

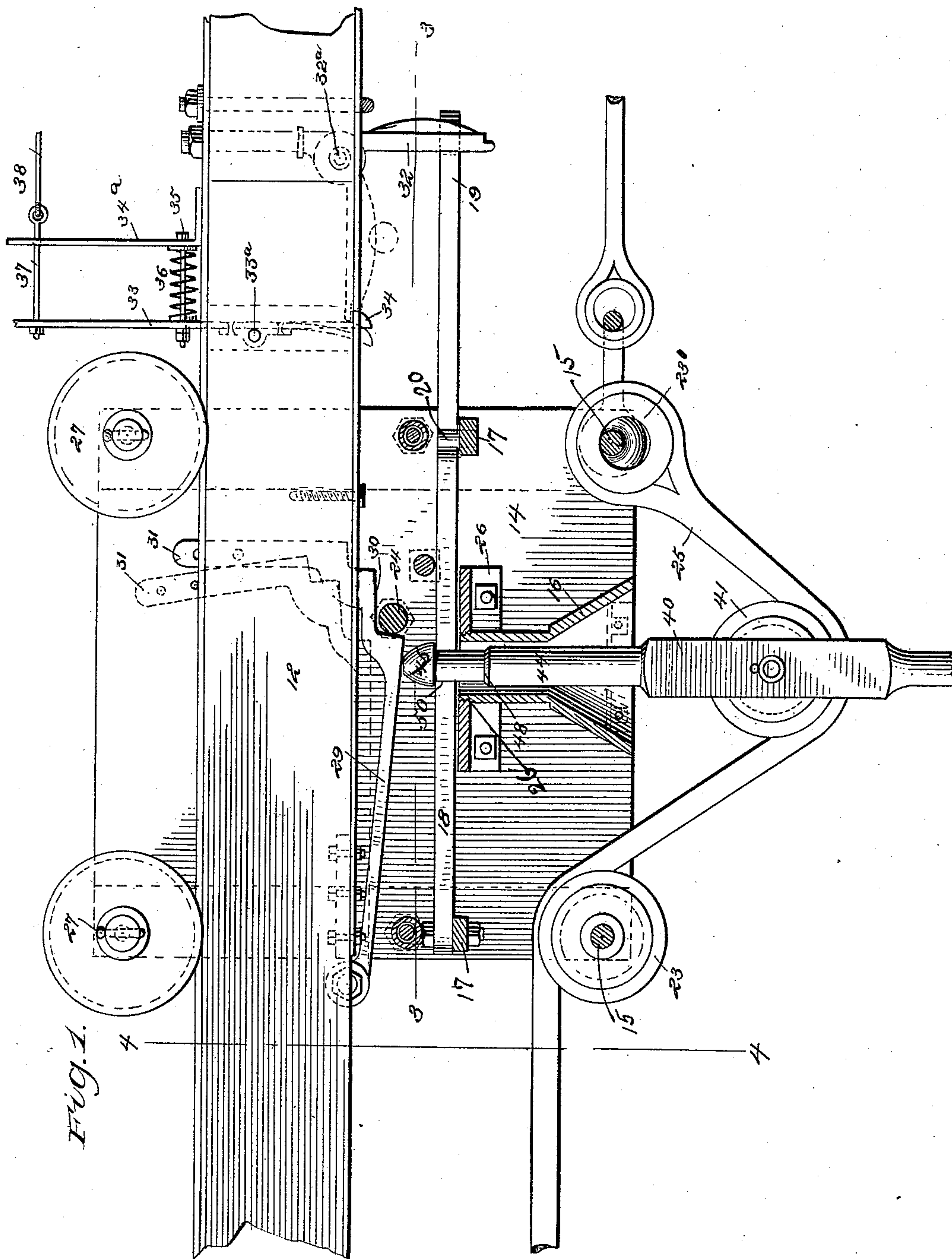
(No Model.)

