Jan. 17, 1956 E. R. HAYHURST 2,730,826

ELECTRICAL MOVING CHART

Filed July 2, 1951 3 Sheets-Sheet 1

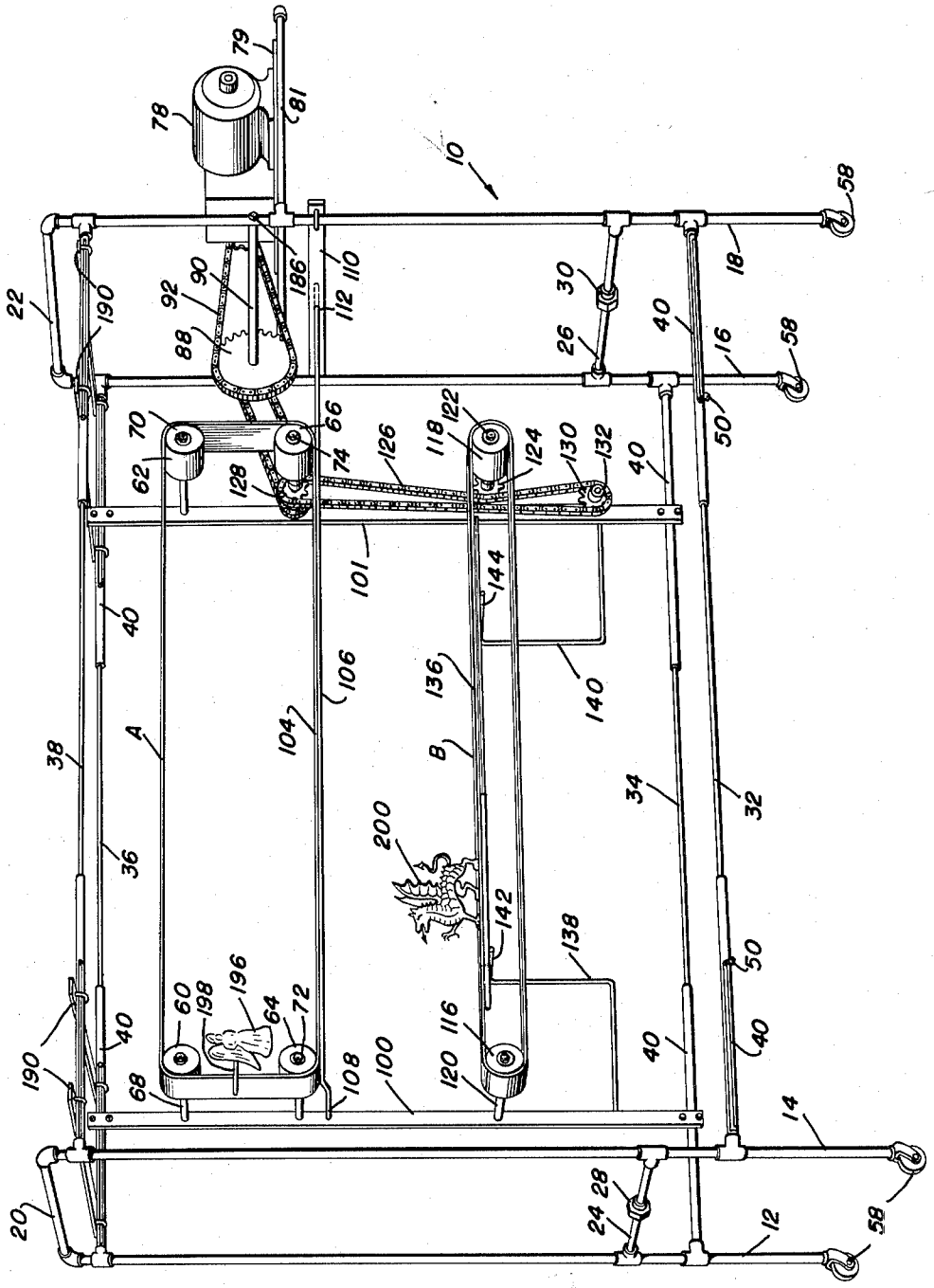


Fig. 1

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ELECTRICAL MOVING CHART

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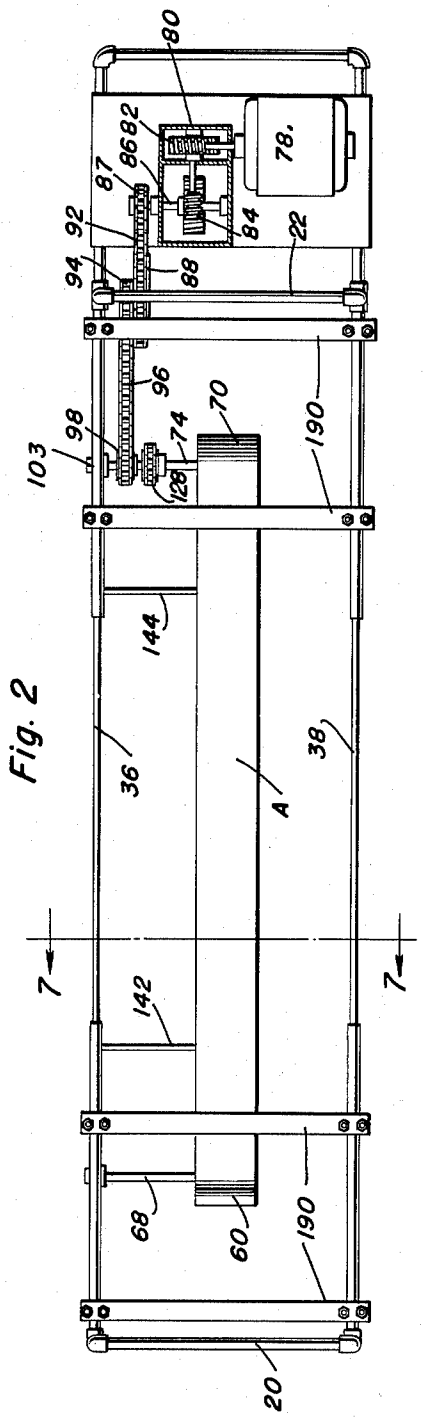


