Oct. 18, 1932. J. C. WALTER ET AL 1,883,426

CONVEYER

Filed Dec. 3, 1930 4 Sheets-Sheet 1

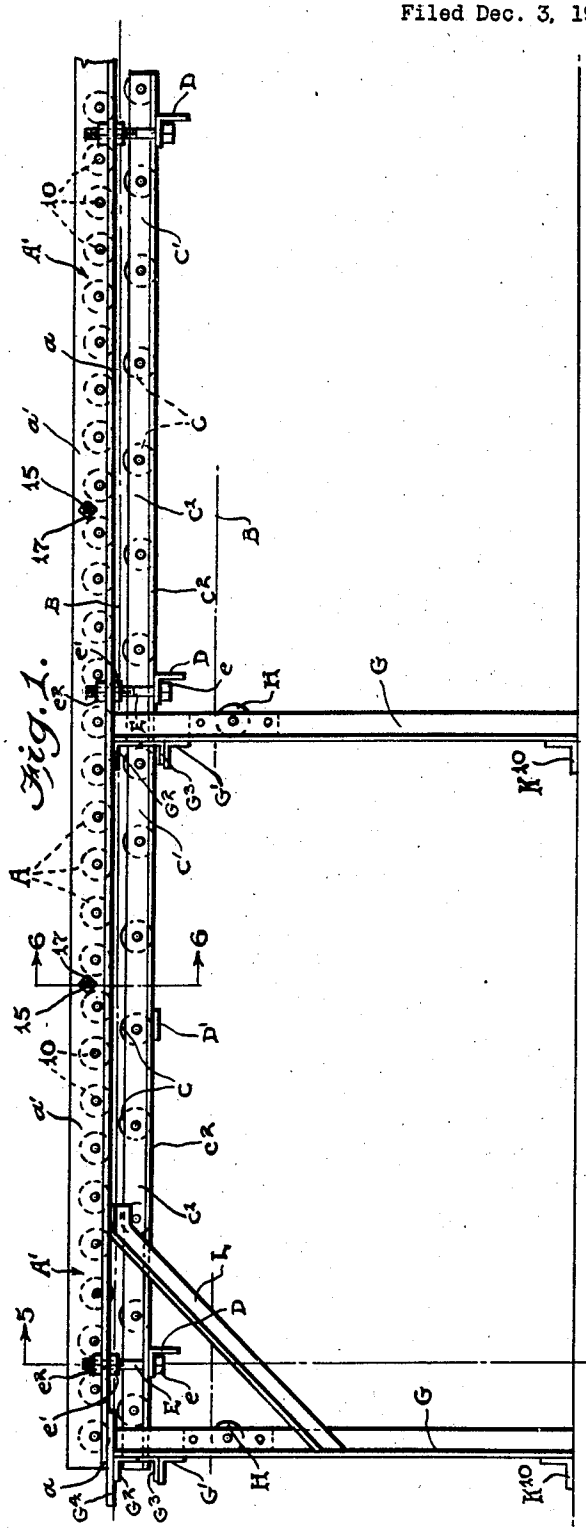


Fig. 1.

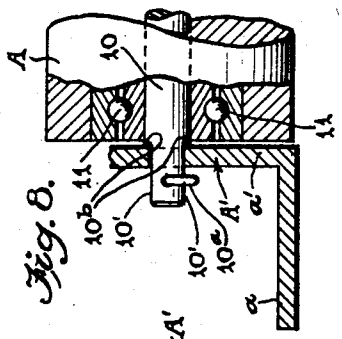


Fig. 8.

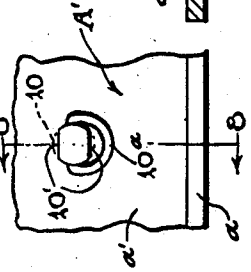


Fig. 7.

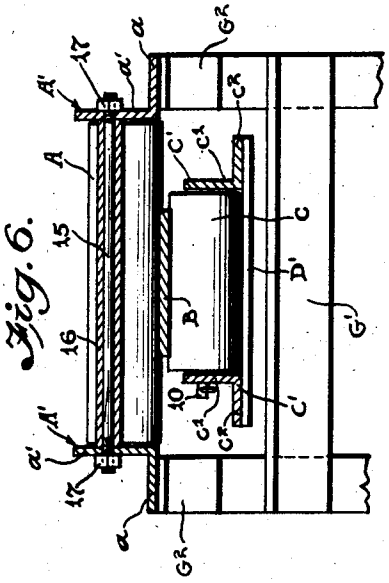


Fig. 6.

