No. 701,459. Patented June 3, 1902.

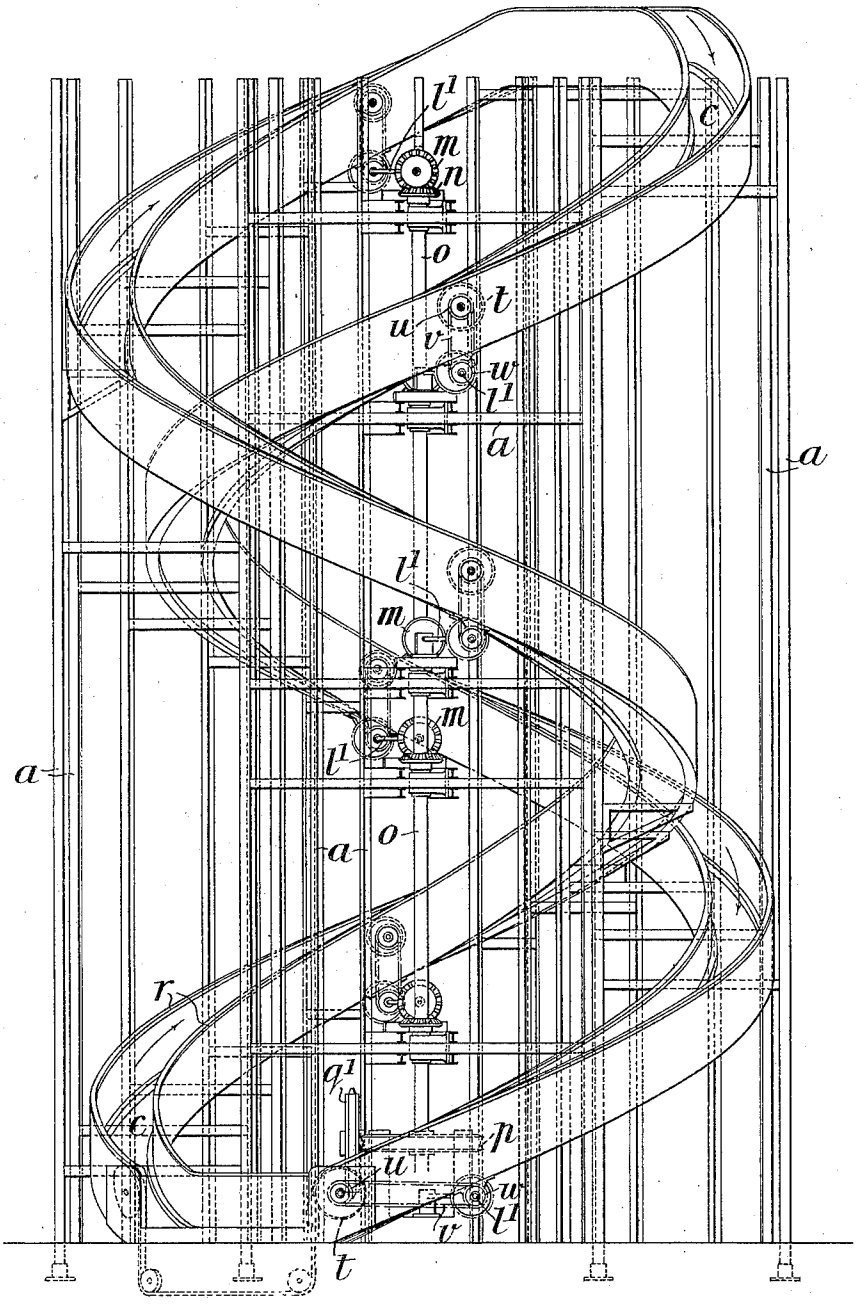
W. H. ASTON.

PASSENGER OR GOODS ELEVATOR OR CONVEYER

(Application filed June 3, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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Fig. 2.

