C. A. MORRIS.

CONVEYER.

APPLICATION FILED JUNE 9, 1909.

1,047,273.

Patented Dec. 17, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

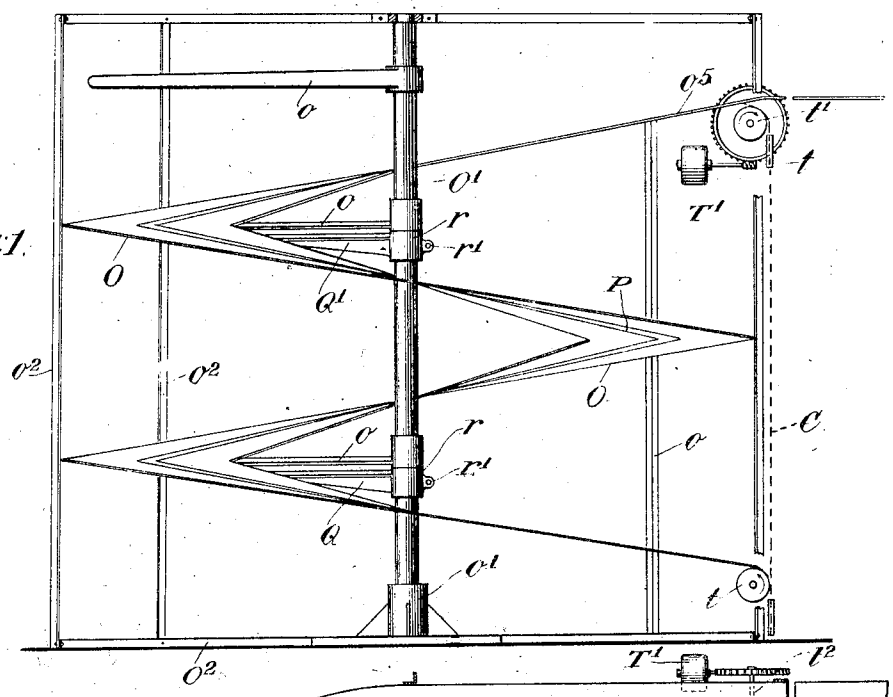
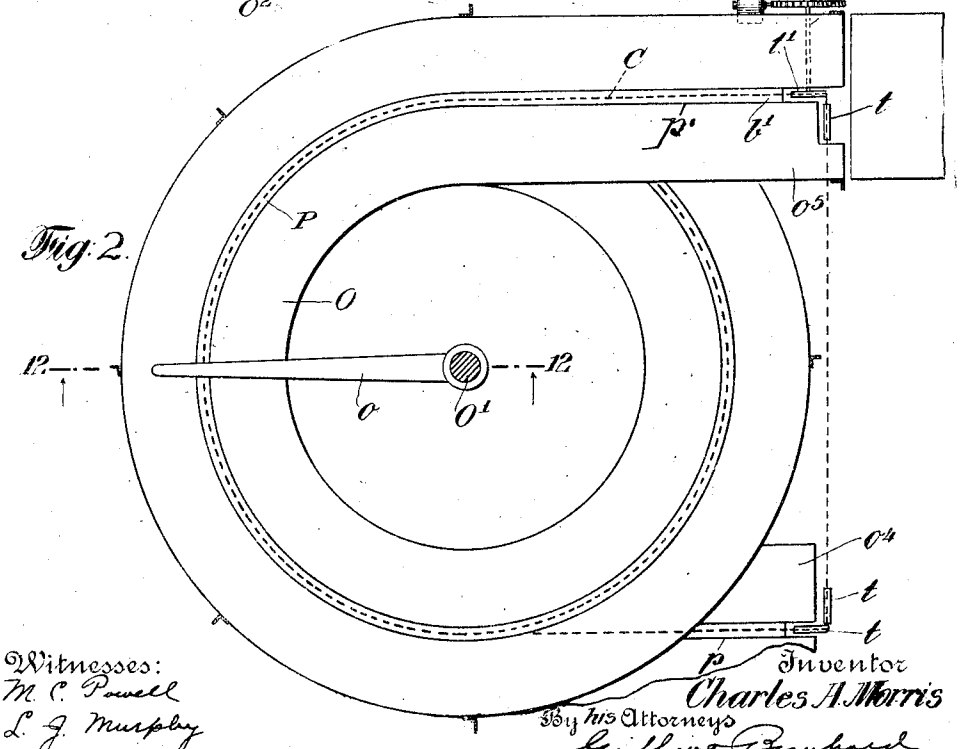


