

No. 685,116.

Patented Oct. 22, 1901.

J. M. DODGE.  
STAIR LIFT.

(Application filed Mar. 30, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

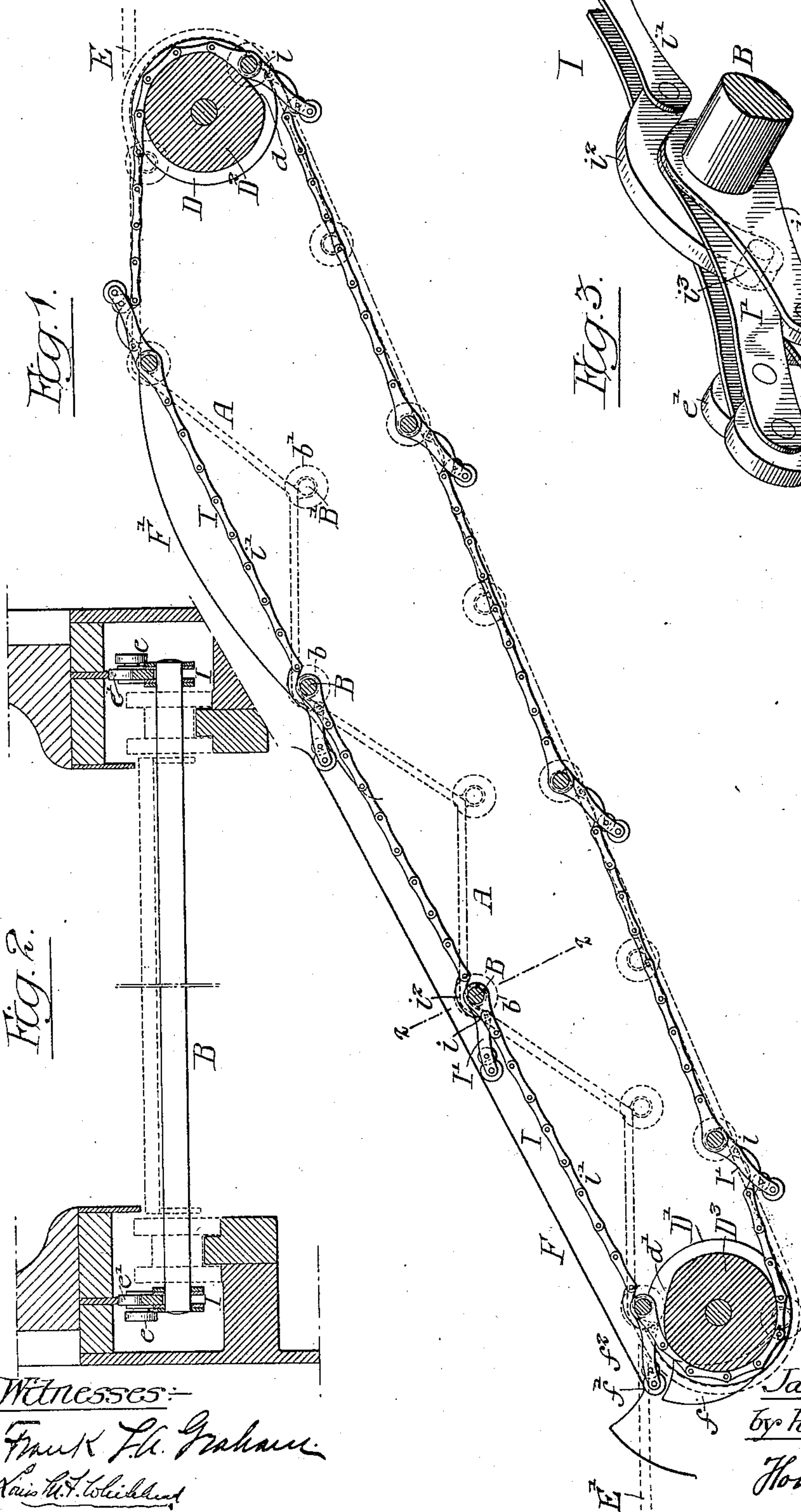
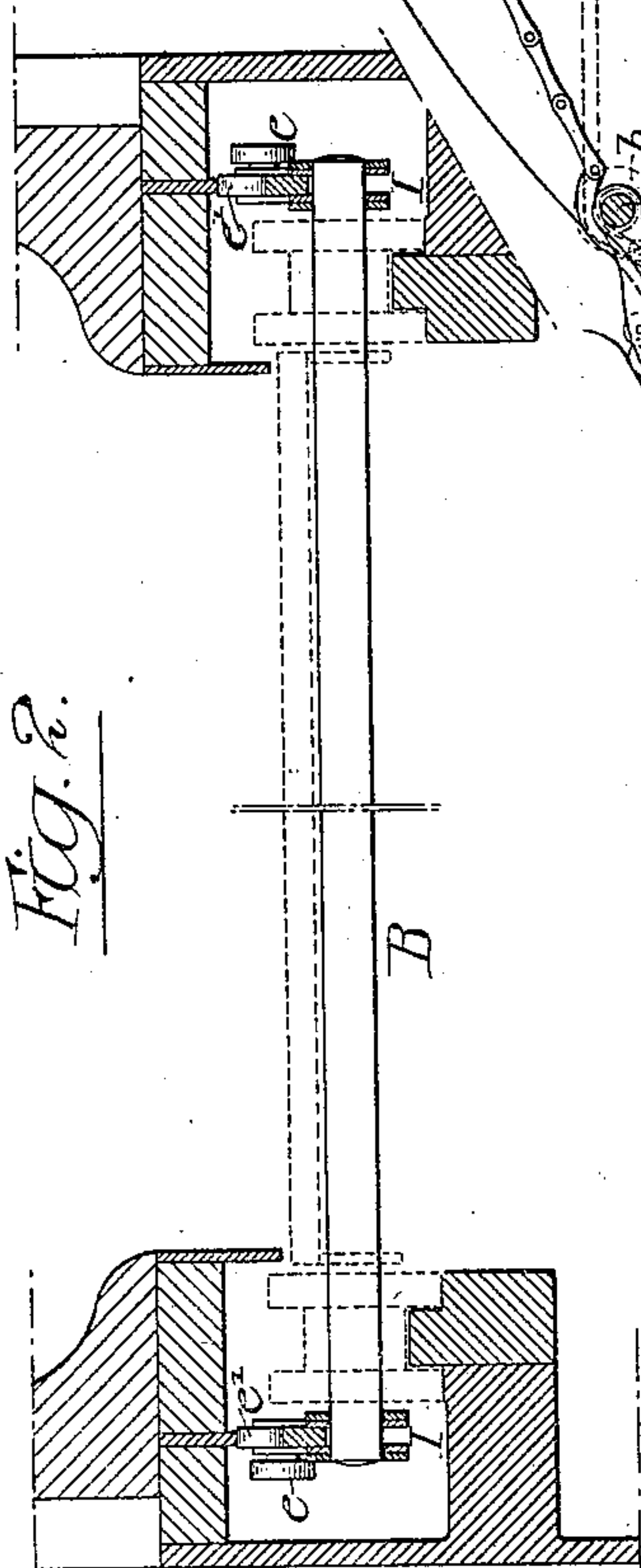


