

(No Model.)

3 Sheets—Sheet 1.

J. THOMSON & R. W. MULLINS.  
EXCAVATING APPARATUS.

No. 338,803.

Patented Mar. 30, 1886.

Fig. 1.

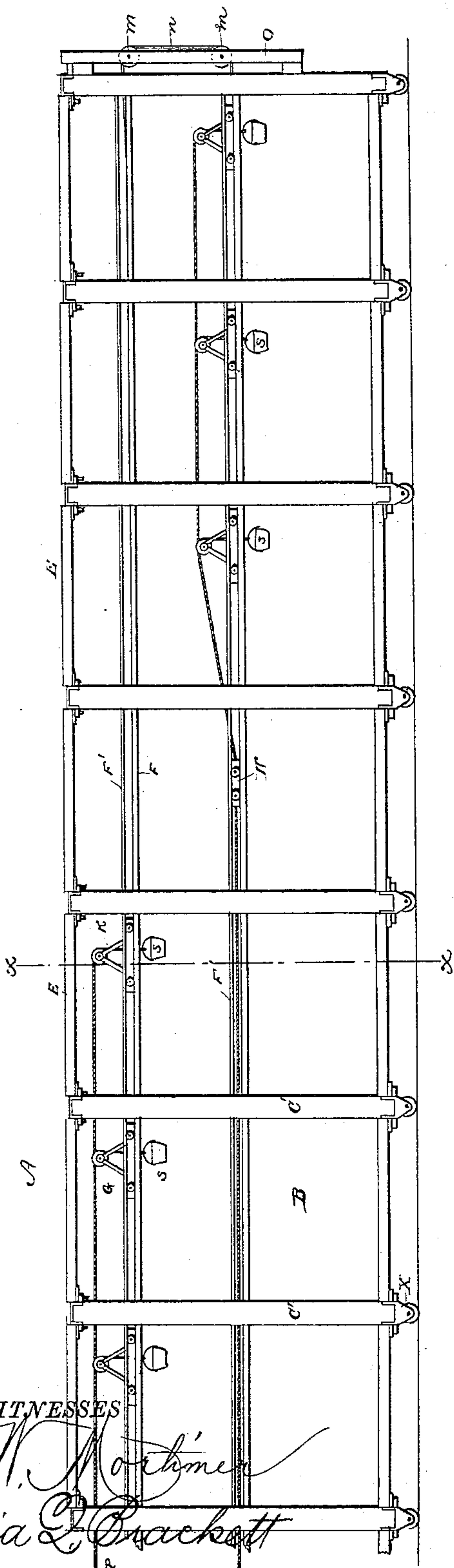
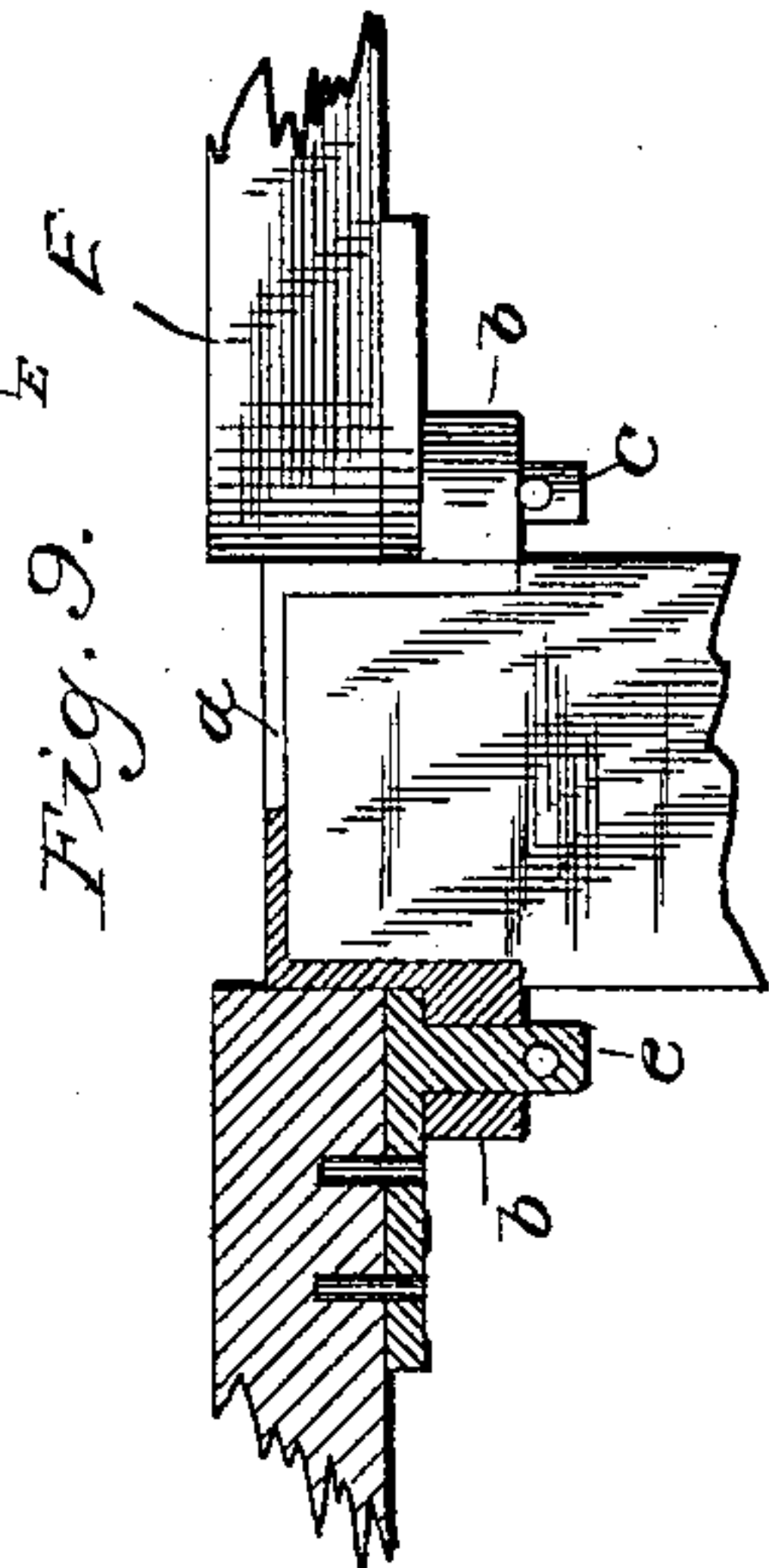
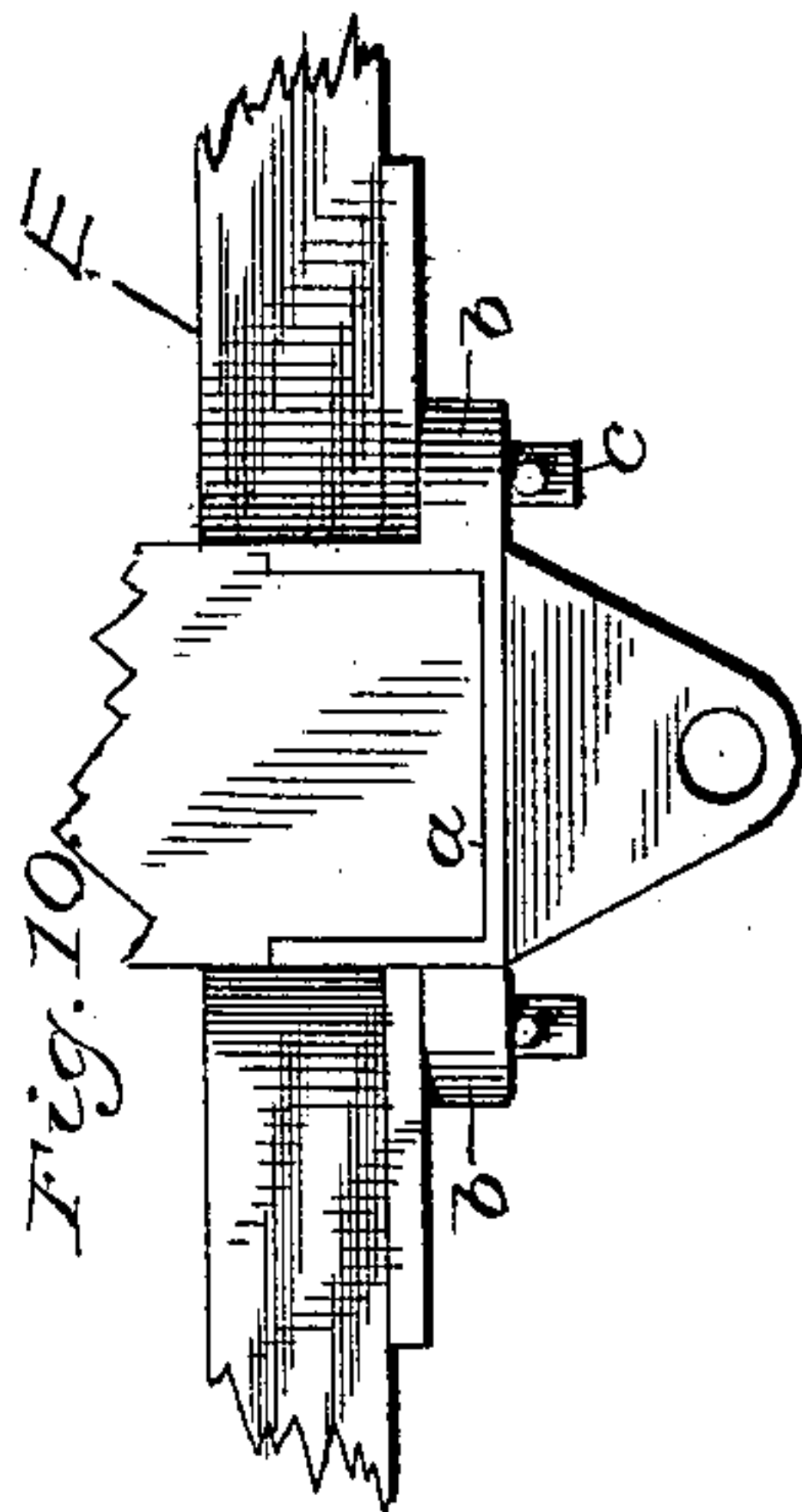
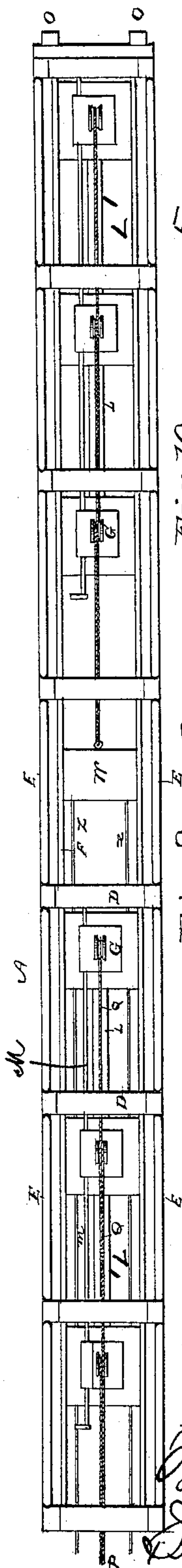


