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MULTI-SHELF RACK

Filed March 29, 1965

3 Sheets-Sheet 1

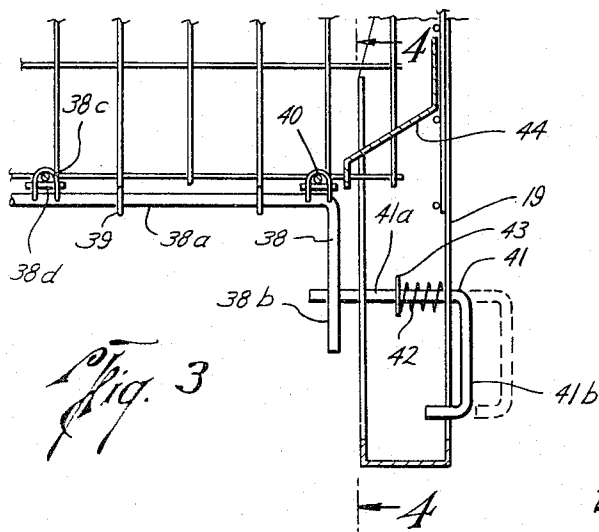
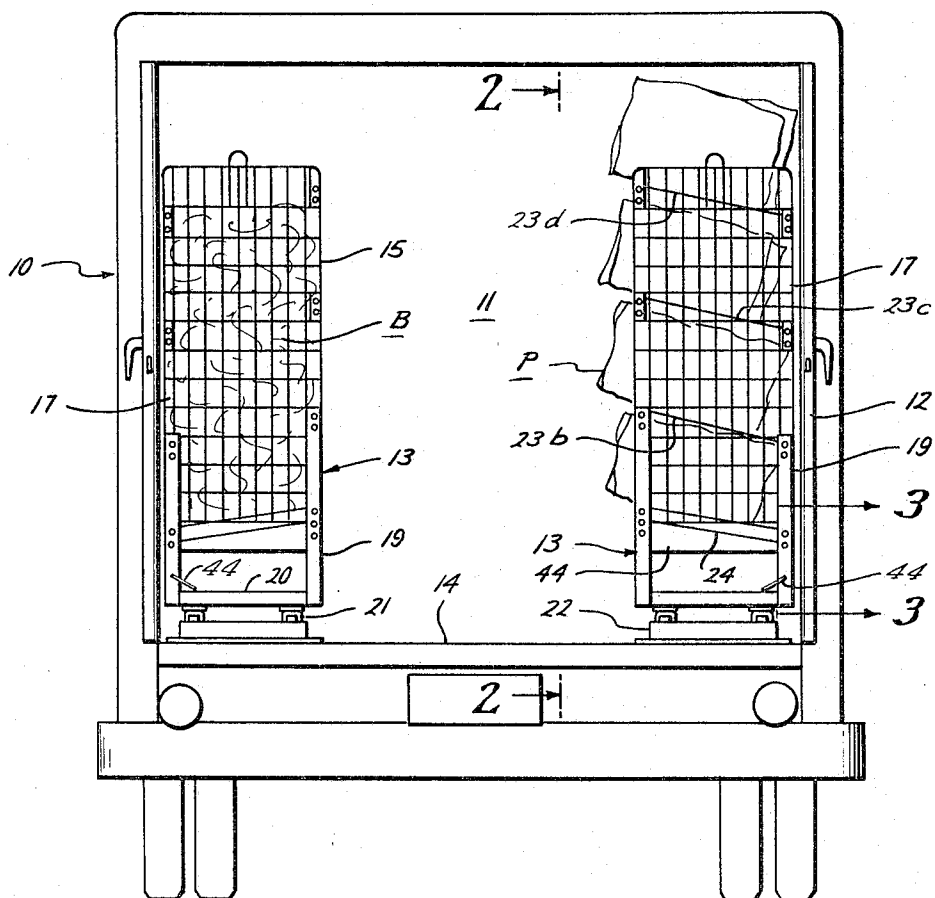