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

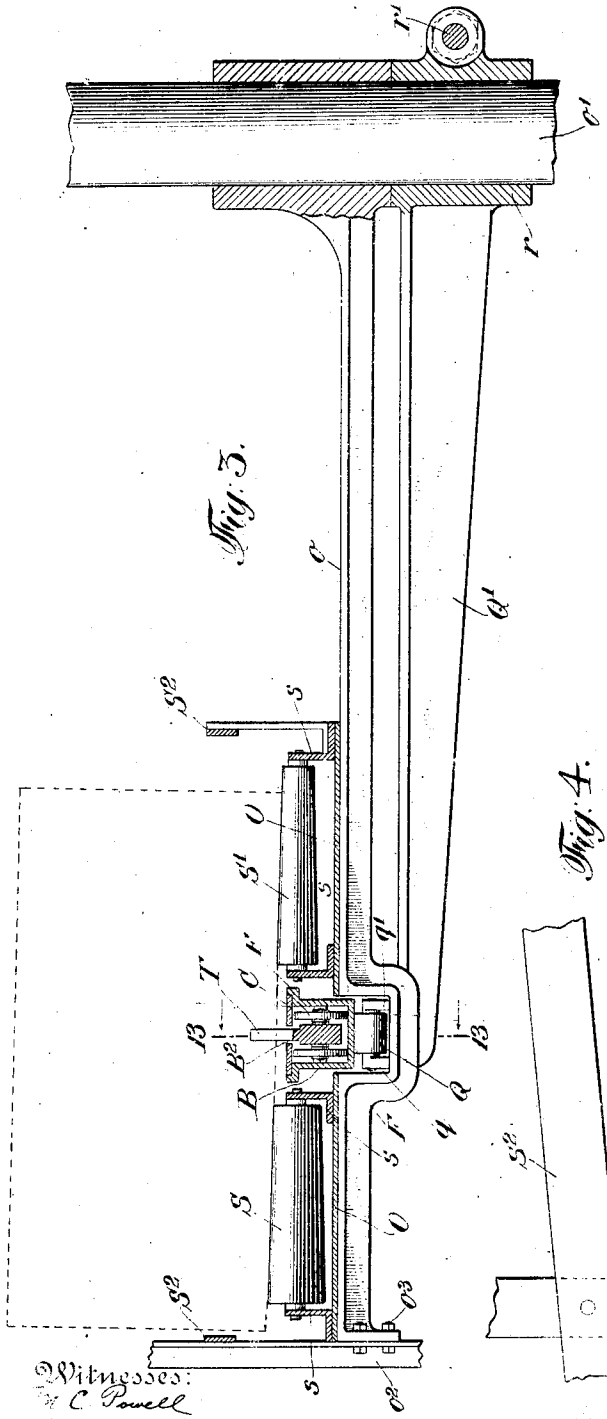


Fig. 5.