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CONVEYER

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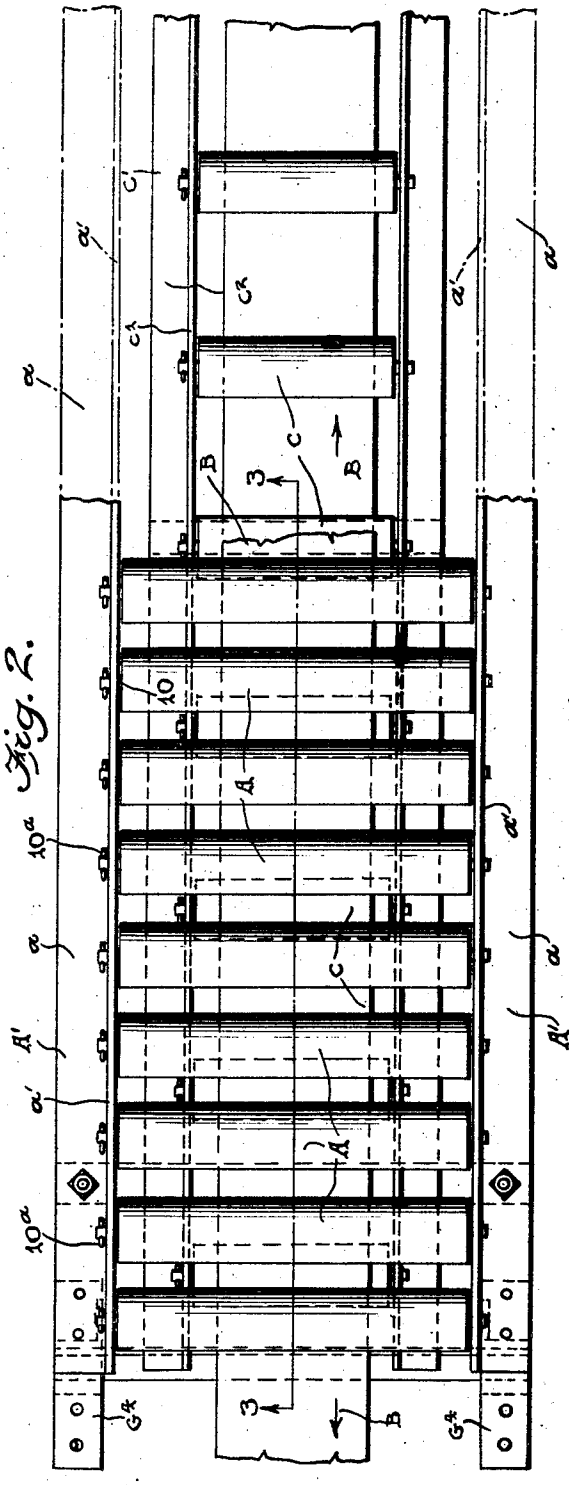


Fig. 2.

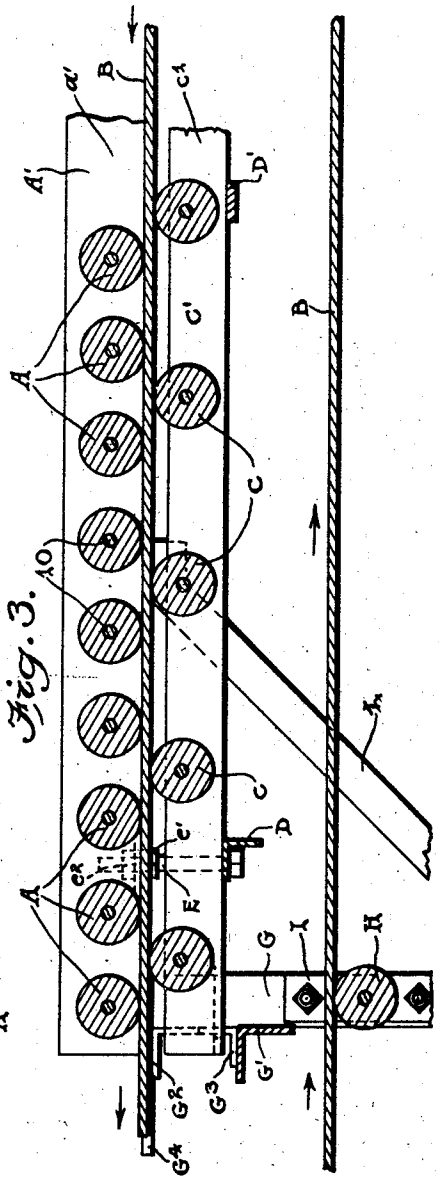


Fig. 3.

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Fig. 4.

