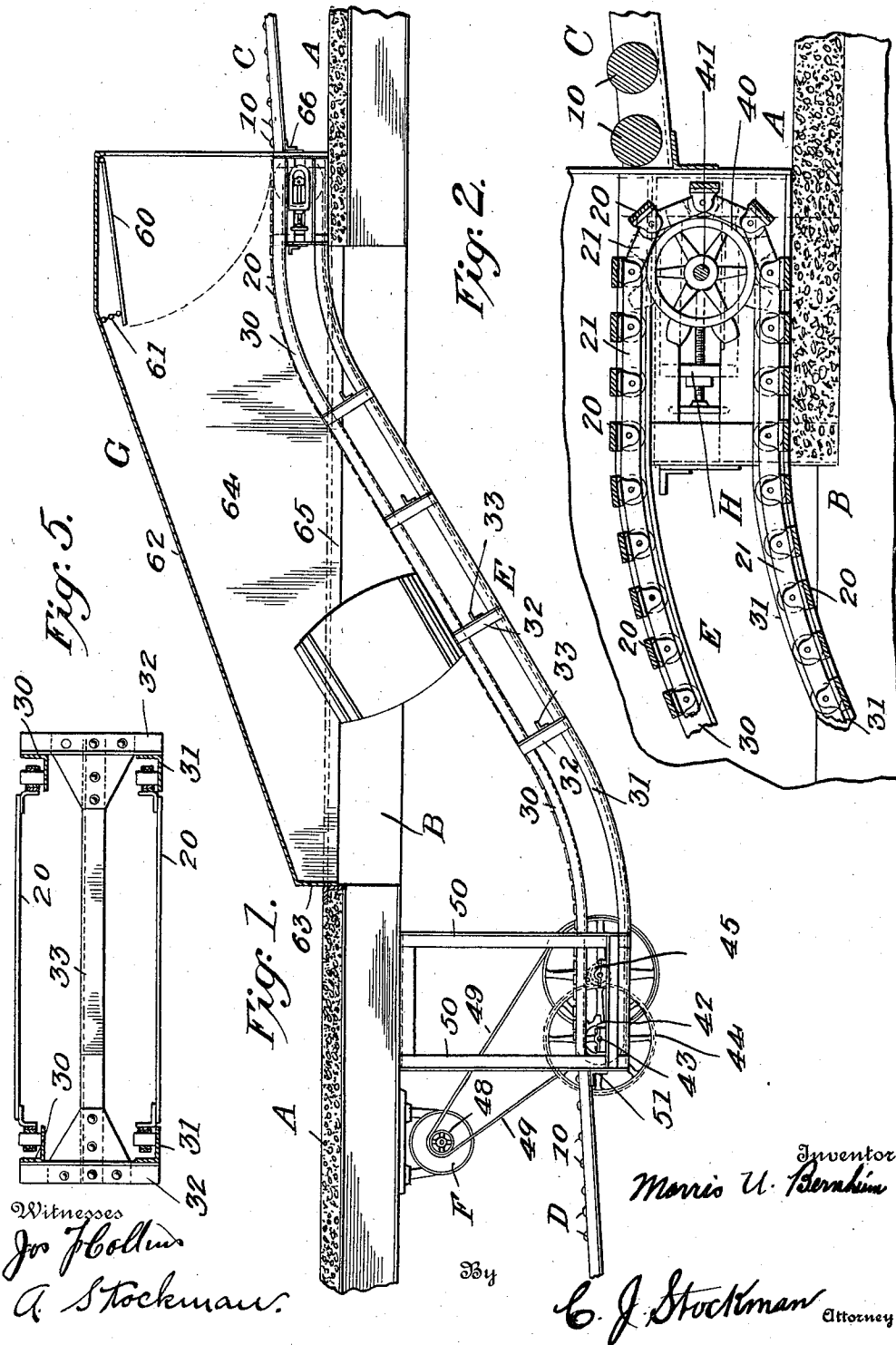


1,179,602.

