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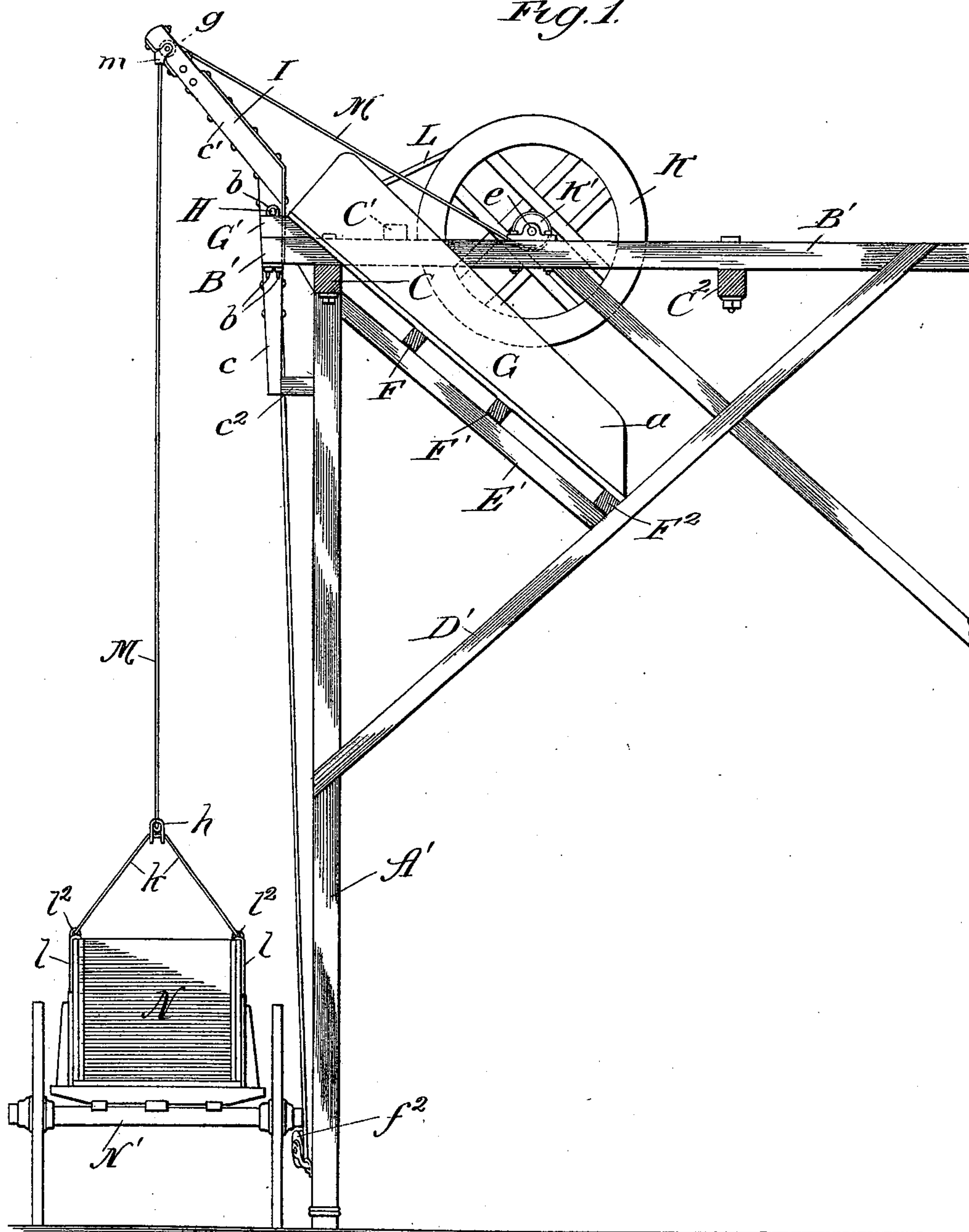
W. A. & E. ROPP.
UNLOADING APPARATUS.

