

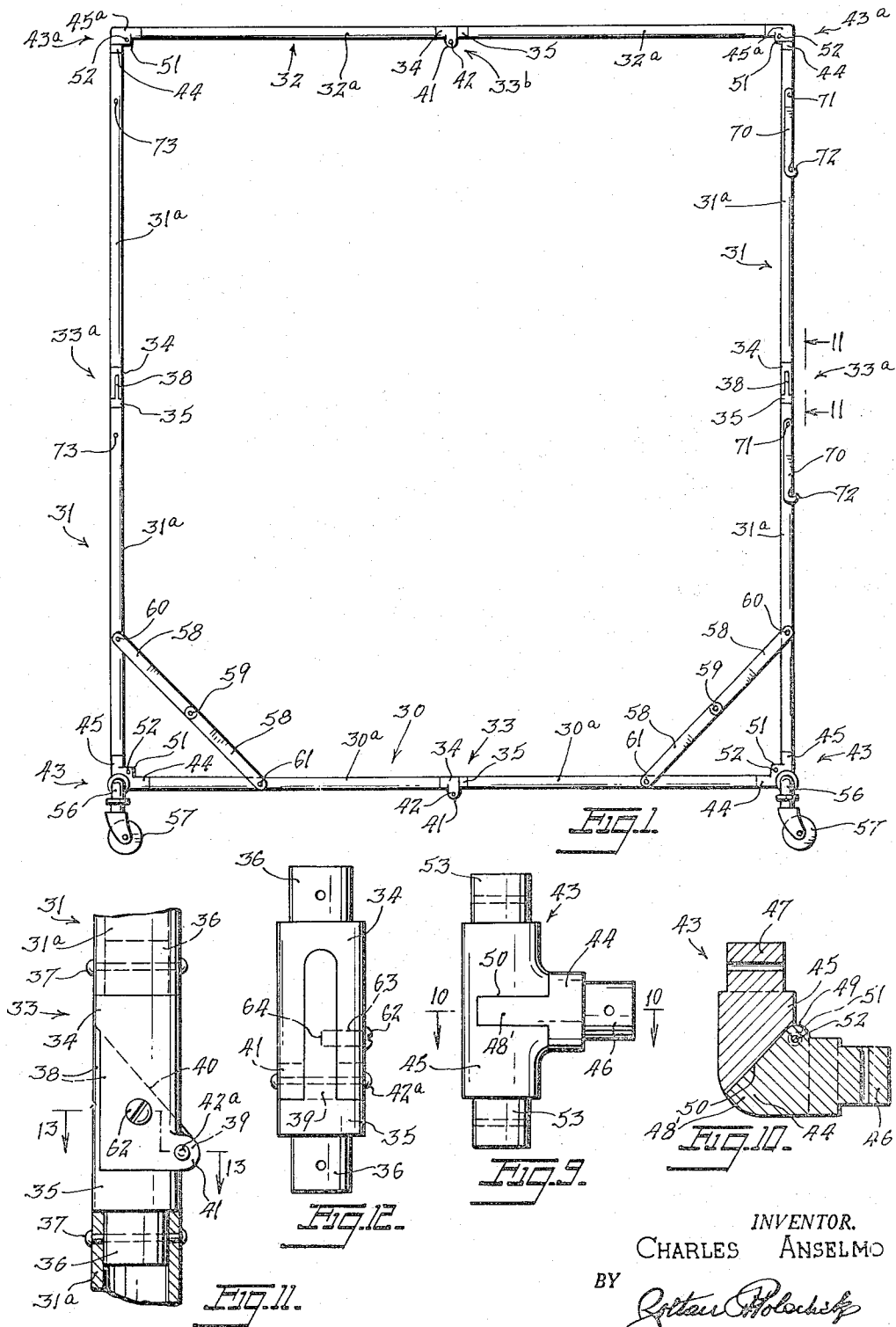
June 5, 1956

C. ANSELMO
COLLAPSIBLE RACK

2,748,955

Filed Aug. 2, 1951

3 Sheets-Sheet 1



