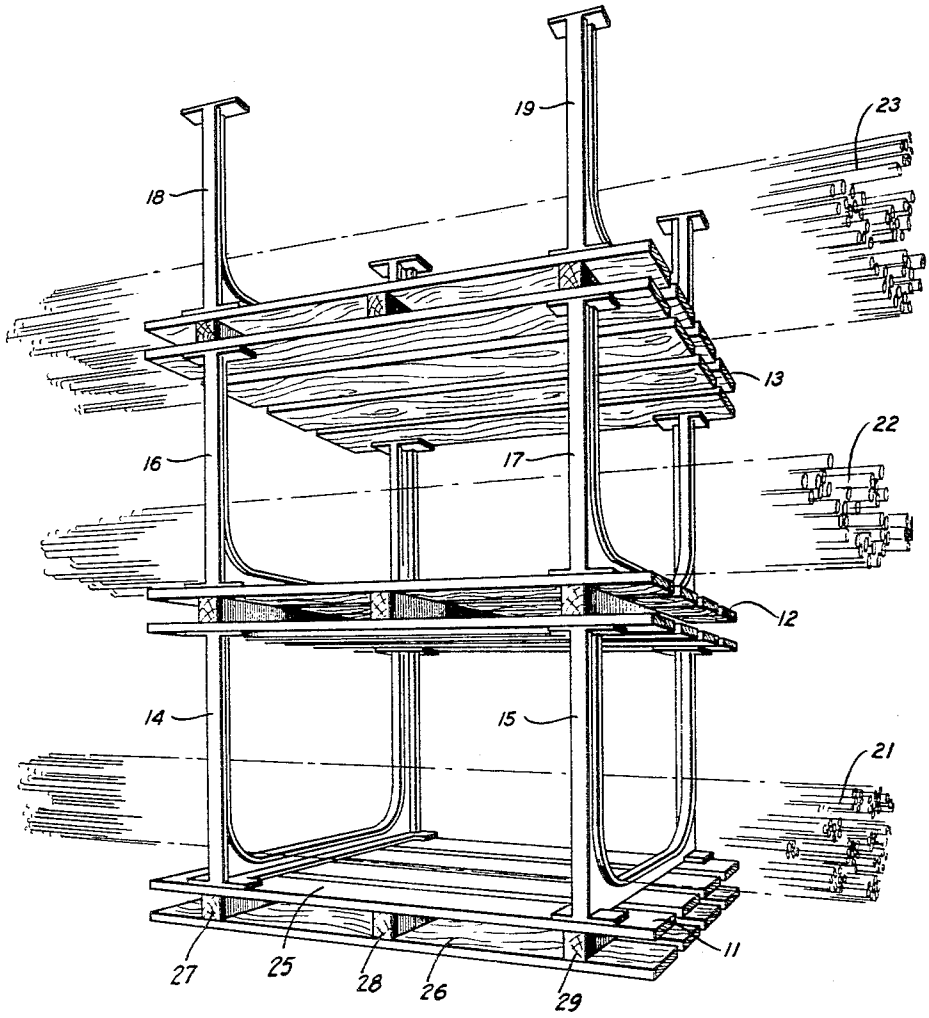
May 3, 1960 M. E. BERRY 2,935,283

MATERIALS HANDLING APPARATUS

Filed April 22, 1957 2 Sheets-Sheet 1

FIG. 1



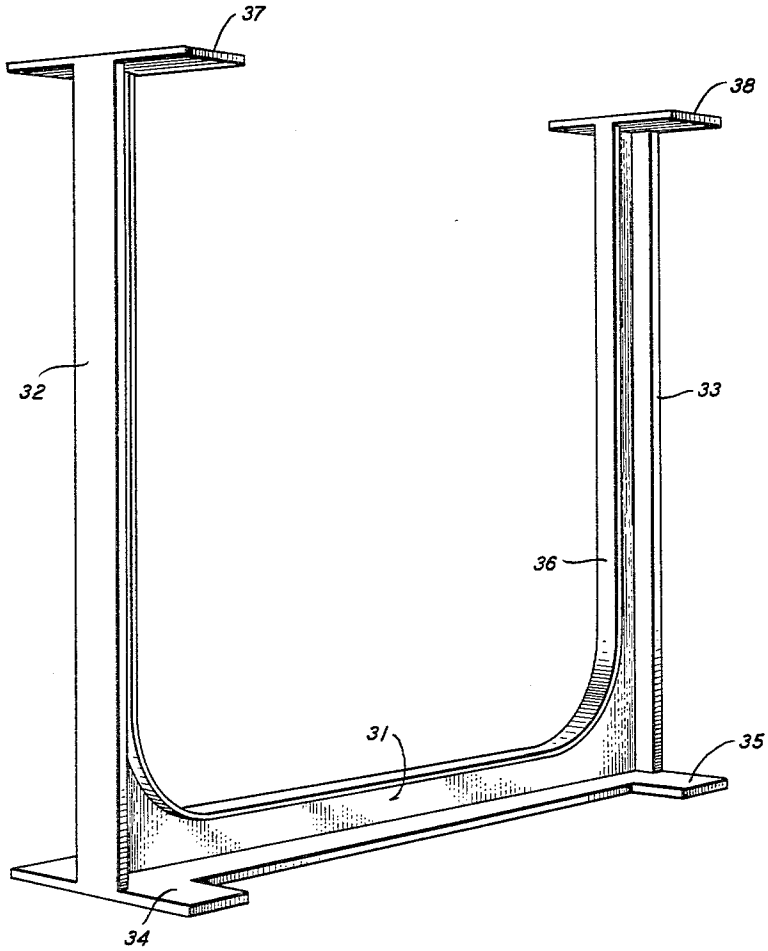
INVENTOR
M. E. BERRY
BY Alan C. Rose
ATTORNEY

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Filed April 22, 1957 2 Sheets-Sheet 2

FIG. 2



INVENTOR
M. E. BERRY
BY Alan C. Rose
ATTORNEY

United States Patent Office

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MATERIALS HANDLING APPARATUS

Moses Ellison Berry, Jackson Heights, N.Y., assignor to Pallet Adapter Company, Inc., New York, N.Y., a corporation of New York

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8 Claims. (Cl. 248—120)

This invention relates to materials handling and storing equipment, and more specifically to arrangements for palletizing elongated objects such as pipe, cylinders, and rolls of material.

The handling and storage of elongated objects has long been a problem in general warehousing facilities and on the docks, where any and all types of material must be stored and handled. Pallets are the ideal method for handling miscellaneous equipment, because they can be readily lifted and stacked by standard fork lift trucks, and hoisted by cranes through standard techniques. However, short lengths of pipe, cylinders, rolls of linoleum, and similar elongated objects do not readily lend themselves to palletization. Many techniques have been proposed for palletizing such materials but they all have serious shortcomings.

Accordingly, the principal object of the present invention is to simplify and improve apparatus for handling and storing elongated objects.