Fig. 1

Fig. 3

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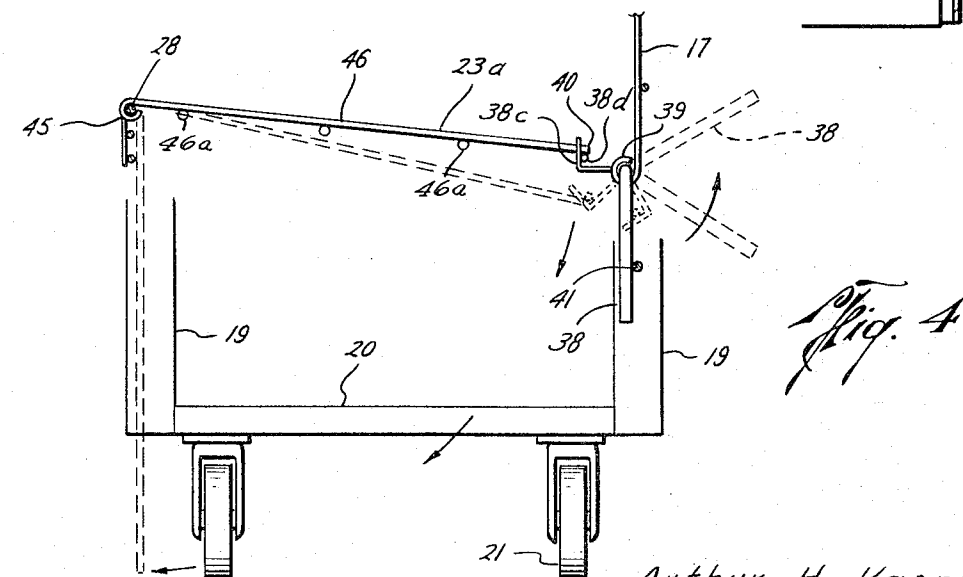
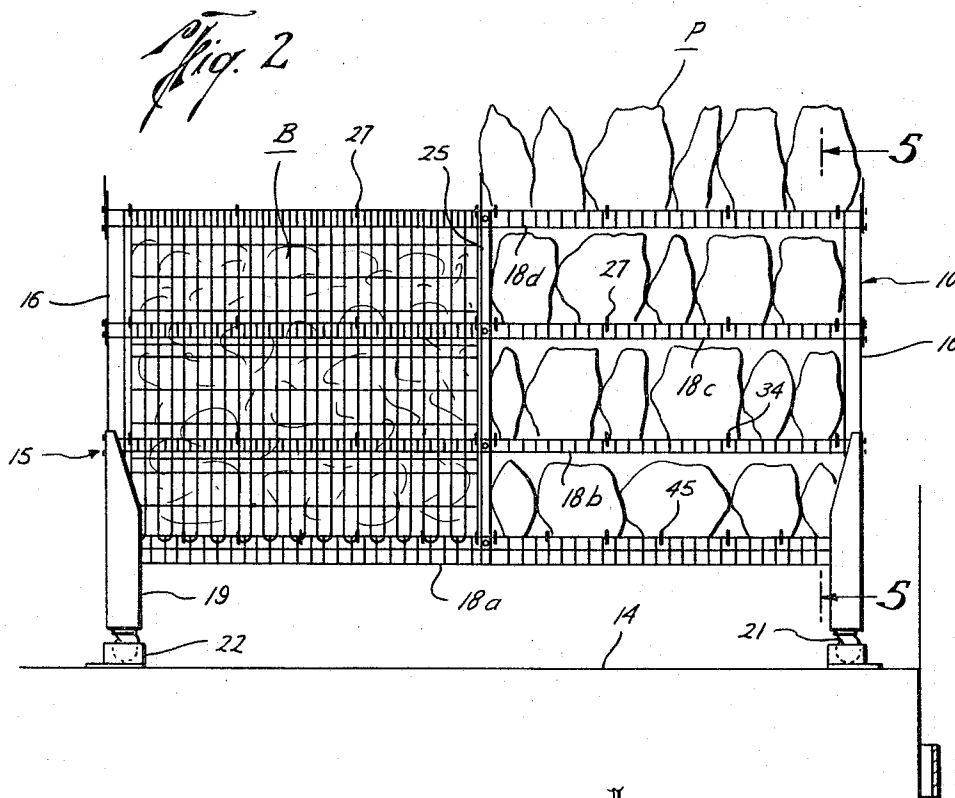
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3 Sheets-Sheet 2