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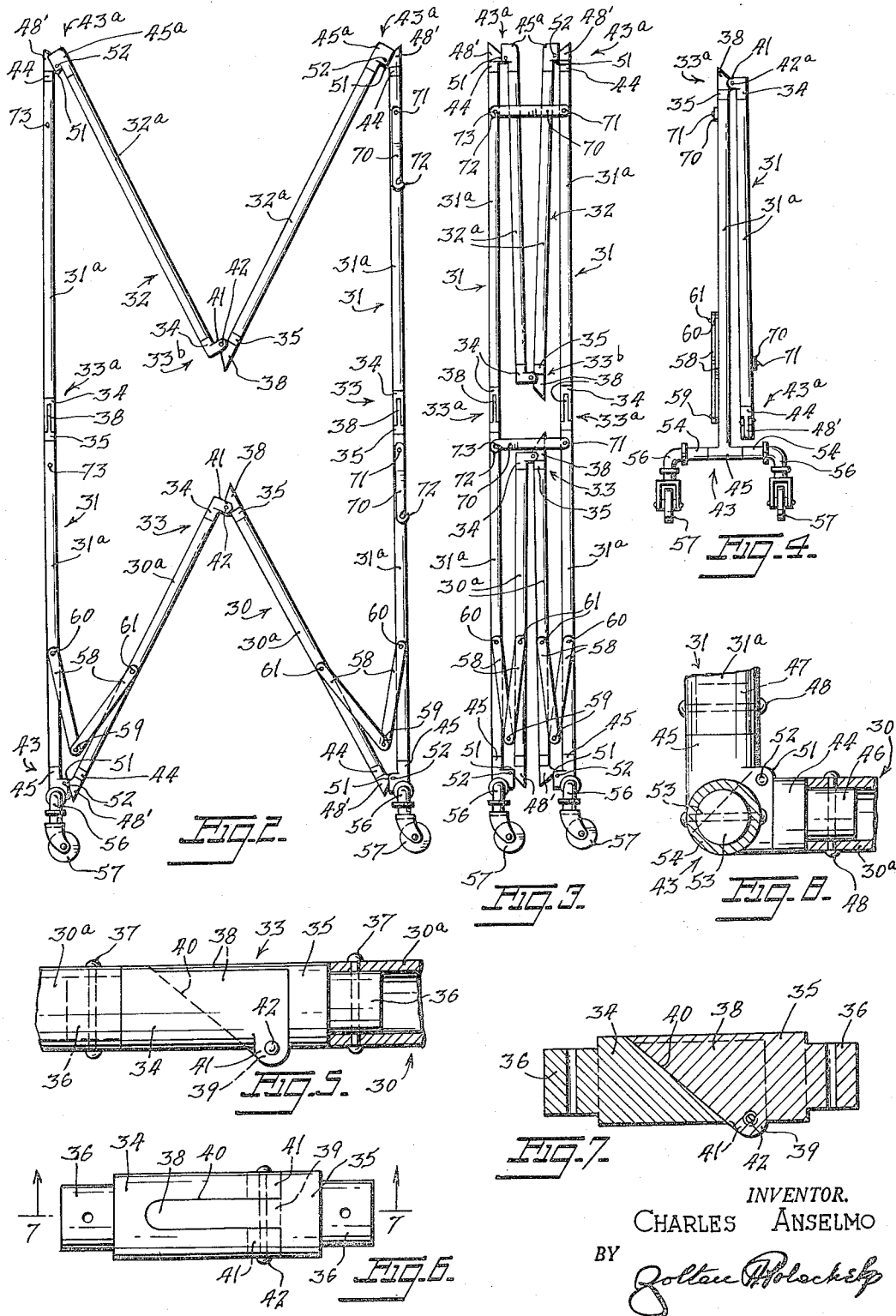
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3 Sheets-Sheet 2



