Aug. 7, 1928.

1,680,035

B. J. BUCKINGHAM

DISPLAY APPARATUS

Filed Feb. 28, 1924

4 Sheets-Sheet 1

Fig. 1

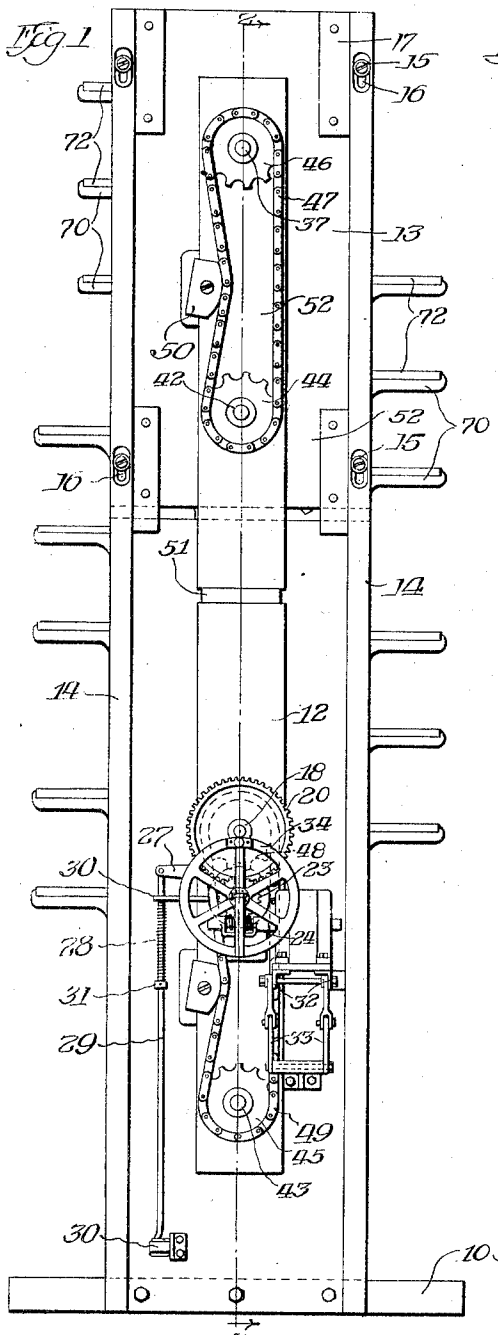
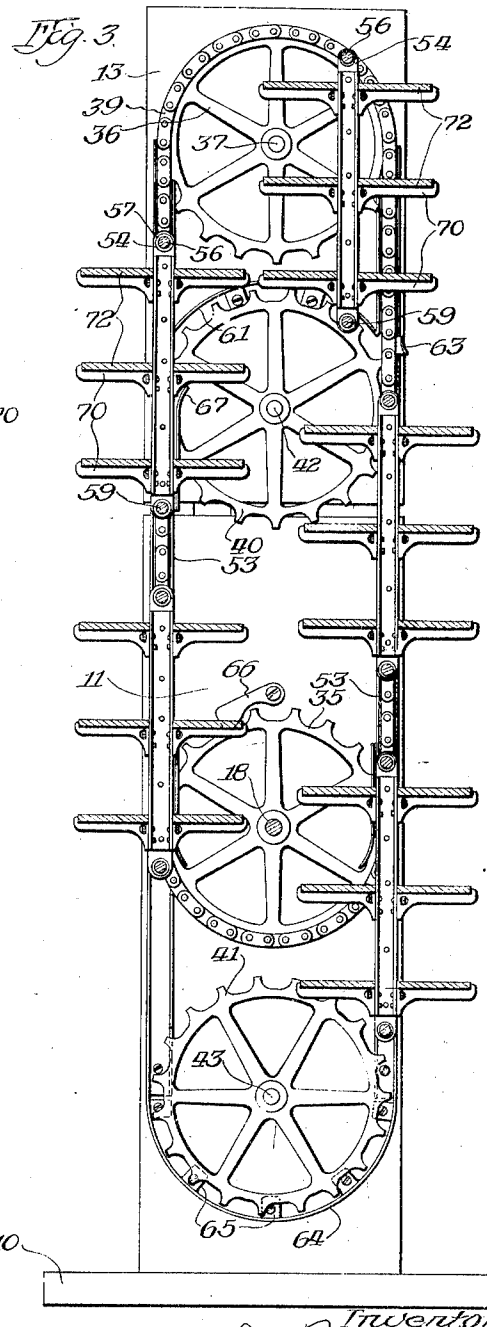


Fig. 3



Witness:

Geo. C. Sweeney

Inventor:

Benjamin J. Buckingham

By Cromwell, Greist & Madden

Attys.

Aug. 7, 1928.