Fig. 2.



WITNESSES

*W. K. Thomson*  
*Lillia L. Brackett*

INVENTORS

*John Thomson*  
*Richard W. Mullins*  
*Geo. H. Young*  
*Chas. B. Farnham*

(No Model.)

3 Sheets—Sheet 2.

J. THOMSON & R. W. MULLINS.

EXCAVATING APPARATUS.

No. 338,803.

Patented Mar. 30, 1886.

Fig. 4

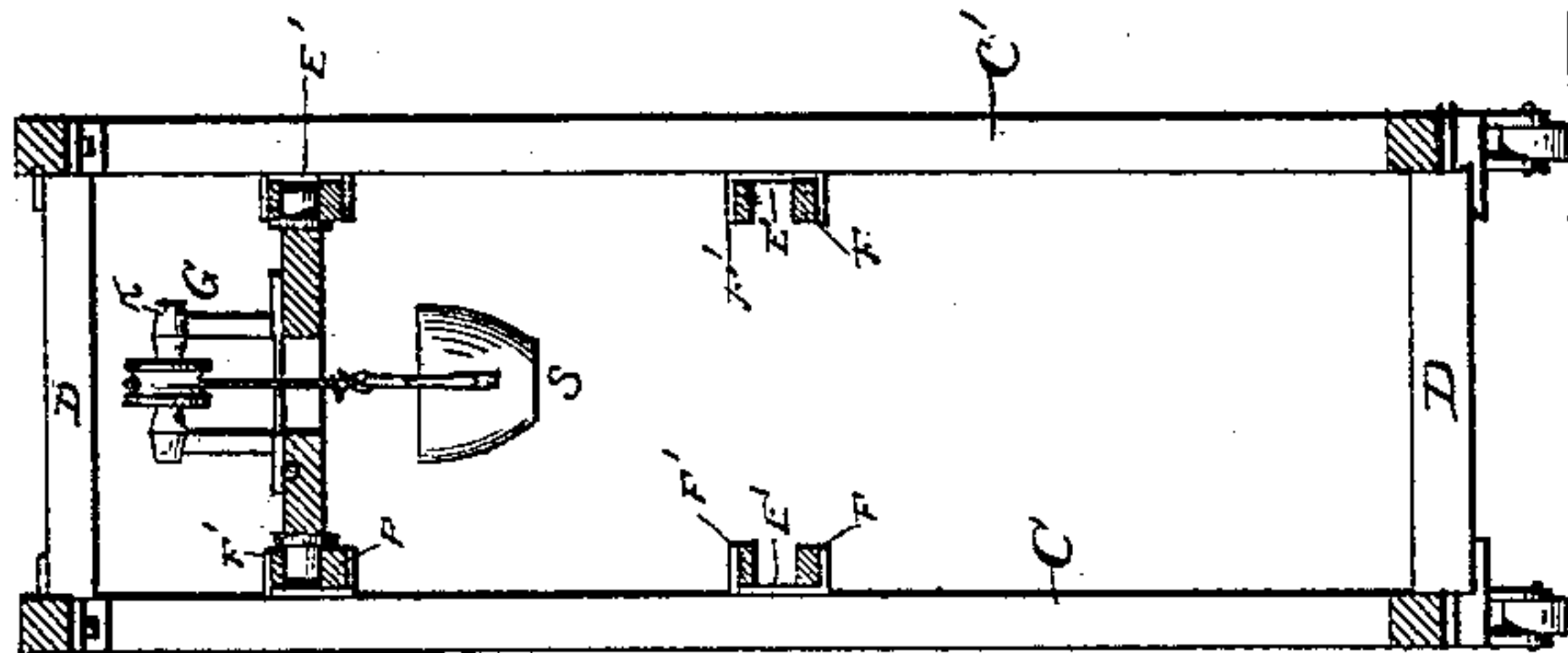
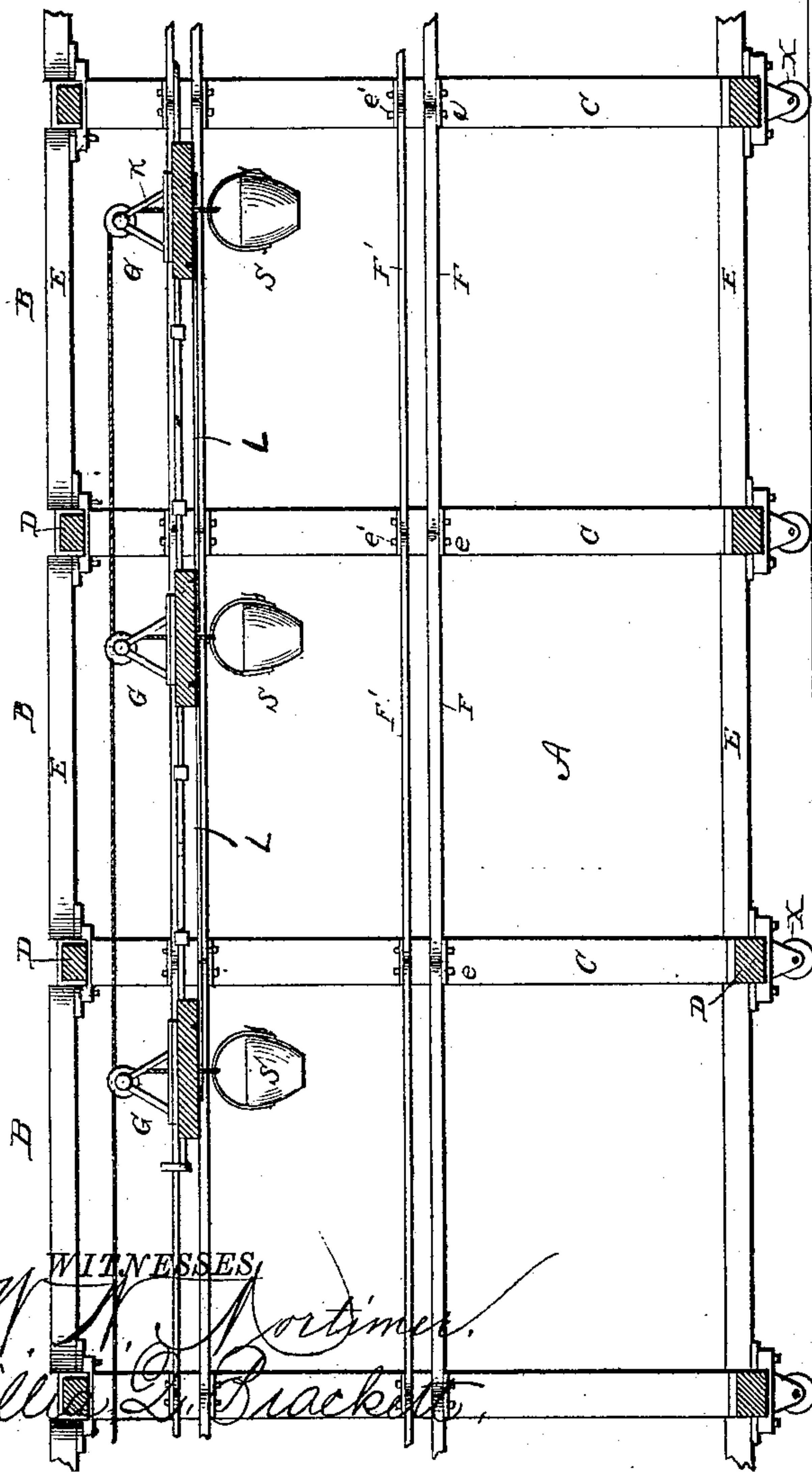


Fig. 3.



WITNESSES

*W. H. Mortimer.*  
*L. L. Brackets.*

Fig. 8.