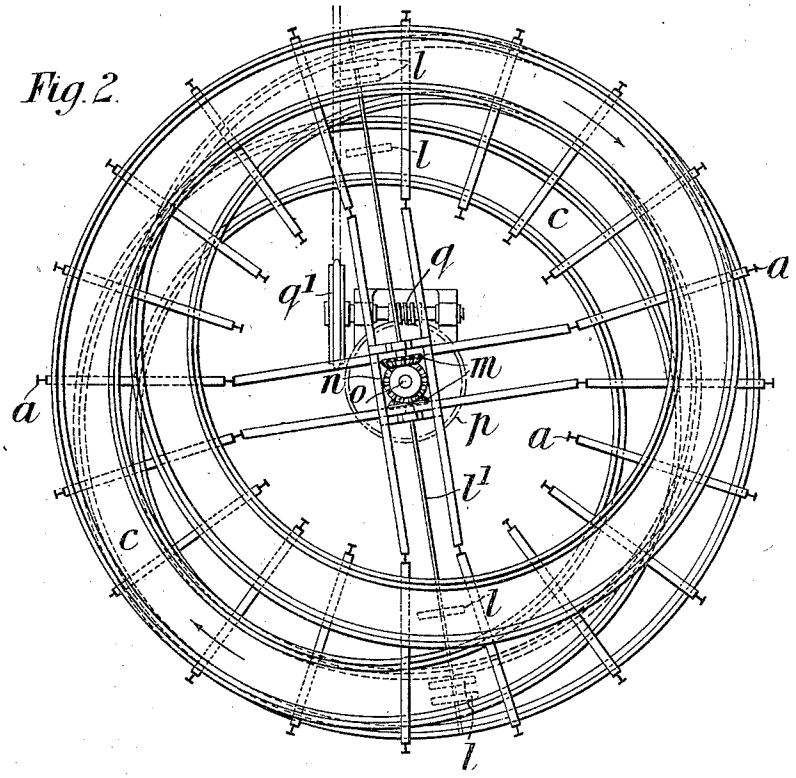


Fig. 3.

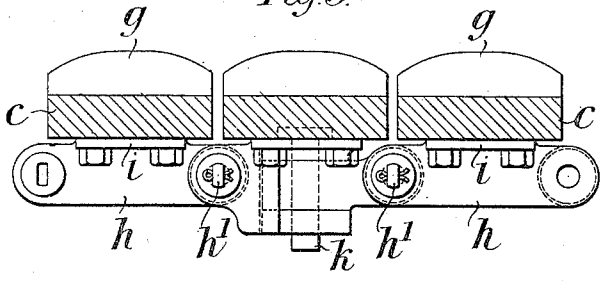
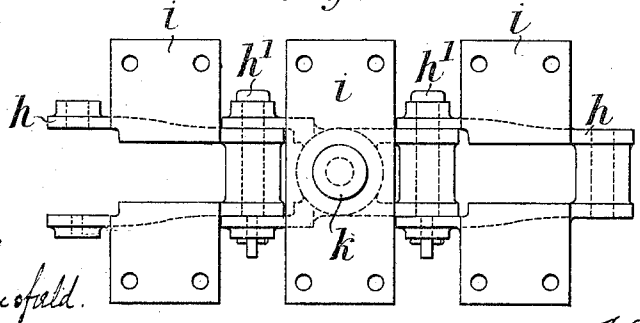


Fig. 4.



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(No Model.) 4 Sheets—Sheet 3.

Fig. 5.