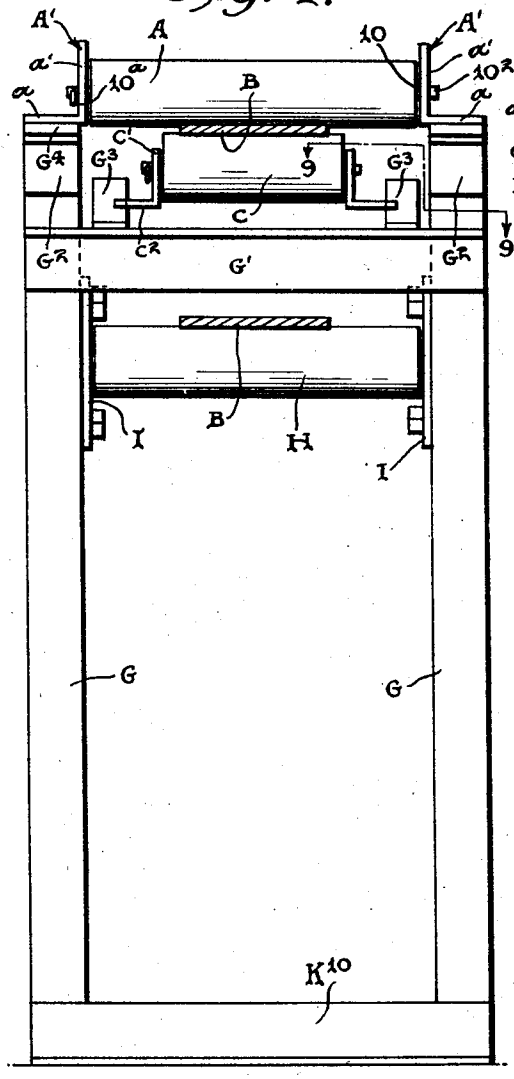


Fig. 5.

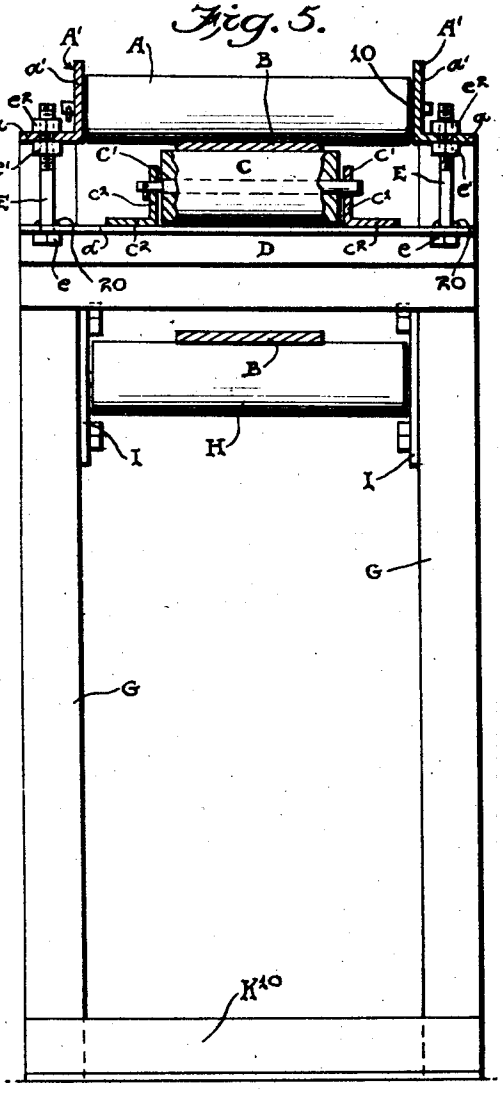
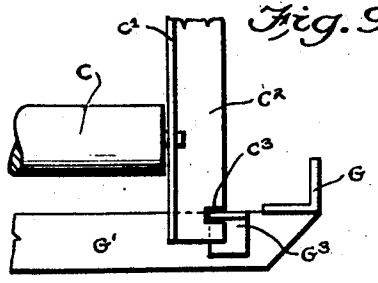


Fig. 9.