4 Sheets—Sheet 1.

J. THOMSON.  
SUSPENDED RAILWAY.

No. 405,059.

Patented June 11, 1889.



WITNESSES:

*N. R. Davis.*  
*E. W. Clark*

INVENTOR:

*John Thomson*  
BY *Munn & Co.*  
ATTORNEYS.

(No Model.)

4 Sheets—Sheet 2.

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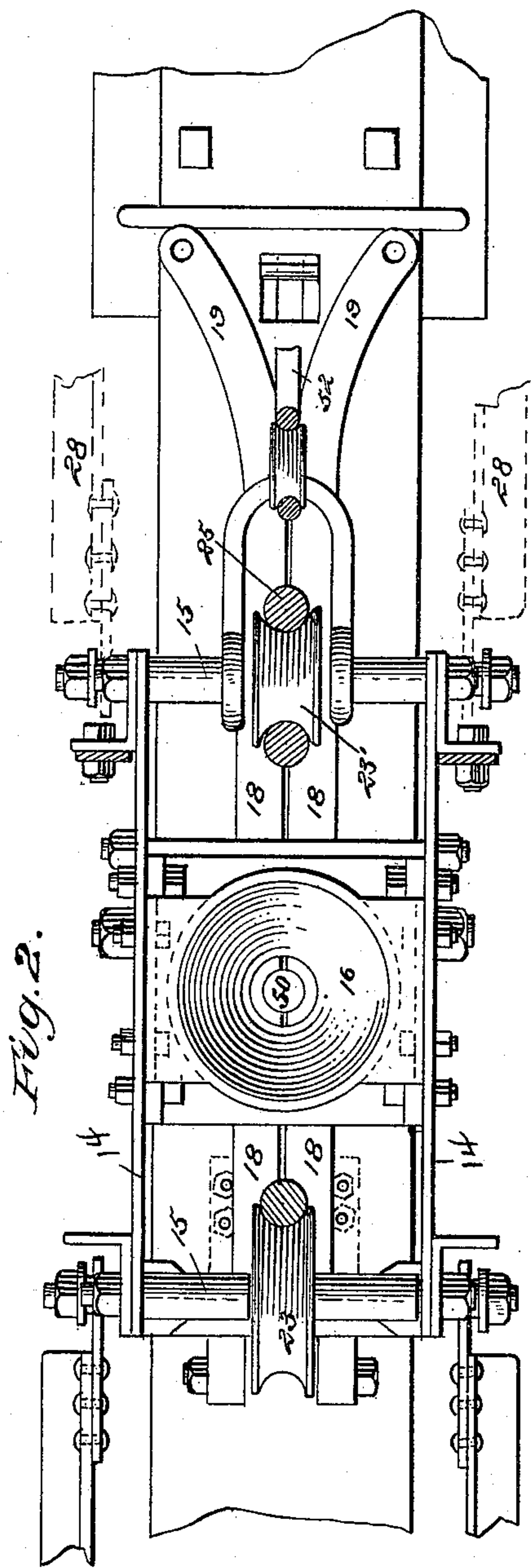


Fig. 2.

