Sept. 6, 1938. H. H. MORGAN 2,129,380

CHAIN CONVEYER

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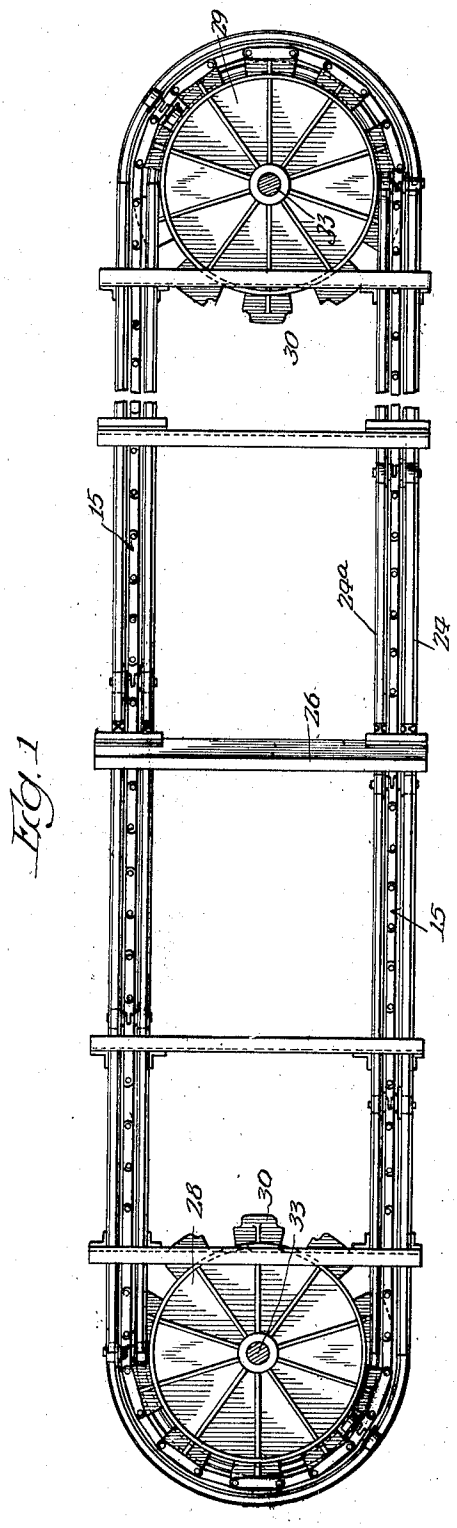


