

April 17, 1951

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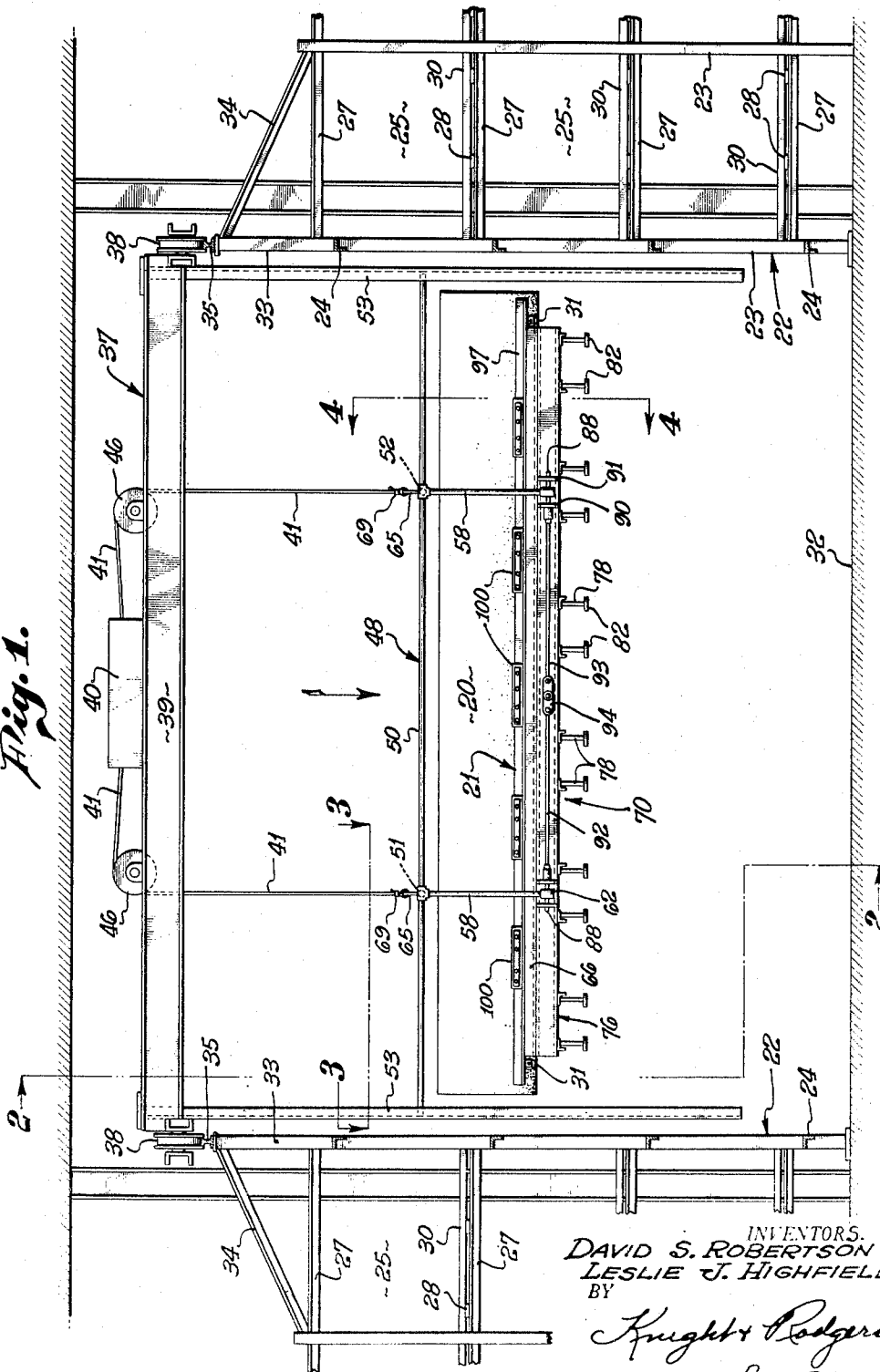
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APPARATUS FOR HANDLING ROLLS OF SHEET MATERIAL

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5 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