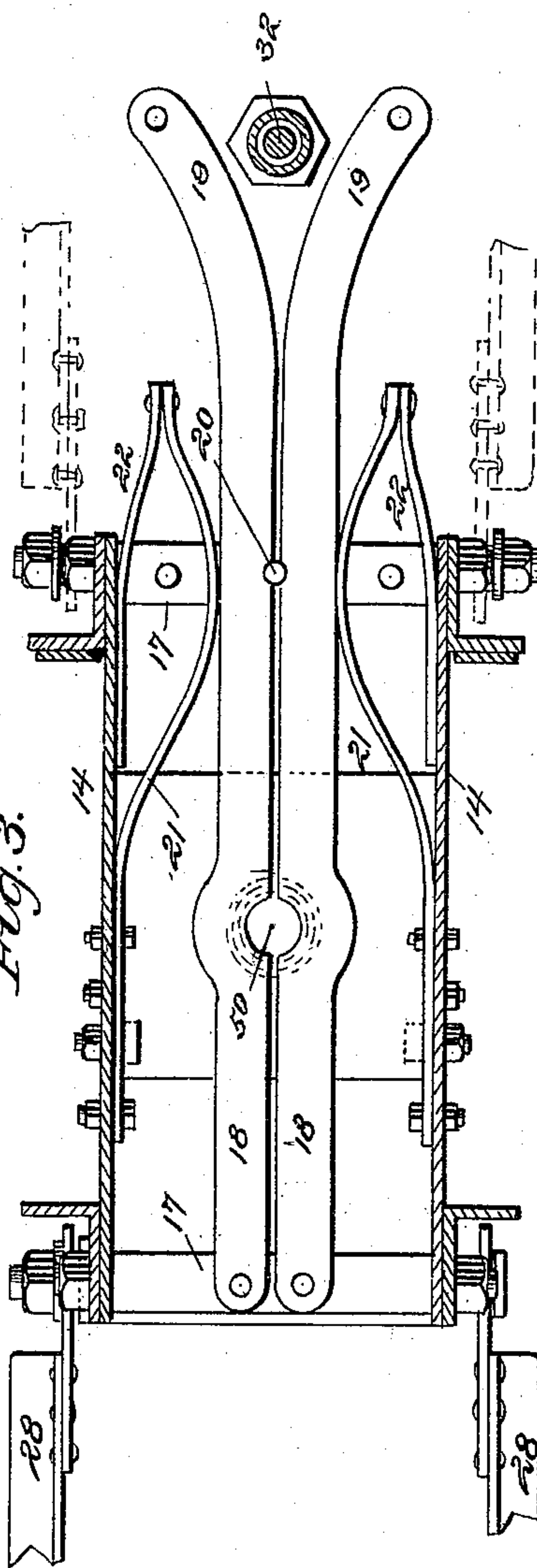


Fig. 3.