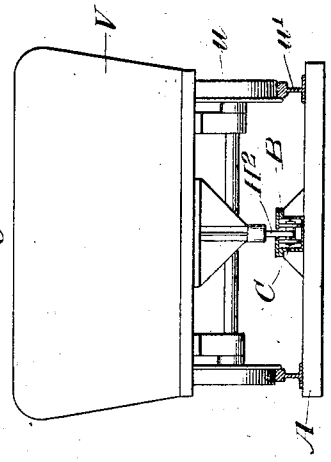
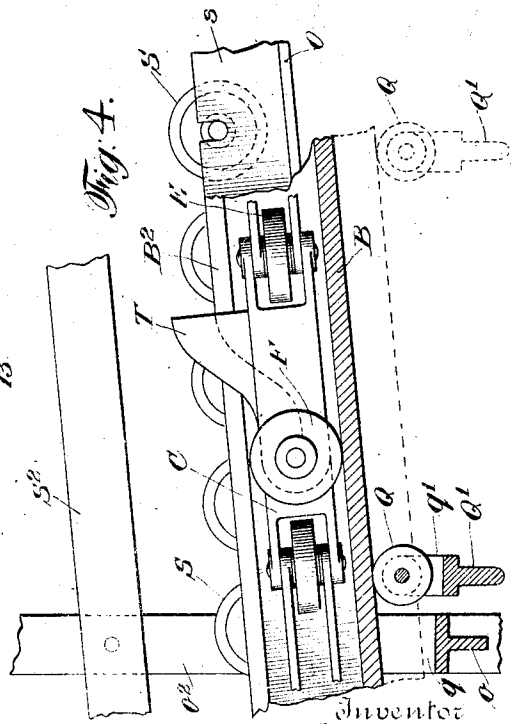


Fig. 4.



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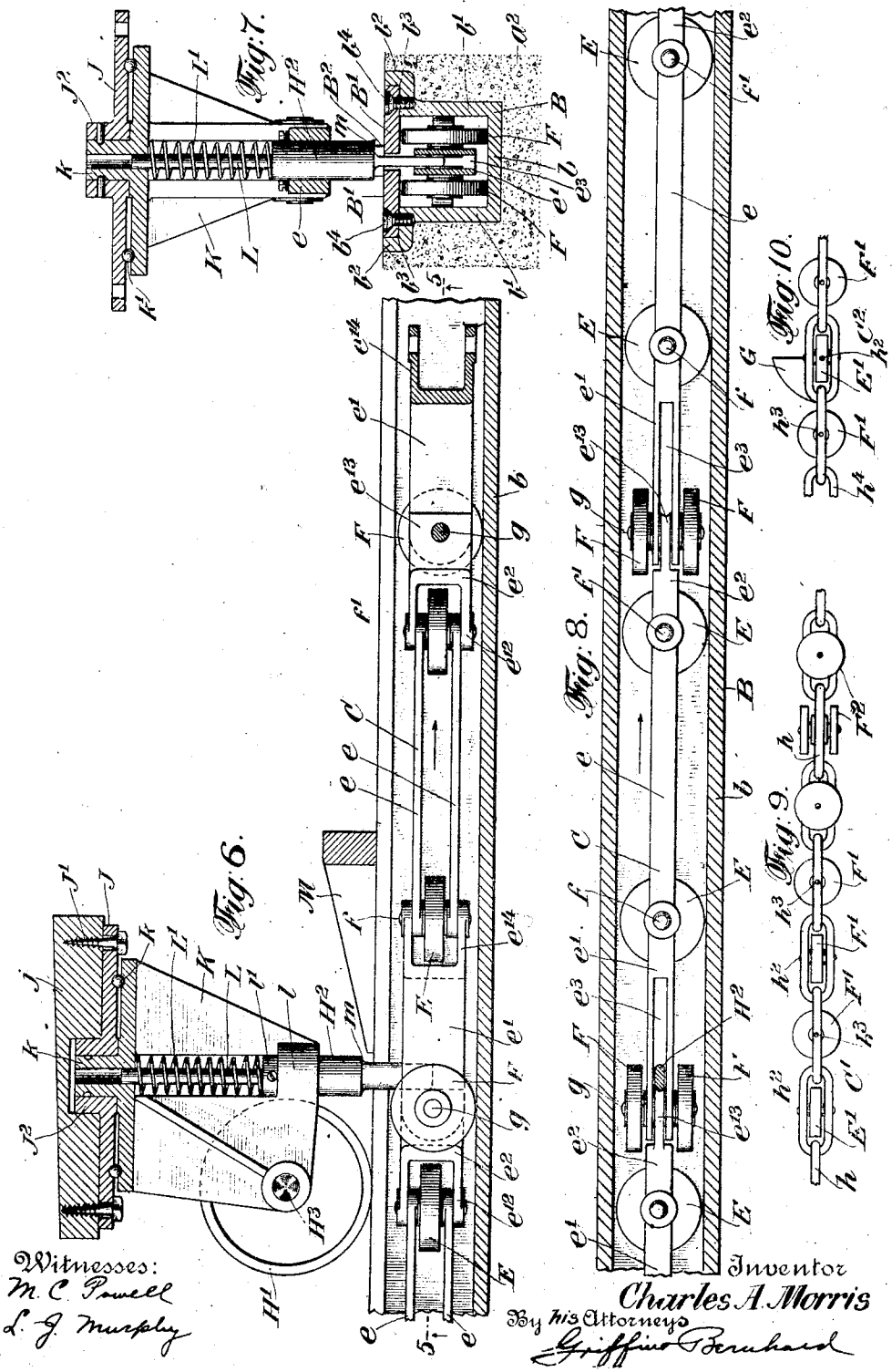
3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

