

United States Patent

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[72] Inventor **Melvin C. Rutledge**
Riverside, Calif.
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[73] Assignee **Olin Corporation**

[56]

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Primary Examiner—Arthur L. La Point

Assistant Examiner—Robert W. Saifer

Attorneys—Richard S. Strickler, Robert H. Bachman, Donald
R. Motsko and Thomas P. O'Day

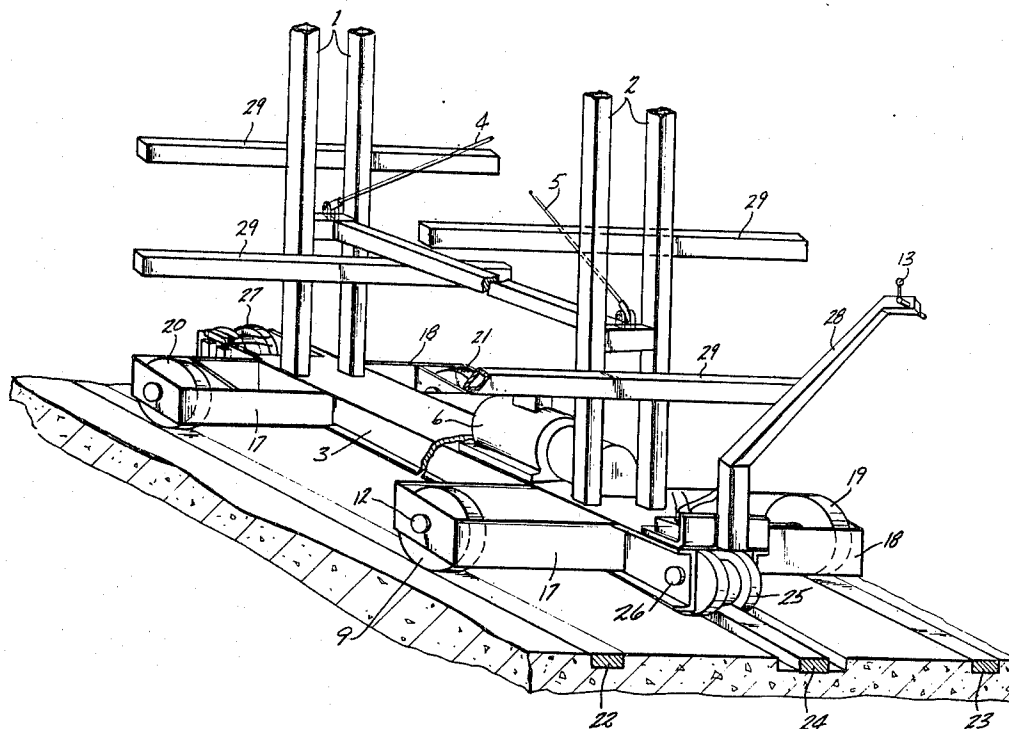
[54] **MOVABLE STORAGE RACK**
1 Claim, 3 Drawing Figs.

[52] U.S. Cl. **104/148,**
104/149, 104/245

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B61f 9/00

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147, 148, 156, 245; 318/468

ABSTRACT: In a rack type storage means the improvement comprising at least two wheels operatively connected to said rack means, means for driving at least one of said wheels, at least one guide in a position removed from said rack means and at least one guide follower connected to said rack means and in operative engagement with said guide.