1,680,035

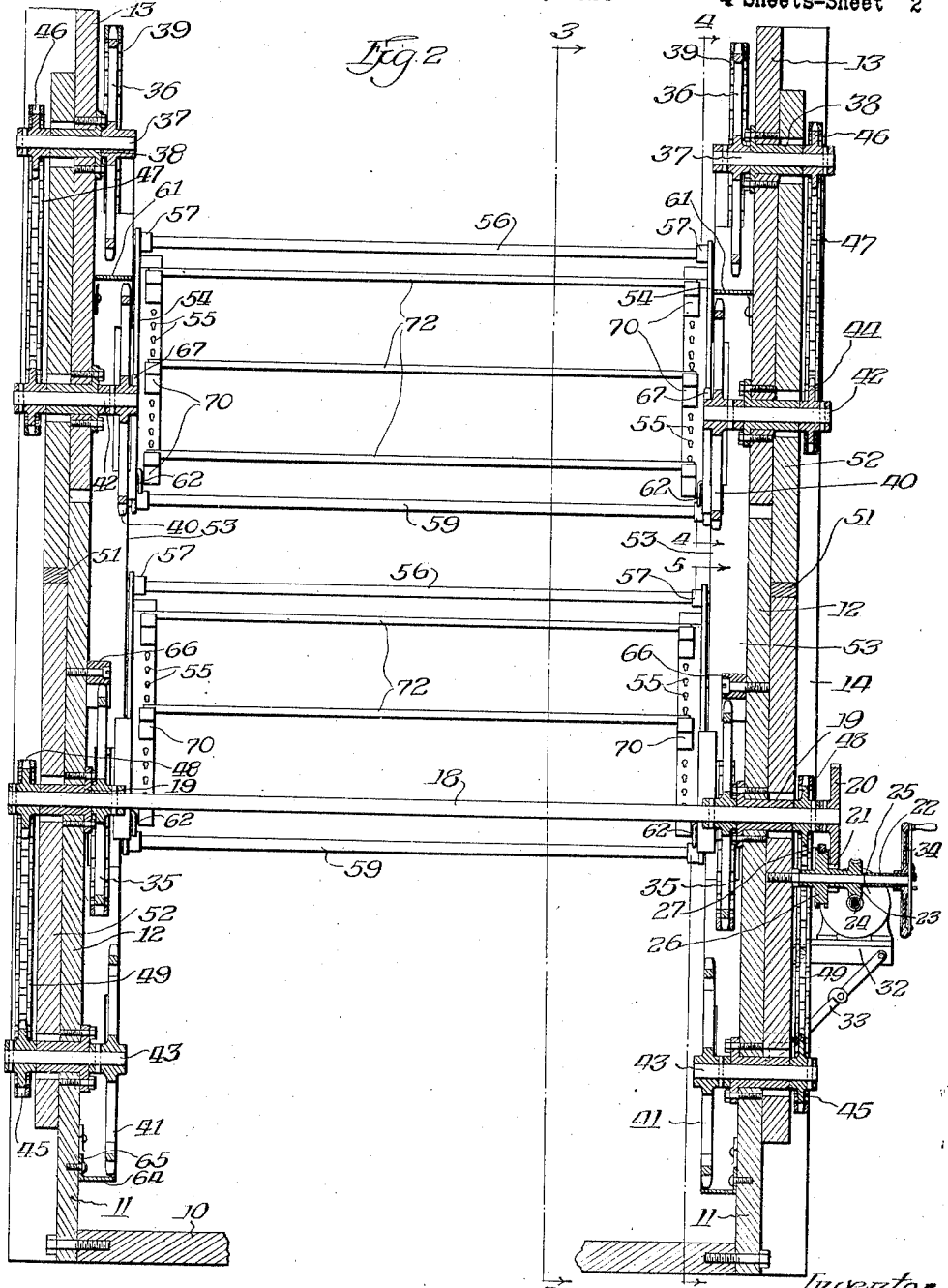
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DISPLAY APPARATUS

Filed Feb. 28, 1924

4 Sheets-Sheet 2

Fig. 2



Witness:

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Aug. 7, 1928. 1,680,035

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DISPLAY APPARATUS

Filed Feb. 28, 1924 4 Sheets-Sheet 3

Fig 4.

