Feb. 10, 1953 M. A. THOMPSON 2,627,968

ARTICLE-HANDLING HOIST AND CONVEYER

Filed Feb. 23, 1950 2 SHEETS—SHEET 1

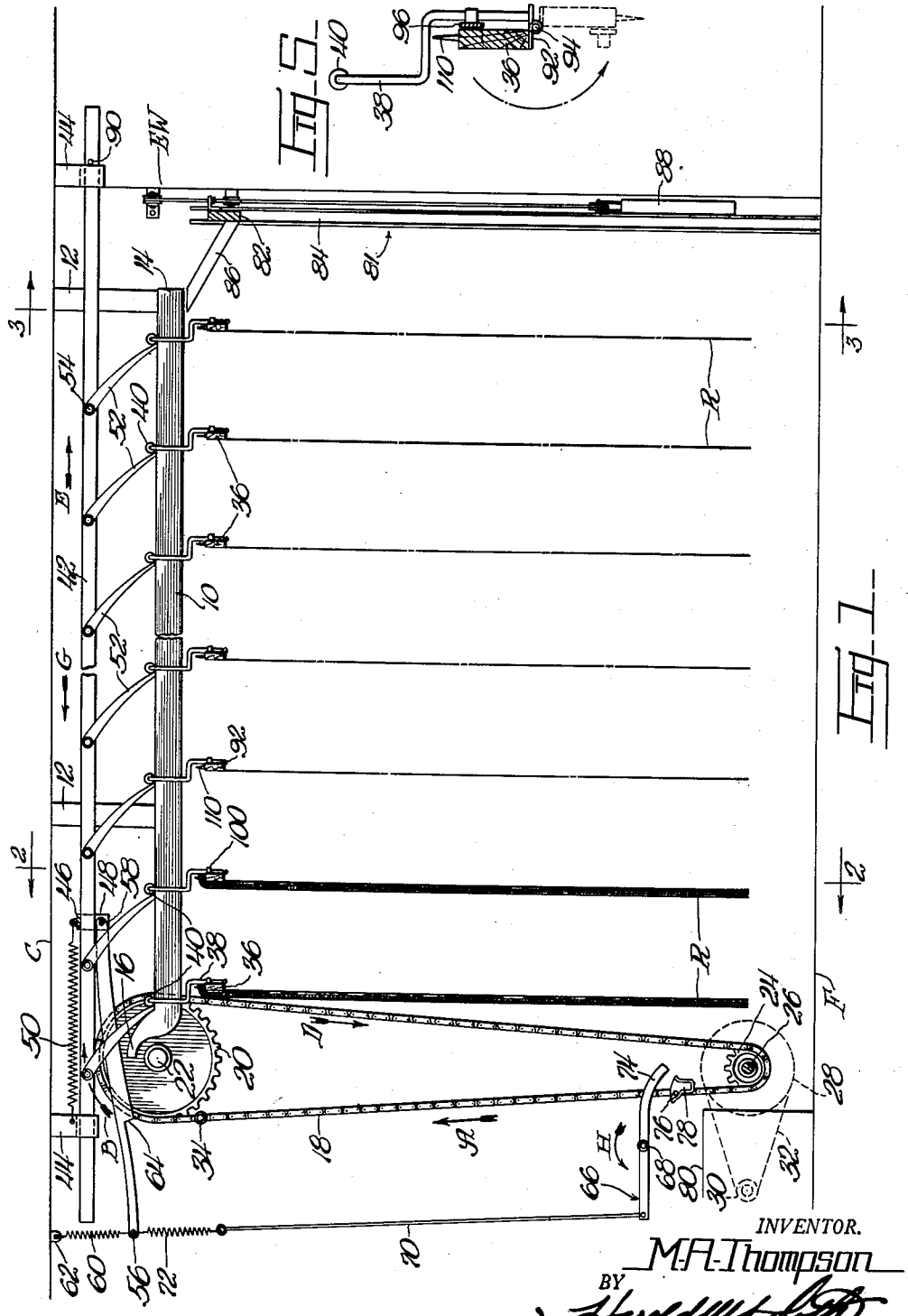


Fig. 1

Fig. 5

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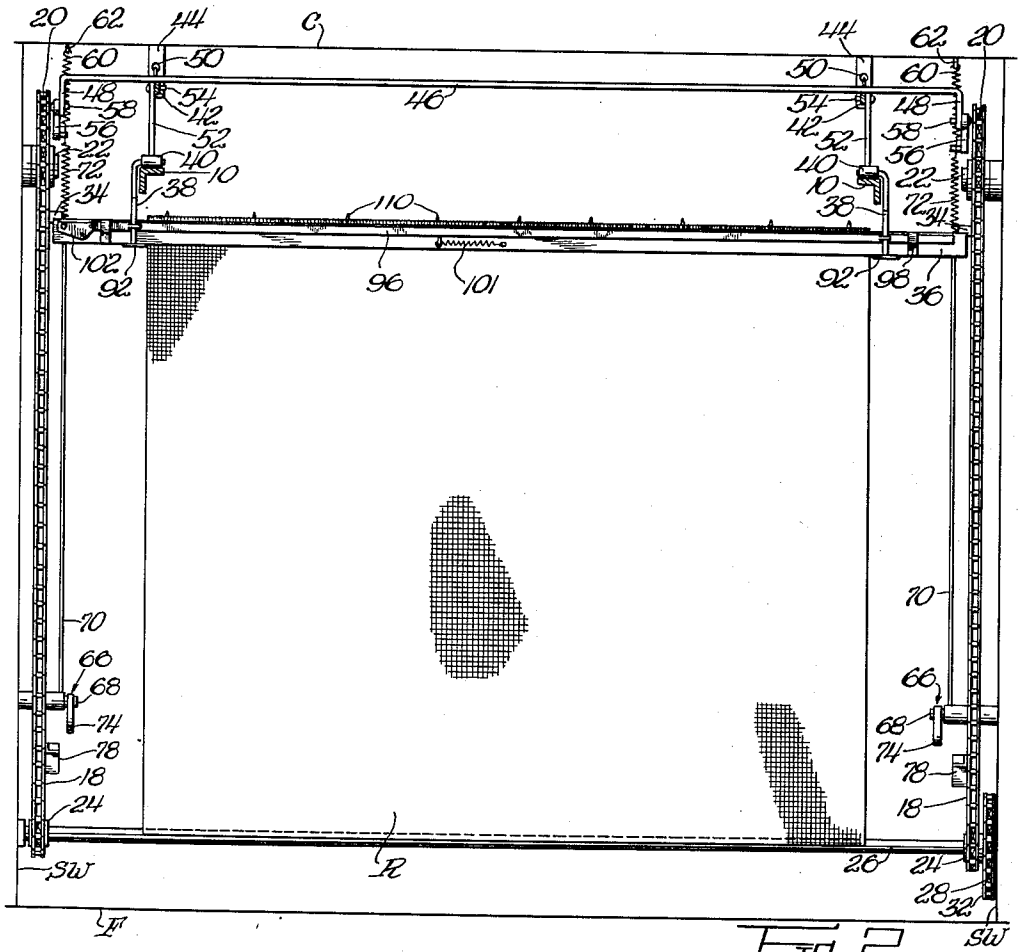