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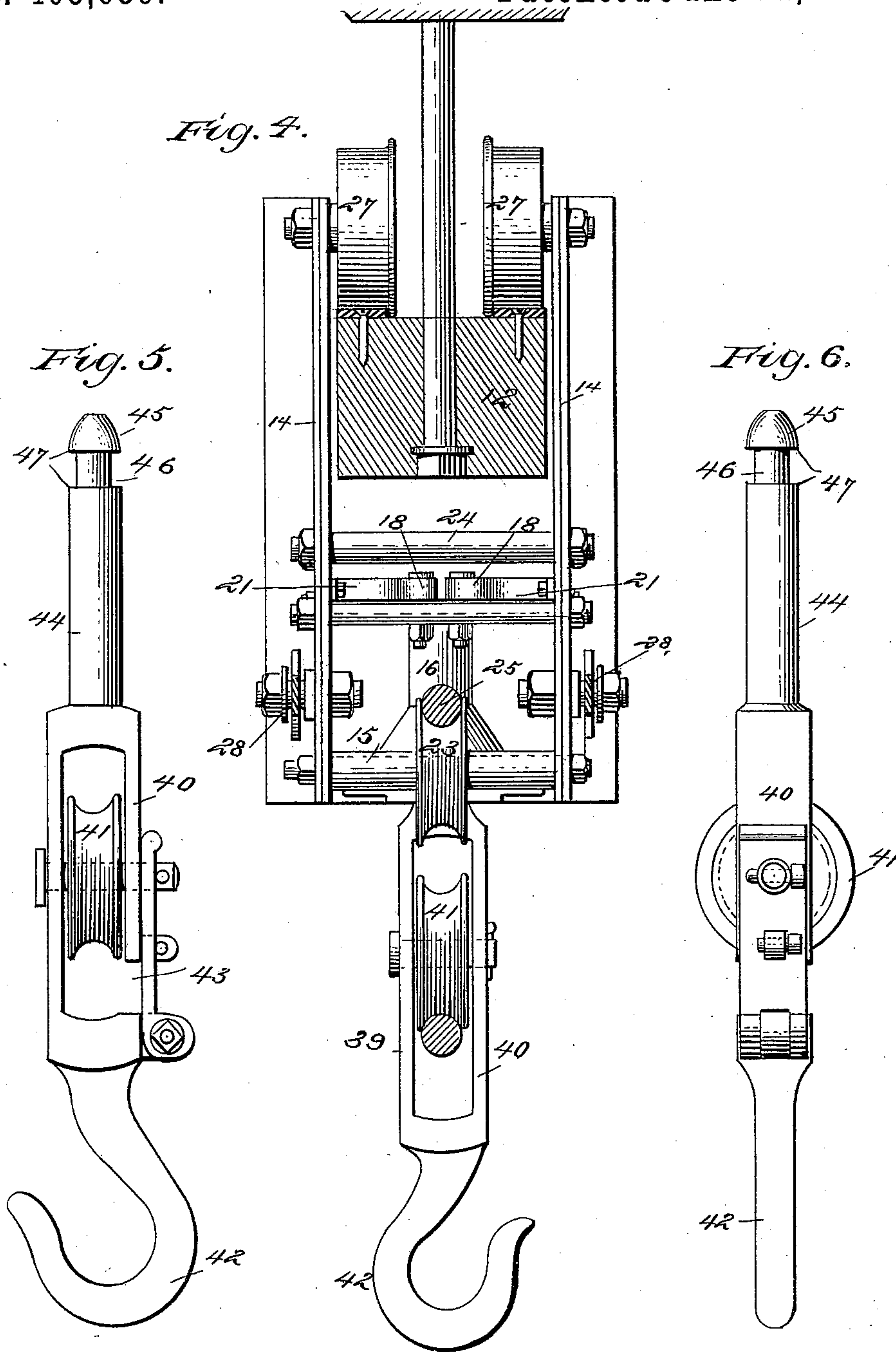
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J. THOMSON.  
SUSPENDED RAILWAY.

No. 405,059.

Patented June 11, 1889.



