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SUPPORT STRUCTURE FOR MOBILE FOLDING STAGE

The invention pertains to the field of stage structures which in their operable position provide a horizontal stage surface, and which can be folded up to a compact storage position and moved by means of wheels or casters to a storage area when not in use. More particularly, the invention pertains to a mobile folding stage having an improved caster mounting arrangement.

Stages consisting of a number of individual foldable, movable stage sections are widely used in multipurpose rooms or areas of hotels, schools, and the like, wherein differing use activities for the rooms require that the stage be capable of rapid setup, takedown and storage. Several different foldable stage structures have been developed for this purpose. One example of a folding mobile stage is found in our U.K. Patent 1 110 670. Improvements of that prior invention so as to permit elevational adjustment are shown in our U.K. Patent 1 494 457 and in U.S. Patent 4 074 636 to Kermit H. Wilson and assigned to the same assignee as the present invention. In these prior patents, the main support legs generally disposed beneath the center of the stage are interconnected to form a base frame, and hinge means including a plurality of hinge links connect the stage surface members to the base frame to permit them to be folded to a vertical storage position. Caster wheels are provided near the bottom of

the main support legs, connected to sleeves which may move telescopically upward or downward on the legs.

Control linkages connect from the stage surface members to the sliding sleeves to cause the casters to retract

5 when the stage is in its operable position, and to be

extended beyond the main support legs so as to support the stage, when the stage is in its folded position, so that the stage can be wheeled away to a storage area. While this type of structure has been very successful in achiev-

10 ing its intended function, the present invention makes certain improvements which provide even greater rigidity, better alignment of the stage surfaces, and more convenient and secure folding of the stage in its storage position.

15 In the prior structure, the rigidity of the base frame formed by the interconnection of the main support legs was limited by the positioning of the sliding sleeves for the casters. Since the sleeves had to move up and down, the lowest cross brace between legs was approximately nine or
20 ten inches from the floor, making the main support legs somewhat vulnerable to bending in case of improper use.

Also, the use of sleeves over the leg tubes required a certain amount of looseness of fit so as to make sure there was no problem of movement of the sleeves due to a tight fit
25 between parts. As a result, however, there was a certain

amount of looseness in positioning of the legs, and this sometimes required positioning plates on the undersides of the stage surface members for lateral positioning of the tops of the legs to avoid slight lateral misalignment of the stage surface members. The loose fit of the sleeves also resulted in tipping of the sleeves against the legs when the weight of the stage was on the casters, causing a significant and not always predictable amount of friction as the sleeves would move up and down the legs during folding and unfolding. The friction would, of course, make folding and unfolding more difficult. The loose fit and tipping of the sleeves also caused the casters to be slightly off from vertical, increasing the wear on the casters.

The present invention provides mobile folding stages having an improved and more rigid leg and retractable wheel structure.

Accordingly, in a first aspect the present invention provides a mobile folding stage comprising:

- (a) a pair of stage surface members each having an abutment edge and which, when horizontally positioned in the operable position with their abutment edges abutting each other, together define a stage surface;
- (b) a base frame for supporting the stage surface members and comprising two pairs of main support legs each pair consisting of first and second legs which, when the stage is in use extend substantially transversely to the ground or floor, the legs of each pair being connected respectively to the stage surface members in the region of their abutment edges, and transverse stiffening members extending respectively between said first

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and second legs of each pair and connected to the lower end portion of each leg;

- 5 (c) means hingably mounting said pair of stage surface members to said base frame for pivotal movement of said members between a storage position in which said members are generally vertically positioned above the base frame with the surfaces adjacent each other, and said operable position;
- 10 (d) outer leg means connected to said stage surface members for supporting the outer ends thereof in said operable position;
- (e) a plurality of laterally disposed caster beams each having a caster wheel mounted thereon;
- 15 (f) means pivotally connecting said caster beams to the transverse stiffening members for pivotal movement thereof to alternately bring said caster wheels into or out of engagement with the ground or floor; and
- 20 (g) actuation links connected to said caster beams and to said stage surface members for pivoting said caster beams to retract said casters when said stage is in its operable position so that the stage is supported by said main support legs, and for pivoting said caster beams to extend
- 25 said casters into ground or floor engagement when said stage surface members are pivoted to said storage position so that the stage is supported by the caster wheels to permit movement of the stage.

