2 Sheets—Sheet 1.

W. H. ELLIOT.

Traveling-Crane.

No. 210,601. **Patented Dec. 10, 1878.**

Fig. 3.

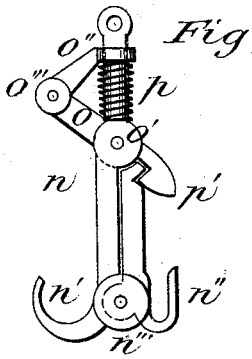
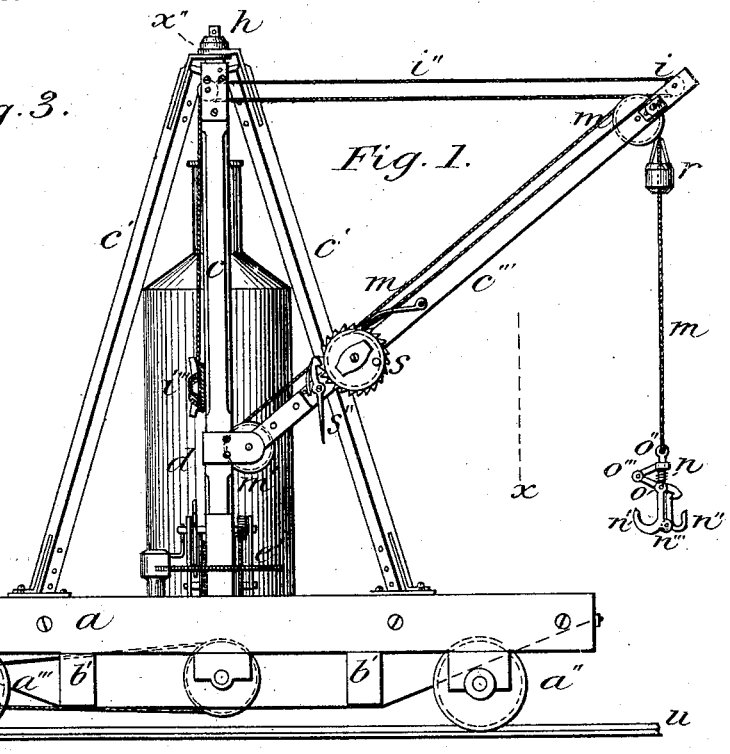


Fig. 1.