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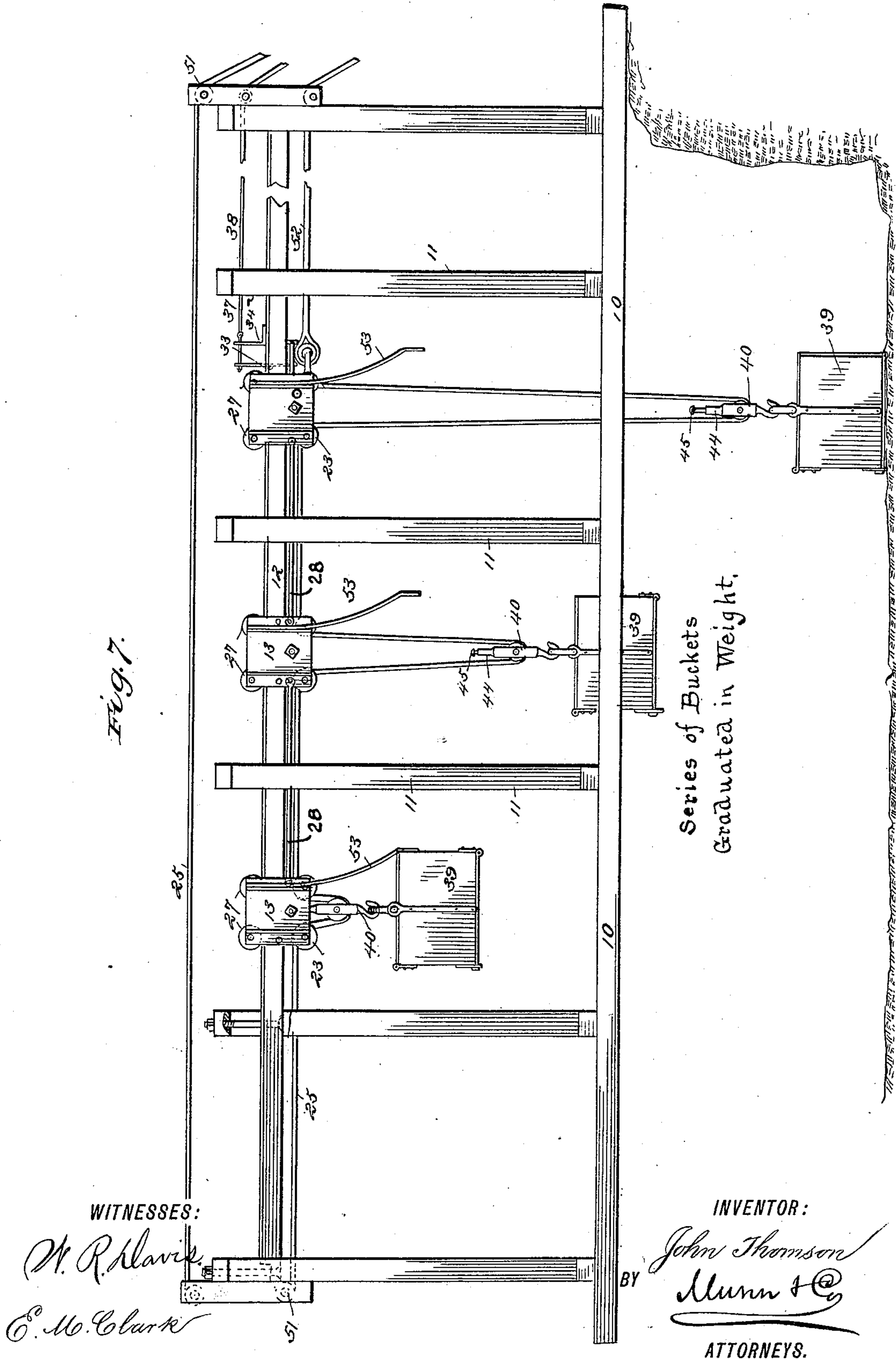
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4 Sheets—Sheet 4.

J. THOMSON.  
SUSPENDED RAILWAY.

No. 405,059.

Patented June 11, 1889.





# UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF KANSAS CITY, MISSOURI.

## SUSPENDED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 405,059, dated June 11, 1889.

Application filed July 16, 1888. Serial No. 280,101. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN THOMSON, of Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Suspended Railways, of which the following is a full, clear, and exact description.

My invention is an improvement in the class of excavating apparatus which includes an elevated railway or track, a series of carriages traveling thereon, and a like series of buckets, which are suspended from said carriages and adapted to be raised and lowered by suitable suspending ropes or chains. Heretofore a hoisting rope or chain has ordinarily been provided for each bucket; but in my system I employ but one such rope or chain for a series of buckets, and the arrangement is such that all the buckets are raised successively, one at a time, by said rope. Thus, however great may be the whole number of buckets employed, the power required to be expended on the hoisting-rope in the operation of elevating them never exceeds at any one time the power necessary to raise one bucket of the series, and when the buckets have been all successively elevated by the single rope or chain the carriages from which they are suspended are hauled together along the track by the same means.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a partial side elevation of the track and a vertical section through the retaining-carriage. Fig. 2 is a bottom plan view of the said retaining-carriage. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a section on line 4 4 of Fig. 1. Figs. 5 and 6 are rear and side views of the bucket-hooks and attached locking devices; and Fig. 7 is a side elevation of a series of buckets suspended from the railway, illustrating the operation of the system.