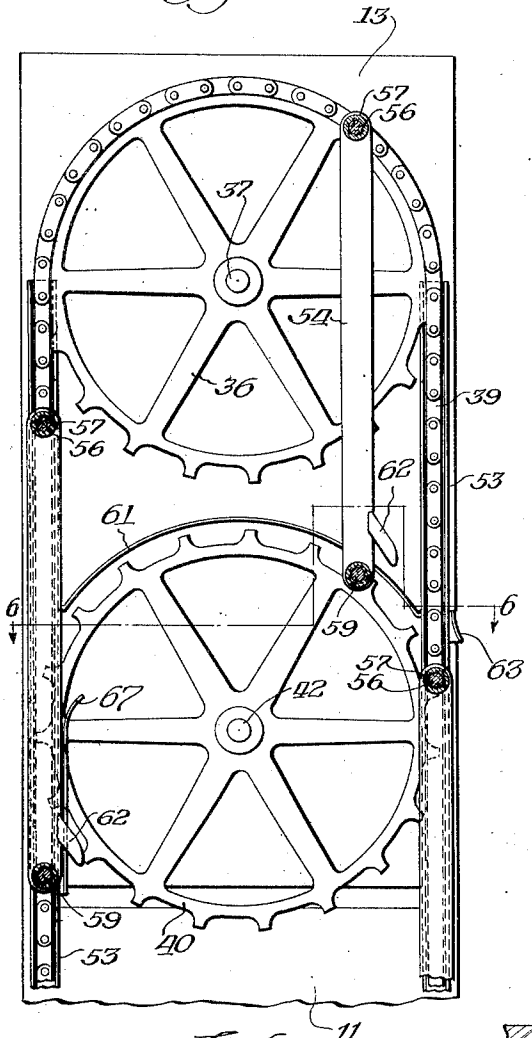


Fig 5.

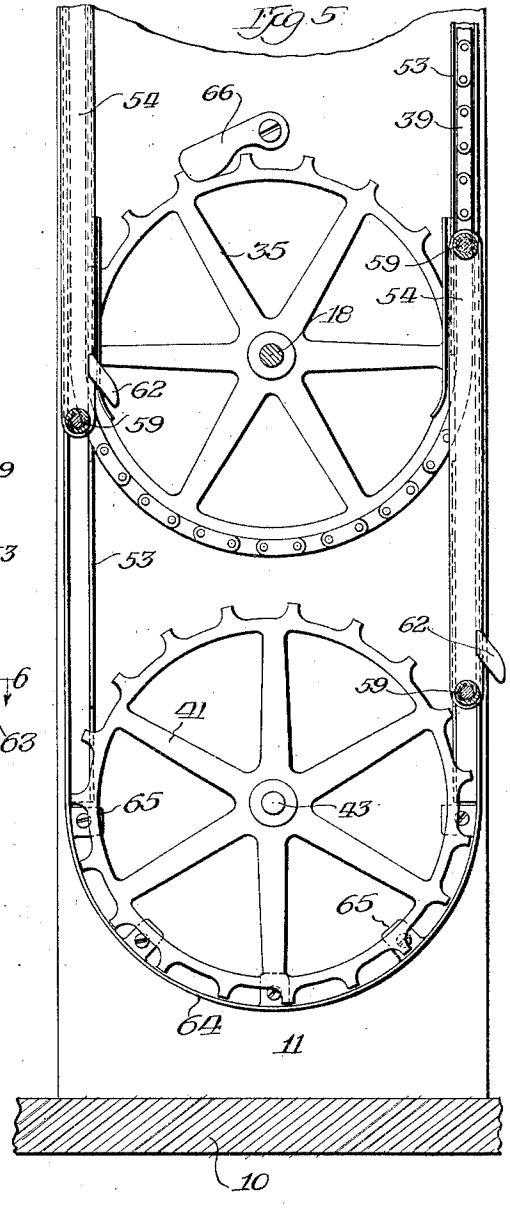
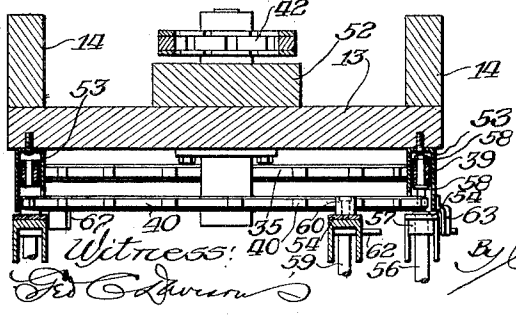


Fig 6.



Witness:

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Aug. 7, 1928.