(Application filed Mar. 6, 1899.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



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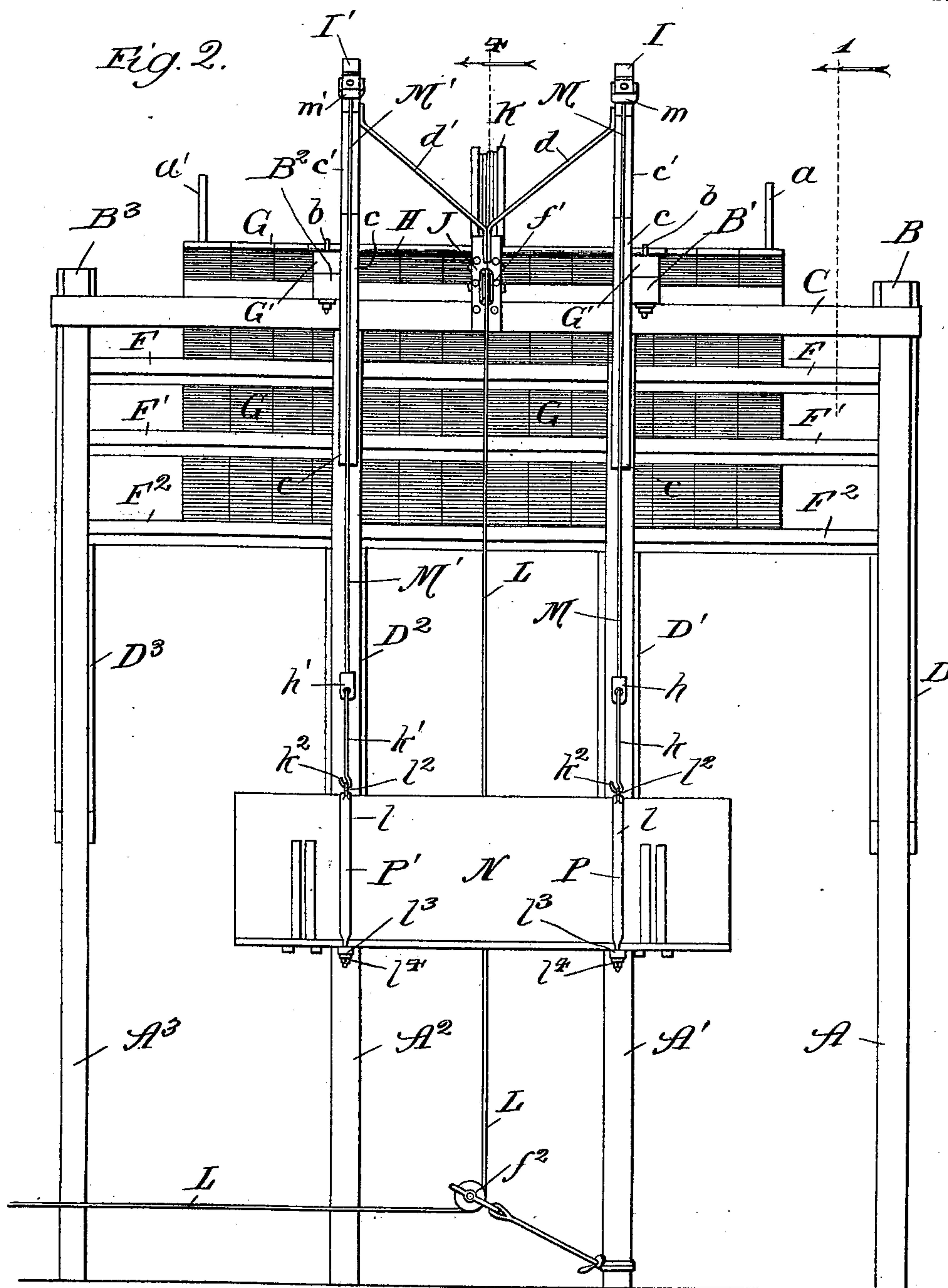