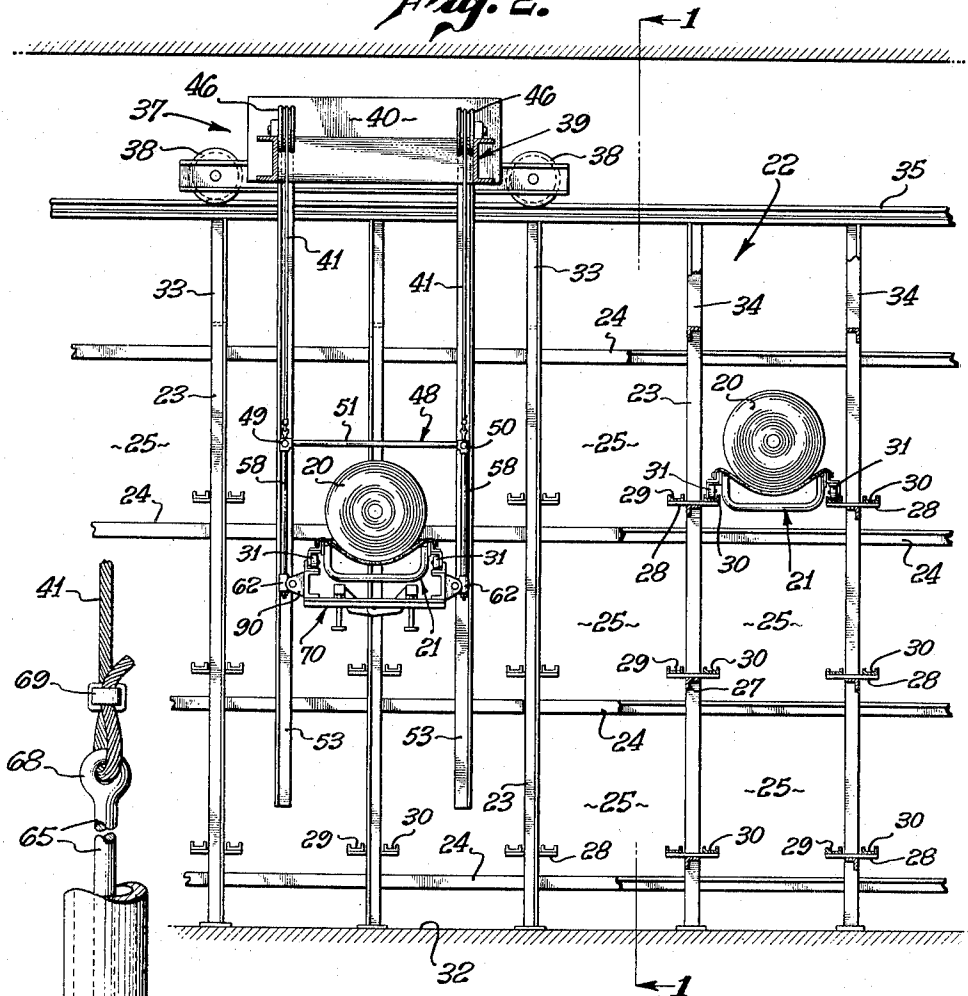


Fig. 3.

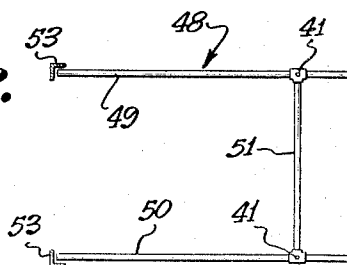
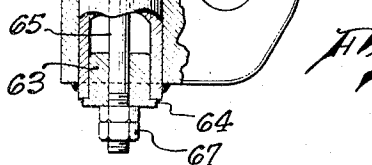


Fig. 11.



