

No. 629,289.

Patented July 18, 1899.

J. M. DODGE.  
CARRIER.

(Application filed Apr. 11, 1898.)

(No Model.)

8 Sheets—Sheet 1.

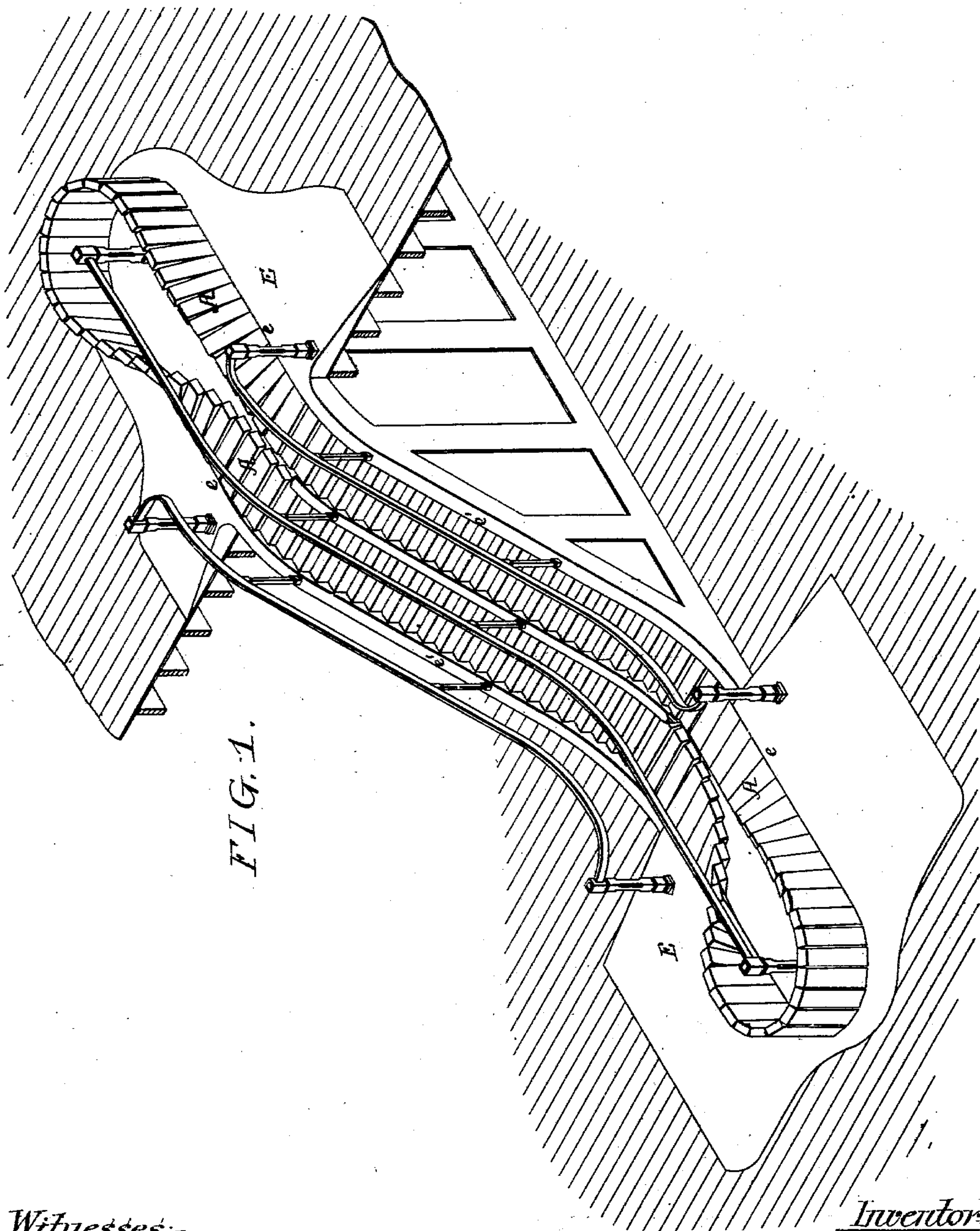


FIG. 1.

Witnesses:-

*Frank La Graham*  
*Will. A. Barr.*

Inventor:

*James M. Dodge.*  
by his Attorneys.

*Howorn & Howorn*

No. 629,289.

Patented July 18, 1899.

J. M. DODGE.  
CARRIER.

(Application, filed Apr. 11, 1898.)

(No Model.)

8 Sheets—Sheet 2.

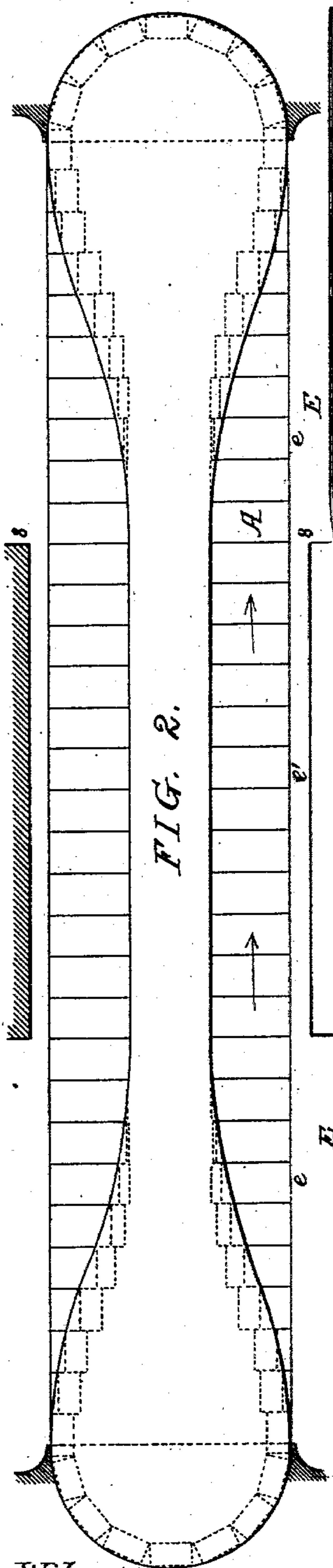


FIG. 2.



FIG. 3.

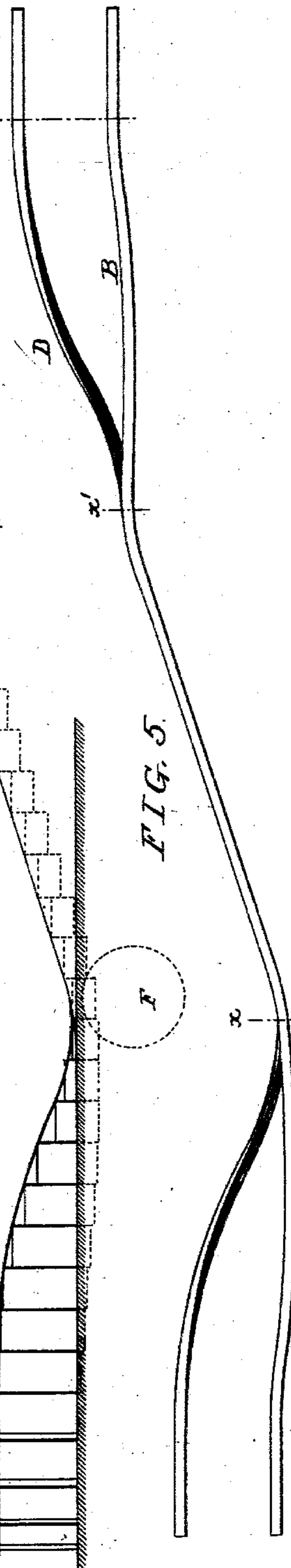


FIG. 5.

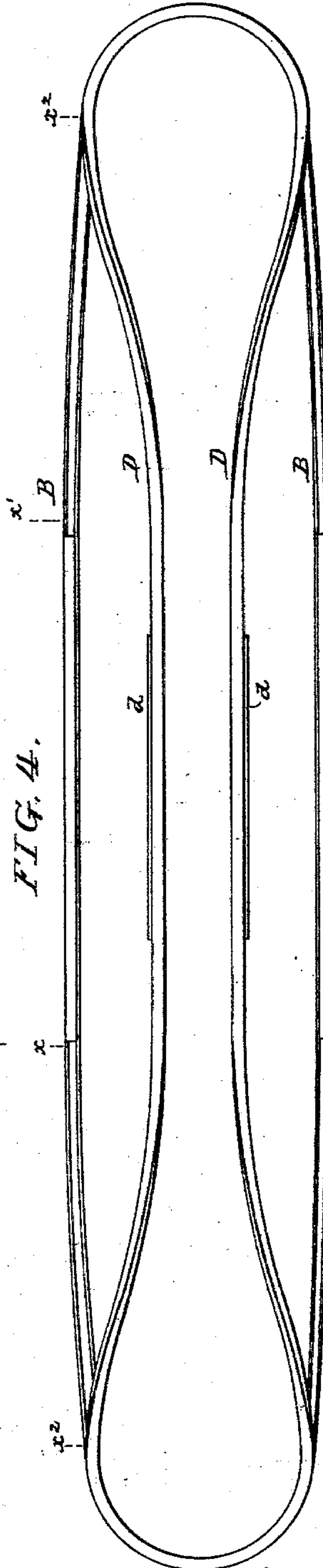


FIG. 4.