Fig. 2

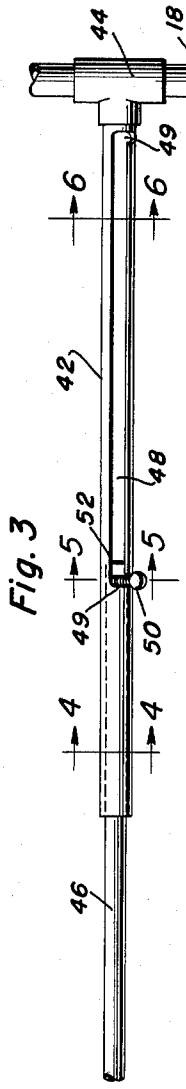


Fig. 3

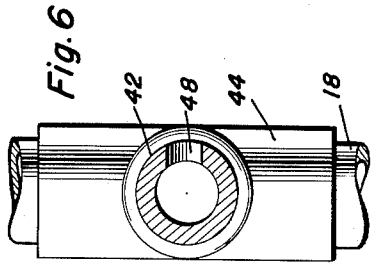


Fig. 6

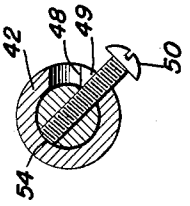


Fig. 5

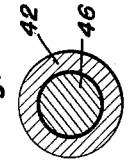


Fig. 4

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ELECTRICAL MOVING CHART

Filed July 2, 1951 3 Sheets-Sheet 3

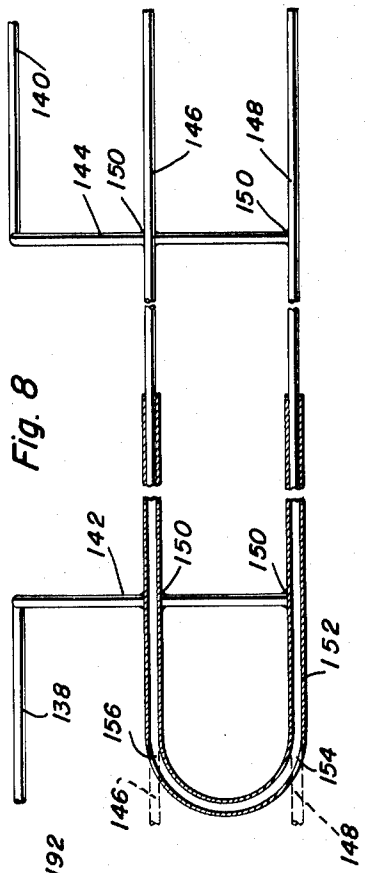


Fig. 8

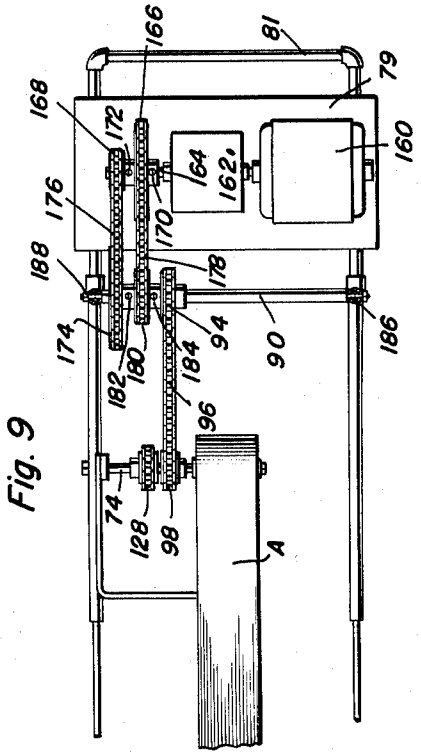


Fig. 9

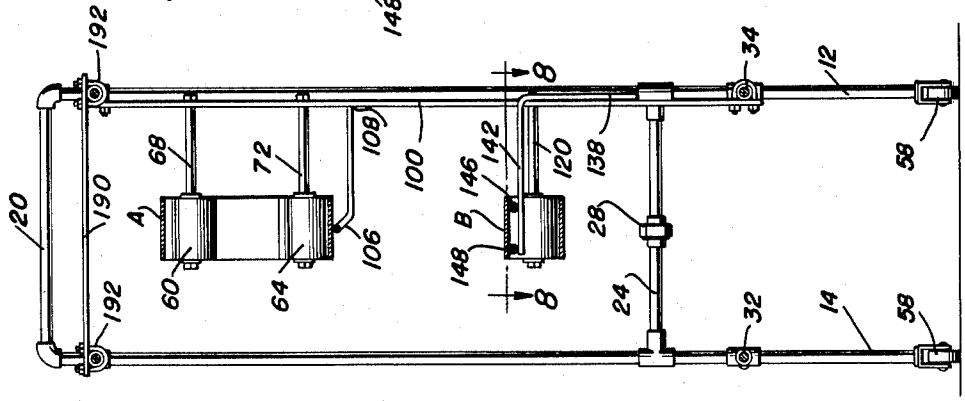


Fig. 7

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2,730,826

ELECTRICAL MOVING CHART

Ernest Ray Hayhurst, Richwood, Va.

Application July 2, 1951, Serial No. 234,815

4 Claims. (Cl. 40—32)

This invention relates to illustrative charts, and more particularly to an electrically operated multi-moving chart or apparatus which is useful in the presentation of illustrative lectures, sermons, and the like.

While the invention will be illustrated and described hereinafter in an embodiment adapted for depicting the coordinated travel of biblical and theological characters through the ages, it will be readily apparent that the invention may be used with equal facility in the displaying and demonstration of other characters, objects, materials, and the like, the relationship of which with respect to time, process, or use is to be illustrated.

It is the principal object of the invention to provide a display apparatus of the character described comprising a plurality of moving charts upon which is adapted to be arranged various figures or objects which it is desired to display and concurrently move along at the same or at a different speed.

Another object of the invention is to provide a display apparatus, as described, which comprises a plurality of charts which are operatively connected so as to be movable in a predetermined manner and utilized in a common prime mover.

An important feature of the invention comprises the utilization of a plurality of endless films or belts which are arranged to be driven simultaneously while supported on a frame, the frame being adjustable, at least longitudinally, to accommodate charts or belts of different sizes or lengths. Another feature of the invention resides in the provision of adjustable supports for maintaining the travelling films carrying the objects to be displayed on an even keel, and whereby the moving charts may be arranged one above the other and operated without interference.