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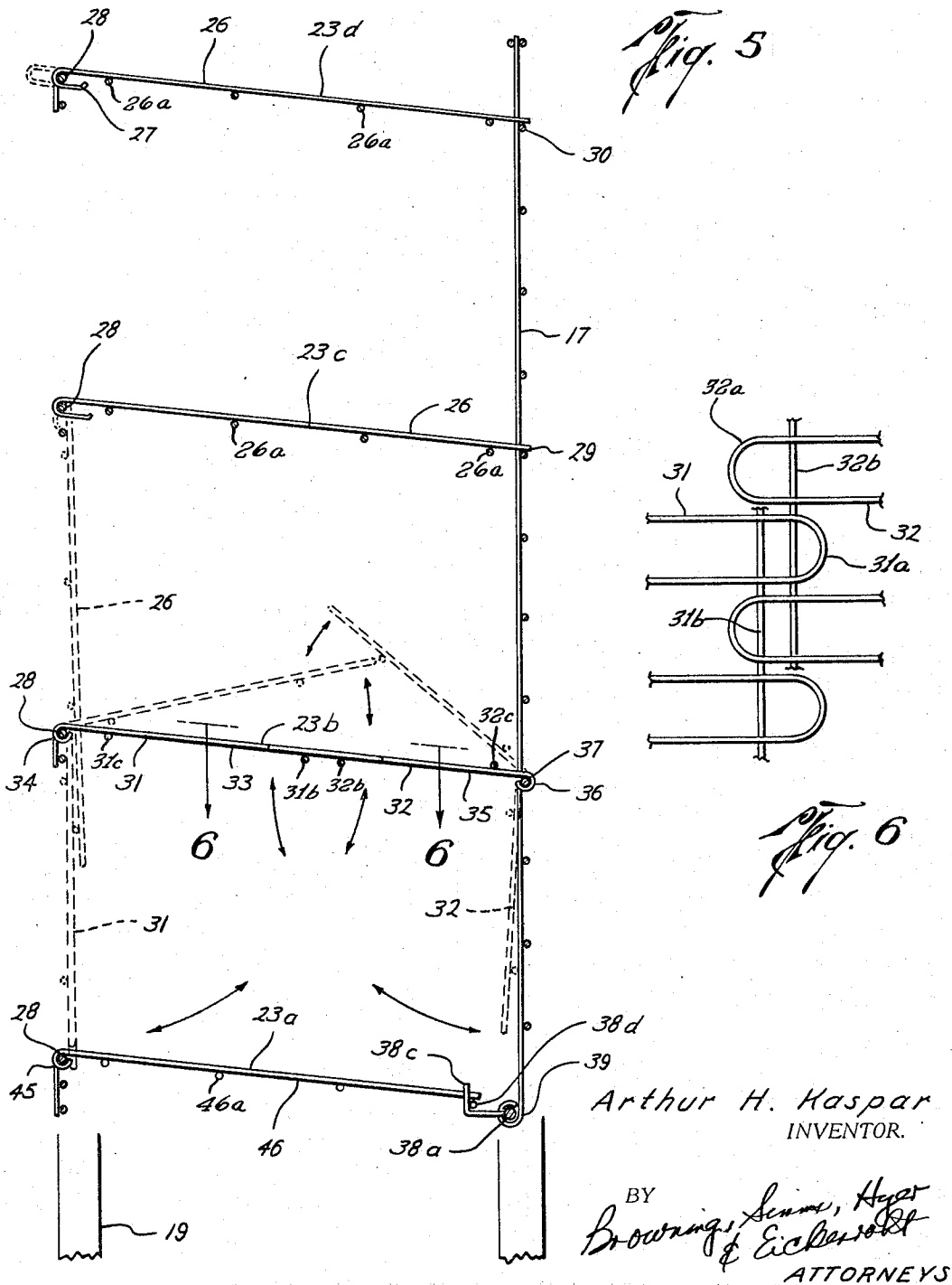
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3,300,056

MULTI-SHELF RACK

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12 Claims. (Cl. 211-134)

This invention relates generally to an improved multi-shelf rack. More particularly, it relates to a rack of this type which is especially well suited for use in the temporary storage of packaged articles which are to be replaced with articles in bulk, or, alternatively, in the temporary storage of articles in bulk which are to be replaced with packaged articles.