1,680,035

B. J. BUCKINGHAM

DISPLAY APPARATUS

Filed Feb. 28, 1924

4 Sheets-Sheet 4

Fig. 7

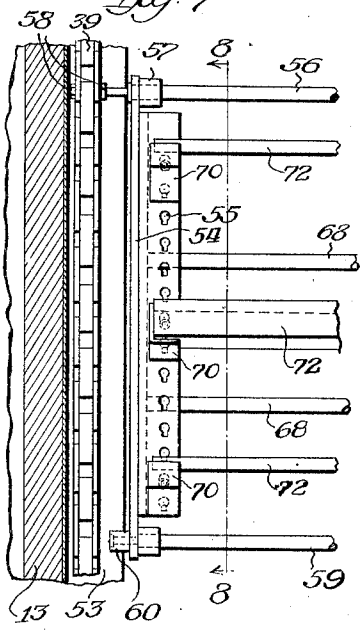


Fig 8

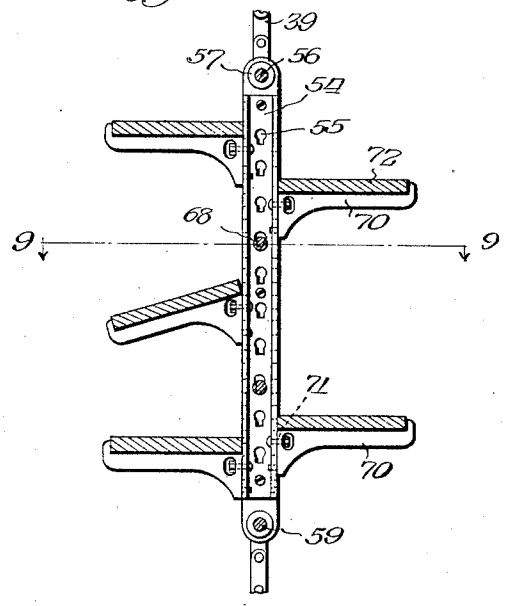
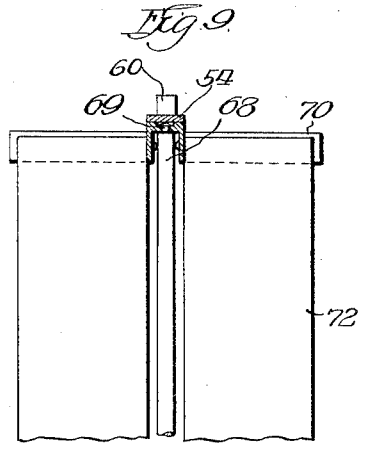


Fig 9



Witness:

Inventor:

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Attys.

Patented Aug. 7, 1928. 1,680,035

UNITED STATES PATENT OFFICE.

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DISPLAY APPARATUS.

Application filed February 28, 1924. Serial No. 695,649.

The primary object of the present invention is the provision of a display apparatus for the exhibition of articles of merchandise while such articles are travelling through a predetermined path. The articles, therefore, may be displayed in regular succession to the observer, and in convenient access for removal from the apparatus when such is desired.

More specifically, the invention contemplates an apparatus of the character mentioned designed for the combined storage and display of clothing, its construction being such as to economize in the space required for storage, thereby enabling a maximum number of garments to be stored in a minimum area, and permitting the garments successively to be displayed while so stored. The economy of storage space thus obtained is effective to eliminate to a large extent the shelving and display cases heretofore used for such purposes, and enables the proprietor of a store to reduce the floor space necessary for such shelving and cases.

Furthermore, the invention has in view the production of a display apparatus wherein provision is made to insure proper travel of the garments through the machine without liability to injury of the garments or entanglement thereof with the moving parts of the machine.

The invention also aims to provide a display apparatus such as referred to wherein the operative parts are so related as to afford a most compact organization, thereby saving in the material for the construction of the apparatus, and rendering the parts of the latter readily accessible for repair or replacement when damaged or worn.

To the accomplishment of the foregoing, and other objects which will appear as the nature of the improvements is better understood, the invention consists substantially in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and finally pointed out in the appended claims.

The embodiment of the invention herein disclosed is believed to be fully illustrative of the same, and incorporates a practical adaptation of the invention for the uses and purposes for which the same is intended. However, it is to be taken in an illustrative sense, and therefore is not to be considered as restricting the invention to that form which is herein delineated.

In the drawings,

Fig. 1 is an end elevation of a display apparatus constructed in accordance with the present invention;

Fig. 2 is a vertical sectional view thereof on the line 2—2, Fig. 1;

Fig. 3 is a view similar to Fig. 2, the plane of the section being at right angles to that of Fig. 2, as on the line 3—3, Fig. 2;

Fig. 4 is a fragmentary sectional elevation, on an enlarged scale, on the line 4—4, Fig 2;

Fig. 5 is a similar view on the line 5—5, Fig. 2;

Fig. 6 is a sectional plan view on the line 6—6, Fig. 4;

Fig. 7 is a fragmentary elevation of a portion of one of the carriers in its association with the conveyor;

Fig. 8 is a vertical sectional view thereof, as on the line 8—8, Fig. 7;

Fig. 9 is a sectional plan view, as on the line 9—9, Fig. 8.

Referring now in detail to the accompanying drawings, the herein described display apparatus includes a base 10 with which is associated a pair of suitably spaced vertical supports 11. Each of these supports is of sectional construction, so that they may be extended or retracted, for a purpose to be presently stated, to which end each support includes a lower member 12 and an upper member 13. At the outer face of each support 11, and located at the margins thereof, is a pair of vertical guide flanges 14, said flanges being connected to the lower members 12, and projecting sufficiently above the same to provide ways on which the upper members 13 are slidably mounted. The members 13 are connected to the guide flanges 14 by means of a plurality of bolts 15, said bolts passing through slots 16 which are formed in the guide flanges 14, said bolts exerting a binding action between the upper members 13 and the guide flanges, and thereby to hold the upper members in positions of adjustment with respect to the lower members 12. The upper members 13 are faced with wear-plates 17 at those portions which are contiguous to the slots 16, and at which points the bolts 15 also are located, in order to promote the binding action of the bolts 15 when the same are tightened, and also to prevent undue wear on the members

13 which may arise in the adjustment of said members with respect to the members 12.

