is extended at  $g^4$  to provide a suitable platform for the operator, and a suitable railing  $g^5$  is preferably carried by this platform. The drawings show on this rail-

ing three controller-levers  $v' v^2 v^3$ , which are in convenient position for the operator and are adapted to govern the motor which elevates the bucket, the motor which rotates the table, and a motor (not shown) for moving the truck. The foot-lever  $S'$  and the hand-lever  $U^2$  are also in convenient reach of the operator in this position.

Having described my invention, I claim—

1. In an unloading apparatus, an elevating-bucket, a guide member therefor adapted to extend down in the hold of a boat, which guide member has a vertical portion and beneath this a downwardly-inclined portion and at the end of this an upwardly-inclined portion, combined with means for moving the bucket along all such portions, substantially as described.

2. In an unloading apparatus, a guide member adapted to extend down into the hold of a boat, said guide member being hollow and open on its front side, combined with a bucket adapted to stand on the front side of the guide member and having wheels occupying the hollow thereof and connected with the bucket through the opening in the front thereof, substantially as described.

3. In an unloading apparatus, the combination of a guide member suitably supported and having a vertical portion and a laterally-extended portion beneath the same, said member being hollow and open on its front and under side, a bucket on the outside of said member, wheels carried by the bucket through the said opening of the guide member, and means for elevating the bucket up said guide member and dumping it at the upper end thereof, substantially as described.

4. In an unloading apparatus, the combination of a wheel-truck, a rotatable table thereon, a vertical housing carried by said table, an adjustable guide member within said housing extending down beneath the truck, a bucket, and means for causing it to travel along said guide member, substantially as described.

5. In an unloading apparatus, in combination, a rotatable table, a vertical housing carried thereby, a guide member occupying said housing and extending laterally beneath the same, said guide member being hollow, a bucket guided by said guide member, means for elevating said bucket along the same, means for controlling the downward movement of said guide member, means for rotating said table, substantially as described.

6. In an unloading apparatus, a wheel-truck, a horizontal circular track carried thereby, a horizontal table, wheels carried thereby taking in said track, a circular rack carried by said truck, a cooperating pinion carried by said table, means on the table for rotating said pinion whereby the table may be rotated, a vertical housing carried by said table, a guide member adjustable vertically within said housing and adapted to extend downward therefrom, a bucket guided by said



guide member, cables for elevating said bucket along the same, and means carried by said table for driving said cables, substantially as described.

5 7. In an unloading apparatus, an adjustable guide member, a bucket guided thereby, cables secured to said bucket and adapted to draw it in opposite directions along said guide member, mechanism with respect to which  
10 said guide member is adjustable for taking in one cable and simultaneously paying out the other, and means for increasing the effective length of said cables whereby the guide member may be adjusted, substantially  
15 as described.

8. In an unloading apparatus, a vertically-adjustable guide member, guide-pulleys carried thereby, a bucket guided by said guide member, a raising-cable secured to said bucket  
20 and passing around said guide-pulleys and onto a winding-drum, a backing-cable secured to said bucket and passing in the opposite direction around guide-pulleys and onto another winding-drum, combined with said  
25 drums and with means for causing them to rotate simultaneously, one paying out its cable and the other taking in its cable, and means for disengaging said drums and allowing the effective length of cable to vary, substantially as described.  
30

9. In an unloading apparatus, in combination, a vertically-adjustable guide member, guide-pulleys carried thereby, a bucket guided by said guide member, a raising-cable secured  
35 to said bucket and passing around said guide-pulleys and onto a winding-drum, a backing-cable secured to said bucket and passing in the opposite direction around guide-pulleys and in the opposite direction onto another  
40 winding-drum, combined with said drums and with means for clamping them rigid with each other and for unlocking them and allowing the effective length of cable to increase and thus provide for the lowering of  
45 the guide member, and means for holding said guide member in its desired position and releasing it therefrom and allowing it to move downward, substantially as described.

10. In an unloading apparatus, the combination of a rotatable table, a guide member adapted to extend therefrom down into the hold of the vessel, a bucket guided by said  
50 guide member, guide-pulleys carried by said guide member, a drum-shaft carried by said table, means carried by said table for rotating said shaft, a pair of drums on said shaft one rigid with the shaft and one loose with it, a clutch for clamping the loose drum rigid,  
55 and cables winding onto said two drums in opposite directions and passing around the guide-pulleys carried by the guide member and secured to the bucket and leading therefrom in opposite directions, and means for adjusting said guide member vertically with  
60 reference to said table and for holding it in the desired position, substantially as described.

11. In an unloading apparatus, the combination of a guideway adapted to extend down into the hold of a boat, a bucket guided thereby, means for elevating the bucket up to the  
70 guideway, and a cradle near the upper end of the guideway adapted to receive the bucket and turn over with it, substantially as described.

12. The combination with a wheel-truck, a platform carried thereby adapted to support the bucket of an ordinary derrick, a pivoted cradle, an excavating-bucket, guideways therefor adapted to extend down into the hold  
80 of the vessel, and means for causing said bucket to travel along said guideways and into said cradle and for thereafter turning said cradle to cause said bucket to dump into the derrick-bucket, substantially as described.  
85

13. The combination with a wheel-truck, a rotatable table thereon, a vertical housing carried by said table, a pivoted cradle at the upper end of said housing, an adjustable guide  
90 member leading downward from said housing, a bucket guided by said guide member, and means for causing the same to travel up said guide member and into said cradle, and for turning over the cradle when the bucket  
95 is in it, substantially as described.