In carrying out the invention a suitable structure is built where it is proposed to dig a ditch or trench, and extending to a point where it is desirable to deliver the dirt or other material taken from the excavation, which structure consists of a base 10, a series of spaced vertical standards 11, and a

track 12, suspended horizontally from said standards, which track is preferably inclined slightly. Upon the said track a series of carriages 13 are adapted to travel, which carriages consist of parallel metal sides 14, united by suitable bolts 15. Between the sides of the carriage, at or near the center, a funnel-shaped casing 16 is secured, extending from its bottom to about its center, as best shown in Fig. 1, the flaring end of said funnel-shaped casing being the lower end thereof. Slightly above the said funnel-shaped casing transverse bars 17 are secured, one at each end of the carriage, upon one of which two horizontal fingers 18 are pivoted, which fingers are adapted to project horizontally beyond the opposite end of the carriage, their extremities 19 being curved in opposite directions, as best shown in Fig. 3.

The fingers 18 rest upon the bar 17 opposite to that upon which they are pivoted, being held normally a suitable distance apart through the medium of a vertical pin 20, and the said fingers are held in engagement with the said pin by springs 21 and 22, the springs 21 being attached to the inner sides of the carriage and bowed to a connection with the outer edges of the several fingers, the outer extremities of the said springs 21 being secured to the said springs 22, the latter being made to bear upon the sides of the carriage at a point contiguous to the bowed section of spring 21. Upon the center of each of the lower connecting bars or bolts 15 a grooved pulley 23 is journaled, and above the fingers 18 a transverse stop-bar 24 is secured.

All the carriages employed are constructed alike and as above described with the exception of one end carriage, which I for convenience designate a "retaining-carriage." The retaining-carriage differs only in that it has but one pulley 23 instead of two, the rope 25, which raises the buckets, being attached to a grommet 23', through which one of said rods 15 passes, as shown in Fig. 1.

In attaching the funnel 16 to the carriages a rectangular frame 26 is ordinarily secured to the side pieces of the same at or near their center, which plate is provided with a threaded aperture 26', adapted to receive the neck of the funnel-casing.

The top, the bottom, and the ends of the



several carriages are preferably left open, and in said top rollers or wheels 27 are journaled, which rollers are adapted to travel upon the track 12, as illustrated in Figs. 1 and 7.

5 The several carriages are connected through the medium of coupling-bars 28, the said bars being secured to each end of the carriages, one bar upon each side, as best shown in Figs. 2 and 4.

10 In the bottom of the track 12 one end of a latch 29 is pivoted, which latch, when the carriages are in their normal position, is adapted to engage the stop-bar 24, and to that end the free extremity of said latch is provided with  
15 a recess 30, as best shown in Fig. 1. In other words, said latch has at its free end a shoulder 30, which is shown engaged with the stop-bar 24. A rigid arm 31 projects vertically from such free end and serves as a handle for  
20 raising the bar 29 out of contact with the stop 24. This handle 31 is shown mainly in dotted lines, Fig. 1, and the alternative or raised position of both the bar 29 and said handle 31 is also shown mainly by dotted lines. To  
25 hold them thus elevated, a cross-pin may be inserted in a hole shown in the handle 31. In front of each of the carriages (when the same are in their normal position) a trip-bar 32 is pivoted at 32<sup>a</sup> and between the lower  
30 portions of tracks and extends vertically downward and engages the curved extremities of the carriage-fingers 18 to separate the same.

When not in use the trip-bar 32, the under  
35 surface of which is cylindrical, is retained in a horizontal position within the track through the medium of a spring-lever 33, fulcrumed at 33<sup>a</sup>, Fig. 1, in the track to the rear of said bar and provided with a latch-head 34, the  
40 upper end of which spring-lever extends above the track, as illustrated in Fig. 1. When the trip-bar is thrown to a horizontal position, the free end of the said trip-bar is engaged by the latch-head 34, as illustrated in the same figure in dotted lines. In front of the lever 33  
45 a perpendicular standard 34<sup>a</sup> is secured to the top of the track, said lever and standard being connected by a horizontal rod 35, and the lever is provided with an aperture which is  
50 large enough to permit the rod to slide freely through it. A spring 36 is coiled upon the said rod 35, bearing against the contiguous faces of the lever 33 and the standard 34<sup>a</sup>, whereby the former is kept in position to at all times en-  
55 gage with the trip-bar 32 when the latter is thrown upward. To release the trip-bar and allow the same to drop, a rod 37 is secured to the upper end of the lever 33, passing through the standard 34<sup>a</sup>, and to said rod a rod 38 is  
60 attached, leading downward to any convenient point.

