STOCK STORAGE DEVICE
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The present invention relates generally to storage devices and specifically to a top loading storage device adapted to receive elongated lengths of stock and store the same in a plurality of vertically oriented storage bays.

The storage of supplies of elongated lengths of stock presents problems which heretofore have not been adequately solved. In storage situations where a variety of lengths of stock of differing sizes and configurations must be kept on hand, and normal problems of space utilization and ease of accessibility are multiplied. In these situations, it has been the usual practice either to store the individual types of stock on suitable mounts all on one level spread out on a relatively large storage area or to place the types of stock within a framework providing a multitude of elongated stock storing bays. These storage frameworks are generally constructed by utilizing cross members providing vertical support for the stock and are accessible either from the ends of the bays such that the lengths of stock must be manually longitudinally moved into and out of the bays, or, in those situations where the horizontal members are cantilevered, from the sides of the bays such that a fork truck or the like may be used to place stock into and remove stock from each storage bay. It will be readily appreciated that important disadvantages are involved in each of these two storage framework systems. In one it is necessary to load and unload from an open end thus requiring hand labor. In the other there is a great sacrifice of space since aisles must be maintained along the length of the stock bays. Interchange, such a system requires the availability of a fork truck. Neither of these systems are adapted to utilize the overhead cranes which are virtually universally available in the normal warehouse situation. Although the overhead crane devices may be utilized when stock is stored on only one level, such a system is extremely inefficient in its utilization of space.

In the storage of supplies wherein one, or a small number of individual lengths of stock must be available for immediate removal, it is necessary that the stock be organized in a system such that each of the differing types of stock are available for easy removal, and further that replacement of a depleted type of stock may be readily and conveniently completed. An advantageous stock storage device would provide these two features in a unit characterized by relative low original cost, low maintenance cost, small space utilization, adaptability for use with stock of a variety of differing configurations and sizes, expandability which may be used in conjunction with existing power equipment.

Broadly, it is an object of the present invention to provide a storage device having one or more of the aforesaid desirable advantages. Specifically, it is an object of the present invention to provide a storage device for elongated lengths of stock wherein individual lengths of stock may be easily removed from the storage device and replacement of lengths of stock in said device may be easily and conveniently accomplished.

It is further within the contemplation of the present invention to provide a storage device wherein groups of lengths of elongated stock may be placed within the device by overhead loading.

It is a further object of the present invention to provide a multiple bay storage mechanism wherein existing overhead cranes may be utilized to place stock within any selected bay of such device and to move batches of stock from one of said bays to another.

It is still further object of the present invention to provide a device for the storage of a plurality of individual groups of lengths of stock which may be easily loaded from above, where individual lengths of stock may be removed by hand, where groups of stock may be transferred from one storage bay to another, which is adaptable for expansion and for the storage of items of differing sizes and shapes, which occupies a minimal area and which is relatively low in capital expense.

In accordance with the invention and illustrating features and advantages of the present invention there is provided a top loading storage device comprising means defining an elongated storage space having two parallel sides including at least two up rights spaced intervals along each of the storage space sides. Barrier means are provided at vertical intervals defining a plurality of individual storage bays one positioned above the other and are mounted for movement from an inoperative position removed from the storage space to an operative position extending into the storage space. The barrier means includes support arms mounted on the up rights for rotation from the operative position to the inoperative position. When the support arms are rotated into the storage space and are perpendicular to the storage space sides, they provide the barrier means defining the individual storage bays and provide support upon which lengths of stock may rest within each individual storage bay. When the support arms are moved into their inoperative position, direct communication is afforded between one storage bay and the storage bay immediately below, such that stock contained in one storage bay will fall downwardly into the next lower storage bay. Interconnecting means are provided between the support arms at one level for a simultaneous movement of such support arms between their operative and inoperative positions thereby to bring one storage bay into direct communication with the storage bay located immediately therebelow and to transfer lengths of stock from said one storage bay to the second of such storage bays.

The above brief description as well as further objects, features and advantages of the present invention will be best appreciated by the reference to the following detailed description when taken in conjunction with the drawings wherein:

FIG. 1 is an elevational end view of a representative portion of a storage device according to the present invention;

FIG. 2 is a sectional view taken along the line 2-2 of FIG. 1 and looking in the direction of the arrows illustrating the barrier means in both their operative and inoperative positions;

FIG. 3 is a sectional view taken along the lines 3-3 of FIG. 1 and looking in the direction of the arrows illustrating the interconnecting movement means of the individual support elements and illustrating the method by which the support elements are moved; and

FIG. 4 is an enlarged elevational view of a portion of an upright mount and support arm shown partially in section for the sake of clarity.

