Sept. 1, 1970 P. I. OUTINEN 3,526,324

CLOTHING STORAGE AND CONVEYER SYSTEM

Filed May 24, 1968 2 Sheets-Sheet 1

FIG. 1

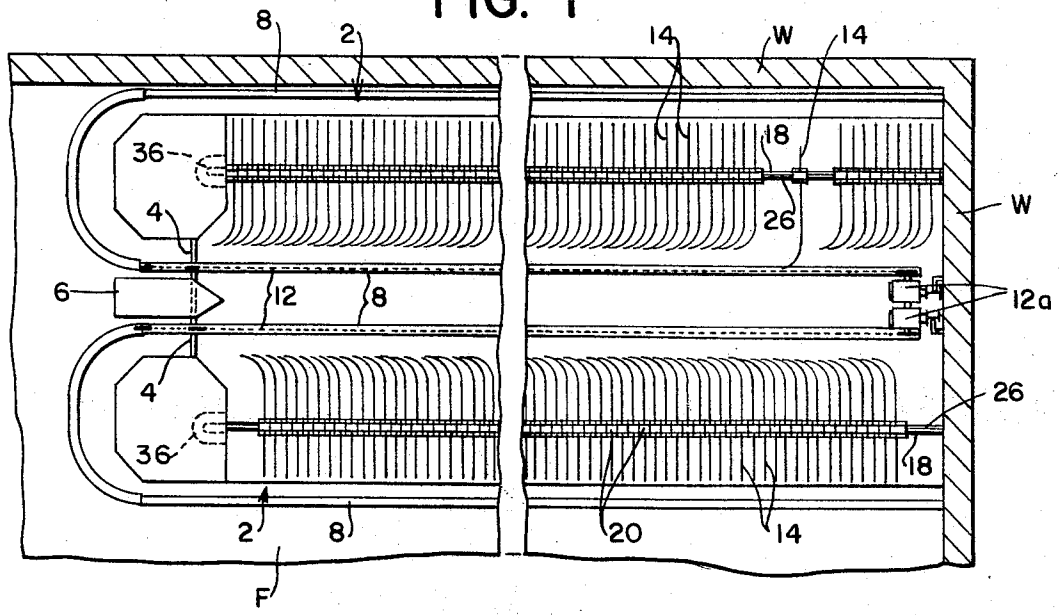
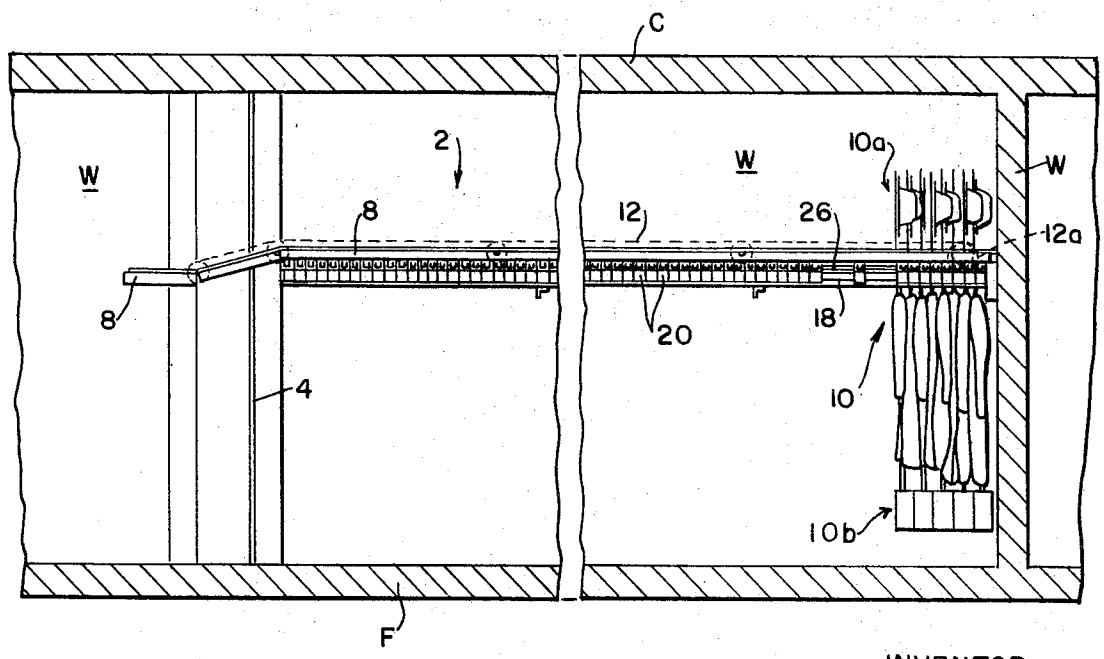