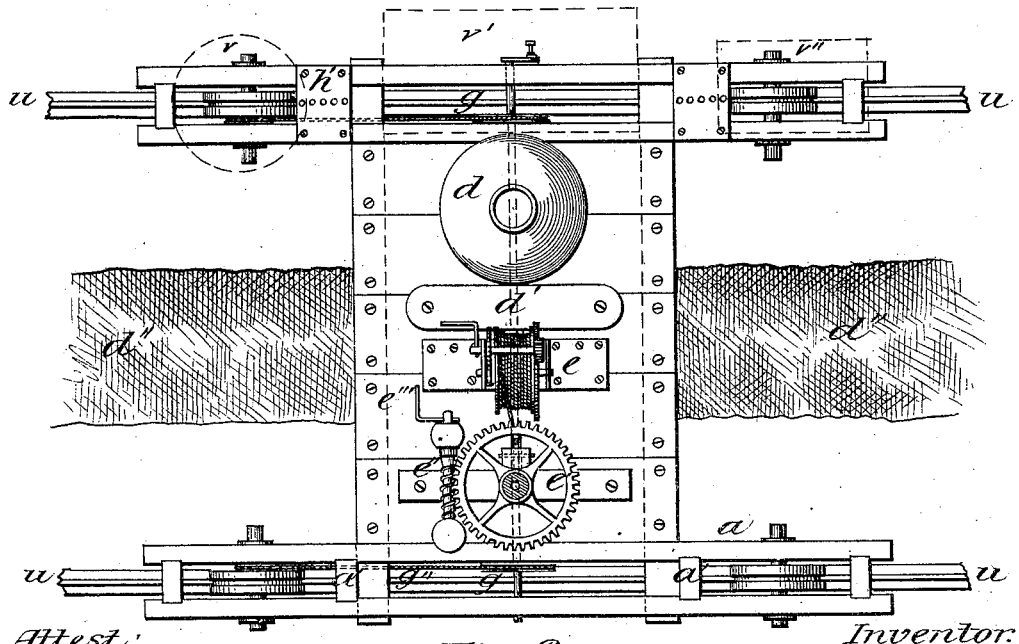


Fig. 2.

Attest:

D. Lewis

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Inventor:

W. H. Elliot

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Fig. 4

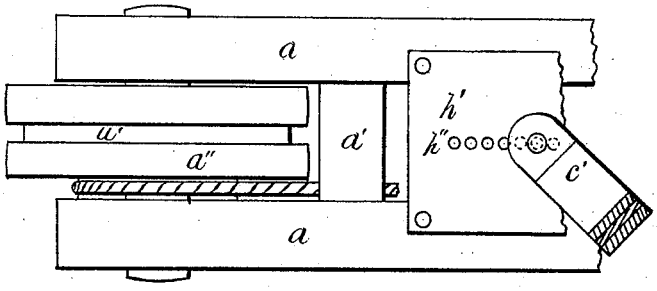


Fig. 5.

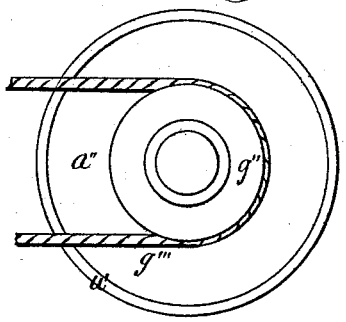


Fig. 6

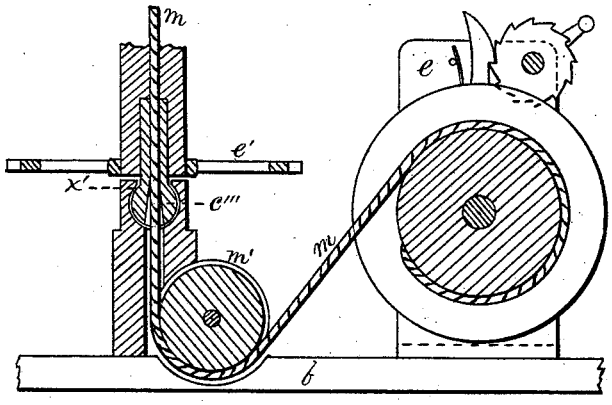


Fig. 7.

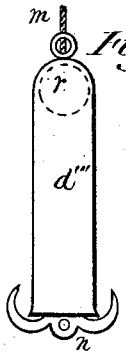


Fig. 8.