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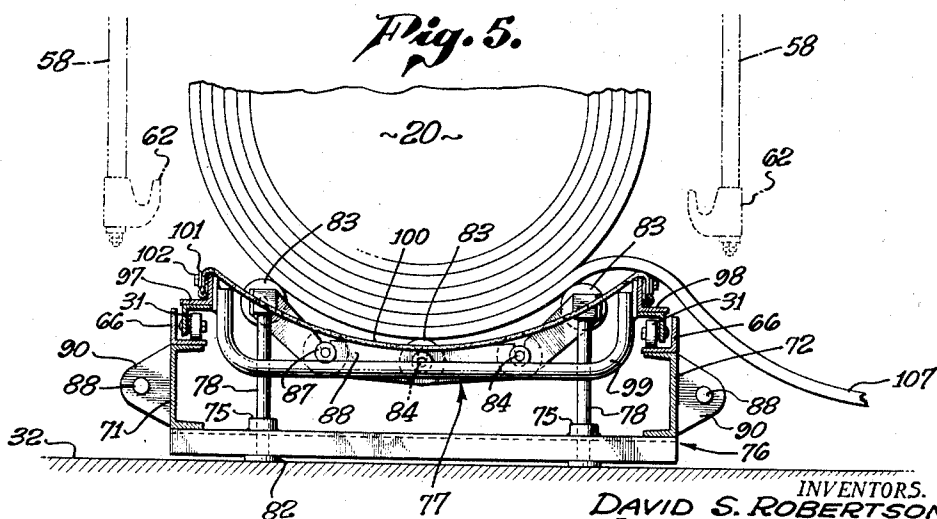
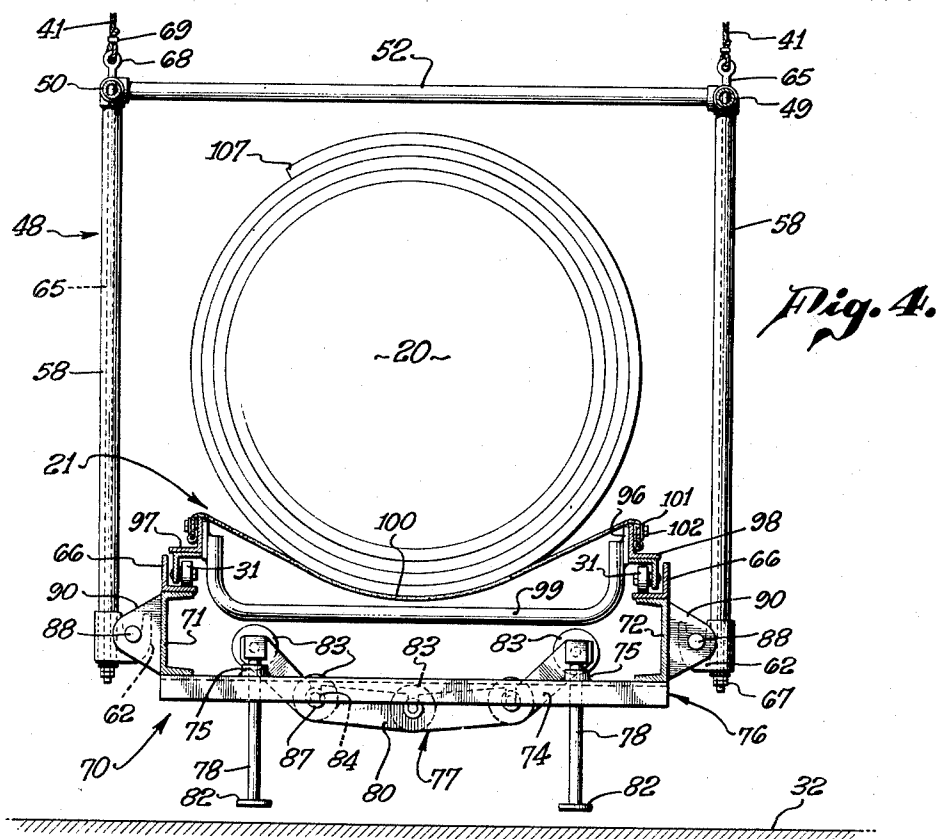
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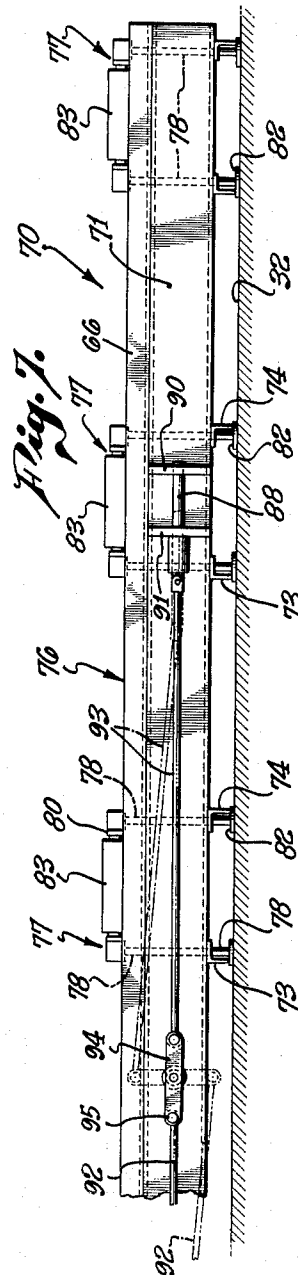
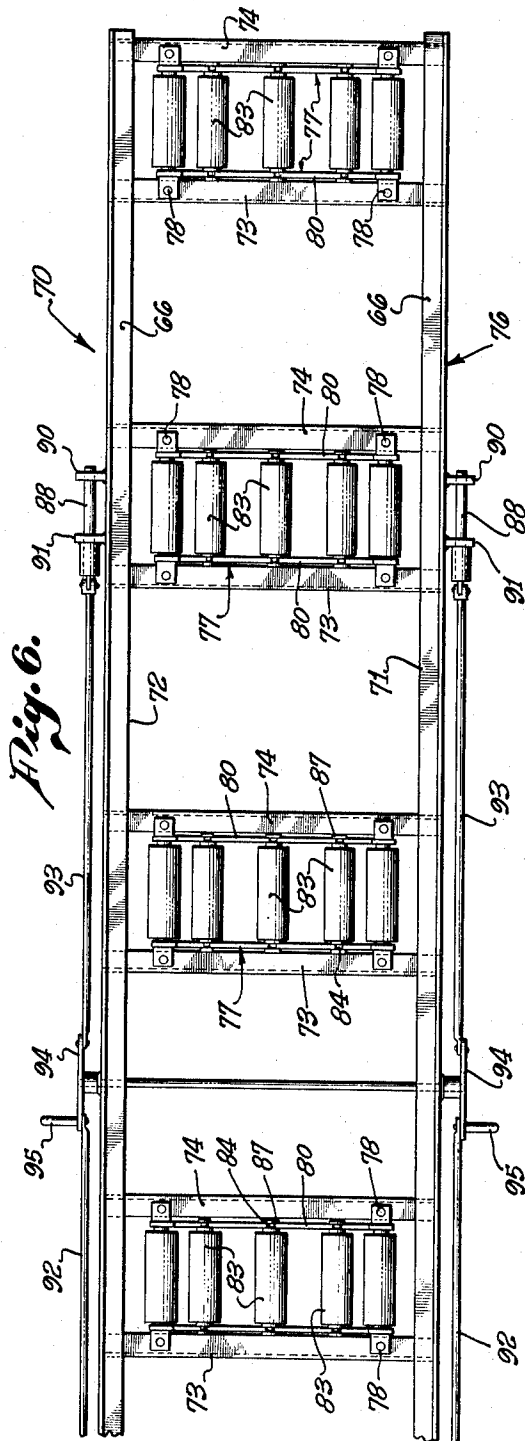
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APPARATUS FOR HANDLING ROLLS OF SHEET MATERIAL