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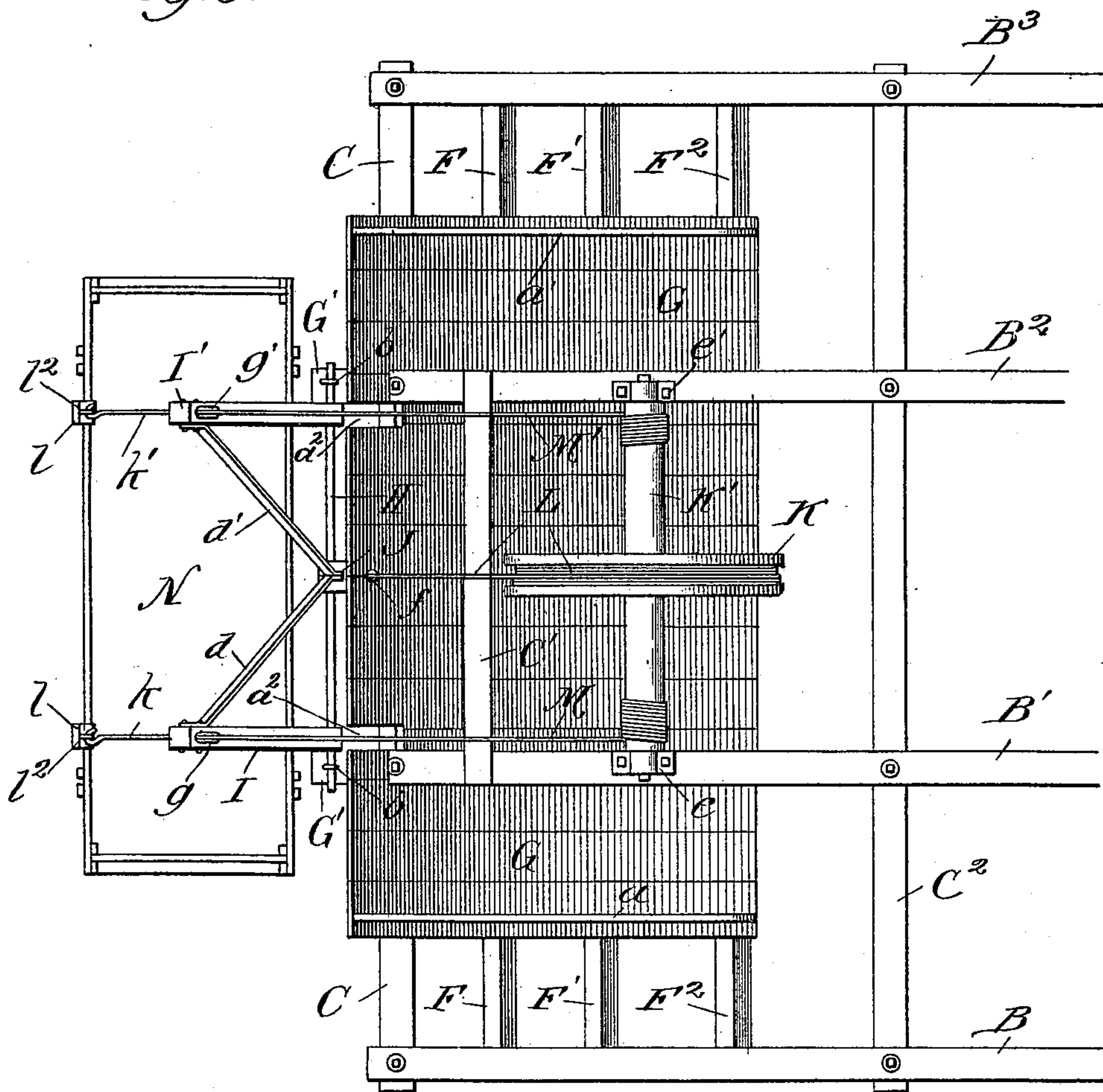
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Fig. 3.