FIG. 2



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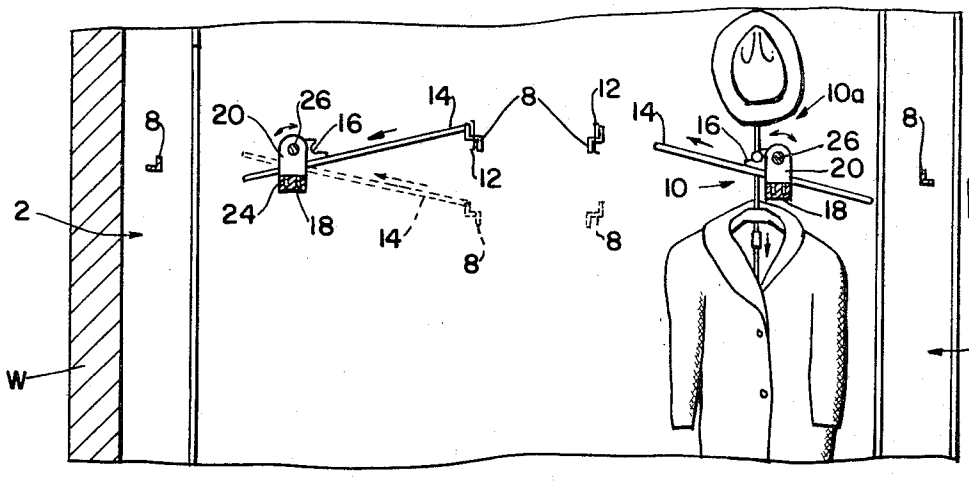