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Application June 18, 1948, Serial No. 33,726

11 Claims. (Cl. 242—58)

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The present invention relates to handling rolls of sheet material, especially fabric material and more particularly to moving, storing and unrolling large heavy rolls of yardage materials such as rugs, carpets, cloth, etc.

In recent years the use of broadloom carpeting has increased in tremendous proportions, with the result that many firms handling floor coverings and operating in the old conventional manner, have had difficulty keeping abreast of their orders, even with sufficient material on hand to do so. The delay has been caused principally on the cutting floor, where the large heavy rolls of carpeting are unrolled, required lengths cut off, sewed together when necessary, and the carpeting re-rolled and stored. The usual lengths of rolls of this material are from 9 to 18 feet, the length varying usually in increments of three feet. The length of such a roll of course, is the width of the yardage in the roll.

Since a large roll of fabric, such as carpeting, may weigh in excess of one thousand pounds, former manual methods of handling the rolls by rolling and sliding them along the cutting floor, and attempting to raise them with ordinary hoists and cranes have been slow and exhausting, and frequently have resulted in damage to the material.

In our co-pending applications Ser. No. 769,136, filed August 18, 1947, and Ser. No. 791,894, filed December 15, 1947, both for "Apparatus for Handling Rolls of Textile or Other Material," we have disclosed improved facilities for uncrating and handling such heavy rolls of material. The present invention is in the nature of an improvement thereon relative to means for handling the rolls at the cutting floor.

An object of the present invention is to make an improved apparatus for handling heavy rolls of yardage materials especially preparatory to and during the cutting operations.

Another object is to make an improved support for rolls of yardage materials, said support being adapted to cooperate with a cradle associated therewith so that yardage may be unrolled easily from a roll of material while supported on the support without removing the cradle from the support.

Another object is to make an apparatus for handling large rolls of yardage materials wherein individual cradle is provided for holding each roll, and a crane-transported support is adapted to receive and support selected cradles with their rolls, the second support having means actuated on engagement with a supporting sur-

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face to raise the roll of yardage material from its cradle and to support the roll for free rotational movement about its axis for unrolling yardage therefrom.

5 Another object is to make an apparatus for handling large heavy rolls of yardage material wherein a roll of such material is supported for free unrolling rotative movement on a cutting table forming part of a carrier, and with a supporting cradle interposed between the carrier and the roll, the cutting table having a portion there-
10 of adapted for cradled rolling engaging elevation of the roll of material thereby to bring the cutting table into supporting engagement with
15 the roll of yardage material.

Another object is to make a combined cutting table and roll carrier with an improved hoisting frame adapted for releasably hoisting engagement therewith.

20 In order to attain these objects, there is provided, in accordance with one feature of the invention, a cradle adapted to support a roll of yardage material thereon and to move endwise of the roll thereon into and out of storage racks
25 which are provided alongside a cutting floor. A carrier is provided to receive the cradle and roll when removed from their storage rack and to support them for transportation to a desired location along the cutting floor. The carrier has a roller support which is arranged to drop down-
30 wardly relative to the carrier when the carrier is suspended from a crane, but is raised relatively to the frame of the carrier into supporting engagement with the roll of yardage material on the cradle when the carrier is deposited
35 on the cutting floor. The carrier thereby acts as a cutting table and permits the roll of material to be rotated freely about its axis for unrolling yardage material for cutting. A traveling crane, having a hoisting frame connected thereto is provided to engage the carrier and to transport it with a supported cradle and roll of material thereon between the various storage racks and over the cutting floor.