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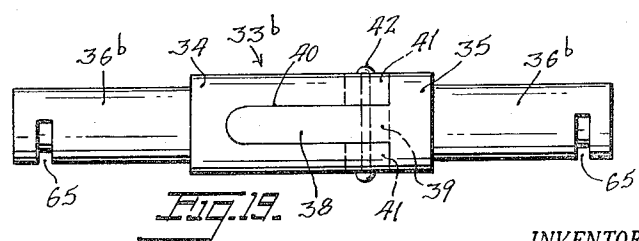
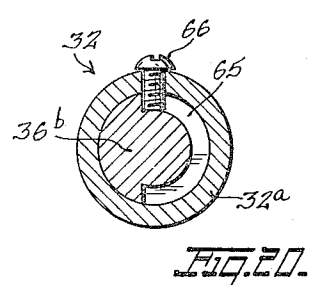
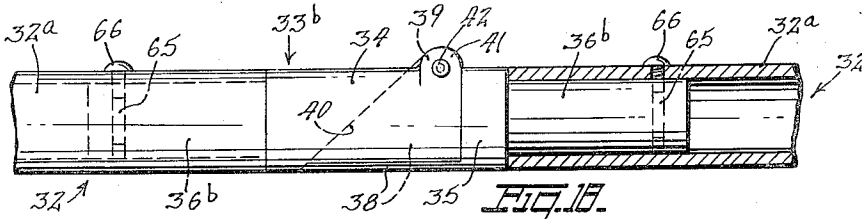
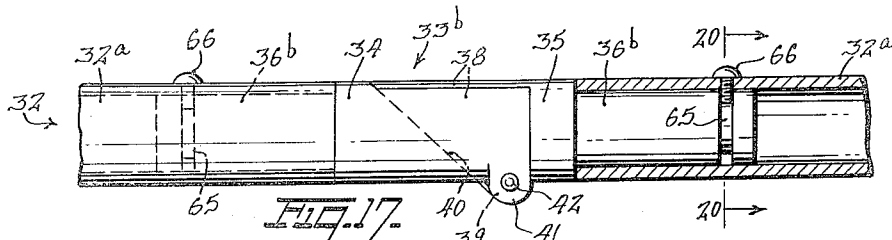
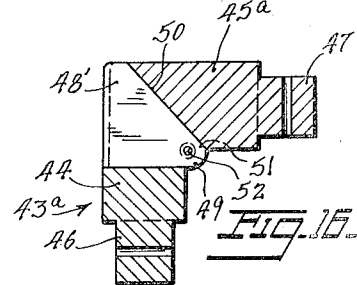
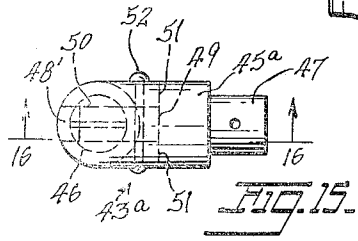
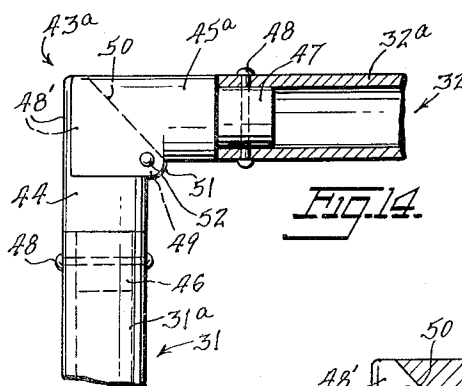
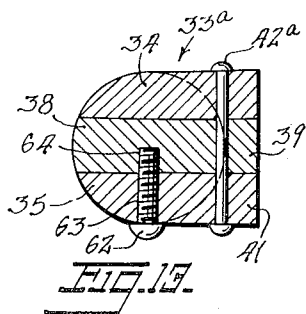
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3 Sheets-Sheet 3



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2,748,955

COLLAPSIBLE RACK

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Application August 2, 1951, Serial No. 239,868

1 Claim. (Cl. 211—178)

This invention relates to new and useful improvements in a collapsible rack and more particularly proposes certain improvements in the collapsible rack disclosed in my co-pending application Serial No. 54,607 filed October 15, 1948 which has become abandoned.