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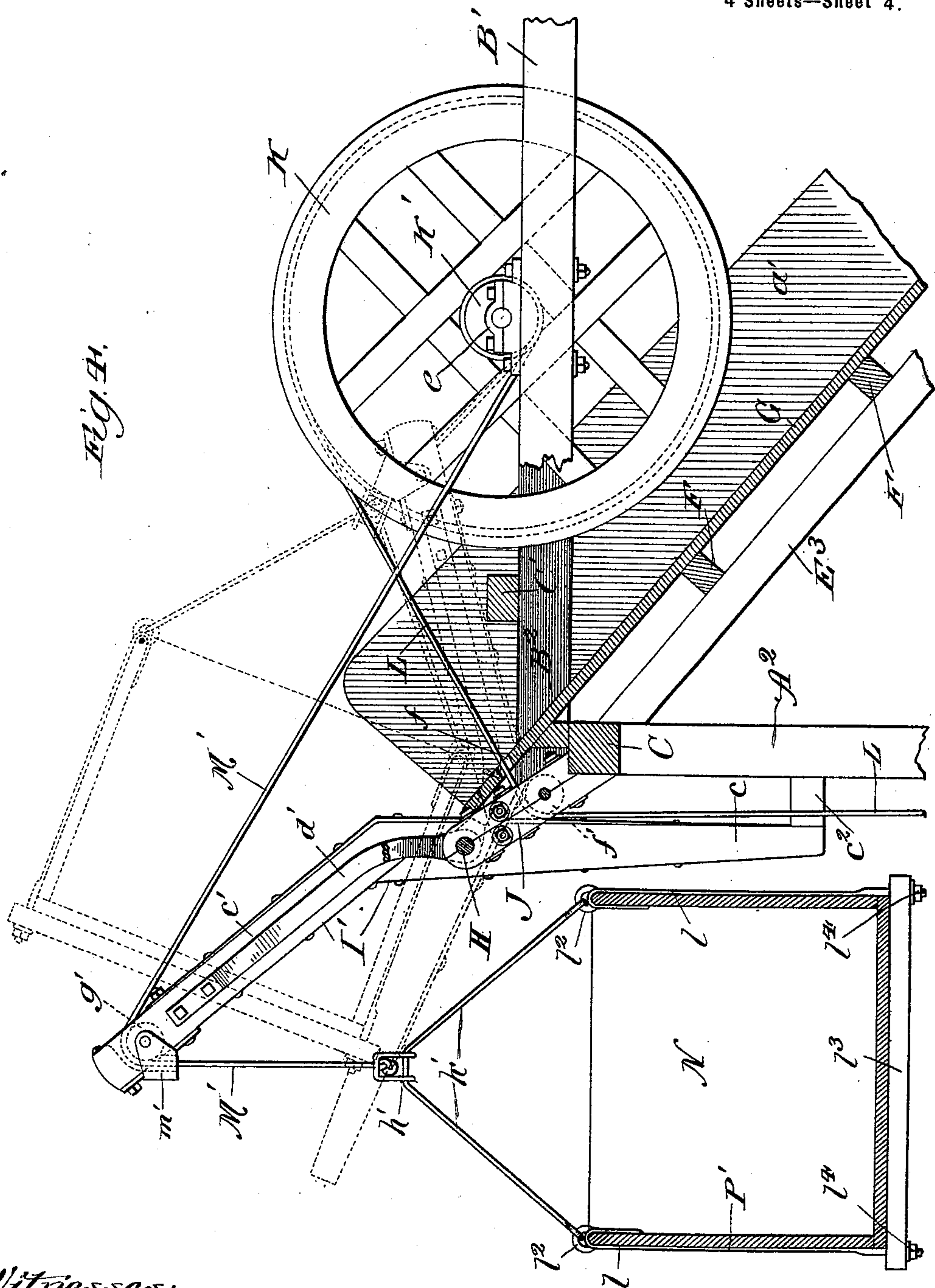
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UNITED STATES PATENT OFFICE.