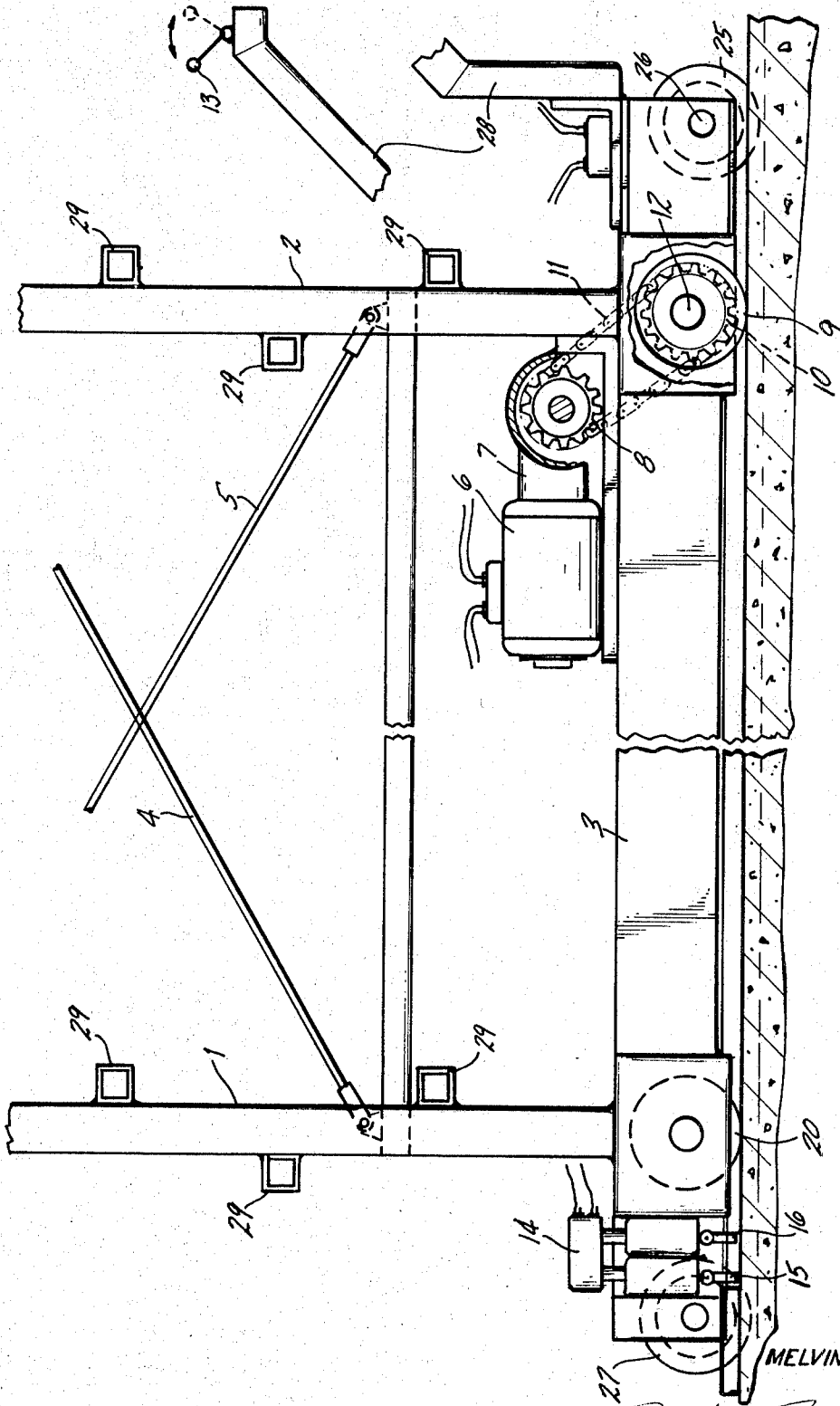


FIG-1

INVENTOR :
MELVIN C. RUTLEDGE

BY *Robert H. Buchanan*

ATTORNEY

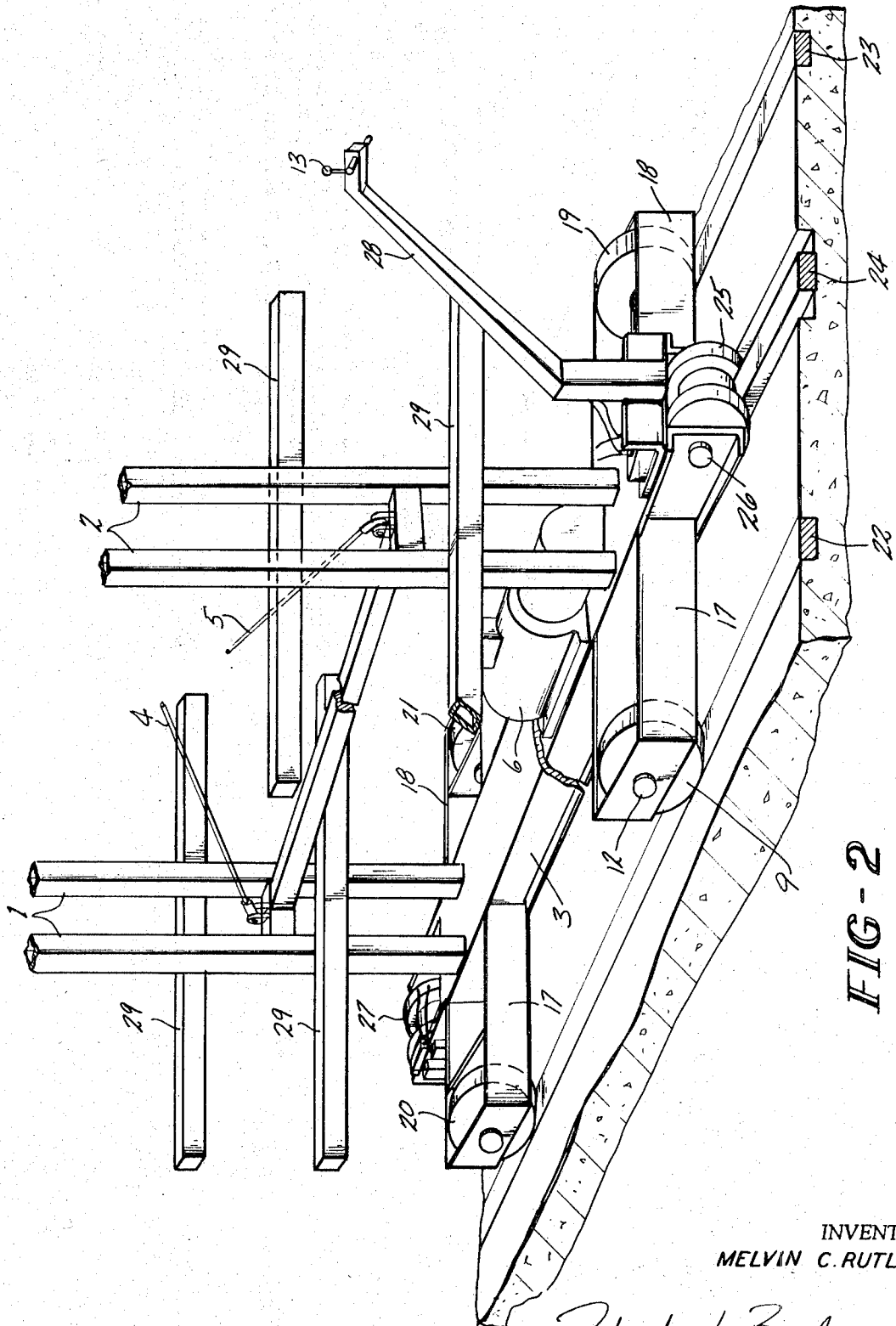


FIG-2

INVENTOR:
MELVIN C. RUTLEDGE

BY *Robert W. Bachwa*

ATTORNEY

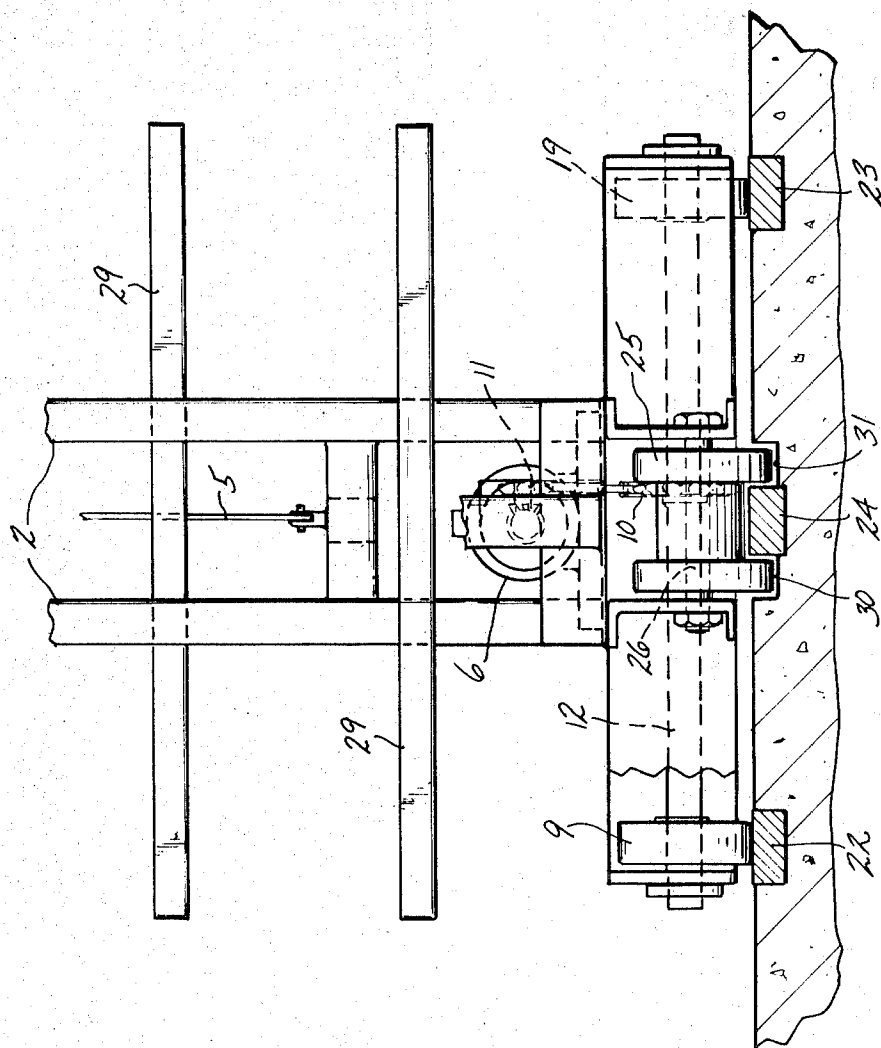


FIG-3

INVENTOR :
MELVIN C. RUTLEDGE

BY *John T. H. Buchwald*

ATTORNEY

MOVABLE STORAGE RACK

BACKGROUND OF THE INVENTION

This invention relates to a movable storage rack for metal products and the like and for supplying metal products to a station for easy access. More particularly, it relates to an improved movable storage rack for handling rod, bar, coils of wire and the like wherein the storage rack may be easily moved to and fro to provide easier access thereto.

In storage areas for metal products and the like the storage structures, i.e., racks and so forth, are fixed in position thereby necessitating aisles therebetween to provide for access to the stored products for their removal. Fork lifts etc. naturally require a substantial width of an aisle in order to remove these products. Thus, it may readily be seen that in conventional storage areas employing standard fork lifts that only a relatively smaller amount of the floor area is actually used for storage. Utilization of space as low as only about 33 percent is not uncommon. Manual removal also naturally requires a certain degree of aisle space for access thereby also limiting the utilization of the actual floor space available.