Fig. 2

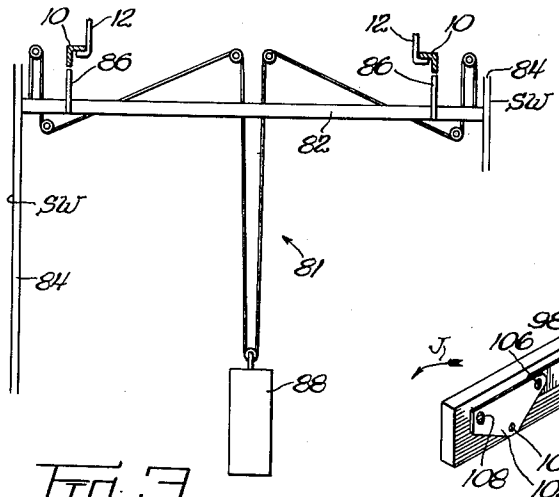


Fig. 3

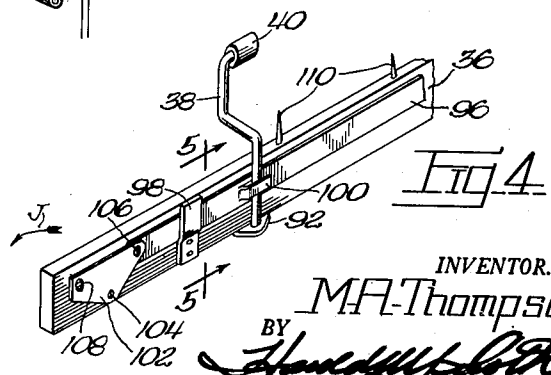


Fig. 4

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ARTICLE-HANDLING HOIST AND CONVEYER

