Nov. 2, 1948. B. WOLDRING 2,452,978

DOLLY STRUCTURE FOR CONVEYERS

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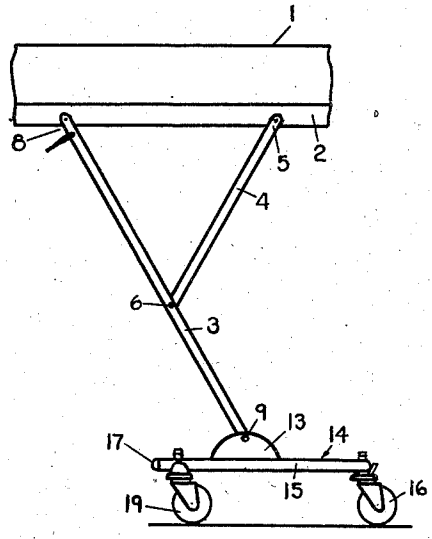

FIG. 1

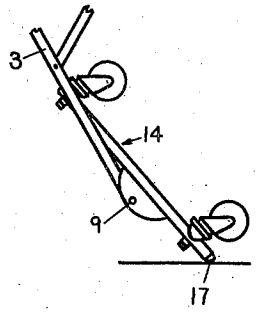

FIG. 2

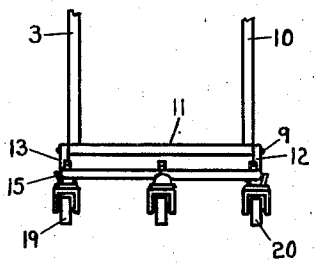

FIG. 3

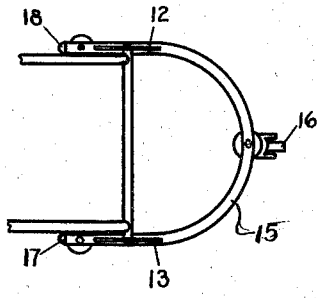

FIG. 4

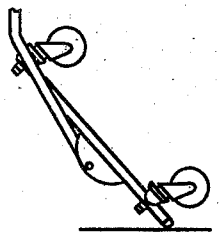

FIG. 5

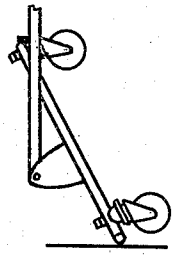

FIG. 6

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DOLLY STRUCTURE FOR CONVEYERS

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14 Claims. (Cl. 198—233)

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This invention relates to conveyors, and has particular reference to the provision of simple and inexpensive means for quickly rendering a conveyor easily movable or substantially immovable with reference to a supporting plane at the will of an operator.

In the conventional construction of conveyors for factories, warehouses, stores and other places where large amounts of bulky goods are being handled, it has usually been customary to install the conveyor mechanism by mounting it relatively permanently in operating position. This has been accomplished in various ways all of which are known to the art and are well understood. Such construction is effective insofar as its operation is concerned but it is expensive to install and is equally expensive to take out. The expense is accordingly doubled when the factory floor plan is changed so as to require the moving of a conveyor from one point to another. Hence, the frequent moving of it from place to place as local needs develop being often prohibitedly costly, such moving is undertaken only in extreme cases and much inconvenience accordingly endured.

In dealing with this problem, I have developed in collaboration with others, a conveyor construction which is made in easily associated and disassociated units, mounted for rapid and easy vertical adjustment and which is normally mounted on wheels for convenient moving from one place to another. These constructions are dealt with in Patent No. 2,347,308 and patent application Serial No. 571,750. However, it has been found that conditions of installation sometimes cause these wheeled units to move at undesired times. This may happen when the unit is used on an uneven floor, or on a slight incline if out of doors to unload a truck, or it may even move due to the vibration incident to its normal use. To place a locking mechanism on the wheels, particularly if these are swiveled casters, is undesirably expensive in addition to providing only questionable satisfaction. Providing additional or supplementary ground or floor engaging means is likewise expensive and in general provides even less satisfaction. Therefore, it has become a real problem to provide a wheel support, particularly including swiveled wheels, for the support members of our conveyor units in which the wheels can be made effective or non-effective quickly and easily at the operator's will without incurring unreasonable expense. Further, for reasons arising from the details of a preferred frame construction, this problem has included providing such wheeled support for a frame supporting member

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in a manner permitting it to move in pivoted relationship to said support in a plane longitudinal of the conveyor bed and vertical with respect to the supporting surface.

