May 22, 1934.

H. A. PHILLIPS

1,959,735

CONVEYER

Filed Dec. 14, 1932

3 Sheets-Sheet 1

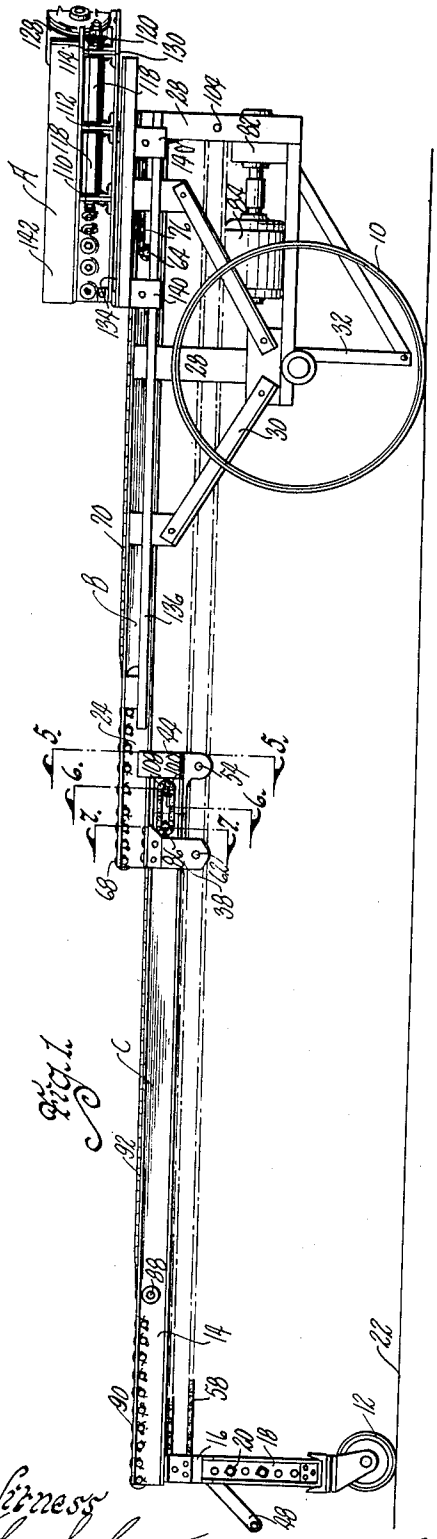


Fig. 1.

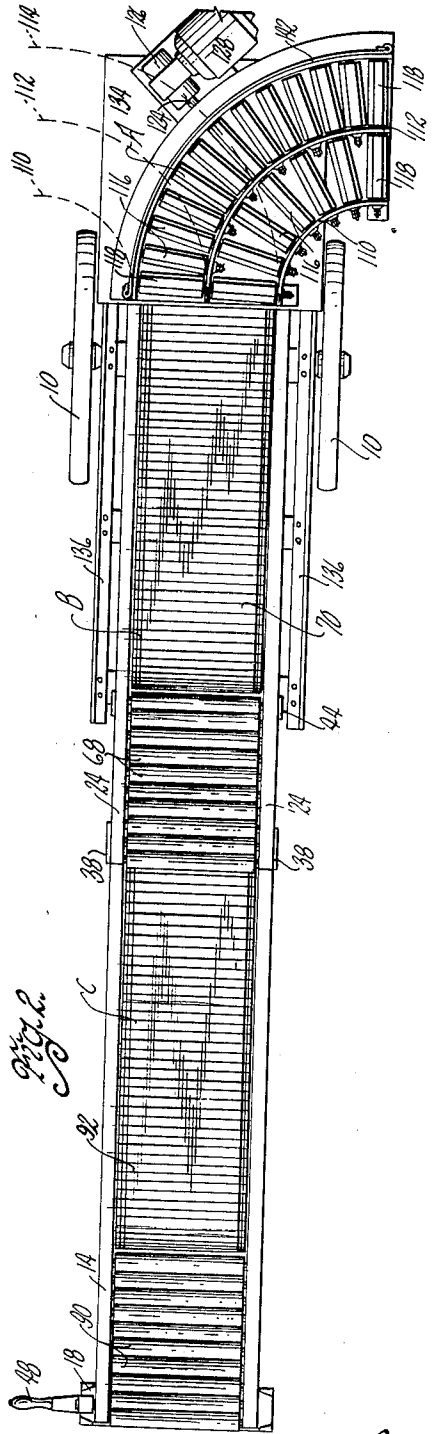


Fig. 2.