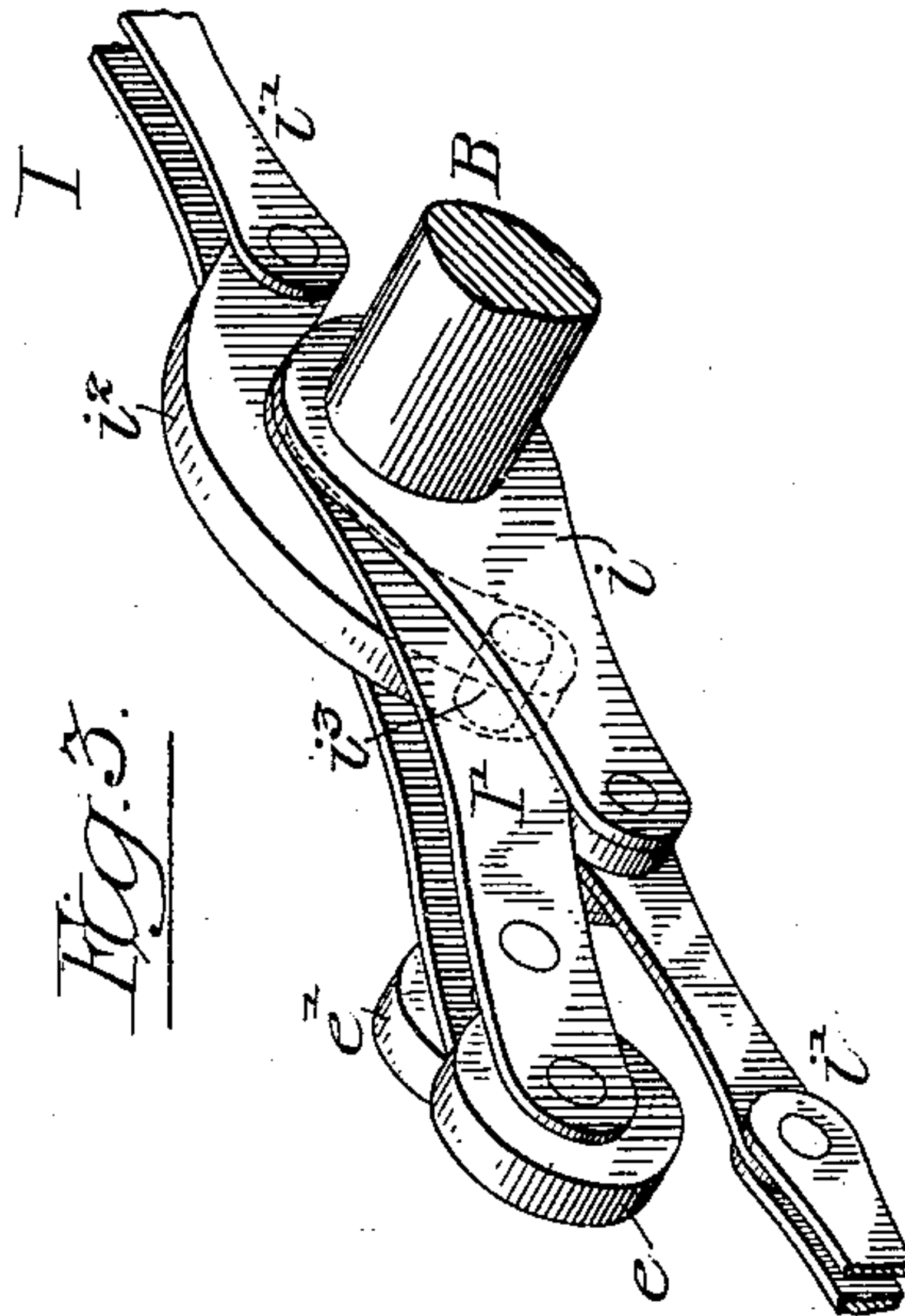
Fig. 2.