CHARLES A. MORRIS, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CONVEYER.

1,047,273. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed June 9, 1909. Serial No. 501,030.

To all whom it may concern:

Be it known that I, CHARLES A. MORRIS, a citizen of the United States, residing in Montclair, county of Essex, and State of New Jersey, have invented certain new and useful Conveyers, of which the following is a specification.

This invention is a conveyer capable of application to a variety of uses, among which may be mentioned that of an upright spiral conveyer for handling boxes, barrels, packages and merchandise generally, as well as for elevating the cars in pleasure or scenic railways, and for use generally in different arts wherein it may be desired to either convey or to impart movement to various inanimate objects or structures.

One leading and prominent factor of my invention is an upright spiral conveyer wherein a flexible roller chain operates in a spiral conduit sunken below the surface of a spiral platform or track, whereby wheeled cars or trucks, or packages of merchandise, may be propelled along the spiral platform or track by the operation of the chain running in the spiral conduit. In this connection it is desired to state that the platform or track of the spiral elevator may be equipped with a roller bed to facilitate the transit thereover of the merchandise. Furthermore, the spiral conduit, as an entirety, is separate and distinct from the platform or track and its roller bed, to the end that said conduit may be adjusted (raised or lowered) with respect to the track, such adjustment of the conduit and the chain being secured by appropriate mechanical contrivances.

In the accompanying drawings I have illustrated different practical embodiments of the invention, but the constructions shown therein are to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a side elevation illustrating a spiral conveyer adapted for various purposes and embodying this invention. Fig. 2 is a plan view of the structure shown in Fig. 1. Fig. 3 is an enlarged vertical section on the line 12—12 of Fig. 2 illustrating in detail a part of the spiral truck or platform, a conduit, a haulage device substantially incased within said conduit, and means for adjusting the conduit and the haulage device with reference to the spiral track or platform. Fig. 4 is a cross section on the line 13—13 of Fig. 3. Fig. 5 is a cross section illustrating the conveying mechanism adapted for use in conjunction with the wheeled trucks or pleasure railways. Fig. 6 is a vertical longitudinal section through a part of the conduit, the haulage device adapted for operation therein and a latch mechanism whereby a wheeled truck, such as shown in Fig. 5, may be connected operatively with said haulage device. Fig. 7 is a vertical cross section through the conduit and the haulage device, illustrating the latch mechanism of Fig. 6 in connection therewith. Fig. 8 is a sectional plan view of the conduit and the haulage device, the plane of the section being indicated by the dotted line 5—5 of Fig. 6. Figs. 9 and 10 are detail views illustrating other embodiments of the flexible haulage device.