It has been proposed to use special pallets with integral side walls for the storage of elongated materials. While this method is satisfactory for some purposes, the storage space required for these special pallets is an expensive luxury when the space is needed for storing standard materials. The use of various types of brackets which require interfitting with or locking onto the pallets have also been proposed. Some of these arrangements have the disadvantage of requiring special fittings secured to the pallets. This is expensive and impractical, because it involves putting brackets on all pallets, or delaying storage activities while fittings are secured to the pallets.

Accordingly, a specific object of the invention is to eliminate the necessity for complex mechanical interlocking of brackets and pallets when elongated materials are palletized.

In accordance with the invention, pipe, cylinders, and the like may be readily palletized through the use of free-standing, open, U-shaped brackets. Two brackets are placed on each pallet, with the brackets on opposite ends of the pallet. The elongated objects are placed in the alined U-shaped brackets, and another pallet is then placed directly on supporting flanges at the upper ends of the upwardly extending arms of the brackets.

The U-shaped brackets in combination with standard pallets have many advantages as compared with prior art arrangements. One important advantage is the simplicity of mounting brackets on pallets. Because the brackets are free-standing, no time is wasted in securing the brackets and pallets together, and the pallets do not require special fittings. The use of two narrow brackets for each pallet means that a four foot bracket may be employed with any pallet which is four feet wide. This would include both the standard four foot by four foot warehousing pallets or the four foot by six foot stevedoring pallets in general use on the waterfront of the eastern seaboard of the United States. The relatively narrow width of the brackets also reduces the amount of space required for their storage when they are not in use.

