

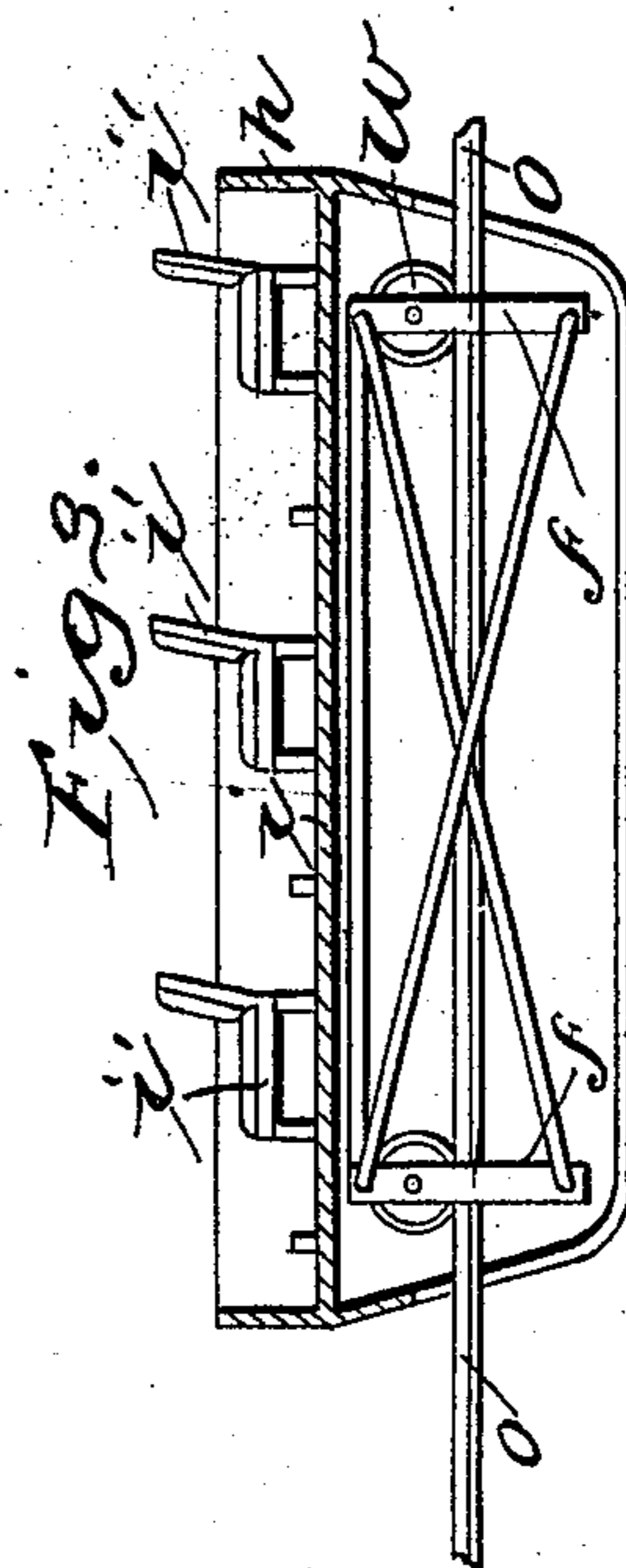
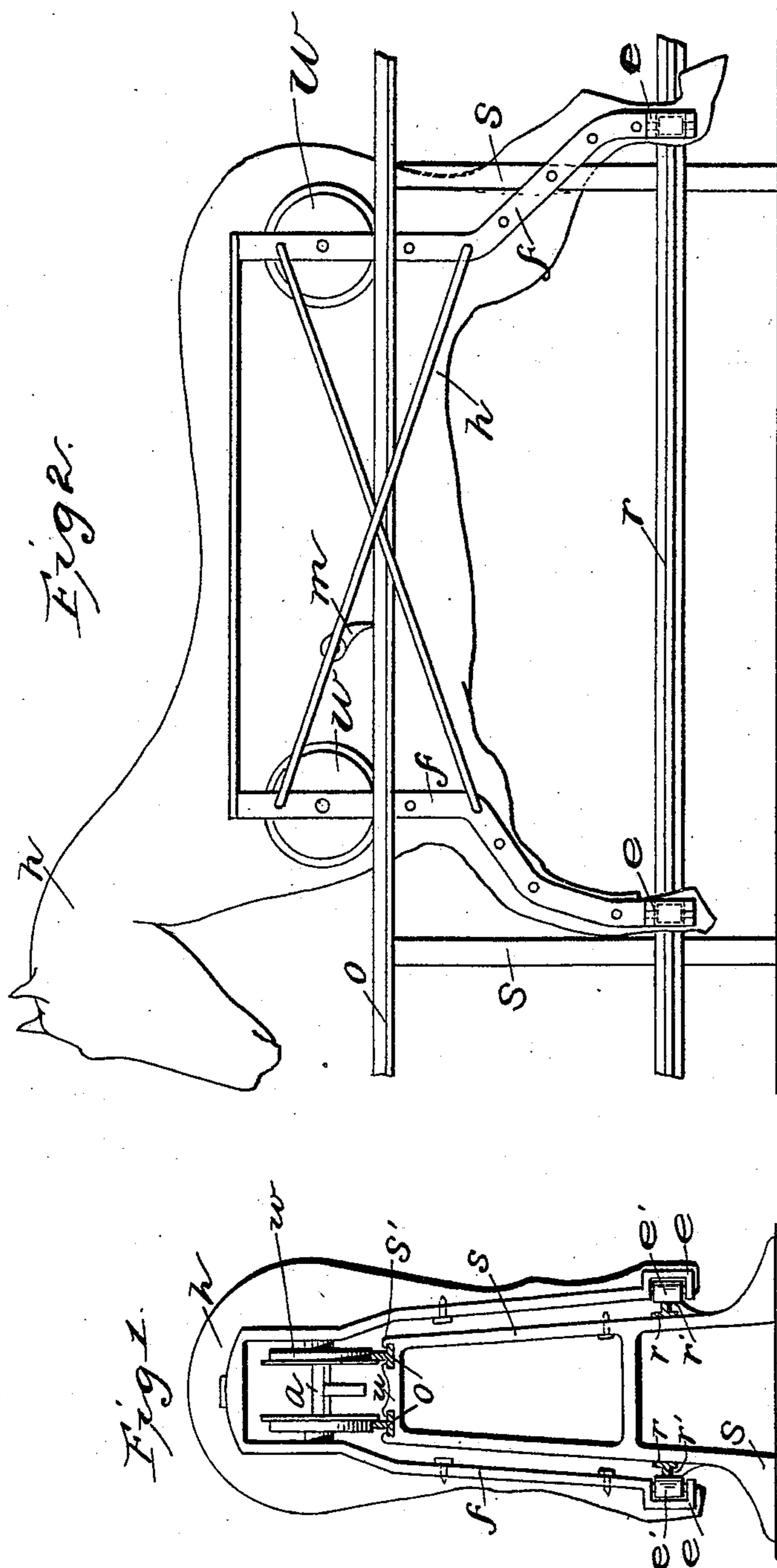
(No Model.)