Accordingly, the principal object of my invention is to provide means for applying a wheeled support to a frame member supporting a conveyor bed, in which said wheels are easily rendered effective or non-effective at the will of the operator.

A further object of my invention is to provide wheeled support as aforesaid requiring a minimum of parts and incurring a minimum of construction cost.

A further object of my invention is to provide wheeled support as aforesaid in which the means for rendering the wheels effective or non-effective are strong and sturdy and always available for operation.

A further object of my invention is to provide wheeled support as aforesaid in which there is no chance for improper operation by any misunderstanding of the operator, and in which visual observation will instantly tell even the most unskilled operator whether or not the wheels are in operative position.

A further object of my invention is to provide wheeled support means as aforesaid in which there is no chance for accidental slipping from one position to the other, and especially such that when the wheels are rendered inoperative there is no chance of their improperly becoming operative.

These and other related objects and purposes will be apparent to persons acquainted with the art upon reading of the following disclosure and inspection of the accompanying drawings.

In the drawings:

Fig. 1 is a side view of my wheeled support shown associated with one form of conveyor supporting frame with which it can operate.

Fig. 2 shows the wheeled support turned with respect to the frame to place the wheels in non-operating position.

Fig. 3 shows a front view of the wheeled support and parts of the frame members.

Fig. 4 shows a top view of the wheeled support with parts of the frame members.

Fig. 5 is a side view of a modified form.

Fig. 6 is a side view of another modified form.

In solving the above outlined problems and accomplishing the indicated purposes, I have apart from others discovered an extremely simple mechanism which fully and effectively accomplishes these ends. Its simplicity is such that its cost

is no more than that of an ordinary dolly but it accomplishes the above outlined objectives effectively and reliably. With the wheels in operating position the conveyor can easily be moved about on the floor or other supporting plane, as desired, but with the wheels moved out of position there is no likelihood of the locking mechanism suddenly loosening to render the dolly free to move. Also the most casual visual observation will inform the worker, however unskilled, whether the dolly is in moving or non-moving position.

Referring now to Fig. 1, reference will be made briefly to the particular mechanism with which this dolly is especially designed for use, although it will be obvious that its usefullness is not at all limited thereto. It may be applied to any object such as a work-table, having one or more supporting frame members providing only the said members, or members equivalent thereto for this purpose, rise, not necessarily vertically, above their point of support on the dolly a distance equal to the distance from the said point of support on the dolly to a point near the front end of the dolly. However, for greater clarity in the immediate showing I will describe in general the mechanism herein adopted as especially illustrative of the application of my invention.

A conveyor body member 1 has depending from it a flange 2 for holding and guiding the several frame members. A long frame member 3 extends from the flange 2 to the point of support at its lower end. A short frame member 4 is pivotally affixed at one end 5 to the flange 2 and at its other end 6 pivotally affixed to the long frame member 3 at a point which preferably is spaced from the upper end of the long frame member 3 a distance approximately equal to the length of the short member 4. A quick-acting frictional gripping means, such as that shown in United States Patent No. 2,347,308, is supplied at the upper end 8 of the long member 3 to grip the flange for holding the supporting frame members in selected and adjusted position. These members may be singly in the middle of the conveyor bed, or there may be one set of them on either side of the conveyor bed, preferably connected by suitable cross-members. In the drawings herein shown it is assumed that one set of them will be placed at each side of the conveyor bed and the figures are made accordingly.

Referring now to the dolly 14 itself it will be evident that the principle of my invention may be embraced in any of several possible constructions. However, the construction illustrated has been found inexpensive to manufacture, sturdy in operation and easy to use and maintain.

The body frame for the dolly 14 is provided by a planar member 15 of bar or tubular material, which preferably takes approximately a horseshoe shape best shown in Fig. 4. This body member has welded thereon the pivot plates 12 and 13 to which are fastened the supporting frame members. Particularly, a cross member 11 is held at each end by a pivot pin 9 inserted into it through each of said pivot plates 12 and 13. The long frame member 3 and its counterpart 10 are then welded to the cross member 11. The open ends of the body member 15 may be closed by rounded plugs 17 and 18, which are usually of metal but may, in some cases, be topped with rubber or other frictional material. Any suitable casters 16, 19 and 20 are placed to provide a three point support, but, where required by the load to be held thereon, any number of additional casters may be arranged suitably around the body member 15.