Figs. 1 to 4, inclusive, of the drawings illustrate an important embodiment of my conveying system, wherein the flexible roller chain is adapted to travel in a substantially spiral path for the purpose of elevating barrels, packages or other merchandise from a lower to a higher point, or for permitting the gravity discharge of merchandise from an elevated point to a lower point. In this embodiment of the invention, I employ an inclined track or platform, O, the same being preferably in the form of a spiral. Said platform or track is supported by a plurality of substantially horizontal bracket arms, o, which are fixed to a central post or column, O′, the lower end of which is stepped in a bearing, o', of a suitable base, O^2. The outer edge of the spiral platform or track, O, is stayed by a plurality of upright brace members, o^2, which are fastened to the track or platform in any suitable way, as by the bolt, o^3, shown in Fig. 3. Coöperating with this substantially spiral track or platform is a conduit, P, which is positioned centrally with respect to the leads or convolutions of said platform, O, see Figs. 1 and 2. The conduit follows the contour of the inclined or spiral platform, and said platform

has a loading or receiving end, o^4, and a discharging end, o^5, the conduit, P, having similar straight ends, p, p', see Fig. 2. It is preferred to construct the apparatus so that merchandise or other inanimate objects may be hauled from a lower to a higher point upon the platform by the operation of a chain, C, within said conduit, P, but the merchandise or other objects may be allowed to slide by gravity along the track or platform, O, so that they will pass from a higher to a lower point by the action of gravity alone. Were the conduit, P, and operating chain, C, fixed in an immovable position with respect to the spiral platform, the operation of unloading by gravity would be interfered with owing to the position of the conduit and the chain, and I therefore make the conduit separate from the track, and position it in movable relation thereto, whereby the conduit may be depressed below the upper surface of the spiral platform in order to lower the dogs on the hauling chain below the path of the merchandise which is adapted to slide by gravity downwardly upon the spiral platform. This embodiment of the invention is shown more clearly in Figs. 3 and 4 of the drawings, wherein the bracket arms, o, are provided with the pockets or depressions, q, the spiral platform, O, being divided centrally so that one part of the platform lies on one side of the pocket, q, and the other part of the platform is on the opposite side of said pocket, q. The conduit, B, is constructed in separate sections which are united in end to end order so as to conform to the spiral contour of the platform, O, each section of the conduit being closed on its bottom and two sides, and said conduit having a slot in its top. The conduit is received in the space between the divided parts of platform, O, and in the pockets, q, on the bracket arms, o, for supporting the divided platform, said conduit being capable of an up and down movement in the pocket, q. The conduit rests upon rollers, Q, which are supported in suitable plates, q', at the outer ends of other bracket arms, Q', each bracket arm, Q', having a collar, r, adapted to be clamped by bolts, r', around post or column, O'. The required number of bracket arms, Q', are attached to the post or column for supporting the conduit, B, in a stationary position with respect to the spiral platform, but when it is desired to adjust the conduit in an up or down direction, the required number of arms, Q', are adjusted in one direction around the post or column, O'. In view of the fact that the conduit is inclined, as shown in Fig. 4, the movement of arm, Q', and roller, Q, in one direction, as for example, to the dotted line position shown in Fig. 4, will lower the conduit, B, and chain, C, to a position below the rollers, S, S', constituting a roller bed upon the spiral platform, O, whereby the dogs, T, of chain, C, will be lowered below said rollers. For bringing the chain back to its position to force the load up the spiral platform, arms, Q', are moved to the positions shown in full lines in Figs. 3 and 4, and thus the conduit and the chain will be raised to their operative positions for the purpose of enabling dogs, T, to push the load over the roller bed, S, S', on the spiral platform.