Patented Apr. 18, 1916.
2 SHEETS—SHEET 1.



Witnesses
Jas. Hollins
A. Stockman.

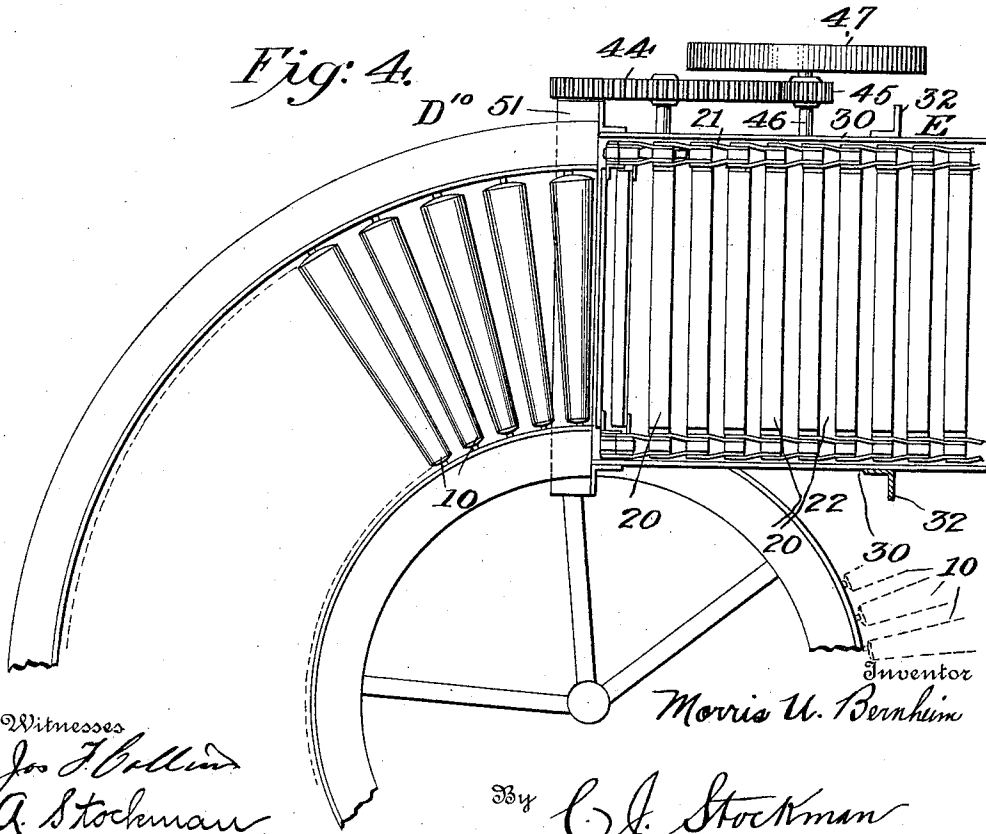
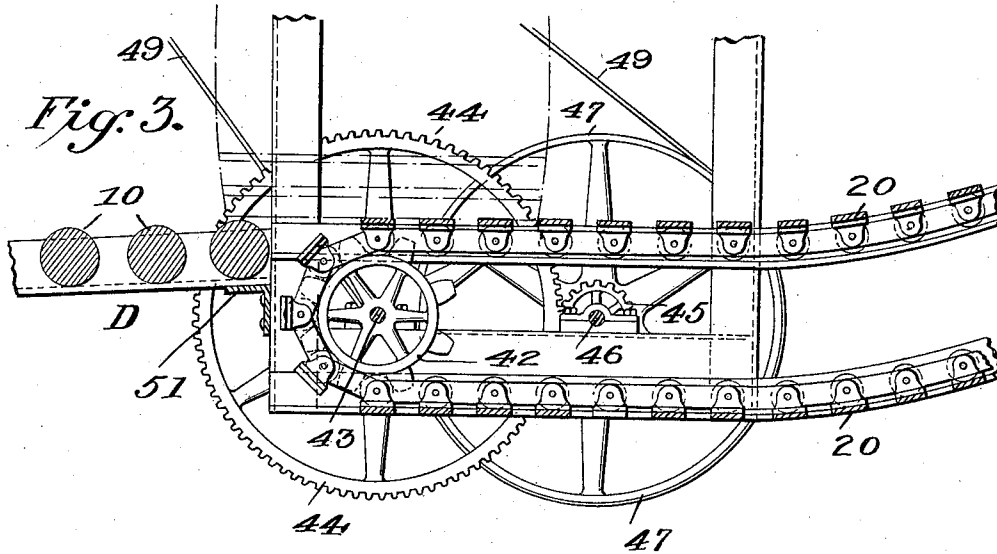
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M. U. BERNHEIM.
CONVEYER.
APPLICATION FILED FEB. 23, 1911.

