

Dec. 18, 1945.

D. ROSE

2,391,272

CONVEYER

Filed Sept. 14, 1942

2 Sheets-Sheet 1

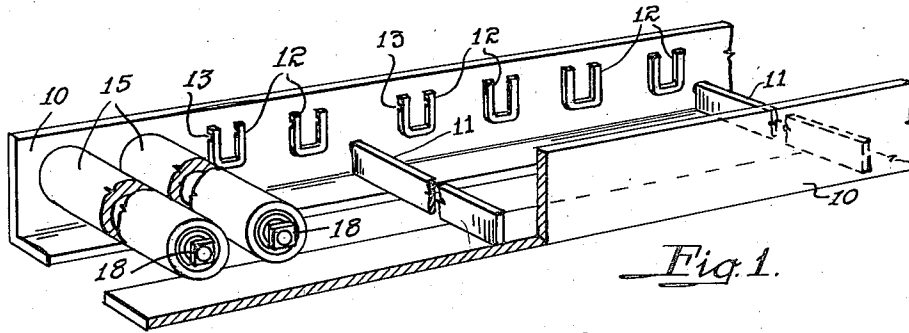


Fig. 1.

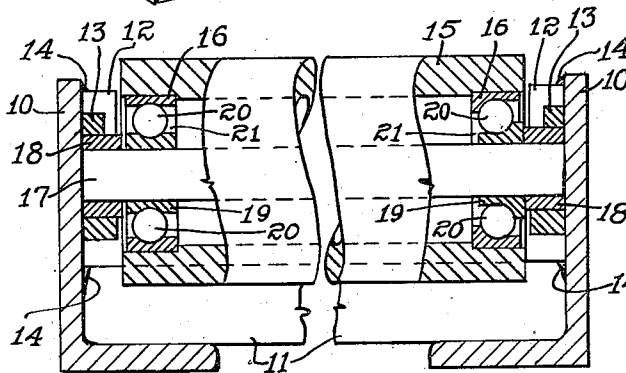


Fig. 2.

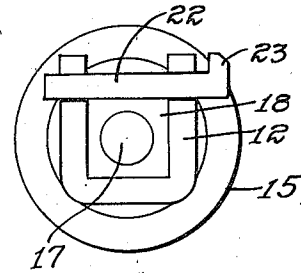


Fig. 3.

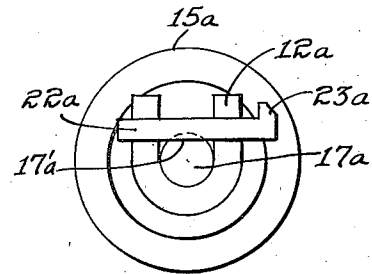


Fig. 4.

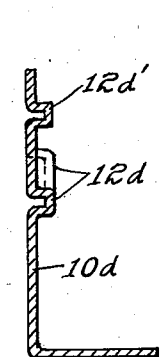


Fig. 6.

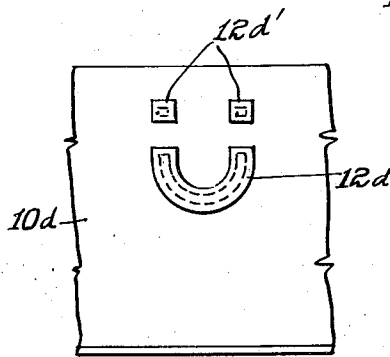


Fig. 7.

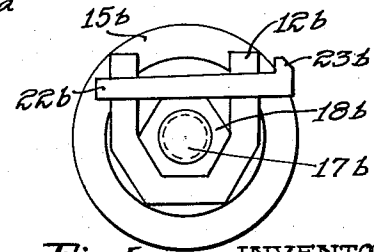


Fig. 5.

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2 Sheets-Sheet 2

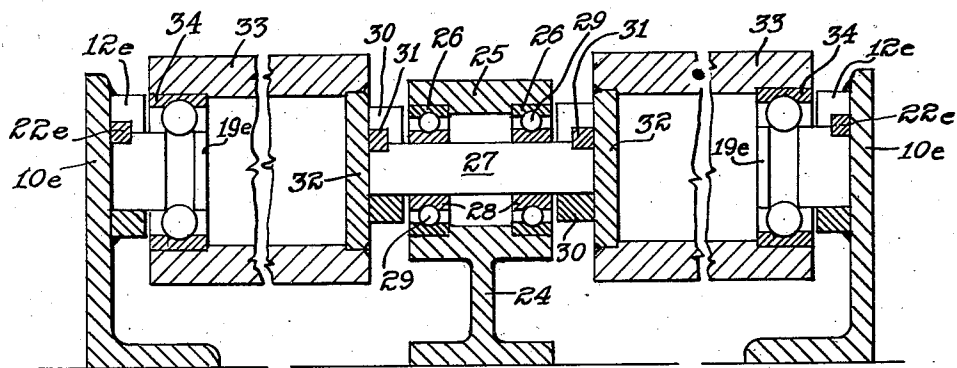


Fig. 8.