In a second aspect the invention provides a mobile folding stage comprising:

a pair of generally planar stage surface members;

two pairs of rectangularly spaced main support
5 legs and means interconnecting pairs of said legs
to form a base frame for said stage;

means hingably mounting said pair of stage surface
members to said base frame for pivotal movement of
said members between an operable position in which
10 the stage surface members are horizontally positioned
with substantially abutting inner edges centered
over said rectangular base frame to define a stage
surface, and a storage position in which said stage
surface members are generally vertically positioned
15 above said base frame;

outer legs connected to said stage surface members
for supporting the outer ends thereof in said operable
position;

said base frame including a caster frame intercon-
20 necting said main support legs near the lower portions
thereof;

four laterally disposed caster beams each having
a caster wheel mounted adjacent one end thereof;

means pivotally connecting said caster beams adjacent their other ends to said caster frame adjacent said main support legs;

actuation links pivotally connected to said caster
5 beams and to the underside of said stage surface
members near the inner ends thereof for pivoting
said caster beams to retract the casters when the
stage is in its operable position so that the stage
is supported by said main support legs, and for pivoting
10 said caster beams to extend said caster wheels into
ground or floor engagement when said stage surface
members are pivoted to said storage position so that
the stage is supported by the caster wheels to permit
movement of the stage.

In one form of the invention the stage is elevation-
ally adjustable and includes auxiliary support legs,
for example those disclosed in U.S. Patent 3 999 491
or U.S. Patent 4 074 636, longer than said main support
5 legs pivotally connected to the undersides of said
stage surface members near the inner ends thereof
for lateral movement between folded storage and unfolded
use positions.

for elevational adjustment of stage height, and wherein said caster beams are positioned for lateral abutment with said auxiliary support legs to hold them in their unfolded use position. The caster beams can have curved or angled end portions extending outwardly from the pivotally connected portions thereof, for engaging the auxiliary legs if partially unfolded and causing them to fully unfold to their use position as the stage surface members are pivoted to their operable position.

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Where auxiliary support legs are used the base frame can with advantage include abutment members positioned for longitudinal abutment with said auxiliary support legs when the stage is in its elevationally extended position so that the base frame is held in alignment thereby.

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A preferred form of the invention is one in which the outer leg means are pivoted to said stage surface members and include control links extending between and pivotally connected to said outer leg means and said main support legs for causing said outer leg means to fold toward the undersides of said stage surface members as they are pivoted to their storage positions, the outer leg means being manually movable to cause the pivotal connection of said control links to said outer leg means to move through

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an over center position with respect to the pivotal connection of the control links to the main support legs and the pivotal connection of the outer leg means to the stage surface members, to resiliently lock the outer leg means and stage surface member in its storage position. Preferably, tabs are provided on the outer legs projecting inwardly toward the base frame, and the control links are pivotally connected to the tabs, and wherein the control links are bent, to facilitate the over center resilient locking function of the outer legs.

There is now described, by way of example and with reference to the accompanying drawings, a mobile folding stage which is a preferred embodiment of the invention.

15 In the drawings, Figure 1 is a side elevational view showing a stage according to the present invention in operable position, portions thereof broken away and shown in section;

20 Figure 2 is a side elevational view of the stage of Figure 1 shown in its storage position, portions thereof broken away and shown in section;

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Figure 3 is a side elevational view of Figure 2, as seen from right to left, portions thereof broken away;

Figure 4 is an enlarged vertical section seen generally from the line 4-4 of Figure 3;

Figure 5 is a view similar to Figure 4, but showing the caster wheels in their extended position;

Figure 6 is an enlarged horizontal section as seen generally from the line 6-6 of Figure 1, portions thereof broken away;

Figure 7 is a view generally similar to Figure 1, but showing the auxiliary support legs extended for elevation of the stage to its higher position;

Figure 8 is an enlarged fragmentary horizontal sectional view as seen generally from line 8-8 of Figure 7;

Figure 9 is a fragmentary detail sectional view as seen generally from line 9-9 of Figure 7, on an enlarged scale; and

Figure 10 is a view similar to Figure 3, but showing an alternate embodiment thereof.