Referring now specifically to the drawings, there is shown a storage device generally labeled by the numeral 10 for storing elongated lengths of stock such as the stock S illustrated in FIGS. 1 and 3. The storage device
10 is mounted on a support 12 which includes a plurality of parallel base members 14, the details of which are best seen in the sectional view of FIG. 3. Extending upwardly of the base members 14 are a plurality of uprights 16 which are spaced at corresponding intervals along the length of each base member 14. In the present illustrative embodiment, three base members 14 are provided and three uprights 16 are secured to the portion of the base members 14 which are illustrated. As may be best seen in FIGS. 1 and 2, two adjacent but spaced uprights 16 on one base member 14, in conjunction with the complementary pair of uprights 16 on the other base members 14, define a storage space generally designated by the numeral 18 of the stock storage device 10.

Referring specifically to FIG. 2 and to the lower portion thereof, one side of the stock storage space 18 is defined by the uprights 16 closest to the edges of the base members 14. The other side of the storage space 18 is defined by the second set of uprights 16 on the base member 14. Further groups of storage spaces may be defined by further sets of uprights 16 on the base member 14 as is illustrated by the storage space 20 defined by the second and third sets of uprights 16 on the space members 14. It will be further appreciated that the width of the storage spaces 18, 20 are defined by the arbitrary positioning of the upright 16 on the base members 14 and the length of the storage spaces 18, 20 may vary with the number of individual uprights 16 utilized to form particular storage space and the distance between the parallel base members 14.

Barrier means, generally designated by the numeral 22, are provided at spaced vertical intervals within the storage spaces 18, 20 and define a plurality of individual storage bays B1, B2, B3, etc. (hereinafter referred to generally as B). For each barrier means 22 on one pair of parallel uprights 16, corresponding barrier means 22 are provided at the same height on the corresponding uprights 16 along the length of the storage spaces 18, 20. As may be seen in FIGS. 1, 2 and 3, the barrier means 22 are adapted to move from an operative stock-supporting position, as shown by the barrier means defining the bottom of storage bay B8, to an inoperative position, as shown by the barrier means defining the bottom of bin B8 thereby to allow stock S to fall or pass from an upper bin to the bin therebelow.

The base members 14 are constructed of a pair of channel members 24, 26 which are interconnected at their lower edges by the base plate 28 and at their upper edges by the top plate 30. Support tubes 32 are positioned at selected spaced intervals along the length of each base member 14 in vertical orientation and held in place by the bracket 34 at their lower ends and within a suitable opening formed at the top plate 30 at their upper ends. The inner diameters of the support tube 32 are sized to intimately receive the uprights 16 which are placed therein and thus held in a rigid vertical orientation. As may be best seen in FIG. 3, longitudinal spacing assemblies 36 are provided to space the respective base members 14 evenly and rigidly along the length of the individual storage spaces 18, 20. The spacing assemblies 36 include a spacing rod 38 which has welded to each of its ends a secured spacer ring 40 which is of an inner and outer diameter equal to that of the support tube 32. The individual rings 40 of the spacer assembly 36 are placed between the corresponding uprights 16 on the parallel base members 14 thereby to rigidly ensure the spaced parallel relationship between the base members 14. As seen on the right hand side of FIG. 3 a second spacer ring 40 is provided between the spacing assembly 36 and the base member 14 to serve as a filler such that the right hand end of the spacing assembly 36 corresponds with the height of the left hand end which is engaged about its respective uprights 16 and is positioned above its respective base member 14 by the next successive spacer assembly 36a which is similar to the spacer assembly 36 in both construction and effect. A number of securing assemblies 36b are positioned along the length of the parallel base members 14 thereby providing an overall rigid support 12. It will be appreciated that the support 12 is constructed of a series of basic building elements which may be easily assembled and disassembled such as to provide a variety of basic structures which are suited to the individual requirements of any given storage situation.

The uprights 16 and the barrier means 22 are similar such that description of only one upright 16 is necessary for a complete understanding of the presently described embodiment of my invention.