Making the brackets from standard metal sheet or angle stock has the advantage of inexpensive construction. In addition, the resulting brackets are sufficiently rugged to stand up under the normal rough treatment on the waterfront. Furthermore, the upwardly extending arms are sufficiently strong to hold elongated objects and the load of extra pallets without additional bridging members interconnecting the arms.

It may also be noted that the weight of the elongated objects rests principally on the transverse base member near the bottom of the U-shaped bracket. This means that adequate lateral stability of the brackets is maintained even with relatively short lateral feet extensions on each end of the brackets.

The U-shaped brackets in accordance with the present invention have the further advantage of holding the elongated material above the floor of the pallet, thus allowing a rope or wire sling to be passed under the material for hoisting it into a ship's hold, for example.

Other objects, features and advantages of the invention may be readily apprehended from a consideration of the following detailed description, the appended claims, and the drawings, in which:

Fig. 1 shows an arrangement for palletizing elongated objects in accordance with the invention; and

Fig. 2 shows one of the brackets employed in the materials handling arrangement of Fig. 1.

Referring more particularly to the drawings, Fig. 1 shows, by way of example, elongated material stored in a palletizing arrangement in accordance with the invention. In Fig. 1 three standard stevedoring pallets **11**, **12** and **13** are stacked on top of each other. As indicated with reference to the pallet **11**, each of the pallets has an upper floor **25**, a lower floor **26**, and three transverse spacing members **27**, **28** and **29**. It may be noted in passing that the standard four foot by four foot warehousing pallets have transverse members at each end of the floors. The four foot by six foot standard stevedoring pallets, however, have three transverse members spaced in the middle and slightly back from each end, as clearly shown in Figure 1 of the drawings. Two U-shaped brackets **14** and **15** are located between the pallets **11** and **12**. Two more brackets **16** and **17** are located between pallets **12** and **13**, and a third pair of brackets is mounted on pallet **13**.

In Fig. 1 the elongated material **21** is stored in the rack formed by the brackets **14** and **15** and the pallet **11**. Similarly the elongated material **22** is stored in the alined U-shaped openings in the brackets **16** and **17**, and the material **23** in the brackets **18** and **19**. The material **21**, **22**, and **23** which is being stored is shown in dash-dot lines in Fig. 1 to distinguish it from the bracket and pallet structure.

The details of the brackets **14** through **19** of Fig. 1 are clearly shown in Fig. 2. The bracket is preferably made of sheet steel, strip or angle stock. It has been found that ⅜ inch thick stock is satisfactory for this purpose. The bracket is generally U-shaped, and includes the base member **31** and the two upright arms **32** and **33**. For use with pallets which are four feet wide, the brackets may be 46 inches long, and the arms may be 32 inches high. Laterally extending foot elements **34** and **35** are provided at opposite ends of the bracket so that the brackets stand erect freely when they are placed on pallets. Accordingly, no additional fittings are required to hold the brackets in place.

The bracket as shown in Fig. 2 is also provided with a flange **36** against which the elongated material bears. When elongated material is loaded into a pair of the brackets, most of the weight is applied to the portion of the flange **36** forming part of the base member **31**. With a considerable amount of weight being applied down-

wardly to the base members of the brackets, they are held rigidly in place, once they are loaded.

In Fig. 2, the flanges or supporting elements **37** and **38** are mounted at the top of the arms **32** and **33**, respectively. They provide supporting areas for mounting additional pallets on top of the brackets. The supporting elements **37** and **38** are preferably flush with the flange **36** to insure freedom in the removal of material stored in the bracket. Although the elements **37** and **38** are shown flush with the outer sides of the arms **32** and **33**, they may extend outwardly to provide additional supporting area for the pallet. Reference may now be had to Fig. 1 in which the pallet **12** is shown mounted on the flanges at the upper ends of the arms of brackets **14** and **15**.