Witnesses:

Frank L. Graham  
Louis H. Winkler

Fig. 3.



Inventor:

James M. Dodge  
by his Attorneys:-  
Horn & Horn

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2 Sheets—Sheet 2.

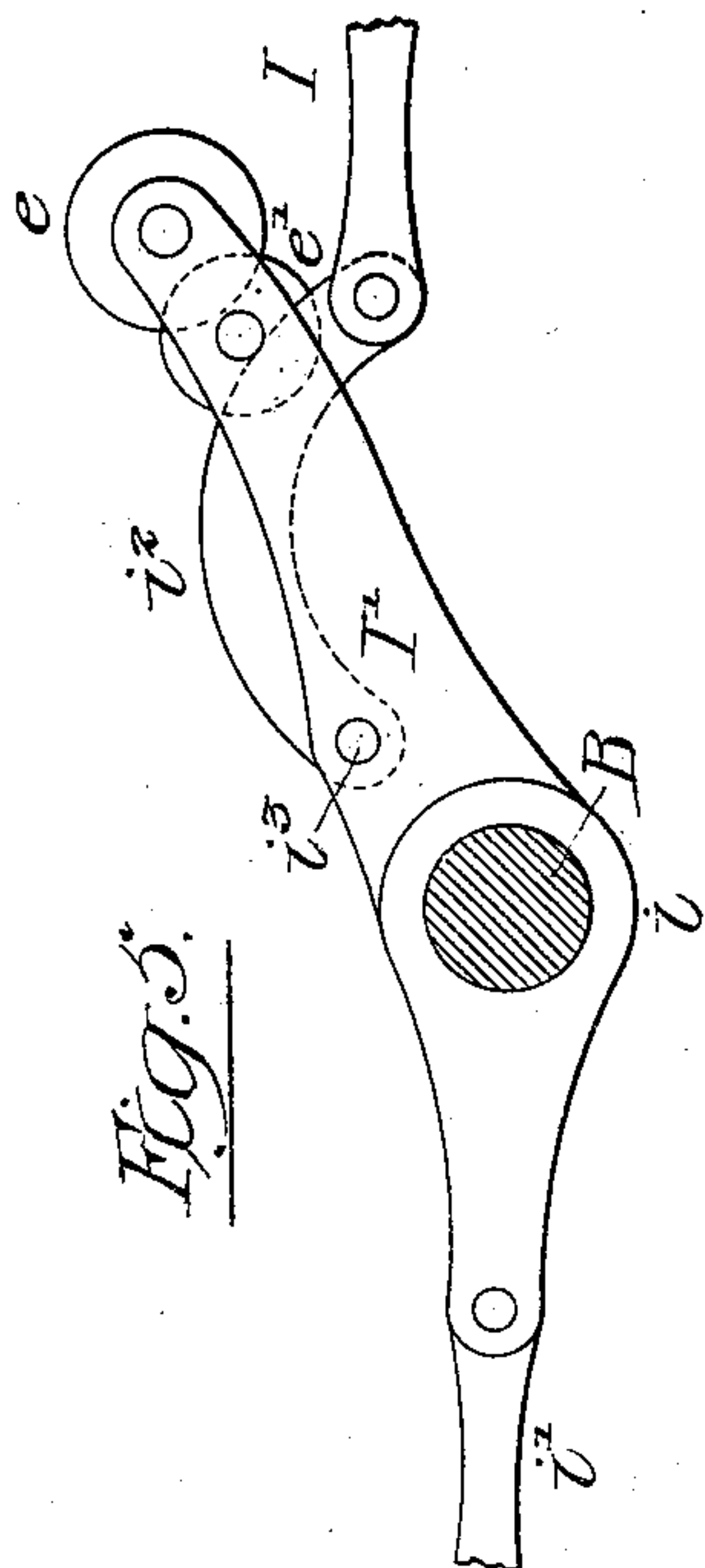


Fig. 5.