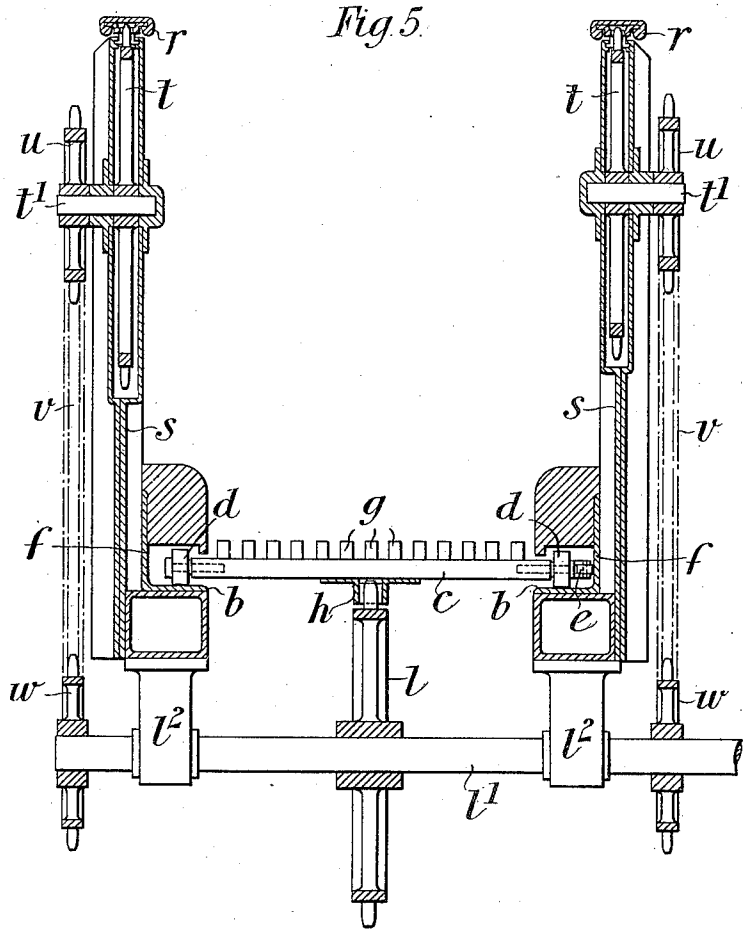

Fig. 6.

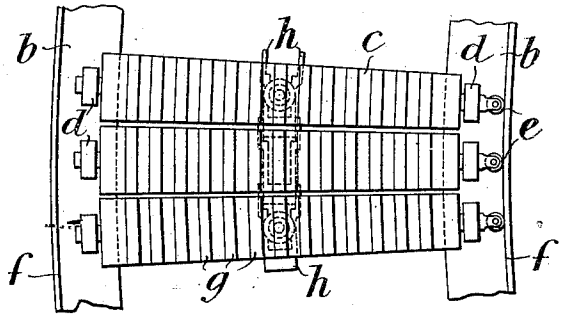

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Fig. 7.

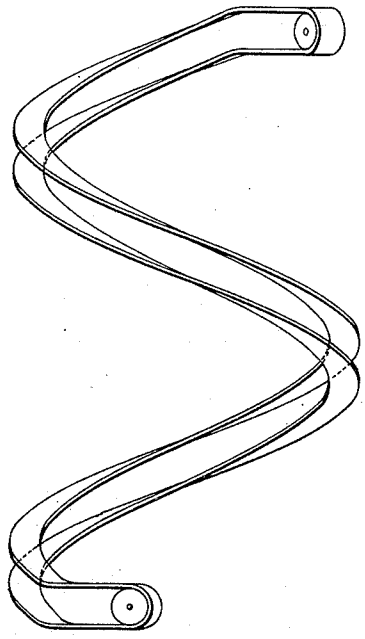
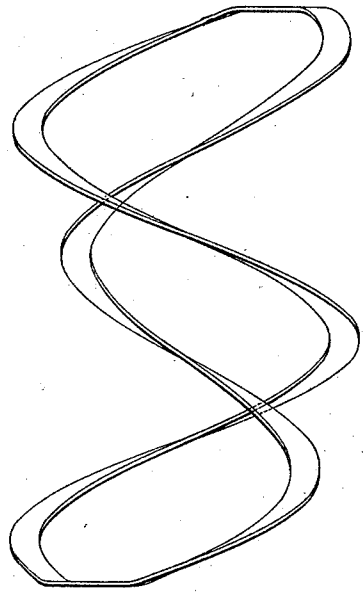


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM HENRY ASTON, OF LONDON, ENGLAND.

PASSENGER OR GOODS ELEVATOR OR CONVEYER.

SPECIFICATION forming part of Letters Patent No. 701,459, dated June 3, 1902.

Application filed June 3, 1901. Serial No. 62,944. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY ASTON, a subject of the King of Great Britain, residing at 46 Eagle Wharf road, London, England, have invented new and useful Improvements in Passenger or Goods Elevators or Conveyers, of which the following is a specification.

