

(No Model.)

3 Sheets—Sheet 1.

J. HALLÉ.

MOVING WAY OR STAIR FOR TRANSPORTING PERSONS AND GOODS.
No. 602,008.

Patented Apr. 5, 1898.

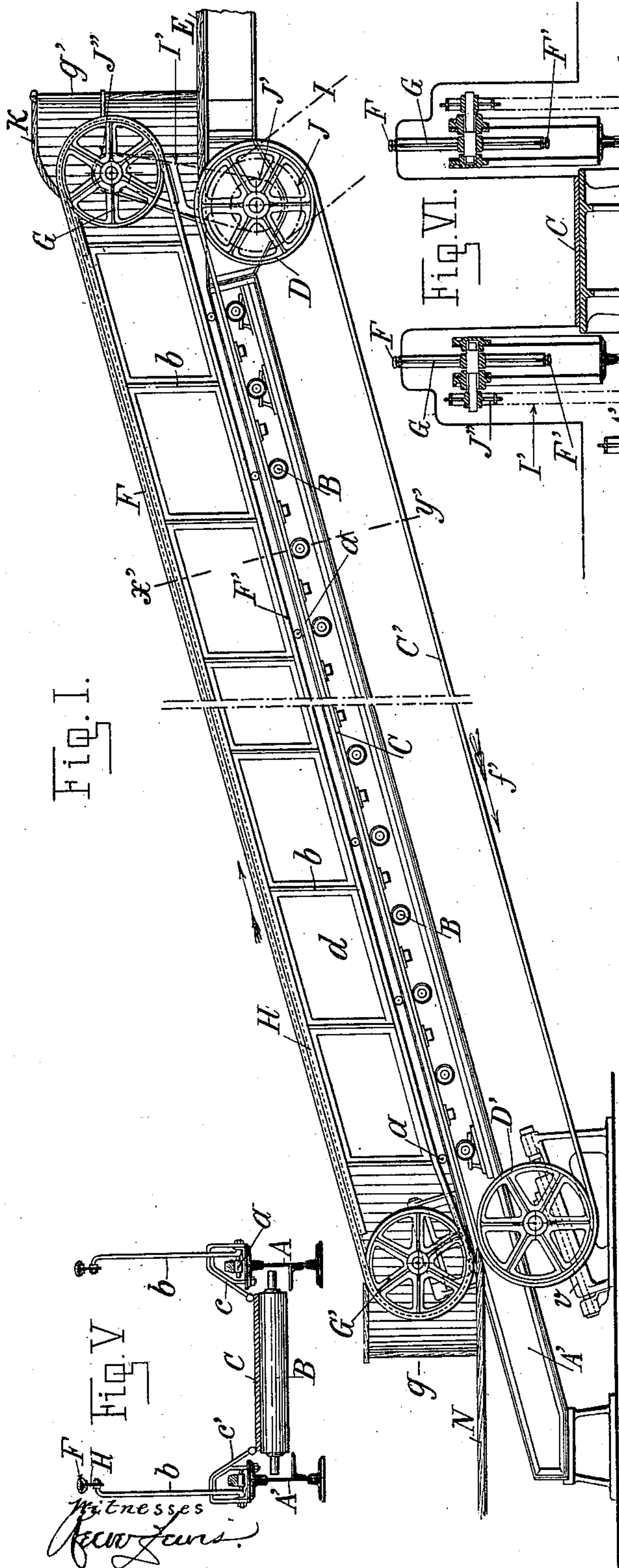


Fig. I.

Fig. V.