As may be best seen in FIGS. 1 and 4, a plurality of locating discs 42 are spaced at intervals along the length of the upright 16 and are secured thereto such as by the weld shown at 44. Supported on each of the locating discs 42 are the individual support arms 46 which includes the upright-engaging ring 48 and the rigid support member 50. The support member 50 is rigidly secured to the upright-engaging ring 48 in perpendicular relationship thereto as by welding as shown 52. It will be appreciated that the ring 48, being of an internal diameter slightly greater than the external diameter of the upright 16, allows the support arm assembly 46 to be rotated about the upright 16 as shown 48. A locating disc 42 and a mating complementary stop 56 on the upright-engaging ring 48 are effective to define an operative position for the support arm 46 wherein the support member 50 extends transversely into the adjacent storage space.

The support members 59 of the support arms 46 are of a length substantially equal to one-half the width of their respective storage spaces such that when oppositely positioned support arms 46 are directed transversely into their respective support spaces a barrier member 22 is provided completely bridging the distance between opposed uprights 16 thus defining the lower level of the individual storage bays B. As seen in FIG. 1, there is provided on the left hand upright 16 five individual support arms 46 resting on five individual locating discs 42. The adjacent upright 16 is provided with a complementary number of support arms 46 at corresponding heights above the base member 14 to define storage bays B1 through B6. In addition this first group of support arms 46, there are a further group of five support arms 46 on the second upright 16 which correspond with a group of five support arms 46 on the third upright 16 which define storage bays B7 through B12 in like manner.

Similarly, a still further group of support arms 46 are shown on the third upright 16 and a fourth upright (not shown) is provided with a corresponding group of support arms 46. It will be appreciated that a structure may be constructed according to the instant embodiment of the present invention wherein any number of uprights greater than two may be placed along the length of parallelly oriented base members 14 to provide any number of desired storage spaces such as 18, 20 and that any desired number of support arms 46 may be mounted on adjacent uprights 16 to provide the barrier members 22 defining any desired number of individual storage bays.

Interconnecting means are provided on the support arms 46 such that movement of one given support arm 46 on one upright 16 will produce a simultaneous movement of the corresponding support arm on the longitudinally corresponding upright 16 of each individual storage bay B. In the present illustrative embodiment, these interconnecting means include a connecting rod 58 which is pivotally secured to the innermost end of the support member 50 by the nut and bolt assembly 60 engaged within an appropriate hole provided on the lower side of the support member 50. In the present illustrative embodiment, wherein three pairs of longitudinally oriented uprights 16 are utilized to form each storage space, each connecting rod 58 is secured to each of the three longi-
tdinially corresponding support arms 46 along the length of each individual storage bay B.

From the foregoing, it will be appreciated that when a storage unit is located in one storage bay, such as storage bay B8 seen in FIG. 1, and when the barrier means 22 comprising a pair of opposed support arms 46 are swung outwardly from their operative stock supporting position, that stock S will be dropped into the next successive lower storage bin B9. This result is easily accomplished with the aid of the aid to swinging the support arms 46 from their supporting position to their inoperative position, as seen in FIGS. 1, 2 and 3. With this movement of the barrier, stock S contained in bay B8 is dropped downwardly into the next lower bay B9. If it is then further desired to move stock S from B9 to bay B10, a similar procedure is followed. When the support arms 46 are returned to their operative stock-supporting position, stock may be dropped from the next higher bay or may be lowered into any given bay B by the means of the overhead crane.

From the foregoing it will be appreciated that there is provided in accordance with the present invention a stock storage device of great versatility and adaptability for the storage of a large number of lengths of stock of differing sizes and configurations. Stock may be moved from one storage bay of the device to another without the necessity of bodily lifting the stock out of the first bay and placing it into the second bay. Further, the device according to the present invention provides a storage means whereby a large number of different types of stock may be stored in a relatively small area and may be placed into the storage device by the use of a simple overhead crane. There is no necessity for the use of fork trucks or for the provision of longitudinal access aisles along the sides of the bays to provide loading and unloading room for a storage device according to the present invention.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is important that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What we claim is:

1. A top-loading storage device for storing elongated lengths of stock comprising means defining an elongated storage space having two sides, barrier means, means operatively connected to and mounting said barrier means for movement from an inoperative position removed from said storage space to an operative position extending from said sides into said storage space at vertically spaced intervals and dividing said space into a plurality of stock storage bays, one above the other, adjacent storage bays being in direct communication with each other when said barrier means is in said inoperative position allowing lengths of stock contained in one of said bays to fall downwardly into the next lower one of said bays, and means interconnecting the individual barrier means defining two successive stock storage bays for simultaneous movement of said barrier means between said operative and inoperative positions to bring said storage bays into direct communication and to transfer said lengths of stock from an upper one of said bays to the next lower one of said bays.