1,179,602.

Patented Apr. 18, 1916.
2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

MORRIS U. BERNHEIM, OF LOUISVILLE, KENTUCKY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ALVEY-FERGUSON COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

CONVEYER.

1,179,602.

Specification of Letters Patent.

Patented Apr. 18, 1916.

Application filed February 23, 1911. Serial No. 610,139.

To all whom it may concern:

Be it known that I, MORRIS U. BERNHEIM, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Conveyers, of which the following is a specification.

This invention has relation to package conveyers of the type comprising sections, more particularly of the kind known as gravity conveyers, arranged on different levels and a means between said sections adapted automatically to receive packages from one gravity section and deliver them automatically to the other gravity section.

It has more particular reference to the provision of a conveyer embracing the gravity sections and connecting means referred to, wherein the connecting means has power driven elements which are adapted to receive barrels, casks and the like from the higher gravity conveyer and deliver them to the lower gravity conveyer without any danger of throwing the same from the connecting means, and without any danger of breakage either of the barrels, etc., or their contents, even when the latter are of a fragile nature, or of the connecting means, and without requiring any manual attendance to assure delivery of the barrels etc. to the connecting means in a properly timed relation to the conducting elements of the latter.

The type of conveyer sections on the different levels to which the present invention has more particular reference is that in which the beds are formed of freely rotatable rollers. Sometimes these gravity conveyers are connected to form a system composed wholly or mainly of a straight line or lines on the various floors or levels, sometimes the systems are composed of a plurality of spiral conveyers on the different floors or levels, and sometimes spiral conveyers and straight line conveyers on different floors or levels are connected with each other. In all of such cases, however, when the packages are to be delivered from the upper to the lower level, the means employed to connect the delivering end of the higher section with the receiving end of the lower section has been composed of a chute or slide arranged at an angle with the lower section. While this has, in the main, proved to be satisfactory for the conveyance of boxes it is

not at all well adapted for the conveyance of barrels, casks and the like, containing, for example, sugar, flour, beer or fragile articles. The reason for this is that the speed at which the packages travel on the chute or slide is such that they forcibly strike the rollers of the gravity conveyer line, either straight or spiral. This is not particularly serious when the packages are in the form of boxes or their contents are not of very fragile nature; but when barrels are being conveyed the holding effect of the rollers at the receiving end of the lower conveyer causes the barrels to topple and fall on their bilge, in which position they cannot be conveyed safely or properly, if at all. In the case of boxes whose contents are of a particularly fragile nature, the shock of the quick loss due to momentum of the packages when they reach the lower conveying line is liable to break such contents.

The most important purpose of the present invention is to overcome the difficulties named and thereby provide a conveyer well adapted to lower packages from one floor to another without being practically restricted to the safe and sure conveyance of boxes with non-fragile contents, and which, in other words, will be adapted safely and properly to convey boxes and barrels, whatever the nature of the contents thereof may be, automatically from a higher to a lower level, through an opening in the floor or landing between such levels, with no interruption in the progress of the package and without shock to the package or its contents, or to the conveying mechanism, and without necessitating manual attendance.