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Application February 23, 1950, Serial No. 145,829

15 Claims. (Cl. 198—106)

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This invention relates to an article-handling apparatus and more particularly to an apparatus or machine for use in handling rugs in a drying room in a rug-cleaning establishment.

It is known in the rug-cleaning art to provide means for hoisting rugs to an elevated track so that the rugs may be suspended in a drying room for drying after being washed. Known apparatus of this type comprises essentially some form of hoist—usually manually operated—for elevating the rugs. The track means is relatively long so that several rugs may be suspended therefrom in spaced relation, with sufficient space therebetween to allow circulation of warm air. Spacing of the rugs on the tracks has heretofore usually been accomplished manually. Since rugs, particularly those that are wet from being scrubbed or washed, are quite heavy the manual labor involved is correspondingly arduous. Further than this, the use of hoisting means involving ropes and snatch blocks is apt to be dangerous to personnel working in the drying room. Additionally, the necessity for manual operation requires personnel within the drying room under conditions not exactly beneficial to health.

According to the present invention, the foregoing and other disadvantages of known handling apparatus have been eliminated by the provision of a fully automatic apparatus including power-driven hoist means and power-driven intermittently operative advancing means for moving the rugs along elevated track means after the rugs are transferred from the elevating means to the track means. It is an important object of the invention to provide an apparatus adapted for installation substantially entirely within a drying room, whereby the attention of personnel within the drying room is not needed except in an emergency or in the event that it is desired to drop a rug out of sequence.

A further object of the invention is to provide a plurality of coordinated handling means including elevating means for raising the rugs to a desired height from which they may be suspended, track means at the desired height from which the rugs may be suspended in properly spaced relation, means for successively advancing rugs along the track means by power derived from the elevating means, and lowering means positioned at the discharge end of the track means to successively receive the endmost rug as the advancing means is operated in response to the presence of a new rug on the elevating means.

Among other objects of the invention are the provision of a simplified and inexpensive apparatus, one in which the component parts are of simple design and susceptible to easy fabrication and installation, and an apparatus that requires little skill and attention for the operation thereof and little, if any, maintenance, thus materially contributing to the lowering of costs in the rug-processing art.

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The foregoing and other important objects and desirable features inherent in and encompassed by the invention will become apparent to those versed in the art as a complete disclosure of a preferred embodiment of the invention is made in the following detailed description and accompanying sheets of drawings in which:

Figure 1 is a side elevational view of the rug-handling apparatus with portions in the foreground removed to illustrate better the details of construction.

Figure 2 is a transverse sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a transverse sectional view, on a reduced scale, taken on the line 3—3 of Figure 1.

Figure 4 is a fragmentary perspective view of one of the rug-carrying members.

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 4 and showing in full lines the normal position of the member and in dotted lines the released position of the member.

Although the present invention is illustrated in connection with its embodiment in apparatus for the handling of rugs, it will be appreciated that various of the principles thereof will find utility in the handling of other articles. Accordingly, the disclosure should be taken as illustrative and not limiting, except as defined in the claims appended hereto.

The drawings show the apparatus installed in a drying room having a ceiling C, a floor F, an end wall EW (Figure 1) and opposite side walls SW (Figures 2 and 3).

There is appropriately suspended from the ceiling at a desirable height above the floor article-supporting or track means including a pair of elongated track members 10, preferably of angle section (Figures 2 and 3). Hangers 12 may be utilized to support or suspend the track members. In the drawings, the overall length of the track members has been foreshortened so that the drawing could be prepared on a larger scale. It will be understood that these members may be of any desired length. Each track member has a discharge portion 14 at one end thereof and a receiving portion 16 at its other end. The members are parallel and are spaced transversely apart and lie in a substantially horizontal plane.