Thus, it is a particular object of the present invention to provide a structure with which an increased amount of floor space may be utilized for storage purposes.

It is a further object of the present invention to provide a structure as aforesaid which is simply and conveniently operated.

It is a still further object of the present invention to provide a structure which may be moved to and fro for easier access thereto.

Further objects and advantages of the present invention will appear hereinafter.

SUMMARY OF THE INVENTION

The present invention relates to an improvement in a rack type storage means comprising at least two wheels operatively connected to the rack means, means for driving at least one of the wheels, at least one guide in a position removed from the track means and at least one guide follower connected to the rack means and in operative engagement with the guide. Means for limiting the travel of the rack are additionally provided which comprises a cutoff switch and a stop positioned for actuating the switch during lateral movement of the rack.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevated view of the front of the movable storage rack.

FIG. 2 is a perspective view of the movable storage rack.

FIG. 3 is an elevated view of an end of the movable storage rack.

DETAILED DESCRIPTION

Referring to the drawings, FIG. 1 shows a movable storage rack, hereinafter referred to as a movable rack, disclosing vertical frame members 1 and 2 affixed to horizontal frame member 3. Horizontal frame support 3 is affixed to vertical frame members 1 and 2 to provide rigidity to the vertical frame members. Rods 4 and 5 are attached to vertical frame members 1 and 2 and run crosswise to the opposite vertical frame members to provide further rigidity. Vertical frame members 1 and 2 are horizontal frame member 3 may take any convenient form and are preferentially aluminum extrusions. For example, H-shaped members or L-shaped members may be readily utilized.

Means for driving the movable rack are provided for movement to and fro upon tracks. The drive means comprises a motor 6 and gear reduction box 7 attached to the motor, a sprocket 8 connected to the gear reduction box, a drive wheel 9 having a sprocket 10 drivingly attached thereto and a continuous drive means 11 connecting sprocket 8 and sprocket 10 to provide a driving connection between sprocket 8 and drive wheel 9.