Any form of sturdy, easily swiveling caster is satisfactory and their mounting may be of any conventional type, provided only that the two rear casters 19 and 20 are mounted so that no part of them is normally rearward of the rear-most part of the plug members 17 and 18. This is so that when the dolly is turned to assume the position shown in Fig. 2 the caster will be entirely clear of the floor and the entire weight supported on the points 17 and 18. While not usually capable of precise adjustment due to the changing angle of the long frame member 3, it will be found advantageous to have the perpendicular distance from the pivot pin 9 to the floor, when the dolly is in its normal horizontal position, approximately equal to the perpendicular distance from said pivot pin to the floor when said dolly is in its turned-up position shown in Fig. 2. However, where the frame members 3 and 10 vary from time to time in their angular relationship to the floor, these perpendicular distances can at best be only approximately equal, and if a precise vertical adjustment is needed as the wheels are placed in or out of operative position it may be done by moving the upper end of the long member 3 to the right or left with respect to the flange 2 as needed or by whatever other vertical adjustment the frame construction provides. Where this frame member 3 is in any installation at a constant angle to the floor, then these two distances may and should be made equal so that the supported object will be at the same height from the floor in either position of the supporting dolly without special adjustment.

Although the pivot plates 12 and 13 may be moved forwardly or rearwardly with considerable freedom without materially impairing the principle of operation of my invention, their position will normally be found most desirable a little rearward of a point midway between the forward and rearward casters. Particularly, when the dolly is in the position of Fig. 2 there should be sufficient horizontal distance between the vertical projection onto the floor of the pivot point 9 and the point of support 17 and 18 to be sure that the moment around said points 17 and 18 is always sufficient and in a direction to hold the body parts 15 tightly against the frame members 3 and 10. So long as the frame members 3 and 10 are at substantially less than 90 degrees to the floor this will present no particular problem. However, if said support members become vertical or approximately so, then the lower end thereof should be somewhat bent with respect to the upper end as indicated in Fig. 5 or the pivot plates 12 and 13 may need to be somewhat lengthened as indicated in Fig. 6.

It will be evident that many variations in the height, length and shape of my improved dolly are possible and will often be desirable for particular applications. Further, although it has been developed for use with a conveyor unit, it is applicable to any article such as a work-table, which is supported on substantially vertical members and which it is desired to have movable or immovable with reference to a supporting plane, as the floor, at the will of an operator. Hence, it is believed that my invention, although physically of extreme simplicity, is of broad application so that all these variations will be included within the scope of my hereinafter appended claims unless expressly limited otherwise.

I claim:

1. In conveyor supporting means the combination: a U-shaped member having a forward end at the curve of the U and a rearward end at the free ends of the U; a plurality of swiveled casters mounted thereon to hold same normally above, and in a plane parallel to, a supporting surface; a pair of plates each affixed to said U-shaped member at its upper side and approximately midway between its ends; a frame structure pivoted to each of said plates at a point vertically above said U-shaped member and respectively inwardly of said pivot plates; said frame structure being positioned at an angle to said supporting surface and supporting at its upper end a portion of said conveyor.

2. In a conveyor construction the improvement in the means supporting the conveyor with reference to a surface; comprising: a support member supporting at least partially the said conveyor at its upper end and positioned at an angle to said supporting surface; a U-shaped member of tubular material having a plug inserted into each end of said tube; a pair of pivot plates affixed on the upper side of said U-shaped member, a swivel caster at each end of said U and a swivel caster in the middle of the curved portion of said U-shaped member; said support member being pivoted to said pivot plates in a plane above said U-shaped member; the whole being so arranged that when the U-shaped member is moved pivotally with respect to the support member its full distance in the direction of maximum pivoting movement, the point of application of the downward thrust of said support member to the U-shaped member will be between the extremities of said U-shaped member, said extremities being taken in a direction parallel to said support member.

3. In conveyor construction the improvement in means supporting same with reference to a surface, the combination comprising: a supporting structure supporting at least partially the said conveyor at its upper end and positioned at an angle to said supporting surface; a U-shaped member; a pair of pivot plates affixed on the upper side of said U-shaped member; a plurality of swiveled casters on the underside of said U-shaped member; said supporting structure being pivoted to said pivot plates in a plane above said U-shaped member; the whole being so arranged that when the U-shaped member is moved pivotally with respect to the suporting structure its full distance in the direction of maximum pivoting movement, the point of application of the downward thrust of said supporting structure to the U-shaped member will be between the extremities of said U-shaped member, said extremities being taken in a direction parallel to the said supporting structure.

4. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame, and at least the lower portion thereof inclined at an angle to a plane perpendicular to said supporting surface; a truck including a frame, and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said truck frame upon said supporting surface; means for pivotally mounting said truck to the lower end of said leg structure at a point between said rotatable elements; one end of said truck frame, when said truck is supported by said rotatable elements, projecting in the direction of inclination of said leg structure from the vertical beyond a vertical plane passing through the axis of said rotatable elements positioned below said leg structure and the other end of said truck frame being so related to said leg structure that upon pivotal movement of said truck frame said other end of said truck frame will not pass said leg structure, such that when the projecting end of said truck is pivoted downwardly about the lower end of said leg structure to a point where the upper surface of said truck at said other end contacts said leg structure, none of said rotatable elements contact said supporting surface.

5. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame and at least the lower portion thereof inclined at an angle to a plane penpendicular to said supporting surface; a truck including a frame, and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said truck frame upon said supporting surface; means for pivotally mounting said truck to the lower end of said leg structure at a point between said rotatable elements; one end of said truck frame, when said truck is supported by said rotatable elements, projecting in the direction of inclination of said leg structure from the vertical, at least to a vertical plane passing through the periphery furthermost in said direction of those of said rotatable elements which are positioned below said leg structure and the other end of said truck frame being so related to said leg structure that upon pivotal movement of said truck frame said other end of said truck frame will not pass said leg structure, whereby said truck in one pivotal position is supported by said rotatable elements and in another pivotal position it has its upper surface contacting said leg structure and is supported by said projecting portion of said truck frame.

6. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame and at least the lower portion thereof inclined at an angle to a plane perpendicular to said supporting surface; a truck including a frame structure and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said frame structure upon said supporting surface; upwardly projecting mounting plates attached to said frame structure between said rotatable elements; means for pivotally mounting the lower end of said leg structure to said mounting plates at a point above the upper surface of said frame structure when said truck is supported by said rotatable elements; one end of said truck frame projecting, in the direction of inclination of said leg structure from the vertical, beyond a vertical plane passing through the axis of those of said rotatable elements positioned below the leg structure, and the other end of said frame structure being so related to said leg structure that upon pivotal movement of said truck said other end of said

frame structure will not pass said leg structure, such that when the projecting end of said truck is pivoted downwardly about the lower end of said leg to a point where the upper surface of said truck contacts said leg none of said rotatable elements contact said supporting surface.

7. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame; a truck including a frame structure and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said frame structure upon said supporting surface; upwardly projecting mounting plates attached to said frame structure between said rotatable elements; means for pivotally mounting the lower end of said leg structure to said mounting plates at a point on each above the upper surface of said frame structure when said truck is supported by said rotatable elements; said frame structure on one end projecting, when said truck is supported by said rotatable elements, at least to a vertical plane passing through the periphery furthest from said mounting plates of those of said rotatable elements adjacent said one end, and the other end of said frame structure being so related to said leg structure that upon pivotal movement of said truck said other end of said frame structure will not pass said leg structure, such that when said projecting end is pivoted downwardly about the lower end of said leg structure to a point where the upper surface of said truck adjacent the said other end of said frame structure contacts said leg structure none of said rotatable elements contact said supporting surface.

8. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame; a truck including a frame structure and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said frame structure upon said supporting surface; upwardly projecting mounting plates attached to said frame structure between said rotatable elements; means for pivotally mounting the lower end of said leg structure to said mounting plates at a point on each substantially above the upper surface of said frame structure when said frame structure is supported by said rotatable elements; said frame structure on one end projecting, when said truck is supported by said rotatable elements, at least to a vertical plane passing through the axis of those of said rotatable elements adjacent said projecting end, and the other end of said frame structure being so related to said leg structure that upon pivotal movement of said truck said other end of said frame structure will not pass said leg structure, whereby said truck in one pivotal position is supported by said rotatable elements and in another pivotal position it has its upper surface contacting said leg structure and none of said rotatable elements contacts said supporting surface.

9. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame and at least the lower portion thereof inclined at an angle to a plane perpendicular to said supporting surface; a truck including a U-shaped frame structure and rotatable elements adjacent each of the ends and the apex of said U for supporting said truck upon said supporting surface; means for pivotally mounting said truck to the lower end of said leg structure at a point between said rotatable elements with the open end of said U positioned below said leg member; said frame structure at its open end extending at least to a vertical plane including the peripheries furthest from the apex of said U of any of said rotatable elements adjacent the open end of said U, the closed end of said frame structure being so related to said leg structure that upon pivotal movement of said frame structure said closed end will not pass said leg structure, whereby said truck in one pivotal position is supported by said rotatable elements and in another pivotal position it has its upper surface contacting said leg structure and none of said rotatable elements contacts said supporting surface.

10. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg assembly including a pair of members spaced apart transversely of said conveyor frame each attached at its upper end to said conveyor frame and at least the lower portion of each member thereof inclined at an angle to a plane perpendicular to said supporting surface; a truck including a U-shaped frame structure and rotatable elements adjacent each of the ends and the apex of said U for supporting said truck frame upon said supporting surface, said frame structure being of greater width than the distance between the members of said leg assembly; upwardly projecting mounting plates attached to said frame structure between said rotatable elements; means for pivotally mounting said truck by said mounting plates to the lower end of said leg members; said frame structure at its open end positioned below said leg assembly and extending at least to a vertical plane passing through the peripheries furthest from said mounting plates of those of said rotatable elements which are adjacent the open end of said U, such that when the open end of said truck is pivoted downwardly about the lower end of said leg the apex of said U passes between said leg members, and adjacent said apex said frame structure contacts said leg members and none of said rotatable elements contacts said supporting surface.

11. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg assembly including a pair of members spaced apart transversely of said conveyor frame each attached at its upper end to said conveyor frame; a truck including a U-shaped frame structure and rotatable elements adjacent each of the ends of said frame structure and the apex of said U for supporting said truck upon said supporting surface, said frame structure being of greater width than the distance between the members of said leg assembly; upwardly projecting mounting plates attached to said truck frame between said rotatable elements; means for pivotally mounting the lower

end of said leg members between and to said mounting plates at a point above the upper surface of said frame structure when said truck is supported by said rotatable elements; said truck frame, at its open end, extending at least to a vertical plane passing through the peripheries furthest from said mounting plates of those of said rotatable elements which are adjacent the open end of said U, such that when the open end of said truck is pivoted downwardly about the lower end of said leg assembly the apex of said U passes between said leg members, and adjacent said apex said frame structure contacts said leg members and none of said rotatable elements contact said supporting surface.

12. In a means supporting a conveyor alternately movable and immovable with respect to a supporting surface, and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame; a truck including a frame structure and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said frame structure upon said supporting surface; means on said frame structure between said rotatable elements extending, when said truck is supported by said rotatable elements, upwardly above either end of said frame structure; means for pivotally mounting said truck to the lower end of said leg structure at a point adjacent the uppermost portion of said upwardly extending means; one end of said frame structure when said truck is supported by said rotatable elements, projecting beyond a vertical plane passing through the axis of those of said rotatable elements which are adjacent said projecting end, the other end of said frame structure being so related to said leg structure that upon pivotal movement of said truck said other end of said frame structure will not pass said leg structure, such that when said projecting end is pivoted downwardly about the lower end of said leg structure to a point where the upper surface of said truck adjacent the other end of said frame structure contacts said leg structure none of said rotatable elements contact said supporting surface.

13. In means supporting a conveyor alternately movable and immovable with respect to a supporting surface and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame and at least the lower portion thereof inclined at an angle to a plane perpendicular to said supporting surface; a truck including a frame structure and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said frame structure upon said supporting surface; means for pivotally mounting said truck to the lower end of said leg structure at a point between said rotatable elements; one end of said truck frame, when said truck is supported by said rotatable elements, projecting in the direction of inclination of said leg structure from the vertical beyond a vertical plane passing through the axis of said rotatable elements positioned below said leg structure; said leg structure including means limiting pivotal movement of said truck frame in a direction wherein the projecting end is moved downwardly about the lower end of said leg structure, said limiting being at a point beyond, in said direction, a position in which the truck frame is perpendicular to the supporting surface and none of the rotatable elements contact the supporting surface.

14. In means supporting a conveyor alternately movable and immovable with respect to a supporting surface and including a conveyor frame and a supporting means associated therewith, the improvement in said supporting means comprising: a leg structure attached at its upper end to said conveyor frame; a truck including a frame structure and rotatable elements spaced apart longitudinally relative to said conveyor frame for supporting said frame structure upon said supporting surface; means for pivotally mounting said truck to the lower end of said leg structure at a point between said rotatable elements; one end of said truck frame, when said truck is supported by said rotatable elements, projecting beyond a vertical plane including the peripheries furthest from said point of pivotal mounting of said truck and leg structure of said rotatable elements adjacent said projecting end; said leg structure including means limiting pivotal movement of said truck frame in a direction wherein the projecting end is moved downwardly about the lower end of said leg structure, said limiting being at a point beyond, in said direction, a position in which the truck frame is perpendicular to the supporting surface and none of the rotatable elements contact the supporting surface.

BERT WOLDRING.

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