FIG. 3

FIG. 4

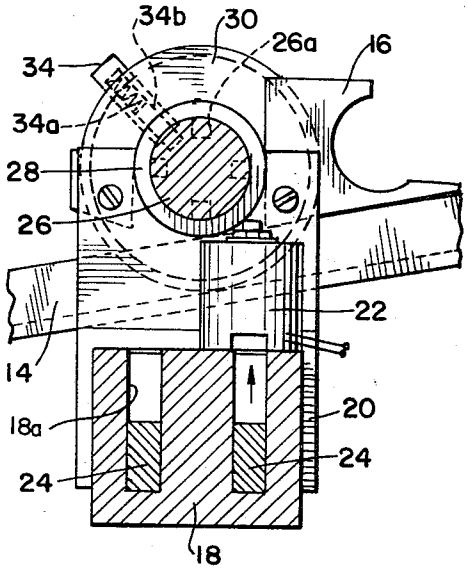


FIG. 5

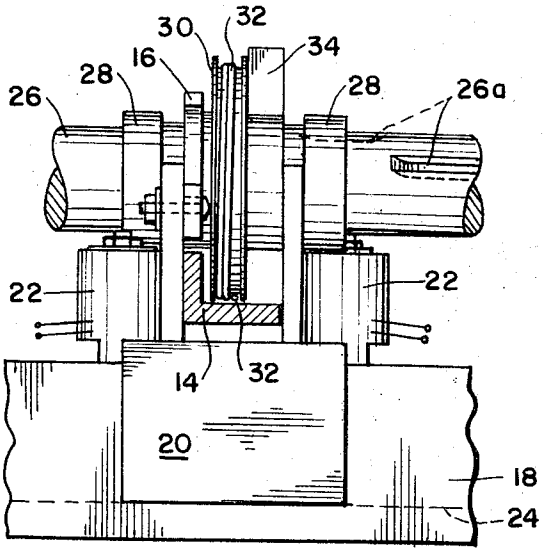
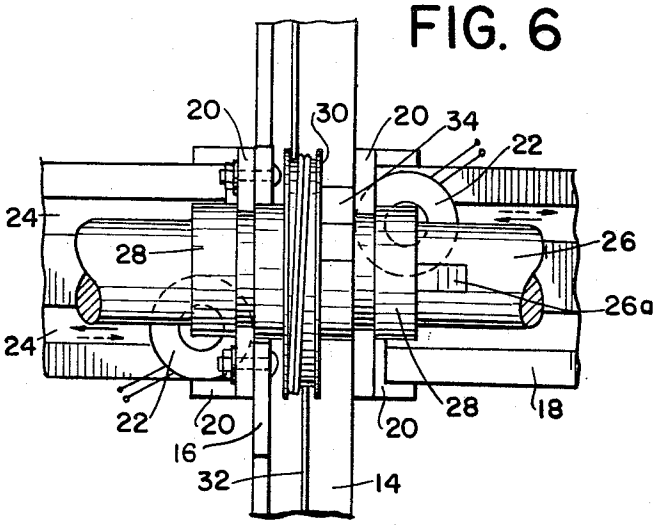


FIG. 6



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CLOTHING STORAGE AND CONVEYOR SYSTEM

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Int. Cl. B65g 1/00
U.S. Cl. 214—16 17 Claims

ABSTRACT OF THE DISCLOSURE

Clothing storage and conveyor system for temporarily storing articles of clothing, such as overcoats, hats and the like, e.g. in restaurants, theaters and other public places. Handling of the clothing is considerably accelerated, and under certain circumstances no attendant is needed for handling the clothing articles.

Basically the installation comprises a substantially horizontal track mechanism including one or two rails and storage means adjoining the rail or rails on one or both sides; hangers adapted for receiving the clothing are slidable along the rail; means for moving the hangers along the rail; and means for transferring the hangers from said rail to the storage means and vice versa. A pivotable arm is preferably provided along which the hanger may slide by gravitational action when transferred to the storage means and when removed therefrom.

The invention relates to clothing storage and conveyor systems or rack installations of the kind used for temporarily storing articles of clothing, for instance in public places such as restaurants, theaters, auditoriums, where a large number of people congregate and have to store away their overcoats, hats and the like articles of clothing.

Conventionally, special personnel is assigned to cloakrooms where such clothing is temporarily stored. Tickets or numbers are given out to the people, against which the clothing is later returned by the personnel. These procedures are time consuming, slow and sometimes unreliable because the human factor allows unavoidable errors in handling the incoming and outgoing articles of clothing.

It is the object of this invention to provide a rack installation suitable for the above purposes, and also for the temporary storage of clothing in cleaning establishments and similar places, which avoids the drawbacks of known devices or other expedients provided so far for similar purposes.

It is another object to provide an installation which requires only a minimum or no attendance at all for handling the incoming and outgoing articles of clothing, yet with a high degree of accuracy in recovering the wanted piece of clothing, without making errors.

It is yet another object to provide a rack system which is easy to install, to operate and to maintain, the latter two procedures by unskilled personnel.

According to one of the major features of the invention, an exemplary embodiment of the rack installation comprises a substantially horizontal track mechanism including at least one rail extending along the mechanism, from a first position, accessible from outside, at which the articles of clothing are inserted, and along a plurality of second positions, at which the articles are stored, a plurality of hangers slidable along the rail or rails between the first and second positions and vice versa, hanger storage means adjoining the rail(s), and means for transferring the hangers from the rail to the storage means and vice versa.

The hangers may be of the conventional type although

certain structural details have to be met so as to adapt them to the other elements of the installation. Preferably, special hangers are used for the installation, which have portions adapted to carry hats and the like articles of clothing in addition to overcoats and other garments.