The chain which I prefer to employ in the spiral conveyer of Figs. 1 to 4, inclusive, is the double jointed link chain having the weight-carrying rollers, F, and direction rollers, E, similar to the chain shown in Figs. 6, 7 and 8, which will be hereinafter described. Suitable links of this chain are provided with upstanding dogs, T, one of which is shown in Fig. 4, each dog being arranged to operate in the slot, B^2, of the conduit. As indicated in Figs. 1 and 2, the running chain is of the endless variety, and it is guided around sprocket wheels, t, t', said sprocket wheel, t', being fixed to a shaft t^2, which is driven by a motor or engine T', whereby motion is communicated to the running chain for the purpose of moving it through the conduit. The roller chain is supported in the conduit, through which it is free to run, and as this chain is provided with rollers, E, F, the chain will operate with very little friction in the conduit, and it will bend or flex so as to easily follow the contour of said conduit.

The sections, O, O, of the divided platform are provided with suitable supports, s, for the arbors of rollers, S, S', the rollers, S, being on one side of the conduit, and rollers, S', being on the opposite side of said conduit. The rollers form a roller bed over which the objects are adapted to easily and freely travel, when said objects are pushed upwardly by the dogs, T, on the traveling chain, C, but when the conduit and the chain are depressed so that the dogs, T, will lie practically below the upper surface of rollers, S, S', then the objects can travel over the rollers and in a downward direction. Suitable guards, S^2, are provided at the inner and outer sides of the spiral platform, O, to preclude the objects from falling off the roller bed when said objects are pushed upwardly by the chain, or when they are allowed to slide downwardly by gravity.

Instead of employing a roller bed upon the spiral platform to facilitate the movement of packages, etc., upon said platform, I may omit said roller bed and provide a platform with a track composed of rails u', as shown in Fig. 5. These rails are adapted to be engaged by the flanged walls u of a truck U. The conduit B may be countersunk below the surface of the platform as heretofore described in connection with

Figs. 1 to 4, or said conduit may be positioned upon the top of the platform, as shown in Fig. 5. Within this conduit operates a traveling haulage chain C which is adapted to be engaged by a trigger H^2 of the truck or car, said trigger being illustrated more particularly in Figs. 5 and 6 of the drawings. The engagement of trigger H^2 with the haulage chain imparts movement to the car or truck U, whereby the car or truck is adapted to be hauled in an upward direction by the operation of the haulage chain, or the descent of the car or truck upon the platform is controlled by the operation of the haulage chain.

It is evident that the spiral conveyer illustrated in Figs. 1 to 4 or in Figs. 5 and 6 may be employed to advantage in connection with scenic or pleasure railways for the purpose of hauling the passenger cars from the unloading point back to an elevated loading point. The spiral conveyer is advantageous for the reason that it requires comparatively little space for the purpose of raising the passenger cars from a lower to a higher point.

Conduit B is constructed, preferably, in longitudinal sections, each section being cast in a single piece so that the bottom and side walls are integral. As shown in Fig. 7, the side walls of the conduit are provided with outwardly and upwardly extending flanges b^2 which form recesses b^3 adapted to receive suitable plates B'. Said plates are seated in the upper flanged end of the conduit so as to lie flush with the flanges b^2. Said plates are adapted to be secured firmly to the conduit by suitable means, such as screws b^4. Furthermore, the plates are spaced at their inner edges for the purpose of producing a slot B^2 in the upper side of the conduit, whereby provision is made for the passage of a device or member, such as a latch, for coupling a truck or car with the traveling haulage chain C. The construction of conduit B is such that its vertical and cross sectional dimensions are reduced as compared with other conveying systems of this class with which I am familiar.

A salient feature of the invention is a double jointed roller chain adapted to travel within, and to be substantially incased by, conduit B, the rollers of said chain being positioned for engagement with side walls b' of the conduit whereby said roller chain is adapted to guide or direct itself within the conduit so as to automatically conform to the contour of said conduit. Various constructions of the flexible haulage chain are shown in Figs. 6, 7 and 8 and in Figs. 9 and 10.