WALTER A. ROPP AND EZRA ROPP, OF YUTON, ILLINOIS.

UNLOADING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 631,129, dated August 15, 1899.

Application filed March 6, 1899. Serial No. 707,976. (No model.)

To all whom it may concern:

Be it known that we, WALTER A. ROPP and EZRA ROPP, citizens of the United States, residing at Yuton, in the county of McLean and State of Illinois, have invented a new and useful Improvement in Unloading Apparatus, of which the following is a specification.

Our invention relates particularly to apparatus for unloading grain from a wagon, though it may be usefully applied to the transfer of materials in many other situations.

Our primary object is to provide apparatus for lifting bodily the box or vessel containing the material to be dumped or transferred, raising it to a desired height, and finally dumping its contents by a tipping movement of the vessel as a whole.

In the accompanying drawings the apparatus is shown adapted to the purpose of lifting a wagon-box from its running-gear, raising it to a predetermined height, then automatically tipping it sidewise to spill out its contents into a hopper, which may connect with a corn-crib, grain-bin, or other receptacle, and finally lowering the box till it rests again on its running-gears.

Our object is accomplished by the employment of a novel construction of pivoted crane and suitable hoisting mechanism employed therewith. For the purpose the apparatus is here put to the crane comprises two pivoted members, each consisting of an inclined projecting upper arm and a vertical lower arm at an angle thereto, each projecting arm being supplied with a pulley for a lifting-cable. Each lifting-cable is attached at one end, through the medium of a suitable sling, to the box and passed over a pulley and thence to a common source for the application of power. The box rises vertically till the projecting arms of the crane are engaged, when crane the tips, causing its vertical arms to engage one side of the box and tip the latter till its contents are free to escape. The movement of the crane is so limited that the center of gravity of the box remains outside the pivotal point of the crane, so that upon paying out the cables formerly drawn in the crane tips back to its original position, after which the uprighted box descends to its resting place upon the running-gear. The principle of operation may be applied where the vessel or

vehicle to be dumped is not too large to be handled readily by means of a crane operating in substantially the manner described. 55

In the accompanying drawings, Figure 1 is a view in side sectional elevation of apparatus embodying our invention and adapted for handling a wagon-box, the section being taken as indicated at line 1 of Fig. 2; Fig. 2, a view 60 in front elevation; Fig. 3, a plan view; and Fig. 4 a section parallel to that shown in Fig. 1, taken as indicated at line 4 of Fig. 2, but on an enlarged scale.

The movable parts are supported by means 65 of any suitable frame. The frame shown comprises front uprights $A A' A^2 A^3$, rearwardly-extending top timbers $B B' B^2 B^3$, cross-timbers $C C' C^2$, rearwardly and upwardly inclined braces $D D' D^2 D^3$, rearwardly and downwardly inclined beams $E E' E^2 E^3$, forming a hopper foundation, and cross-beams $F F' F^2$ upon the last-named beams, forming, with the timber C , the immediate support for a hopper G , provided with side 75 pieces $a a'$.

The timbers $B' B^2$ extend through openings in the upper margin of the bottom of the hopper and project in front of the uprights $A' A^2$, where they support pillow-blocks G' , which 80 in turn support a shaft H , firmly held in place by U-shaped irons b . The shaft has pivoted upon it a crane comprising two members $I I'$, each comprising a vertical arm c and an inclined projecting arm c' , the pivoted point of 85 each member being preferably a short distance below the junction of its two arms. Metallic struts $d d'$, firmly secured at their outer ends to the free ends of the arms c' and pivotally connected at their inner ends to the 90 center of the shaft, serve to prevent lateral racking of the members $I I'$. A central inclined pulley-block J (shown as composed of two parts) is firmly secured to the beam C at its lower end and to the shaft H at its upper 95 end, where it is recessed to receive the adjacent ends of the metallic struts $d d'$. The vertical arms c of the crane bear at their lower ends against studs c^2 on the frame. The exact details of construction are of minor 100 importance.

To the rear of the cross-beam C' , which is shown as extending from timber B' to timber B^2 , is journaled in bearings $e e'$ a wheel and

axle K K', the wheel being at the center of the axle. Attached to the wheel is a power-cable L, which is given a few turns about the wheel and then passes through a perforation *f* in the upper margin of the hopper G, thence over a sheave *f'* in the pulley-block J, and thence over a pulley *f''* at the base of the upright A'. Attached to the axle, near its ends, are lifting-cables M M', which are given a few turns about the axle, whence they pass over pulleys *g g'* at the free ends of the projecting arms *c'* of the crane.

For convenience in attaching the lifting-cables to a wagon-box they carry, attached to their lower ends, clips *h h'*, connected with bent rods *k k'*, having hooked ends *k''*, as shown in Fig. 2. The box N, supported on running-gears N', has attached to it, preferably as permanent fixtures, two slings P P', each comprising side bars *l*, supplied at their upper ends with hooks *l'*, which clasp the tops of the sides of the box, and eyes *l''*, with which the hooks *k''* engage, and a bottom cross-bar *l'''*, through which the lower threaded ends of the side bars *l* pass, being secured by nuts *l''''*.

In Fig. 2 the box is shown supported by the lifting-cables, the running-gears being removed for clearness of illustration.

In Fig. 4 the full lines represent the position of the box just previous to its engagement with the arms of the crane and the dotted lines its position after it has been tipped to the dumping position.

The method of use is as follows: The frame is set up in such position that the box contents will be dumped at the desired point. The wagon is stopped in the position shown in Fig. 1. The team is detached from the wagon and hitched to the power-cable L, and the wheel K is caused to rotate as the power-cable is drawn from it, causing the lifting-cables to wind upon the axle. The resultant forces upon the pulleys *g g'* at this time act in lines passing outside the pivotal points of the crane, and the crane retains the position shown in Fig. 1. When the clips *h h'* engage the ends of the arms *c'* of the crane, (at stop-blocks *m m'*), further application of power causes the rearwardly-acting forces to predominate and tilt or rock the crane, its arms describing vertical planes. In this movement the arms *c* of the crane engage the side of the box and tip the box to the position shown in dotted lines, allowing the contents to be discharged into the hopper where the latter is present. The rearward tilting of the crane is limited by the engagement of the arms *c'* with the cross-beam C' of the frame. Once the contents of the box have been discharged the box is allowed to settle back, tilt the crane to its original position, and finally descend again to the running-gear. In order that the box may tilt the crane back, it is of course necessary that its center of gravity be kept outside of the pivotal points of the crane. Counterweights might be provided for the purpose of tilting the crane to its