It is the practice in the retail laundry business to load packages of laundered clothing onto the shelves of a portable rack, and then move the rack from the laundry into the rear end of a panel type delivery truck. As the individual packages are delivered to their respective owners, they are usually replaced by substantially equal volumes of dirty clothing for return to the laundry. At the present time, this dirty laundry is merely piled on the floor of the truck, so that space in the truck which might otherwise be used for additional racks must be reserved for this purpose. Also, when the deliveries are completed and the truck returns to the laundry, it's necessary to unload not only the empty racks but also this large bulk of dirty laundry.

An object of this invention is to provide a multi-shelf rack which is easily and quickly convertible to a bin into which dirty clothing or other bulk articles may be placed as the clean laundry or other packaged articles are removed from its shelves.

It is a more particular object to provide a rack of this type which is of such construction that only that portion thereof from which the packaged articles have been removed need be converted to a bin so that, during the delivery and pick-up of the articles, the rack may serve to receive both packaged and bulk articles.

Another object is to provide such a rack which is easily and quickly convertible back to use for temporarily storing the packaged articles.

A further object is to provide such a structure in which the bulk articles may be easily and quickly dumped therefrom upon return to the laundry.

It is a still further object to provide such a rack in which the shelves are of such construction as to accommodate long and narrow packages in side-by-side relation with a minimum waste of head room.

These and other objects are accomplished, in accordance with the illustrated embodiment of the invention, by a rack which includes an upright frame having side walls and a generally horizontal lower wall extending laterally between these side walls to provide a lower shelf. There is at least one additional wall extendible laterally between the side walls for movement between a position in which it is generally horizontal and spaced above the next lower wall and another position in which it depends across the front of the frame above such next lower wall. Suitable means are provided for alternately releasably maintaining each of the individual walls in its generally horizontal position so as to provide an upper shelf and locating such wall in its depending position so as to close the front of the frame.

Thus, when it is releasably maintained in its generally horizontal position, each additional wall provides another shelf above the lower shelf to permit additional packaged articles to be stored therein. On the other hand, upon removal of the packaged articles from above each of the upper shelves, the additional wall providing same may be released from its generally horizontal position to permit its movement into depending position so as to convert that

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portion of the frame of the rack above the next lower shelf into a bin. Thus, in the use of this rack, the packaged articles may be stored from the bottom up in the order in which they are to be delivered, so that the shelves may be emptied and the walls providing same converted to bin providing positions in the same order. In this manner, the rack is usable for storing packaged articles and articles in bulk at the same time, whereby it is unnecessary to pile all the bulk articles outside of the rack as the packaged articles are being delivered.

The lower wall which provides the lower shelf is also releasable for movement into a depending position across the front of the frame beneath the next upper additional wall. Thus, with the bulk articles contained in the converted rack, it may be moved from the delivery truck into the laundry and its contents removed in toto through the opened lower end of the rack. This, of course, avoids the necessity of lifting the bulk articles from the open upper end of the converted rack or, alternatively, inverting the rack, which may be quite heavy and cumbersome.

In the preferred embodiment of the invention, each of the additional and lower walls is pivotally connected to the front of the frame for swinging between its shelf providing and depending positions. In this case, of course, means are provided for limiting the downward swinging movement of each additional wall outwardly from its depending position. Also, the width of each of the additional shelves from the front to the rear of the frame is greater than the vertical space between it and the next lower shelf, thereby making the rack particularly well suited for storing long and narrow packages.

This latter construction presents no particular problem insofar as all but the shelf next above the bottom shelf is concerned. That is, each wall providing same is released and swung downwardly to depending position only after the wall or walls beneath it have already been swung to depending position, so that its lower end is free to extend downwardly past the upper end of the next lower wall in its depending position. However, inasmuch as the bottom wall is the last to be moved to depending position, the additional shelf just above it is instead provided by first and second walls each of which is narrower in width than the space between it and the bottom shelf, whereby each is free to swing downwardly to depending position while the lower wall is maintained in its lower shelf providing position. At least the first wall is approximately as wide as this spacing so that it closes the front of the frame above the bottom shelf when it swings down to depending position. In the illustrated embodiment of the invention, the first and second walls are maintained in their generally horizontal positions by releasable interlocking parts on their adjacent lateral edges.