This object and others which will hereinafter appear, are fully accomplished by the construction illustrated in the accompanying drawings to exemplify what is regarded to be the best embodiment of the invention. To the details of the illustrated exemplifications, however, the invention is not restricted as changes may be made in such details without departing from the spirit of the invention, an important feature of which consists in the use of a connector between the delivering end of the upper line and the receiving end of the lower line, having an endless traveling bed which supports the package and which is guided to traverse downward planes which are at an angle

with each other and merge one into the other and whose receiving and delivering portions are so related to the delivering and receiving portions of the upper and lower lines of conveyers, respectively, as to be approximately in the planes thereof and in such contiguity thereto as to act in conjunction therewith in the safe deposition of the package from the upper line or conveyer onto the connector and from the connector onto the lower line or conveyer, while its intermediate section, which is inclined, will safely conduct the package between the two levels at an angle which enables the package to clear the lower surface of the floor or landing without requiring an undue length or unsafe angle, as heretofore, of its said inclined intermediate section.

In said drawings: Figure 1 is an elevation of the delivering and receiving ends of two gravity conveyers which are disposed on different floors, and of the connector between said ends for conveying barrels and the like, from one to the other. Fig. 2 is a vertical longitudinal sectional view on a larger scale than the preceding figure, showing in detail the parts at and adjacent to the junction of the upper conveyer and connector. Fig. 3 is a similar view showing the parts at and adjacent to the junction of the lower conveyer and connector. Fig. 4 is a plan view of the parts at and adjacent to the junction of the receiving end of a spiral conveyer and the connector. Fig. 5 is a transverse sectional view through the connector.

Similar characters of reference denote corresponding parts in the several views.

A designates a floor or landing having an opening B. Upon this floor or landing there is mounted a gravity conveyer, either straight, spiral or of other approved type, as desired, whose delivering end, marked C, terminates suitably near one side of the opening B. Another gravity conveyer is arranged in the room or space below the floor or landing A and has its receiving end at the side of the opening B opposite the end C of the other conveyer. The lower conveyer may be a straight line conveyer or a spiral conveyer, or of other suitable shape, as desired. A straight line conveyer is indicated in Figs. 1 and 3, wherein the receiving end of the lower conveyer is marked D, and a spiral conveyer is indicated in Fig. 4 wherein its receiving end is marked D'. Each of these conveyers has its bed provided with rollers 10 upon which the packages are caused to travel by gravity, the conveyers being arranged upon appropriate inclines.

E designates the connector herein before referred to. This connector has an endless traveling bed which is formed of slats 20 and endless traveling chains 21 and 22 to

which the ends of the slats are pivotally connected at 23. These chains are guided so that the working run of the bed has its receiving and delivering ends arranged contiguous to and approximately in the planes of the delivering and receiving ends of the gravity conveyers, respectively, while its intermediate portion is inclined with relation to such ends sufficiently to permit the barrel, keg or other package freely to pass below the floor or landing onto the lower conveyer. The length of each of said receiving and delivering ends is such as to provide a full and firm support for the packages.

Its described relation to the delivering end of the upper conveyer is such that the packages will pass unobstructedly and without danger of tilting or shock onto its receiving end from said delivering end, and will be delivered at its delivering end unobstructedly and without danger of tilting or shock directly to the receiving end of the lower conveyer. It will be noted that the correlation of the parts is such at the junction of the upper conveyer and connector that the forward side of the package as soon as it leaves the former is caught by an ascending slat whose movement in a direction away from the conveyer C pulls the packages off the latter, other slats meanwhile successively coming up under the package and engaging the latter until it has a firm support on the approximately horizontal receiving end of the connector before it leaves the gravity conveyer, so that it is fully deposited on the connector before it reaches the incline. Thus a barrel, for example, traveling on end on the rollers of the upper conveyer has its forward edge delivered thereby to the receiving end of the slatted bed and the movement of the latter, assisted to some extent by the gravity conveyer, gently moves the barrel from the gravity conveyer until it is wholly deposited on the slatted bed. By the latter it is then moved to the delivering end of the connector where it is gradually deposited on the receiving end of the lower gravity conveyer, the horizontal portion of the connector being here approximately continuous with said receiving end, so that the package is unobstructedly and gently delivered. The illustrated grade of its intermediate inclined section is such as to hold the package stationary thereon by gravity.