My invention relates to elevators or conveyers of the kind wherein a continuous-moving or endless surface or carrier is made use of for transferring persons or goods from one level to another—such, for instance, as described in the specification of British Letters Patent Nos. 5,088 of 1892 and 14,813 of 1899—the object of my invention being to provide an elevator or conveyer of this class which shall travel in a spiral course.

According to my invention I provide a suitable framework carrying spiral or approximately spiral guideways upon which the endless carrier will travel, that portion of the guideways which serves for supporting the descending portion of the traveling carrier being arranged at an opposite inclination to that of the guideways for the ascending portion of the said carrier or being carried immediately beneath the latter, so that the guideways for the ascending and descending portions of the carrier have approximately the same inclination. With the former arrangement the descending portion of the carrier may be used simultaneously with the ascending portion for conveying passengers or goods. The treads, which run on the track or guideways by means of suitable rollers, are made tapering or broader on the outer end than on the inner end in order to accommodate themselves to the curvature of the guideways and are caused to travel by means of a chain passing over suitable carrying-wheels and to which motion may be imparted, for instance, from a vertical shaft through the medium of suitable bevel-gearing. This chain is provided with a number of jointed links, each alternate link being advantageously provided with an additional joint, so that the chain will follow the curvature of the guideways. In order to reduce friction between the ends of the treads and the side of the guideways of smaller diameter, lateral guide-rollers are arranged on the ends of the said treads and roll against a suitably-arranged surface. In connection with this traveling conveyer when intended for carrying passengers a movable hand-rail is also arranged to travel in suitable guideways.

In the accompanying drawings, Figure 1 is an elevation of a spiral elevator made according to the invention, the front half of the supporting-framework being removed to better show the spiral track. Fig. 2 is a plan view thereof. Fig. 3 is a sectional side elevation of the traveling platform. Fig. 4 is a plan view of a portion of the chain carrying the platform-slats. Fig. 5 is a transverse section of the traveling platform and hand-rails, and Fig. 6 is a plan of the platform shown upon the supporting-track. Figs. 7 and 8 are diagrammatic views illustrating other modes of arranging the spiral guideways and traveler. Figs. 3 to 6 are drawn to a larger scale than the other figures.

Referring first to the construction shown in Figs. 1 to 6, *a* is the framework, which may be built up in any suitable manner of girders or pillars or the like, and *b b* are the spiral or approximately spiral guideways, forming the track upon which the endless carrier travels, the said guideways passing upward in an irregularly spiral manner to the top of the elevator and thence passing downward also as an irregular spiral in such a manner as to clear the ascending track, as will be clearly seen on reference to Figs. 1 and 2, this construction being adopted in order that the average diameter of the descending track shall be approximately the same as that of the ascending track.

The traveling carrier comprises a number of cross-bars or slats *c c*, which are provided at their outer ends with rollers *d d*, running upon the track, and also on the inner end with lateral guide-rollers *e e*, which bear against lateral guide-surfaces *f f*, provided upon the track. Upon these cross-bars are secured a number of treads *g g*, and the said cross-bars are made to taper from the outer guideway to the inner one of the track—that is to say, are broader on the outer end than on the inner end, as clearly shown in Fig. 6—the object of making them thus tapering being to enable them to accommodate themselves to the curvature of the track.

h h are the links which form the chain and which are joined together by pins *h' h'*, as shown, each link being provided with a plate *i*, to which the aforesaid cross-bars *c* are bolted. To enable the chain to follow the curvature of the track, every alternate link is provided with a vertical joint-pin *k*, Figs. 3 and 4.

To drive the traveling carrier, a number of chain-wheels *l* is mounted at suitable intervals on shafts *l'*, carried in brackets l^2 upon the under side of the guideway *b b*, (see Fig. 5,) the said chain-wheels engaging the chain and the shafts *l'* being driven by means of the bevel-wheels *m m*, which gear with bevel-wheels *n n*, mounted upon an upright shaft *o*, which is driven by any suitable means, such as by the worm-wheel *p*, worm *q*, and chain-wheel *q'*. By rotating this vertical shaft the bevel-gear revolves the shafts *l'*, thereby causing the chain-wheels *l* in gear with the chain to travel the carrier along the up-and-down spiral track in the direction of the arrows, Fig. 1.