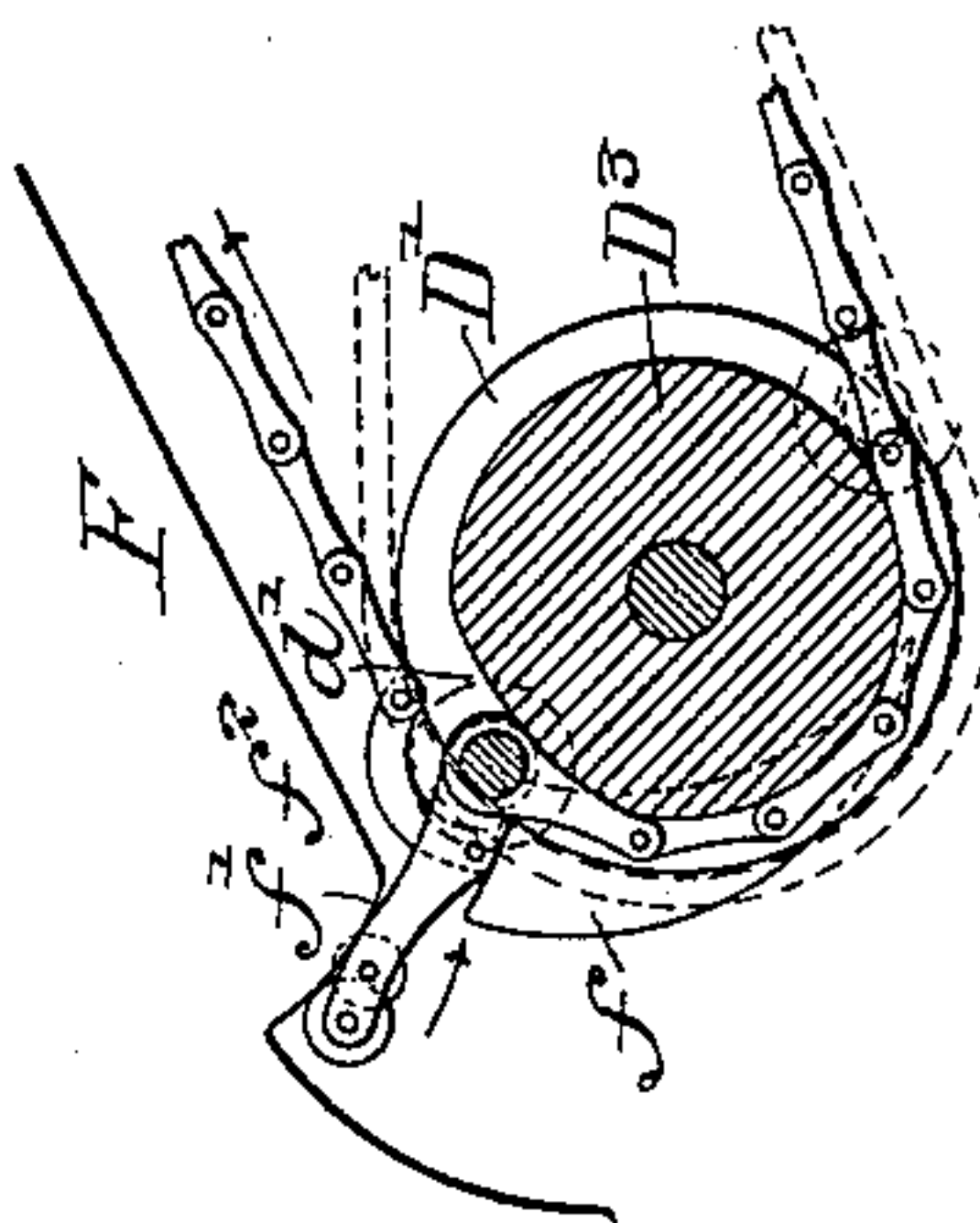


Fig. 8.