FIG. 1

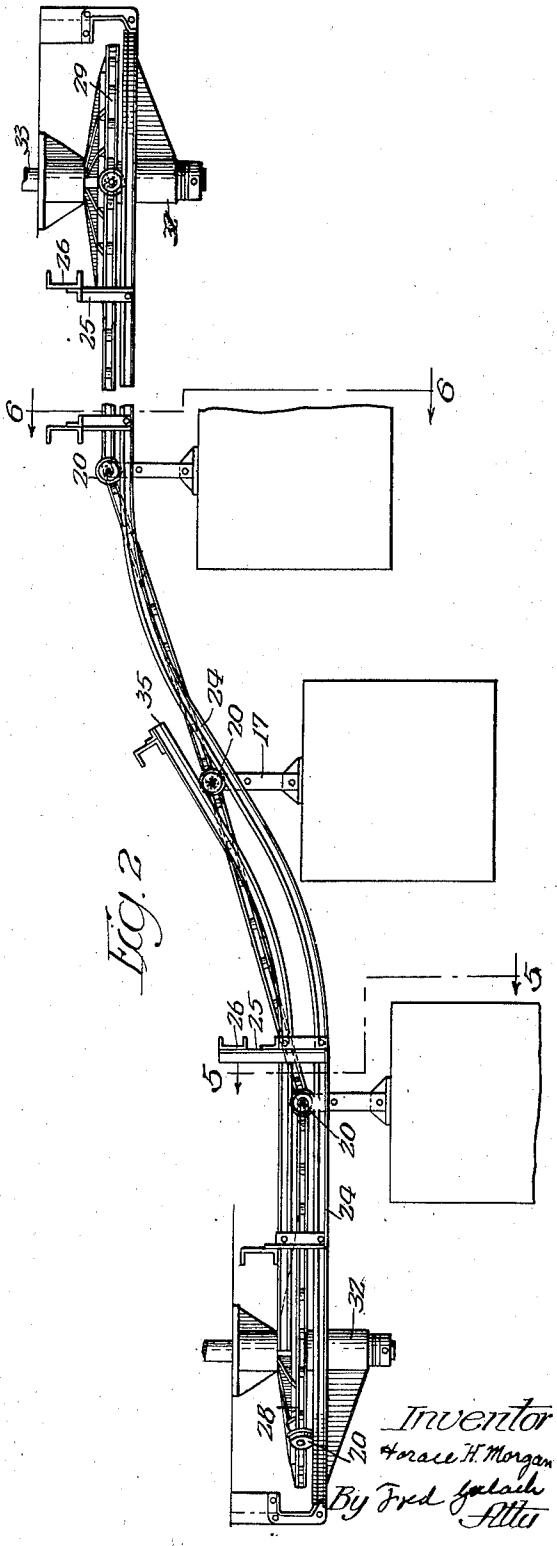


FIG. 2

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Fig. 3

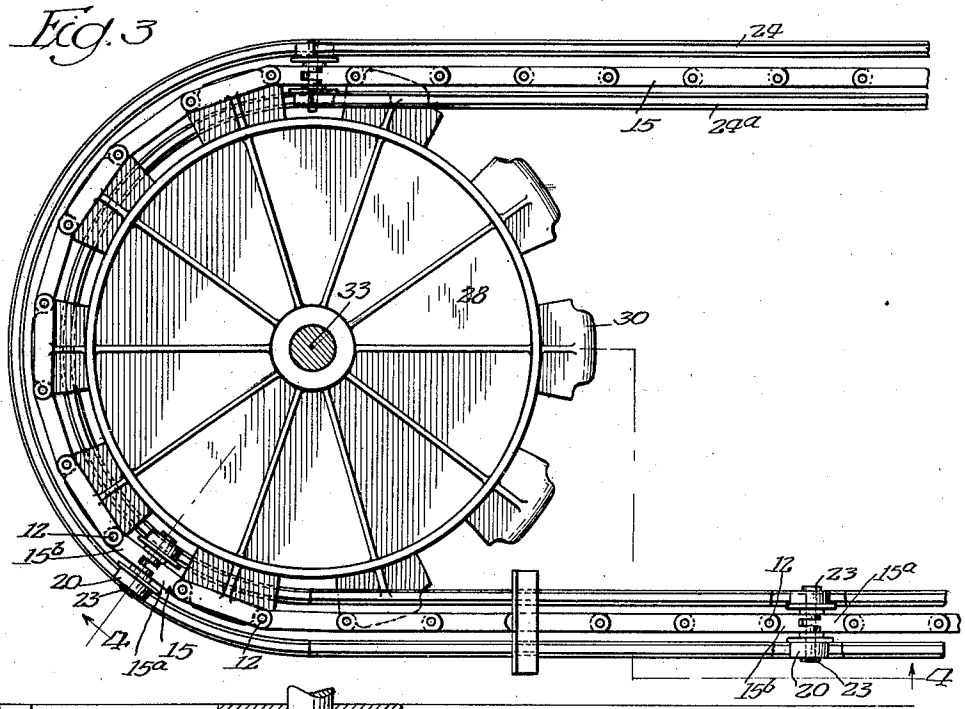
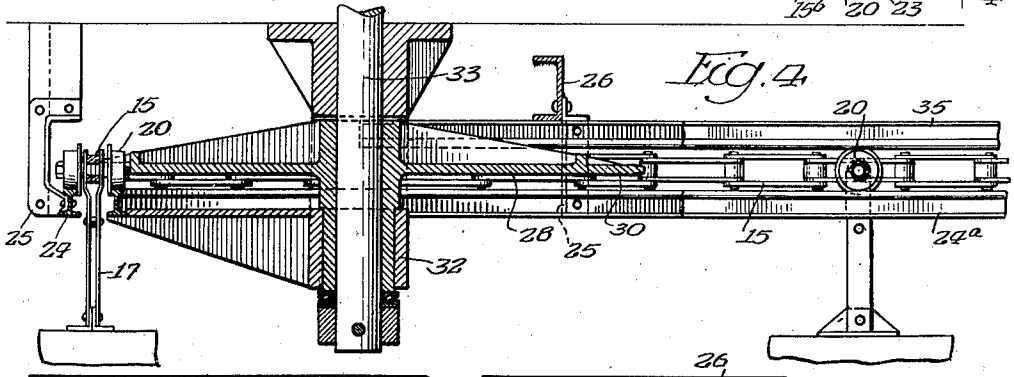