At a suitable point in the members 12, preferably at a relatively low point with respect to the entire height of the structure, a driving shaft 18 is positioned. This shaft spans the space between the supports 11, and its ends are journalled in suitable bearings 19 connected to and extending through the lower members 12 of said supports. At the extremity of one of the projecting ends of the shaft 18 a spur gear 20 is fixedly connected so as to impart rotation to the shaft 18 when said gear 20 is actuated. The gear 20 meshes with a spur pinion 21 which is fixedly connected to a power shaft 22 through the medium of a worm wheel 23. This worm wheel 23 is in mesh with a worm 24 connected to the armature shaft of an electric motor 25. The motor 25 is controlled by suitable switch mechanism, which it is unnecessary here to describe, the same forming no part of the present invention. Suffice it to say that said switch mechanism is of such character that when the brake mechanism, about to be described, is acting to maintain the display apparatus inactive, the electric motor 25 is at rest, said motor becoming energized when the restraining action of the brake mechanism is released.

Also associated with the shaft 22 is a brake drum 26 and co-acting with said brake drum is a brake lever 27 which is adapted normally to frictionally engage the brake drum 26 and prevent rotation thereof. This is due to the action of a coil spring 28 which surrounds a link 29, one end of the latter being connected to the brake lever 27, while the other end is connected to a foot lever 30 mounted at the lower portion of the machine. The link 29 passes through a perforated arm 30 against which the upper end of the coil spring 28 abuts, the lower end of said spring contacting with a collar 31 adjustably mounted upon the link 29, and thereby permitting various degrees of compression to be imparted to the spring 28. The pressure of the spring 28 is exerted normally to force the link 29 in a downward direction, thereby exerting a pull on the brake lever 27, and establishing its frictional engagement with the brake drum 26. When, however, the foot lever 30 is manipulated by application of pressure thereon, the link 29 is pushed upwardly against the pressure of the spring 28, with a resultant release of the lever 27 from the drum 26. This release will permit the electric motor 25 to operate freely and impart the necessary driving action to the apparatus.

For convenient application of the motor 25 the same is seated upon a supporting table 32 held in proper position by an inclined strut 33.

While the motor 25 is the primary source of driving power for the herein described apparatus, provision is made for operating the same manually, for those conditions where only limited operation of the apparatus is required, and to this end there is connected to the outer extremity of the power shaft 22 a hand wheel or crank 34 through the medium of which the apparatus may be readily actuated by hand.

Suitably keyed to the driving shaft 18, at the inner side of each support 11, is a sprocket wheel 35. Each of the sprocket wheels 35 is in vertical alignment with an idler sprocket wheel 36 arranged at the inner side of the upper member 13 immediately thereabove, and said idler wheels 36 are suitably keyed to stub shafts 37 journalled in bearings 38 which are connected to and extend through said members 13. A sprocket chain 39 is trained over each of the sprocket wheels 35 and the idler sprocket wheel 36 associated therewith, said chains 39 and the article-carriers, to be presently described, constituting an endless conveyor for the storage and display of the merchandise. These chains 39 are of the usual construction employed in chain and sprocket gearing, including the customary male and female link connections, and as they travel over the sprocket wheels 35 and 36 the merchandise supported by the several carriers is transferred from one stretch to the other stretch, thereby permitting the merchandise readily to be inspected as the same may pass any given point. Furthermore, by such construction the merchandise may be compactly stored in the apparatus, and when such merchandise is in the form of wearing apparel, whether ladies' garments or those of men, it may be readily removed from the apparatus and replaced therein when such may be desired.

In carrying into effect the present invention, it is highly desirable that the article-carriers shall be maintained in vertical relation as the same traverse the path of movement which they follow, and particularly so when they are transferred from one stretch of the conveyor to the other stretch thereof. For the accomplishment of this the transfer mechanism now to be described is employed. It includes upper transfer sprocket wheels 40 and lower transfer sprocket wheels 41, the upper and lower transfer wheels being in alignment with each other, but being offset with respect to the sprocket wheels 35 and 36 of the conveyor. The upper wheels 40 are suitably connected in fixed relation to stub shafts 42, while the lower wheels 41 are suitably connected to stub shafts 43. At the outer ends of the shafts 42 are mounted sprocket pinions 44, and similar pinions 45 are mounted at the outer extremities of the shafts 43. Each of the upper sprocket pin-

ions 44 is in line with a similar sprocket pinion 46, mounted on the outer extremity of each of the shafts 37, a sprocket chain 47 being trained over the pinions 44 and 46. At the outer ends of the driving shaft 18 are fixedly connected sprocket pinions 48 which are in line with the pinions 45 carried by the shafts 43, and sprocket chains 49 are trained over the pinions 45 and 48. Thus it will be seen that in the operation of the conveyor the shafts 37 will actuate the shafts 42 by means of the chains 47, while the shaft 18 and the sprocket pinions 48 carried thereby, through the chains 49, will actuate the shafts 43. This imparts movement of the sprocket wheels 40 and 41 in unison with the movement of the sprocket wheels 35 and 36.