The above mentioned co-pending application proposes the construction of a collapsible rack having a top bar of pivotally connected sections pivotally connected at their outer ends to the top ends of vertical posts. The bottom ends of the vertical posts are pivotally connected to the outer ends of a bottom bar formed of end aligned sections pivotally connected together at their meeting ends so that as the top and bottom bars are pivoted inward the vertical posts are drawn together to collapse the rack to a width considerably less than the extended width of the rack. The bottom ends of the vertical posts are provided with suitably located wheels on which the rack can be moved about both when extended and collapsed. The pivotal connectors of the rack are provided with means for holding the bars and posts in the desired extended positions when the rack is to be used.

The present invention proposes a collapsible rack substantially similar to that of the co-pending application in that it also has pivotally interconnected bars and posts; however, the present invention proposes a new pivotal connector for the meeting ends of the top bar or the bottom bar wherein rotation of that pivotal connector will function to retain all of the rack parts in their operative extended positions when the rack is to be used.

Another object of the present invention proposes constructing the vertical posts of pivotally interconnected and aligned sections arranged in a manner so that when the posts are drawn inward by the collapsing of the vertical bars, the posts can then be folded substantially in half to reduce the overall height of the rack in its collapsed condition.

It is a further object of the present invention to construct a novel collapsible rack which is simple and durable, which can be manufactured and sold at a reasonable cost and which is effective for its intended purposes.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is an elevational view of the rack of the present invention shown in its fully extended position.

Fig. 2 is a view similar to Fig. 1 showing the first step in the act of collapsing the rack.

Fig. 3 is another view similar to Fig. 1 showing a further step in the act of collapsing the rack.

Fig. 4 is an end elevational view of the rack in its fully collapsed position.

Fig. 5 is an enlarged detailed view partly in longitudinal section of the connector for the meeting ends of the bottom bar.

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Fig. 6 is a plan view of Fig. 5.

Fig. 7 is a longitudinal sectional view taken substantially on the line 7—7 of Fig. 6.

Fig. 8 is an elevational view, with portions thereof shown in section, of one of the connectors for the bottom ends of the posts and the adjacent ends of the bottom bar.

Fig. 9 is a bottom plan view of Fig. 8.

Fig. 10 is a sectional view taken substantially on the line 10—10 of Fig. 9.

Fig. 11 is an elevational view of one of the connectors for the meeting ends of the sections of the vertical posts looking in the direction of the line 11—11 of Fig. 1.

Fig. 12 is a view looking from the left side of Fig. 11.

Fig. 13 is an enlarged horizontal sectional view taken substantially on the line 13—13 of Fig. 11.

Fig. 14 is an elevational view of one of the connectors for joining the outer ends of the top bar and the top ends of the vertical posts, with a portion thereof shown in longitudinal section.

Fig. 15 is a plan view of Fig. 14.

Fig. 16 is a sectional view taken substantially on the line 16—16 of Fig. 15.

Fig. 17 is an elevational view of the connector for joining the meeting ends of the top bar shown in its operative turned position locking the rack in its extended position and with a part of the view shown in longitudinal section.

Fig. 18 is a view similar to Fig. 17, but showing the connector turned to its inoperative position in which the sections of the top bar are free to be pivoted downward.

Fig. 19 is a plan view of Fig. 17.

Fig. 20 is an enlarged vertical sectional view taken on the line 20—20 of Fig. 17.

The collapsible rack, according to the present invention, is in the form of a frame-work including a bottom bar 30 composed of end aligned sections 30^a, a pair of vertical posts 31 each composed of end aligned sections 31^a and a top bar 32 composed of end aligned sections 32^a. The bars 30 and 32 and the vertical posts 31 are of metallic formation being preferably cut-off lengths of tubular pipe.

A connector 33 is provided for pivotally joining the meeting ends of the sections 30^a of the bottom bar 30. Constructional details of the connector 33 are shown in Figs. 5 to 7 from which it will be noted that the connector comprises a pair of end aligned parts 34 and 35. Extended laterally from the outer ends of the parts 34 and 35 there are studs 36 which are projected into the meeting ends of the bottom bar sections 30^a. The studs 36 are retained in position by headed over pins 37 which are passed through aligned holes formed in the studs 36 and the ends of the bar sections 30^a, see particularly Fig. 5.