In the drawings, wherein like reference characters are used throughout to designate like parts,

FIG. 1 is an elevational view of the rear end of a delivery truck with its doors open to show a rack constructed in accordance with the present invention disposed adjacent each side thereof;

FIG. 2 is an elevational view of the rack on the right-hand side, as seen along broken line 2-2 of FIG. 1;

FIG. 3 is an enlarged sectional view, as seen along broken line 3-3 of FIG. 1, of the means for releasing the bottom wall from its bottom shelf providing position.

FIG. 4 is another cross sectional view of this lower wall releasing means, as seen along broken line 4-4 of FIG. 3;

FIG. 5 is a cross sectional view of the rack with its shelves in package storing position, and as seen along broken line 5-5 of FIG. 2; and

FIG. 6 is an enlarged detailed view of the adjacent interlocking lateral edges of the first and second walls providing the shelf next above the bottom shelf.

With reference now to the details of the above-described drawings, the truck 10 shown in FIG. 1 is of the conventional panel type used, for example, in the delivery and pick-up of laundry. Thus, it has a storage area 11 which may be opened or closed by means of doors 12 hingedly connected to the opposite sides of the truck and a bed 14 on which the racks 13 are supported in an upright position.

As best shown in FIGS. 1 and 2, each rack 13 comprises a frame 15 having side walls 16 and a rear wall 17 extending laterally between the side walls. The front of the frame is open between members 18a, 18b, 18c and 18d which also extend laterally between the side walls. Legs 19 which depend from each corner of the frame are connected by cross braces 20, and casters 21 are mounted on the braces to facilitate movement of the rack. During deliveries, the casters are confined by flanges 22 secured to the bed 14 so as to prevent the racks from moving about in the truck.

In the illustrated embodiment of the rack 13, it comprises a pair of units arranged side by side, as shown in FIG. 2, so that one such unit may be completely converted for use to a bin for containing bulk laundry B, while the other is maintained with its shelves in position to store packages P. Obviously, the rack may comprise only a single unit or, in the alternative, it may be made up of three or more of such units. For purposes of simplicity, only one such unit will be described in detail, it being understood that each such unit is merely a duplication of the other unit.

As shown in the drawings, the packages P are stored on shelves 23a, 23b, 23c and 23d provided by generally horizontal walls which extend laterally from one side to the other of each frame unit. When the rack is converted to a bin so as to receive the bulk articles B, all of the generally horizontal walls with the exception of the bottom one are moved to depending positions so as to close the openings between the frame members 18a, 18b, 18c and 18d on the front of the frame. As shown in the drawings, all of the walls of the frame are made of stiff wire strands arranged crosswise of one another. These walls are braced where required, as for example by the upward extension of the corner legs 19, which are in turn connected not only by cross braces 20, but also by cross bars 24 (see FIG. 1). Further bracing is provided by means of a vertically disposed wall 25 which divides the side-by-side units of the frame (see FIG. 2).

As best shown in FIG. 5, the single walls providing each of the upper shelves 23c and 23d are pivotally connected to frame members 18c and 18d, respectively, by means of strands 26 which are connected by cross strands 26a and bent at their front ends to provide elongate loops 27 fitting over the upper strand 28 of such frame member. With the wall moved rearwardly to engage the front end of the loop against the strand 28, the rear end 29 of each of the strands 26 rests upon a strand 30 of the rear wall 17 of the frame to maintain the wall in its generally horizontally extending shelf providing position. As can be seen from FIG. 5, the projection of this end 29 beyond the rear wall 17 is less than the length of the loop 26. Thus, when it is desired to move each of these walls to its depending position, it is only necessary to move the wall and loop forwardly, as shown by broken line representation of shelf 23d in FIG. 5, to free the ends 29 of each of the strands 26 for swinging downwardly with the wall to a depending position, as shown by the broken line representation of shelf 23c in FIG. 5. In this latter position, the lower end of the wall providing the shelf extends downwardly past the upper end of the next lower frame member, and the wall is located in this depending position by engagement with the front of the frame.