Witness
Edw. Leeles

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Attorneys

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Fig. 3.

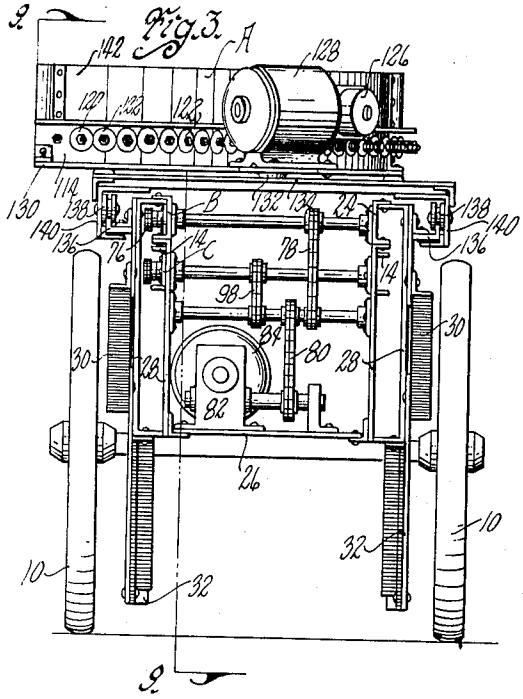


Fig. 5.

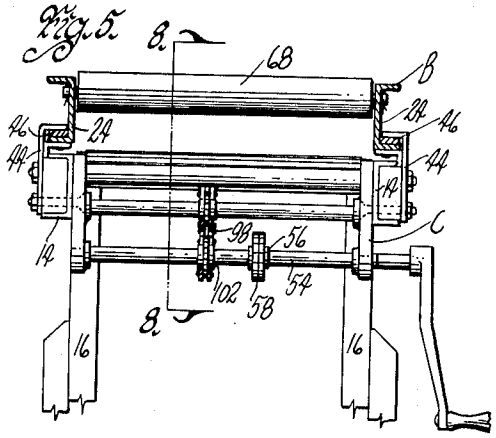


Fig. 6.

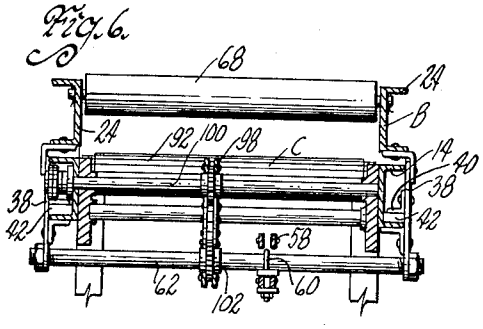


Fig. 4.

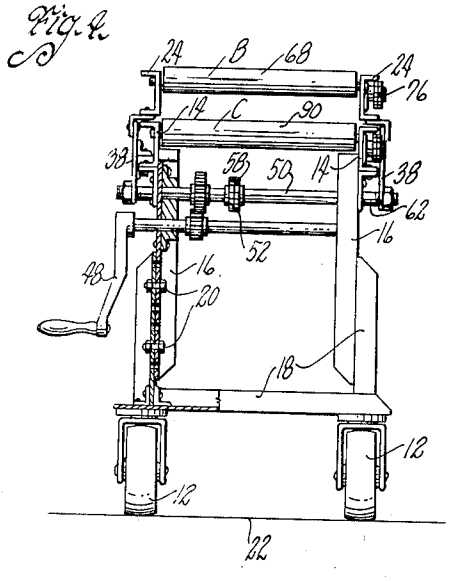


Fig. 7.