The overall configuration of the mobile folding stage incorporating the present invention is shown in Figures 1, 2 and 3. The stage surface members are indicated by reference,

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numbers 10 and 11. Reference number 12 generally indicates the base frame, which is composed of main support legs and inter-connecting members, as explained hereinafter. Reference number 13 generally designates the hinge means which connects stage surface members 10 and 11 to base frame 12. Reference numbers 14 and 15 designate the outer leg means for stage surface members 10 and 11, respectively.

The stage surface members are flat and rectangular in shape, and may be made from any suitable material such as steel, plywood, particle board and the like, and the members may have a decorative or protective covering layer (not shown) as is generally known. As seen in Figure 3 with respect to stage surface member 11, a reinforcing frame is made from a plurality of welded or bolted angle iron rails. Reinforcing rails 21 and 23 are placed along the sides, and reinforcing rail 22 is located along the end. A plurality of cross-reinforcing rails 24, 25 and 26, also made from angle iron, extend between side rails 21 and 23, and connect thereto. The stage surface member 11 may be secured by any suitable means to the support frame, as is generally known in the art. The support frame, in addition to providing additional strength for the stage, provides convenient points for connection of hardware and components. A similar supporting frame is provided for stage surface member 10.

Base frame 12 includes four main support legs 30-33, as shown in the various drawings. Legs 30 and 32 are positioned on either side of stage surface member 10, generally beneath and adjacent the inner end thereof which abuts the inner end of stage surface member 11 in the operable position of Figure 1. Similarly, main support legs 31 and 33 are provided beneath stage surface member 11. The main support legs are preferably tubular steel members of sufficient size for the loads to be encountered on the stage. Caps or glides 28 are provided on the tops of the main support legs so the sharp edges thereof will not cut into the underside of the stage surface members as they rest on the tops of the main support legs in the operable position. An upper cross member 34 connects between legs 30 and 31 near the upper ends thereof, as

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part of the base frame. Cross member 34 is preferably made from a piece of steel bar stock, and it is secured to the legs by welding. A similar cross member not shown in the Figures interconnects the upper portions of legs 32 and 33 on the other side of the stage.

While a number of different hinge configurations could be used, the preferred embodiment uses the multiple link hinge from prior Patent No. 3,351,029. Link 40 and elbow link 41 are pivotally connected at their lower ends to cross member 34, and at their upper ends to a bracket 42 which is bolted to cross-reinforcing rail 26 beneath stage surface member 11. A similar pair of links are provided at the other side of stage surface member 11, and similar pairs are provided for either side of the inner end of stage surface member 10. As shown in my above-mentioned prior patent, these links are designed to permit pivotal movement of the stage surface members between the operable position shown in Figure 1, and the storage position shown in Figure 2. In the operable position, the inner edges of stage surface members 10 and 11 are in direct abutment without a significant gap or obstruction.

The lower ends of the main support legs have glides or feet 29 as is generally known to prevent marking the floor while providing adequate slide resistance for the stage.

The lower ends of the main support legs are interconnected by the caster frame, generally indicated by reference numeral 45. This frame is placed relatively low on the legs, as determined by the height of the casters, so as to provide increased rigidity to the base frame. As best seen in Figure 6, the caster frame includes a lower cross member 48 extending between legs 30 and 31, and formed from a piece of bar stock welded to the main support legs. A similar lower cross member 49 extends between main support legs 32 and 33.