To insure the proper degree of tension to the sprocket chains 47 and 49, and to take up any slack therein which may arise by wear thereon, a slack adjusting block 50 is pivotally mounted contiguous to one stretch of each of these chains. These blocks 50 are provided with eccentric faces, and when the blocks are adjusted on their pivots the chains 47 and 49 may be tightened to the required extent.

For taking up slack in the chains 39 is the purpose of the sectional construction of the supports 11. When such slackness arises in the chains 39 the bolts 15 are loosened, and the upper members 13 are moved in an upward direction with respect to the members 12, thereby tightening chains 39 to the required extent. At such time the space intervening the contiguous ends of the members 12 and 13 may be filled with a spacing block 51. In this connection it is observed that the proper alignment of the member 13 with respect to the member 12 of each of the supports should be preserved, in order to provide for proper alignment of the various sprocket wheels and chains, and to this end each of the members 13, at its outer face, is provided with a longitudinally extending guide arm 52, the lower ends of these arms 52 overlapping the upper ends of the members 12, as readily seen in Fig. 2. These arms also serve as spacing members, and they are vertically aligned with similar spacing members 53 arranged at the outer faces of the members 12 of the vertical supports 11.

Each stretch of the chains 39 travels in a U-shaped guide 53, said guide being in the form of a channel iron, and the chains thereby are prevented moving from a vertical line in both the upward and downward movement of the stretches. This serves the dual purpose of maintaining the stretches of the chains in proper relation to the wheels 35 and 36, and also of preserving the vertical position of the article-carriers, and preventing the latter from swaying or swinging as they traverse their path of movement. The carriers may be of varied construction and form, and either may be in the form of supporting bars or shelves. The preferred embodiment of the carrier is shown in detail in Figs. 7, 8 and 9. It includes a pair of suspended links 54, said links also being in the form of channel iron, and having keyhole slots 55 in both their body portions as well as their flanges. The upper ends of the links 54 are pivotally mounted on supporting rods 56, as by perforated hubs 57, the ends of the rods 56 being suitably secured in the links of the chains 39, and held therein as by fastening nuts 58. Thus the upper ends of the links provide points on which the links may readily swing, while the lower ends of the latter are free. These ends, however, also carry supporting rods 59 at the extremities of which are mounted anti-friction rollers 60, and said rollers 60 also are designed to travel in the channel guides 53 in the movement of the conveyor.

Extending over the upper edges of the sprocket wheels 40, and arranged at the inner sides of the members 13, are arcuate guide plates 61, conforming generally to the radius of the wheels 40. The purpose of these plates 61 is to guide the lower ends of the links 54 as they pass from one stretch of the conveyor to the other. But it is necessary to insure proper thrust or throw of the lower ends of the links 54 in unison with the movement of the upper ends thereof as these upper ends pass around the idler sprocket wheels 36. For this purpose each of the links 54 is provided near its lower end with an inclined contact spur 62, and at one side of one of the guide channels 53, at a point adjacent to each wheel 40, each of said guide channels 53 is provided with a downwardly flared deflecting lip 63. In the upward travel of each of the links 54 the contact spur 62 thereof will engage the deflecting lip 63 at the time that the upper end of the link 54 is about to pass around the adjacent wheel 36, and as the link 54 continues to rise the inclination of the spur 62, as the latter moves over the deflecting lip 63, forces the inner end of the link 54 inwardly and causes the anti-friction roller 60 at the adjacent side of the link to enter one of the notches between two teeth of the sprocket wheel 40. When the roller 60 thus has been introduced between the teeth of the sprocket wheel it will be seen that the rotation of the latter causes the lower end of the link 54 to move in vertical alignment with the upper end of that link as the latter is rounding the sprocket wheel 36, and the contiguous guide plate 61 directs the movement of the lower end of the link until the latter reaches the opposite stretch of the conveyor and begins its downward movement. Thereupon, the roller 60 enters the guide

channel 63 at the opposite side of the conveyor, through which channel the link descends to the lower end of that stretch of the conveyor.

Surrounding the lower sprocket wheels 41 are arcuate guide plates 64, held suitably in position through the means of fastening tongues 65. These guides 64 establish a path of movement for the anti-friction rollers 60 when the lower ends of the links 54 reach the wheels 41. At such time the rollers 60 will enter spaces between two adjacent teeth of the wheels 41, and the rotation of the latter moves the lower ends of the links 54 from the descending stretch of the conveyor over to the ascending stretch thereof, the vertical position of the links 54 thus being preserved at the lower end of the conveyor as the links are transferred from one side thereof to its opposite side.