The connector herein exemplified comprises at each side a pair of frame members 30 and 31, connected by bars 32, said frame members being formed to provide tracks or guides for the chains. Preferably they are made of angle iron, as shown. The upper members 30 support the working run of the bed and the lower members 31 support the returning run of the bed. The illustrated chains are of the roller type and their rollers run on the horizontal flanges of the frame

members, as shown. Transverse bars 33, whose ends are suitably connected with the bars 32 are arranged at intervals along the length of the frame and connect the two sides of the latter with each other. The flights 20 hereinbefore referred to preferably are slats. The chains run over sprockets at the ends of the connector frame. Two of these sprockets are idlers while the other two are driving sprockets. The idlers are preferably mounted at the receiving end of the connector and the driving sprockets are preferably mounted at the delivering end of the connector. The idlers, marked 40, are mounted on a shaft 41, and the driving sprockets, 42, are mounted on a shaft 43. This shaft is provided with a gear 44 engaging a pinion 45 mounted on a stub shaft 46 which carries a pulley 47 through which motion is derived from an electric or other suitable motor F, whose pulley 48 is connected with the pulley 47 by a belt 49. The delivering end of the connector is supported by hangers 50 suspended from the floor or landing A and is provided with a ledge 51 upon which the receiving end of the lower gravity conveyor is supported.

The receiving end of the connector extends into a hood G which is mounted upon the floor or landing A over the opening B in the latter. This hood is preferably of a fire-resisting construction. By covering the opening in the floor or landing it prevents all danger of a person falling through said opening and also, when closed, excludes draft through the opening, which is important in case of fire. Its front is open, and a door 60 is provided thereat for closing it, when desired. This door is preferably hinged at its upper end, and held in normally-open position by a fusible chain or link, 61, whereby it will be released and will automatically close under a temperature sufficiently high to indicate a fire. Its top, 62, its back 63 and its sides 64 are closed, while its bottom 65 is open. Its front is high enough to accommodate the package to be conveyed and its top wall 62 is preferably of a shape corresponding to the shape of the connector, that is, the top is preferably approximately horizontal at the front a distance corresponding to the length of the approximately horizontal portion of the receiving end of the connector and rearward correspondingly to the downward and rearward inclination of the intermediate section of the connector, which is below it. The front of the hood is preferably provided with a ledge 66 which serves as a support for the delivering end of the conveyor C.

A means designated generally by the letter H is preferably employed to adjust the tension of the chains. This means may be of any suitable construction.

Having now described the invention what

I believe to be new and desire to secure by Letters Patent, is:

1. A conveyor for lowering packages comprising gravity sections disposed on different levels and a connector between said sections, the upper gravity section being downwardly inclined to the upper end of the connector and the lower gravity section being downwardly inclined away from the lower end of said connector, and said connector comprising an endless traveling bed whose intermediate section is inclined from one level to the other and whose ends are at an angle with the inclined intermediate section, gradually merge into the latter and terminate respectively adjacent to and are approximately in planes forming continuations of those of the terminals of the upper and lower gravity sections, respectively, the connector also having means for moving the upper run of the bed in a downward direction and said bed being adapted to maintain packages in a stable position thereon.

2. A conveyor for lowering packages from one room to the lower portion of the room below the same, comprising a gravity section which has its upper terminal in the lower room, and an endless traveling bed which extends from the upper room to said terminal, through an opening which is located at one side of the vertical plane of said terminal and in the floor or landing above that containing the latter, said endless traveling bed having means for causing its working run to travel in a downward direction and including an inclined section adapted to maintain packages in a stable position thereon and a delivering end, the delivering end being disposed at an angle with and merging into the inclined section and being approximately in a plane continuous with the upper terminal of the gravity section and contiguous thereto.