Obviously when the bin is to be converted back to a multi-shelf rack, the foregoing procedure is reversed in that the wall is lifted so as to engage the lower end of

the slot 27 with the strand 28 and swung upwardly to a position slightly above its generally horizontal position. At this time, the entire wall is moved rearwardly so that the ends 29 of the strands 26 move beyond the rear wall 17 for support on the strands 30 thereof when the wall is permitted to assume its shelf providing position. As can be seen in FIG. 5, in such position, the walls slope at a small angle from the front to the rear of the frame so as to lessen any tendency for the packages P to fall out of the openings in the front of the frame.

The shelf 23b just above the lower shelf 23a is provided by a pair of generally horizontal sectional walls 31 and 32 pivotally connected to the frame member 18b and rear wall 17, respectively. For this purpose, wall 31 has several strands 33 bent at their front ends to provide loops 34 disposed about upper strand 28 of member 18b. Similarly, the wall 32 has several strands 35 bent at their rearward ends to provide loops 36 closely disposed about strands 37 of the rear wall 17.

However, as distinguished from the loops 27, loops 34 and 36 fit closely about the strand 28 and 37, respectively, since it is unnecessary to shift the walls 31 and 32 forwardly and rearwardly in moving them between their alternate positions. In the generally horizontal shelf providing position of the walls 31 and 32, they are interconnected in substantial alignment with one another, as shown by the solid lines of FIG. 5. However, when released from this position, each such wall is free to swing downwardly to a depending position, as shown by the broken lines of FIG. 5. In this latter position, the lower end of wall 31 is located by engagement with the frame members 18a and 18b on the front of the frame, and the wall 32 is limited in its downward swinging by engagement with the rear wall 17.

As can be seen in FIG. 6, the free laterally extending edges of each of the walls 31 and 32 are provided with a series of laterally spaced apart loops 31a and 32a, respectively. These are staggered from one side to the other and of such lengths that when the walls are in their generally horizontal extending positions, the loops of one wall overlap with the loops of the other. More particularly, walls 31 and 32 have a laterally extending strand 31b and 32b, respectively, spaced inwardly of the end of its loops for disposal beneath the loops of the other wall when the two walls are in shelf providing positions, so that the walls are supported from one another to maintain them in shelf providing positions. The wall 31 also has a cross strand 31c running parallel to strand 31b and the wall 32 has a cross strand 32c running parallel to strand 32b.

In order to release the walls from this position, they are raised simultaneously by swinging about their pivot points, as indicated by the broken lines and arrows of FIG. 5. When these walls have been swung sufficiently far so as to clear their adjacent edges, one may be swung downwardly to its depending position and the other swung downwardly to its depending position. The walls may be moved back into interlocked shelf providing positions by a reversal of this procedure. That is, the walls may be raised above their generally horizontal positions so as to clear their adjacent edges and swung downwardly so as to move their loops 31a and 32a into interlocking positions.

Reviewing now the illustrated use of this rack in the delivery of packaged articles P and storing of bulk articles B, the packages are first delivered from the lower or bottom shelf 23a, and the bulk articles which are picked up following these deliveries are temporarily stored on the bed of the truck adjacent the rack. As the packages on the next upper shelf 23b are being delivered, the picked up bulk is also temporarily stored on the truck bed. However, when all packages have been removed from shelf 23b, the walls 31 and 32 are released and moved downwardly to their depending positions to convert the lower portion of the rack into a bin which is closed between frame members 18a and 18b and open at its front be-

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tween frame members 18b and 18c. At this time, at least some of the aforementioned bulk articles picked up during delivery of packages removed from the shelf 23a and 23b may be placed in such pin portion.

After additional packaged articles P have been delivered from the shelf 23c, the wall providing it may also be swung downwardly to depending position, as shown by broken lines of FIG. 5. The bin portion is at this time three-shelves deep and is confined along its lower two-thirds. Thus, at least some of the bulk articles picked up during this delivery may be stored within the converted rack. Then, of course, upon delivery of the packaged article P from the uppermost shelf 23d, the wall providing it may also be swung downwardly to depending position so that the entire rack is converted to a bin of a height corresponding to all four shelves, whereby at least substantially all of the bulk articles may be accommodated.