Elevating means comprising a pair of conveyor elements such as endless belts or chains 18 operate respectively in transversely spaced apart upright planes spaced apart a greater distance than the transverse spacing between the track members 10, so that the elevating belts or chains lie respectively outside the track members (Figure 2) and adjacent the receiving ends 16 of the track members. The belt or chain of each elevating conveyor is trained at its upper end about a rotatable element in the form of a wheel or sprocket 20 journaled on a stub shaft 22 carried by an appropriate bearing in the proximate side wall of the drying room. The short shafts 22 are coaxial on an axis that lies generally in the plane of the upper edges of the track members 10. As best seen in Figure 2, the wheels 20 are widely spaced apart and there is no shaft between them.

The lower end of each chain or belt is trained about a driving member or small sprocket 24. These sprockets are, of course, respectively below and in vertical alinement with the wheels 20 and are keyed to a continuous driving shaft 26 that extends across the drying room just above the floor F. A driving sprocket 28 is keyed to one outer end of the shaft 26 for receiving power from an input sprocket 30 as by means of a belt or chain 32. The sprocket 30 may be appropriately driven from any suitable source of power, the details of which are not important and have not therefore been illustrated.

It will be noted that the disposition of each elevating or hoisting conveyor 18 is such that one run thereof operates upwardly in the direction of the arrow A in Figure 1 along a path which changes direction by virtue of the upper portion of the wheel 20 so that the path is first upwardly toward the track means and then in the direction of the arrow B along or lengthwise of the receiving end portions of the track means and then downwardly away from the track means in the direction of the arrow D. Each elevating or conveying chain 18 carries for movement therewith along the path just outlined a driving member or lug 34. This lug is connectible or disconnectible from driving means associated with advancing means for the track members in a manner to be presently described.

Referring now particularly to Figure 1, it will be seen that a plurality of rugs R are suspended from the track members 10 through the medium of a plurality of individual article- or rug-carrying means, each of which includes a transverse bar or member 36 and a support 38 in the form of a hook having a roller 40 thereon adapted to roll along the upper edge of the proximate track, there being a pair of such supports 38 for each bar 36, as shown in Figure 2. The details of the carrying bars may be passed over for the moment.

The advancing means referred to above comprises a pair of elongated slides 42 slidably carried adjacent opposite ends by a pair of hangers 44 suspended from the ceiling C. These slides are spaced apart on the order of the spacing of the tracks 10 and are disposed respectively above the tracks. These slides are cross connected by a transverse member 46 for movement as a unit. The transverse member has depending ears 48 respectively lying in planes just inside the upright planes in which the elevating belts 18 operate. The slides are movable at times in an advancing direction indicated by the arrow E in Figure 1 and are returnable in the opposite direction as indicated by the arrow G. A pair of tension springs 50, one for each slide 42, is connected between the advancing means and the proximate slide hangers 44 to normally bias the slides in the direction G.

The rug supports 36—40 are uniformly spaced lengthwise along the track members 10, having achieved this position by virtue of article-advancing members in the form of pawls 52 forming part of the advancing means. There are two sets of pawls, one for each slide and each track member. Each pawl is pivoted at one end at 54 to its slide 42 and extends downwardly and in a direction of advance to engage ahead of the roller 40 of a proximate rug bar. The pawls rest by their own weight on top of the track members 10 in the positions of Figure 1.

It is an important feature of the invention to drive the advancing means 42—52 intermittently from the elevating means 18—18. For this purpose, the driving members or lugs 34 are selectively connectible with and disconnectible from drive means including a pair of driven members 56, each pivotally connected at one end at 58 to one of the ears 48 on the transverse slide-connecting member 46. These driven members are therefore relatively closely proximate to the wheels 20. Each driving member is elongated and is resiliently supported at its opposite end by a tension spring 60 connected between that end and a suitable bracket 62 attached to the ceiling. The springs 60 provide means for normally positioning the driven members 56 out of the paths of movement of the driving members 34 as these members are carried about the wheels 20. As best seen in Figure 1, although the driving member will engage the bottom edge of the driven member 56, it will merely raise and then lower the driven member. Driving connection between the members 34 and 56 is not established until the driven member 56 is lowered sufficiently to place in the path of the driving member 34 a driving portion or notch 64. When these two members become engaged in driving relationship, movement of the lugs 34 generally in the direction of the arrow B will operate through the driven members 56 to advance the slides toward the right or in the direction of the arrow E. The pawls will respectively advance the rug-carrying supports 36—40.