14. In an unloading apparatus, the combination of a guide member adapted to extend down into the hold of a boat, a bucket guided thereby, means for elevating the bucket up  
100 the guide member, a pivoted cradle having an opening into which said bucket may pass and engage the cradle, cables for elevating said bucket, and means whereby the continuous elevation thereof when it is engaged by  
105 the cradle turns over both the cradle and bucket, substantially as described.

15. In an unloading apparatus, in combination, a bucket, guides therefor, a pivoted cradle located near the upper end of said  
110 guides and adapted to receive the bucket, guide-pulleys carried by said cradle, a winding-drum, an elevating-cable secured to said bucket and passing over pulleys on the cradle to said winding-drum, and means for causing  
115 the bucket to engage the cradle so that the continued travel of the bucket turns over both the cradle and bucket, substantially as described.

16. In an unloading apparatus, the combination of a bucket, a guide therefor, a dumping-cradle near the upper end of said guide adapted to receive the bucket, a raising-cable for said bucket, guide-pulleys carried by  
120 said cradle over which said cable passes, a backing-cable secured to said bucket and leading therefrom in substantially the opposite direction to elevating the cable, and means for simultaneously taking in one cable and paying out the other, substantially as described.  
125

17. In an unloading apparatus, in combination, a dumping-cradle, guides leading downward therefrom, a bucket adapted to  
130



travel along said guides, cables leading from said bucket, guide-pulleys carried by said cradle, a rotating shaft, winding-drums thereon, an elevating-cable leading from said bucket around guide-pulleys on said cradle to one of said drums, a backing-cable leading from the other of said drums around suitable guide-pulleys to the bucket, said cables winding on the drums in opposite directions so that as one is paid in the other is paid out, and means for rotating said drum-shaft, substantially as specified.

18. In an unloading apparatus, a pivoted dumping-cradle, a guideway leading downward therefrom, a bucket guided by said guideway, guide-pulleys carried by said cradle on opposite sides of its pivots, an elevating-cable leading around the pulley beneath the pivot of the cradle and the pulley above that pivot, and then downward to the bucket, a guide-pulley suitably carried near the lower end of the bucket-path, a backing-cable secured to the bucket and passing around said last-mentioned guide-pulley, means for simultaneously taking in one cable and paying out the other, substantially as described.

19. In an unloading apparatus, a guide member, a bucket adapted to be guided by said guide member, guide-pulleys carried by the guide member, cables leading in opposite directions from the bucket passing over said guide-pulleys, means for taking in one cable and paying out the other, a pivoted cradle located at the upper end of said guide member and adapted to receive said bucket, and means for causing the bucket to pass into the cradle and turn over with it when the bucket is elevated, substantially as described.

20. The combination of a hollow guide member having a vertical portion and a laterally-extended portion at the lower edge thereof, said guide member having an opening in its front and under side, a bucket having wheels within the member connected through said opening whereby the bucket is guided by the member, a cradle located above said bucket and having an opening to receive the bucket and an opening to receive the wheels, means for limiting the independent movement of the bucket and cradle, means for thereafter raising the bucket whereby both bucket and cradle are turned over, substantially as described.

21. In an unloading apparatus, a pivoted dumping-cradle, a guideway leading downward therefrom, a bucket guided by said guideway and adapted to occupy said cradle and turn over with it, means for raising said bucket into said cradle and for turning over the cradle and bucket together, a backing-cable secured to said bucket and adapted to pull downward from a point behind the pivot

of the cradle when it is turned over, combined with means for so pulling the backing-cable and thereby returning the cradle, substantially as described.

22. In an unloading apparatus, in combination, a pivoted dumping-cradle, a guideway leading downward therefrom, a bucket guided by said guideway and adapted to occupy said cradle and turn over with it, means for limiting the independent movement of the bucket and cradle whereby continued elevation of the bucket turns over the cradle, elevating-cables adapted to raise said bucket, and backing-cables secured to the bucket and adapted to draw downward from the dumped cradle at a point at the rear of the pivot thereof and thereby return the cradle and bucket, and means for operating said cables, substantially as described.

23. In an unloading apparatus, in combination, a pivoted dumping-cradle, a guideway leading downward therefrom, a bucket guided by said guideway and adapted to occupy said cradle and turn over with it, a pair of raising-cables secured to said bucket passing around suitable guide-pulleys on said cradle, and a pair of backing-cables secured to said bucket wider apart than said elevating-cables, guides on the under side of said cradle far enough apart to allow the bucket to pass between them but adapted to receive the backing-cables when the bucket and cradle turn over, and suitable guide-pulleys for said cables, substantially as described.

24. A pivoted cradle having an opening through it adapted to receive a bucket, a pair of guide-pulleys  $m^5 m^5$  on opposite sides of the opening above the pivot of the cradle, a pair of guide-pulleys  $m^6 m^6$  aligned therewith below the pivot of the cradle, a pair of rigid segments carried on the under side of the cradle, combined with a bucket, a pair of elevating-cables secured thereto and each passing over pulleys  $m^5 m^6$ , and backing-cables extending from the bucket when it is in the cradle in alinement with said segments, means for taking in the elevating-cables and paying out the backing-cables when the bucket is in the cradle whereby the cradle and bucket are turned over, and means for thereafter paying out the elevating-cables and taking in the backing-cables whereby the latter pulling on the segments bring the cradle and bucket back to normal position, substantially as described.

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

RICHARD THEW.

Witnesses:

F. A. SMYTHE,

WM. A. DONALDSON.