When the converted rack is returned with the truck to the laundry, it is lifted from the bed of the storage area of the truck and moved inside the laundry where the bulk articles are emptied into the wash tubs. For this purpose, casters 21 of the rack may move over an overhead track above the wash tubs, so that the bulk articles may be dropped directly into the tubs without the necessity of intermediate handling. In any case, the wall providing the shelf 23a is movable to a depending position so that it is not necessary to lift the bulk articles from within the bin or invert the bin in order to empty it.

The wall providing the lower shelf 23a is swingably connected to the front of the frame by means of loops 45 formed on the inner ends of strands 46 and closely disposed about the upper strand 28 of the frame member 18a. As shown in FIGS. 4 and 5, the free swinging edge of this wall terminates short of the rear wall of the frame and is supported by an arm 38 pivotally connected to the rear wall 17 of the frame so as to maintain such wall in its generally horizontal position.

This arm includes a portion 38a which extends laterally through a series of loops 39 formed on the lower ends of downwardly extending strands of the rear wall 17 and another portion 38b extending at substantially a right-angle to the portion 38a. Flanges 38c are secured to the laterally extending portion 38a of the arm to project toward the front of the frame, in the wall supporting position of the arm, so as to receive the edge of the wall providing the bottom shelf 23a. More particularly, the flange 38c is bent to provide an inverted "U", as shown in FIG. 3, and a short pin 38d extends across the "U" to define an opening for receiving the end 40 of a strand of the bottom shelf providing wall.

As can be seen from FIGS. 4 and 5, the extension of the end 40 beyond the flange 38c is sufficiently short that, upon swinging of the arm in a counterclockwise direction and the wall in a clockwise direction, as indicated by the broken lines of FIG. 4, such ends 40 move out of the inverted "U" above the pin 38b. This, of course, frees the wall providing the shelf 23a for swinging downwardly to the depending position also shown by broken lines in FIG. 4.

The arm 38 is releasably maintained in the wall supporting position of FIGS. 3 and 4 by means of a lever or latch 41 which extends through one of the rear legs 19 of the frame. As best shown in FIG. 4, the lever also includes a laterally extending portion 41a having an end projecting inwardly of the leg 19 for disposal against the rear side of the portion 38b of the arm 38. In this manner, the lever holds the arm 38 in the upright position so as to thereby maintain the wall in its generally horizontal position.

The lever also has a handle portion 41b extending approximately perpendicularly to the portion 41a on the outer side of the leg 19 on which the lever is swingably mounted. The entire lever is normally urged to its arm holding position by means of a coil spring 42 compressed

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between the leg 19 and a flange 43 on the portion 41a of the arm. As indicated by the broken lines of the FIG. 3, in order to release the arm 38 from the wall holding position, and thereby permit the wall providing the shelf 23a to swing downwardly to the depending position shown by broken lines in FIG. 4, the handle 41b need merely be pulled away from the leg 19 so as to compress the spring 42 and thereby move the outer end of portion 41a from engagement with portion 38b of the arm 38. When the wall providing the shelf 23a is thus freed to swing into depending position, the handle may be released to assume the normal position shown in FIG. 3.

When it is desired to move the wall back into the shelf providing position, it is only necessary to again retract the lever 41 and swing the arm in a clockwise direction beyond the solid line position shown in FIG. 4. The lever is then released, and the wall is swung upwardly beyond its generally horizontal position. When the free edge of the wall and flanges 38c have cleared one another, they are swung downwardly to insert ends 40 into the openings in the "U" 38c. As the portion 38b then swings down further to engage the lever 41, the wall will have assumed and be maintained in its generally horizontal position.

As shown by broken lines of FIG. 4, in its depending position, the wall providing the shelf 23a will engage with the lower strands of the frame member 18a beneath the strand 28 thereof. Each side wall 16 of the frame is provided adjacent its lower end with a downwardly and inwardly sloping plate 44 for directing the flow of bulk articles downwardly through the open lower end of the bin provided by the converted rack. Thus, upon moving of the wall providing the bottom shelf 23a to its depending position, the bulk articles are deflected away from the legs 19 or other parts of the frame at each side thereof.