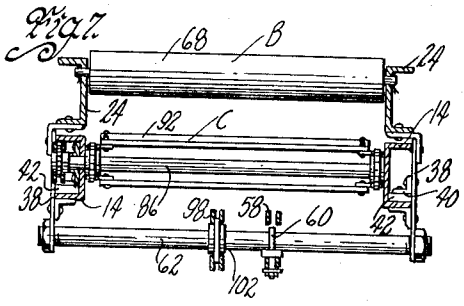
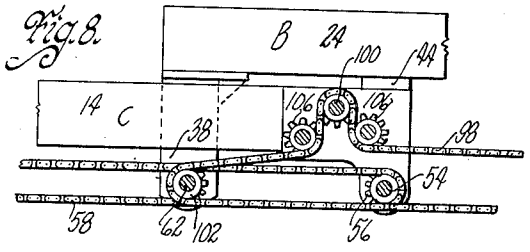


Fig. 8.



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CONVEYER

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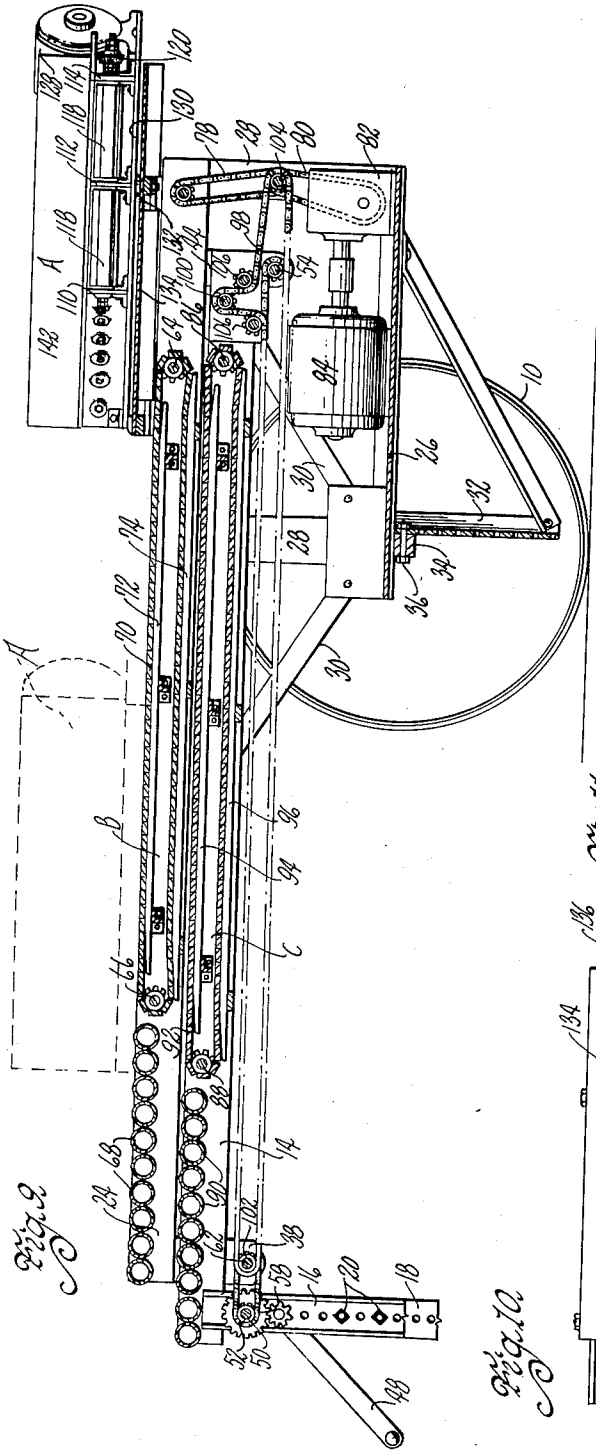