3. A conveyor for lowering packages from one room to the lower portion of the room below the same, comprising a gravity section which has its upper terminal in the lower room, and an endless traveling bed which extends from the upper room to said terminal, through an opening which is located at one side of the vertical plane of said terminal and in the floor or landing above that containing the latter, said endless traveling bed having means for causing its working run to travel in a downward direction and comprising an inclined section which is adapted to maintain packages in a stable position thereon and receiving and delivering ends which are disposed at an angle with the inclined section and gradually merge into opposite ends thereof, the delivering end of said bed being contiguous to and in a plane which approximately forms a continuation of that of the receiving end of the gravity conveyor, and a sec-

ond gravity conveyer, which is located above said floor or landing and has its delivering end at the side of the opening opposite to that of the lower conveyer and contiguous to and approximately in the plane of the receiving end of the traveling bed.

4. A conveyer, comprising a gravity section and a package lowerer extending from said gravity section to a level below the same, said lowerer having an endless series of flexibly connected package-supporting elements which extend transversely of the conveyer and form the bed of the same and means for guiding said elements to traverse a path whereby the working run of the bed is approximately horizontal adjacent to said gravity section and thence extends at an inclination downward with respect to the approximately horizontal portion, said inclined portion having its end merged with the approximately horizontal portion and the latter part of the bed being adjacent to the end of said gravity section and of a length such that the package will be wholly and firmly deposited on said elements before it reaches the inclined portion of the bed, whereby the ascending elements will successively engage the underside of the package protruding directly from said gravity section and will force said package away from the latter and will afford a firm support therefor.

5. A conveyer comprising upper and lower conveyer sections and a connector between said sections, said connector comprising an endless series of flexibly connected transversely-extending package-supporting elements which form the bed thereof and means for imparting traveling movement to the bed in a downward direction and for guiding the same to form end portions which are approximately in the plane of the ends of the upper and lower conveyer sections and are contiguous thereto and an intermediate section which is inclined to said end portions and merges therinto, the portions of said bed which adjoin the end of the upper conveyer-section being of such length that the package-supporting elements ascending thereat will successively engage the underside of the package protruding from said conveyer-section and will draw the package from the latter and cause it to be firmly supported before the inclined section is reached, the package-supporting elements being adapted to maintain the packages in a stable position thereon.

6. A conveyer, comprising an upper conveyer-section and a lower conveyer-section,

combined with an intermediate conveyer having an endless traveling package-supporting bed whose ends respectively adjoin said upper and lower sections so as to receive packages directly from the upper section and deliver them directly to the lower section, and means for imparting traveling movement to said bed and for guiding the same, the same being arranged to cause the bed to traverse a downward path which is approximately horizontal adjacent to the upper section and is thence inclined and is again approximately horizontal adjacent to the lower section, the inclined portion gradually merging into the approximately horizontal portions, said bed being substantially continuous from the upper section to the lower section and having its inclined portion at an angle adapted to resist movement of the package thereon.

7. A conveyer comprising upper and lower gravity sections and a connection between the same, said connection having an endless traveling package-supporting bed whose working run is guided to traverse a downward path the ends of which are approximately horizontal and approximately in the planes of said upper and lower sections respectively and terminate contiguous to the ends of the latter and the intermediate part of which path is inclined to said ends and merges therinto.

8. A conveyer comprising upper and lower gravity sections and a connection between the same, said connection having an endless traveling package-supporting bed formed of closely-spaced transversely extending slats flexibly connected with each other, said slats having substantially flat surfaces presented to the packages and means whereby the bed is given traveling movement in a downward direction and is guided to traverse a path whereby the ends of the bed are approximately horizontal and approximately in the planes of said upper and lower sections respectively and terminate contiguous to the ends of the latter and the intermediate part of the bed is inclined to said ends and merges therinto, the inclined portion being disposed at an angle which maintains the packages in a stable position thereon.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

MORRIS U. BERNHEIM.

Witnesses:

ROY R. WORRALL,
T. B. GOTTHARDT.