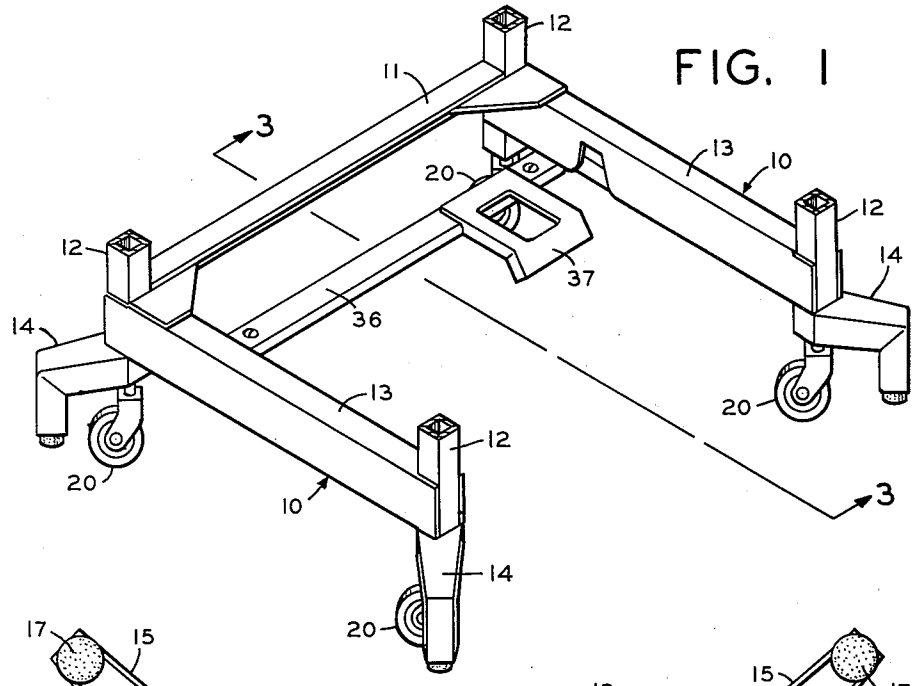
Sept. 18, 1962 W. SIMPKINS 3,054,623

STAND HAVING RETRACTABLE CASTERS

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FIG. 1



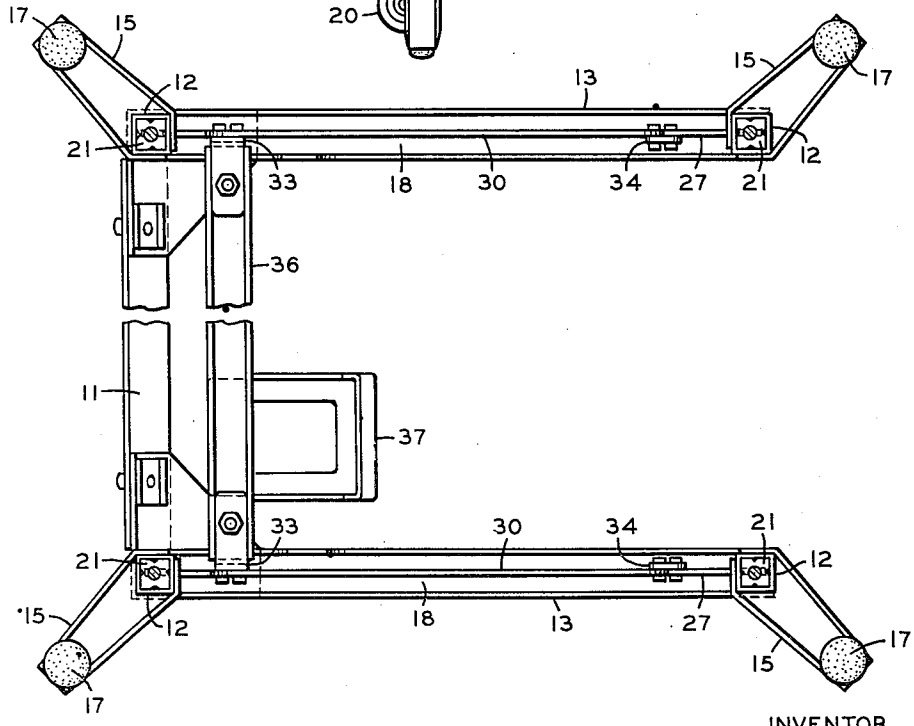


FIG. 2

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STAND HAVING RETRACTABLE CASTERS