Witnesses:

Frank La Graham  
Wm. A. Barr.

Inventor:  
James M. Dodge.

By his Attorneys: Howson & Howson



No. 629,289.

Patented July 18, 1899.

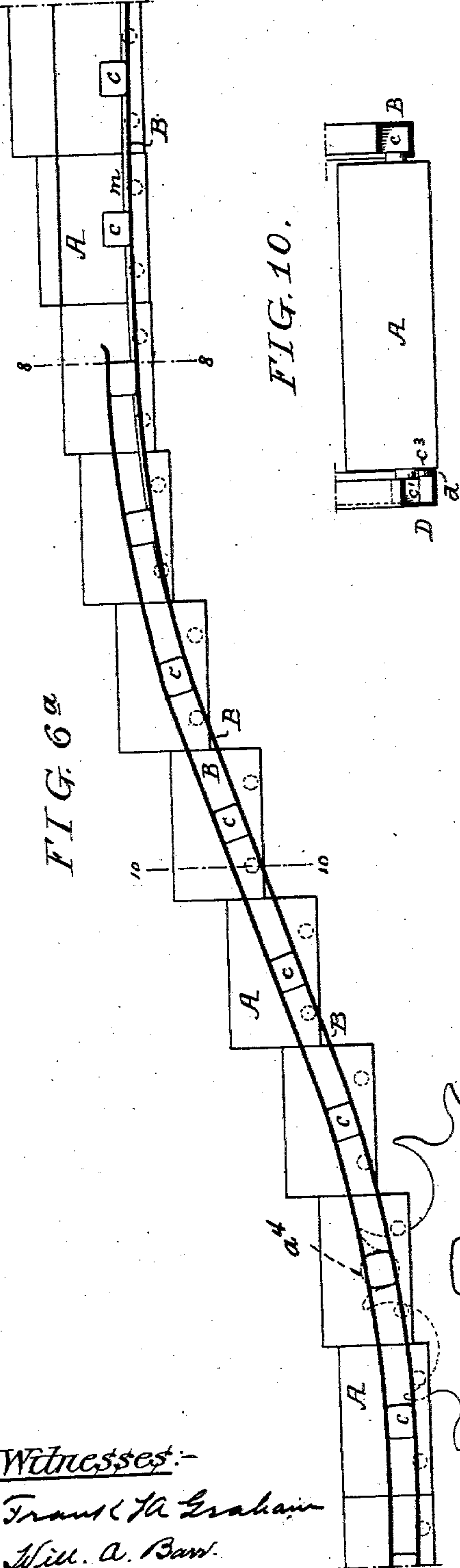
J. M. DODGE.

CARRIER.

(Application filed Apr. 11, 1898.)

8 Sheets—Sheet 3.

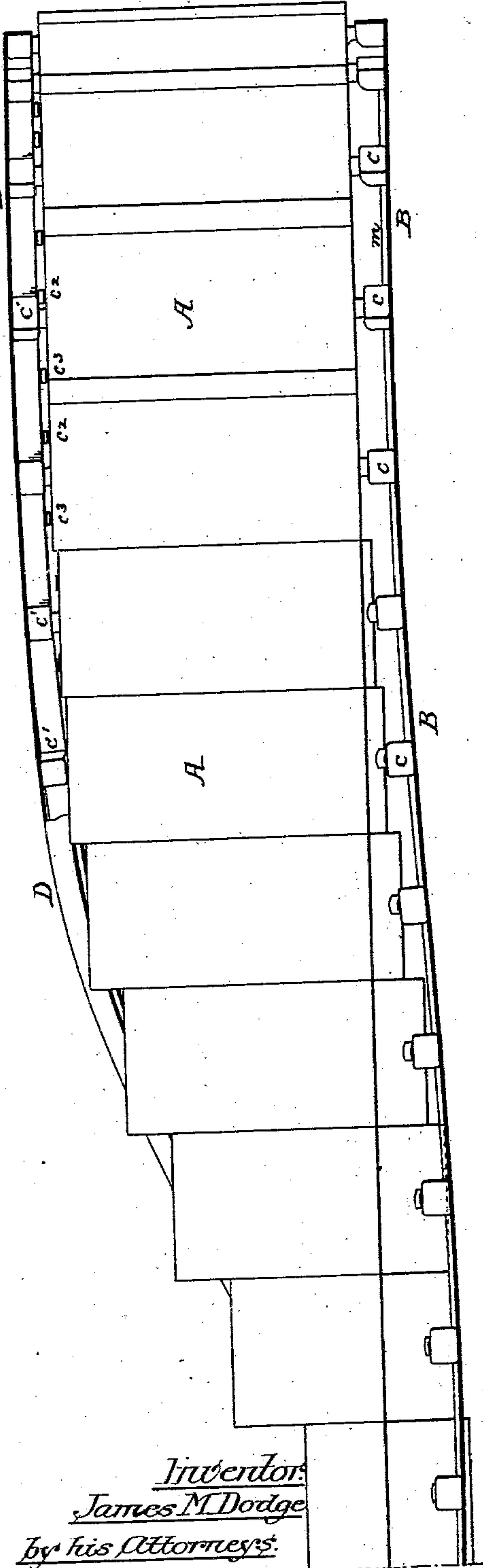
(No Model.)



Witnesses:-

Frank H. Graham  
Will. A. Barr.

FIG. 6b



Inventor:  
James M. Dodge  
by his Attorneys:

Howson & Howson

No. 629,289.

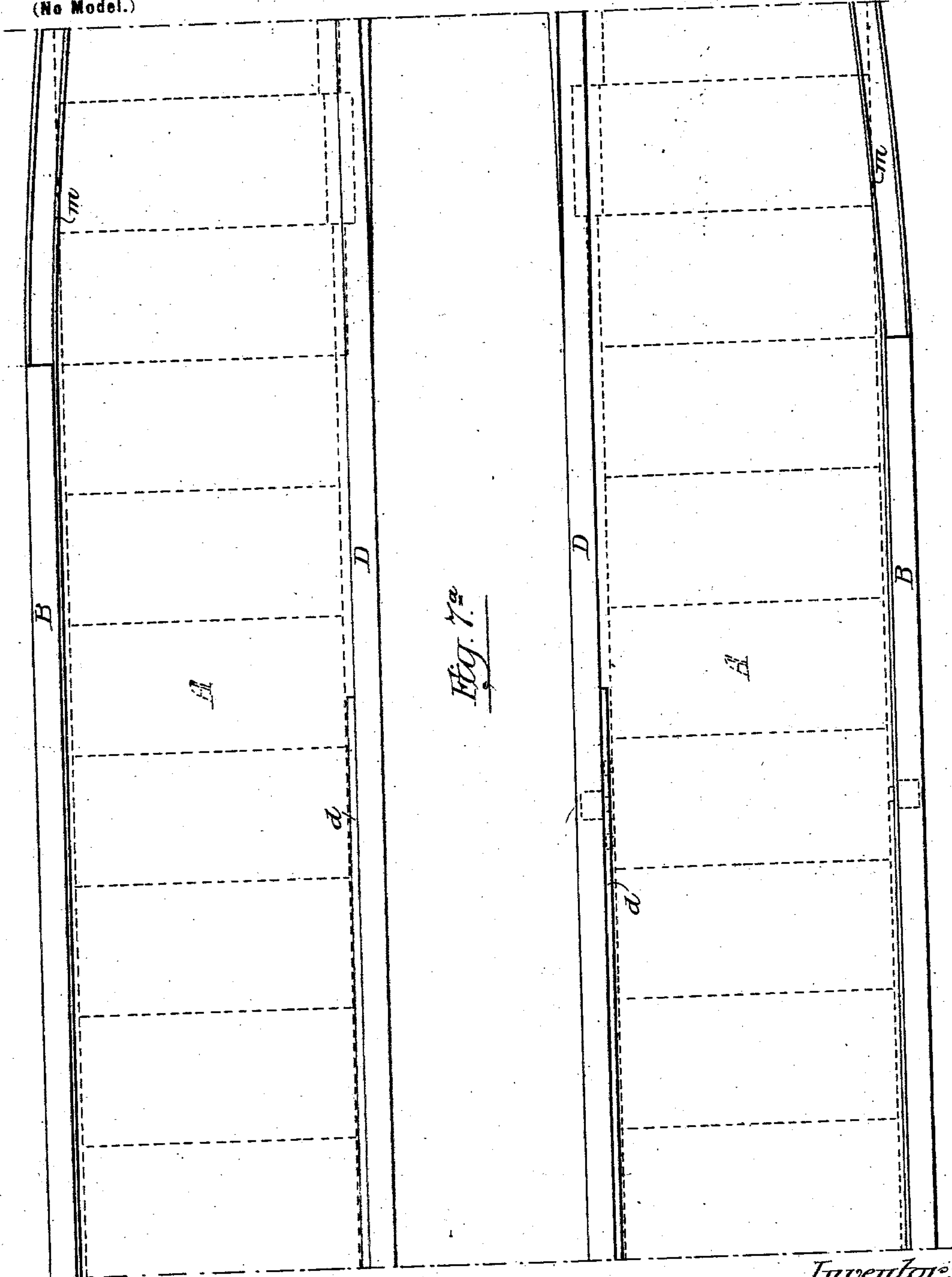
Patented July 18, 1899.

J. M. DODGE.  
CARRIER.

(Application filed Apr. 11, 1898.)