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CONVEYER

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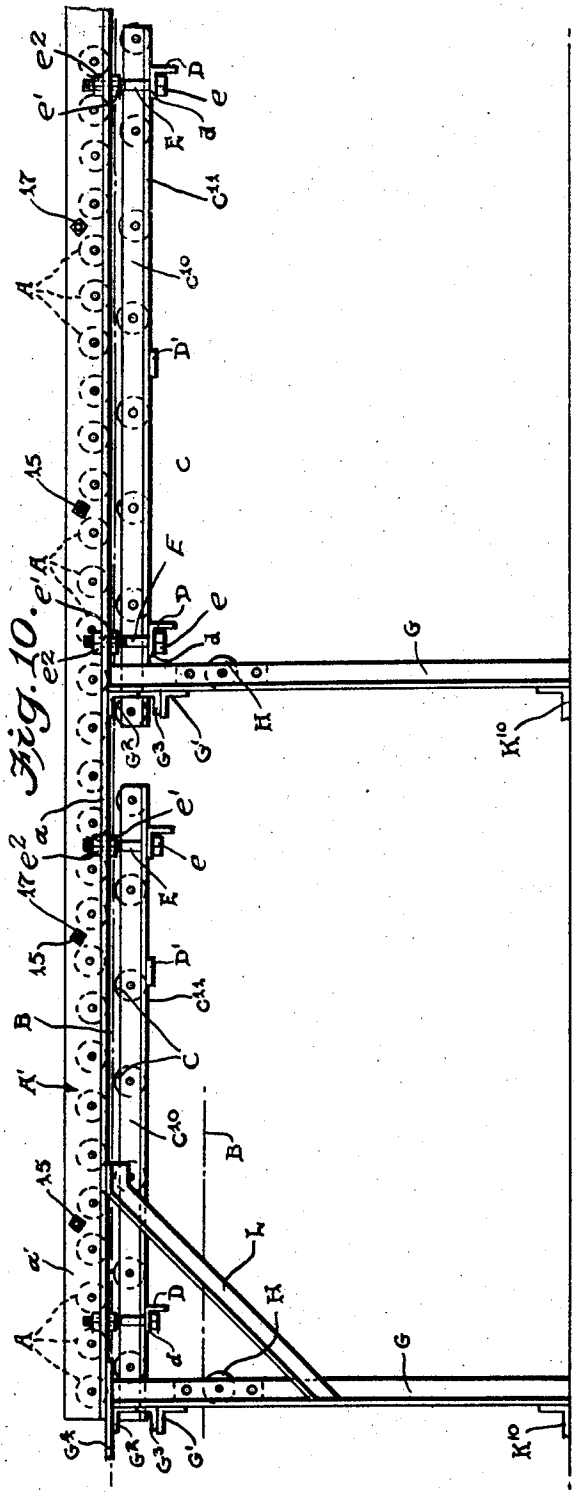


Fig. 10.

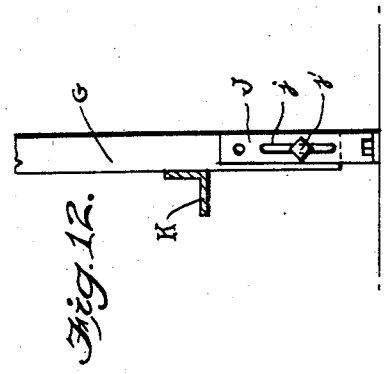


Fig. 12.

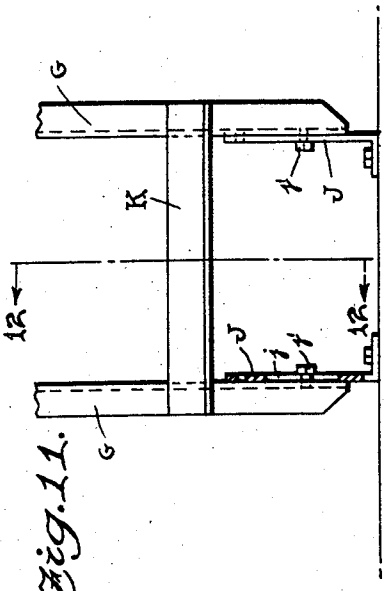


Fig. 11.

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UNITED STATES PATENT OFFICE

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CONVEYER

Application filed December 3, 1930. Serial No. 499,765.

This invention has relation to a mechanism of a type in which a series of rollers are rotated by a traveling belt held in frictional contact with the undersides of said rollers, with a pressure suitable for the service to be performed, by a series of rollers which are arranged at appropriate intervals along the length of the mechanism and are adjustable up and down to regulate the pressure of the belt against the first mentioned series of rollers.

One mechanism of the kind referred to, and to which the invention is particularly applicable, but is not in all respects restricted, is a conveyer of the type in which the said first mentioned series of rollers form the load supporting bed of the mechanism and operate by their rotation to impart advancing movement to the load mounted thereon.