Naturally, the drive means may take a form other than the sprocket arrangement as described, such as a wheel adapted for receiving a belt connected to gear reduction box 7 and a similar wheel connected to drive wheel 9. Preferably the axle 12 connects wheel 9 to a second wheel 19 (shown in FIG. 2) in order to provide driving force to another wheel, although wheel 9 may be operatively connected to the structure in a conventional fashion employing for example roller bearings or the like. The drive motor is a standard electrical motor run on 120, 220 or 440 volts. Motor 6 is in electrical connection with a controller, or motor starting switch 13 which when activated turns on the motor 6 which in turn provides power through gear reduction box 7, sprocket 8, continuous drive means 11, sprocket 10, to drive wheel 9.

As is shown, the motor 6 is further connected to a limit or cutoff switch 14. The purpose of limit switch 14 is to limit the travel of the rack upon the tracks when in operation. The limit switch is activated by a contact arm 15 when contact arm 15 encounter a suitable stop during motion of the rack. The contact arm 15 when engaged by the stop is caused to move from a first to a second position thereby breaking the electrical contact by automatic shutting off the motor. Upon reactivation, the rack is caused to move in the opposite direction until similar contact arm 16 encounters a stop at the other end of the travel of the rack.

Naturally, separate limit switches having contact arms may be supplied at any convenient location on the rack for encounter with stops depending upon the actual travel desired and convenience in location. Thus, the embodiment just described is shown merely to illustrate the mechanism of shutting off the motor 6 to limit travel to and fro.

Referring now to FIG. 2, it is seen more clearly how the rack moves to and fro upon tracks. More specifically, a base support comprising horizontal member 3 and cross members 17 and 18 are adapted for travel to and fro. The cross members 17 and 18 are each provided with wheels 9, 19, 20, and 21 operatively connected substantially at the ends thereof for contacting tracks 22 and 23. Drive wheel 9 is connected by an axle 12 to opposing wheel 19. Power is supplied to the wheels as hereinbefore described. Tracks 22 and 23 may be recessed into the floor in order to provide a flat surface for passage of lift forks and so forth. It will be noted that wheels 9, 19, 20 and 21 are not flanged, so that a recessed area need not be provided in the floor to accommodate flanges.

Guide 24 is further provided for guidance of the rack in combination with guide spool or follower 27. Guide spool 25 is shown located at one end of horizontal member 3. Guide spool 25 is connected to horizontal member 3 by way of an axle 26 connected to each side of the member 3. Bearings, e.g., needle bearings are provided for easily rotatable operation of the axle within the horizontal member 3.

As is shown member 3 takes the form of a channel member to provide a locus for the guide spool 25. Naturally, however, other suitable arrangements may be utilized such as attaching the spool at a point adjacent the horizontal member thereby eliminating the necessity for a channel member such as shown in FIG. 2. In addition the guide spool 25 as shown in FIG. 2 may be positioned at any convenient point along horizontal member 3 in conjunction with the additional guide spool 27 depending upon the design of the rack and the stability required. Guide spools 25 and 27 take a grooved form so that in operation guide 24 is positioned within the groove portion of the guide spools 25 and 27. The groove or channel preferably has dimensions greater than that of the guide so that the sides or flanges of the spools as well as the recessed portion therein do not contact the guide 24 in order to eliminate friction. Thus, the flanges will only contact the guide when correction of the direction of travel is required by the movement of the rack.

Naturally, any suitable number of guide spools and guides may be provided if desired. In order to make optimal use of available storage space the guide spools and guide should be positioned at a point between the wheels, although if desired,

the guide spools and guide may be so positioned that they are at a point disposed to one side of the rack.

Naturally, the present invention contemplates wheels in addition to or less than four. For example, it may be possible, depending upon actual load and stability requirements, to provide a rack having three wheels attached thereto in a triangular arrangement although this would necessitate the provision of an additional track. Furthermore, wheels in addition to four may be provided in any suitable arrangement where the load to be carried by the movable rack is such that additional bearing surface is required.