Witnesses
J. W. Lewis
W. R. Edson

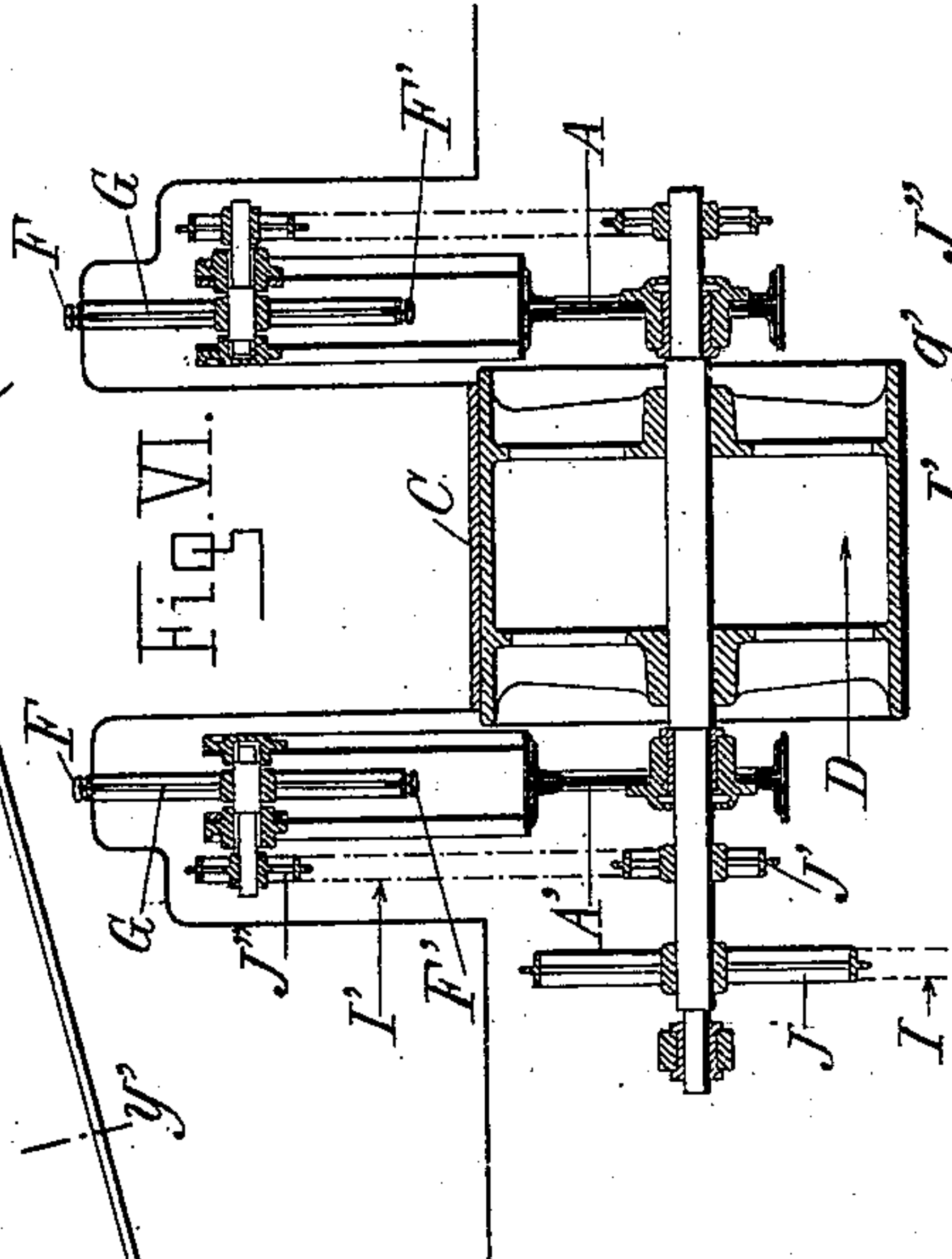
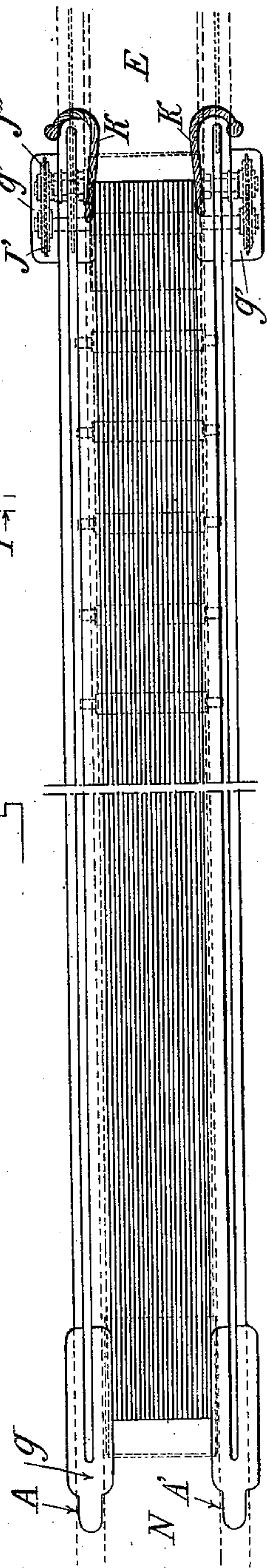


Fig. VI.