8 Sheets—Sheet 4.

(No Model.)



Witnesses:-

Frank A. Graham  
Will A. Barr.

Inventor:  
James M. Dodge.

by his Attorneys:

Howson & Howson

No. 629,289.

Patented July 18, 1899.

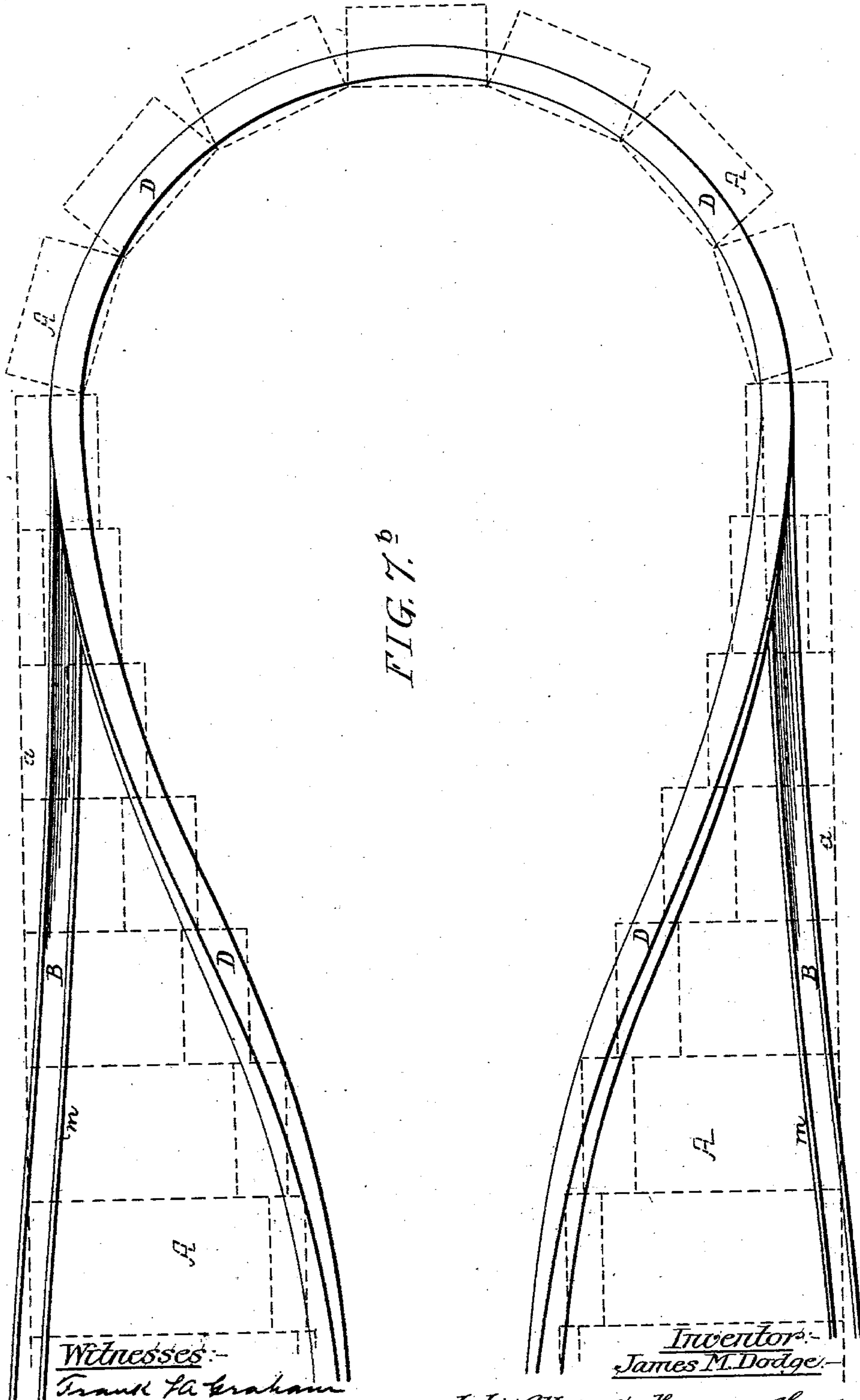
J. M. DODGE.

CARRIER.

(Application filed Apr. 11, 1898.)

(No Model.)

8 Sheets—Sheet 5.





No. 629,289.

Patented July 18, 1899.

J. M. DODGE.  
CARRIER.

(Application filed Apr. 11, 1898.)

(No Model.)

8 Sheets—Sheet 6.

FIG. 8.

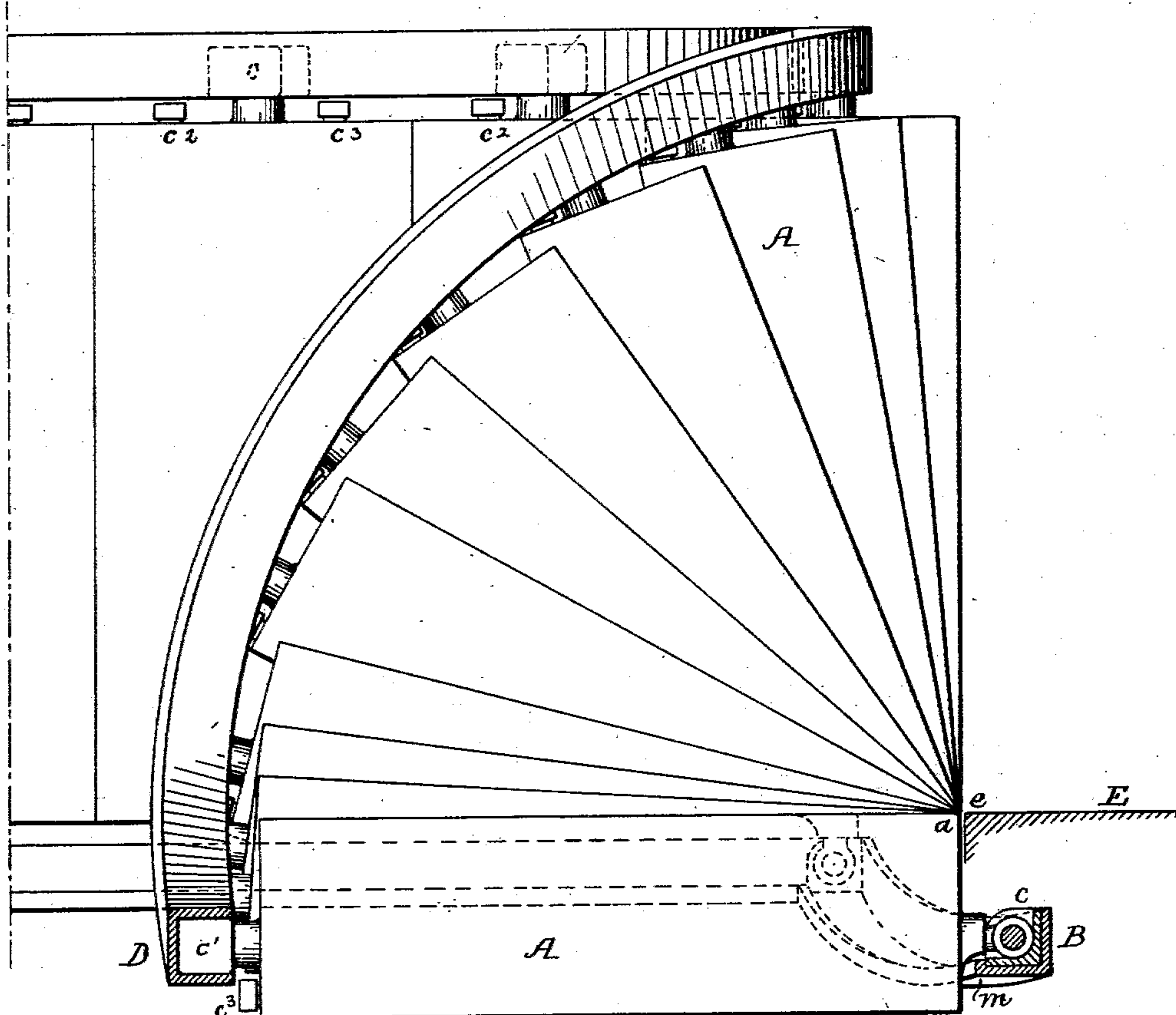
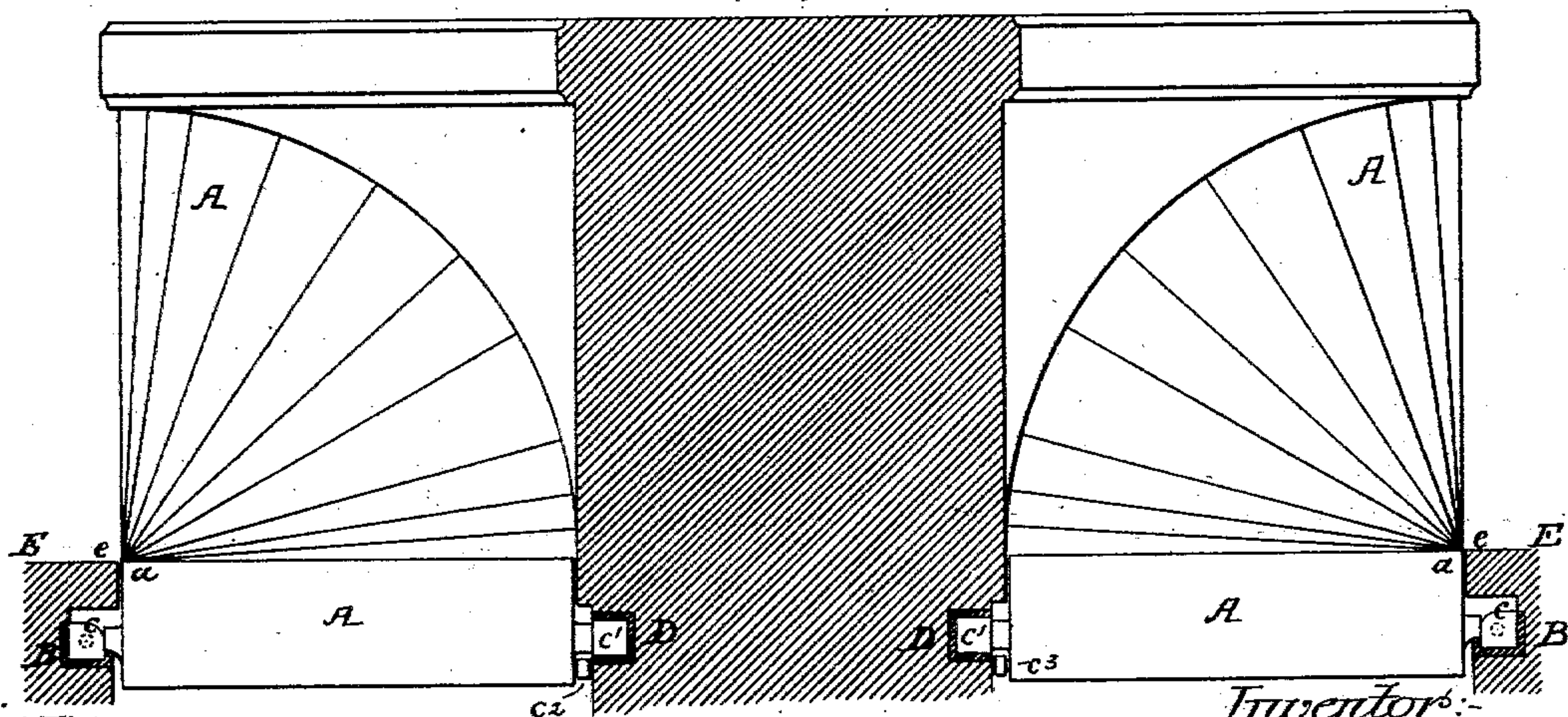