The actuating means for effecting the driving relationship between the driving members 34 and driven members 56 comprises a pair of actuating members 66 pivoted on transversely alined horizontal axes 68 relatively remote from the upper portions of the elevating means 18—18. The left-hand end of each member 66 is connected by a rod or link 70 and a tension spring 72 to the free end of the proximate driven member 56. It will thus be seen that rocking of the element 66 in the direction of the arrow H (Figure 1) will move the driven member 56 downwardly so that the driving portion or notch 64 is in position to be engaged by the lug 34 as it moves about the upper portion of the wheel 20.

The other end of each element 66 comprises a control portion 74 which, although projecting in proximity to the adjacent chain or belt 18, is free from engagement with such chain or belt. In other words, the elements 66 are spaced respectively inwardly of the chains or belts 18. Hence, these chains or belts may operate without effecting any operation of the advancing means 42—52.

Each chain 18 has pivoted thereto at 76 an article-carrying pocket member 78 preferably

shaped as shown in Figures 1 and 2. These pocket members are transversely alined and are spaced apart transversely a greater distance than the transverse spacing between the actuating elements 66. Therefore, the pocket members may move upwardly with the chains without affecting the actuating elements 66.

The characteristic just described is an important feature of the invention, for it may be desired to allow the elevating conveyors 18 to operate continuously, yet it would be undesirable to operate the advancing means. Operation of the actuating means comprising the actuating elements 66 is effected only by the presence of a rug-carrying bar 36 supported at its opposite ends between the pocket members 78. This will be clearly evident from an examination of the drawings, wherein it will be seen that each bar 36 is sufficiently long to extend completely across between the pocket members 78. Hence the control portions 74 of the elements 66, although not effected by movement of the pocket members 78, are directly in the path of upward movement of a rug-carrying bar carried by the pocket members.

Another feature of the invention is the location of the driving members 34 well in advance of the rug- bar-carrying pocket members 78. This arrangement enables the actuating elements 66 to be operated by a carried rug bar at a point relatively remote from the receiving end portions 16 of the track members 10. In Figure 1, the numeral 80 designates a platform on which a rug may be placed preliminary to loading thereof in the pocket members 78 by means of a bar 36. As the elevating conveyors move upwardly, the full weight or load of the picked up rug is partly supported by the platform 80 and a major portion of the power capable of being transmitted by the elevating means is available for driving the advancing means, enabling the use of a smaller motor as the source of initial power. As the carried bar 36 is moved upwardly the elements 66 are moved through appreciable angles. However, the tension springs 72 allow the elements 66 to overrun, since at about the point of departure of the rug-carrying bar from the control portion 74, the driving members 34 are completing the advancing movement of the advancing means. After the rug bar passes the control portion 74, and after the driving members 34 become disconnected again from the driven members, the driven members and control elements resume their normal positions as shown in Figure 1.

As the elevated rug bar is carried by the chains or belts 18, it follows the path defined by the wheels 20, these wheels serving as guide portions within a transfer zone including the upper portions of the wheels and the receiving end portions of the track members 10. It will be seen that the rug bar as carried by the pocket members may move about the upwardly curved receiving portions 16 and thence downwardly onto the upper edges of the track members 10 to assume the position of the first rug at the left in Figure 1. The wheels function in the manner of the so-called Ferris wheel movement in this respect. The rollers 40 on the rug bar being so transferred easily pass under the proximate pawls 52 to occupy the position indicated. The pocket members 78 are constructed as shown and are therefore downwardly releasable from the ends of the rug bar as the pocket members are carried downwardly in the direction of the arrow D. The cycle of operations just described is repeated each time a rug is manually loaded onto the pocket members 78.

As the advancing means 42—52 operates in response to the presence of a rug bar on the elevating means 18, the endmost rug at the right-hand or discharge ends of the track members 10 is pushed off to be received by lowering means indicated in its entirety by the numeral 81. This means comprises a transverse member 82 appropriately slidably carried at each of its opposite ends for vertical movement in guides 84 suitably fixed to the side walls SW. The transverse member carries a pair of receiving fingers 86 that project upwardly and toward the discharge ends 14 of the track members 10. The member 82 is maintained in its normal or upper position as shown in Figure 3 by means of a counterweight 88 and a cable and sheave arrangement which may be of any construction and the details of a representative form of which are believed to be clear without further description. The counterweighted means 81 provides for gently lowering the discharged rug to the floor F, where it may be transported away by any convenient method.