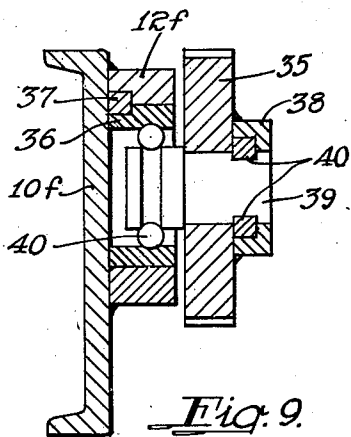


Fig. 9.

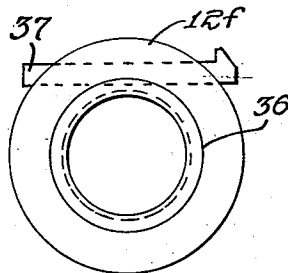


Fig. 10.

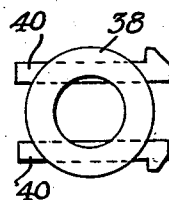


Fig. 11.

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UNITED STATES PATENT OFFICE

2,391,272

CONVEYER

David Rose, Chicago, Ill.

Application September 14, 1942, Serial No. 458,185

7 Claims. (Cl. 193—35)

The present invention relates to conveyers and more particularly to improved conveyers of the gravity type.

While gravity conveyers of the present general character are known and have been developed to a comparatively efficient state, nevertheless, there is still ample room for improvement in a number of particulars. Roller conveyers generally have parts projecting through and beyond the framework and this has been found to be objectionable. Prior conveyers of this type have also been unduly expensive and inconvenient to disassemble for repair, maintenance and the like, nor do they provide absolute means for confining the roller assemblies to prevent undesired endwise movement and in general such conveyers are known to be far from ideal. It is with the improvement of roller conveyers and especially gravity-actuated roller conveyers that my present invention is concerned.

It is accordingly one of the objects of the present invention to provide for the first time a roller conveyor of the gravity type which is exceedingly simple and inexpensive in its construction and which permits of unusual access to the various parts both for servicing and replacement.

Another object of my invention resides in producing a gravity-actuated roller conveyor in which each roller is almost instantaneously demountable; yet it is rigidly held in place and restricted from any movement except rotation about its axis.

A further object of my invention resides in producing a conveyor in which the outside faces of the structure are smooth or without projections such as shaft ends, cotter pins, etc., which may interfere with auxiliary equipment used for loading material on, or unloading material from the conveyor.

Other and further objects and advantages will be understood by those skilled in this art or will be apparent or pointed out hereinafter.

In the accompanying drawings in which I have illustrated preferred embodiments of the present invention:

Fig. 1 is a perspective view partly in section and partly broken away, illustrating a typical portion of my new conveyor.

Fig. 2 is a transverse sectional elevation on an enlarged scale and with parts broken away and in elevation of the conveyor structure of Fig. 1 taken through one of the roller assemblies thereof.

Fig. 3 is an end elevational view of the so-called bracket employed in conjunction with the invention together with the parts necessary to a clear understanding of the same.

Fig. 4 is a view similar to Fig. 3 but of a modified form of the invention.

Fig. 5 is a view similar to Fig. 3 of further modification.

Fig. 6 is a fragmentary sectional elevation of a modified form of frame capable of being used in the present invention and forming part thereof.

Fig. 7 is a fragmentary elevational view of the frame member of Fig. 6.

Fig. 8 is a view generally similar to Fig. 2 but illustrating a further application of the invention.

Fig. 9 is a fragmentary vertical sectional view of a structure embodying the present invention but adapted for use in connection with rotating gears.

Fig. 10 is an incomplete elevational view showing the bracket, outer race, and key arrangement employed in the structure of Fig. 9; and

Fig. 11 is a view similar to Fig. 10 but showing the keying of a bracket on a rotating gear.