Fig. 9

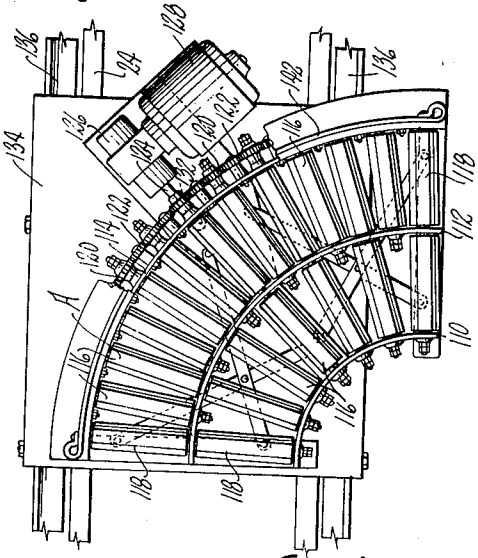


Fig. 10

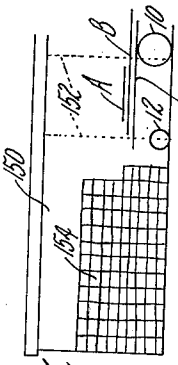


Fig. 13

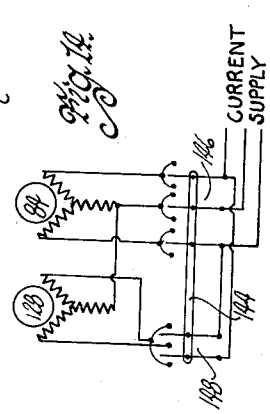


Fig. 14

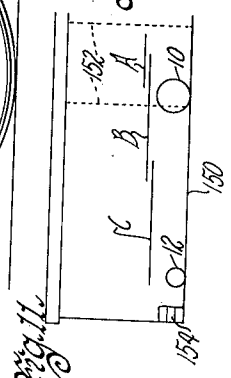


Fig. 11

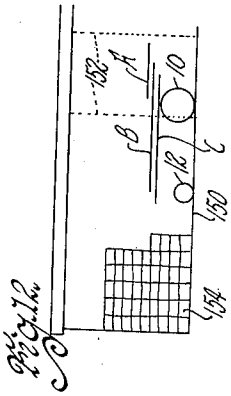


Fig. 12

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Patented May 22, 1934 1,959,735

UNITED STATES PATENT OFFICE

1,959,735

CONVEYER

Howard A. Phillips, Ottumwa, Iowa

Application December 14, 1932, Serial No. 647,078

26 Claims. (Cl. 198—3)

The object of my invention is to provide a conveyer which is simple, durable and comparatively inexpensive to manufacture.

More particularly, it is my object to provide a conveyer which is especially adapted for loading or unloading box cars, the conveyer being so constructed that it can be placed in the box car and quickly adjusted so as to extend from the door to the far end of the car or convey articles just inside the door as desired, the adjustment being readily effected while the conveyer is in operation.

Still a further object is to provide a conveyer unit having means for conveying in a substantially straight line and another unit for conveying articles in a curved line, the units being associated so that articles can be received laterally through a box car door, conveyed in a curved line and then conveyed in a straight line substantially longitudinal relative to the car.

Still a further object is to provide a conveyer which is wheel mounted so that it can be wheeled into and out of a box car and wheeled to various positions in the car, as desired, the wheels being so associated with the conveyer that the conveyer can be supported at different heights relative to the car floor.

Still another object is to provide a conveyer comprising a telescoping frame with a pair of straight line conveyers supported thereon and a curved line conveyer supported on the frame, the curved line conveyer being movable longitudinally of the straight line conveyers for adjustment purposes.

Still another object is to provide the curved line conveyer with a rotatable mounting which permits reversing thereof so that the conveyer construction can be used to receive articles from either side of the box car and to discharge to either end of the car.