Stop means, as indicated in representative fashion at 90 in Figure 1, may be provided to fix the retracted position of the advancing slides 42.

Each rug-carrying bar 36 is preferably constructed as shown in Figures 4 and 5. The bar has secured along its lower edge portion a plurality (preferably two) of hinge means 92, the pivot axes 94 of which are alined and parallel to the lower edge of the member. One portion of the hinge is secured to the member and the other portion is secured to the bottom of the hook or support 38. As previously described, each support 38 extends upwardly and then forwardly and then upwardly again beyond the upper edge of the member 36, the upper portion of each support carrying the roller 40. A release bar 96 parallels the member 36 and is slidably carried thereon by a pair of bearing straps 98 for shifting movement back and forth between retaining and releasing positions. The bar 96 passes between the rear face of the member 36 and the front portions of the supports 38 and has thereon a pair of releasable or disconnectible hook portions 100 which, when the bar is in its retaining position, hook behind the hooked supports 38. The bar 96 is biased in retaining position by a spring 101 (Figure 2). A control member 102 is pivoted at 104 adjacent one end of the bar 36 and is in the form of a bell crank having a pivotal connection 106 with the proximate end of the bar 96. An opening 108 is provided in the other arm of the bell crank of the member 102. It will be seen that rocking of the member 102 in the direction of the arrow J in Figure 5 will shift the bar 96 to the left and will withdraw the release hooks 100 from behind the support hooks 38. The bar 36 will then drop by its own weight to the dotted line position shown in Figure 5.

The upper edge of the member 36 is provided with article-engaging means, here in the form of a plurality of pointed pins 110 which are adapted to pierce the edge portion of a rug as suggested in Figures 1 and 2. When the member 36 is in its retained position, the rug is appropriately suspended. When the bar 96 is shifted by means of the rockable member 102 the added weight of the rug causes the member 36 to drop to its discharge position, the rug falling off of the pins 110 and dropping to the floor. This provision is made in the event that it is desired to drop a rug out of sequence. The operator may reach

up with a pole having a hook at one end for engagement with the opening 108 in the release member 102.

The operation of the apparatus has been brought out in connection with the description and it is believed that all the important aspects thereof are sufficiently set forth so as to demonstrate the achievement of the objects and features first set forth herein. Other objects and features not specifically enumerated will undoubtedly occur to those versed in the art, as likewise will numerous modifications and alterations, all of which may be achieved without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. Apparatus for handling rugs or like articles, comprising: support means including a pair of generally horizontal track members disposed in transversely spaced apart parallel relationship above the ground or floor and having receiving ends and discharge ends; transfer means including a pair of coaxial wheels respectively rotatable in parallel upright planes spaced apart a greater distance than the spacing between the track members so that the wheels are respectively outside and adjacent to the receiving ends of the track members; elevating means including a pair of upwardly moving elements spaced apart transversely on the order of the spacing of the wheels and having upper portions guided by the wheels toward the receiving ends of the track members, each pair of elements having a carrier movable upwardly therewith, said carriers being transversely alined and adapted to receive opposite ends of a transverse bar on which a rug or like article is carried, said carriers being guided by the wheels for transfer of such transverse bar to the receiving ends of the track members; advancing means movable lengthwise of the track members in opposite directions away from and toward the wheels and engageable with a portion of such transverse bar on the track members when moving away from the wheels but adapted to overrun such bar portion when returning toward the wheels; operating means for moving the advancing means away from the wheels; means for returning the advancing means toward the wheels; drive means connected to the operating means and connectible with and disconnectible from the elevating means; means normally effecting disconnection of the drive means from the elevating means; and actuating means for effecting connection of the drive means and the elevating means, including a control element positioned between the elevating elements so as to be free from the elevating elements but arranged to be engaged by a transverse bar between the carriers for effecting connection of the drive means and the elevating means.

2. The invention defined in claim 1, further characterized in that: the elevating elements comprise a pair of endless flexible elements respectively trained about said wheels.