40 These objects and advantages of the invention, as well as others not specifically mentioned, will be brought out more fully in the following description and in the accompanying drawings, wherein:

45 Fig. 1 is a fragmentary elevation and vertical sectional view through a cutting and storage room having equipment embodying the present invention installed therein, the view being taken in the plane of line I—I of Fig. 2;

55 Fig. 2 is a fragmentary elevation and vertical

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transverse section taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary horizontal section showing an end portion of a carrier hoisting frame, with guide angles therefor, taken on line 3—3 of Fig. 1, but omitting a cradle, roll of yardage material, and carrier therefrom;

Fig. 4 is an elevational section of a carrier taken on line 4—4 of Fig. 1, with a cradle supporting a roll of yardage material thereon, as it appears with the carrier suspended from a hoisting frame;

Fig. 5 is a fragmentary section of the lower portion of the assembly shown in Fig. 4 as the parts appear when resting on a floor and with the hoisting frame detached from the carrier;

Fig. 6 is a fragmentary plan of a combined carrier and cutting table;

Fig. 7 is a fragmentary side elevational view of the combined carrier and cutting table shown in Fig. 6;

Fig. 8 is a fragmentary plan view of a roll supporting cradle;

Fig. 9 is a fragmentary side elevation of the cradle shown in Fig. 8;

Fig. 10 is a fragmentary section showing a modified form of cradle with track thereon, and supporting wheels therefor mounted on a carrier side frame member; and

Fig. 11 is an enlarged fragmentary elevation and partial section of a hoisting frame hook for supporting a carrier, a portion of a carrier sliding pin being shown in dot-dash lines, and parts being broken away to disclose the structure.

In practicing our present invention, it is contemplated that use may be made of suitable apparatus such, for example, as that described in our co-pending application Ser. No. 791,894, filed December 15, 1947, referred to above, for handling crated rolls and for uncrating and removing rolls from their crates, and placing them on a supporting cradle such as that used in the present invention. However, the present invention is capable of use independently of such uncrating means.

The description of the present invention will proceed therefore on the assumption that a roll of yardage material has been uncrated by any suitable means or process and is supported on a cradle 21. Storage racks 22 employed in the present invention also may be similar to those described in our co-pending application above-enumerated. The storage racks 22 comprise cross-connected framework having vertical supports 23 and transverse framing members 24, bolted, or otherwise strongly secured together, to define rectangular storage compartments 25 for receiving therein rolls of yardage material on their cradles. The storage racks may be constructed with their compartments of different lengths to receive therein rolls of materials to be handled by the particular installation for which they are intended. One preferred arrangement for the handling of broadloom carpeting is to have the racks in the four different lengths 9, 12, 15 and 18 feet each. A section of several tiers of the 9 foot storage compartments may be installed at one end of a row of racks, then a section of 12 foot racks, and so on, ending with an 18 foot section.

In the form of racks shown in Figs. 1 and 2 vertical supports 23 and transverse framing members 24 are of angle iron. Longitudinal bracing and track supporting stringers 27, which also may be of angle iron, extend lengthwise on each side of each compartment between adjacent vertical supports 23 from front to rear of each compartment. These stringers are at a height, relatively

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to the transverse framing members 24, to permit a cradle 21 and a roll thereon to clear the transverse framing members when moving into and out of a compartment. Rail supporting cross plates 28 are mounted at intervals throughout the length of each stringer 27, and project laterally beyond both sides of the stringer to support cradle rails 29 and 30 thereon. The cradle support rails, which in pairs comprise cradle supporting tracks, may be shallow channels, of a width to receive and guide cradle support wheels 31 therein.

In the form illustrated in Fig. 1 storage racks 22, comprising aligned tiers of storage compartments, are provided along both sides of a cutting floor 32. The front row of vertical storage rack support members 23 of both rows of storage racks extend above the uppermost tier of storage compartments, as shown at 33 in Fig. 1, and are braced by diagonal supports 34. A hoist supporting rail 35 is mounted on top of each front row of vertical supports 23 to provide a track for a travelling crane generally indicated at 37.

The crane has double flanged rollers 38 adapted to have guided rolling support along the track thus formed by the two rails 35. These rollers may be motor driven in a usual manner by suitable reversible electrical drive mechanism, not shown. The crane has a frame 39 of channel iron or other suitable structural material, and has usual motor driven hoisting mechanism installed in a compartment 40 thereon. Any suitable travelling crane mechanism may be employed, and the brief description of the one illustrated is merely to facilitate a complete understanding of the invention. Four hoisting cables 41 are controlled for simultaneous movement from the hoisting mechanism in the compartment 40. These cables pass over idler pulleys 46 journaled on the hoist frame 39 and are secured at their lower ends to a hoisting frame 48.

The hoisting frame 48 may be of strong tubing or pipe, and comprises a pair of spaced, parallel, horizontally extending side rails 49 and 50 with intermediate transverse frame members 51 and 52 (see Figs. 1, 2 and 3). The ends of the hoisting frame side rails are guided in their vertical movement, and restrained from swaying, by four vertical angle iron guide members 53, rigidly mounted to depend one from each corner of the frame 39 of the crane. This arrangement greatly facilitates aligning a carrier, with a cradle thereon, with a desired storage compartment.