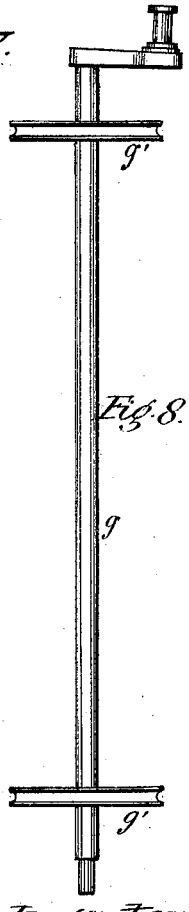


Fig. 9

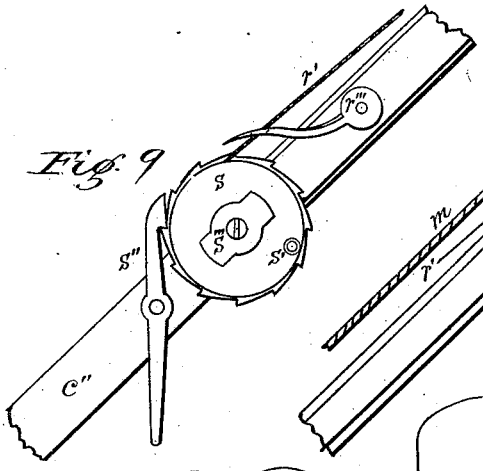
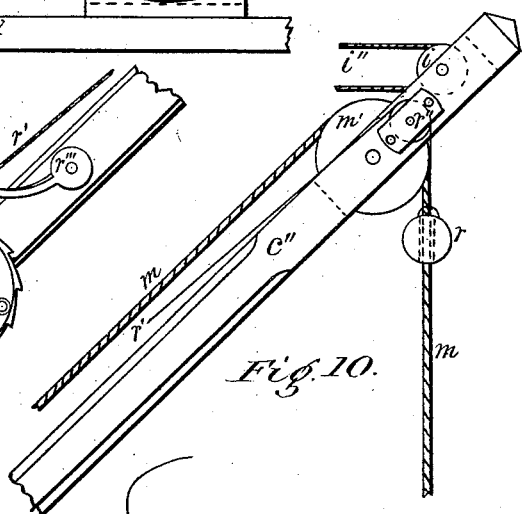


Fig. 10.



Witnesses: L. Lewis
Louis E. Moore

Inventor:
W. H. Elliot

UNITED STATES PATENT OFFICE.

WILLIAM H. ELLIOT, OF NEW YORK, N. Y.

IMPROVEMENT IN TRAVELING CRANES.

Specification forming part of Letters Patent No. **210,601**, dated December 10, 1878; application filed August 2, 1878.

To all whom it may concern:

Be it known that I, WM. H. ELLIOT, of the city and State of New York, have invented a new and Improved Traveling Crane, of which the following is a specification.

The object and nature of my invention are described as follows:

The object of my invention is to provide a simpler, cheaper, and more practical method of raising, carrying, and depositing rock and earth than any now in use; and the nature of my invention consists in the use of certain appliances and methods which are fully set forth in the following specification and claims.

In Sheet 1, Figure 1 is an elevation of my improved crane. Fig. 2 is a plan of the lower part of the crane. Fig. 3 is an elevation of the hoisting-hooks. In Sheet 2, Fig. 4 is a plan of the end of a wheel-frame. Fig. 5 is an elevation of a wheel. Fig. 6 is a vertical section of the lower end of the mast and of a hoisting-machine. Fig. 7 is an elevation of a guard to prevent accident. Fig. 8 is a plan of a driving-shaft for propelling the crane. Fig. 9 is an elevation of the lower portion of the boom and of some of the tripping devices. Fig. 10 is an elevation of the upper end of the boom and of some of the hoisting, adjusting, and tripping devices.

a a are the timbers of which the wheel-frames are composed; *a'*, the blocks which are bolted between the timbers *a*; *a''*, wheels; *a'''*, boxes for the axles of the same; *b*, platform; *b'*, timbers for supporting the same, which are bolted to the under side of the wheel-frames; *b''*, truss-braces; *c*, *c'*, and *c''*, mast, braces, and boom, composing the derrick of the traveling crane; *c'''*, pivot of mast; *d*, boiler; *d'*, engineer's stand; *d''*, sewer; *d'''*, guard; *e*, hoisting mechanism, which may be operated by hand or by steam; *e'*, gear on the lower end of the mast; *e''*, worm working in the same; *e'''*, crank for driving the worm; *g*, driving-shaft; *g'*, driving-pulleys; *g''*, pulley on the side of the wheel; *g'''*, driving belt or chain; *h*, attachment of the braces to the top of the mast; *h'*, plate to which the lower ends of the braces are bolted; *h''*, holes for adjusting the mast and braces in relation to each other; *i* and *i'*, pulleys over which the adjusting-rope *i''* runs; *i'''*, belaying-pin for fastening rope *i''*; *m*, hoisting-rope; *m'*, pulleys around which rope *m* passes; *n*, hoisting-hooks; *n'*, stationary hook; *n''*, pivoted or trip hook; *o*, pawl pivoted at *o'* to the shank of stationary hook *n'*; *o''*, link and collar pivoted to pawl *o* at *o'''*; *p*, spiral spring on the shank of the hook *n'*; *p'*, catch of pawl *o* on hook *n''*; *r*, weight; *r'*, cord for raising the same; *r''*, pulley over which cord *r'* passes; *r'''*, check-pawl; *s*, windlass for raising weight *r*; *s'*, crank of same; *s''*, stop-pawl to engage ratchet; *s'''*, friction-washer; *u*, track composed of square timber with iron rails laid upon it; *u'*, grooves in the wheels; *v*, *v'*, and *v''*, dotted lines showing the position of the tank, the coal-bunker, and the tool-chest; *x*, dotted lines showing the position of the hoisting-rope when heavy loads are to be raised; *x'*, shoulder on the lower pivot of the mast; *x''*, shoulder or washer on the upper pivot of the mast.