3. The invention defined in claim 1, further characterized in that: the actuating means is located at a lower portion of the elevating means, and the drive connection of the drive means and the elevating means occurs at an upper portion of the elevating means so that actuation of the advancing means by the elevating means is effected before the elevating means has the full load thereon of such transverse bar and a rug carried thereby.

4. The invention defined in claim 1, further characterized in that; lowering means is positioned at the discharge ends of the track members to receive a transverse bar discharged from the track members by the advancing means.

5. Apparatus of the class described, comprising: means providing a track along which articles may be moved, said track having an article-receiving portion and an article-discharge portion spaced apart lengthwise thereof; normally idle advancing means movable lengthwise along the track in an advancing direction from the receiving portion to the discharge portion and in a return direction opposite to the advancing direction, said advancing means including a plurality of article-engaging elements spaced apart lengthwise as respects the track for engaging individual articles spaced lengthwise along the track and for moving such articles successively along the track toward the discharge portion of the track, said elements being so constructed and arranged as to overrun such articles upon movement of the advancing means in said return direction, article-delivery means for moving articles to the receiving portion of the track means from a location relatively remote from said receiving portion, said delivery means having article-carrying means movable past said receiving portion in article-transfer relationship thereto; driving means selectively connectible and disconnectible between the delivery means and the advancing means and normally disconnected so that the delivery means may operate while the advancing means is idle; and actuating means for effecting connection of the drive means to drive the advancing means from the delivery means, said actuating means including a control element in proximity to but free from engagement with the article-carrying means and engageable and operative only by an article carried by said article-carrying means.

6. Apparatus of the class described, comprising: means providing a track along which articles may be moved, said track having an article-receiving portion and an article-discharge portion spaced apart lengthwise thereof; normally idle advancing means movable lengthwise along the track in an advancing direction from the receiving portion to the discharge portion and including an article-engaging element for engaging and moving such article along the track toward the discharge portion of the track; article-delivery means for moving articles to the receiving portion of the track means from a location relatively remote from said receiving portion, said delivery means having article-carrying means movable past said receiving portion in article-transfer relationship thereto; driving means selectively connectible and disconnectible between the delivery means and the advancing means and normally disconnected so that the delivery means may operate while the advancing means is idle; and actuating means for effecting connection of the drive means to drive the advancing means from the delivery means, said actuating means including a control element in proximity to but free from engagement with the article-carrying means and engageable and operative only by an article carried by said article-carrying means.

7. Apparatus of the class described, comprising: means providing a track along which articles may be moved, said track having an article-receiving portion and an article-discharge portion spaced apart lengthwise thereof; normally idle advancing means movable lengthwise along the track in an advancing direction from the receiv-

ing portion to the discharge portion and including an article-engaging element for engaging and moving such article along the track toward the discharge portion of the track; article-delivery means for moving articles to the receiving portion of the track means from a location relatively remote from said receiving portion, said delivery means having article-carrying means movable past said receiving portion in article-transfer relationship thereto; driving means selectively connectible and disconnectible between the delivery means and the advancing means and normally disconnected so that the delivery means may operate while the advancing means is idle; and actuating means for effecting connection of the drive means to drive the advancing means from the delivery means, said actuating means including a control element in proximity to but free from engagement with the article-carrying means at a portion of the delivery means relatively remote from the track and engageable and operative only by an article carried by said article-carrying means and moved thereby past said relatively remote portion, for effecting said drive connection well prior to transfer of such article to the track.

8. Apparatus of the class described, comprising: a pair of conveyor elements operative in upright parallel planes spaced transversely apart and respectively having transversely alined upper portions defining a transfer zone at which the belts change direction from upward movement to generally horizontal movement, and an article carrier on each belt movable with said conveyor element, said carriers being transversely alined and spaced apart and adapted to receive and carry an article therebetween to elevate such article to said transfer zone and thereat to move such article generally horizontally; track means extending generally horizontally from said transfer zone in the direction of said generally horizontal movement of the article carriers, and having an article-receiving portion in said zone; means cooperative between the conveyor elements and the receiving portion of the track means for effecting transfer of an article from the article carriers to said receiving portion; advancing means operative to move such article along the track means away from the transfer zone; and means operative in response to the presence of a subsequent article on the conveyor elements for operating the advancing means to advance a prior article on said track means.