The part 35 of the connector 33 is formed with a centrally located substantially triangularly elongated tongue 38. One side of the tongue 38 is formed with a laterally extended ear 39. The adjacent end of the part 34 is formed with a triangularly shaped slot 40 into which the tongue 38 is extended with the spaced portions of the part 34 extended along opposite sides of the tongue 38. The tongue 38 and the slot 40 are of uniform width from end to end so that the tongue will have freedom of movement into and out of the slot.

In lateral alignment with the ear 39 of the tongue 38, the spaced portions of the part 34 are formed with spaced ears 41 in facial contact with the sides of the ear 39. The ears 39 and 41 are formed with aligned holes through which a pivot pin 42 is extended. The pin 42 has its axis extended at right angles to the length of the bottom bar 30 so that the meeting ends of the bar sections 30^a can be pivoted upward, as shown in Figs. 2 and 3, about the pin 42 as an axis. The inner hypotenuse side of the triangularly shaped tongue 38 strikes on the material of the

part 34 at the inner end of the slot 40 forming a stop member holding the meeting ends of the bar sections 30^a against pivoting in a downward direction.

Right angular connectors 43 are provided for connecting the outer ends of the sections 30^a of the bottom bar 30 to the bottom ends of the bottom sections 31^a of the vertical posts. Constructional details of the connectors 43 are shown in Figs. 8 to 10. The connectors 43 are comprised of right angularly disposed parts 44 and 45. Extended horizontally from the part 44, there is a stud 46 fitted into the outer end of the respective bottom bar section 30^a. Extended upward from the part 45 there is a similar stud 47 which is received in the bottom end of the respective post section 31^a. The studs 46 and 47 are fixedly secured in position within the respective sections 30^a or 31^a by means of headed over pins 48 passed through aligned holes in the studs and the sections.

At its side facing the part 45, the part 44 is formed with a centrally located tongue 48' which is substantially triangular in outline. Extended from the tongue 48 at the converged sides of the parts 44 and 45, there is an ear 49. The part 45 is formed with a slot 50 in which the tongue 48' is received with the spaced portions of the part 45 extended along opposite sides of the tongue in facial contact therewith. Ears 51 are formed on the spaced portions of the part 45 and extend along opposite sides of the ear 49. The ears 49 and 51 are formed with aligned holes through which there is extended a pivot pin 52 which, as in the case of the pivot pin 42, has its axis extended at right angles to the length of the bottom bar 30. The disposition of the pivot pin 52 permits the outer ends of the bar sections 30^a to pivot relative to the bottom ends of the vertical posts 31 as the meeting ends of the bottom bar sections 30^a are pivoted upward, see Fig. 2. The outer ends of the bar sections 30^a are retained against downward pivoting relative to the bottom ends of the vertical posts by the engagement of the hypotenuse sides of the triangularly shaped tongues 48' with the inner surfaces of the slots 50.

The connectors 43 are wheeled so that the rack can be rolled from place to place either while fully extended, as shown in Fig. 1, or while collapsed, as shown in Fig. 4. This is accomplished by providing the sides of the parts 45 of the connectors 43 with aligned laterally extended trunnions 53. Fitted over the trunnions 53 there are short lengths of piping 54 secured fixedly in position by headed over pins 55 passed through aligned holes in the trunnions 53 and the piping 54. Screwed onto the outer ends of the lengths of piping 54 there are elbows 56 which mount conventional swivel casters 57 for rolling on the floor.

The right angular positioning of the bottom bar 30 and the vertical posts 31 in the extended position of the rack shown in Fig. 1, is maintained by pairs of diagonally extended end aligned links 58, see particularly Figs. 1 to 4. The adjacent ends of the links 58 of each pair are pivotally connected together by means of pins 59. The top outer ends of the links 58 are pivotally connected to the bottom sections 31^a of the vertical posts 31 by means of pins 60. Likewise, the bottom inner ends of the links 58 are pivotally connected to the bar sections 30^a by means of pins 61. The arrangement of the links 58 is such that the pivot pins 59 drop past a dead center, just slightly, in the fully extended position of the rack shown in Fig. 1 requiring that the centers of the interconnected pairs of links 58 be raised before the bottom bar sections 30^a are free to be pivoted upward relative to the bottom ends of the vertical posts.