The invention particularly comprehends a construction in which the belt supporting rollers are adjustable in groups, instead of individually, and, in fact, one of its important purposes is to provide a practicable construction by which they may be so adjusted. Other purposes and advantages of the invention will be apparent to those familiar with the constructions exemplified by the accompanying drawings, in which:—

Fig. 1 is a side elevation of an intermediate section of a conveyer, showing the driving belt in broken outline to avoid confusion, and exemplifying a construction in which all of the belt supporting rollers of said section are supported by an adjustable frame common thereto;

Fig. 2 is a plan view, on a larger scale, with parts broken away, of a part of the construction illustrated in Fig. 1;

Fig. 3 is a vertical section on the line 3—3 of Fig. 2;

Fig. 4 is an end view of the section of conveyer shown in Fig. 1;

Fig. 5 is a vertical section on a line corresponding to the line 5—5 of Fig. 1;

Fig. 6 is a vertical section on a line corresponding to the line 6—6 of Fig. 1;

Fig. 7 is a detail view particularly intended to show the squared end of the shaft upon which one end of the corresponding roller is rotatably mounted;

Fig. 8 is a detail vertical view on a line corresponding to the line 8—8 of Fig. 7;

Fig. 9 is a detail view particularly intended to show means at one side of one end of the frame which carries the belt supporting rollers by which, in co-operation with like means at the opposite side of said frame and at opposite sides of the other end of the frame, the frame is held against lateral displacement and is guided in its vertical adjustments;

Fig. 10 is a side elevation corresponding to Fig. 1 but illustrative of an embodiment in which a lesser number of belt supporting rollers are simultaneously adjustable;

Fig. 11 is a detail view illustrative of a means by which the supporting legs of the conveyer frame may be lengthened or shortened for leveling purposes; and

Fig. 12 illustrates the parts shown in Fig. 11 viewed at right angles from the position in which they are shown in said figure.

For illustrative purposes, this invention has been shown as embodied in a conveyer in which a series of closely set rollers (marked A in all the figures of the drawings) are employed as the load supporting bed of the conveyer.

Each of these rollers A is preferably rotatably mounted on a stationary shaft 10 through the medium of bearings of friction reducing nature, one of which is shown at 11 in Fig. 8 of the drawings. The entire series of rollers A of a section of the conveyer are carried by a main frame common thereto, which frame includes two continuous longitudinal members A′, at the opposite sides thereof. These longitudinal members are preferably of angle iron construction, each comprising a horizontal member *a* and a vertical member *a′*.

The longitudinal members A′ at opposite sides of the frame are tied together by appropriately spaced rods 15, Figs. 1, 6 and 10, which extend transversely of the conveyer and through and outwardly beyond the vertical members *a′*, and also through spacing sleeves 16 arranged between said vertical

members and having their ends in contact with the inner surfaces thereof. The outer ends of the rods 15 are threaded and nuts 17 mounted on said outer ends with their surfaces in contact with the outer surfaces of the vertical members a' co-operate with the spacing sleeves and rods in holding the frame members A' against lateral relative displacement.

Each shaft 10, in the illustrated embodiment of the invention, has its opposite ends extending through and outwardly beyond the frame members A' and is held against rotation by flattening one of its ends, as shown at 10' Figs. 7 and 8, and seating the said flattened end in a similarly shaped opening in the corresponding member a'. The other ends of the shafts are round and fit in correspondingly round shaped openings in member a' so that the shafts can be readily assembled. As shown in Figures 2 and 8, rings 10^a, removably applied to the outer end of the flattened portion of the shafts causes the shaft to be held in place by the member a' fitting between said rings 10^a and the shoulder 10^b of the flattened shaft.

For positively rotating rollers A about their respective axes a driving belt, marked B in all figures of the drawings is employed. This belt is engaged between its ends by pressure regulating rollers, marked C in all the figures and is driven by any suitable belt driving means, not necessary herein to illustrate or describe.

These pressure regulating rollers C, as already stated, are arranged to be adjusted in sets or groups, and to this end the sets or groups are respectively mounted in secondary frames, which are separately adjustable relatively to each other and to the corresponding portion of the frame which carries the rollers A, preferably by the means hereinafter set forth.

The number of rollers in any set or group throughout the length of the conveyer may vary in accordance with preferences or requirements. This is exemplified by Figs. 1 and 10; Fig. 1 showing a construction in which all of the pressure regulating rollers of the illustrated section of conveyer are carried by a frame common thereto so that all of said rollers throughout said section will be adjusted simultaneously by adjustment of the frame, while Fig. 10 shows a construction in which the pressure regulating rollers of the section of conveyer corresponding to that illustrated in Fig. 1 are separated into two groups carried by frames which are separately adjustable.