original position; but this is unnecessary where the construction is as here shown. As will be observed, the upper edge of the inner side of the box is at the moment of tilting close in the angles formed at the meeting of the vertical with the inclined arms of the crane and at such a height above the shaft H as to carry the upper margin of the box sufficiently over the perforation *f* of the hopper to cause the grain to fall clear of it.

The hopper G may be located above a grain-bin or the like or it may connect with a second hopper leading to the grain-depository, and it may even be dispensed with entirely without departure from my invention. The frame may be of any suitable form, and portions of it may be replaced by portions of the building where the apparatus is employed.

No limitation in matters of detail of construction is meant by the particular description given above, nor is the apparatus limited to any particular use.

It is necessary that the lifting-cables be supplied with some means of engaging the projecting arms of the crane to tilt it, though it may be the box itself which performs this function. It is likewise necessary that means be supplied for limiting the forward swinging of the projecting arms of the crane, the means for performing this function shown being the arms *c* of the crane and the stops *c''*. The hopper is shown provided with slots *a''* to accommodate the arms *c'* of the crane.

What we claim as new, and desire to secure by Letters Patent, is—

1. In an unloading apparatus of the character described, the combination of a frame, a two-member crane supported on a horizontal pivot, each member comprising a depending arm supported from said pivot and a forwardly-projecting arm forming with the depending arm an angle above the pivotal point of the crane, into which angle said box may enter, pulleys journaled in said projecting arms, lifting-cables passing over said pulleys, means for attaching said cables to said box, and means for applying power to the lifting-cables, substantially as and for the purpose set forth.

2. In apparatus of the character described, the combination with a frame, of a crane supported on a horizontal pivot and provided above the pivotal point with a projecting arm, and below said point with a depending arm for engaging one side of the box to be tilted, a pulley journaled in the projecting arm, means for limiting the forward rotation of said arm, a wheel and axle, a lifting-cable passing over said pulley to said axle, and a power-cable connected with said wheel, substantially as and for the purpose set forth.

3. In apparatus of the character described, the combination of a pivoted crane provided with a depending arm and a forwardly-inclined arm, the pivotal point being below the conjunction of said arms, and tackle for raising the vessel to be dumped and tilting said

crane, substantially as and for the purpose set forth.

4. In apparatus of the character described, the combination of a frame, a horizontal shaft, crane members pivoted thereon provided with projecting arms, a pulley-block supported at one end by said frame and at the opposite end by said shaft, a pulley journaled in said block, pulleys journaled in said projecting arms, means for limiting the forward rotation of the crane, a wheel and axle, and power and lifting cables, substantially as and for the purpose set forth.

5. In apparatus of the character described, the combination of a two-member pivoted crane provided with arms set at angles to each other, means for limiting the rotation of said crane forwardly and rearwardly, pulleys journaled in the projecting arms of the crane, lifting-cables depending therefrom, and means for securing said cables to the box to be lifted and dumped, substantially as and for the purpose set forth.

6. In apparatus of the character described, the combination with the frame, crane, and tackle, of removable slings for attachment to a wagon-box, comprising side bars provided at their tops with in and down turned hooks for engaging the top of the box and eyes for

attachment to the tackle, and bottom cross-bars secured to said side bars, substantially as and for the purpose set forth.

7. In apparatus of the character described, the combination with the frame, crane, and tackle, of removable slings for attachment to a wagon-box, comprising side bars provided at their tops with in and down turned hooks for engaging the top of the box and with eyes, and bent rods or bars secured at their centers to the lifting-cables of the tackle and provided at their ends with hooks detachably engaging said eyes, substantially as and for the purpose set forth.

8. In apparatus of the character described, the combination with a suitable frame, a horizontal shaft, a two-member crane, each member being provided with a forwardly-projecting arm and a downwardly-depending arm, a brace for each member attached at one end to an arm of said member and pivotally connected at its opposite end with said shaft near its center, and tackle, substantially as and for the purpose set forth.

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In presence of—

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