FIG. 9.



Witnesses:-

Frank H. Latham  
Will. A. Bow.

Inventor:-  
James M. Dodge.

By his Attorneys: Howson & Howson

**No. 629,289.**

**Patented July 18, 1899.**

**J. M. DODGE.**

**CARRIER.**

(Application filed Apr. 11, 1898.)

**8 Sheets—Sheet 7.**

(No Model.)

FIG. 13.

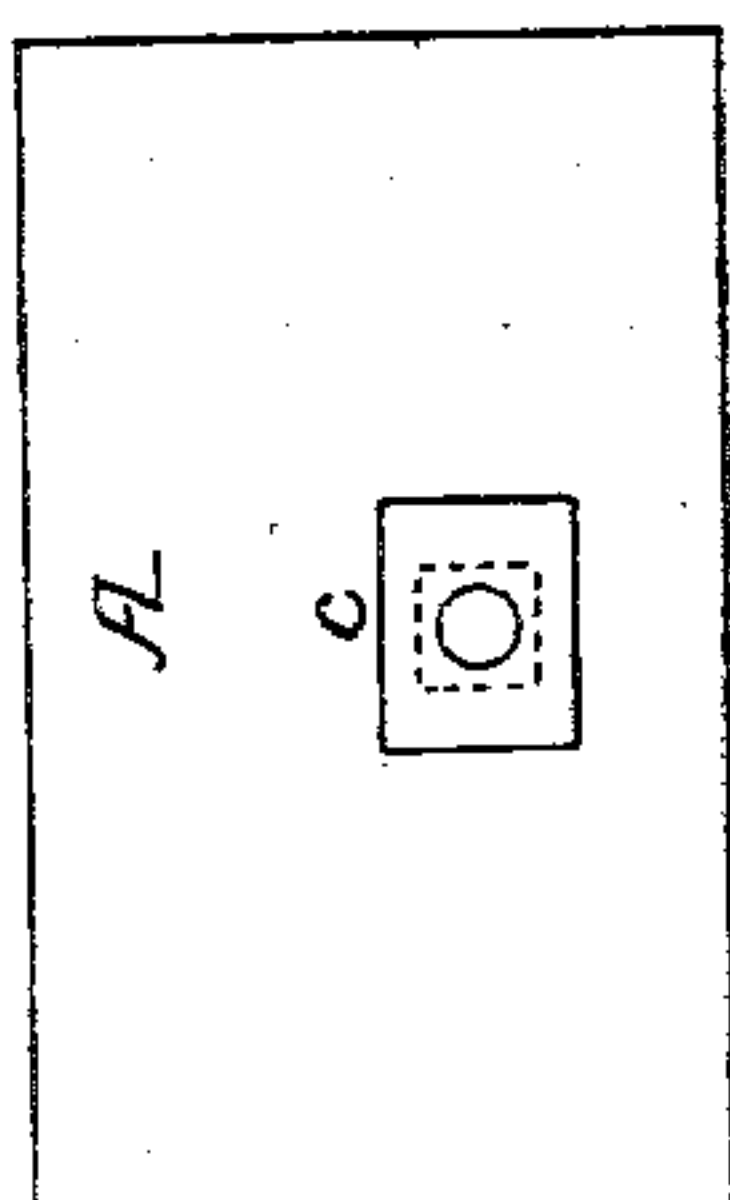


FIG. 12.

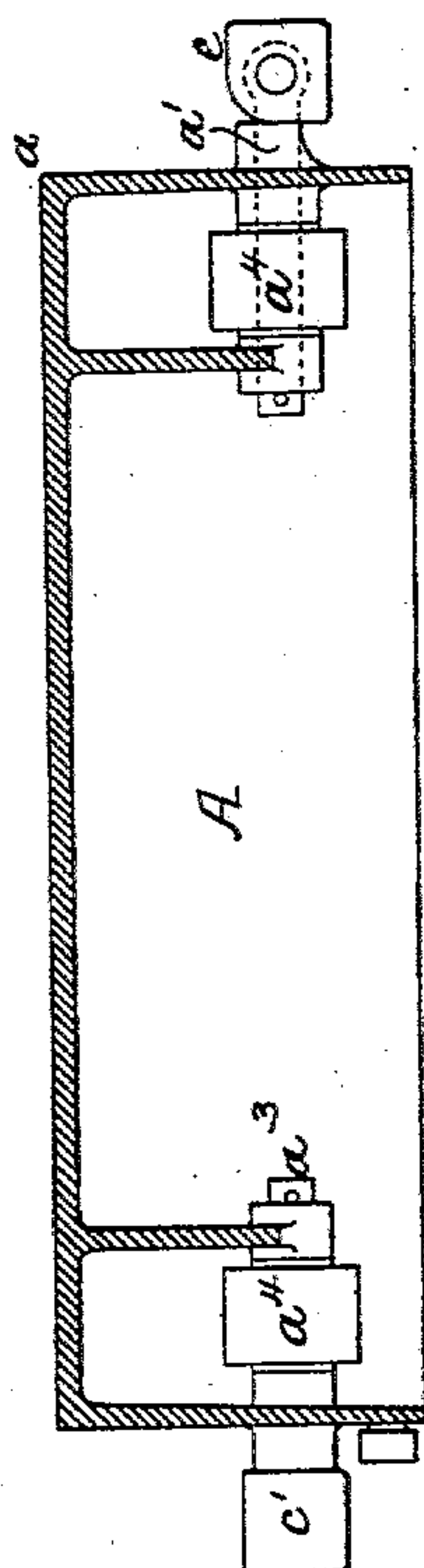


FIG. 11.