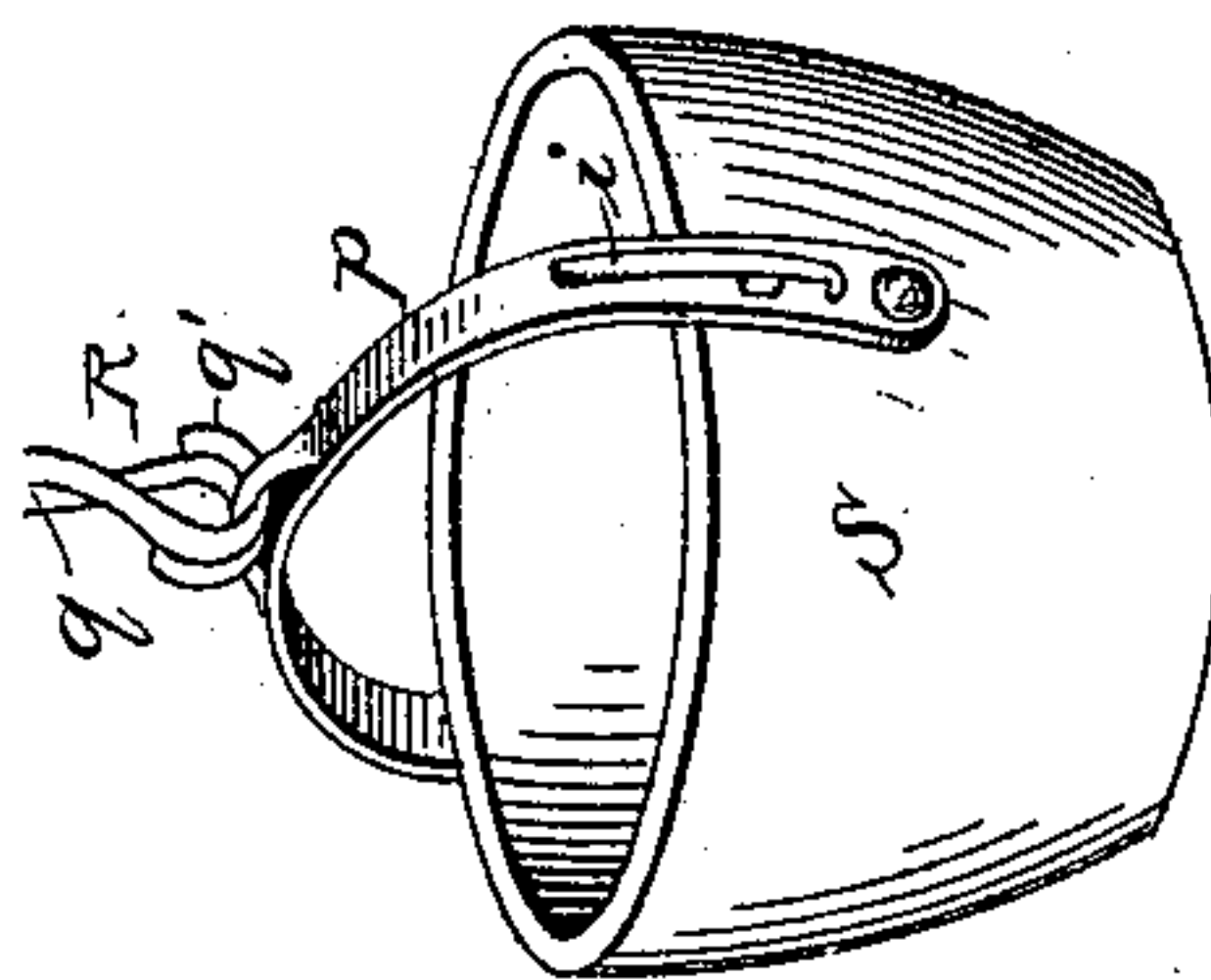
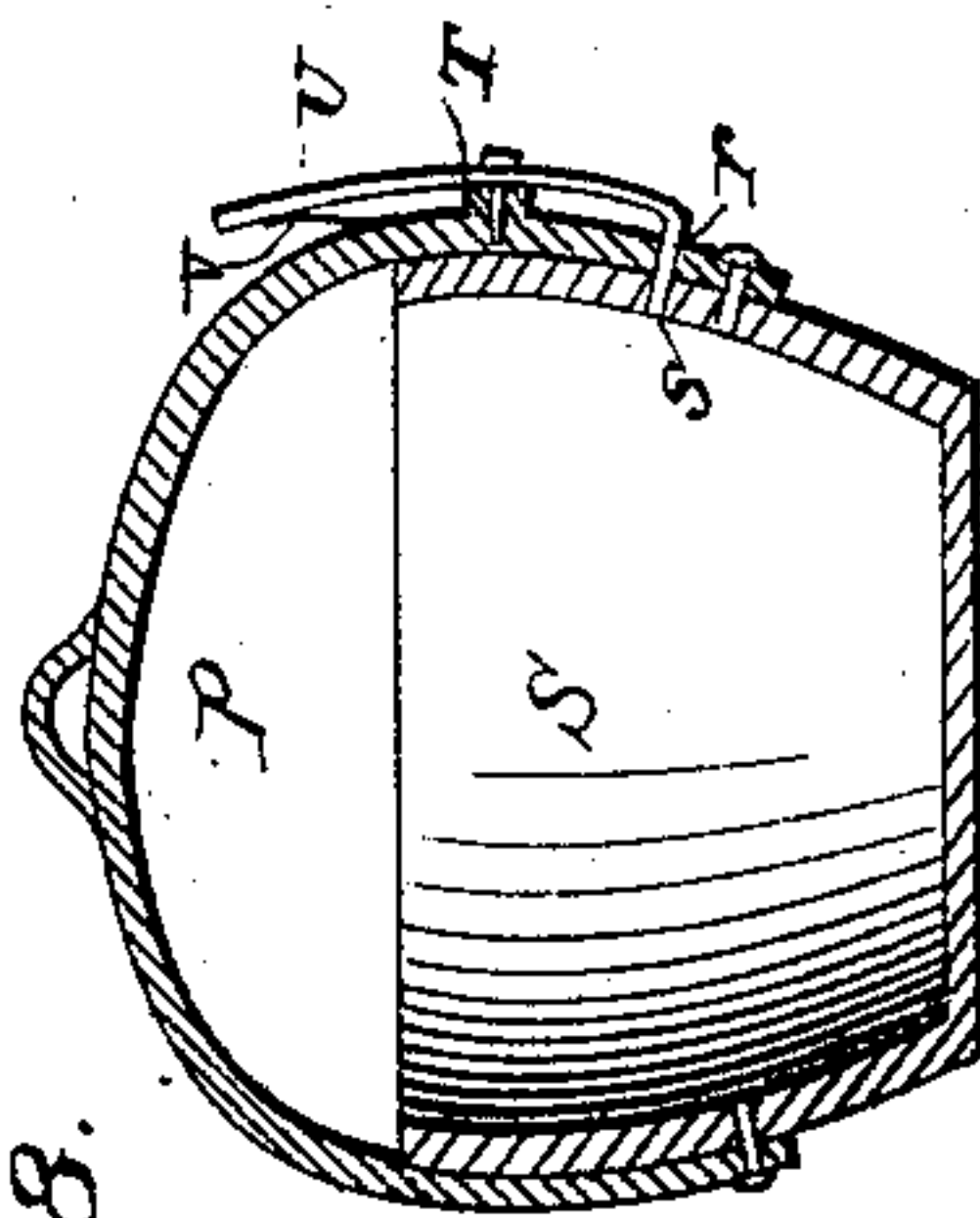