Four vertical hoisting frame legs 58 are mounted to depend one from each of the four junctions of side rails 49 and 50 and their transverse frame members 51 and 52. A carrier support hook 62 is mounted on the lower end of each depending leg 58 of the hoisting frame 48. Each of these hooks has an opening vertically therethrough closely to receive the lower end of a frame leg 58 therein, and is secured in position thereon as by welding, as best seen in Fig. 11.

A plug 63 is inserted in the lower end of each frame leg 58, and has a radially projecting flange 64 thereon to underlie and support the lower end of the leg. The plugs 63 each have an axial hole therethrough to receive a support rod 65 closely therethrough. Support nuts 67 are threaded onto the lower end of each support rod. The rods 65 extend upwardly through the tubular hoisting frame legs 58 and project above the longitudinal side rails 49 and 50. The upper end of each support rod 65 is formed into an eye 68, see Figs. 1, 2, 4 and 11, and is secured to a hoisting cable 41 as by a cable clamp 69.

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A carrier generally indicated at 70 has an oblong frame 76 with parallel side frame members 71 and 72, which may be of suitable structural material such as channel iron. These side frame members are of a length to accommodate a cradle supporting the longest roll which the carrier is designed to handle. An angle 66 extends longitudinally of and is fastened to the top leg of each channel frame member 71, 72. The two angles 66 face each other and form tracks to receive wheels 31 on the cradle 21. A plurality of pairs of transverse angle iron bracing members 73 and 74 are secured, as shown in Figs. 6 and 7, across the lower edges of the side frame members 71 and 72 as by welding. Each transverse frame member has a boss 75 thereon near each end thereof with a hole drilled vertically through the boss and its supporting transverse frame member.

A roller assembly 77 is mounted by means of bosses 75 for vertically slidable movement on each pair of transverse frame members 73 and 74. Each roller assembly 77 has a pair of transversely extending side frame members 80, with concave upper edges. As may be seen in Fig. 4, a pair of tubular legs 78 is secured, as by welding, to each side frame member 80, one at each end. These legs are inserted for vertical sliding movement in the drilled bosses 75 of the transverse frame members so that the bosses provide vertical guides within which the straight intermediate portions of legs 78 move up and down. The lower end of each roller frame leg 78 has a radially projecting flanged foot 82 thereon to provide a broad supporting area in contact with the floor 32, and to limit the upward movement of the roller frames relatively to the carrier frame.

Rollers 83, which may be of wood, are mounted for free rotation, preferably on ball or roller bearings in a usual manner, on roller shafts 84. The ends of these shafts are mounted in notches, or by other suitable means, in the concave upper edges of the side frame members 80, the rollers extending longitudinally of carrier 70 between two frame members so as to constitute an assembly 70. The outer ends of the roller shafts preferably have each a washer 87 to hold the parts against relative movement lengthwise of the rollers. We prefer to use five rollers 83 positioned as shown in each assembly; but the number may be varied if desired. When thus mounted, each set of rollers in its frames describes a concavely curved support for a roll 20, as shown in Fig. 4. When roll 20 is thus wholly supported on the rollers 83 the roll is free of cradle 21 and can rotate about its axis, and yardage can be unrolled easily from the roll. The carrier 70 thus combines the functions of a transporting carrier and a cutting table for holding the roll as it is unwound.

The side frame members 80 of the roller assembly are connected at each end to the top of a leg 78. The two side frame members are interconnected only by the intervening rollers 83. This construction is preferred as it permits one frame member to be slightly higher than the other in order to compensate for minor irregularities in the cutting floor.

The combined carrier and cutting table is adapted to be secured to, and released from, the hoisting frame 48 by pairs of sliding bolts 88 mounted one pair on each side of the carrier frame 76. Each bolt is mounted for sliding movement in aligned holes in a pair of ears 90

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and 91 secured, as by welding, at equal distances from the center of the carrier frame side members. These bolts are adapted to register with the support hooks 62 on the lower ends of the hoisting frame legs 58 when the hoisting frame is centered over the carrier.

The bolts are connected in pairs to the outer ends of a pair of draw links 92 and 93. The inner ends of each pair of draw links are pivoted to opposite ends of an operating lever 94 which is pivotally mounted centrally on the outer side of each carrier frame side member. An operating handle 95, which may be an extension of one of the pins which connect the draw links 92 and 93 to the operating lever 94, is provided for manipulating the bolts 88 and 89. When operating lever 94 is aligned with links 92 and 93 as shown in solid lines in Fig. 7, the locking bolts are advanced endwise apart to extend through the holes in both ears 91 and 90. The bolts then are in position to be engaged by the hooks 62 on the hoisting frame for raising the carrier frame.