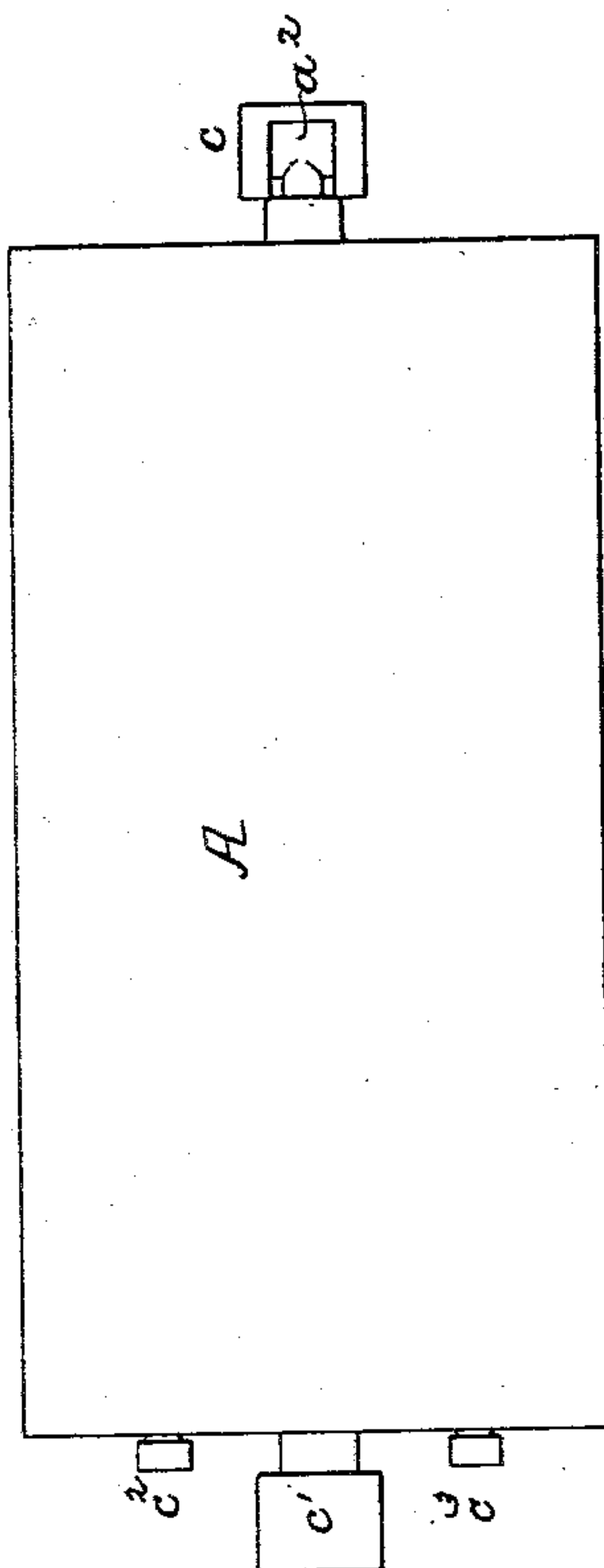
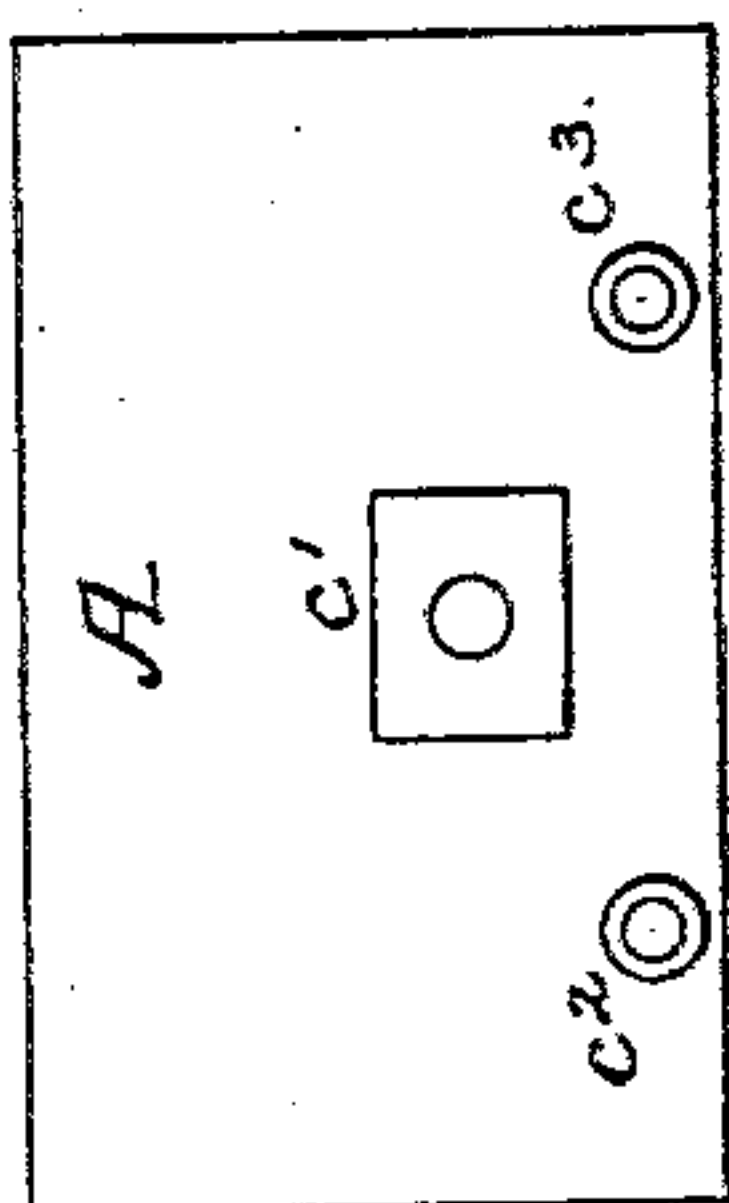


FIG. 14.



Witnesses:-

Frank La Graham  
Hill a Bar.

Inventor:-  
James M. Dodge.  
by his Attorneys:

*Hovson & Hovson*

No. 629,289.

Patented July 18, 1899.