The meeting ends of the sections 31^a of the vertical posts 31 are secured together by connectors 33^a similar in construction to the connector 33 previously described. Constructional details of the connectors 33^a are illustrated in Figs. 11 to 13 from which it will be noted that the studs 36 are secured in position within the meeting ends of the post sections 31^a in such a position that the axis

of the pivot pins 42^a are arranged in end alignment and parallel to the length of the bottom bar 30. That disposition of the pivot pins 42^a leaves the parts 34 and 35 of the connectors 33^a to be pivoted to lower the top sections 31^a of the vertical posts 31 together with the top bar 32 along side of the bottom sections 31^a of the posts to achieve the fully collapsed condition of the rack shown in Fig. 4.

In addition, the connectors 33^a are characterized by means for securing their parts together in the aligned positions of the sections 31^a of the vertical posts 31 in the fully extended position of the rack. Securement of the parts 34 and 35 of the connectors 33^a is accomplished by screws 62 which are passed through holes 63 formed in one of the spaced portions of the part 34 and threaded into a complementary aligned threaded recess 64 formed in the adjacent side of the tongue 38, see particularly Figs. 12 and 13. With the screws 62 in position, the sections 31^a of the vertical posts 31 will be maintained in their end aligned positions. Before the top sections 31^a of the posts can be pivoted downward it is necessary to remove the screws 62. If desired, the screws 62 can be attached to one of the parts of the connectors 33^a by the use of chains or the like, as is generally known in the art for retaining the screws against being misplaced when they are removed.

The top ends of the top sections 31^a of the vertical posts 31 are connected to the outer ends of the sections 32^a of the top bar 32 by means of connectors 43^a similar in construction to the connectors 43. The connectors 43^a differ from the connectors 43 in that the parts 45^a of the connectors 43^a have no laterally aligned trunnions 53 for mounting casters as in the case of the corresponding parts 45 of the connectors 43. Constructional details of the connectors 43^a are shown in Figs. 14 to 16 from which it will be noted that the studs 46 of the parts 44 are depended vertically and fixedly mounted in position in the top ends of the top sections 31^a of the vertical posts 31. Also, the studs 47 of the parts 45^a are extended horizontally and secured in position in the outer ends of the sections 32^a of the top bar 32.

The disposition of the pivot pins 52 of the connectors 43^a at right angles to the length of the bottom bar 30 leaves the outer ends of the top bar sections 32^a free to pivot in a downward direction in the fully extended position of the rack. Upward pivoting of the bar sections 32^a is restricted by the engagement of the hypotenuse sides of the triangularly shaped tongues 48 of the connectors 43^a with the material of the parts 45^a describing the adjacent walls of the slots 50.

The meeting ends of the sections 32^a of the top bar 32 are secured together by a connector 33^b which is the key to the means for maintaining the rack in the extended rectangular formation shown in Fig. 1. Constructional details of the connector 33^b are illustrated in Figs. 17 to 20 which upon comparison with Figs. 5 to 7 discloses that the connector 33^b is in many ways similar to the connector 33. The only difference in the two connectors is that the laterally aligned studs 36^b of the connector 33^b are somewhat longer than the studs 36 of the connector 33 and are turnably received in the meeting ends of the top bar sections 32^a.

Means is provided for restricting rotation of the studs 36^b within the meeting ends of the top bar sections 32^a to positions in which the pivot pin 42 of the connector 33^b is located either below the longitudinal axis of the top bar 32, see Figs. 1 and 17, or above the longitudinal axis of the top bar, see Figs. 2 and 18; a turn of 180 degrees. The rotation restricting means comprises accurate grooves 65 formed on the studs 36^b. The grooves 65 are formed on the same sides of the studs 36^b, see Fig. 19, and cover substantially 180 degrees of the peripheral surfaces of the studs, see Fig. 20. Threaded through the sides of the meeting ends of the top bar sections 32^a in alignment with the grooves 65, there are

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screws 66 which have their inner ends extended into the grooves 65. When the connector 33^b is in the rotative position shown in Figs. 1 and 17, the screws 66 about the material of the studs 36^b at one end of the grooves 65 thus bringing the pivot pin 42 in position directly below the longitudinal axis of the top bar 32. When the connector 33^b is turned to the position shown in Figs. 2 and 18 the screws 66 strike the material of the studs 36^b at the other ends of the grooves 65 positioning the pivot pin 42 directly over the longitudinal axis of the top bar 32.