A pair of mounting bars 50 and 51 are bolted respectively to lower cross members 48 and 49, by a plurality of bolt and nut assemblies 52. Lateral members 53 and 54 are welded to mounting bars 50 and 51, and extend from one side of the stage to the other. Lateral members 53 and 54 are preferably made of square sectioned steel tubes, as seen in sectional view in

Figures 4 and 5. Beam carriers 55-58 are made of bar stock, and are welded to lateral members 53 and 54, as seen in Figure 6. The casters are attached to caster beams, indicated by reference numbers 60-63, which are pivotally connected to the beam carriers. In the preferred embodiment, the caster beams are formed from steel tubes, bent into a U-shape. The open ends of the caster beams are pivotally connected by means of pivot bolts 64 to the beam carriers. Specifically, caster beams 60 and 61 are positioned between, and pivotally connected to, beam carriers 55 and 56, while caster beams 62 and 63 are similarly connected to beam carriers 57 and 58. The rounded closed end portion of the U-shaped caster beams project outwardly beyond lateral members 53 and 54. Semicircular plates 65 are welded beneath the curved ends of the caster beams, and the casters are connected thereto. In the preferred embodiment, fixed casters 70 and 71 are secured to the plates 65 in caster beams 60 and 61, respectively, while swivel casters 72 and 73 are connected to caster beams 62 and 63. This is to allow the stage to be guided more easily as it is being moved in its storage position. Of course, all four casters could be swivel casters if desired.

A pair of pad eyes 76, 77 are welded to beam carriers 56 and 57, respectively, on the inward sides thereof. A pair of cross braces 78 and 79 are bolted thereto. The other end of cross brace 79 is bolted to a pad eye 81 welded on the back side of upper cross member 34. The other end of cross brace 78 is bolted to a similar pad eye 81 welded to the back side of the corresponding upper cross member (not shown) that extends between main support legs 32 and 33. These cross braces serve to further increase the rigidity of the base frame for the stage.

A pair of pad eyes indicated by reference numeral 83 are welded in spaced apart position to the top surface of each of the plates 65 for each of the caster beams. Actuation links 86-89 extend downwardly from the stage surface members and their ends are pivotally connected to these pad eyes. Specifically, the end of actuation link 86 is pivotally connected to pad eyes 83 for caster beam 60, by means of a pivot bolt 84.

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X In similar manner, the end of actuation link 87 connects to the pad eyes for caster beam 61, and actuation links 88 and 89 are pivotally connected to the pad eyes for caster beams 62 and 63, respectively. The upper ends of actuation links 86-89 are pivotally connected to brackets positioned beneath the stage surface members near the inner ends thereof. For example, as seen in Figure 3, actuation link 87 is pivotally connected to bracket 91, which comprises a pair of pad eyes welded to cross-reinforcing rail 26 for stage surface member 11. The link is connected by means of a pivot bolt assembly 94. As can be seen in Figures 2 and 4, bracket 91 extends downwardly from the stage surface member and generally in a direction towards the inner end of the stage surface member. Actuation link 89 is similarly pivotally connected to bracket 93. Stage surface member 10 has similar brackets, and bracket 90 which pivotally connects actuation link 86 is shown in Figures 1 and 2. A similar bracket is provided for connecting the upper end of actuation link 88, but is not visible in the drawings.

20 Operation of the means for retracting the casters is seen with reference to Figures 1, 2, 4 and 5. Figures 1 and 4 show the positioning of the casters and caster beam when the stage is in its horizontally extended operable position. The positioning of the actuation link brackets, and the length of the actuation links are designed to lift the caster wheels off the ground by pivoting the caster beams upward, as shown in Figure 4, when the stage is in its horizontally extended operable position as shown in Figure 1. As the stage surface members are swung upwardly to the storage position indicated in Figure 2, the actuation links move downwardly, bringing the caster wheels into ground or floor engagement, and lifting the main support legs off the floor, as indicated in Figures 2 and 5. In this position, the stage may be wheeled to the storage area. It is apparent that the brackets 90 and 91 for the actuation links, and the corresponding brackets on the other side of the stage, are positioned generally inwardly of the effective pivot axis of the respective stage surface members, so that the required downward motion will be transmitted to the actuation links for the caster beams, as the outer ends of the

stage surface members are moved upwardly. Of course, it is also possible to provide the necessary retraction and extension motion for the caster beams by other equivalent linkages appropriately connected to other portions of the stage surface members or the hinge means.