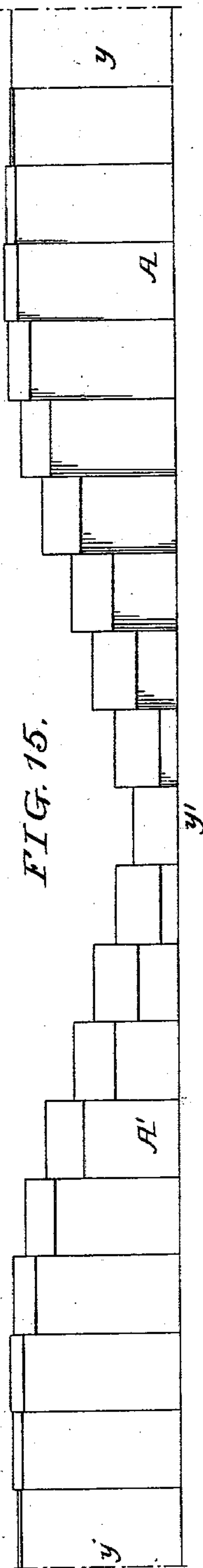
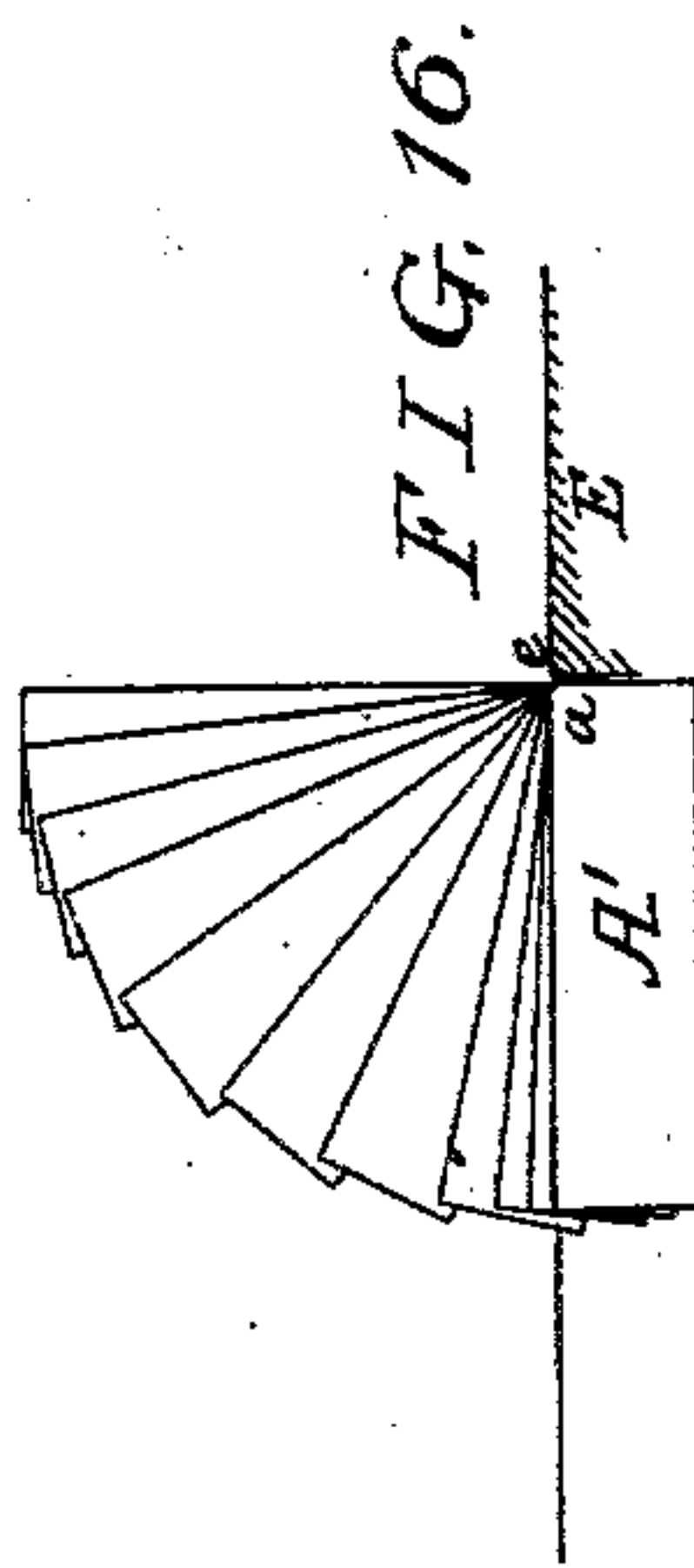
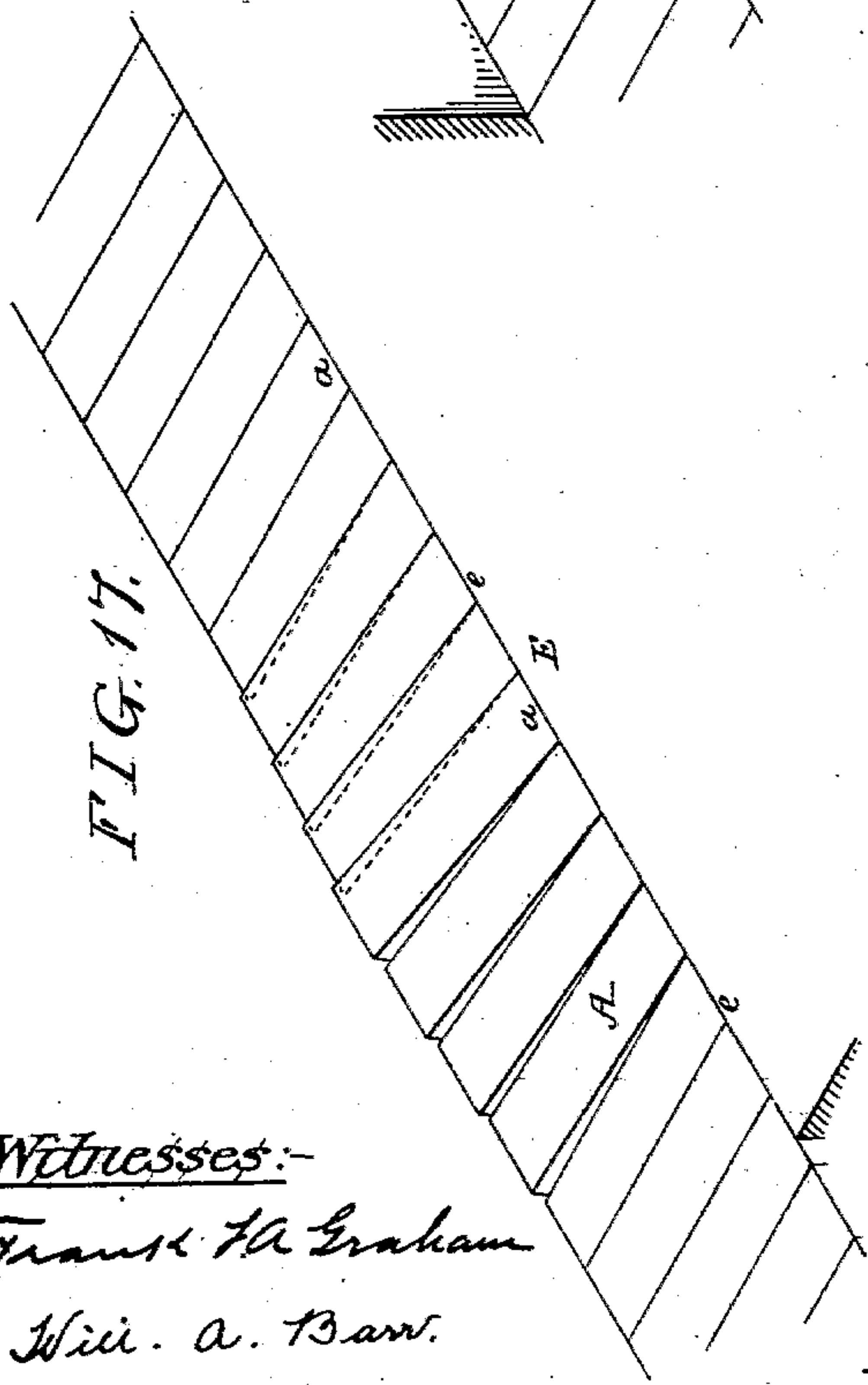
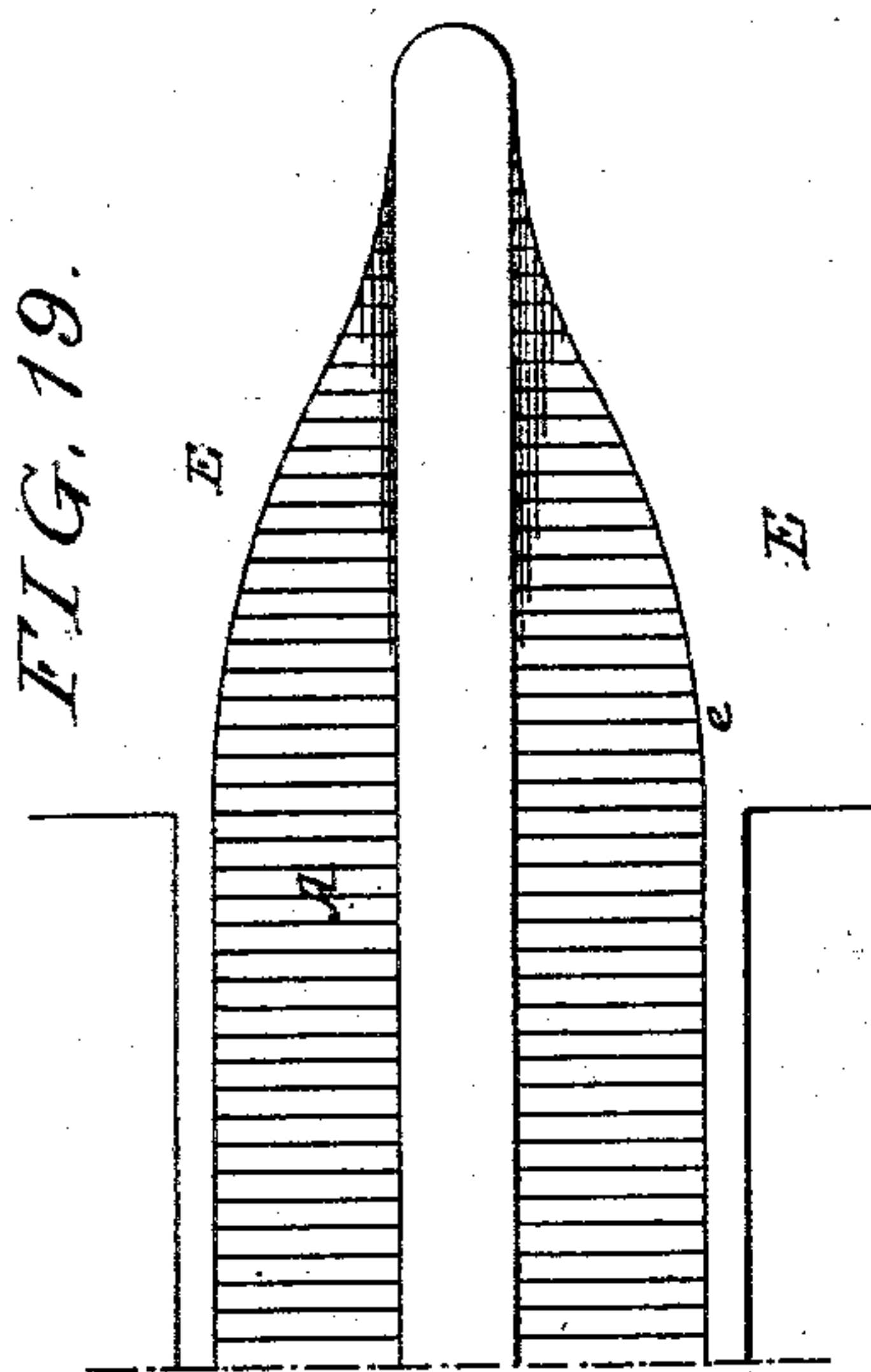
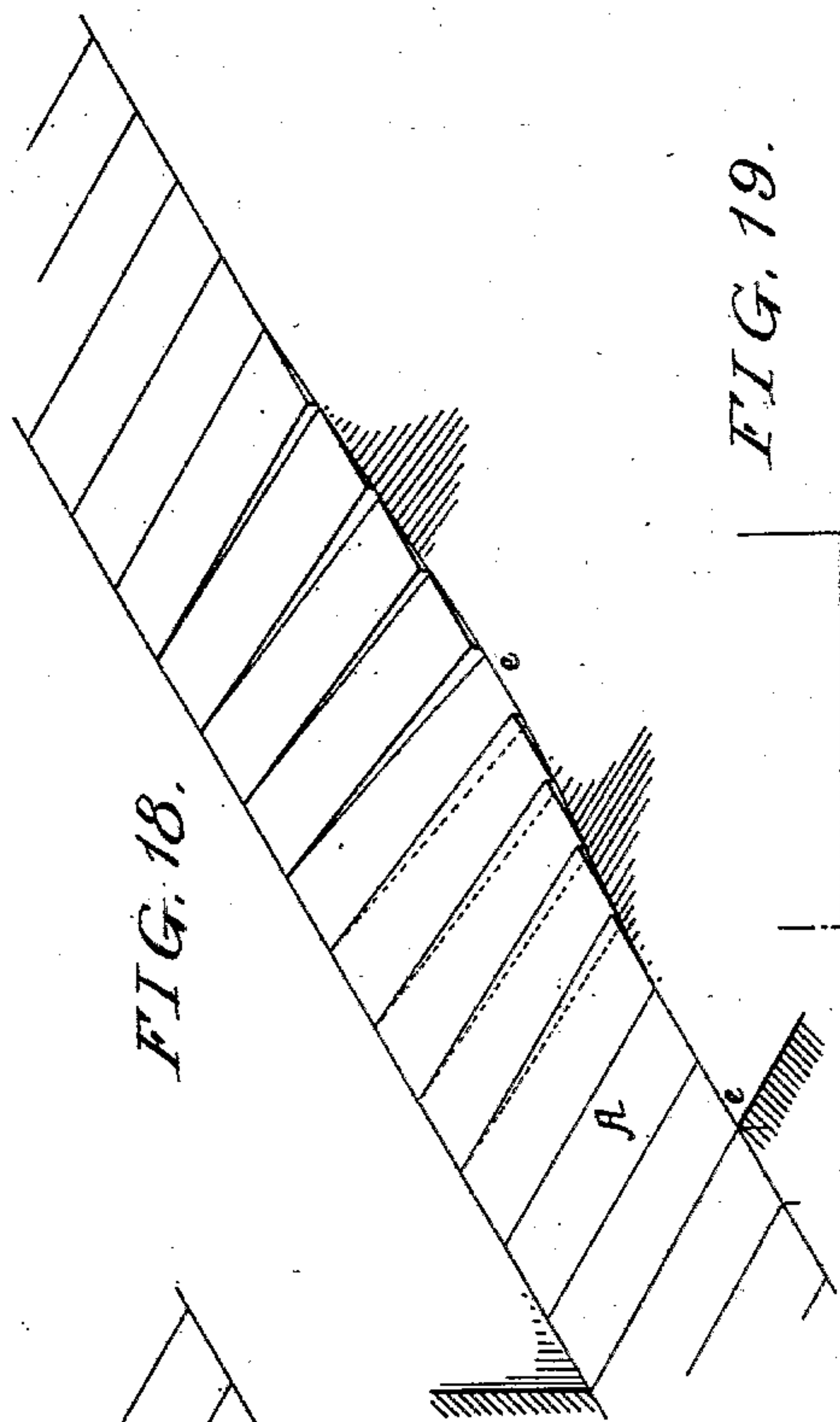
J. M. DODGE.