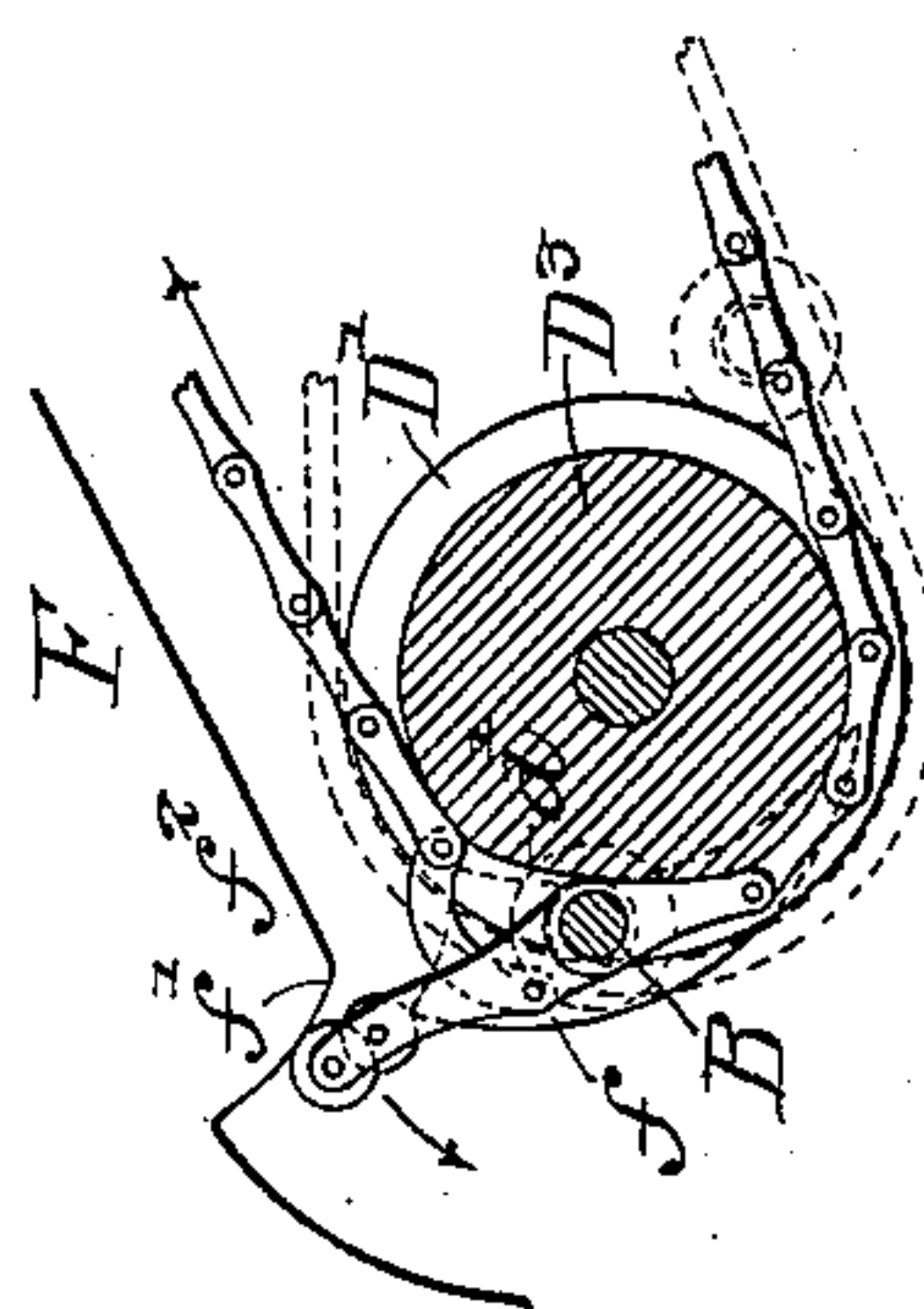


Fig. 7.