Fig. 4



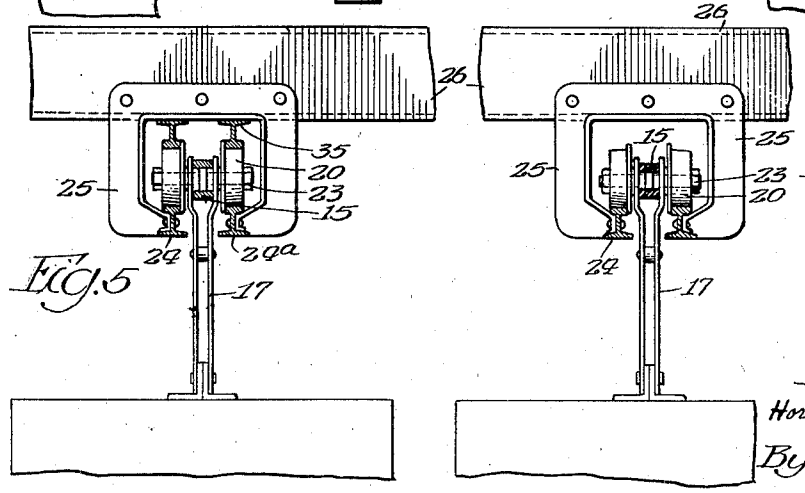


Fig. 5

Fig. 6

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FIG. 8

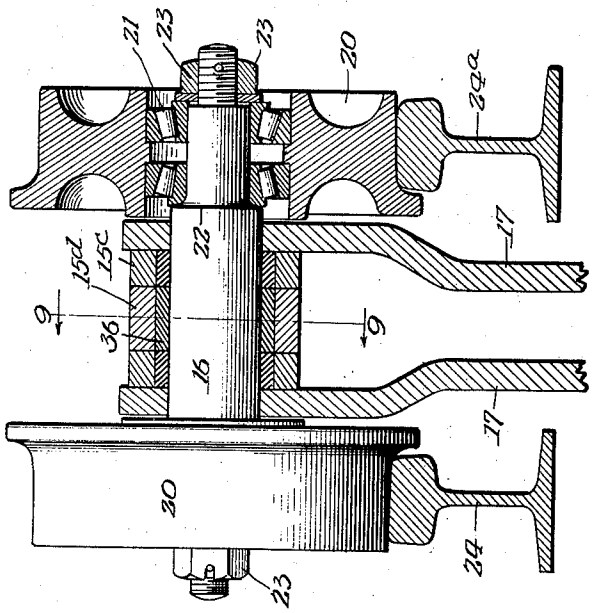


FIG. 7

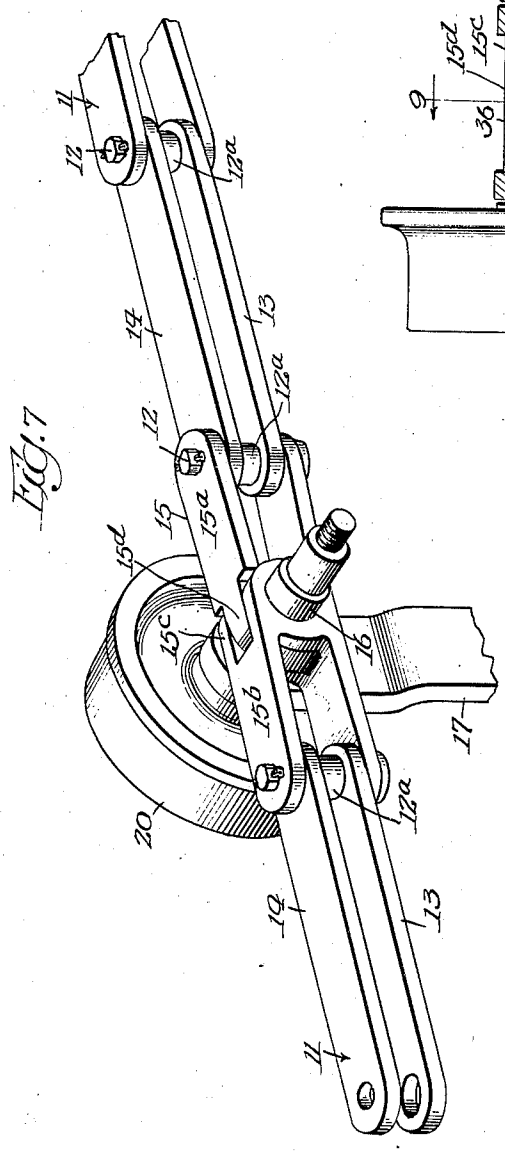
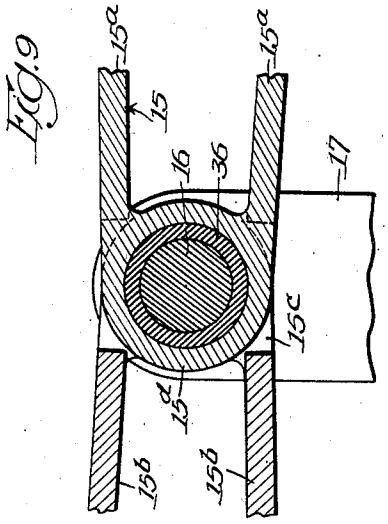