Like numerals designate corresponding parts throughout the various views of the drawings.

Referring to the drawings and first to Figs. 1, 2 and 3 thereof, it will be apparent that the framework of my new conveyor is made up of two opposed members 10, each of which may be made of any suitable material and in any desired dimensions to take care of the particular conditions of any given installation. Members 10 are preferably of relatively great length so that the framework is as continuous as possible and are constructed so as to form a positive barrier which will prevent any part of the roller assemblies contained therein from moving endwise out of the confines of the frame. It will be understood that like members are suitably secured together by welding or in any other desired manner to produce a framework of the required width.

It will further be noted that the exterior of the members 10 is smooth and uninterrupted and has no projecting shaft ends, cotter pins or any other structural elements which would render the framework disadvantageous from that point of view. My present conveyor is, therefore, what I may term a "streamlined conveyor." At intervals the members 10 are held in the desired spaced relationship by means of cross-bars 11. The exact spacing and size thereof will be governed by good engineering design. Cross-bars 11 also give the desired rigidity to the frame members 10 and insure proper alignment at all times so as to prevent interference with the proper operation of the rollers. Along the inner side wall of each frame member 10 is a series of brackets designated by the numeral 12. In the form of the invention

illustrated in Figs. 1, 2 and 3, these brackets are U-shaped but with a flat bottom and each of the arms of each of the brackets 12 is provided with a recess or groove 13 for a purpose to be described hereinafter. Each bracket 12 is securely welded or otherwise united to the wall of frame member 10 as shown at 14. The number and spacing of brackets is selected with a view toward obtaining the desirable number of roller assemblies since each bracket receives one roller assembly.

Each roller assembly includes a hollow tube 15 of desired material and wall thickness depending upon the service to be rendered in any given installation. These tubes may likewise be made of any desired length and wall thickness so as to accommodate loads of different sizes, shapes, and weights. These are details which are well understood by engineers versed in this field. Each end of each tube 15 is bored out for the reception of an outer ball race 16 which fits snugly within the bored out portion of the tube and which in effect forms an integral part of the tube turning with it during operation. These outer ball races 16 are per se well known and require no detailed explanation. Each roller assembly also includes a shaft which extends from one bracket to another and the ends of which are provided with nuts 18, the nuts and brackets being so constructed and arranged that each nut 18 fits within a bracket 12 in non-rotatable manner. The roller assemblies and brackets of each conveyor are understood to be interchangeable. The nuts 18 are suitably secured to the ends of shafts 17 so that they are non-rotatable one to the other. Inwardly of said nuts said shafts are provided with inner ball races 19 secured to the shaft and, therefore, likewise stationary. A series of ball bearings 20 is disposed in the usual manner between each pair of inner and outer races. This, per se, is likewise well known and requires no further description. It will also be understood that the ball bearings will be suitably lubricated and that the ball chambers 21 are sealed in the conventional manner to prevent loss of lubrication or the entrance of foreign matter. Lubrication may take place through the shaft or the bearings may be permanently packed and sealed at the time of assembly, as desired. A tapered rectangular wedge 22 passes through the grooves 13 of brackets 12 and locks the roller assembly in place. These wedges are tapered so as to exert a wedging action. As will be clear from Fig. 3, wedges 22 immobilize nuts 18 and thus hold the shaft 17 and the inner ball races in a stationary condition whereas the tubes 15 and the outer ball races 16 are free to rotate.

In Fig. 4 I have illustrated a slightly modified construction in which the bracket 12a is still U-shaped but has a rounded bottom so that the ends of shaft 17a cooperate directly therewith. In this construction, locking wedge 22a cooperates with a flat portion 17a' provided on the shaft ends for immobilizing the assembly. In Fig. 5 the arrangement is still further modified in that a polygonal nut 18b is employed and the bracket 12b is complementarily configured but otherwise the construction is the same as will be clearly understood upon inspection.

In Figs. 6 and 7 I have illustrated a modified form of the invention in which the frame members 10d are stamped out of suitable sheet material. In some instances and where the loads are not excessive, I find that this form of invention can be utilized at very low cost and with entire satisfaction. As will be appreciated from

these two figures, the brackets are in effect pressed up out of the frame material by means of suitable dies and presses. In realizing this form of invention I stamp up a U-shaped bracket portion 12d which has an inverted U-shaped cross section and suitably spaced therefrom are the pressed up projections 12d' between which and brackets 12d are thus formed the spaces for the insertion of a locking wedge (not shown in this modification). It will be understood that the ends of shafts 17 rest in these brackets 12d in the same manner as is illustrated in Fig. 4. I may thus, under some circumstances, avoid the use of separate brackets and the extra operations of welding them in place.