These, together with various ancillary features and objects of the invention, which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated by way of example only, in the accompanying drawings, wherein:

Figure 1 is a perspective view of an electrically operated moving chart that is constructed and operated in accordance with this invention;

Figure 2 is a plan view of the apparatus shown in Figure 1;

Figure 3 is a fragmentary detail view on an enlarged scale showing the telescoping tubular frame construction which provides for longitudinal adjustment while preventing the tubular members from coming apart when adjusting the same;

Figure 4 is a cross-sectional view taken on the plane 4—4 of Figure 3;

Figure 5 is a similar cross-sectional view taken on the plane 5—5 of Figure 3 and illustrating the means provided for adjustably positioning the tubular frame members and maintaining the same in telescoping interlocked arrangement;

Figure 6 is a cross-sectional view taken on the plane 6—6 of Figure 3;

Figure 7 is a vertical sectional view taken on the plane 7—7 of Figure 2 and looking in the direction of the arrows;

Figure 8 is an enlarged fragmentary view, partly in section, and illustrating the arrangement for adjustably supporting the endless belt or film and comprising the moving charts; and

Figure 9 is a plan view similar to Figure 2, partly broken away, and illustrating a modification of the driving arrangement for moving the charts.

Referring now specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, it will be seen that the display chart or apparatus, as illustrated in Figure 1, comprises two endless travelling belts A and B which are supported for movement on an adjustable frame, generally designated 10. The frame, which is preferably constructed of light-weight, tubular members or pipe sections suitably threaded together, comprises upstanding leg members 12 and 14, and 16 and 18 arranged in pairs which are connected together at the top by the cross-frame members 20 and 22, respectively. These pairs of leg members are joined together below their middle section by pipe sections 24 and 26, respectively, the lower pipe cross-frame members being suitably joined by means of unions 28 and 30. These opposed pairs of upstanding leg members are adjustably secured together by means of telescoping pipe sections 32 and 34 arranged near the bottom thereof, and longitudinally extending members 36 and 38 positioned near the top.

To allow for longitudinal adjustment of the frame 10, the members 32, 34, 36, and 38 are connected at opposite ends to the frame by telescoping pipe and rod sections, generally indicated at 40, the construction of which is best shown in Figure 3. As illustrated, the construction comprises a tubular section 42 which is threaded at its outer end into the T-fitting 44 on a leg member, such as 18. At the opposite end, the tubular section 42 is arranged to receive a smaller diameter rod 46 in telescoping engagement. The tubular section 42 is provided on its outer side with an elongated slot 48 having the communicating vertically disposed end slot portions 49 for slidably receiving a set screw 50 which is threaded onto the end portion 52 of the rod 46. Thus, by turning down the set screw 50 so that it engages the inner surface of the tubular section 42, as at 54 (Figure 5), the rod 46 and tubular member 42 may be firmly held against relative movement. The end slot portions 49 are provided to receive the set screw 50 when it is desired to lock the rod 46 to member 42 in either a fully extended or retracted position. Further, when adjusting the length of the rods 46, as by loosening the set screw 50 and slidably adjusting the rod in the tubular section 42, the set screw prevents the rod from sliding out of the tubular member 42 by engagement of the same against the inner end surface portion of the slot 48. If desired, the rod member 46 may be a hollow tube pipe instead of a solid rod.

A sturdy, unitary frame structure is thus provided which is longitudinally adjustable for supporting the endless belts A and B and associated operating mechanism. To permit the apparatus to be readily moved about, as desired, casters 58 are suitably mounted on the lower ends of the leg members 12, 14, 16 and 18, respectively, as illustrated in Figure 1.

As illustrated in Figure 1, the endless belt member A is supported for movement over the rollers 60, 62, 64, and 66, the rollers 60, 62 and 64 being suitably journaled on the stub axles 68, 70, and 72, respectively. To drive the belt, the roll 66 is keyed to a driven shaft 74 which is

geared to a motor 78. The motor and associated speed reducer are suitably supported on a base 79 which in turn is supported on the pipe frame extension 81. The motor 78 is operatively connected to the shaft 74 through a speed reducer 80, which, as illustrated in Figure 2, comprises interconnected worms 82 and 84 for driving a sprocket shaft 86 at the desired speed. A small sprocket 87 is mounted on the outer end of the shaft 86 and is arranged to drive a larger sprocket 88 on a shaft 90 by means of a chain 92.