The control arm 28, having controller switch 13 thereon is positioned for the convenience of the operator. The switch so may of course be placed at any convenient position thereon, or, if desired the switch 13 may be placed at any convenient position on the rack such as vertical member 2 without the necessity of a control arm. It is to be noted that the control arm itself merely provides a convenient locus for operation of the rack, i.e., for positioning of the controller switch 13.

It is also to be noted that any desired number of cross-members, vertical members, or horizontal members may be provided depending upon the strength and size of the rack desired. The cross-members 29 provide for positioning of bar and so forth adjacent the vertical members or for hanging spools of wire, small diameter rod and the like.

Furthermore, cross rods 4 and 5 as shown in FIG. 1 may additionally be provided for further rigidity.

Referring now to Fig. 3 it may be seen in clear detail how the tracks guide and guide spool are positioned. More specifically, it is seen that tracks 22 and 23 are recessed into the flooring thus, as aforementioned, the wheels 9, 19, 20, 21 do not have to be flanged and requisite grooves in the flooring are thereby eliminated. Grooves 30 and 31 however are necessitated in order to accommodate flanges of the guide spool 25. It is, of course, not a necessity that the tracks and guide be recessed although this is preferable in order to reduce bumping when fork lifts etc. pass thereover. It may also be readily seen that the tracks 22 and 23 need not have the bearing surface thereon in a horizontal plane with the top surface of the guide. For example, the tracks may be recessed while the guide is not or vice versa. The guide spool 25 naturally is positioned on horizontal member 3 so as to operatively correspond with the guide 25.

It may be seen that the axle 12 is provided connecting wheels 9 and 29 in this embodiment, although it may be envisioned that the axle 12 connecting drive wheel 9 terminates at another point such as at horizontal member 3.

The tracks 22 and 23 and guide 24 of the present invention may be readily installed on existing flooring. Suitable metal bars to serve as tracks 22 and 23 and for the guide 24 may be positioned on the floor and concrete or the like filled around them leaving a space to provide for the grooves for the flanges of the guide spool 25.

Thus, it may be seen that the present invention provides for a simple and expeditious means for storing metal and the like while providing for increased use of available storage area. By the use of the present invention aisles and access as for fork lifts etc. are eliminated. A plurality of movable racks may be positioned side by side in substantially abutting relationship

until access to the racks is desired. Upon actuation of the motor the rack will move to a predetermined position, for example, in a central aisle whereby easy access to the desired material may be obtained. The movable rack may then be returned to its original position in a column of these racks.

In addition to providing any desirable number of movable racks in a side by side position the racks may in addition be positioned in an end to end arrangement and geared to move in opposing directions toward and to a central aisle. Hence, any suitable number may be employed in a column with the column having two in end to end positions forming a pair. It may thus be seen that the overall utilization of space is vastly increased over conventional storage with the utilization totaling over 60 percent of the total space available. That the saving of space of considerable may be seen when compared to a conventional stacking arrangements employing an increased multiplicity of aisles and passageways and standard type fork lifts which utilizes in the order of about 33 percent of the available storage area.

In the present invention overhead structure for accommodating a traveling crane or the like, which also requires a multiplicity of aisles, is eliminated. Thus, the present invention is readily adaptable to existing buildings requiring only, if desired, filling around the tracks and guide to provide a somewhat more even surface of for passage of fork lifts. As is readily seen the present invention is also readily adaptable to buildings yet to be constructed.

The present invention may also be readily adapted to a centrally located control system whereby each movable rack may be electrically controlled from a central point.

This invention may be embodied in other forms or carried out in other ways without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered as in all respects illustrative and not restrictive, the scope of the invention being indicated by the appended claims, and all changes which come within the meaning and range of equivalency are intended to be embraced therein.

I claim:

1. In a rack type storage means, the improvement which comprises:

four wheels operatively connected to said rack means to provide for lateral movement thereof;

track means engaging said wheels;

means for driving at least one of said wheels comprising a motor, a gear reduction box operatively connected to said motor, a first sprocket operatively connected to said gear reduction box, a second sprocket drivingly connected to one of said wheels, and a continuous drive means operatively connected to said first and second sprockets;

an axle operatively connected to said wheel having said second sprocket drivingly connected thereto, and to an opposing wheel;

a guide comprising a track and a guide follower comprising a spool in guiding arrangement with said track; and

means for limiting travel of said rack means comprising a cutoff switch for said motor and a stop removed from said rack means positioned for actuating said switch during lateral movement of said rack means.