The configuration and operation of outer leg means 15 will now be explained with the aid of Figures 1, 2 and 3, it being understood that the construction and operation of outer leg means 14 for the other stage half is substantially identical.

The preferred embodiment of the stage is adapted for vertical height adjustment, and outer leg means 14 and 15 therefore have telescoping lower portions in the Figures and the following description. However, the invention is not limited to elevationally adjustable stages.

As seen in Figure 3, outer leg means 15 comprises a pair of tubular leg members 96 and 97, positioned beneath and along either side of stage surface member 11. Leg members 96 and 97 are pivotally connected to the stage surface member at their upper end, by means of pivot pins 98, which pass through pairs of pad eyes 99 welded to reinforcing angle iron rail 22. Leg members 96 and 97 are interconnected for added rigidity by a tubular cross brace member 100 welded between them near their lower ends, and a pair of cross braces 101 and 102 which are also welded. Leg member 96 has a lower portion 106 which telescopically fits inside the leg, and leg member 97 has a corresponding telescopic lower portion 107. These two lower leg portions are connected together by a tubular cross brace 108.

Elevational adjustment of the outer leg means is accomplished by means of pins 109 which pass through holes in the tubular leg members 96, 97, and corresponding holes in telescopic lower portions 106 and 107. Additional pairs of holes are provided at different spacings so that the overall effective length of outer leg means 15 can be adjusted in height by removing the pins, extending the telescopic lower portion, and reinserting the pins in the proper holes. Retaining chains 110 are provided to prevent loss of the pins while changing heights.

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Folding and unfolding of the outer leg means is accomplished by a pair of outer leg control links 112 and 113. As seen in Figure 1, link 112 pivotally connects to main support leg 31 by pivot pin 114, and to a pad eye 116 welded to tubular leg member 96, by means of a further pivot pin 117. Similar pivotal connections are provided for the remaining three outer leg control links. As can be seen in Figure 1 with reference to link 112, the outer leg control links have bends or elbows, as indicated by reference numeral 120.

In operation, as the stage surface member is swung upwardly, the outer leg control links serve to pivot the outer support leg inwardly with respect to the stage surface member, so that when a stage is completely folded, the outer support legs are essentially folded along the undersides of the stage surface member as shown in Figure 2. Generally speaking, this type of folding action for the outer leg is well known, as exemplified by the above-mentioned prior art patents. However, the present invention provides a further improvement to provide an over center locking force to help keep the stage in its storage position. Specifically, pad eye 116 provides an offset of the pivot point for pin 117 from the plane of tubular leg member 96. This offset, in conjunction with the bend 120 in the outer leg control link allows pivot pin 117 to pass through a plane containing pivot pins 98 and 114 as the stage is being folded. As this occurs, a slight resistance force takes place, resulting in a lateral resilient bending of link 112. Figure 2 shows that in the storage position, pivot pin 117 has passed through the plane containing pivot points 114 and 98. This latter plane is indicated in Figure 2 by a line and reference numeral 122. To unfold the stage, it is necessary to pull outwardly on the folded outer leg with sufficient force to return the pivot points just described through the center position, after which the stage will tend to move freely to its horizontal position. Because of the over center force, the stage halves will be normally held in their storage position, and a definite pull will be required to bring them out of the over center condition. For added security, a spring catch is provided. Spring 123 connects through a chain to a bracket 125.

welded to member 22, and the spring has a hook 124 on its other end for hooking around the corresponding angle iron member on the other stage surface member. The hook must be manually released before the stage can be unfolded.

Tabs 126 and 127 are provided as is generally known in the art, for purposes of hooking the edge of an adjacent stage section set at a lower height to create a stepped or riser type of stage.

It will be appreciated that the improved base frame and retracting caster arrangement previously described, and the over center locking arrangement for the outer support leg described above, are independent of whether they are used on the stage having a fixed height or a variable height stage. In case of a fixed height, of course, the telescoping lower portions of the outer support legs would not be required.