The secondary frame illustrated in Fig. 1 (see also Figs. 2, 4 and 5) includes two longitudinal members C' respectively arranged at opposite sides thereof and each extending throughout the length of the corresponding section of the conveyer. Each of these members C' is preferably of angle iron construction to provide a vertical member c^1, to be engaged by the shafts 10 of the corresponding rollers C, and a horizontal member, c^2, to rest upon and be secured in any suitable way to transversely extending elements D and D' of this frame. These elements D and D' are spaced at appropriate intervals along the length of the frame and tie the longitudinal members C' together. The illustrated elements D extend outwardly at their ends beyond the members C', to be engaged by adjusting means, of suitable construction, and are of angle iron construction to give them strength and rigidity appropriate to their use, (see Fig. 5), while the illustrated elements D' are of plain construction and need not extend outwardly beyond the members C', (see Fig. 6), since they serve, or may serve, only as elements for tying the members C' at opposite sides of the frame together.

The adjusting means for the secondary frame, preferably employed, comprise an appropriate number of bolts E which extend through the horizontal members a and d of the main frame member A' and secondary frame element, D, respectively, at place outside the secondary frame members C'. Each bolt has at one end a head e and at its opposite ends a pair of adjusting and clamping nuts e', e^2, the said head being preferably arranged beneath and in contact with the horizontal member d and the said nuts being preferably positioned to receive the member a between them. It will be apparent that adjustment of the nuts e' and e^2 of the several bolts will raise or lower the secondary frame and the pressure rollers C and hold said frame rollers securely in its adjusted position. It will also be noticed that the correlation of the parts is such as to render the assemblage of the main and secondary frames into operative relationship with each other one of easy accomplishment, which is true also with respect to adjustment of the secondary frame, since the connecting and adjusting means are of simple nature and readily accessible.

In the construction illustrated in Fig. 10 there is for the illustrated section of the conveyer a plurality of secondary frames arranged in an end to end relationship, instead of a single secondary frame extending continuously throughout the length of the said section of the conveyer. The longitudinal members of these secondary frames are marked C^{10} in Fig. 10 and differ from the corresponding members C^1 of Fig. 1 only in respect of their length. In every other respect each secondary frame in the embodiment illustrated in Fig. 10 is or may be of identical construction with the secondary frame illustrated in Fig. 1 and this is true also with respect to the means by which the

secondary frames are adjustably supported from the frame which carries the load supporting rollers A. Accordingly, the members which extend transversely from one member C^{10} to the corresponding member at the opposite side of the frame (it being understood of course there are members C^{10} at opposite sides of each frame) are designated by reference characters, D and D^1, and the adjusting bolts and their co-operating heads and nuts are designated by the characters E, e, e^1, e^2, all as in the construction shown in Fig. 1. The horizontal member of each longitudinal member C^{10}, in Fig. 10 is marked c^{11}.

It may be here mentioned that the bolt E in each of the exemplified forms of the invention is preferably welded to the horizontal member, d of the corresponding tie member D, as indicated at 20.

The entire structure is supported by a plurality of appropriately arranged stands extending transversely thereon and preferably from the floor of the room. Each of the stands preferably includes a pair of legs G arranged at opposite sides thereof and connected with each other near their upper ends by cross members G^1 and at their upper ends by cross members G^2. Mounted upon the members G^1 are other frame members G^3 which are so correlated with the side members C′ of the secondary frame as to guide said frame in the adjustments thereof to regulate the pressure of the driving belt upon the load carrying rollers A. It is preferred that the legs G and the cross members G^1 and G^2 be of angle iron construction. These parts are all rigidly secured to each other, by welds or other appropriate means. At the ends of each section of the conveyer provided with these stands, plates or arms G^4 are arranged at rest upon the upper surfaces of the cross members G^2 and project from the stands into position to be engaged by the ends of members A′ of the next adjacent section in order to provide a means by which a plurality of sections of the conveyer may be rigidly secured to each other at their confronting ends. It is also preferred in practice to miter or bevel the end of the horizontal members G^1 as shown best in Fig. 9. Each of the members G^3, provided to guide the frame carrying the rollers C in the adjustments of said frame and rollers, also preferably is of angle iron construction to provide a base portion to rest upon the corresponding member G^1, to which it is rigidly secured by welding, or otherwise if preferred, and also to provide a flange or lip which enters an opening c^3 in the adjacent edge of the member c^2 of the frame carrying the rollers C. The plates or arms G^4 and the upper horizontal elements of the members G^2 at the places unprovided with said plates or arms are rigidly secured in any suitable way to the horizontal members a of the frame carrying the rollers A. It will thus be seen that the frame which carries the rollers A is supported by a structure of strong and durable nature and which structure also includes means by which the frame carrying rollers C is guided in the up and down adjustments of the latter.