Fig. 7.

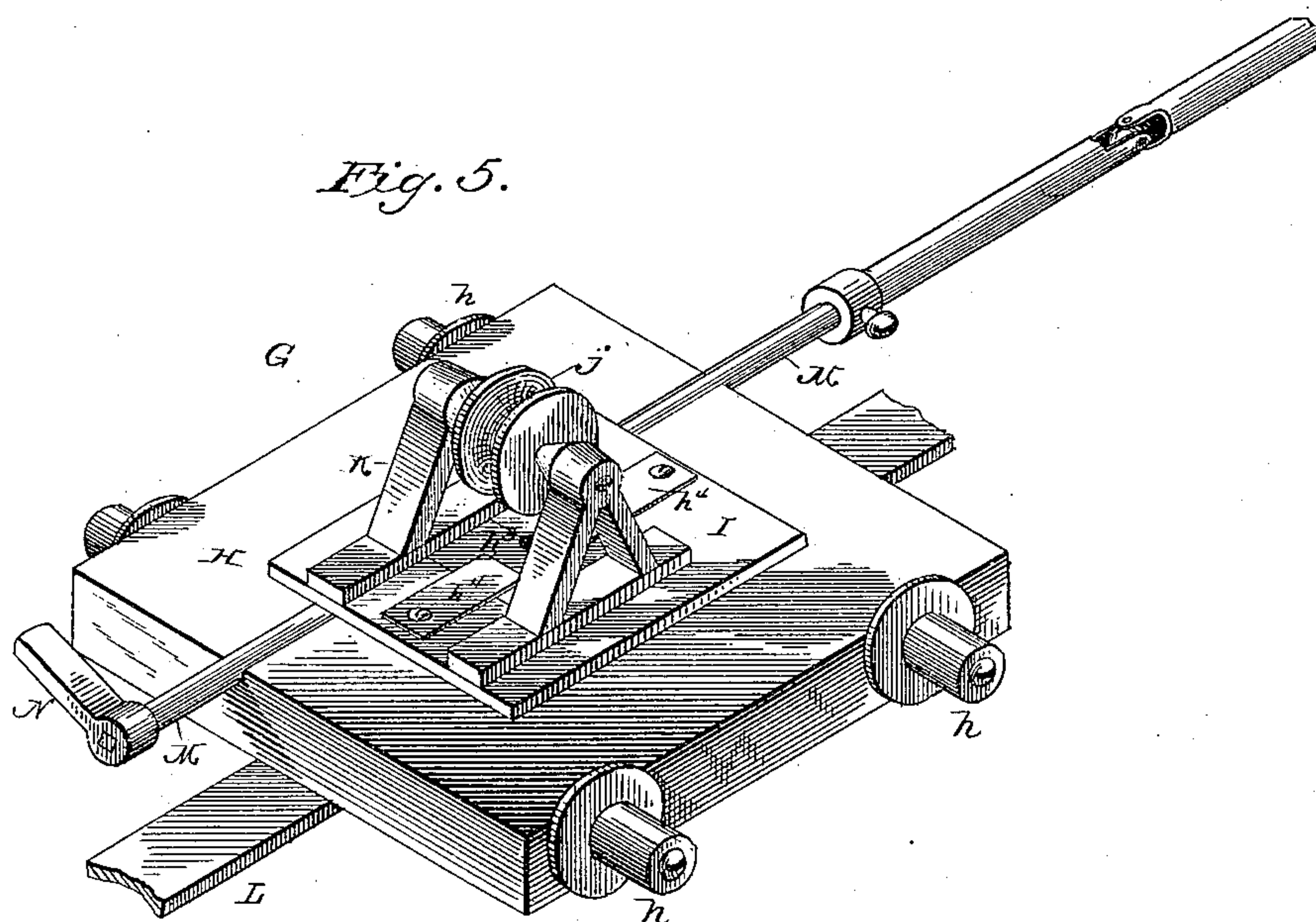
INVENTORS  
*John Thomson*  
*Richard W. Mullins*  
*Joe. H. Young*  
*Chas. B. Hume*



3 Sheets—Sheet 3.

## EXCAVATING APPARATUS.

Patented Mar. 30, 1886.