For use with a vertically adjustable stage, fold-down auxiliary support legs are provided, as covered in the above-mentioned patents 3,999,491 and 4,074,636. A pair of auxiliary legs is provided for each stage surface member. In Figure 3, auxiliary legs 131 and 133 are shown in their folded position against the bottom side of the stage surface member, where they may be held in place by a rubber strap and hook 134. A similar pair of auxiliary legs are provided for stage surface member 10, and auxiliary leg 130 is shown in Figure 7 in its extended position. The auxiliary legs are made of tubular members bent into a generally U shape, with the upper portion pivotally connected to the stage surface members as will be described, and with the lower portions flattened for ground or floor engagement when the stage is in its elevated position as shown in Figure 7. Figure 9 shows in enlarged fragmentary form, the upper portion of auxiliary leg 130 welded to an offset tab 136, which in turn is pivoted to the cross-reinforcing angle iron beneath the stage surface member by means of a pivot bolt 137. Similar offset tabs and pivots are provided for both uprights of each of the four auxiliary legs, and they permit the legs to be laterally folded to the storage position as shown in Figure 3, or extended as shown in Figure 7. In the extended position the sides of offset tabs 136 engage the flanges of the rein-

forcing angle irons to thus transfer the weight of the stage to the auxiliary legs.

Although the use of auxiliary legs of this type for height adjustment is disclosed in Patent Nos. 3,999,491 and 4,074,636, their use in conjunction with the improved base frame and caster structure of the present invention results in further improved operation. In the prior patents, a plurality of locating tabs are provided on the auxiliary legs to hold them in their vertical position in use. These tabs have been eliminated in the present invention by the use of properly designed caster beams. This is shown in Figure 10, which is generally similar to one end of Figure 6, except that it shows auxiliary legs 130 and 131 in their down position as in Figure 7. The width and positioning of caster beams are designed so that side portions of the caster beams abut the auxiliary legs to hold them in their fully extended vertical position. As seen in Figure 8, auxiliary leg 130 is positioned against the side of caster beam 60, and this prevents the leg from trying to fold up. At the same time, the leg cannot move further outward, i.e., in a direction away from caster beam 60, because of the engagement of the offset tabs 136 to the stage surface member reinforcing angle irons as described above with respect to Figure 9. The auxiliary support legs are therefore secured in their full vertical position, adding yet another degree of rigidity to the structure.

As taught in the above-mentioned patent, the auxiliary legs are brought into use position while the stage is still in its folded position. The auxiliary legs are first laterally folded to extend outwardly from the bottom side of the stage surface member, and the surface member is then lowered towards its horizontal position. Because the auxiliary legs are longer than the base frame of the stage, they engage the floor before the outer ends of the stage surface members are fully horizontal. As the outer end is brought fully horizontal, the stage is forced to pivot about the floor-engaging portion of the auxiliary support leg, which lifts the main support legs and the entire base frame off the ground to the position shown in Figure 7.

If it should happen that an auxiliary support leg is not quite fully extended before the stage surface is brought downward, the rounded shoulder of the caster beam in the preferred embodiment will help guide it in the proper place. Thus, for example, in Figure 8, if auxiliary leg 131 was not quite fully extended, it would engage caster beam 61, for example, at shoulder portion 140. Due to the rounded shape of the caster beam, as the stage surface member 11 is brought more toward the horizontal, the curved edge of the caster beam would guide and fully extend the auxiliary leg to the position shown in Figure 8. Of course, if the leg is initially too far out of position, this effect will not work, but that degree of misalignment should be apparent to the operator as he attempts to set up the stage. At any rate, the effect described above does provide a self-centering action for final alignment of the auxiliary legs. The same effect can be obtained by using other shapes for the caster beam. For example, a V-shaped or other member having an angled shoulder portion would also serve to center the auxiliary leg.