FIG. 9



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Patented Sept. 6, 1938 2,129,380

UNITED STATES PATENT OFFICE

2,129,380

CHAIN CONVEYER

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Application October 24, 1936, Serial No. 107,383

3 Claims. (Cl. 198—177)

The invention relates to endless chain-conveyers of that type in which the conveyer-chain comprises links connected by vertical pivots, intermediate members connected by horizontal pivots to permit the chain to traverse guide-rails for changes in horizontal and vertical directions and trolley-wheels for supporting the chain.

One object of the invention is to provide an improved conveyer-chain, which comprises links connected by vertical pivots and intermediate members connected by horizontal pivots and trolley-wheels which are co-axial or concentric with the transverse pivots, so that the chain-pull on vertical curves or inclines will be through the center of the transverse pivots between the members which are connected for relative vertical swinging movement.

Another object of the invention is to provide a conveyer of this type, in which the center of the transverse pivots are in the center line of chain-pull and are coaxial with the trolley-wheels, so that chain-pull on vertical curves or inclines will be directly through the center of the axles of the wheels and the axles will travel on the bisector of the angle of the chain portions in traversing vertical curves or inclines.

Another object of the invention is to provide a conveyer of this type in which the direction of pull in the chain is directly through the center of the axles on the vertical curves and inclines and the load is suspended directly on the transverse joint.

Other objects of the invention will appear from the detail description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a plan of a conveyer system embodying the invention; Fig. 2 is a side elevation; Fig. 3 is a plan of one end of the conveyers, parts of the supporting structure being omitted; Fig. 4 is a section on line 4—4 of Fig. 3; Fig. 5 is a section on line 5—5 of Fig. 2; Fig. 6 is a section on line 6—6 of Fig. 2; Fig. 7 is a perspective of one of the portions of the conveyer-chain which carries the trolley; Fig. 8 is a vertical transverse section through the trolley; Fig. 9 is a section on line 9—9 of Fig. 8.

The invention is exemplified with a conveyer-chain composed of links 11, which are connected together by vertical pins 12 to permit the chain to travel around horizontal curves or inclines. Each of these links 11 comprises separate upper and lower members or bars 13, 14, which are serially and pivotally connected at their lapping ends by vertical pins 12. The links of alternating sections are disposed between the links of contiguous sections. Sleeves 12a around pins 12, space apart the upper and lower members of the links. The vertical spaces between the members 13 and 14 receive the teeth of the sprocket-wheels around which the chain travels.

To adapt the conveyer to transverse vertical inclines or curves, the chain includes intermediate link-sections 15 in the desired manner. Each section 15 comprises a pair of members 15a and 15b, the ends of which are pivotally connected by vertical pins 12 to the contiguous links 11. Each pair of members 15a, 15b has interfitting ears 15c and 15d which are pivotally connected together for relative vertical pivotal movement by a transverse axle or shaft 16 which extends through said ears of the members. The axis of axle 16 is at the vertical center of the sections 11 of the chain so that the center line of pull of the chain will intersect the axis of said shaft. Preferably, the links 14, 15 are provided with bushings 36 to avoid wear on the links at the axles 16.

Each axle or shaft 16 is carried by a pair of trolley-wheels 20 which are adapted to travel on supporting rails. Each axle 16 is carried by anti-friction bearing 21 in a pair of coaxial trolley-wheels. As a result of pivotally connecting the chain-links for relative vertical pivotal movement by axles which are coaxial with the wheels, such movement occurs at points which are coaxial with the trolley-wheels. As a result of pivotally connecting the members 15a, 15b for relative vertical movement by the axles located at the vertical center line of pull of the chain, the upper and lower links of the chain will be evenly stressed in the operation of the conveyer. Divided hangers 17 are pivotally suspended from the axles 16 between the trolley-wheels and the members 15b. These hangers constitute load-carriers for the articles to be conveyed. As a result of suspending the hangers directly on the axles which are in the vertical center line of pull and coaxial with the trolley-wheels, the loads will be carried directly by the axles and trolley-wheels without imposing deflecting moments on the links. The bearings 21 are confined between shoulders 22 on the shaft 16 and nuts 23 secured on the outer ends of the shaft. The trolley-wheels are flanged and are adapted to run on a pair of rails 24, 24a, which are stationary to support the trolley. These rails ex-

tend horizontally vertically according to the requirements of the conveyer system.