Still another object is to provide power means for operating the conveyer units regardless of their various positions of adjustment and control means for the power means which can be manipulated to cause operation of the curved line conveyer in the proper direction after it has been adjusted to a reverse position.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings. Although the invention is susceptible of a variety of embodiments, it is unnecessary to fully describe and illustrate more than one in order to give a full understanding of the invention both from its structural and functional standpoints. Accordingly, I have illustrated a preferred and desirable embodiment of the invention in the accompanying drawings, in which:

Figure 1 is a side elevation of a conveyer embodying my invention.

Figure 2 is a plan view of the same.

Figure 3 is a rear elevation of the conveyer.

Figure 4 is a front elevation thereof.

Figures 5, 6 and 7 are enlarged vertical sectional views on the lines 5—5, 6—6 and 7—7, respectively, of Figure 1.

Figure 8 is a sectional view on the line 8—8 of Figure 5.

Figure 9 is a sectional view on the line 9—9 of Figure 3.

Figure 10 is an enlarged plan view of the right end of Figure 2.

Figures 11, 12 and 13 are diagrammatic views showing the conveyer in use in a box car; and

Figure 14 is an electro-diagrammatic figure of control means for electric motors which operate the conveyer.

On the accompanying drawings, I have used the reference numeral 10 to indicate rear wheels and 12, front caster wheels for supporting the conveyer. The conveyer has three distinct units, a curved line conveyer A and straight line conveyers B and C. These are mounted on a suitable framework, the details of which will now be described.

The frame for the conveyer C comprises side bars 14 and vertical front end bars 16. The bars 16 are adjustably associated with a U frame 18 to which the front caster wheels 12 are pivoted. As shown in Figure 9, a series of openings are provided and bolts 20 serve to bolt the bars 16 to the U frame 18 with the conveyer unit C at any desired elevation with respect to the floor 22 on which the wheels 12 rest.

The conveyer B is supported by side bars 24. Connected with the side bars 24 is a platform 26. Upright bars 28 and angular braces 30 serve as the means of connection between the side bars 24 and the platform 26. Upright legs 32 are provided on the platform 26. An axle 34 for the rear wheels 10 is detachably connected with the uprights 32 by bolts 36. A plurality of perforations in each upright 32 provides for connection of the axle 34 at different vertical positions relative to the uprights. Thus the rear end of the conveyer can be adjusted for height as desired.

The side bars 14 and 24 are telescopically as-

sociated with each other. At the front end of the side bars 24, downwardly extending arms 38 are provided. These are provided with angle bars 40 to which brass shoes 42 are secured for sliding on the tops of the lower flanges of the front side bars 14 which are channel-shaped, as shown in Figures 6 and 7.

At the rear ends of the side bars 14, upstanding arms 44 are provided which have secured thereto, brass shoes 46 for sliding along the upper surfaces of the lower flanges of the rear frame bars 24 which are also channel-shaped, as shown in Figure 5. Thus it will be obvious that the side bars 14 and 24 are telescopically arranged relative to each other and the frame consisting of these bars and associated parts thus far described is entirely supported by the wheels 10 and 12.

I provide a means for readily and quickly adjusting the side bars 14 and 24 and thereby the conveyers C and B relative to each other. This means consists of a crank 48 geared to a sprocket shaft 50 (see Figure 4). A sprocket 52 is provided on the shaft 50. Depending ends of the arms 44 carry a cross shaft 54 having an idler sprocket 56 thereon. A chain 58 extends around the sprockets 52 and 56. One stretch of the chain is secured by a U bolt 60 to a shaft 62 which is supported by the depending ends of the arms 38. It will thus be obvious that rotation of the crank 48 in one direction will move the shaft 62 longitudinally in one direction relative to the front side bars 14 and vice versa. This will result in moving the conveyer units B and C telescopically relative to each other.