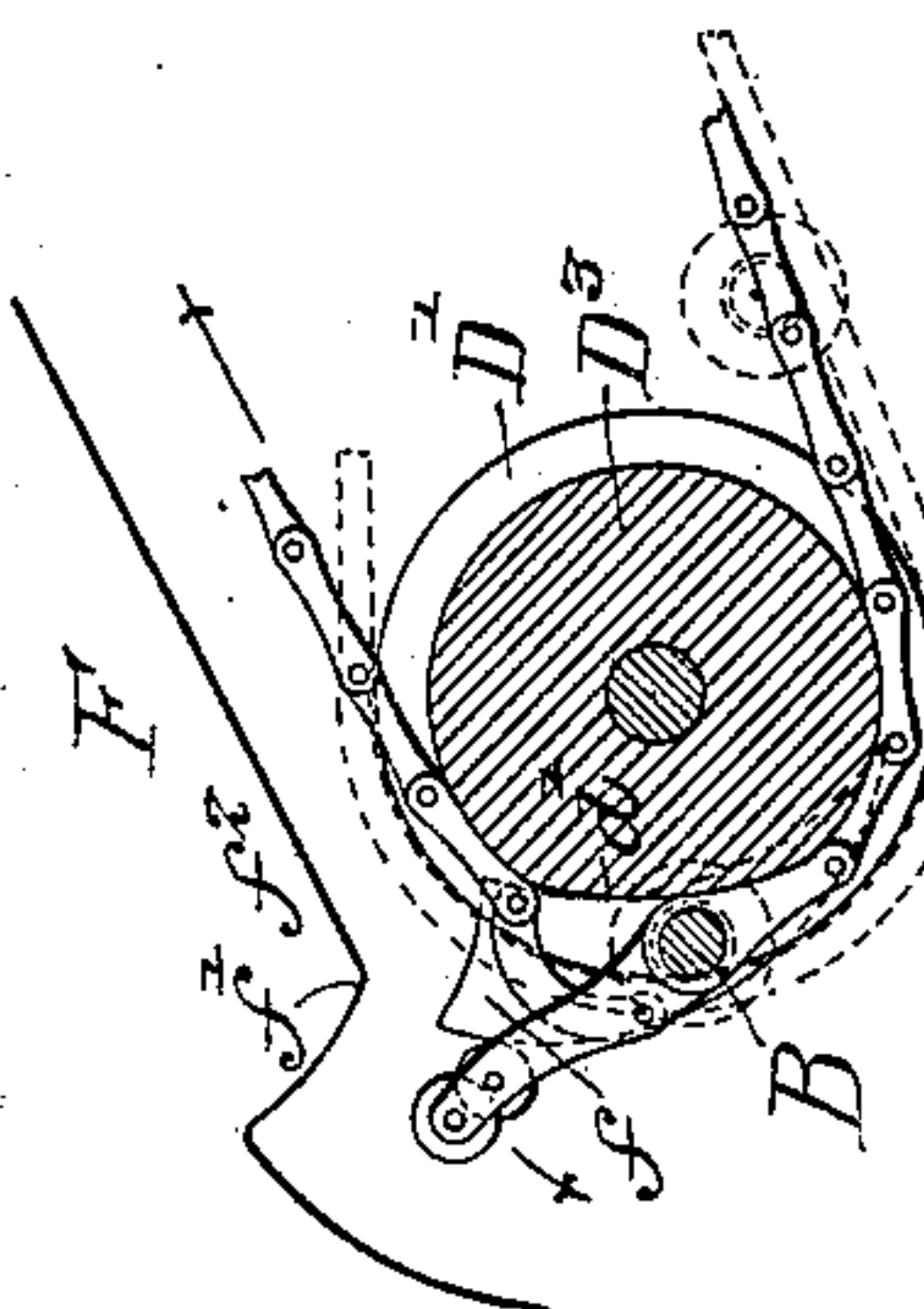


Fig. 6.