Hand-rails *r r* are advantageously provided, being arranged upon the upper ends of sides *s s*, secured to the guideways *b b*, the said hand-rails being endless and provided upon their under side with teeth or the like, with which engage the teeth of wheels *t t*, arranged at suitable intervals along the track and preferably at the same points as the gear-wheels for driving the traveling platform, the said wheels *t t* being mounted upon spindles *t'*, carried in the sides *s s* and having keyed upon them chain-wheels *u u*, which are driven by chains *v v* from chain-wheels *w w*, mounted upon the shafts *l'*, so that the hand-rails are driven simultaneously with the traveling carrier.

Figs. 7 and 8 are diagrammatic views illustrating two other methods of obtaining the spiral ascending and descending track. In the arrangement shown in Fig. 7 the descending track is immediately underneath and exactly follows the course of the ascending track, so that it is turned over on descending and cannot be used for transport, while in Fig. 8 the descending track is inside the ascending track—that is to say, is a spiral of smaller diameter.

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

1. In an elevator, the combination with the track, of a movable platform, comprising an endless driving-chain, located centrally of said platform, and provided with links connected by horizontal and vertical pivots, to permit said chain to bend vertically and also laterally, and transverse bars secured to the chain-links, and provided at opposite ends with supporting-rollers engaging said track, and driving mechanism for said chain, substantially as described.

2. The combination with the endless curved track, of an endless platform, comprising an endless driving-chain, a series of horizontally-disposed bars, secured to the links of said chain, supporting-rollers at each end of said bars, for engaging horizontal portions of the track and horizontally-disposed guide-rollers secured to said bars and adapted to engage vertical portions of the track and driving mechanism for said chain, substantially as described.

3. The combination with an endless curved track, of an endless platform, comprising an endless chain, a series of transverse bars, secured thereto, said bars being wider at one end than at the other, supporting-rollers secured to the ends of said bars, and engaging horizontally-disposed portions of the track and horizontal rollers secured to the ends of said bars, and engaging vertical portions of said track and driving mechanism for said chain, substantially as described.

4. In an elevator, the combination with the spiral track, of an endless platform comprising an endless driving-chain located centrally of said platform, transverse bars secured to the links of said chain, certain of said chain-links being provided with vertically-disposed pivots, a supporting-roller secured to each end of said cross-bars and engaging said track, and horizontal guide-rollers secured to the ends of said transverse bars and engaging vertical portions of said track and driving mechanism engaing said chain, substantially as described.

5. In an elevator, the combination with the spiral track, of an endless platform comprising a driving-chain located centrally of the platform and provided with links connected by horizontal pivots, certain of said links being jointed vertically and connected by vertical pivots, cross-bars secured to said links, each provided with a supporting-roller at each end engaging the track, said cross-bars being wider at one end than at the other, and a horizontally-disposed roller secured to each cross-bar and engaging a vertical face of said track and driving mechanism engaging said chain, substantially as described.

6. In an elevator, the combination with the supporting-frame of the spiral track, an endless drive-chain, an endless platform carried by said chain and engaging said track, a series of driving-wheels located at different elevations along said track and engaging said chain, a vertical driving-shaft and connections between said vertical driving-shaft and each of said driving-wheels, for driving said chain simultaneously at different points throughout its length, substantially as described.

7. The combination with the spiral track, provided with sides, of the endless driving-chain, an endless platform carried by said chain and engaging said track, an endless hand-rail engaging the upper edge of one of said sides, and provided with driving projections on its lower face, a series of drive-wheels engaging said chain at intervals through-

out its length, and provided with horizontal shafts, a driving-wheel engaging said hand-rail adjacent to each of said chain-driving wheels, and connected with the shaft thereof, a main driving-shaft extending vertically up through said spiral track and connections from said driving-shaft to each of the shafts of the chain-driving wheels for driving said chain and hand-rail simultaneously at different points throughout their length, substantially as described.

8. In an elevator, the combination with a spiral track having a spirally-arranged ascending portion and a descending portion lying directly beneath and parallel to said ascending portion, an endless platform engaging said track and means for driving said platform, substantially as described.

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Witnesses:
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