The haulage chain of Figs. 6, 7 and 8 is a double jointed chain comprising pairs of links e e and intermediate links e' e^2. Each link e' is provided with a longitudinal slot e^3, whereas each link e^2 is forked or bifurcated at e^{12}, and is provided with a tongue e^{13}, said link e' being forked at e^{14} at the opposite end from its slot e^3. The links e, e, comprising one pair are fitted within the bifurcated part e^{14} of link e', said links e, e, and e' being connected by a pintle f. The several ends of links e, e, are received within the bifurcated part e^{12} of link e^2, and said links e, e, and e^2 are pivotally connected by another pintle f'. The link e' is positioned next to the link e^2, so that the shank e^{13} of link e^2 is received in the slotted part e^3 of said link e', said links e^2, e^3 being connected pivotally by a pintle g. From this description it is apparent that the pairs of links e, e are each connected at one end by a pintle f to the forked part e^{14} of one link e', while the other ends of said pair of links e, e, are connected by a pintle f' to the forked part e^{12} of the other link e^2, whereas links e' and e^2 are connected pivotally by the pintle g. Pintles f, f' extend through the links of the chain in one direction, said pintles f, f' being vertical, whereas pintles g extend through the links of the chain in a direction at an angle to the pintles f, f', said pintles g being preferably at right angles to the pintles f, f'.

The described construction of the chain permits it to bend or flex in two directions for the reason that pintles g permit the links to turn in a vertical plane, whereas pintles f, f' enable the links to bend in a horizontal plane, and this chain is adapted to travel within an irregular or spiral conduit.

The haulage chain is provided with rollers F for sustaining its weight and reducing the frictional contact between the chain and the bottom of the conduit. Furthermore, said chain is provided with rollers E positioned for frictional contact with the side walls of the conduit for the purpose of reducing the friction between the chain and the conduit as said chain travels around bends or corners in said conduit. Rollers E are mounted to rotate freely on pintles f, f', whereas rollers F are mounted to turn freely on pintles g. Rollers F are between, or in alternate relation to, rollers E, see Figs. 6 and 8, and said rollers F rotate on axes which are at right angles to the axes of rotation of rollers E.

As shown, rollers E are mounted in the forked or bifurcated ends e^{12} e^{14} of links e', e^2, respectively, and between the end portions of the pair of links e, e, but it is preferred to mount rollers F in pairs exteriorly to the links, see Figs. 7 and 8. Thus the direction rollers work within the links, while the weight sustaining rollers F operate exteriorly to the links, two of said weight sustaining rollers F being mounted on the end portions of one pintle g.

It is not desired to limit the invention to

the double jointed pivoted link chain of the character shown in Figs. 6, 7 and 8, for the reason that I may employ a haulage chain C′ of the form shown in Fig. 9, or the haulage chain C^2 of the form shown in Fig. 10.

Chain C′ of Fig. 9 consists of links h loosely connected to each other like an ordinary link chain so as to permit flexibility of the chain in various directions. Said chain is provided with rollers E′, F′. As shown at the left of Fig. 9, roller E′ is positioned within one link and is arranged to turn freely on a vertical pintle h^2, whereas the other roller F′ is positioned within an adjacent link and rotates on a horizontal pintle h^3. If desired, the weight carrying rollers may be arranged in pairs, as at F^2 at the right hand portion of Fig. 9, said weight carrying rollers being positioned exteriorly to link h instead of operating within said link.

In the construction of Fig. 10, links h^4 of the chain are provided with rollers E′, F′ which rotate on vertical and horizontal axes h^2, h^3, respectively. Said chain of Fig. 10 is provided with an upstanding member G adapted to travel in slot B^2 of the conduit, and to project above the upper surface of said conduit for the purpose of engaging with package or other inanimate object which is to be pushed along by the operation of the haulage chain.