According to another feature of the invention, automatic or semi-automatic control means may be provided, preferably in association with a coin-operated mechanism, for starting the rack installation, for inserting and removing the articles of clothing, and for collecting fees for the temporary storage thereof. In a known manner, safety and operational measures may be accomplished by the provision of said control means.

The transferring means, in accordance with the invention, preferably includes arms for guiding the hangers from the rail toward the storage means, in a direction away from and toward the rail.

A further feature relates to the provision of means, otherwise conventional in its structures, for selectively raising and lowering at least a portion of the rail, for transferring the hangers by gravity to the storage means when the rail portion is raised, and vice versa, when it is lowered.

The afore-mentioned hanger guide arms may have ends that are bent either in the plane of the arms, or out of said plane, allowing the hangers to be slid from the rail and back again from the storage means. The ends of the arms may be curved so as to face the inserting or first position of the installation from where the hangers arrive by action of the moving means, for easy transfer from the rail to the storage means and vice versa. Appropriate hook means may be associated with the arms, for receiving the hangers at the storing or second positions.

According to yet another important feature of the invention, the transferring means may also include rail means in the area of the storage means, with guide means being associated with said rail means, and a plurality of slides on said guide means, one each for carrying one of the hangers.

The arms may be made pivotable about the longitudinal axis of the rail means; simultaneously or separately, the arms may be made slidable or reciprocable between the storage means and the rail so as to assist the handling of the respective hangers.

The rail means, according to further noteworthy features of the invention, is preferably provided with plungers reciprocable in bores in said rail means, the bores being preferably spaced apart by the distance between the hanger carrying slides mentioned before. Two electromagnets are provided for selectively raising the respective plungers, thereby pushing successive ones of the slides in opposite directions. Owing to the provision of the bores of the rail means, the latter resembles the letter E lying on its side, with the limbs directed upwards. The ends of the plungers may have enlarged portions or protrusions adapted to push the slides back toward the center of the rail means.

The means provided for reciprocating the arms preferably includes a bearing in each slide for the respective hanger guide arm, and a wheel is provided for imparting a sliding movement to the arms in the bearings. The reciprocating movement of the arms is preferably provided by way of a string wound about the wheel, and having its ends attached to portions of the arms.

As a further feature of the afore-mentioned reciprocating means, the invention also provides a shaft and a sleeve disposed about the shaft, and connected with the string carrying wheel. The shaft has a plurality of recesses, each with a wedge which is biased thereinto, for selectively preventing rotation of the sleeves with respect to the shaft.

The recesses in the shaft are preferably provided in two or more axial rows, successive recesses alternating between the rows. According to one of the inventive features, four symmetrical axial rows are provided, with the recesses successively alternating between the rows, so that, for example, the first, fifth and recesses are in the first row, and so forth.

Yet another inventive feature relates to the fact that the depth of the recesses in at least one row decreases from one section of the shaft to the other, preferable, from its center toward one or both ends of the shaft. The sole or bottom of the recesses at the shaft ends coincides with the periphery of the shaft.

Other objects, inventive features and many of the attendant advantages of the invention will be readily appreciated as the same becomes better understood by reference to the following detailed description, when considered with the accompanying drawings, wherein

FIG. 1 is a somewhat schematic top view of a preferred, exemplary embodiment of the clothing storage and conveyor system, or rack installation, according to the present invention, with a central portion thereof broken away;

FIG. 2 is a longitudinal sectional view of the inventive installation, showing a number of overcoats and hats stored away, as a matter of example;

FIG. 3 is a transversal sectional view of the installation, taken at right angles to the sectional plane of FIG. 2, and showing the rails forming part of the track mechanism in the clothing discharging (solid-line) as well as receiving (broken-line) positions;

FIG. 4 is a partly sectional view of one of the carrying rail means with the associated structure, including the parallel shaft means, the section being taken in front of a slide, in a plane similar to that of FIG. 3;

FIG. 5 is a partial side view of the structure of FIG. 4, seen in the direction of FIG. 2; and

FIG. 6 is a partial top view of the elements shown in FIGS. 4 and 5.