When the carrier frame 76 is supported by hooks 62, the shear force on the locking pins produced by the supported weight of the carrier frame prevents ready release of the locking pins. When the carrier is resting on the cutting floor 32 however, the levers 94 can be manipulated easily by handles 95 to withdraw the locking bolts from between their mounting ears and from the hoisting frame hooks. On elevating the frame after it has been released from a carrier, with a cradle and roll thereon, the vertical guide members 53 guide the hoisting frame in a vertical path, so that there is no danger of having the hooks strike or damage the roll of material. Thus, in a busy cutting room, more than one combined carrier and cutting table 70 may be employed for each hoisting frame 70, and the crane 37 may be released for transporting other carriers.

A separate roll supporting cradle 21 preferably is provided for each storage compartment adapted to hold a roll of yardage material to be handled by the present invention. In the cradle illustrated in Figs. 8 and 9, longitudinal side frame members 97 and 98 thereof may be of angle iron, connected by transverse frame members 99. These transverse frame members 99 may be of strong pipe or tubing bent to U-shape as best shown in Fig. 2. They are secured at their ends to the side members by welding them to plates 96 which in turn are bolted to the two parallel side frame members 97 and 98. Flexible roll supporting cradle bands 100, which may be of strong canvas webbing, extend transversely between the cradle side frame members, and are secured in longitudinally spaced relation. These bands are so spaced apart as to be each positioned in a space intervening between successive sets of rollers 83 on the carrier when the cradle is centered on the carrier. The ends of the cradle bands 100 are attached to the cradle by being reversed upon themselves as shown in Fig. 10 and passed over the upper edges of the cradle side frame members. The bands are clamped to the frame members by plates 101, and secured by through bolts 102. A rod 103 is inserted in the bight of each end of the band to lie closely beneath each clamping plate 101 to anchor the cradle band securely to its cradle frame.

In the cradle illustrated in Figs. 1, 2, 4, 5 and 9, supporting wheels 31 are provided at intervals along the side frame members 97 and 98 of the

cradle and supporting rails 29 and 30 are mounted, as previously described, in the storage compartments and angles 66 on the carrier to constitute tracks for wheels 31. In the modification shown in Fig. 10, however, cradle support wheels 104 are mounted along the sides of the carrier on side frame members 71 and 72, while tracks 105 therefor are secured beneath the side frame members 97, 98 on the cradles. Either arrangement is entirely satisfactory and may be used at the option of the manufacturer or user.

Operation

Among the principal features of the present invention is the self-elevating roll support on the carrier which permits the carrier to be used additionally as a cutting table. When the carrier 70 is supported by the hoisting frame 48 as shown in Figs. 1 and 4, gravity causes the roller assemblies 77 to slide downwardly, relatively to the carrier, so that a cradle 21 with a roll 20 thereon is free to move endwise off of and onto the carrier, and thence into and out of its compartment in the storage racks.

When the carrier 70 with a cradle and its supported roll 20 is lowered onto the cutting floor 32, however, the lower ends 82 of the roller frame support legs 78 engage floor 32 first, arresting the downward movement of the roller side frames. Continued downward movement of the carrier frame and its supported cradle moves the cradle downwardly until the carrier also rests on the floor as shown in Fig. 5. In this position the cradle bands are below and clear of the roll 20, leaving the full weight of roll 20 supported entirely on the rollers 83. The bolt actuating levers 94 then may be swung about their central supporting pivots to withdraw the bolts 88 from between their supporting ears. The hoisting frame 48 is now free and can be elevated out of the way by the hoisting cables, leaving the roll supported on a cutting table formed by the roller assemblies 77.

The free end portion 107 of the material then may be grasped by the cutter, and a desired amount of yardage may be withdrawn from the roll 20 which is free to rotate about its axis on rollers 83. When a required amount has been withdrawn, the material preferably is severed outwardly from the roll to leave an end portion of sufficient length so that it can be flipped up by the cutter to lie on top of the roll as shown in Fig. 4. By handling the material in this manner it never is necessary to re-roll any of the material, with the attendant tendency for the material to telescope which greatly increases the danger of damaging the material.

To replace the roll of material and its cradle in a storage rack compartment, the hoisting frame again is lowered centrally over the combined cutting table and carrier until the hooks 62 are below their respective bolts 88. The bolt operating levers 94 then are swung to force the bolts outwardly to extend across the space between their supporting ears. Upon elevating the hoisting frame with the crane, the carrier frame and its supported cradle moves upwardly, raising the roll of material on the cradle bands. The roller frames during the initial phase of this hoisting operation remain stationary, moving downward relatively to the carrier frame, toward the position illustrated in Fig. 4. The roller frames then rest on the bosses 75, below the cradle bands 100 and the transverse cradle frame members 99, leaving the cradle and its sup-

ported roll of material free for endwise movement relatively to the carrier. The crane can then be operated to bring the cradle into alignment with its storage compartment, whereupon the cradle with its supported roll of material can be moved endwise into its compartment.