In Figs. 6 and 7 of the drawings I have shown a trigger mechanism adapted to be carried by a hanger of a wheeled truck, such as a car or truck V of Fig. 5, said trigger mechanism operating to connect the car or truck with the haulage chain C incased within the conduit. The trigger H^2 is slidably mounted within a hanger K, the latter being shown in Fig. 4 as having a caster wheel H′. The frame j of the car or truck is provided with a bearing plate J secured firmly thereto by bolts or screws j', said bearing plate being provided with an upstanding boss j^2. The hanger K coöperates with said bearing plate J, said hanger being provided with a stud k which fits into the boss j^2, suitable bearing balls k' being positioned between the hanger and the bearing plate, whereby said hanger is free to turn relative to the bearing plate. The hanger is provided with a guide lug l for the spindle L forming a part of the trigger H^2. Said spindle is provided with a collar l' upon which is seated a coiled spring L′, the latter acting to depress the spindle and the trigger with reference to the hanger and the car or truck. Said trigger is adapted to pass through slot B^2 in the top of the conduit, the lower end of the trigger entering the slot e^3 in one link of the chain, as shown in Fig. 8, or to enter an opening in the chain link h of Figs. 9 and 10. When it is desired to release the trigger from the chain, I may employ a trip M, see Fig. 6, said trip being positioned at a suitable place with respect to the conduit and in the path of the trigger. The trip acts to lift the trigger against the tension of spring L′ so as to disengage the trigger automatically from the haulage chain.

It is to be understood that my invention is not restricted to any particular cross sectional form of conduit, nor to the specific conduit construction herein disclosed, for the reason that said conduit, particularly the conduit for the spiral conveyer, may be varied in form and construction as deemed suitable by skilled constructors.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent is:

1. In a conveyer, a substantially spiral platform, a roller bed thereon, a substantially spiral conduit in coöperative relation to said platform and the roller bed thereon, and a roller chain operating in said conduit.

2. In a conveyer, a spiral platform, a spiral conduit coöperating therewith, load-supporting rollers positioned on said platform, a flexible haulage device substantially incased within the conduit, and a load engaging device movable with the haulage device.

3. In a conveyer, a platform, a conduit separate from said platform, means whereby the conduit may be adjusted relatively to said platform, and a traveling member operating in said conduit.

4. In a conveyer, a platform, a conduit separate therefrom, means whereby one of said parts may be raised or lowered relative to the other, and a traveling member positioned within said conduit.

5. In a conveyer, a platform, a conduit separate therefrom, means for bodily raising or lowering said conduit with reference to the platform, and a flexible chain operating in said conduit.

6. In a conveyer, a substantially spiral platform, a substantially spiral conduit separate from said platform, said conduit being adjustable relatively to said platform, and a traveling member operating in said conduit.

7. In a conveyer, a substantially spiral platform, a substantially spiral conduit separate from said platform, means for bodily raising and lowering said conduit relative to said platform, and a traveling member operating in said conduit.

8. In a conveyer, a substantially spiral platform, a substantially spiral conduit separate from said platform, means for bodily raising and lowering said conduit relative to said platform, and a flexible roller chain operating in said conduit.

9. In a conveyer, a substantially spiral platform, a roller bed thereon, a conduit

following the curvature of said platform, means whereby said conduit may be raised or lowered with respect to said roller bed, and power operated means within said conduit.

10. In a conveyer, a substantially spiral platform, a conduit coöperating therewith, means whereby the elevation of one of said parts may be changed with relation to the other part, and power operated means housed in said conduit.

11. In a conveyer, a substantially spiral platform, a conduit coöperating therewith, means whereby the elevation of one of said parts may be changed with relation to the other part, a flexible roller chain supported within said conduit for movement with respect thereto.

12. In a conveyer, an inclined platform, an inclined conduit separate therefrom, means movable in a horizontal plane and coöperating with said conduit whereby the position of said conduit relative to the platform may be changed, and a chain operating in said conduit.

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

CHARLES A. MORRIS.

Witnesses:

H. I. BERNHARD,

JAS. H. GRIFFIN.