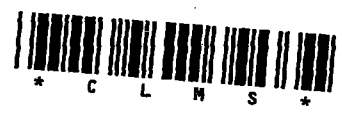
A further improvement involves the use of tabs 141-144 formed in the ends of beam carriers 55 and 58. As seen best in Figure 8, tabs 141 and 142 are abutted by auxiliary legs 130 and 131. The same situation is true with respect to tabs 143 and 144 for the other side of the stage, as shown in Figure 6. These tabs serve to provide rigidity between the auxiliary legs on the opposite stage halves, and they prevent an unwanted slight rocking or pivoting of the base frame structure which could otherwise occur and which would result in slight vertical misalignment of the adjacent inner edges of the stage surface members 10 and 11. For convenience of manufacture, beam carriers 56 and 57 also have tabs so that the same part can be used in any of the four positions, but the tabs for the inboard beam carriers are not used.

An alternate embodiment is shown in Figure 10, wherein there is a single pivot bolt 64 pivotally connecting the ends of both caster beams to the beam carriers 55 and 56. The ends of the caster beams are slightly different in this embodiment, and for this reason the beams have been indicated by

reference numerals 60' and 61'. Basically, the tubular section of the caster beams is flattened at their ends so that the two opposite beams can be positioned together for the same pivot bolt. This embodiment has
5 the advantage of requiring only a single pivot bolt, but has the disadvantage of requiring additional steps in flattening the ends.

The preferred embodiment mobile folding stage, described above with reference to the accompanying
10 drawings, has good rigidity in its base frame, smooth operation in the retraction and extension of the casters, an over center resistance force in the outer support legs for holding the stage surface members in their storage position and a self-centering and aligning
15 feature for positioning the auxiliary leg when the stage is in its elevated position.

Being without sliding sleeves, it avoids the problems of looseness of fit and excessive friction, and provides greatly improved stage alignment and caster
20 positioning.



CLAIMS

1. A mobile folding stage comprising:
- 5 (a) a pair of stage surface members each having an abutment edge and which, when horizontally positioned in the operable position with their abutment edges abutting each other, together define a stage surface;
- 10 (b) a base frame for supporting the stage surface members and comprising two pairs of main support legs each pair consisting of first and second legs which, when the stage is in use extend substantially transversely to the ground or floor, the legs of each pair being connected respectively to the stage surface members in the region of their abutment edges, and transverse stiffening members extending respectively between said first and second legs of each pair and connected to the lower end portion of each leg;
- 15 (c) means hingably mounting said pair of stage surface members to said base frame for pivotal movement of said members between a storage position in which said members are generally vertically positioned above the base frame with the surfaces adjacent each other, and said operable position;
- 20 (d) outer leg means connected to said stage surface members for supporting the outer ends thereof in said operable position;
- 25 (e) a plurality of laterally disposed caster beams each having a caster wheel mounted thereon;
- 30 (f) means pivotally connecting said caster beams to the transverse stiffening members for pivotal movement thereof to alternately bring said caster



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wheels into or out of engagement with the ground or floor; and

5 (g) actuation links connected to said caster beams and to said stage surface members for pivoting said caster beams to retract said casters when said stage is in its operable position so that the stage is supported by said main support legs, and for pivoting said caster beams to extend
10 said casters into ground or floor engagement when said stage surface members are pivoted to said storage position so that the stage is supported by the caster wheels to permit movement of the stage.

2. A mobile folding stage according to Claim 1,
15 wherein the transverse stiffening members together constitute a caster frame.

3. A stage according to claim 1 or claim 2, wherein the stage further includes auxiliary support legs longer than said main support legs and pivotally connected to the undersides of said stage surface members near the inner ends thereof for lateral movement between folded storage and unfolded use positions for elevational adjustment of stage height, and wherein said caster beams are positioned for lateral abutment with said auxiliary support legs to hold them in their unfolded use position.



4. A stage according to claim 3 wherein said caster beams have curved or angled end portions extending outwardly from the pivotally connected portions thereof, for engaging the auxiliary legs if partially unfolded and causing them to fully unfold to their use position as the stage surface members are pivoted to their operable position.

5. A stage according to claim 3/^{or 4} wherein said base frame includes abutment members positioned for longitudinal abutment with said auxiliary support legs when the stage is in its elevationally extended position so that the base frame is held in alignment thereby.