Fig. II.



Inventor
Jacques Hallé
by Edward Manno,
his attorney

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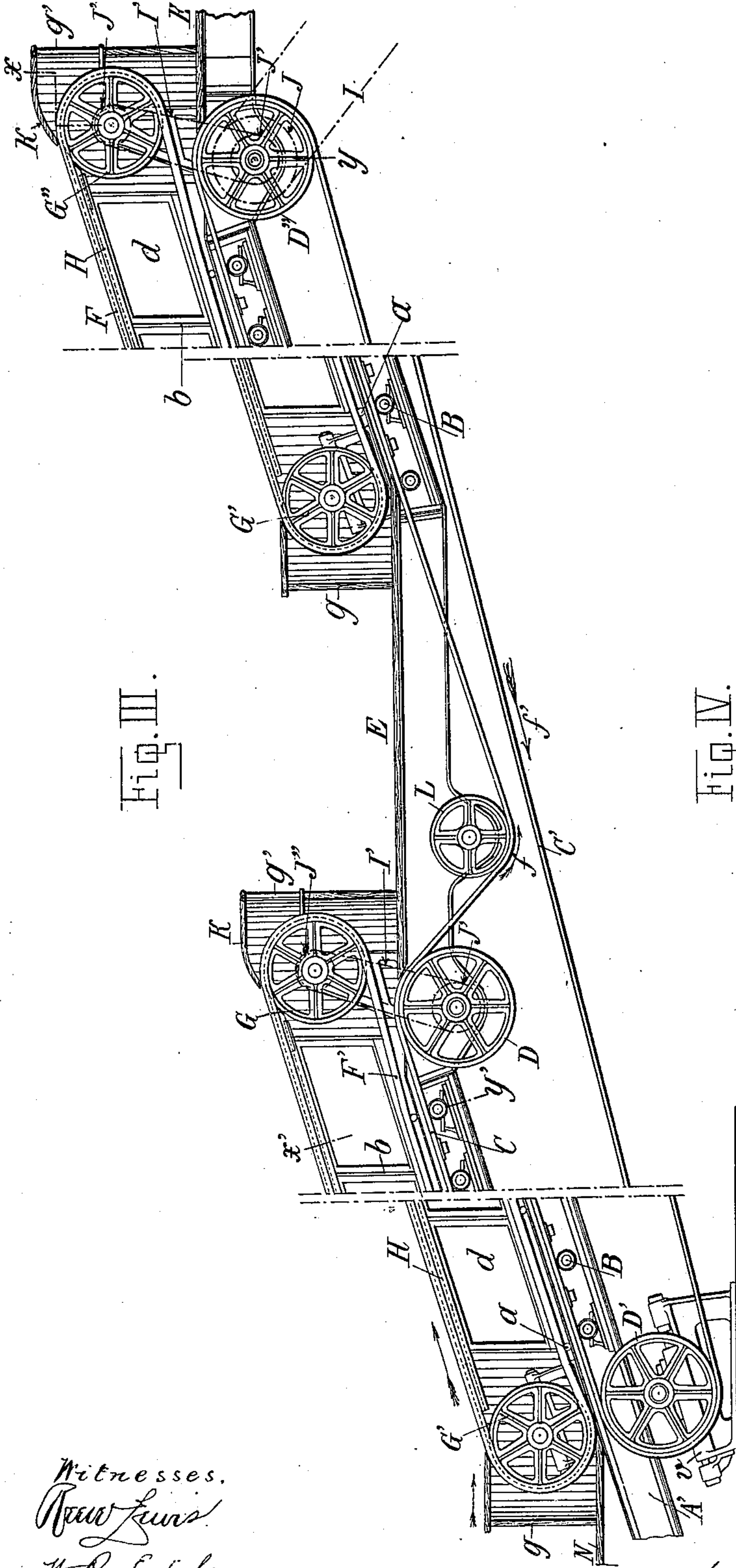
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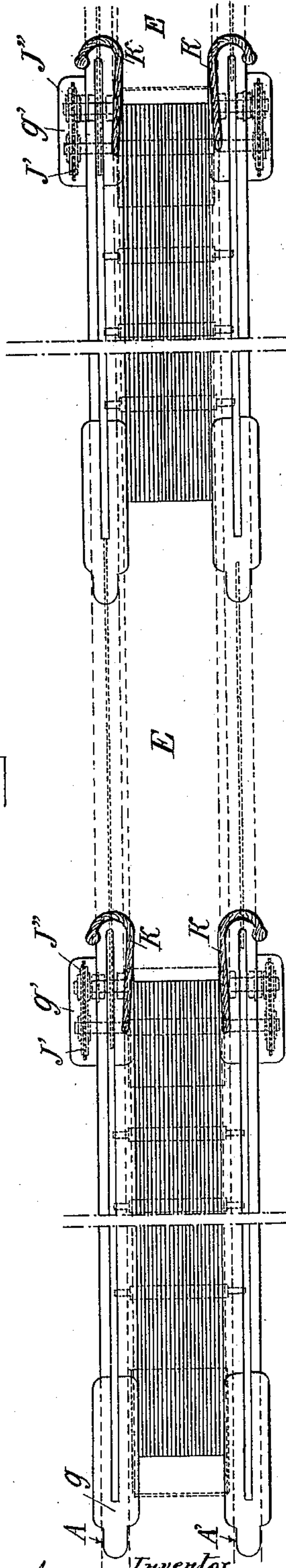
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Fig. III.