My improved traveling crane may be described as composed of four principal parts, which are two wheel-frames, a platform, and a derrick.

The two wheel-frames are each composed of two long timbers, *a*, bolted together through blocks *a'*. In each end of each wheel-frame there is an independent car-wheel, *a''*, the axles of which have a bearing in boxes *a'''*, one under each end of each timber. The platform *b* is composed of the flooring and the timbers *b'*, which are bolted to the under side of the wheel-frames. These timbers are supported by truss-braces *b''*, which prevent the wheel-frames from sagging.

The derrick is composed of a mast, *c*, two braces, *c'*, and a boom, *c''*. The two braces are bolted at their lower ends to one wheel-frame, while the mast stands upon the platform near the other wheel-frame. The platform is in width equal to about one-third of the length of the wheel-frames, as shown in Fig. 2, Sheet 1. That portion of the traveling crane called the "car" is composed of the two wheel-frames and the platform, with its supporting-timbers.

By the above-described construction and arrangement of the principal parts of the crane heavy loads may be raised and lowered en-

tirely within the lines of the base. In swinging the load around it passes a short distance outside of the base; but as the opposite side of the crane is weighted by the boiler, and its contents by the tank, the coal-bunker, and the tool-chest, the heaviest load in any position does not disturb the stability of the crane.

My improved crane is intended as a companion machine to the rock-drilling engine for which several patents have been granted to me.

I have shown the crane provided with a boiler for furnishing the necessary steam to operate it; but as it must always be in close proximity to the engine, it may, in case the crane has but a few feet to travel, be supplied with steam from that machine through a flexible pipe.

I have herein shown the crane provided with a hand hoisting-machine. It may, however, be provided with one of the many forms of steam hoisting-machines that are now manufactured.

My crane is made locomotive by connecting the driving-shaft *g* with a suitable engine, whereby power is communicated to two or more of the wheels through pulleys *g'* and *g''* and chain or belt *g'''*. By connecting the driving-shaft *g*, under the platform, with the wheels in the extreme ends of the wheel-frames, in the manner described, I leave all the space between the wheel-frames at each side of the platform unobstructed, through which the heavy loads are raised and lowered. For this connection shafting and gears may be used instead of belts.

To adjust the mast of the derrick to a vertical position on a street of any grade, I change the position of the lower end of the mast and the lower ends of the braces in relation to each other by moving one or the other in a direction parallel with the track. I prefer to move the braces, as this interferes less with the operations of the hoisting and swinging machinery. After the crane has been placed upon the track, the adjustment of the derrick is effected by bringing the mast to a vertical position and then bolting the lower ends of the braces to the plates *h'* through the holes *h''*. These holes are arranged in a line parallel with the wheel-frames upon which the lower ends of the braces are bolted, whereby it is practical to adjust the mast in any direction. To adjust it to the grade of the street the lower ends of the braces have both to be moved in one direction. To adjust it to rails of different heights, the lower ends of the braces have to be moved in opposite directions.