The conveyer B comprises rear and front shafts 64 and 66, a plurality of idler rollers 68 and a chain and slat type conveyer belt 70. The conveyer belt 70 is suitably associated with the shafts 64 and 66 as shown on the drawings for conveying operation when these shafts are rotated and the upper and lower stretches of the belt are supported by longitudinally arranged bars 72 and 74, respectively.

For driving the conveyer belt 70, I provide chain connections 76, 78 and 80. The connection 80 is with a gear box 82 with which a motor 84 is connected for operating the gearing thereof which, of course, is of step down type to operate the conveyer belt 70 at a proportionally lower speed than the motor 84 operates.

The conveyer B being mounted on a frame rigid with the platform 26 makes it possible to provide the chain connections 76, 78 and 80 with the belt 70. The conveyer C comprises rear and front shafts 86 and 88, idler rollers 90 and a chain and slat type conveyer belt 92. The upper and lower stretches of the belt 92 are supported by bars 94 and 96, respectively.

The gear box 82 and the conveyer C are relatively adjustable as disclosed by the foregoing description. In order to drive the conveyer C in any of its adjusted positions, I provide the following described mechanism. A chain 98 is provided for driving purposes. It drives a shaft 100 which is journalled on the arms 44 (see Figure 8). It also extends around an idler 102 mounted on the shaft 62. The shaft 62 and a shaft 104 with which the chains 78, 80 and 98 are associated are therefore both carried by the rear side bars 24. Idlers 106 (see Figure 8) are provided for the chain 98.

For transmitting rotation from the shaft 100 to the shaft 86, I provide a chain 108. During the telescoping adjustment of the conveyer units B and C, the sprockets 106 are merely carried along the chain 98 without tending to shorten or lengthen the chain. Thus the shaft 86 and consequently the conveyer C are properly driven in all positions of adjustment.

The curved line conveyer unit A comprises curved frame bars 110, 112 and 114 which support a plurality of rollers 116 and 118. The rollers 116 are driven rollers, while the rollers 118 are idler rollers, there being two idlers at each end of the conveyer unit.

The driven rollers 116 are geared together by gears 120, idler gears 122 being interposed between the gears 120. The shaft of the central roller is indicated at 124. It extends into a gear box 126 which is driven by an electric motor 128.

The frame bars 110, 112 and 114 are suitably mounted on a platform 130. The platform is pivoted at 132 to a supporting plate 134 for horizontal rotary movement. The supporting plate 134 is in turn supported on track members 136 (see Figure 3) by rollers 138 which are journalled on depending side bars 140 of the supporting plate 134. A guard plate 142 is arranged along the diverging ends of the rollers 116 and 118.

The conveyer A is rotatable about the pivot 132 from the full line position of Figure 2 to the dotted line position thereof. This is so that articles can be received from either side of the machine.

In Figure 14, I have illustrated a control switch 144 for controlling the motor 84 for the conveyers B and C and the motor 128 for the conveyer A. The right section 146 of the switch serves to energize the motor 84 and cause it to travel in one direction regardless of which direction from center the section 146 is swung.

The section 148 of the switch, however, causes rotation of the motor 128 in one direction when the switch is thrown in one direction and vice versa. This is necessary because it is always required that the conveyers B and C travel in one direction, while after reversing the position of the conveyor unit A, it is required that it travel in an opposite direction so that the rollers 116 will be rotated in the proper direction for discharge onto the conveyer unit B.

The particular arrangement of the conveyers B and C so that they can telescope apart or together and the arrangement of the conveyer unit A so that it is reversible and also longitudinally adjustable relative to the conveyer B by rolling its wheels 133 along the track 136 adapts the conveyer disclosed for use in a box car. Diagrammatically this is shown in Figures 11, 12 and 13. In Figure 11, the conveyer is extended to its fullest extent with the unit A at its rearmost position. In this position, the loading is started. The box car is indicated at 150 and the door thereof at 152. Articles are received on the conveyer A which gives them a quarter turn and discharges them onto the conveyer B. From the conveyer B, they are discharged onto the conveyer C and then deposited as indicated at 154 by a man in the car. As the loading progresses, the conveyer may be progressively shortened to the position of Figure 12 by rotating the crank 48.