Witnesses.
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H. R. Gidlin

Fig. IV.



Inventor
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by *G. L. Dumas*
his attorney.

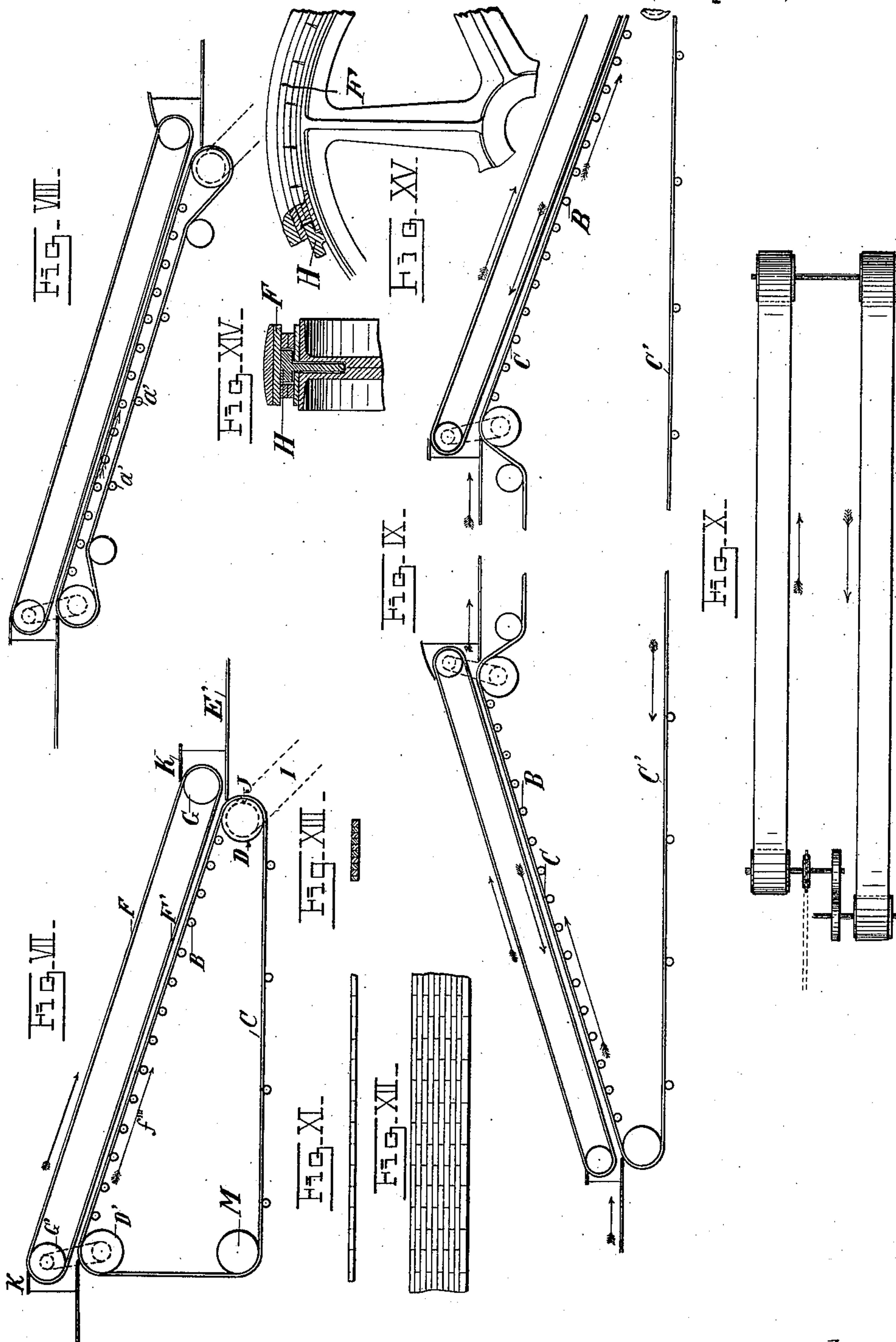
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J. HALLÉ.