9. Apparatus of the class described, comprising: a pair of elevating means operative in upright parallel planes spaced transversely apart and respectively having transversely alined upper portions defining a transfer zone at which the elevating means change direction from upward movement to generally horizontal movement, and an article carrier on each elevating means movable with said elevating means, said carriers being transversely alined and spaced apart and adapted to receive and carry an article therebetween to elevate such article to said transfer zone and thereat to move such article generally horizontally; track means extending generally horizontally from said transfer zone in the direction of said generally horizontal movement of the article carriers, and having an article-receiving portion in said zone; means cooperative between the elevating means and the receiving portion of the track means for effecting transfer of an article from the article carriers to said receiving portion; advancing means operative to move such article along the track means away from the transfer zone; and means operative in response to the presence of a subsequent article on the elevating means for operating the advancing means to advance a prior article on said track means.

10. Apparatus of the class described, comprising: article-delivery means movable in a defined path toward an article-transfer zone; article-supporting means extending away from said transfer zone and having an article-receiving portion in said zone; means on said delivery means for carrying an article for delivery to said transfer zone and for transfer to said article-supporting means; advancing means associated with the article-supporting means and engageable with an article thereon to advance such article; normally disconnected drive means for operating said advancing means; and means for effecting connection of said drive means in response to the presence on said delivery means of a subsequent article.

11. Apparatus of the class described, comprising: track means extending generally horizontally and having a receiving portion and a discharge portion spaced apart lengthwise thereof; article-delivery means including an endless element running in an upright plane, and a wheel proximate to the receiving portion of the track and around which the element is trained so that as the element passes around said wheel it moves generally lengthwise of the track means; article-carrying means on the element and movable therewith and about the wheel to carry an article to said receiving portion, said article-carrying means being releasable from such article for effecting transfer of such article to the track means; advancing associated with the track means for engaging an article thereon and for moving such article toward the discharge end of the track means; drive means between the element and the advancing means, including a driving member movable with the element and a driven member connected to the advancing means; means mounting the driven member for selective movement into or out of the path of the driving member; means normally positioning the driven member out of the path of the driving member; and actuating means for moving the driven member into the path of the driving member, including a control portion projecting in proximity to and free from engagement with said element but arranged to be engaged and moved by an article carried by said article-carrying means.

12. Apparatus of the class described, comprising: article-supporting means along which articles may be moved; advancing means associated with said supporting means for intermittently moving such articles; movable article-delivery means having an article-carrying element movable therewith for receiving and carrying an article to and for transferring such article to the supporting means, said delivery means including guide means for directing the delivery means in a path first toward, then along and then away from the track means for transferring such article to the track means; a driving member on the delivery means movable in said path; a driven member connected to the advancing means and selectively positionable into or out of that portion of said path in which the driving member moves along the track means, and actuating means normally effecting positioning of the driven member out of said path portion when the delivery means operates without an article on said

article-carrying element, said actuating means including a control portion in the path of such carried article for effecting positioning of the driven member into the path of the driving member.

13. The invention defined in claim 12, further characterized in that: the driving member is positioned on the delivery means in advance of the article-carrying element so that driving engagement between the driving and driven members to move the advancing means occurs while the article-carrying element is in that portion of said path leading toward the track means.

14. Apparatus of the class described, comprising: means providing a track along which articles may be moved, said track having an article-receiving portion and an article-discharge portion spaced apart lengthwise thereof; intermittently operative advancing means movable lengthwise along the track in an advancing direction from the receiving portion to the discharge portion and including an article-engaging element for engaging and moving such article along the track toward the discharge portion of the track; article-delivery means for moving articles to the receiving portion of the track means and having article-carrying means movable past said receiving portion in article-transfer relationship thereto; driving means selectively connectible to and disconnectible from the advancing means and normally disconnected so that the delivery means may operate independently of the advancing means; and actuating means for effecting connection of the drive means to drive the advancing means and including a control element free from engagement with the article-carrying means and engageable and operative only by an article carried by said article-carrying means.

15. The invention defined in claim 14, in which: the control element is so positioned and arranged as to effect connection of the drive means to the advancing means well prior to transfer of an article from the delivery means to the track.

MARTIN A. THOMPSON.

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