2 Sheets—Sheet 1.

J. W. CAWDERY.
GRAVITY RAILWAY.

No. 518,224.

Patented Apr. 17, 1894.



Attest
Wm. F. Hall
J. L. Minkerton

Inventor
John William Cawdery
by Richard & Co.
Attys.

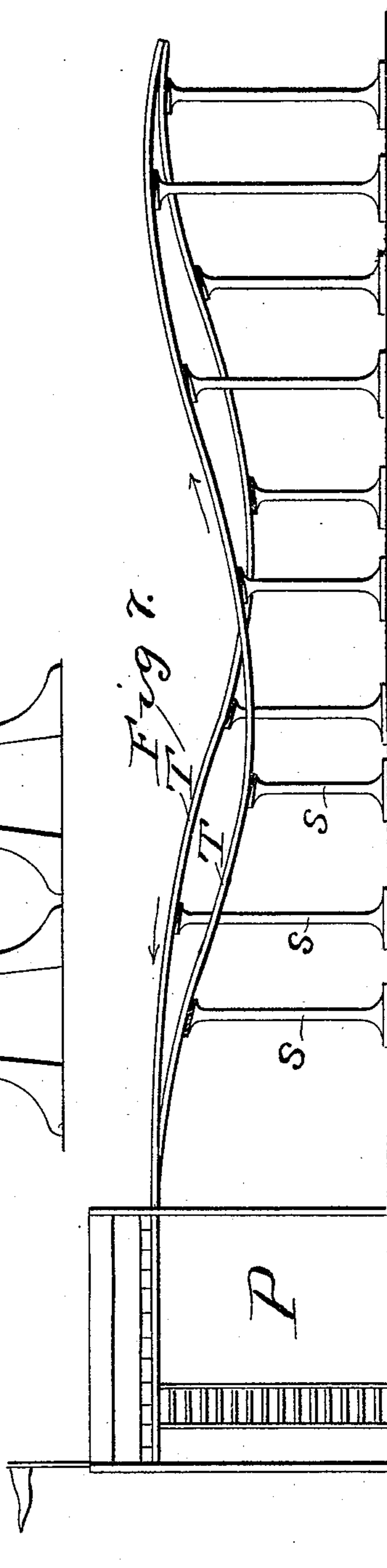
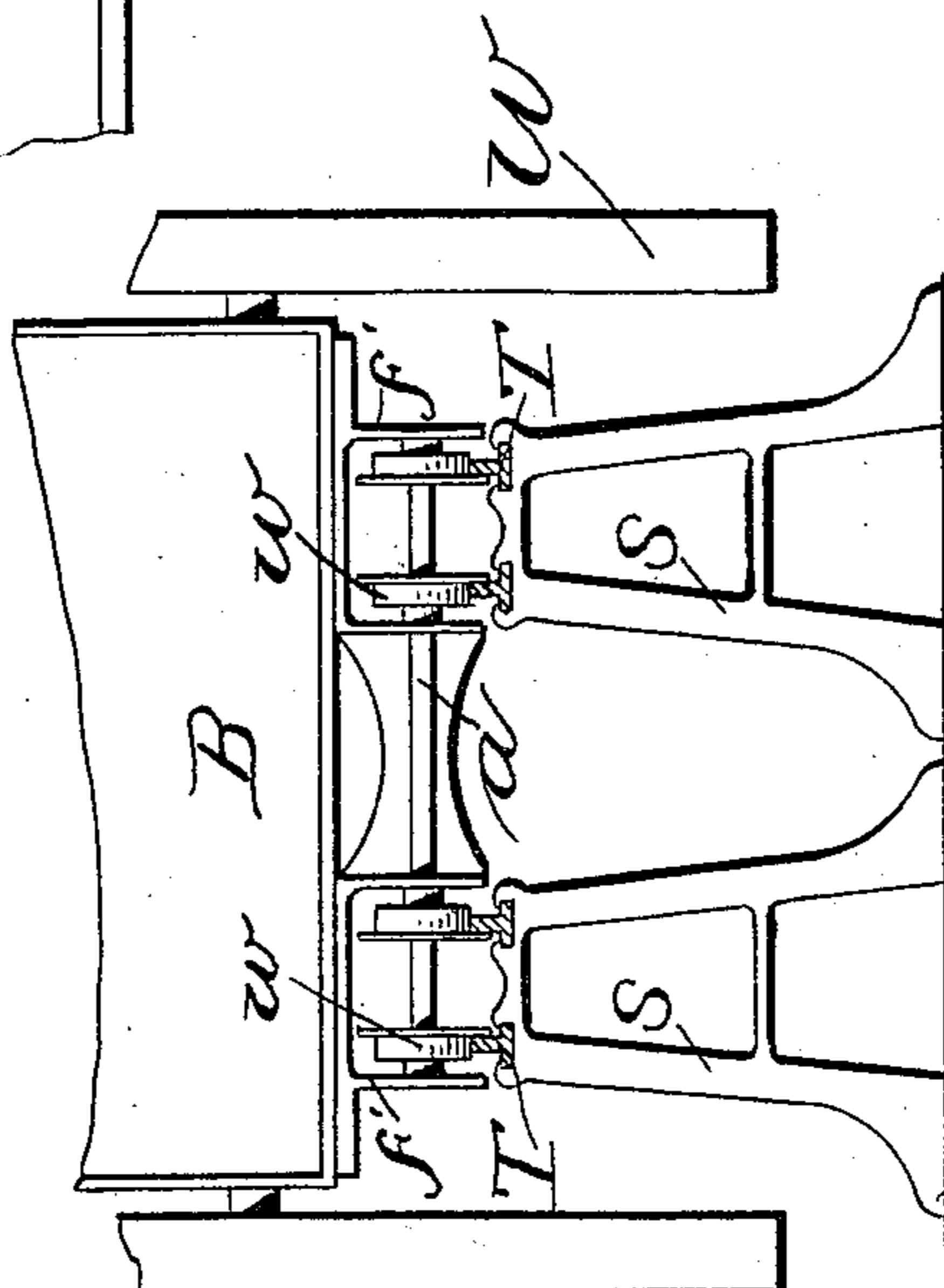
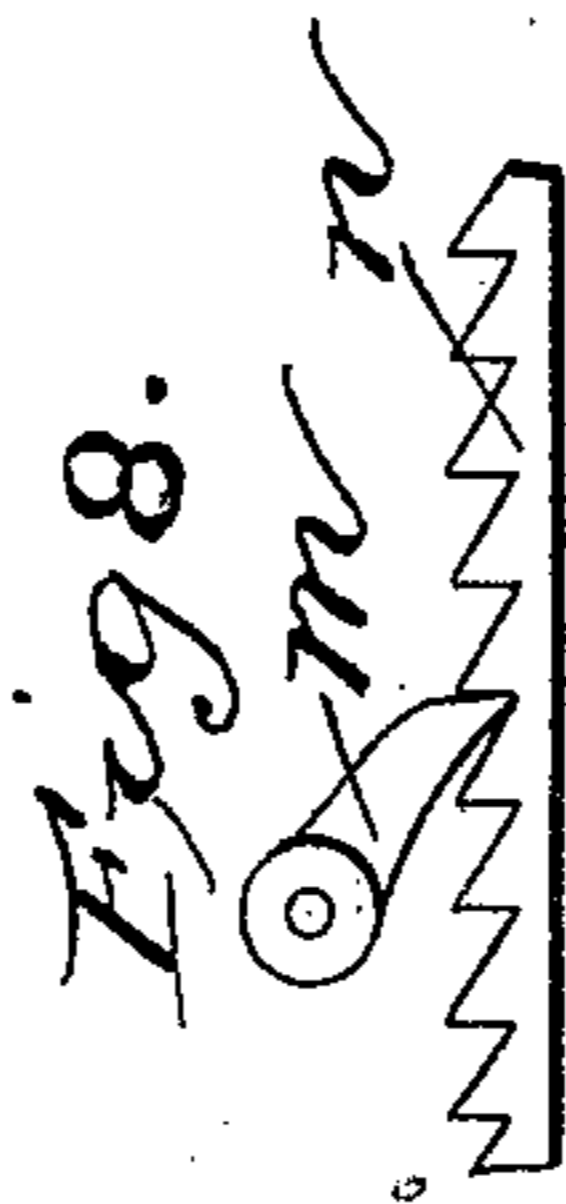