6. A stage according to ^{any of the preceding claims} wherein said outer leg means are pivoted to said stage surface members and include control links extending between and pivotally connected to said outer leg means and said main support legs for causing said outer leg means to fold toward the undersides of said stage surface members as they are pivoted to their storage positions, the outer leg means being manually movable to cause the pivotal connection of said control links to said outer leg means to move through an over center position with respect to the pivotal connection of the control links to the main support legs and the pivotal connection of the outer leg means to the stage surface members, to resiliently lock the outer leg means and stage surface member in its storage position.

7. A mobile folding stage comprising:
a pair of generally planar stage surface members;
two pairs of rectangularly spaced main support legs and means interconnecting pairs of said legs to form a base frame for said stage;
means for hingably mounting said pair of stage surface members to said base frame for pivotal movement of said members between an operable position in which the stage surface members are horizontally positioned with substantially abutting inner edges centered over said rectangular base frame to define a stage surface, and a storage position in which said stage

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surface members are generally vertically positioned above said base frame;

outer legs connected to said stage surface members for supporting the outer ends thereof in said operable position;

5 said base frame including a caster frame interconnecting said main support legs near the lower portions thereof;

four laterally disposed caster beams each having a caster wheel mounted adjacent one end thereof;

means pivotally connecting said caster beams adjacent their other ends to said caster frame adjacent said main support legs;

10 actuation links pivotally connected to said caster beams and to the underside of said stage surface members near the inner ends thereof for pivoting said caster beams
15 to retract the casters when the stage is in its operable position so that the stage is supported by said main support legs, and for pivoting said caster beams to extend said caster wheels into ground or floor engagement when
20 said stage surface members are pivoted to said storage position so that the stage is supported by the caster wheels to permit movement of the stage.

8. A stage according to claim 7 further including auxiliary support legs for elevational adjustment of the stage height, said auxiliary support legs being longer than said
25 main support legs and being pivotally mounted to the undersides of said stage surface members near the inner ends thereof for lateral movement between folded storage positions and unfolded use positions, and wherein said
30 caster beams are positioned on said caster frame for lateral abutment with said auxiliary support legs to secure them in their unfolded use position.

9. A stage according to claim 8 wherein said caster beams are U-shaped members with their open ends pivotally connected to said caster frame and said casters mounted to
35 their closed ends, the caster beams being positioned for lateral abutment of said auxiliary support legs against a side portion of said caster beam when the auxiliary support legs are in their unfolded use position, and for engagement of said



5 auxiliary support legs with shoulder portions of said caster beams if said auxiliary support legs are not fully unfolded when the stage surface members are pivoted to their horizontal position, whereby said shoulder portions will move said auxiliary support legs to ^{their} fully unfolded positions.

10 10. A stage according to claim 8 ^{or 9} /further including tab members positioned on said caster frame adjacent said caster beams for longitudinal abutment with said auxiliary support legs in their unfolded use position so that the base frame and inner edges of the stage surface members are held in alignment against rocking motions by the auxiliary support legs on opposite sides of the base frame.

15 11. A stage according to ^{any of Claims 7 to 10} / wherein said outer legs are pivotally connected to their respective stage surface members, and further including control links pivotally connected and extending between the outer legs and the main support legs for causing folding of the outer legs toward the undersides of the stage surface members as they are pivoted to
20 their storage positions, the outer legs being manually movable through the final portion of their travel toward the undersides of the stage surface members to cause the pivotal connection of the control links to the outer legs to move through an over center position with respect to the other pivotal connection of
25 the control links and the pivotal connection of the outer legs to the stage surface members, to thereby provide a resilient force to lock the outer legs and stage surface members in the storage position.

30 12. A stage according to claim 11 wherein tabs are provided on the outer legs projecting inwardly toward the base frame, and the control links are pivotally connected to the tabs, and wherein the control links are bent, to facilitate the over center resilient locking function of the outer legs.

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13. A mobile folding stage according to any of the preceding claims, substantially as described herein with reference to the accompanying drawings.
14. A mobile folding stage substantially as described herein and substantially as shown in the accompanying drawings.

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