A long or short sweep may be given to the boom by means of the rope *i''* working over pulleys *i* and *i'* in the usual way. When the boom has been adjusted the rope is wound upon the belaying-pin *i'''*.

When very heavy loads are to be raised the boom must be drawn up till the hoisting-rope assumes the position of dotted line *x*. The weight of the load is then brought within the base of the crane.

By means of the gear *e'*, on the lower end of the mast, and the worm *e''*, provided with a suitable crank, the crane is caused to swing around to any desired position.

By the use of the two last-mentioned features the engineer is able, without help from others, to deposit a load at any point he may desire.

When it becomes necessary to move the load farther than the sweep of the boom will carry it, it has to be swung around by means of the worm and gear *e'* and *e''* until it hangs outside of the base, on the side of the crane opposite to the boiler. In this position the load is carried hanging upon the hoisting-rope. The advantage of carrying the load in this position is a more equal distribution of the weight of the crane and load among the wheels and a greater degree of safety, as in case of accidentally dropping the load it would have only a few inches to fall, and could not by any chance roll back into the sewer, so as to endanger the lives of the men.

To enable the engineer to dump the load, as well as to swing it around to the proper place for dumping, I employ hoisting-hooks *n*, weight *r*, with its cord *r'*, and windlass *s*, with its pawl *s''*, for that purpose. The weight *r* is supported upon cord *r'*, which runs over pulley *r''*, and is wound upon the cylinder of windlass *s*. The hoisting-rope passes through the weight *r*. When the load has been brought over the spot where it is to be deposited, the stop-pawl is raised from the ratchet, when the weight *r* immediately falls, running down upon the hoisting-rope *m* till it strikes the collar *o''* on the hoisting-hooks. By the blow thus given the collar is driven down, depressing the spring *p*, raising catch *p'* on the pawl *o*, and liberating the hook *n''*, which turns upon its pivot and drops anything that may be hanging upon it. As soon as the hook *n''* is tripped the weight should immediately be wound up to its place at the end of the boom, where it is held by pawl *s''* ready for the next operation.

To prevent the windlass from running off cord *r'* by its momentum after the weight strikes the collar *o''*, I employ pawl *r'''*. The cord passes through this pawl, and while the weight is acting upon it to draw it off the windlass its tension prevents the pawl from engaging the teeth of the ratchet; but when the cord is relieved of the action of the weight it becomes slack, which allows the pawl *r'''* to fall and stop the rotation of the windlass.

To prevent accidentally dropping the load, by drawing the collar *o''* up against the weight the guard *d'''* may be employed. This guard, which is in the form of a bell-glass attached to the upper end of the boom, is large enough to allow the weight to be drawn up into the upper end of it; and if by accident the hooks are drawn up too high they will catch upon the lower edge of the guard and stop before

the collar o'' reaches the weight, and thus prevent any action of the weight upon the collar.

It is sometimes desirable to use a double hoisting-rope. In this case one end of the rope is fixed to the extreme end of the boom, and the hooks n are attached to a sheave, around which the hoisting-rope passes, and the stationary or fixed side of the rope passes through the weight r and the collar o'', the operation of tripping being the same in both cases.

I support the mast at the bottom upon a pivot-bearing, which, to admit of the necessary movements in the top of the mast for adjustment to variable grades, should be loosely fitted, or it may be globular, and it should also be provided with an annular shoulder on the pivot, to prevent it from being raised out of the bearing by an upward lift.

The mast at the top is provided with a pivot, which passes through the upper ends of the braces, and has a washer and pin on its upper end to prevent the braces from being forced off by the strain of the load on the boom.

I provide the car of my traveling crane with wheels which have broad flat faces, with a groove, w', in the center of each face, to adapt them to run safely upon raised railroad-tracks, while they are equally adapted to run upon planks or upon pavements. A car for street improvement having wheels so constructed may easily be moved from one street to another without being taken apart for that purpose.