*Fig. 6.*

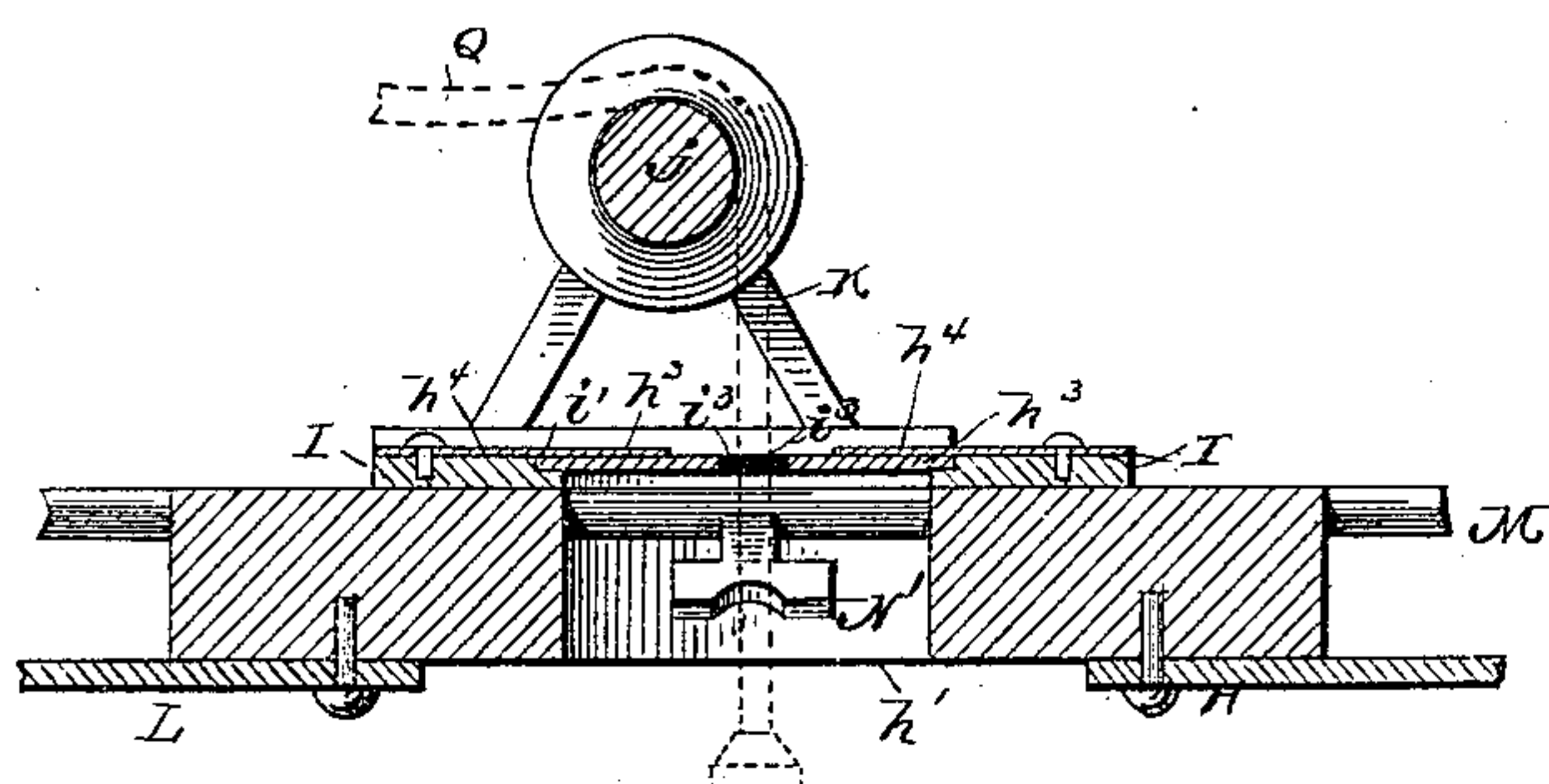
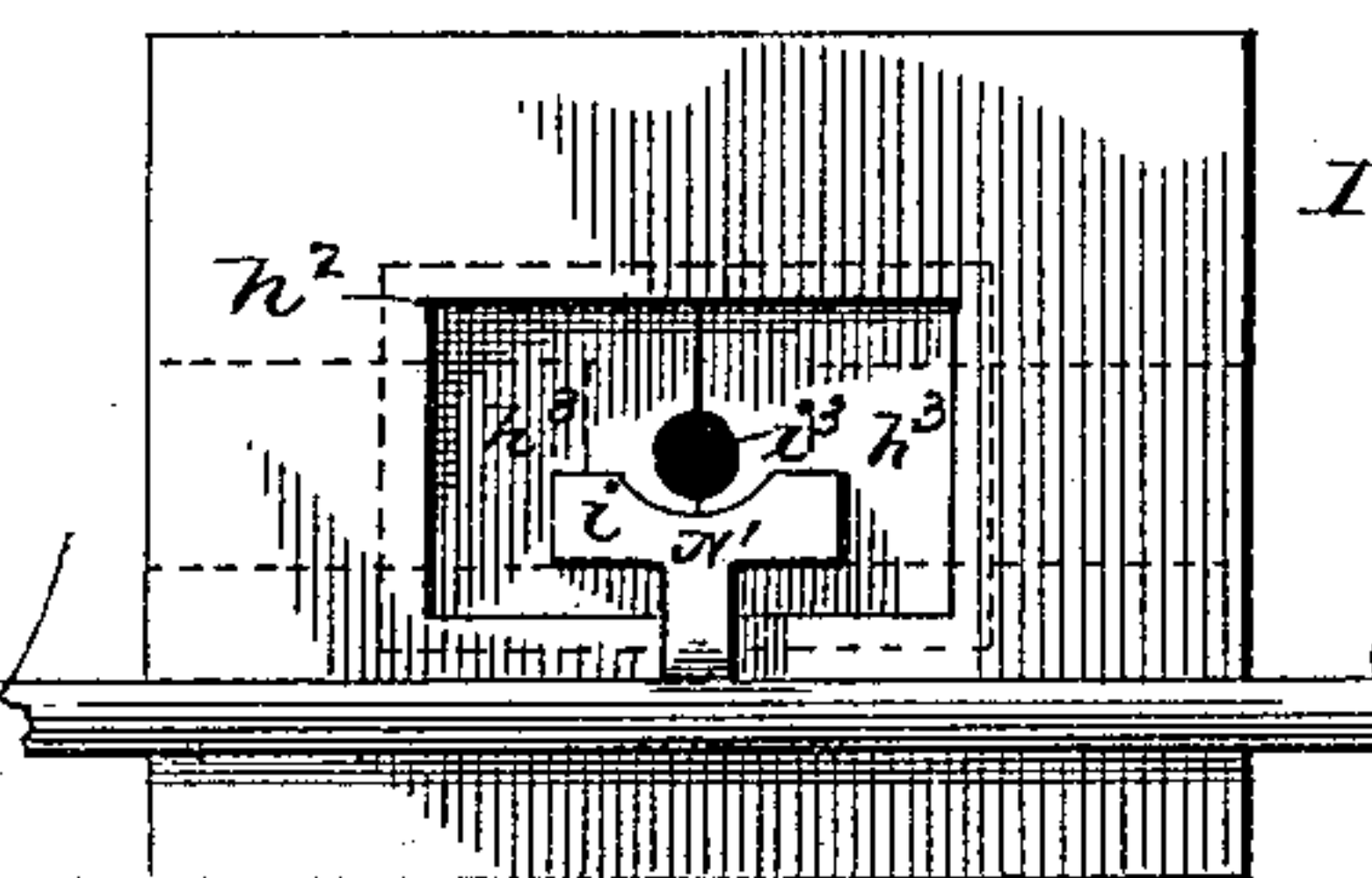


Fig. 6'



*WITNESSES*

W. W. Mortimer  
Lillia Q. Brackett.

**INVENTORS**

INVENTORS  
John Thomson  
Richard W. Mullins  
Jas. H. Young  
W. B. Farnum  
Attys



# UNITED STATES PATENT OFFICE.

JOHN THOMSON AND RICHARD W. MULLINS, OF KANSAS CITY, MISSOURI;  
SAID THOMSON ASSIGNOR TO SAID MULLINS.

## EXCAVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 338,803, dated March 30, 1886.

Application filed August 5, 1885. Serial No. 173,591. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN THOMSON and RICHARD W. MULLINS, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Excavating Apparatus; and we 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 appertains to make and use the same.

Our invention relates to excavating apparatus, and more particularly to that class in which the receptacles for carrying or transporting the excavated material are moved upon tracks.

The objects of the invention are to provide an improved construction of tramway upon which the trucks or cars can be moved, and which tramway will readily adapt itself to curves or angles; to provide a tramway which may be readily and easily taken apart for transportation, and one that may be quickly put together; to provide two tracks, one above the other, whereby when the trucks on one track are removing a load from the point of excavation the other cars will be returned to receive another load; to provide an improved construction of truck to travel on said tramway; to provide improved means for connecting the trucks, whereby they will be allowed to flex in turning curves; to provide an improved construction of bucket; and to provide improved means for maintaining or holding the buckets in a raised or elevated position, and for releasing said buckets, whereby they may be lowered so as to be within easy access of the workmen.

With the above and other objects in view the said invention consists in the features of construction and combinations of parts hereinafter fully described, and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of our invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail longitudinal vertical section. Fig. 4 is a transverse section on the line *xx* of Fig. 1. Fig. 5 is a detail view of one of the trucks or carriages removed. Fig. 6 is a transverse section of the same. Fig. 6'

is a bottom view of one of the trucks. Fig. 7 is a detail view of one of the buckets employed. Fig. 8 is a sectional view of Fig. 7; and Figs. 9 and 10 are detail views.

Corresponding parts in all the figures are denoted by the same letters of reference.

Referring to the drawings, A represents the tramway or trestle-work of the apparatus, which tramway is composed of a series of flexibly-connected frames, B. Each of these frames B is composed of the vertical beams C C', which are connected at their upper and lower ends by the cross or tie beams D, brackets *a*, having perforated lugs *b*, being employed as connecting means. The beams C C', which are connected by the cross or tie beams D, are connected at their upper and lower ends on each side by beams E, which have downwardly-extending bolts *c* at their ends, which bolts are adapted to engage the openings in the lugs *b*, from which it will be seen that the several frames are flexibly or pivotally connected so that the tramway or trestle-work can accommodate itself to curves or angles.

Secured to the inner sides of the vertical beams C C' are brackets E', the brackets of the several sections being on a horizontal plane. These brackets are secured one set at or about the center of the beams, and another set at a short distance from the upper ends thereof.

F represents tracks which are pivoted between the brackets E' by means of vertical pivot-bolts *e*, said tracks being arranged one above the other, as shown, so that the trucks or cars can travel one above the other. The ends of the tracks are round, so that said ends may be located very closely together, and yet may turn without interfering when the apparatus is moved upon curves.

Secured between and connecting the brackets E' are guard-rails F', which are arranged at slight distances above the tracks F, so as to enable the wheels of the truck to run easily on the tracks and yet prevent them from jumping therefrom.

G represents trucks which are adapted to travel on the tracks F, said trucks being preferably arranged in a series and running upon the upper and lower tracks.



As the trucks are all of the same construction it is thought that a description of one of them will be sufficient.

The trucks G comprise a platform, H, which is provided with wheels  $h$ , which run upon the tracks F, said platform being provided with an opening,  $h'$ , over which is secured a metal plate, I, which is also provided with an opening,  $h^2$ . In the sides of the opening  $h^2$  are hinged or pivoted doors  $h^3$ , against the upper sides or faces of which bear flat springs  $h^4$ , which are secured to the metal plate I. These doors are held in a horizontal position and flush with the upper side of the plate I by means of ledges or shoulders  $i'$ , which project from the sides of the opening in said plate I. The inner ends of the hinged doors are provided with recesses  $i^2$ , which register and form an opening,  $i^3$ , of sufficient size to permit the passage of a rope, cable, or chain.

Projecting upwardly from opposite sides of the plate I are brackets K, between which brackets is journaled a sheave,  $j$ .

As before stated, the trucks are arranged in a series of any desired or suitable number. These trucks are connected on their under sides by bars L, which are pivoted to the platforms near the ends thereof, thus allowing the advance car to turn a curve without interfering in the least with the remainder of the series.

M represents a rock-shaft, which has bearing in recesses upon the upper sides of the platforms of the trucks, and upon one end of which is rigidly secured an arm or lever, N, whereby said shaft may be turned. The rock-shaft M is jointed between the trucks, as shown, so as to permit the trucks turning.

Upon the rock-shaft M are located tappet-arms N', which are rigidly secured to said rock-shaft. These tappet-arms are formed with heads  $l$ , which are adapted to bear against the under sides of the doors  $h^3$ , whereby when the rock-shaft is turned the doors will be forced open upwardly by the tappet-arms.

At one end of the tramway or trestle-work are secured two uprights, O, in which are journaled pulleys  $m$ , and passing over said pulleys are ropes, chains, or cables  $n$ , which are secured at their free ends to the end trucks of the series upon the upper and lower tracks. It will thus be observed that if the upper series of trucks be moved in one direction the series of trucks on the lower tracks will be moved in an opposite direction.

P represents a rope which connects with a suitable winding-drum designed to be actuated by a steam-engine. (The drum and engine being of ordinary construction are not shown.)

Attached to the rope, chain, or cable P are short or branch ropes Q, which pass through the openings formed by the recesses on the inner ends of the hinged doors. Upon these ropes Q are conical buttons or disks, (see the dotted lines, Fig. 6,) which are adapted to bear upon the upper sides of the doors for a purpose which will be explained.

Attached to the lower ends of the ropes Q are hooks R, and adapted to be attached to said hooks are buckets S. The buckets S are provided with pivoted bails  $p$ , which are adapted to be engaged by the hooks R. These hooks R consist of a body,  $q$ , the ends of which are bent or curved in opposite directions, as at  $q'$ , and lapped so as to hold the buckets firmly and securely against accidental detachment.