The buckets 39, adapted for attachment to the carriages, are made of different weights, the bucket carried by the forward or retain-  
65 ing carriage being heavier than the one next thereto, and the next heavier than the one following, and so on, thus causing the last

bucket to be the lightest of all. Each bucket is provided with a sheave and hook, ordinarily consisting of a longitudinally-slotted  
70 body 40, in which a pulley 41 is journaled, the hook 42 being integral with the lower end of said body, as best illustrated in Figs. 4, 5, and 6. If found desirable, in order to remove the carrying-ropes readily, an opening 43 may  
75 be made in one side of the body near the bottom, as best shown in Fig. 5, and a hasp hinged thereto to cover said opening, which hasp is secured by passing over the journal-pin of the  
80 roller and an apertured lug projecting from the body, a pin being passed through the journal and lug outside the hasp.

The body of the sheave and hook, which for convenience I denominate a "latch-sheave," is provided at its upper end with a neck 44,  
85 having a semi-spherical head 45 and an annular recess 46 beneath said head, whereby opposing square shoulders 47 are obtained, as illustrated in Figs. 5 and 6.

The recess in the neck of each latch-sheave,  
90 except that employed in connection with the retaining-carriage, is of a length about equal to the thickness of the carriage-fingers 18. The recess or reduced portion of the remain-  
95 ing latch-sheave, as illustrated in Fig. 1, is much longer, and the lower shoulder is beveled, as illustrated at 48 in the same figure.

The heads 45 of the latch-sheaves are adapted at the proper moment to enter the  
100 funnels 16 of the carriages and pass up through an aperture 50 between the fingers 18, immediately above the funnel, as best shown in Figs. 1 and 2, the aperture 50 being formed  
105 by producing an aligning semicircular recess in the opposing edges of the said parallel fingers, as best shown in Fig. 3.

The carriages being in position upon the track, the carrying-rope 25 is secured to the  
110 grommet 23' on bar 15 of the retaining-carriage and carried downward under the pulley in the forward latch-sheave, carrying the heaviest bucket. From thence the rope  
115 25 is carried upward over the pulley 23 of said retaining-carriage, over the forward pulley 23 of the next carriage, thence downward  
120 through the latch-sheave of said carriage, up over the second carriage-pulley, and so on until each carriage and latch-sheave are con-  
125 nected by the same rope, as shown in Fig. 7.

The rope 25 is now carried through two  
120 pulleys 51 at the end of the track and back over the same to a suitable winding-drum. A second rope 52 is attached to the lower forward end of the retaining-carriage, which  
125 latter rope is led to a second drum purposed to bring back the carriages when the buckets have been emptied.

To each carriage two downwardly-extending stay-rods 53 are attached, adapted to en-  
130 gage the side of the buckets when elevated and steady the same against lateral movement.

In operation, when the buckets are all filled and in the ditch, the drum connected



with the carrying-rope 25 is revolved, where-  
upon the said rope is tightened, and the last  
bucket, being the lightest, is drawn upward  
until the head of the latch-sheave entering  
5 the funnel of the last carriage presses the  
fingers therein apart, and, passing up through  
the aperture 50, is locked in said carriage by  
the recoil of the fingers. Thus the weight of  
that bucket is relieved from the drum. The  
10 other buckets to the rear of the forward  
bucket are in like manner and in turn ele-  
vated in their several carriages. The for-  
ward bucket is finally elevated, and as the  
recess or neck of the latch-sheave of this  
15 bucket is longer than in the others the head  
passing through the aperture 50 in the fin-  
gers is brought in engagement with the car-  
riage-latch 29, raising the same against the  
pressure of the gravity locking-lever 31, as  
20 illustrated in dotted lines in Fig. 1. The  
stop-bar 30 being thus released, the entire  
train of carriages passes down the track.