In Fig. 8 I have illustrated a form of the invention based upon the same principles of construction and operation but wherein there are a plurality of rotating rollers or tubes in alignment and connected by a rotating shaft. In this instance the frame members 10e are spaced somewhat further apart than in the preceding constructions and there is an intermediate frame member 24, the upper portion of which is in the form of a tube 25 constructed like a roller assembly heretofore described, except that tube 25 and its race members 26 are stationary. A shaft 27 extends through member 25 and is provided with spaced races 28 which rotate with the shaft 27. In conventional manner ball bearings 29 are provided between the sets of races. Each end of shaft 27 is provided with a bracket 30 of any of the constructions heretofore described and these brackets are locked to the shaft 27 by means of the keys 31. Brackets 30 are, however, secured in any desired manner, as by welding, to the end plate 32 of the adjacent roller assemblies which differ from the roller assemblies above described in that only one end (the outer) need be rotatably mounted. As shown, each end plate 32 is welded in place in the end of tube 33 and the distal end of each such tube is counterbored, as before, for the reception of race 34 which turns therewith. Each frame member 10e is provided with a bracket 12e of any of the kinds heretofore described and these are locked by means of wedges 22e to the extension of inner race 19e. In other words, the ball bearings are mounted between races 34 and 19e and the races 19e are extended to form what may be termed stub shafts. Thus I have produced a modified form of the invention in which unusually wide or large objects may be handled or in which two sets of objects may be handled but the arrangement will have other and analogous uses in connection with rotating machine elements as will be appreciated by those familiar with this field.

In Fig. 9 I have shown a still further modified form of invention which is much like either end of Fig. 8 and wherein a gear such as that illustrated at 35 is mounted for rotary movement but it is to be understood that other forms of devices may be similarly mounted, such as milling cutters, pulleys, conveyor disks, etc. An outer race 36 is mounted within bracket 12f and is connected to the bracket by one or more keys 37. The gear or other element 35 has been provided with a bracket 38 welded to one face thereof and a stub or other shaft 39 is keyed thereto by means of one or more keys 40. The stub shaft 39 extends within member 36 and forms the inner race and the ball bearings 40 are located between the members specified. Thus gear 35, bracket 38, shaft 39, and keys 40 can all rotate with respect to bracket 12f and race 36. Suitable means may of

course be provided for driving gear 35. It is to be understood that the brackets and keys may be of the shape and structure shown in Figs. 10 and 11 or may be of other suitable or required shape.

The foregoing is intended as illustrative and not as limitative and it is to be understood that other additions, omissions, substitutions and variations may be made without departing from the invention which is rather defined by the appended claims.

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

1. In a gravity conveyer, opposed side members extending in parallel relationship, having outer faces that are free of projections, and inner faces provided therealong with rigidly positioned generally U-shaped support members having wedge-receiving openings extending through the up-standing legs thereof; each such support member co-operating with a support member of the other side member to form a support for a roller assembly, the roller assembly having outwardly extending shaft ends located within each co-operating pair of such U-shaped support members, and tapered means extending through and wedged in position within said wedge receiving openings whereby said shaft ends and roller assemblies are rigidly but removably secured in place; the

conveyer being free of anything that extends outwardly beyond the outer surfaces of said side member.

2. A structure according to claim 1 in which the shaft ends snugly fit the bottoms of the U-shaped support members and are flattened to co-operate with said tapered means to rigidly hold the shaft ends in place.

3. A structure according to claim 1 in which the side members are L-shaped in transverse section and the bases of such members extend beneath the roller assemblies.

4. A structure according to claim 1 in which the generally U-shaped support members are welded to the side members.

5. A structure according to claim 1 in which the side members are L-shaped in transverse section with the bases thereof extending beneath the roller assemblies and in which the side members are secured together by cross members which are welded in place thereto.

6. A structure according to claim 1 in which the shaft ends are part of a shaft extending through the roller assembly.

7. A structure according to claim 1 in which the openings in the legs of the generally U-shaped support members and the tapered means are rectangular in transverse section.

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