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No. 602,008.

Patented Apr. 5, 1898.



Witnesses
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UNITED STATES PATENT OFFICE.

JACQUES HALLÉ, OF PARIS, FRANCE.

MOVING WAY OR STAIR FOR TRANSPORTING PERSONS AND GOODS.

SPECIFICATION forming part of Letters Patent No. 602,008, dated April 5, 1898.

Application filed November 3, 1897. Serial No. 657,305. (No model.) Patented in France April 5, 1897, No. 265,663.

To all whom it may concern:

Be it known that I, JACQUES HALLÉ, a citizen of the Republic of France, residing at Paris, Republic of France, have invented new and useful Improvements in Moving Ways or Stairs for Transporting Persons and Goods, which are fully set forth in the following specification, and patented in France, No. 265,663, April 5, 1897.

Moving ways or stairs having more or less inclination and serving as conveyers or lifts have heretofore been constructed, but such apparatus when put into practical use have developed serious defects and have revealed great difficulties in their operation.

I have sought to provide an apparatus of which the moving way, combined with a hand-rail, also moving, should be flexible, have a smooth and continuous surface, and should be capable of being readily stretched, supported, lubricated, and guided; also, to so construct the apparatus that it should work without noise and require the minimum of driving power, that its motion should be capable of being regulated at any moment, and that all cause of accident should be obviated as far as possible. For these purposes the apparatus is constructed as I shall now describe with reference to the accompanying illustrative drawings, wherein—

Figures 1 and 2 show, respectively in side elevation and plan, the apparatus arranged between two stories. Figs. 3 and 4 are similar views showing an arrangement of the apparatus employed in the case of three or more stories. Figs. 5 and 6 show cross-sections on the lines $x'y'$ and xy , respectively, of Fig. 3, but drawn to a larger scale than this figure. Figs. 7, 8, 9, and 10 are diagrammatic views hereinafter more particularly referred to. Figs. 11, 12, and 13 show a portion of an endless apron respectively in side view, plan, and cross-section. Figs. 14 and 15 show, respectively in cross-section and in side elevation, part of a driving wheel or drum with movable hand-rail.

Between the lateral beams $A A'$ are arranged supporting-rollers B , whose axles rotate freely in swivel-bearings capable of being adjusted as regards position on their supports, and over and upon which the stretched

upper side C of an apron $C C'$ passes. This apron consists of a wide and thick belt composed of thin strips of leather placed on edge side by side one behind another, so as to break joints, and sewed together. (See Figs. 11, 12, and 13.) Its upper part passes partly around a drum or roller D and its lower part passes partly around another drum or roller D' , which serves also as a stretcher, being provided with two adjusting-screws v , which act on the bearings for the shaft of this drum.

When the apparatus is arranged between three or more stories, the hand-rails are separate for each story, although they receive their motion at the same rate from the motion of the apron itself. The upper length C of the apron for the time being travels in the direction of the arrow f (see Fig. 3) and passes around the upper drum D'' , which acts to drive it, the said upper portion of the apron serving as a stretched path or way. The flooring, landing, or fixed bearing E is situated between two apparatuses, and the upper length C of the apron is deflected under and kept under it by a roller L and is wound up by the drum D'' , whence the lower portion C' of the apron moves downward in the direction of the arrow f' .