T represents a lug, which projects from the bail of the buckets, and pivoted to said lug are levers U, the ends of which are bent inwardly, and project through openings  $r$  in the bail, so that their ends will engage openings  $s$  in the bucket, and thus support the bucket in position, and holding them rigid with the bails, so that they will not drop until the pivoted levers are depressed at their outer ends to remove the inturned ends from the openings in the buckets. Springs V are placed under the outer or free ends of the levers, so as to hold the same in engagement with the buckets. It will be apparent that when the free ends of the levers are depressed their bent ends will be removed from engagement with the openings in the buckets, and thus allow the buckets to drop to discharge their load. The series of buckets on the trucks of the lower tracks are connected with a car, W, which travels in advance of the trucks, by short ropes, and this car W is connected with the winding-drum before mentioned by two ropes,  $z$ , secured to the corners of the car, so that the buckets of the upper trucks may be lowered between the ropes without touching the latter. If a single rope were employed, when the buckets of the upper trucks were lowered they would strike said rope.

It will be observed that by turning the rock-shaft, and then unwinding the drum, so as to loosen the cords, the buckets will be lowered, from the fact that the rock-shaft opens the hinged doors and permits the disks or buttons on the ropes to pass through said doors. When the buckets have been loaded, the drum being revolved the buckets are raised, and the conical buttons raise the doors and pass the same. The doors are then forced to their closed position by the springs  $h^4$ , and the buttons bear upon the upper sides of the same, and thus support the buckets while they are being moved to the point at which they are to be dumped. When this point is reached, it is only necessary to depress the levers on the bails of the buckets, when said buckets will dump and discharge their loads.

An important feature of our invention is found in the fact that as the tracks are arranged one above the other, the tramway or trestle does not occupy but a slight space as to width.

It will be observed that rollers X are located at the lower ends of the vertical uprights of the tramway or trestle. These rollers are for the purpose of allowing the trestle to be moved from place to place on an ordinary track.



By placing the buckets to travel on tracks arranged one above the other, it will be seen that a very narrow tramway may be employed.

Numerous changes may from time to time suggest themselves; hence, we would have it distinctly understood that we do not limit ourselves to the exact construction shown and described, but reserve to ourselves the right to make all such alteration in the construction and arrangement of the various parts as may properly fall within the scope of our invention.

Having thus described our invention, we claim—

1. In an excavating apparatus, the combination, with a supporting tramway or trestle comprising a series of flexibly-connected sections, of tracks secured to said tramway, one above the other, a series of trucks to travel on said tracks, and buckets carried by the trucks and adapted to be raised and lowered, substantially as set forth.

2. A supporting tramway or trestle comprising a series of flexibly-connected sections, said sections being provided with wheels or rollers at their lower ends, flexibly-connected tracks supported by said trestle and arranged one above the other, and a set of flexibly-connected trucks on each track, substantially as set forth.

3. The combination, with a supporting tramway or trestle comprising a series of flexibly-connected sections, tracks supported by said trestle and adapted to turn with the sections, guard-rails arranged above the track and adapted to turn with the sections, and trucks to travel on the tracks, as set forth.

4. A trestle or tramway comprising a series of flexibly-connected sections, a series of flexibly-connected tracks supported by said trestle, flexibly-connected trucks on the tracks, buckets carried by the trucks, and a rope or chain connected with said buckets and adapted to raise and lower the same, substantially as set forth.

5. A trestle or tramway comprising a series of flexibly-connected sections, jointed tracks secured to the trestle, and a series of trucks to travel on the tracks, said trucks being connected by means substantially as described, whereby they may readily turn upon curves, as set forth.

6. A trestle comprising vertical bars connected at their upper and lower ends to form frames, brackets having perforated lugs secured to said frame, and bars connecting the frames and having bolts or pins to engage the openings in the lugs, as set forth.

7. A trestle consisting of a series of flexibly-connected sections, brackets on the inner sides of the vertical uprights of said sections, and tracks having their meeting ends pivoted in said brackets, substantially as set forth.

8. The combination, with a trestle or frame, of tracks arranged one above the other, trucks on said tracks, buckets supported by the trucks and adapted to be lowered therefrom,

and cables or their equivalents connecting the trucks upon the different tracks at one end, substantially as set forth.

9. The combination, with a trestle or frame composed of a series of flexibly-connected sections, a series of flexibly-connected rails to form a track, and a series of flexibly-connected trucks on the track, substantially as set forth.

10. The combination, with a supporting frame or trestle comprising a series of flexibly-connected sections having tracks arranged one above the other, of a series of trucks on said tracks, openings in the trucks, hinged doors to close said openings, a rock-shaft to raise the doors, buckets, cables connected with the buckets and passing between the doors, and disks or buttons on said cables, substantially as set forth.

11. The combination, with a tramway or trestle comprising a series of flexibly-connected sections, of a track, a series of flexibly-connected trucks on the track, openings in the trucks, hinged doors to close the same, a rock-shaft having tappet-arms and connecting the trucks, buckets, and cables secured to the buckets and extending through the hinged doors, and disks or buttons on the cables, as set forth.

12. The combination, with a trestle comprising a series of flexibly-connected sections, of trucks to travel on a track supported by said trestle, said trucks being flexibly connected, a jointed rock-shaft connecting the trucks and having an operating-lever and tappet-arms, hinged doors to close openings in the trucks, springs to bear against the upper sides of the doors, cables to pass between the doors, buckets on the lower ends of the cables, and buttons on said cables, for the purpose set forth.

13. The combination, with a supporting-trestle comprising flexibly-connected sections, of flexibly-connected trucks adapted to travel on a track thereof, brackets on the upper sides of the trucks, sheaves journaled between the brackets, cables leading to the trucks, and buckets suspended from the ropes, substantially as set forth.

14. The combination, with a supporting-tramway, and tracks arranged one above the other and supported by the tramway, of a series of trucks to travel on the tracks, buckets suspended from the upper trucks by ropes which are connected with a winding-drum, a car on the lower track connected with the winding-drum by two ropes, and buckets connected by ropes with said car, whereby the buckets of the upper trucks may be lowered between said ropes.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN THOMSON.

RICHARD W. MULLINS.

Witnesses:

JAS. SHAUGHNESSY, Jr.,

LILLIA Q. BRACKETT.