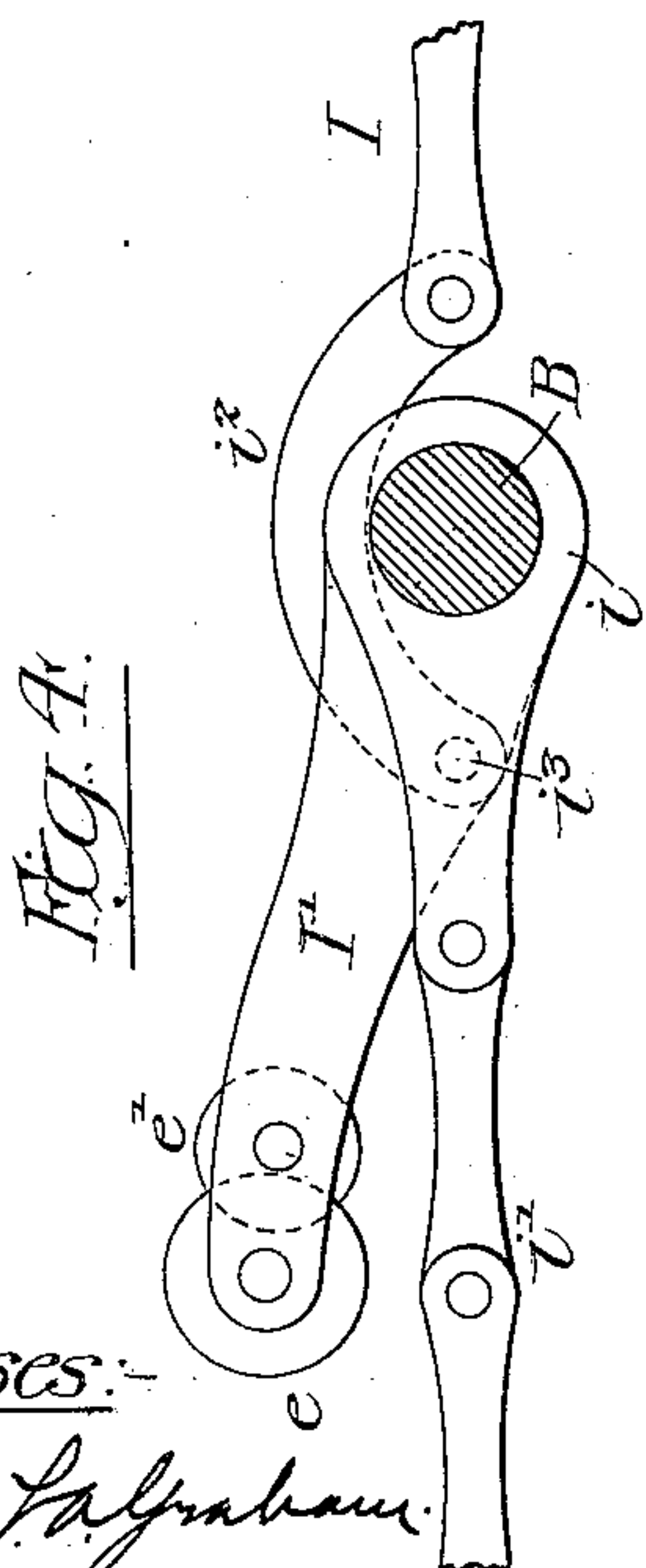


Fig. 4.

Witnesses:-

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Inventor:-  
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# UNITED STATES PATENT OFFICE.

JAMES M. DODGE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE STAIR LIFT COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## STAIR-LIFT.

SPECIFICATION forming part of Letters Patent No. 685,116, dated October 22, 1901.

Application filed March 30, 1901. Serial No. 53,631. (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 Stair-Lifts, of which the following is a specification.

My invention relates to certain improvements in stair-lifts or moving stairways in which an endless carrying-belt is flexed to  
10 form treads and risers on the carrying-run of the stair-lift.

The object of my invention is to provide means for taking the driving strain from the flexed portion of the stair-lift in order to reduce the friction and strain upon the belt.  
15

My invention is an improvement upon the device illustrated and claimed in an application for patent filed by me on the 7th day of January, 1901, Serial No. 42,411. In the  
20 above-mentioned application a supplemental coupling-belt is used, engaging the carrying-belt during a portion of its travel only, whereas the belt illustrated and claimed in the present application is practically a part of the  
25 carrying-belt and is capable of being lengthened or shortened to agree with the carrying-belt, so that the driving strain is not taken by the carrying-belt, but by the supplemental belt or chain.

30 In the accompanying drawings, Figure 1 is a longitudinal sectional view through sufficient of a stair-lift to illustrate my invention, the carrying-belt being shown in dotted lines. Fig. 2 is a section on the line 2 2, Fig. 1. Fig.  
35 3 is a perspective view showing a detail of the belt illustrated in Fig. 1. Figs. 4 and 5 are views showing the means for lengthening and shortening a section of the belt in its two positions. Figs. 6, 7, and 8 are diagram views  
40 showing the means of shifting the mechanism shown in Fig. 3 from the position shown in Fig. 5 to that shown in Fig. 4 at the lower platform of the stair-lift.

Referring to the drawings, A is the flexible  
45 carrying-belt, having axles B B', on which are the wheels b b', respectively, which travel on rails at the side of the stairway illustrated in Fig. 2. This type of stair-lift is fully shown and described in the patent granted to me on  
50 the 12th day of December, 1899, No. 639,154. The carrying-belt passes around a head-wheel

D at the upper end and around a driving-wheel D', at the lower end in the present instance, although power may be applied to either of the wheels D D'. The upper and  
55 lower platforms of the stairway are shown by dotted lines at E E'. On each side of the carrying-belt in the present instance are the supplemental belts or chains I, coupled to the axles B, as clearly shown in Fig. 1, the  
60 axles B' being free, so that the carrying-belt can be flexed, while the supplemental belts or chains I are taut. The chains I pass around wheels D<sup>2</sup> D<sup>3</sup>, forming part of or in line with the wheels D D', respectively, and these wheels  
65 D<sup>2</sup> D<sup>3</sup> are shaped at d d' to accommodate the enlarged portions i of the chains or belts I. The main portion i' of the chain is of the ordinary link-and-pin type in the present instance, and each section is coupled at one  
70 end by the enlarged link i to an axle B and connected at the other end to an arched link i<sup>2</sup>, which is in turn pivoted to a lever I', hung on the axle B. (Clearly illustrated in Figs. 3, 4, and 5.) On the end of the lever I' is a  
75 wheel e, and at one side of the lever is a second wheel e', somewhat less in diameter than the wheel e in the present instance.