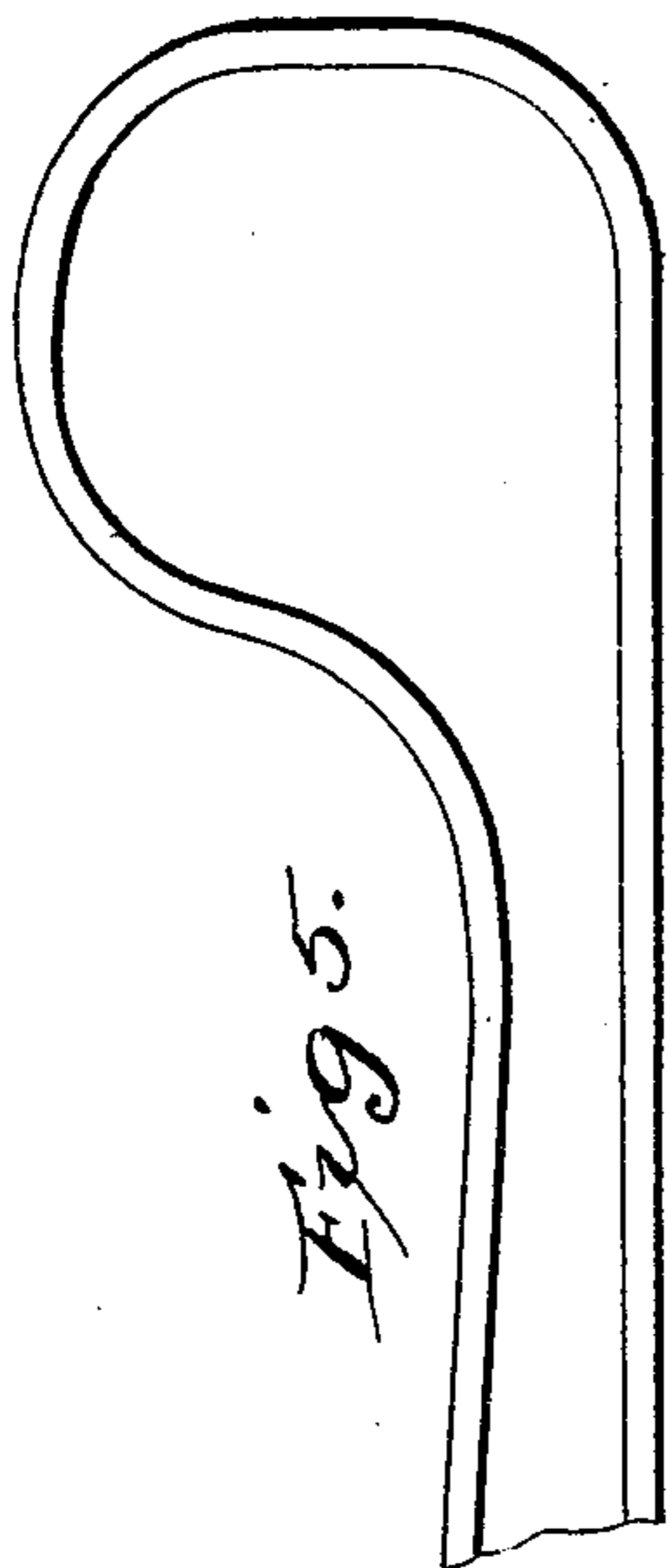
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UNITED STATES PATENT OFFICE.