Tracks for street-improvement cars must always be temporarily constructed, and for the purpose herein described they cannot have ties; hence the great advantage of wheels for such cases, constructed as described, as the tracks are effectually tied by the car, and the wheels are prevented from running off the tracks by the grooves.

The engineer, while on his stand at d', can see and easily reach the safety-valve, the gage-cocks, and pressure-gage. He can, without moving from his post, reach all the cranks and levers for operating the crane, and he can also see the bottom of the sewer and all that is going on there, and instead of receiving his orders from the men below as to when and how to operate the crane, he himself controls not only all the operations of the crane, but also the movements of all the men connected with it.

In chaining rocks, for the purpose of raising them out of the sewer, the chain has to be applied to both hooks, and in such a way that the rock will be dropped by tripping the hook n'', but the chain still hanging to the hook n' will be pulled out from under the rock and brought away by it.

In using the bucket, the hook n' takes hold of the bail, while the bucket is held from turning over by a link or short chain, which connects the lip of the bucket with the hook n''. When the link is released by the trip-hook the bucket immediately turns bottom side up, but still hangs upon the hook n'.

The windlass s may be dispensed with, and the weight r, by means of the rope r', may be operated by hand. The weight r and rope r' may be dispensed with, and the hook n'' tripped by depressing the long end of pawl o by hand, and the hooks thus used would have a great advantage over ordinary hooks, as a rock could be dropped without first resting it upon the ground. The link and collar o'' may also be dispensed with, and still the weight falling upon the pawl o would trip the hook n''; but I prefer to use the invention as shown in the drawings.

By the arrangement of the feet of the two braces of the derrick upon one wheel-frame and the mast near the other wheel-frame, the boom reaches with equal facility the open spaces between the wheel-frames at either end of the car.

To enable the car to conform to the irregularities of the track I place sheet-rubber in the joints between the wheel-frames and the timbers b'.

I have described my traveling crane in its operation upon sewers. It will, however, operate with equal facility upon cellars or any other open cuts.

Having described my invention, what I desire to have secured to me by Letters Patent of the United States is—

1. A traveling crane consisting of two wheel-frames, a platform, and a derrick, constructed in the manner described, whereby the load may be raised at one end of the car and lowered at the other end entirely within the lines of the base, substantially as set forth.

2. In a traveling crane, the combination of the driving-shaft g, pulleys g' and g'', belt g''', and wheels a'' with a car, constructed as described, whereby the space between the projecting ends of the wheel-frames is left unobstructed, substantially as and for the purpose set forth.

3. A traveling crane having a car constructed and a derrick arranged upon the car as described, whereby the boom is allowed to reach the unobstructed open spaces between the ends of the wheel-frames at each end of the car, substantially as specified.

4. In a traveling crane, the combination of the adjustable boom c'', with its pulleys i i' and its rope i'', the gear e' and worm e'', the stationary hook n', and trip-hook n'', whereby the depositing of the load is greatly facilitated, substantially as described.

5. In a crane or derrick, the combination of the hook n'' and pawl o with the hook n', whereby the load may be dropped, substantially as specified.

6. In a crane or derrick, the combination of the weight r and cord r' with the hooks n, substantially as and for the purpose specified.

7. In a crane or derrick, the windlass s, in

combination with the weight and cord r and r' and the hooks n, substantially as and for the purpose specified.

8. In a crane or derrick, the pawl r''', in combination with the windlass s, weight and cord r and r', and the hooks n, substantially as and for the purpose set forth.

9. A car for a traveling crane constructed in the manner set forth, and provided with a derrick, which is arranged upon said car as shown, and is made adjustable to the grade of the street and to the height of the rails by the means substantially as shown and described.

WM. H. ELLIOT.

Witnesses:
D. LEWIS,
LOUIS E. MOORE.