The apparatus of the invention is strong, simple to manufacture, and to use. It provides for positive positioning of the rolls of material relatively to their storage compartments and eliminates side sway of the rolls when supported by the hoist. The invention further positively positions the hoisting frame hooks for easy manipulation relatively to the carrier, and gives a double function to the carrier by permitting it to serve as a cutting table, eliminating need for removing roll 20 from the carrier. This reduces expense and saves time, floor space, and effort.

The invention can be installed in its minimum form with a few storage racks and cradles and a single combined carrier and cutter frame with the assurance that it can be expanded readily, as business demands increase, to provide for and service adequately the demands of the largest of cutting floors by adding storage racks, cradles and carriers, as required, all of which may be of the same basic types as those of the original installation.

While we have described a presently preferred form of our invention and have suggested modifications thereof, other modifications will occur readily to those skilled in the art making and using the invention. Also while reference has been made principally to the use of the invention for carpeting, it may be used also for any other material which is handled in large heavy rolls, coils, or reels, including, but not limited to, linoleum, paper, and sheet metal. It is desired therefore not to limit the invention except as defined in the following claims.

We claim:

1. In apparatus for handling rolls of material, the combination with a storage compartment and a cradle adapted to support a roll of material thereon for longitudinal movement into and out of said compartment, comprising: a carrier frame having cradle support means adapted to receive by longitudinal movement a cradle with a roll of material thereon; roll support means on the carrier frame adapted to limited vertical movement relative to the carrier frame; and means connected to the roll support means and extending below the carrier frame to be engaged by a floor element prior to the carrier frame on downward movement thereof, thereby to elevate the roll support means relative to the carrier frame to support said roll of material free of said cradle.

2. The apparatus set forth in claim 1 wherein the roll support means comprises a plurality of rollers mounted in an upwardly concave formation.

3. The apparatus set forth in claim 2 wherein the roll support elevating means comprises a leg operatively connected adjacent its upper end to the rollers, and having a straight vertical portion slidably mounted in a vertical guide carried by the carrier frame.

4. The apparatus set forth in claim 1 wherein a pair of frame members are disposed transversely of the carrier frame, the upper edges of said frames being upwardly concave and having roller mounting means thereon; and a plurality of rollers are mounted to extend between said frames with their axes extending longitudinally

of the carrier frame and the roll carried thereby.

5. The apparatus set forth in claim 1 wherein a pair of upwardly concave roller frame members are disposed transversely of the carrier frame; and a plurality of rollers are journaled loosely at their ends in said frame, the rollers comprising the only connection between the upper ends of said frames whereby the frames are free for limited relative vertical adjusting movement to compensate for flood irregularities under load.

6. In apparatus for handling rolls of material, the combination comprising: a cradle having a plurality of longitudinally spaced roll support bands mounted transversely thereon and adapted to support a roll of material thereon; a cradle carrier having cradle support means along each side thereof to receive by endwise movement and to support a cradle with a roll of material thereon; hoisting means adapted to have hoisting engagement with the carrier; a roller assembly mounted on the carrier below the cradle between said spaced apart bands on the cradle and free for upward movement relative to the carrier; and floor engaging means extending below the carrier to be engaged by a floor element prior to the carrier on downward movement thereof, thereby to elevate the roller assembly relative to the carrier to bring the roller assembly into position supporting said roll of material free of said cradle.

7. Apparatus as in claim 6 comprising in addition releasable connecting means for connecting the hoisting means to the carrier.

8. Apparatus for handling rolls of material comprising: a carrier; roll supporting means on said carrier adapted to hold a roll of material non-rotatively; a rolling roll support mounted on said carrier for upward movement relative to the first mentioned roll support; and means to elevate said rolling roll support thereby wholly to support a roll of material on the rolling roll support for rotation of the roll about its axis.

9. Apparatus as in claim 8 in which the rolling roll support includes a plurality of rollers arranged in an upwardly concave configuration and with their axes parallel to the axis of the roll of material when non-rotatively supported.

10. Apparatus for handling rolls of material comprising: a carrier; roll supporting means on the carrier adapted to hold a roll of material non-rotatively, including a plurality of station-

ary cradle roll supports provided in longitudinally spaced relation on said carrier frame; rolling roll support means including a plurality of individual supports each mounted on said carrier between successive stationary roll supports for vertical movement relative to the stationary cradle roll supports; and floor engaging means mounted to elevate said rolling roll supports thereby wholly to support a roll of material for rotation of the roll about its axis.

11. Apparatus for handling rolls of material comprising: a carrier; roll supporting means on said carrier including a plurality of longitudinally spaced transversely extending roll support bands; a plurality of sets of roll support rollers mounted for vertical movement on said carrier, said sets of rollers being each positioned in a space between successive cradle roll support bands and each set having the central rollers of the set lower than the end rollers to support a roll of material for rotative movement thereon; and a roller supporting frame for each set of rollers, having a downwardly extending portion adapted to engage a floor element in advance of the carrier on lowering the carrier from an elevated position above the floor element, thereby to lower the carrier and the cradle band supports relative to the rollers, leaving the roll supported only on the rollers for rotative action.

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