The returning run of the belt B is supported by rollers H which in turn are supported by the respective stands through the medium of plates I suitably secured to the legs G, respectively. These legs G are preferably provided at their lower ends with feet J which may be adjustably secured thereto, as shown in Figs. 11 and 12 to permit the conveyer to be levelled, as is well understood in the art. Simple means for permitting such adjustment may include the formation of the feet with vertical slots j through which the stem of a fastening bolt j^1 extends. Additional cross members, marked K in Figs. 11 and 12, are preferably provided to connect the pairs of legs at opposite sides of the stand with each other when the feet pieces are of a nature which permits adjustments of the height of the stand. These additional cross members are preferably arranged above said feet pieces. In some cases, however, adjustment of the heights of the stands is not necessary and in such cases the feet pieces J and transverse members K may be replaced by transverse members K^{10} arranged at the bottom of the legs G and accordingly serving both as tie members and feet, as shown in Figs. 1, 4, 5 and 10. Additional brace means L extending diagonally from the legs G to the horizontal members a of the frame carrying the rollers A and secured at the opposite ends to said legs and frame member are provided as shown in Figs. 1 and 10.

It will be apparent from the foregoing that we have provided a load conveying structure of strong, simple and practical construction which includes as a part of its bed a travelling belt whose tension can be regulated at various places at the length thereof in a most practical way and with a minimum of effort. It will also be understood that when this belt is embodied in the type of conveyer illustrated, namely, in which it is employed to impart rotating movement to load supporting rollers, the means by which its tension against such rollers is regulated, including as it does elements by which a plurality of pressure regulating rollers engaging the undersurface of the belt are simultaneously adjusted, reduces the time required in the adjustment and assures a more accurate alignment of the belts with respect to each other, than otherwise. It may be herein mentioned that the pressure regulating rollers may be so adjusted as to free the belt entirely from its contact with the rollers A

whereby a storage space may be set up at the corresponding part of the conveyer and also whereby packages can be pushed freely along the rollers A in the event of damage to the drive unit. Adjustment of the tension of the belt upon the rollers A compensates for undue stretch in the belt and also enables the application of its power to the roller A to be in accord with the nature and weight of the articles propelled by said rollers.

While adjustment of the rollers C and their frame or frames in up or down or vertical direction only has been described and illustrated it should be understood that adjustment of said rollers and their frame or frames in a horizontal direction if and when desired in any particular installation also is contemplated. Any means suitable to accomplish such adjustment may be employed.

It will be noticed that after the secondary frames have been once set in the positions they are intended to occupy, either in the installation of the conveyer or at any time thereafter, they may be permanently fixed in their said set positions. One simple and practicable way of so fixing the frames involves merely the upsetting of the protruding ends of the bolts E down against the nuts e^2.

Having thus described the invention what we believe to be new and desire to secure by Letters Patent, and therefore claim is:—

1. A conveyer including a main frame, a traveling belt, load supporting means driven by said belt, a secondary frame having a group of rollers supporting the working run of the belt, and means for raising and lowering said secondary frame and belt supporting rollers, unitarily, relatively to said main frame and load supporting means.

2. A conveyer including a traveling belt, a frame, a series of rollers carried by said frame and driven by said belt, a secondary frame, a group of belt supporting rollers carried by the secondary frame, and means adjustably connecting the secondary frame with the first mentioned frame and operative to raise and lower the secondary frame and the group of belt supporting rollers carried thereby, unitarily, relatively to the first mentioned rollers.

3. A conveyer including a main frame having supporting stands, a traveling belt, means supported by the main frame and driven by said belt, a secondary frame, adjustable supporting connections between the main frame and secondary frame, a group of belt supporting rollers carried by the secondary frame and unitarily adjustable thereby up and down relatively to the means driven by said belt, and means substantially forming part of the main frame stands and having a guiding relationship with the secondary frame.

4. A structure according to claim 3 and wherein the last mentioned means include vertical flanges or members and the secondary frame includes longitudinal members having openings into which said flanges or members extend.

5. A conveyer according to claim 3 and wherein the means supported by the main frame and driven by the belt comprise a series of load supporting rollers arranged to be rotated about fixed horizontal axes by said belt.

6. A structure according to claim 1 and wherein the adjustable frame includes longitudinal roller-supporting members at opposite sides thereof and transverse elements projecting laterally at both ends beyond the said longitudinal members respectively and connecting the same with each other, and wherein also the adjusting means for the frame engages the projecting ends of the said transverse members.

7. A structure according to claim 2 and wherein the secondary frame includes longitudinal roller supporting members at opposite sides thereof and transverse elements which connect said members with each other and project outwardly at their opposite ends beyond the same, and wherein also the first mentioned frame is wider than the secondary frame and includes longitudinal roller supporting members, and the means for adjustably connecting the secondary frame with the main frame are engaged with the longitudinal members of the first mentioned frame and the outwardly projecting ends of the transverse elements of the secondary frame.