This is the full contracted position of the units B and C. As the loading further progresses, the units B and C can be pushed back by rolling the entire machine on the wheels 10 and 12 to the position of Figure 13, for instance. Pushing back of the conveyer can be accomplished progressively and likewise pulling forward of the unit A relative to the conveyers B and

C can be accomplished progressively in order to keep the conveyer unit A within the outline of the door 152 so that it can properly receive articles from men loading the conveyer or from a conveyer extended from the warehouse, for instance. In the full contracted position of Figure 13, the conveyer device is quite short so that it can be revolved within the box car to load the other end thereof or can be manipulated for entrance or exit relative to the box car. The particular combination of adjustments, it will be obvious, especially adapts the conveyer for box car loading as just described.

The conveyer unit A might be driven from the motor 84, but this would considerably complicate the driving mechanism. Although I have shown slat type conveyer belts, it will be obvious that any other type such as a flexible belt or driven rollers could be used instead. I have shown the conveyer constructed for loading a box car. It can also be constructed for unloading a box car by placing the conveyer B below the conveyer C and the conveyer A below the conveyer B. All the conveyer belts and conveyer rolls are then reversed so as to convey articles from inside the car to the door thereof.

Such a departure from the actual construction shown and other changes might be made without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit for conveying in a curved line to the first means, said second unit being mounted for such rotary adjustment with relation to the first unit that either end thereof may register with said first unit and for adjustment lengthwise of the first unit.

2. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, and a third unit for conveying in a curved line to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and also adjustable about a vertical pivot at the center of said second unit so that either end thereof may register with said second unit.

3. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, and a third unit for conveying in a curved line to the second unit, said third unit being mounted for such rotary adjustment with relation to the second unit that it may assume two positions, one with one of its ends registering with the second unit and its other end extending from one side thereof and the other position with said other end registering with the second unit and the first mentioned end extending from the opposite side of said second unit.

4. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, and a third unit for conveying through a quarter circle to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and for such rotary adjustment with relation to the second unit that either end thereof may register with the second unit.

5. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, a third unit for conveying in a curved line to the second unit, said third unit being mounted for end for end rotary adjustment with relation to the second unit, and independent means for operating the third unit, said independent means being reversible.

6. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, a third unit for conveying in a curved line to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and for end for end rotary adjustment with relation to the second unit, and reversible means for operating the third unit.

7. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, a third unit for conveying through a quarter circle arc to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and for end for end rotary adjustment with relation to the second unit, and independent reversible means for operating the third unit.

8. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit for conveying in a curved line to the first means, said second unit being mounted for rotary adjustment to reversed position with its former receiving end discharging to the first unit, power means for operating said units and control means for said power means to cause operation

thereof in the proper direction when said second unit is adjusted to said reversed position.

9. In a conveyer, a conveyer unit having a frame and means for conveying in a substantially straight line, a second unit for conveying in a curved line, said second unit being mounted on the frame for adjustment lengthwise, and for end for end adjustment rotarily, of the first unit.

10. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit having means for conveying in a substantially straight line, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units for operating them in all positions of their relative adjustment, a third unit for conveying in a curved line, said third unit being mounted for end for end rotary adjustment relative to the second unit, and independent reversible means for operating the third unit.

11. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit for conveying in a substantially ninety degree arc to the first means, said second unit being mounted for rotary adjustment to reversed position with its former receiving end discharging to the first unit, electric means for operating said units and a switch for said electric means to cause operation thereof with the circuit to the second unit reversed when said second unit is adjusted to said reversed position.

12. In a conveyer, a conveyer unit having means for conveying in a substantially straight line, a second unit for conveying in a substantially ninety degree arc to the first means, said second unit being mounted for rotary adjustment to reversed position with its former receiving end discharging to the first unit, electric means for operating said units and a switch for said electric means to cause simultaneous operation of the electric means for the first and second units in one direction or simultaneous operation of the first unit in said direction and the second unit in an opposite direction when the second unit is adjusted to said reversed position.