The rails **24** are fixed to forked hangers **25** which are supported by an overhead frame **26** of any suitable construction and are extended horizontally and vertically with connecting curves or inclines according to the desired requirements of the system. The conveyer system comprises sprockets **28**, **29**, either or both of which can be driven to propel the conveyer-chain and the load-carriers. These sprockets are located according to the requirements of the system, and are provided with teeth **30**, which are adapted to pass between the upper and lower members of links **11**. The inner rails **24a** for guiding the inner wheels of the trolleys, when traversing the horizontal curves, are supported by brackets **32** which are carried by the shafts **33** for the sprocket-wheels **28**, **29**. The spaces between teeth **30** are sufficient to clear the trolley-wheels, axles **16** and the hangers **17** while the latter are traveling around the sprocket-wheels.

Wherever it is required that the conveyer travel along vertical curves or inclines, inverted guide-rails **35** are suitably carried by the supporting frame to confine the trolley-wheels **20** to the supporting rails **24**.

When the chain is traveling horizontally the tension is the same in the top and bottom links because the load is suspended directly on the axles which constitute the transverse joint of the chain and are supported directly by the trolley-wheels and the line of chain-pull is coincident with the vertical center of the links of the chain. The hanger is free to swing vertically on the axles which are supported by trolley-wheels, so the loads will be carried without deflecting the links from their control course. When the conveyer traverses vertical inclines or curves, as illustrated in Fig. 2, the force of the chain-pull is applied directly through the center of the axles and at the bisector of the angle between the relatively vertically inclined portions of the chain and the loads are suspended from the axles, so that the pivotal point around which the hanger or load swings will not be applied to deflect the chain-sections out of their course.

This construction makes it possible to have any pitch of chain, spacing of transverse joints, size of links and pins, to suit the weight and size of load to be carried and the vertical and horizontal curves desired. The axles can be made of any desired diameter to reduce wear and thus avoid, to a great extent, the links getting out of pitch. This extends the life of the chain. The inside chain tracks on the horizontal curves may be supported from the sprocket shafts thereby maintaining their correct relative position to the sprockets at all times. On the horizontal runs of the conveyer the chain-pull is directly through the center of the axle so that the tension in the top and bottom links of the chain will be equalized, and the load carriers are supported by the trolley-supported axles so that the loads will not be applied to deflect the links out of the direct line of pull.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

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

1. In an endless chain conveyer, the combination of a series of links, vertical pivots between said links to permit relative horizontal pivotal movement between them, pairs of intermediate link-sections, vertical pivots connecting the outer ends of the link-sections to adjacent links, horizontal axles having their axes in the plane of the vertical center of the links, and extending through and pivotally connecting the inner ends of each pair of link-sections for relative vertical pivotal movement of the sections, trolley-wheels on, coaxial with, and for supporting the axles, and rails for supporting the wheels.

2. In an endless chain conveyer, the combination of a series of links, vertical pivots between said links to permit relative horizontal pivotal movement between them, pairs of intermediate link-sections, vertical pivots connecting the outer ends of the link-sections to adjacent links, horizontal axles having their axes in the plane of the vertical center of the links, and extending through and pivotally connecting the inner ends of each pair of link-sections for relative vertical pivotal movement of the sections, trolley-wheels on, coaxial with, and for supporting the axles, load-supporting hangers pivotally suspended on and to swing about the axes of the axles, and rails for supporting the wheels.

3. In an endless chain conveyer, the combination of a series of links, vertical pivots between said links to permit relative horizontal pivotal movement between them, each link comprising separate upper and lower members spaced apart vertically, pairs of intermediate link-sections, vertical pivots connecting the outer ends of link-sections to adjacent links, horizontal axles having their axes in the plane of the vertical center of the links and extending through and pivotally connecting the inner ends of each pair of link-sections for relative vertical pivotal movement, trolley-wheels on, coaxial with, and for supporting the axles, both of the link-sections of each pair being free to swing vertically around the axle extending through them and the axis of the trolley-wheels on said axle, and rails for supporting the wheels.

HORACE H. MORGAN.