The distance between the carriages may be  
regulated by lengthening or shortening the  
25 coupling-bars. I desire it to be distinctly  
understood that, although I have described  
specific construction, other equivalent con-  
struction may be employed without depart-  
ing from the spirit of the invention.

30 If found desirable, the stay-rods 53 may  
be constructed of three leaf-springs suitably  
connected, having their lower ends bent in  
to form fingers.

Having thus described my invention, what I  
35 claim as new, and desire to secure by Letters  
Patent, is—

1. The combination, with a track and a  
series of carriages adapted to travel thereon  
and having pulleys journaled in their lower  
40 portions, of a corresponding series of buckets  
of graduated weights, a like series of latch-  
sheaves adapted for connection with said  
buckets, and a rope which is secured to the  
forward carriage of the series and then passes  
45 successively through each latch-sheave and  
over the pulleys of each carriage of the com-  
bined series, as shown and described, whereby  
the said rope serves as the means of hoisting  
all the said buckets successively, as set forth.

50 2. The combination, with a track, a series  
of carriages traveling thereon having pulleys  
journaled in their lower ends, and a series of  
buckets of graduated weight, of latch-sheaves  
adapted to engage said buckets, and a rope  
55 secured to the forward carriage, passing alter-  
nately over the carriage-pulleys and through  
the latch-sheaves, substantially as shown and  
described.

3. The combination, with a track, a series  
of carriages traveling thereon having pulleys 60  
journaled in their lower ends, and a series of  
buckets graduated in weight from the forward  
to the rear, the forward bucket being the  
heaviest, of latch-sheaves adapted to engage  
said buckets, and a rope secured to the for- 65  
ward carriage, passing alternately over the  
carriage-pulleys and through the latch-  
sheaves, as and for the purpose specified.

4. The combination, with a track, a series  
of carriages traveling thereon having pulleys 70  
journaled in their lower ends, a series of  
buckets graduated in weight from the front  
to the rear, the heaviest bucket being at the  
front, and latch-sheaves adapted to carry said  
buckets, of stay-rods projected downward 75  
from the carriage, a rope secured to the for-  
ward carriage, passing alternately over the  
carriage-pulleys and through the latch-  
sheaves, and means, substantially as shown  
and described, for locking the latch-sheaves 80  
in the carriages and releasing said carriages,  
as and for the purpose specified.

5. The combination, with a track, a series  
of carriages traveling thereon having pulleys  
journaled in their lower ends, coupling-rods 85  
uniting said carriages, a series of buckets  
graduated in weight from front to rear, the  
rear bucket being the lightest, and latch-  
sheaves adapted to carry said buckets, of a  
rope secured to the forward carriage, passing 90  
alternately over the carriage-pulleys and  
through the latch-sheaves, and means, sub-  
stantially as shown and described, for locking  
the carriages upon the track and automati-  
cally releasing the same, as set forth. 95

6. The combination, with a track, a train of  
united carriages traveling upon the same, a  
transverse stop-bar secured in the said car-  
riages, and pulleys journaled therein, and a  
gravity-latch pivoted in the track engaging 100  
the stop-bar of the forward carriage, of a  
series of buckets graduated in weight, latch-  
sheaves attached to said buckets, and a rope se-  
cured to the forward carriage, passing alter-  
nately over the carriage-pulleys and through 105  
the latch-sheaves, substantially in the manner  
and for the purpose specified, whereby the  
buckets are raised alternately from the rear  
and the carriages released when elevated, as  
set forth.

JOHN THOMSON.

Witnesses:

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