The hand-rail, of which F , Fig. 3, is the upper stretched or tight portion, is driven by a driving-drum G , below which the lower or slack portion F' passes to a stretching-drum G' , this lower portion being supported at suitable intervals by small rollers $a a$. The upper portion F slides on a fixed bar H , to which it is hooked by means of its lower wing-pieces. This bar is supported by uprights $b b$, Fig. 5, between which are arranged smooth panels $d d$, Figs. 1 and 3, preferably of glass. The vertical walls formed by the uprights and the panels are set back in an outward direction to a suitable extent for the purpose of widening the passage and preventing any part of the garments of the passengers from becoming caught therein. Inclined panels, shields, or covers $c c'$ are provided by way of plinths and serve to bridge over the space between the lower parts of these panels, Fig. 5, and the upper portion C of the traveling apron, which is arranged and moves exactly under the lower edges of the said inclined

planes and near to or against the beveled edges of the parts E and N of the floors or landings.

Motion imparted by a pitch-chain I, Fig. 1, to a wheel J is transmitted to the drum D by means of two pitch-pinions J' J'' and a chain I' to the two upper drums G G' of the hand-rails, Fig. 6, which, as also the lower drums G' G', are protected in boxes *g g' g' g'*, Figs. 1 to 6, the upper part of each of which is provided with a slit to allow of the passage of the upper part F of the corresponding hand-rail.

Small inclines or ramps K K, which are fixed, smooth, and curved in a suitable manner, are arranged internally near and at the upper part of the portions F in such a manner as to raise the wrists of the passengers and to detach their hands from the upper ends of the hand-rails.

When the apparatus is to be used for lowering, Fig. 7, the driving-drum that actuates the apron is arranged at the lower part in order that the portion of the latter that serves as the moving way shall be stretched. The guide-drum M acts as a stretcher like the drums D D'. The descending stretched portion of the way is operated, supported, and guided as described in the case of the lift shown in Fig. 1. Similarly the position, as regards height, of the landing or bearing E' is regulated in such a manner that the feet of persons descending will assume a natural and easy position without jolting. Smooth inclines or ramps K K are also arranged and act, as in the apparatus shown in Fig. 6, for the protection of the fingers by detaching them from the hand-rails when the end of the journey is reached.

The lower portion of the way in the case of a separate lowering apparatus is raised by end rollers and other small intermediate rollers *a' a'*, as shown in Fig. 8, so as to occupy less room. Generally it is of advantage to connect together a lifting and a lowering apparatus, as shown diagrammatically in Fig. 9 and in Fig. 10, the coupling in the apparatus shown in the latter figure being effected in a parallel manner. The hand-rails, however, are always separate from one another, but they always receive their motion from the apron. This also holds good both in the case of several lifts placed in succession, Fig. 3, and connected together and in that of a lifting apparatus coupled with a lowering apparatus.

Each fixed bar H has a section which combines with that (shown in Fig. 14) of the corresponding stretched portion F in such a manner that the said stretched portion slides along the upper side of its internal support on the top of the wings of the bar, while the lateral edges of the portion F pass under the said wings and are hooked and held, the central portion of the bar occupying the narrow slit which exists between the said edges and extending uninterruptedly from one drum to the other. This central portion extends to a cer-

tain extent inside the end drums, which for this reason are split at the center of their rims, as shown in Figs. 14 and 15.

The end drums G G' enable the top straight lengths of the hand-rail to be stretched. In order that this may be done and to attain other advantages resulting therefrom, the hand-rail is not drawn along by means of teeth, the pitch of which would be altered during the first few days of working, but by means of friction.

As the top of the hand-rail must be smooth and as the thickness of the hand-rail is considerable, in order to impart to it the necessary suppleness for enabling it to pass around the drums, the lower side edges are formed by leather straps placed flatwise, but at intervals of distance, Figs. 14 and 15, and attached to other narrow intermediate straps, which are also made discontinuous with the same object.

The edge of the floor N is beveled and is arranged near the outer surface of the apron C, which being formed of straps which are placed on their edges, which may be short and are connected and sewed together, can be made economically in all widths and thicknesses and can be trimmed or adjusted to one uniform thickness.