It is essential in the operation of the apparatus hereindescribed that the uni-directional movement of the conveyor chains 39 shall be maintained to insure the vertical hanging of the carrier links 54. For this purpose a pivoted pawl 66 is arranged at the inner side of each of the supporting members 12, said pawls co-operating with the teeth of the sprocket wheels 35 and preventing reverse movement of these wheels. The pawls 66 are arranged above the wheels 35 and act by gravity in relation to the wheels 35.

The guide channels 53 in which the descending stretches of the chains 39 are located are each provided with a curved guide lip 67 against which the rollers 60 are designed to contact to direct the same into the channels 63 as they begin their downward movement.

It has been stated that varying forms of supporting devices may be used for the storage and display of the merchandise. If the latter is to be suspended on the carriers, as in the case of clothing, simple suspending bars 68 may be employed. The ends of said bars are formed with headed fastenings 69 adapted to enter and be engaged with the keyhole slots 55 in the body portions of the links 54, and thus while the bars 68 may be readily detached from the links, they are effectually held. This construction clearly is illustrated in Fig. 9.

Should it be necessary to support the articles of merchandise on shelving, the present invention readily admits of this, and in such event supporting arms 70 having headed fastenings 71 are employed. The fastenings 71 are caused to engage the keyhole slots 55 in the flanges of the links 54, through which medium the arms 70 are detachably connected to said links. Shelves 72 are associated with the arms 70, and thus provide the requisite extended supporting surface as may be required by the nature of the articles to be stored and displayed. The arms 70 may either be horizontal or inclined as illustrated in Fig. 8, according to the most effective display which it is desired for the articles carried by the shelves 42, and in either construction the relatively broad surfaces of the shelves 72 afford display at opposite sides of the links 54.

The operation of the hereindescribed display apparatus will be readily understood from the preceding description, and briefly described is as follows:

When pressure is applied to the foot lever 30 the brake lever 27 is released from its frictional contact with the brake drum 26. Thereupon, the electric motor 25 becomes energized and through the gearing interposed between the motor and the driving shaft 18 rotation is imparted to that shaft. With the operation of the shaft 18 the conveyor, constituted by the chains 39, the sprocket wheels 35 and 36 over which said chains are trained, and the article-carriers, is given the necessary driving movement to cause the merchandise stored on the conveyor to rise on one stretch thereof and descend at the other stretch. The rate of movement of the conveyor obviously is controlled by the ratio of the gears, the best effect of the apparatus being attained by relatively slow movement of the conveyor. As the merchandise passes a given point, the observer can determine the character thereof and the price thereof, if the pricing be displayed on the merchandise. As each of the carriers reaches the upper end of the conveyor the upper ends of the links 54 thereof pass around the wheels 36, the lower ends of the links being deflected inwardly and into engagement with the teeth of the wheels 40. As the latter rotate the lower ends of the links 54 follow their movement in unison with the movement of the wheels 36, and the upper ends of the links 54 travel in connection therewith until the opposite stretch of the conveyor is reached and descent of the carriers begins. In that movement the lower ends of the links 54, being still in vertical alignment with their upper ends, enter the guide channels 53 at the opposite side of the conveyor and descend to the lower end of the latter where they pass around the wheels 41, and are transferred to the ascending stretch of the conveyor. But in the entire path of travel of the article-carriers their vertical position is maintained, and the merchandise stored and displayed thereon is maintained in proper relation thereto.

During the movement of the wheels 35 the gravity pawls 66 ride over the teeth thereof alternately dropping into the spaces between adjacent teeth, and thereby locking these wheels against reverse movement. This insures uni-directional movement of the con-

veyor and precludes injury thereto which might arise incidental to such reverse movement.

The operation of the apparatus continues so long as the electric motor 25 is energized and the brake lever 27 is out of frictional contact with the brake drum 26. The foot lever 30 is the medium for maintaining this relation of the parts, but it will be understood that any suitable mechanism may be adopted for locking the parts in such position as to insure continuity of operation of the apparatus for any predetermined period of time, thus avoiding the necessity of maintaining pressure on the foot lever 30 by an operator of the apparatus.

I claim:

1. An apparatus of the class described, comprising an endless chain conveyor for the articles to be displayed, channel guides in which the stretches of the conveyor chains are adapted to travel, means for driving the conveyor, carriers for the articles, transfer means independent of the conveyor coacting with said carriers to positively engage and propel the same in their transfer from one stretch of the conveyor to the other, and means acting independently of the guide means for deflecting said carriers from said guides to said transfer means, whereby the latter serve to preserve the vertical position of the carriers in their transfer from one stretch of the conveyor to the other.