8. A conveyer section including a main frame, a secondary frame, a traveling belt, a series of load supporting rollers carried by the main frame and arranged to be rotated by said belt, a group of pressure regulating rollers carried by the secondary frame and engaging the belt, and means for raising and lowering the secondary frame relatively to the main frame to thereby correspondingly adjust the pressure regulating rollers unitarily relatively to the load supporting rollers.

9. A structure according to claim 8 and wherein the secondary frame extends continuously throughout the length of the section and the rollers of the secondary frame are arranged at intervals throughout the length thereof, whereby all the pressure regulating rollers of the entire section are simultaneously adjustable.

10. A conveyer section including a main frame extending throughout the length of the section, a series of transverse rollers carried by said main frame, a traveling belt engaging said rollers and rotating the same, a plurality of secondary frames arranged in an end to end relation along the length of the section and each provided with a group of pressure regulating rollers which engage the surface of the belt opposite that engaged with

the first mentioned rollers, and independently adjustable means at opposite ends of each secondary frame for supporting the latter and raising and lowering the rollers thereof unitarily.

11. A structure according to claim 8 and wherein each secondary frame is of narrower width than the main frame and includes transverse tie elements each projecting at its opposite ends outward beyond the sides of the frame, and the adjustable means for each secondary frame comprises a series of bolts respectively engaging the outwardly projecting ends of the tie elements and also engaged with the main frame.

12. A conveyer including a main frame having supporting stands provided with transversely extending members, the main frame also including longitudinally extending members respectively at opposite sides thereof and means rigidly connecting its said longitudinally extending members with its stands; rollers carried by said longitudinal members; a traveling belt arranged to rotate said rollers; a secondary frame including longitudinal members at opposite sides thereof, said secondary frame being of narrower width than the frame; a plurality of pressure regulating rollers for the belt, carried by said secondary frame; means for adjustably supporting the secondary frame from the main frame, thereby operative to adjust the plurality of pressure regulating rollers simultaneously; and means supported by the transversely extending members of the supporting stands and having a guiding relationship with the longitudinal members of the secondary frame.

13. A structure according to claim 12 and wherein the last mentioned means comprise flanges and the longitudinal members of the secondary frame have openings which receive said flanges, respectively, said flanges and the walls of the openings having a guiding relationship with each other.

14. A conveyer section comprising a main frame provided with a load supporting bed having transversely extending rollers, a belt traveling longitudinally of said section and arranged to be frictionally engageable with said rollers and when so engaged to impart power thereto, a secondary frame extending longitudinally of the section and provided with belt supporting members arranged below the bed of the main frame and means for raising and lowering said secondary frame and the belt supporting members, unitarily, and thereby the belt into and out of power transmitting relationship with the rollers in the bed of the conveyer, at will.

15. A conveyer section comprising a main frame provided with longitudinal side members and with a load supporting bed having transverse rollers carried by said side members, a belt traveling longitudinally of the frame and frictionally engageable with said rollers to impart power thereto, a secondary frame having longitudinal side members and provided with a group of transversely extending belt supporting and tensioning rollers spaced apart along its length and arranged below said load supporting bed, and means by which the secondary frame is supported from the main frame, said means being adjustable to raise or lower at will the secondary frame and the group of rollers carried by said frame, unitarily, to correspondingly raise or lower the belt into or out of power transmitting relationship with the rollers in the load supporting bed, whereby said section is readily adaptable for the transfer or for the storage of articles.

16. A conveyer comprising a main frame having longitudinal side members, transversely arranged load supporting rollers supported by said members, a driving belt whose upper surface is adapted to frictionally engage the under peripheral surfaces of said load supporting rollers and when so engaged to impart rotative movement thereto, a plurality of secondary frames separate from the main frame and arranged along the length of the conveyer in a lower plane than said main frame, each of said secondary frames having longitudinal members at its opposite sides, a corresponding plurality of groups of transverse belt supporting and tensioning rollers carried by the respective secondary frames and engaging the under surface of said belt and means for raising and lowering the respective secondary frames relatively to the main frame and to each other.

17. A conveyer according to claim 1 in which the means for raising and lowering the secondary frame and belt supporting rollers unitarily relatively to the main frame and load-supporting means are permanently fixed against movement when said secondary frame and load supporting rollers have been set in their intended positions.

18. A conveyer section according to claim 8 in which the means for raising and lowering the secondary frame are permanently fixed to prevent raising and lowering movement of said frame when the frame has been set in its intended position.

19. A conveyer according to claim 16 in which the means for raising and lowering the respective secondary frames relatively to the main frame and to each other are permanently fixed against movement when said secondary frames have been set in their intended positions.

In testimony whereof we affix our signatures.

JOHN C. WALTER.
RUDOLPH VOGT.