The drum G' must be placed a considerable distance in front of the drum D', (see Figs. 1 and 3,) and the portions F should arrive at a sufficient height to enable the hands of an ascending passenger to grasp them, one hand grasping the left-hand portion F and the other the right-hand portion F, while one of his feet rests upon the apron, his body having already acquired a low speed.

At the upper part of each lift not only is the fixed landing E arranged quite close to the surface (which is then curved) of the apron, Figs. 1 and 3, but it ought also to be placed below the highest part of the said apron to an extent such that the feet of a passenger will be automatically placed upon the corresponding edge of the said landing, while the fixed ramps or inclines K K in raising the wrists will detach the hands from the upper portion F of the hand-rails.

It has been assumed up to the present when several lifts or conveyers follow one on another that they have one and the same speed; but it will be readily understood that they may be given a speed that gradually increases or decreases from the first to the last. This holds good in the case of lowering apparatus; also, instead of imparting a uniform speed to a raising or a lowering apparatus it may have imparted to it an intermittent speed—as, for example, by the use of elliptical toothed wheels for transmitting the motion to the apron.

Having thus particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A movable inclined way or stair formed

in two sections with a landing interposed between said sections, and having an endless flexible apron or belt common to both sections, the first section of said apron rising to a point with its tread-surface on a level with the plane of the landing, means for deflecting the apron under said landing to the second section, and means for driving the apron, substantially as described.

2. In a movable inclined way or stair, a plurality of sections with a landing interposed between the same, a flexible apron or belt common to both sections and running over suitable rollers at the ends of the sections, a roller beneath the landing under which the apron runs and whereby it is deflected under the landing to the succeeding section, and means for driving the belt, substantially as described.

3. In a movable inclined way or stair, the combination with an apron or belt, of a movable hand-rail sliding on a fixed bar extending longitudinally therewith at the side of the way, and means for driving the apron and hand-rail, substantially as described.

4. In a movable inclined way or stair, the combination with an apron or belt, of an endless hand-rail running over suitable drums and sliding on a fixed bar extending longitudinally therewith at the side of the way, and means for driving the apron and hand-rail, substantially as described.

5. In a movable inclined way or stair, the combination with an apron or belt, of an endless flexible hand-rail running over drums at the ends of said way, a fixed bar arranged at one side of the way between said rollers and along which the upper part of the hand-rail slides, a shield or cover over the lower part of the hand-rail projecting downwardly into close proximity with the edge of the apron, and means for driving the apron and hand-rail, substantially as described.

6. In a movable inclined way, the combination with the tread portion and a movable hand-rail, of an incline K extending along the inner edge of the hand-rail at the exit end of the way, its upper edge extending upwardly from the plane of the hand-rail to a point

above the same, whereby the hand of a person being transported by the way is lifted from the hand-rail upon arriving at the exit end of the way, as set forth.

7. In a movable inclined way or stair for the transport of persons or goods, the combination of a continuous apron consisting of thin leather strips secured together and running over drums D D', of which one is a driving-drum and draws by frictional contact the upper length of the apron which serves as a moving path, while the other drum serves as a stretching-drum, the upper length of the apron being supported by rollers arranged at intervals thereunder, with a continuous flexible and separate hand-rail F F' driven from the apron and moving at the same speed therewith, said hand-rail running over two drums G G' of which one is a stretching-drum and the other a driving-drum, a fixed bar H on the upper winged edge of which the hand-rail slides running from one drum to the other and supported on uprights, panels between said uprights, and inclined plinths c c' extending downwardly into proximity with the upper surface of the edge of the apron, substantially as described.

8. In a movable way or stair of the kind referred to, ramps or inclines K K which are connected to boxes inclosing the moving parts, and which are smooth, curved, and turned up in such a manner as, at the end of the travel, to raise the wrists of the passengers, while their feet move forward and slide upon the fixed flooring, substantially as described.

9. In a moving way or stair of the kind referred to, the arrangement of two or more lifts, placed one behind another, each having a separate hand-rail, but being served by the same apron, which is deflected under each landing E by means of a roller L, substantially as described.

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

JACQUES HALLÉ.

Witnesses:

EDWARD P. MACLEAN,
EDWARD BENGUIOT.