The inventive concept can be carried out in a number of ways. As a matter of example, but in no way with an intent of limitation, a preferred, exemplary rack installation will be described hereafter with reference to the figures, particularly FIGS. 1 through 3, giving a top view and two perpendicular (longitudinal and transversal) sectional views. As a matter of example, the installation is provided in the corner of a room or space, flanked on at least two sides by walls W, and having ceiling and floor portions C and F, respectively (see FIG. 2).

The rack installation exemplifying the inventive system is generally designated by numeral **2**; the input side is toward the left, as viewed in FIGS. 1 and 2. A partition or door **4** may be provided in this area for preventing unauthorized persons to accede to the storage area, as shown in FIG. 2 to the right-hand side of the door **4**. A control panel **6** is preferably provided just outside the door **4**, or on an adjoining wall area (the panel **6** having been omitted from FIG. 2 for the sake of clarity). As will be explained later, the panel may include conventional control means for operating the rack installation, preferably including coin-operated means for allowing the public access to the installation, against payment of a coil, token or the like.

A track mechanism is best seen in FIG. 1, including one or two rails **8** which, in the exemplary installation, have elongated U-shapes, defining a storage area between the limbs of the rails. As shown in FIGS. 1 and 2, the arcuate central sections of the rails **8** extend toward the left, beyond the door **4**, while the rest is within the storage area of the rack installation **2**. In the middle portion of FIG. 3 it can be seen that at least a portion of each rail **8** can be lowered from the solid-line (upper) position to the broken-line (lower) position, as will be explained later in more detail. The outer runs of the rails may be given a similar structure, if necessary. The means for raising and lowering the rails are conventional and need not be described or illustrated herein.

Clothes hangers for the articles to be temporarily stored inside the rack installation are shown in FIGS. 2 and 3 at **10**. The hangers may have portions or attachments **10***a* for holding hats and the like articles of clothing. The lower ends **10***b* of the hangers may also be provided with means for attaching suitcases, briefcases, small packages and the like, within the limitations of the space available for one overcoat or the like article of clothing, as will be readily understood.

Moving mechanism **12** are disposed adjacent to the innermost, straight rails **8** for moving the hangers **10** (with or without **10***a* and/or **10***b*) along the rails, namely from a first position, to the left of door **4**, where the articles of clothing are inserted, and along a plurality of second positions, at which the articles are stored with the hangers **10**, as shown in FIG. 2. As a matter of example, electric motors **12***a* are shown associated with the moving "mechanism" **12**. In FIG. 3, the latter is only schematically shown (underneath and adjacent the solid-line or upper position of the rails **8**).

In accordance with one of the important features of the invention, arms **14** are provided (see FIGS. 1 and 3 through 6), serving to transfer the hangers **10** from the rails **8** to the storage area of the rack installation. A hook-shaped element **16** (FIGS. 3–6) is disposed adjacent the arms **14**, for receiving the respective hanger **10**. FIG. 3 shows that when the rails **8** are raised, a hanger **10** moved therealong can be slid onto one of the arms **14** when it is lengthwise moved toward the respective rail (as shown in the lefthand section in the center of FIG. 3). Once the hanger **10** has reached the hook **16**, the arm **14** is moved away from the rail **8** so as to avoid interference with the further operation of the installation.

Before the complete operation of the installation can be described, further details of the structural elements have to be given which are associated with the hanger transferring and storage means only cursorily mentioned so far.

A supporting rail **18** runs along both sections of the storage area, as best seen in FIG. 1, for receiving a plurality of slides **20** which are shown in their starting positions in the lower section of FIG. 1. On both sides of the slides there are electromagnets **22** the action of which will be explained somewhat later. The rails **18** have therein bores **18***a* (see FIG. 4) lodging push rods or plungers **24** which are moved simultaneously but in opposite directions. The plungers **24** have holes therein, below the respective electromagnets **22**, and wedge members in said holes, acted upon by the magnets. When the wedge members are raised by the magnets, the plungers **24** move in opposite directions so that a space results on either side of the afore-mentioned slide **20** for receiving or discharging a respective hanger **10**; see the upper section of FIG. **1**, where spaces appear between adjoining arms **14**.