Obviously, this rack is useful in a reversal of the above-described procedure—e.g., in the delivery of bulk articles and pick-up of packaged articles. In this case, of course, the rack would initially be arranged as a bin and stacked from top to bottom with bulk articles in the order in which they are to be delivered. As the deliveries are made, the walls would gradually be moved to their generally horizontal positions so as to permit storage of the picked up packaged articles. At any rate, the rack of this invention may find various and sundry uses other than that described.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A multi-shelf rack, comprising an upright frame having spaced side walls and a means connecting the side walls, a generally horizontal lower wall connected to the frame for extension laterally between the side walls to provide a lower shelf, at least one additional wall extendible laterally between the side walls for movement between a position in which it is generally horizontal and spaced above the next lower wall and another position in which it depends across the front of the frame above said next lower wall, and means for alternately releasably

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maintaining each said additional wall in its generally horizontal position to provide an upper shelf and locating it in its depending position so as to close said front of the frame.

2. A multi-shelf rack of the character defined in claim 1, wherein said lower wall is releasable from its generally horizontal position for movement into a position depending across the front of the frame beneath the next upper additional wall.

3. A multi-shelf rack of the character defined in claim 2, wherein the width of each said upper shelf from the front to the rear of the frame is greater than its spacing above the next lower shelf.

4. A multi-shelf rack comprising an upright frame having spaced side walls and a means connecting side walls, a generally horizontal lower wall connected to the frame for extension laterally between the side walls to provide a lower shelf, at least one additional wall extending laterally between the side walls and pivotally connected to the frame for swinging between a position in which it is generally horizontal and spaced above the next lower wall and another position in which it depends across the front of the frame above said next lower wall, means for releasably maintaining each said additional wall in its generally horizontal position to provide an upper shelf, and means for limiting swinging of each said additional wall outwardly from its depending position across the front of the frame so as to provide a closure for the portion thereof above the next lower wall.

5. A multi-shelf rack of the character defined in claim 4, wherein said lower wall is pivotally connected to the front of the frame and releasable from its generally horizontal position for swinging into a depending position across the front of the frame beneath the next upper wall.

6. A rack of the character defined in claim 5, wherein the width of each said upper shelf from the front to the rear of the frame is greater than its spacing above the next lower shelf.

7. A multi-shelf rack of the character defined in claim 5, including an arm pivotally connected to the frame for swinging between a position supporting the lower wall in its generally horizontal position and another position releasing it for swinging into its depending position, a latch supported on the frame for retraction from a position holding the arm in its lower wall supporting position, and spring means urging the latch to said arm holding position.

8. A multi-shelf rack, comprising an upright frame having connected side and rear walls, a generally horizontal bottom wall extending laterally between the side walls and connected to the frame to provide a bottom shelf, a first upper wall extending laterally between the side walls and pivotally connected to the frame for swinging be-

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tween a position in which it is generally horizontal and spaced above the bottom wall and another position in which it depends across the front of the frame above the bottom wall, a second upper wall extending laterally between the side walls and pivotally connected to the frame for swinging between a position in which it is generally horizontal and spaced above the bottom wall and another position in which it depends against said rear wall of the frame above the bottom wall, means for releasably maintaining said first and second upper walls in said generally horizontal position to provide an upper shelf, and means for limiting swinging of the first upper wall outwardly from the front of the frame so as to provide a closure therefor.

9. A multi-shelf rack of the character defined in claim 8, wherein said means for releasably maintaining said first and second upper walls in said generally horizontal positions comprises interlocking parts on their adjacent lateral edges.

10. A multi-shelf rack of the character defined in claim 8, wherein said bottom wall is pivotally connected to the frame and releasable for swinging into a depending position across the front of the frame beneath the first upper wall.

11. A rack of the character defined in claim 8, including a third upper wall extending laterally between the side walls and pivotally connected to the frame for swinging between a position in which it is generally horizontal and spaced above the upper shelf provided by the first and second upper walls and another position in which it depends across the front of the frame above the first upper wall, and means for releasably maintaining said third upper wall in said generally horizontal position to provide another upper shelf above the first mentioned upper shelf, the width of the third upper wall from the front to the rear of the frame being greater than its spacing above the first upper wall, whereby in its depending position the lower end of said third upper wall overlaps with the upper end of the depending first upper wall.

12. A rack of the character defined in claim 11, wherein, said bottom wall is pivotally connected to the frame and releasable from its shelf providing position for swinging into a depending position across the front of the frame beneath the first upper wall.

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