2. A top-loading storage device for storing elongated lengths of stock comprising means defining two sides of an elongated storage space having two parallel sides, barrier means, means operatively connected to and mounting said barrier means for movement between an inoperative position removed from said storage space to an operative position extending from said sides into said storage space at vertically spaced intervals and dividing said space into a plurality of stock storage bays, one above another, said barrier means including support arms mounted on said mountings for movement between an inoperative position extending into said storage space substantially perpendicular to said sides to an inoperative position wherein said arms are removed from said storage space, adjacent storage bays being in direct communication with each other when said support arms are moved into said inoperative position allowing lengths of stock contained in an upper one of said bays to pass downwardly
into the next lower one of said bays, and means interconnecting the individual support arms dividing two successive storage bays for simultaneous movement of said support arms between said operative and inoperative positions to bring said storage bays into direct communication and to transfer said lengths of stock from an upper one of said bays to the next lower one of said bays.

3. A top-loading storage device for storing elongated lengths of stock comprising means defining a plurality of elongated storage spaces having two parallel sides, at least two uprights at spaced points along each of said storage space sides, barrier means, means mounting said barrier means on said upright for movement between an inoperative position removed from said storage space to an operative position extending from said sides into said storage space at vertically spaced intervals and dividing said space into a plurality of stock storage bays, one above the other, said barrier means including support arms extendible into said storage space substantially perpendicular to said sides in said operative position of said barrier means and removable from said storage space when said barrier means is in said inoperative position, adjacent storage bays being in direct communication with each other when said barrier is in said inoperative position allowing lengths of stock contained in one of said bays to pass downwardly into the next lower one of said bays, and means interconnecting the individual barrier means dividing two successive storage bays for simultaneous movement between said operative and inoperative positions to bring said storage bays into direct communication and to transfer said lengths of stock from an upper one of said bays to the next lower one of said bays.

4. A top-loading storage device for storing elongated lengths of stock comprising means defining an elongated storage space having two parallel sides, said means including at least two uprights at spaced points along each of said storage space sides, barrier means, means operatively interconnecting said uprights and said barrier means mounting the latter for movement from an inoperative position removed from said storage space to an operative position extending from said sides into said storage space at vertically spaced intervals and dividing said space into a plurality of stock storage bays, one above the other, said barrier means including support arms mounted on said upright for rotation from an operative position extending into said storage space substantially perpendicular to said sides to an inoperative position wherein said support arms are removed from said storage space, adjacent storage bays being in direct communication with each other when said support arms are moved into said inoperative positions allowing lengths of stock contained in one of said bays to fall downwardly into the next lower one of said bays, and means interconnecting the individual support arms dividing two successive storage bays for simultaneous movement of said support arms between said operative and inoperative positions to bring said storage bays into direct communication and to transfer said lengths of stock in a plurality of vertically aligned individual bays comprising a support including at least one base member, at least two pairs of spaced apart uprights secured to said base, the individual uprights of said pairs being in a right rectangular relationship defining a stock-storage space within the individual uprights of said pairs of uprights, a plurality of pairs of support arms respectively mounted on said pairs of uprights at corresponding heights from said base for rotation in planes perpendicular to said uprights between an operative stock-supporting position wherein the individual support arms of said pairs of support arms extend inwardly into said stock-storage space and an inoperative position wherein said arms are rotated out of said stock-storage space, corresponding pairs of said support arms on said pairs of uprights defining individual stock-storage bays adapted to receive and store lengths of stock, and means interconnecting the individual arms of corresponding pairs of said support arms to maintain said corresponding arms in parallel relation as they are rotated, rotation of the corresponding pairs of support arms at one level of said uprights from their operative to their inoperative position, being effective to drop the stock contained within the bay above said arms to the next successive lower bay.

5. A storage device for storing elongated lengths of stock comprising means defining an elongated storage space, barrier means, means operatively interconnected to and mounting said barrier means for movement between an inoperative position removed from said storage space to an operative position extending into said storage space at vertically spaced intervals and dividing said space into a plurality of stock storage bays, one above another, said barrier means including support arms mounted on said mounting means for movement from an operative position extending into said storage space to an inoperative position wherein said arms are removed from said storage space, vertically adjacent storage bays being in direct communication with each other when said support arms are moved into said inoperative position allowing lengths of stock contained in an upper one of said bays to pass downwardly into the next lower one of said bays, and means interconnecting the individual support arms dividing two successive storage bays for simultaneous movement of said support arms between said operative and inoperative positions to bring said storage bays into direct communication and to transfer said lengths of stock from an upper one of said bays to the next lower one of said bays.

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