Above the slides **20** there are rotating shafts **26** which rest on said slides by the intermediary of a sleeve **28**. A wheel **30** is associated with the sleeve, and a string **32** is wound about the wheel, having its ends attached to portions of the respective arm **14**.

A tubular member or sleeve **34** is also associated with the sleeve **28**, for lodging a spring **34***a* and a wedge member **34***b* therein. The latter is urged into an appropriate recess **26***a* of the shaft **26**, thereby preventing the rotation of the sleeve **28** about the shaft **26**.

FIG. 1 shows electric motors or similar drive means **36** for each of the shafts **26**, for purposes to be understood as the description proceeds. It will be understood that these motors **36**, as well as the motors **12***a* of the hanger moving "mechanism" **12**, can be electrically or otherwise correlated with the earlier mentioned control panel **6** and its associated mechanism (which may of

course include relays, hydraulic, mechanical or other control means and the like).

When the slides **20** are in their initial positions (lower sections of FIG. 1), all wedge members **34***b* are located in their respective recesses **26***a*. These recesses have about four-fifth of the length of the slides **20**, and they become flatter from the center of the shaft **26** toward its ends so that eventually the bottoms of the recesses **26***a* coincide with the periphery of the shaft, as shown in FIG. 5.

Preferably the recesses are in four axial rows (see FIG. 4) so that each fifth recess is in the same axial row. The distances between the centers of the recesses corresponds to four length of the slides **20**. When the plungers **24** move the slides **20** 3½ times their length, all wedge members are raised with the exception of one which remains stationary. When the shaft **26** is rotated by the respective motor **36**, the wedge members (except the one) slide along the shaft surface. Only one wheel is entrained which remained stationary, and then the respective arm **14** is pushed onto the rail **8**, as shown in the left-hand section of FIG. 3.

The arms **14** are balanced so that in the extreme outward positions they do not pivot in the absence of a hanger **10** thereon. The ends of the arms may be bent in the same plane whereby the hangers **10** can be slid from and onto the respective rail **8** when they are transferred to the storage area and vice versa.

Alternatively, the arms **14** may be given ends that are bent out of the planes thereof, as shown in FIG. 1. The ends are curved so as to face the first or inserting position from where the hangers **10** arrive by action of the moving "mechanism" **12**, **12***a*, for easy transfer from and to the respective rail **8**. If two systems are used, as shown in the exemplary embodiment, the arm ends are bent in opposite directions, substantially as shown in FIG. 1.

For operating the rack installation of the clothing storage and conveyor system, for purposes of inserting articles of clothing, the procedure is as follows: Each overcoat is applied to one of the hangers **10** and the latter is placed onto one of the rails **8**. The respective mechanism **12**, **12***a* is actuated, and then the hanger in question is conveyed into the installation. At a given point, coordinated with the position in which the shaft **26** is with the associated elements, one of the arms **14** is advanced toward the rail in question which, it will be understood, should now be raised to its upper position. The hanger will be allowed to slide along the arm **14** until it is lodged in the hook **16** (right-hand section of FIG. 3), whereupon the arm can be withdrawn. Successively, the storage area can be filled up with overcoats and other articles of clothing, each to occupy one of the hangers **10**, **10***a*, **10***b* as shown in FIG. 2, right-hand end.

For removing the articles of clothing, the procedure is the opposite: the arm **14** bearing the clothing in question is advanced toward the respective rail **8**, the latter is lowered to the broken-line position appearing in FIG. **3**, whereupon the hanger **10** can slide thereon by its own weight, and the arm in question can again be withdrawn. The appropriate mechanism **12**, **12***a* brings the clothing, on its hanger, to the first or handling position of the installation.

The operation of the motors **36** is correlated with the activation of the "mechanism" **12***a* so that the shaft **26** is always rotated into the position appropriate for inserting or removing a particular article of clothing from a particular arm **14**. The insertion and removal of clothing is preferably carried out when the spacing of the structural elements, including the adjoining arms, is as shown in the right-hand top section of FIG. 1.