Returning to Fig. 1, the many advantages of the present palletizing arrangement are obvious from a consideration of the example portrayed in this figure of the drawings. Prior to the advent of the present apparatus, it was customary to store material, such as the pipe indicated at **21**, **22** and **23** in Fig. 1, directly on the dock or on the floor of the warehouse. Through the use of the brackets and standard pallets, however, the pipe can be unloaded directly into the brackets; and the palletized pipe can immediately be stored and moved by a fork lift truck in a simple manner. The storage space saved by vertical stacking of the palletized material is another advantage of the present invention. It is again noted that the key to every day use of the present materials handling technique lies in the fact that the brackets are "freely mountable" on any standard pallet. As employed in the present specification and claims, the term "freely mountable" means that the bracket may be mounted on the pallet by a direct translational movement of the bracket with respect to the pallet. This factor of easy mounting, in combination with the relatively small storage space required for the brackets, has greatly increased the efficiency of general materials handling locations where they have been employed.

It is to be understood that the above-described arrangements and the specific dimensions of the brackets are merely illustrative of the principles of the invention. Variations of the palletizing arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. In a palletized rack for storing elongated objects, a plurality of U-shaped brackets, a plurality of standard pallets mounted on top of each other, each pallet being spaced from the adjacent pallets by a pair of said U-shaped brackets, each of said brackets being freely mountable on the pallet below it, said brackets extending substantially across the width of said pallets and having the openings of said U-shaped bracket alined with the longer dimension of said pallets, and means for holding each bracket erect and means for at least partially supporting an overlying pallet included in the structure of each bracket.

2. In combination, two standard pallets, two U-shaped metal brackets located on one of said pallets at opposite ends thereof and supporting the other of said pallets, each of said brackets being freely mountable on the pallet below it, and means for holding each bracket erect, and means for at least partially supporting an overlying pallet included in the structure of each bracket.

3. In a bracket for spacing stacked pallets and concurrently holding elongated material, a single transverse member consisting only of a combined base and support beam member having a length approximately equal to the width of said pallets, laterally extending feet secured to said transverse member for holding said bracket erect, upwardly extending arms secured to each end of said base transverse member for retaining said elongated material, and individual spaced supporting elements mounted on the upper ends of each of said arms for holding one

end of a pallet above said bracket, the total width of said bracket being significantly less than one-half the length of said bracket.

4. A bracket as defined in claim 3 wherein said transverse member has a length of approximately four feet.

5. An arrangement for palletizing elongated material comprising a first pallet, two U-shaped brackets resting on said pallet and including a base member and two upwardly extending arms located entirely above the upper surface of said first pallet, means for holding said pallet erect secured to said base member, and means for supporting an overlying pallet associated with the upper ends of each of said upwardly extending arms, and a second pallet resting on the upper ends of said arms.

6. In an arrangement for palletizing elongated objects, a plurality of U-shaped brackets, and a plurality of standard pallets mounted on top of each other, each pallet being spaced from the adjacent pallet by a pair of said U-shaped brackets; each of said brackets including a base member having a length approximately equal to the width of said pallets, laterally extending feet secured to said base member for holding said bracket erect, upwardly extending arms secured to each end of said base member for retaining said elongated objects, and individual spaced supporting elements mounted on the upper ends of each of said arms for holding a pallet above said bracket.

7. In an arrangement for palletizing elongated material, a plurality of U-shaped brackets, and a plurality of standard pallets including spaced upper and lower floors, said pallets being spaced from each other by pairs of said U-shaped brackets; each of said brackets including a base member extending substantially across the width of one of said pallets, laterally extending feet secured to said base member for holding said bracket erect, and upwardly extending arms secured to each end of said base member for retaining said elongated material; the base member and arms of each of said brackets being located wholly above the upper floor of the pallet upon which it stands, and each of said brackets being freely mountable on the pallet on which it stands.

8. In an arrangement for palletizing elongated material, a plurality of U-shaped brackets, and a plurality of standard pallets including spaced upper and lower floors, said pallets being spaced from each other by pairs of said U-shaped brackets; each of said brackets including a base member extending substantially across the width of one of said pallets, foot elements extending laterally from said base member for holding said bracket erect, upwardly extending arms secured to each end of said base member for retaining said elongated material, and individual spaced pallet-supporting elements mounted on the upper ends of each of said arms; the arms and base member of each of said brackets being located wholly above the upper floor of the pallet upon which it stands; and each of said base members including a lower portion resting with said foot elements on the upper floor of one of said pallets and an upper load bearing surface spaced significantly from said upper floor to permit the passage of ropes or similar materials handling gear between the elongated material and the pallet.

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