JOHN WILLIAM CAWDERY, OF LONDON, ENGLAND.

GRAVITY-RAILWAY.

SPECIFICATION forming part of Letters Patent No. 518,224, dated April 17, 1894.

Application filed June 28, 1893. Serial No. 479,070. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILLIAM CAWDERY, a subject of the Queen of Great Britain and Ireland, residing at 45 Wells Street, Oxford Street, West, in the city of London, England, have invented certain new and useful Improvements in Gravity or Switchback Railways, of which the following is a specification.

10 My invention relates to improvements in gravity or switchback railways, and has for its object to provide an arrangement which can be more easily erected than those commonly employed, and which will not present
15 the heavy and massive appearance of such structures, also providing for vehicles of different constructions, in the form of a horse for instance, to be used, the track being raised clear of the ground and supported only
20 at necessary intervals.

In carrying my invention into practice, I arrange at suitable distances along the ground, a number of standards or fixed frames, preferably of cast iron, and carrying at the top
25 and on each side a T shaped rail. Upon these rails can run two wheels mounted on an axle fixed at each end to a movable frame suspended thereon at the top, the lower ends or extensions of which are guided by a
30 bar or rod secured to, or formed integrally with the standards or frames, and extending along the whole length of the track. This iron frame is inclosed in a shell of suitable material, having the shape of a horse or other
35 animal, the legs of which surround the extensions of the suspended frame, while the body incloses the top part of the said frame with the wheels, the rail track passing through the shell above mentioned. The track is laid
40 in the ordinary manner, so as to present alternate curved ascents and descents, the whole track being inclined from one pavilion at one end to the other at the other end, and there being two lines of rails as usual switched or
45 made continuous with one another at both ends. There are thus two rows of cast iron frames which may be of graduated or of uniform height, according as the track or the ground is undulated. Suitable means are
50 provided at the pavilion ends for preventing the horse from moving back when reaching

the end of its travels. Instead of the shell representing a horse, I may arrange the same to assume the form of a boat, of a carriage and pair, &c., two sets of standards carrying
55 each a pair of rails being used in the latter case.