Considering first the position of the pivot pin 42 directly over the longitudinal axis of the top bar 32 shown in Figs. 1 and 17, it will be noted that the tongue 38 of the connector 33^b is in such a position that the sections of the top bar 32, at the meeting ends of those sections 32^a, are free to be pivoted upward about the pivot pin 42. However, such upward pivoting of the top bar sections 32^a is restricted by the action of the tongues 48' of the connectors 43^a at the outer ends of the top bar sections 32^a. The tongues 48' of the connectors 43^a function to permit only downward pivoting of the top bar sections 32^a with relation to the top ends of the vertical posts 31. Thus, the position of the connector 33^b shown in Figs. 1 and 17 is the locked or operative position of that connector in which the rack is maintained in the fully extended position shown in Fig. 1. All attempts at pivoting the vertical posts inward about the pivot pins 52 of the connectors 43^a while simultaneously pivoting the sections 30^a of the bottom bar upward is resisted by the linkages 58 connected between the bottom ends of the vertical posts 31 and the outer ends of the bottom bar 30.

On the other hand, when the connector 33^b is turned to the position shown in Figs. 2 and 18, the tongue 38 of the connector 33^b will be disposed so as to free the meeting ends of the top bar sections 32^a to pivot downward, which pivoting is also permitted by the tongues 48' of the connectors 43^a. If at the same time, the links 58 are released by pulling upward at the centers of the links, the bottom bar sections 30^a will be freed to pivot upward about the pivot pin 42 of the connector 33. Such downward pivoting of the sections to the top bar 32 and upward pivoting of the sections of the bottom bar 30 are shown in Fig. 2 and is continued until the position of Fig. 3 is reached which reduces the width of the rack to its minimum.

In the position of the rack shown in Fig. 3, means is provided for connecting together the laterally aligned top and bottom sections of the vertical posts 31 to prevent accidental respreading of the rack. That connecting means comprises elongated arms 70 pivotally supported at one of their ends on one of the vertical posts 31 above and below the respective connector 33^a, by means of pins 71. The free ends of the arms 70 are provided with hooks 72 engageable with laterally aligned pins 73 mounted on the other vertical post 31.

When the collapsing of the rack reaches the position shown in Fig. 3 in which the arms 70 are connected in

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position, the screws 62 are withdrawn from the connectors 33^a of the posts freeing the top sections 31^a of the posts 31 to be pivoted downward to the fully collapsed position shown in Fig. 4 reducing the height of the rack to substantially half its fully extended height. It is appreciated, of course, that the casters 57 function to permit the rack to be rolled about in both its fully extended position and in its fully collapsed position as well as in any partially collapsed position of the rack—the position of Fig. 3 for example.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claim.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

In a collapsible rack having spaced parallel vertical tubular bars and spaced parallel horizontal tubular bars, each bar being divided into sections, connectors for pivotally joining the sections of the horizontal tubular bar sections, each connector including aligned cylindrical parts, studs extending from the remote ends of said parts into the adjacent bar sections, said studs having arcuate-shaped peripheral slots, screws carried on the bar sections extending into said slots for locking said sections in position for use, a triangular-shaped tongue on the adjacent end of one of said cylindrical parts, a laterally extending ear on said tongue, the adjacent end of the other cylindrical part being formed with a triangular-shaped slot for movably receiving said triangular-shaped tongue, a perforated ear on said latter cylindrical part adjacent its slot aligned with said laterally extending ear, a pivot pin extending through the perforations in said ears, said pin having its axis extended at right angles to the length of the bar sections, whereby the meeting ends of the bar sections may be pivoted in one direction, the inner hypotenuse side of the triangular shaped tongue being disposed in the path of the base of said slot whereby pivoting of the bar sections in the opposite direction is prevented.

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