CARRIER.

(Application filed Apr. 11, 1898.)

(No Model.)

8 Sheets—Sheet 8.



Witnesses:-

Frank H. Graham

Will. A. Barr.

by his Attorneys.

Inventor:-  
James M. Dodge.

Howson & Howson



# UNITED STATES PATENT OFFICE.

JAMES M. DODGE, OF PHILADELPHIA, PENNSYLVANIA.

## CARRIER.

SPECIFICATION forming part of Letters Patent No. 629,289, dated July 18, 1899.

Application filed April 11, 1898. Serial No. 677,241. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES M. DODGE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain  
5 Improvements in Carriers, of which the following is a specification.

My invention relates to improvements in traveling stairways or platforms for passengers or freight.

10 One object of my invention is to insure the safe discharge of passengers or freight from such carriers at or near any predetermined point or points in their journey—as, for example, at the top or bottom of a stairway or at  
15 the terminal point of a horizontal or inclined platform; and to this end my invention consists in means, substantially as hereinafter described, whereby a gradual lateral tilting of the carrier is automatically effected at the de-  
20 sired point or points of discharge.

A further object of the invention is to so construct a traveling carrier composed of sections that said carrier shall be adapted to describe any desired curve or curves in its travel  
25 without objectionable gaps or spaces between the sections.

A still further object of the invention is to make a compact double traveling stairway.

30 In the accompanying drawings, Figure 1 is a perspective view, partially in diagram, of my improved carrier in the form of a moving stairway. Fig. 2 is a plan view, and Fig. 3 is a side view, of the moving stairway, the platforms being in section. Fig. 4 is a plan view  
35 of the guide-rails with the sections removed. Fig. 5 is a side view of Fig. 4. Figs. 6<sup>a</sup> and 6<sup>b</sup> are side views of portions of a stairway with the guide-rails in section. Figs. 7<sup>a</sup> and 7<sup>b</sup> are enlarged sectional plan views of one  
40 end of the rails, showing the sections in dotted lines. Fig. 8 is an enlarged transverse sectional view on the line 8 8, Fig. 6<sup>a</sup>, showing only the sections and rails. Fig. 9 is a sectional view, on a smaller scale, on the same  
45 line as Fig. 8, showing the platform and inclosing casing. Fig. 10 is a transverse sectional view on the line 10 10, Fig. 6<sup>a</sup>. Fig. 11 is a plan view of one of the sections. Fig. 12 is a sectional view of one of the sections.  
50 Fig. 13 is a view of one end of a section. Fig. 14 is a view of the other end of the section.

Figs. 15 and 16 are diagram views showing a straight platform, the sections being tilted to a vertical position at one point. Fig. 17 is a  
55 diagram view of a platform, showing the sections slightly tilted at a certain point. Fig. 18 is a diagram view showing one side of the sections depressed at a certain point, and Fig. 19 is a diagram view showing a modification.  
60

While my invention is adapted for use in connection with various kinds of traveling platforms, it is particularly applicable to the terminals of traveling stairways for the purpose of preventing accidents by compelling  
65 passengers to leave the moving stairway or platform or landing thereof at the proper time and place. At the same time, when used in connection with such a stairway, my invention supplies effective means for carrying  
70 the sections of the moving stairway around the terminal point and into a parallel return-run with economy of space and without danger to users of the structure from the existence of gaps or spaces between the sections  
75 in the "carrying-run" or from the possibility of being carried by the structure to a point of danger. I will therefore first describe my invention in connection with a traveling stairway, as illustrated by Figs. 1 to 9, inclusive,  
80 of the accompanying drawings.

A A are step-sections arranged in series, one resting against another, so as to avoid objectionable gaps or spaces between the sections, these sections being made in the present  
85 instance as shown in Figs. 11, 12, 13, and 14, though it will be understood that the form of the step-sections may be varied without departing from my invention.

B and D are endless guides on opposite  
90 sides of the stairway, these guides being in the present instance in the form of grooved rails, in which rest the blocks of the step-sections.

It will be noticed on referring to the figures  
95 that the rails B and D in the present instance are endless, being looped at each end, so as to form return-guides for the sections, making an upward-traveling stairway on one side and a downward-traveling stairway on the opposite  
100 side, as clearly shown in Fig. 1. Each of these stairways has a fixed platform at the



top and bottom terminal points, so that passengers can get on or off while the stairway is in motion.

The rails B and D are so formed that the sections will be guided from the horizontal to a vertical position at the platforms, making it obligatory on the part of the passenger to get off at the platform, and I so arrange the rail-sections B and D in respect to each other that they are parallel from the points  $x$  to  $x'$ , Figs. 4 and 5, the rail B from the point  $x'$  to the point  $x^2$  at each end and at each side being slightly curved both vertically and laterally, so that the edge  $a$  of each traveling section will always bear a fixed relation to the edge  $e$  of the platforms E and the edge  $e'$  of the inclined portion of the stairway, while the rail D extends above the plane of the rail B and is curved outward, so that at the point  $x^2$  it is in position directly above the rail B in the present instance. It is also twisted so as to accommodate the blocks of the step-section, as clearly illustrated in Fig. 8.

From the point  $x^2$  on one side of the stairway to the point  $x^2$  on the opposite side of the stairway the two rails B and D are parallel and arranged in a vertical plane, one directly above another, and form the return-loop, so that the section will be guided from one side of the stairway to the opposite side.

It will be understood that the lines of the guideways may be modified according to the design of the sections used and the position and number of the guide blocks or wheels, and while I have shown one form it will be understood that many modifications may be used without departing from the main feature of the invention, which is the guiding of the step-sections so that they will be tilted at the terminal points or platforms to automatically discharge the passenger or freight carried.

One method of guiding the step-sections is shown clearly in Figs. 6<sup>a</sup> to 10, inclusive, and one form of step-section is shown in Figs. 11 to 14, inclusive.

I preferably make the rail B, as shown in the drawings, partly in the form of a channel, with guiding portions at the top and bottom between the points  $x$  and  $x'$ , and I discontinue the upper portion of the rail, as shown in Figs. 4 and 6<sup>a</sup> at the point  $x'$ , so as to allow for the lateral tilting of the step-sections. I also preferably form a lip  $m$  on the inner side of the rail B, so as to retain the block in the fixed position laterally.

The rail D has a bearing-surface at top and bottom on the inclined portion from the point  $x$  to  $x'$ ; but the rail is gradually twisted from  $x'$  to  $x^2$ , so that the bearing-points are on a vertical plane at  $x^2$  and form lateral supports for the blocks in passing around each end of the stairway.

Adapted to bearings in one side of the step-sections A is a short shaft  $a'$ , having a head  $a^2$ , to which is pivoted a block  $c$ . The block is so pivoted to the head that the step-sections can turn from the horizontal position to the

vertical position on a pivot, as shown in Fig. 8, while the block simply slides upon the rail-section B. Mounted in bearings in the opposite side of the step-sections A is a shaft  $a^3$ , secured to which is a block  $c'$ , which is adapted to the grooved rail D and slides freely therein and is so proportioned that it will travel in the twisted and curved portion of the rail carrying the sections A from the horizontal to the vertical position, Fig. 8.