In the accompanying drawings, wherein like letters of reference indicate corresponding parts, Figure 1 is a vertical section showing the fixed frame or standard, the movable or suspended frame with its shell representing a horse, and the rail track laid on the top of the fixed frame or standard, Fig. 2 being a corresponding longitudinal section. Fig. 3
60 is a sectional view of a shell representing a boat and its suspended frame. Figs. 4 and 5 are plan views showing two different methods of connecting the lines at their ends. Fig. 6 is a sectional view showing the application of
65 my invention to a carriage. Fig. 7 is an elevation of a part of the track with a pavilion at one end. Fig. 8 is a detail.

According to my invention, I arrange a series of cast iron frames or standards *s* along
75 the ground, these frames having suitable heights in order to allow the rail track to be laid thereon, with the necessary undulations or to follow those of the ground. Fig. 1 shows one of these standards or frames carrying at
80 the top the rails *o*, having the form of an inverted T, the cross and lowermost bars of the rails *o* being fixed in the chairs *s'*, formed on each side of the top of the frame. Upon these rails can freely move the wheels *w* mounted
85 on the axle *a*, secured at each end to the inner walls of the suspended frame *f*, the latter being thus suspended on the fixed frame or standard *s*, while its lower extensions or ends *e* are guided by a rail *r* fitted at each side of
90 the standards in the chairs or supports *r'* cast on the same. Each extension is bent to form a recess or pocket furnished with a friction roller *e'*, which runs on the rail *r*, thus effectually preventing any side motion. This
95 frame *f* is fitted in the shell *h* cast or otherwise made in the form of a horse, and fixed thereto in any suitable manner, such as by bolts or screws, so that the shell *h* and the frame *f* form one piece, and hence move together, giving the appearance of a horse galloping along the track T or T'. This shell
100

may also be made to represent a boat, as shown in Fig. 3, the suspended frame *f* being inclosed in the hold of the boat, which is provided in this case with a deck *i* to carry the seats *i'*.

Fig. 7 shows the general arrangement of the tracks *T* and *T'*, a pavilion such as *P* being provided at each end, and the two tracks, *T* and *T'*, being connected at one or both ends, either by the switch shown in Fig. 4 or by the connection of Fig. 5, in which case the horse or other figure will run round on to the return line.

In Fig. 7 the standards are shown of different heights, and are placed on a horizontal ground, so as to obtain the necessary undulations, but in some cases I may form the undulations in the ground, when the standards will have a uniform height.

To prevent the horse, boat, &c., from moving back, on reaching the platform at each end, and in each pavilion, I arrange a rack *n* on the central portion *u* Fig. 1 of the top of the last two or three standards *s*, wherein engages a pawl *m*, fixed under the shell or horse's belly (in the case first mentioned), and so arranged as to pass freely over the rack, as the vehicle proceeds toward the end of the track, but to engage with the teeth of the said rack

should the vehicle move backward away from the pavilion.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination, the standards having chairs formed at their upper ends for the upper rail and laterally projecting hooked chairs or seats on their sides, and the carriage having wheels to run on the upper chairs and side extensions on each side of the standard, the lower ends of said extensions having rollers bearing on the rails held by the laterally extending chairs, substantially as described.

2. In combination, the standards, having the upper and side rails, the carriage comprising an inner frame *f* having downward extensions on each side of the standards, said extensions having bent lower ends to form pockets or recesses, the rollers journaled therein to bear on the side rails and the outer shell *h*, secured to the inner frame, substantially as described.

In witness whereof I have hereunto set my hand, at London, this 9th day of June, 1893.

JOHN WILLIAM CAWDERY.

In presence of—

ALBERT EDWARD ELLEN,
JAMES MILLER.