A small sprocket 94 carried by the shaft 90 is operatively connected through a chain 96 to a sprocket 98 which is keyed to the shaft 74. Accordingly, operation of the motor 78 causes rotation of the shaft 74 through the interconnecting chain and sprocket mechanism whereby the roller 66 which is keyed to the shaft 74 is driven, to cause movement of the belt A over the rollers. The rollers 60, 62, 64 and 66 are suitably supported on the vertically arranged spaced bars 100 and 101 which are fastened to the longitudinally extending adjustable frame members 34 and 36, as shown in Figure 1. The driven shaft 74 upon which the roller 66 is mounted is suitably journaled in the bar 101, as shown at 103. For preventing sagging of the belt A as it passes along the bottom section 104, a rod 106 is arranged centrally therebeneath so as to extend therealong and form a support for the belt A, the rod 106 being supported at one end, as at 108, in the bar 109, and at the opposite end in a cross-bar 110 fastened to the uprights 16 and 18, as at 112. The rod 106 is slidably supported in the cross-bar 110 to provide for longitudinal movement of the rod relative to the cross-bar, as illustrated in Figure 1 by the dotted lines.

Arranged below the endless belt A is the second endless belt member B. This second endless belt is supported for movement on the rollers 116 and 118, the roller 116 being suitably supported for rotation on the stub shaft 120 which in turn is supported on the vertical bar 100. The roller 118 is keyed to the shaft 122 which is suitably journaled in the vertically arranged bar 101. For driving the endless belt B, a sprocket 124 is keyed to the shaft 122, which is suitably journaled in the upright bar 101, the sprocket being arranged to be driven from the shaft 74. This is accomplished by means of a chain 126 which is operatively connected to a sprocket 128 on the shaft 74 and running over the idler sprocket 130 mounted on the stub axle 132 which is carried by the bar 101, as illustrated in Figure 1.

For adjustably supporting the belt B along the upper section or run 136, there are provided S-shaped members 138 and 140 which are fastened to the vertical supports 100 and 101, respectively. These S-shaped members are provided with an outwardly or forwardly extending end portion 142 and 144, respectively, which are arranged to provide a lateral support for the parallel bars 146 and 148 which are arranged to extend longitudinally beneath the belt B. These parallel bar members 146 and 148 are suitably welded or otherwise secured to the laterally extending S-shaped members. The members 146 and 148 are suitably fastened, as by welding, to the laterally extending supporting sections 142 and 144, as shown at 150 in Figure 8. To provide for longitudinal adjustment of the parallel bars 146 and 148, a U-shaped tubular end section 152 is provided, and which is suitably fixed to the lateral support 142 and arranged to telescope over the bars 146 and 148, apertures 154 and 156 being provided in the U-shaped member 152 in order to permit the ends of the bars 146 and 148 to extend therethrough when the supports are moved closely together, and as illustrated by the dotted lines in Figure 8.

Referring to Figure 9, a modification of the driving mechanism for the endless belt is shown, wherein provision is made for changing the speed so that two different speeds may be employed. In this modification, a motor 160 which is suitably mounted on the base member 79, similar to the embodiment shown in Figure 1, is connected through a speed reducer 162 and the driven shaft 164 which extends therefrom carries a large sprocket 166

and a smaller sprocket 168. These sprockets are keyed to the shaft 164 by means of set screws 170 and 172, respectively. The small sprocket 168 is arranged drive a large sprocket 174 on the shaft 90 by means of a chain 176. Similarly, the large sprocket 166 is drivingly connected by means of a chain 178 to a small sprocket 180 mounted on the shaft 90, these sprockets 174 and 180 being keyed to the shaft by means of set screws 182 and 184, respectively. The shaft 90, upon which the sprocket 94 is fixed, is suitably journaled at its outer ends, as at 186 and 188, in the upstanding frame members 18 and 16, respectively.