It will be noticed that while each of the blocks  $c$   $c'$  is pivoted longitudinally in respect to the step-sections the block  $c$  is also pivoted transversely, as above remarked. By pivoting the blocks on a longitudinal line in respect to the step-sections the blocks will travel readily over the horizontal, inclined, and curved portions of the rails, while the tread of the step-sections will always remain in a horizontal plane. In many cases a sliding block at each side will be sufficient, as the pressure of the sections one against the other will be sufficient to keep the blocks steady. I, however, mount on one side of the sections steady-rolls  $c^2$   $c^3$ , and I form an extension  $d$  on the rail D between the points  $x$  and  $x'$ , as shown in Figs. 4, 7<sup>a</sup>, and 10, so that a steady-rolling on each step-section will travel on this extension and prevent the tipping of the sections due to the pressure of the adjoining step as the sections are pushed forward up the incline, as it will be noticed on referring to Fig. 6<sup>a</sup> that the upper edge of one section is only slightly above the pivot-point of the block of an adjoining section.

The roll  $c^2$  rests upon an extension  $d$  of the rail D on the upward run, and the roll  $c^3$  rests on the other extension  $d$  of the rail D on the return-run.

In place of rolls  $c^2$   $c^3$  slide-blocks may be used, and in some instances rolls may be substituted for the slide-blocks  $c$   $c'$ . In place of the small rolls two slide-blocks may be used at one or both sides of the step-sections, and the guide-rails may be modified to accommodate these blocks.

As shown in Fig. 12, I mount on the shafts  $a'$   $a^3$  rolls  $a^4$ , with which engage the driving-wheels F. (Shown in full lines in Fig. 6<sup>a</sup> and in dotted lines in Fig. 3.) There are two of these wheels in the present instance; but it will be understood, however, that one wheel may be used and that the wheels may be arranged at different points throughout the stairway to aid in driving and to carry the sections past different points to relieve the friction. The method of driving is similar to that described in the patent issued to me on February 8, 1898, No. 598,772, so that the sections are pushed from a point preferably at the bottom of the stairway and all gaps and spaces will be closed; but it will be understood that the sections may be enchain- and pulled instead of pushed without departing from the main feature of the invention.

It will be noted that the only point at which the edges of the step-sections part is where



they turn around the loop at each end of the stairway. This portion I preferably inclose either in the wall of a building, as shown in Fig. 2, or by a casing where the end of the stairway is exposed.

By forming the guides so that the corner *a* of the step-sections will always remain in the fixed position in regard to the edge *e e'* of the fixed portion of the stairway I prevent unnecessary gaps or spaces at this edge, and as this is the edge over which the passenger must step either onto or off the step-sections there is no danger whatever to the passenger. The other edge of the step-sections is protected by an inclosing casing, as shown in Fig. 9, which is shaped to conform to the curve that the step-sections take, making a close joint at this point as well.

When my invention is adapted to straight platforms, a construction may be used, as shown in the diagram views Figs. 15 and 16, in which the sections *A'* are tilted by suitable guides to a position from the horizontal at *y y'* to the vertical at *y'*. In some instances they may be slightly tilted, as shown in Fig. 17, by elevating one of the guides so that the sections will assume such an angle as to cause the passenger to step off, as the angle is such that he cannot retain his foothold, and in the case of freight it will slide off as the step is tilted to the angle of repose.

In Fig. 18 I have shown a modification in which one guide is depressed instead of raised, carrying out the same idea as illustrated in Fig. 17, this being especially applicable for freight, where the sections discharge into an inclined chute.

In Fig. 19 I have shown a modification in which the rail *D* is not curved toward the rail *B*, but is simply curved at each end, and the rail *B* is curved so as to assume a position under the rail *D*, and in this instance I have shown a conveyer formed of narrow sections which do not form steps on the inclined lines, but simply are inclined traveling platforms. It will be understood that an endless-belt carrier may be substituted for the conveyer without departing from the main feature of the invention.

Referring again to the description and drawings of the traveling stairway, it will be seen that the step-sections *A* are mounted upon and preferably pushed along guide-rails in the direction indicated by the arrows, Fig. 2, and owing to the described deflection of the rails the sections will be gradually tilted laterally when they have passed the point *x* in their journey until they have been brought from the horizontal into the vertical position. This gradual tilting of the steps will cause the passengers to voluntarily leave them before the steps have assumed a pronounced angle; but if by accident a passenger should remain on one of the sections after being warned by this gradual tilting process to leave them he will soon be obliged to leave, because the angle assumed by the section makes it

impossible for him to longer retain foothold thereon.

The sections retain their vertical position until they have passed around the terminal curve, and they then gradually assume the horizontal position, forming a stairway moving downward, so that the sections assume such a position at the upper platform that a passenger can readily mount the sections and be carried down to the lower platform, where the sections are again tilted, causing the passenger to leave before the steps assume a vertical position, and carried around the lower terminal to the receiving-platform of the upward-traveling division of the stairway.

It will be understood that the lateral tilting of the sections may be commenced before or after the sections reach the fixed platform, so as to either compel passengers to leave the stairway immediately upon reaching a landing or to carry them some distance along the platform. It will also be understood that so far as the purpose of insuring the safe discharge of passengers or freight is concerned it is not necessary that the sections shall be tilted beyond an angle sufficiently acute to make it impracticable to longer remain upon them, while, if desired, on the other hand, the device may be arranged to tilt the sections beyond the vertical.

While it is preferable to arrange the guides at each end of the step-sections as shown, it will be understood that they may be arranged under or above the sections, the guides being for the purpose of directing the sections as they are moved forward, and may be modified, depending to a great extent upon the location of the stairway or moving platform and the peculiar design of the sections used.

I claim as my invention—

1. The combination of a platform, a moving carrier, means for guiding said carrier in close proximity to the platform and for tilting the same sidewise when opposite the platform, substantially as described.

2. The combination of a series of independent carrier-sections, mechanism for moving said sections, and means for laterally tilting the sections at a given point or points, substantially as described.

3. The combination of an endless series of independent carrier-sections, and guides therefor adapted to tilt the sections as they pass a given point, substantially as described.

4. The combination of a series of moving sections, guides therefor, said guides being arranged so as to shift the sections from a horizontal to a vertical position, substantially as described.

5. The combination of a moving carrier, guides for the said carrier looped at one end, said guides being so arranged one in respect to the other that they will tilt the carrier laterally as it approaches and leaves the loop, substantially as described.

6. The combination of a series of moving sections, and guides therefor looped at each



end, one of said guides being raised above the level of the other at the loops so as to tilt the sections, substantially as described.

7. The combination in a traveling stairway, with two fixed platforms at each end, a traveling carrier arranged to pass the platforms, guides for the said carrier so that the carrier will assume a horizontal position at the carrying portion of the stairway from one platform to the other and will assume a vertical position as it passes around each end, the guides being so arranged that the carrier will be gradually curved from the horizontal to the vertical and from the vertical to the horizontal opposite the platforms, substantially as described.

8. The combination in a traveling stairway, of the inclined portion, platforms at top and bottom thereof, a traveling carrier and means for deflecting the carrier at the top and bottom opposite the platforms, substantially as described.

9. The combination in a traveling stairway, of the inclined portion having a platform at the top and at the bottom thereof, with traveling sections, guides therefor, said guides being so arranged at the top and bottom that the sections will be tilted toward the platform beyond the angle of repose, substantially as described.

10. The combination in a traveling stairway, of step-sections, pivoted guide-blocks at each side of the step-sections, and rails at each side of the stairway on which the guide-blocks slide, the rails being arranged in respect to each other so that the sections will be tilted at a given point, substantially as described.

11. The combination of a series of step-sections, a pivoted block on one side, a pivoted shaft at the opposite side carrying a block pivoted at right angles to the pivot of the shaft, guide-rails for the two blocks, said rails being so arranged in respect to each other as to tilt the sections at a given point, one guide-block acting as the pivot on which the sections are tilted, substantially as described.

12. The combination of the pivoted sections, guide-blocks mounted in each side of each section, guide-rails on which the blocks slide, said rails being arranged to laterally tilt the sections at a given point, and means for preventing the tilting of the sections on their pivots, substantially as described.

13. The combination in a stairway, of a series of step-sections, pivot-blocks thereon, guide-rails for the said blocks, means for laterally tilting the sections at a given point by elevating one end of the step-sections, and a projection on one end of the step-sections adapted to a rail on the inclined portion of the stairway, substantially as described.

14. The combination in a traveling stairway or platform, of fixed platforms, the edge of the traveling platform or stairway adjacent to the edge of the fixed platform remaining in a given position in respect thereto, with means for elevating the opposite edge of the moving platform or step-section, substantially as described.

15. The combination in a stairway, of the platforms, step-sections, means for moving the said sections, guides therefor, said guides being so arranged in respect to the platforms that the edge of each step-section will retain a fixed position in respect to the platform, with means for elevating the opposite end of the step-sections, substantially as described.

16. The combination in a stairway, of a series of moving sections, means for guiding said sections and for elevating one end of each section as it passes a given point without tipping it in any other direction until it assumes a vertical position, thereby preventing gaps or spaces being formed on the carrying-run of the stairway, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES M. DODGE.

Witnesses:

WILL. A. BARR,  
JOS. H. KLEIN.