2. An apparatus of the class described, comprising an endless chain conveyor for articles to be displayed, channel guides in which the stretches of the conveyor chains are adapted to travel, means for driving the conveyor, carriers for the articles, sliding connections between said carriers and guides to prevent the carriers from tilting, means independent of the conveyor coacting with said carriers to positively engage and propel the same in their transfer from one stretch of the conveyor to the other, deflecting means associated with said guides, and means associated with the carriers and co-operating with said deflecting means for positively directing the carriers to said guiding means, whereby the latter serve to preserve the vertical position of the carriers in their transfer from one stretch of the conveyor to the other.

3. An apparatus of the class described, comprising a frame, an endless conveyor for the articles to be displayed, means for driving the conveyor, carriers for the articles, each of said carriers including a pair of suspended links having a series of slots formed therein, and a suspensory device for the articles to be displayed having headed connections for engagement with said slots, whereby to detachably connect the suspensory device to the links.

4. An apparatus of the class described, comprising a frame, an endless conveyor for the articles to be displayed, means for driving the conveyor, carriers for the articles, each of said carriers including a pair of suspended links of channel formation, the body and flanges of said links having a series of slots formed therein, and suspensory devices for the articles to be displayed having headed connections for engagement with said slots whereby to detachably connect the suspensory devices to the links.

5. An apparatus of the class described, comprising a frame, upper and lower sprocket wheels journalled at the inner faces of opposite sides of said frame, sprocket chains trained over the upper and lower sprocket wheels, inwardly opening guides also arranged at the inner faces of opposite sides of said frame and in one of which each stretch of said sprocket chains is disposed, whereby said chains are guided in their movements between the upper and lower sprocket wheels, carriers for the articles to be displayed associated with said chains and including a plurality of links, transfer wheels operatively related to said sprocket wheels and coacting with the links to guide the latter in their transfer from one stretch of the chains to the other, a deflecting lip associated with one of said guides and located in proximity to one of said transfer wheels, and a contact spur carried by each of the links for engagement with said deflecting lip, whereby the latter deflects the carriers into operative relation with said transfer wheel.

6. In an apparatus of the character described, a supporting framework, an endless chain conveyor thereon, article carriers supported in vertical positions on the conveyor, guides on the framework receiving the conveyor chains and ends of the article carriers, means for driving the conveyor, independent gear means connected to and driven by the conveyor gear, separate transverse guides between the reaches of the conveyor, cooperating means on the carriers and associated with the guides for positively deflecting the lower end of the carriers into engagement with the independent gear means to engage and transfer the article carriers from one reach of the conveyor to the other.

7. In an apparatus of the character described, a supporting frame, an endless chain conveyor thereon, article carriers supported in vertical positions on the conveyor, transfer wheels, guide means for the conveyor chains and article carriers, separate transverse guides communicating with the first named guide means, means for driving the conveyor and transfer wheels, and means for deflecting the lower ends of the carriers into the transverse guides and into positive engagement with the transfer wheels to transfer the article carriers from one reach

of the conveyor to the other maintaining the vertical position of the carriers during the transfer.

8. In a display device comprising a supporting frame and a plurality of sprockets conveying endless chains on opposite sides of the frame providing display and storage spaces therebetween, inwardly opening guide channels through which the chains travel, separate transfer sprocket wheels, a plurality of sprocket and chain connections between the conveyor and the separate transfer wheels providing an interconnected drive, article carriers having portions engaging the guides and portions supported from the chains, deflecting means overlying the guides, and means associated with the carriers for engagement with the deflecting means to move the carriers into positive engagement with the transfer wheels.

9. An apparatus of the character described comprising a plurality of endless conveyor chains, sprocket wheels over which said chains are trained, means for driving said chains, guides through which the chains travel, article carriers having projecting portions traversing the chain guides and a separate supporting connection with said conveyor chains, transfer wheels operatively related to said sprocket wheels and coacting with the carriers to guide the carriers from one stretch of the conveyor chains to the other, and means independent of the guides for deflecting the carriers from the guides into engagement with the transfer wheel.

10. In a display device comprising a supporting frame and a plurality of sprockets conveying endless chains on opposite sides of the frame providing display and storage space therebetween, U-shaped guides through which the conveyor chains travel, article carriers comprising rods pivotally supported at their ends in said chains, and link means pivoted at one end on the rods and provided at the opposite ends with projecting portions traversing said guides, transfer wheels for moving the carriers from one stretch of the conveyor to the other, and means independent of the guides for deflecting the projecting portions of the article carriers from the guides into engagement with the transfer wheels.

11. In a display device comprising a supporting frame and a plurality of sprockets conveying endless chains on opposite sides of the frame providing display and storage space therebetween, U-shaped guides through which the stretches of the conveyor chains travel, transfer wheels between the U-shaped guides, and separate transverse guides connecting the chain guides and overlying the transfer wheels, contact carriers supported between the chains having projecting portions traversing the chain guides, and means independent of the guides for positively deflecting the carriers from the chain guides into the transverse guides and in engagement with the transfer wheels.

In witness whereof I have hereunto signed my name.

BENJAMIN J. BUCKINGHAM.