13. In an article conveyer, a conveyer unit having means for conveying articles in a substantially straight line, a second unit for conveying articles in a curved line, said second unit being of roller type and mounted for rotary adjustment with relation to the first unit with either end overhanging it and means for driving said first unit and for driving the rollers of said second unit in either direction depending on the end of said second unit overhanging said first unit.

14. In a conveyer, a conveyer unit having means for conveying and a second unit for conveying in a curved line to the first means, said second unit being mounted for such rotary adjustment with relation to the first unit that either end thereof may register with said first unit and for adjustment lengthwise of the first unit.

15. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, and a third unit for conveying in a curved line to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and also adjustable about a vertical pivot at the center of said second unit so that either end thereof may register with said second unit.

16. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, and a third unit for conveying to the second unit, said third unit being mounted for such rotary adjustment with relation to the second unit that it may assume two positions, one with one of its ends registering with the second unit and its other end extending from one side thereof and the other position with said other end registering with the second unit and the first mentioned end extending from the opposite side of said second unit.

17. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, and a third unit for conveying through a quarter circle to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and for such rotary adjustment with relation to the second unit that either end thereof may register with the second unit.

18. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, a third unit for conveying to the second unit, said third unit being mounted for end for end rotary adjustment with relation to the second unit and independent means for operating the third unit, said independent means being reversible.

19. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, a third unit for conveying to the second unit, said third unit being mounted for adjustment lengthwise of the second unit and for end for end rotary adjustment with relation to the second unit and reversible means for operating the third unit.

20. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying to the first unit, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units, for operating them in all positions of their relative adjustment, a third unit for conveying through a quarter circle arc to the second unit, said third

unit being mounted for adjustment lengthwise of the second unit and for end for end rotary adjustment with relation to the second unit and independent reversible means for operating the third unit.

21. In a conveyer, a conveyer unit having means for conveying, a second unit for conveying to the first means, said second unit being mounted for rotary adjustment to reversed position with its former receiving end discharging to the first unit, power means for operating said units and control means for said power means to cause operation thereof in the proper direction when said second unit is adjusted to said reversed position.

22. In a conveyer, a conveyer unit having a frame and means for conveying and a second unit for conveying, said second unit being mounted on the frame for adjustment lengthwise, and for end adjustment rotarily of the first unit.

23. In a conveyer, a conveyer unit having means for conveying, a second unit having means for conveying, said units being operatively connected for relative lengthwise adjustment for thus varying the length of the complete conveyer, a power device operatively connected with the conveying means of both units for operating them in all positions of their relative adjustment, a third unit for conveying, said third unit being mounted for end for end rotary adjustment relative to the second unit and independent reversible means for operating the third unit.

24. In a conveyer, a conveyer unit having means for conveying, a second unit for conveying to the first means, said second unit being mounted for rotary adjustment to reversed position with its former receiving end discharging to the first unit, electric means for operating said units and a switch for said electric means to cause operation thereof with the circuit to the second unit reversed when said second unit is adjusted to said reversed position.

25. In a conveyer, a conveyer unit having means for conveying, a second unit for conveying to the first means, said second unit being mounted for rotary adjustment to reversed position with its former receiving end discharging to the first unit, electric means for operating said units and a switch for said electric means to cause simultaneous operation of the electric means for the first and second units in one direction or simultaneous operation of the first unit in said direction and the second unit in an opposite direction when the second unit is adjusted to said reversed position.

26. In an article conveyer, a conveyer unit having means for conveying articles, a second unit for conveying articles, said second unit being of roller type and mounted for rotary adjustment with relation to the first unit with either end overhanging it and means for driving said first unit and for driving the rollers of said second unit in either direction depending on the end of said second unit overhanging said first unit.

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