Utilizing the arrangement shown in Figure 9, the shaft 90 may be driven at two different speeds. For example, assuming the shaft 90 is driven by the pair of sprockets 168 and 174, and it is desired to change the speed to a higher one, it is only necessary to loosen the set screws 172 and 182 to release or loosen the sprockets on the operating shafts and turn down the set screws 170 and 184 so that the shaft 90 will now be driven by the larger sprocket 166 and cooperating smaller sprocket 180 on the shaft 90. Thus, by driving the shaft 90 by means of one or the other of the pairs of sprockets, two different speeds may be easily obtained.

To provide a suitable base for supporting various objects, such as may be positioned on the endless belts A and B, spaced pairs of slats or bars 190 are suitably fixed to the top frame members 36 and 38 at opposite ends of the frame. These slats are preferably attached to the adjustable frame members 40 by U-bolts 192.

As illustrated in Figure 1, there is arranged for movement on the endless belt A an angelic figure 196 which is pivotally secured to the outer end of a flat metal strip 198 which extends outwardly from the edge of the belt and is suitably fastened to the belt, as illustrated in Figure 1. By thus pivotally mounting the figure 196 on the outer end of the strip member 198, the object tends to remain upright during movement of the belt and the figure or object to be displayed does not interfere with the support 106 positioned beneath the lower run of the belt. Upon the lower endless belt B objects, such as a dragon 200, are suitably fixed upon the surface of the belt so as to pass around the rollers 116 and 118 when the belt is driven. As will be readily understood, other figures, charts or objects, of course, may be similarly mounted on the endless belts and operated so as to be carried along simultaneously and displayed as the belts are driven.

It will further be appreciated that by shifting of the chain drive 126 relative to the sprocket 124 so that the opposite run of the chain drives the sprocket, the direction of travel of the belt B may be changed relative to the belt A, as desired.

From the foregoing, the construction and operation of the device will be readily understood, and further description and explanation is believed unnecessary. However, inasmuch as numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and, accordingly, all suitable modifications and equivalents may be resorted to falling within the scope of the appended claims.

Having described the invention what is claimed as new is:

1. A moving display chart comprising a frame, said frame being adjustable horizontally, horizontally disposed endless belt means arranged for movement on said frame and upon which objects for display are adapted to be mounted, means for driving said belt, and means for varying the directional movement and the travelling speed of said belt, said horizontally adjustable frame comprising a means for tensioning said endless belt means.

2. In a device of the character described, a frame, means for adjusting said frame to vary its width, a plurality of endless belts mounted for movement on said

frame, said belts being disposed one above the other, longitudinally extending means arranged beneath the major portion of the lower run of said upper belt to maintain said run free from sagging, longitudinally extending means disposed beneath the major portion of the upper run of said lower belt for preventing the sagging of said belt, and means for driving said endless belts concurrently, said longitudinally extending means being longitudinally adjustable in response to adjustment of said frame.

3. A moving display chart comprising a portable frame, said frame including end members, longitudinal members connecting said end members, spaced brackets mounted on said longitudinal members adjacent said end member, sets of rollers on said brackets, conveyor belts entrained over said sets of rollers between said brackets, drive means on said frame for said conveyor belts driving at least one roller from each set, said longitudinal members being horizontally adjustable for moving said brackets toward and away from each other to vary the length of the conveyor belt runs, support means for one of the runs of each conveyor belt, said support means being horizontally adjustable with said longitudinal members, said sets of rollers being arranged in vertically spaced relation to one another.

4. A moving display chart comprising a portable frame, said frame including end members, longitudinal members connecting said end members, spaced brackets mounted on said longitudinal members adjacent said end members, sets of rollers on said brackets, conveyor belts entrained

over said sets of rollers between said brackets, drive means on said frame for said conveyor belts driving at least one roller from each set, said longitudinal members being horizontally adjustable for moving said brackets toward and away from each other to vary the length of the conveyor belt runs, support means for one of the runs of each conveyor belt, said support means being horizontally adjustable with said longitudinal members, said sets of rollers being arranged in vertically spaced relation to one another, said drive means including vertically spaced gears on one of said brackets, an endless chain entrained over said gears, one of said gears driving a roller of one set of rollers, a gear mounted on one of the rollers of the other set of rollers selectively engaging each run of the chain to drive the second conveyor belt unidirectionally with and in reverse direction to the second conveyor belt.

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