It should be understood, of course, that the foregoing disclosure relates only to preferred embodiments of the installation and that it is intended to cover all changes and modifications of the exemplary rack installation described which do not constitute departures from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A rack installation for temporarily storing articles of clothing and the like, comprising, in combination: a substantially horizontal track mechanism including at least one first rail extending along said mechanism from a first position, accessible from outside, at which the clothing is inserted, and along a plurality of second positions, at which the clothing is stored; a plurality of hangers slidable along said first rail and adapted to carry the clothing; means for moving said hangers along said first rail between said first and said second positions and vice versa; hanger storage means adjoining said first rail; means for transferring said hangers from said first rail to said storage means and vice versa; control means for selectively actuating said moving means and said transferring means; the latter including arms for guiding said hangers in a direction toward and away from said first rail; said transferring means further including a second rail in the area of said storage means and substantially parallel with said first rail, guide means associated with said second rail, and a plurality of slides on said guide means, one each for carrying one of said hangers; hook means associated with said arms, for receiving said hangers at said second positions; and means for pivoting said arms about the longitudinal axis of said second rail.

2. The rack installation as defined in claim **1** wherein said hangers include portions adapted to carry hats and the like articles of clothing.

3. The rack installation as defined in claim **1**, further comprising coin-operated means associated with said control means.

4. The rack installation as defined in claim **1**, wherein said arms have ends bent in the same plane, whereby said hangers can be slid from and onto said first rail when they are transferred to said storage means and vice versa.

5. The rack installation as defined in claim **1**, wherein said arms have ends bent out of the planes thereof, and curved so as to face said first position from where said hangers arrive by action of said moving means, for easy transfer from said first rail to said storage means and vice versa.

6. The rack installation as defined in claim **1**, wherein said transferring means further includes means for selectively raising and lowering at least a portion of said first rail in the area of said second positions, for transferring said hangers by gravity to said storage means when said rail portion is raised, and vice versa, when it is lowered.

7. The rack installation as defined in claim **1**, further comprising two plungers reciprocable in respective bores provided in said second rail in a manner spaced apart by the distance between said slides, and two laterally offset electromagnets energizable so as selectively to raise the respective plungers, thereby pushing successive ones of said slides in opposite directions.

8. The rack installation as defined in claim **7**, wherein said second rail with its bores has substantially the shape of a letter E with upwardly directed limbs.

9. The rack installation as defined in claim **7**, wherein the ends of said plungers have enlarged portions adapted to push said slides back toward the center of said second rail.

10. The rack installation as defined in claim **1**, wherein said transferring means further includes means for reciprocating said arms between said storage means and said first rail in a direction substantially perpendicular to the latter.

11. The rack installation as defined in claim **10**, wherein said reciprocating means includes a bearing in each slide for the respective arm, further comprising a wheel rotatable to perform sliding movement of said arms in said bearings.

12. The rack installation as defined in claim **11**, wherein said reciprocating means further includes string means

wound about said wheel, having its ends attached to terminal portions of a respective one of said arms, and performing its sliding movement between said storage means and said first rail.

13. The rack installation as defined in claim **11**, further comprising shaft means in the area of said storage means and substantially parallel with said first rail, and a sleeve disposed about said shaft means and connected with said wheel.

14. The rack installation as defined in claim **13**, further comprising spring-biased wedge means reciprocable in a recess provided in said shaft means, for selectively preventing rotation of said sleeves with respect to said shaft means.

15. The rack installation as defined in claim **13**, wherein a plurality of recesses is provided in said shaft means in at least two axial rows, successive ones of said recesses alternating between said axial rows.

16. The rack installation as defined in claim **15**, wherein the depth of said recesses in at least one of said rows decreases along said shaft means.

17. The rack installation as defined in claim **15**, wherein said recesses are provided in four symmetrically disposed axial rows, with the first, fifth, ninth recesses being in the first row, the second, sixth, tenth recesses in the second row, and so forth.

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U.S. Cl. X.R.

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