When the lever I' is in the position shown in Figs. 3 and 4, a section of the belt is contracted, and when the lever is forced over to  
80 the position shown in Fig. 5 a section of the belt is lengthened. On the return run the sections of the belt are lengthened and on the flexed portion of the carrying-run the sections are contracted. This is accomplished  
85 by means of the rails and cam-surfaces shown in Fig. 1. In the first place, when the belt passes around the lower wheel D<sup>3</sup> the wheel e' on the lever I' travels upon the cam-rail f, as shown in Fig. 6, causing the lever to move  
90 in the direction of the arrow, and consequently will contract the section of belt between two of the axles B B'. The cam-rail f will have control of the lever until the wheel  
95 e strikes the surface f' of the rail F, as shown in Fig. 7, which will continue to force the lever over, as shown in Fig. 8, until it passes the point f<sup>2</sup> of the rail F, as shown in Fig. 1, when the lever will be thrown completely  
100 over. The pivot-point i<sup>3</sup>, which couples the link i<sup>2</sup> to the lever I', will then be on a dead-



center and the lever will not have a tendency to throw over; but in order to guard against accident the lever is held down by the body of the rail F, which extends up to a point near the upper end of the stairway, where it is discontinued, and the lever is then under the control of a rail F', which is curved in the present instance. This rail F' acts upon the wheel e', gradually lifting the lever I' and throwing the pivot i<sup>3</sup> off the dead-center. When the lever reaches the upper end of the rail F', the section of the belt will be lengthened prior to passing around the head-wheel D<sup>2</sup>, as clearly shown in Fig. 1. Thus it will be seen that sections of the chains or belts will be lengthened at certain points of their travel and be shortened at other points, and the levers are so controlled that the sections will be shortened when the carrying-belt is flexed to form treads and risers and when the carrying-belt passes around the carrying-wheels, and on the return run the sections of the chain or belt will be lengthened. Thus the driving strain is taken by the coupling belt or chain when the step-sections are flexed, and consequently there is a saving in power and in wear and tear of the apparatus.

While I have shown a chain, a rope may be used in place of the chain, if desired.

I claim as my invention—

1. The combination in a stair-lift, of a carrying-belt, means for flexing said belt on the carrying-run of the stair-lift, a coupling-belt attached at intervals to the carrying-belt, and means for lengthening and shortening said coupling-belt, substantially as described.

2. The combination in a stair-lift, of a carrying-belt, means for flexing said belt on the carrying-run of the stair-lift, a coupling-belt attached at intervals to the carrying-belt, and means for lengthening and shortening sections of said coupling-belt between the points of attachment, substantially as described.

3. The combination in a stair-lift, of a carrying-belt, means for flexing said belt on the carrying-run to form treads and risers, a coupling-belt attached at intervals to the carrying-belt, the sections of said coupling-belt between the points of attachment being capable of being lengthened or contracted, and rails for automatically contracting or lengthening the said sections, substantially as described.

4. The combination in a stair-lift, of a carrying-belt, means for flexing the said belt to form treads and risers, axles at the points of flexure, a coupling-belt attached to the carrying-belt at the alternate axles forming a series of sections, and means for contracting each section as the treads and risers are formed, whereby the driving strain will be taken by the coupling-belt, substantially as described.

5. The combination in a stair-lift, of a carrying-belt, wheels around which the belt passes, means for flexing the said belt to form treads and risers on the carrying-run of the stair-

way, a coupling-belt attached at intervals to the carrying-belt, the section of the belt between the coupling being capable of being lengthened or shortened, with means for automatically shortening the coupling-belt when the carrying-belt is flexed to form treads and risers, and means for lengthening the coupling-belt when the carrying-belt reaches the upper end of the stairway, substantially as described.

6. The combination of an endless carrying-belt, means for flexing the said belt to form treads and risers, axles at the points of flexure, a coupling-chain at each side of the carrying-belt and attached to alternate axles, and means for lengthening or shortening the sections of chain between the alternate axles, substantially as described.

7. The combination in a stair-lift, of a flexible endless carrying-belt, means for flexing the belt to form treads and risers, axles at the point of flexure, levers pivoted to each alternate axle, a chain extending from an axle to the lever, and means for operating the lever so as to take up the slack in the chain when the carrying-belt is flexed, substantially as described.

8. The combination in a stair-lift, of a carrying-belt, axles on said belt, means for flexing the belt to form treads and risers, coupling-chains at each side of the carrying-belt, said coupling-chains being attached to alternate axles, one of the links of said chain being in the form of a lever and rails for controlling the position of the said lever, whereby it is thrown to one side or the other of the axle to which it is pivoted so as to lengthen or shorten the section of belt of which it forms a part, substantially as described.

9. The combination in a stair-lift, of a flexible carrying-belt, means for flexing the belt to form treads and risers, axles at the nose of each tread, a coupling-belt made in sections, each section being attached to an axle forming a continuous coupling-belt, a lever forming part of each section, and rails for operating the lever to lengthen or shorten the belt, substantially as described.

10. The combination in a stair-lift, of an endless carrying-belt, means for flexing the belt to form treads and risers, coupling-belts at each side of the carrying-belt and connected to the carrying-belt at intervals, each section of belt between the points of attachment consisting of a chain and a lever to which one end of the chain is attached, said lever having two wheels, one out of line with the other, and fixed rails also arranged out of line so as to actuate the levers, 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.