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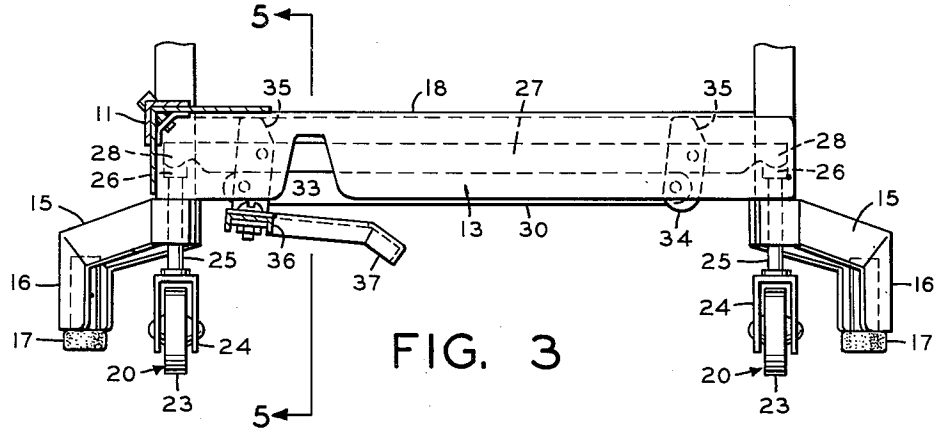


FIG. 3

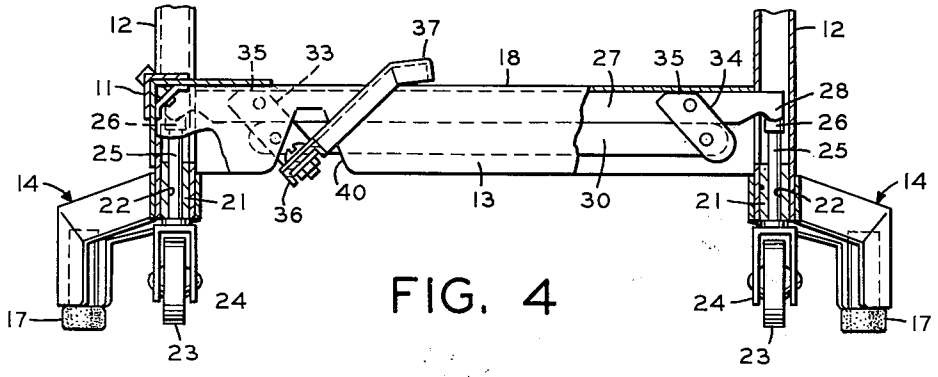


FIG. 4

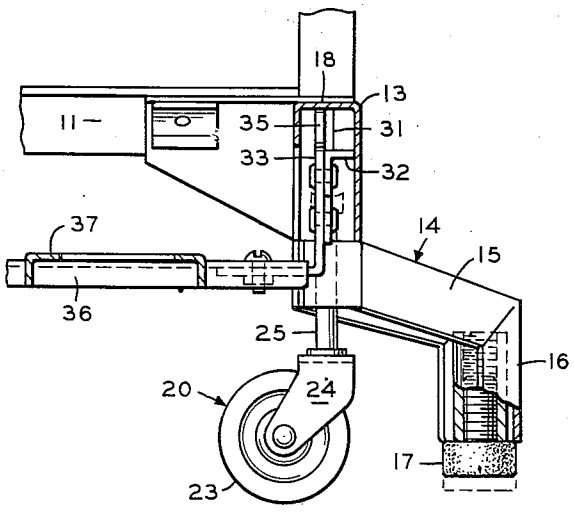


FIG. 5

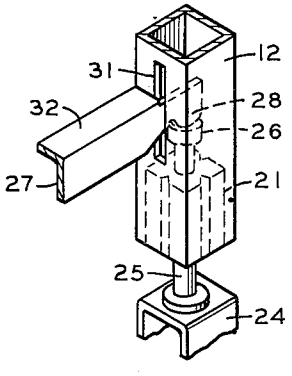


FIG. 6

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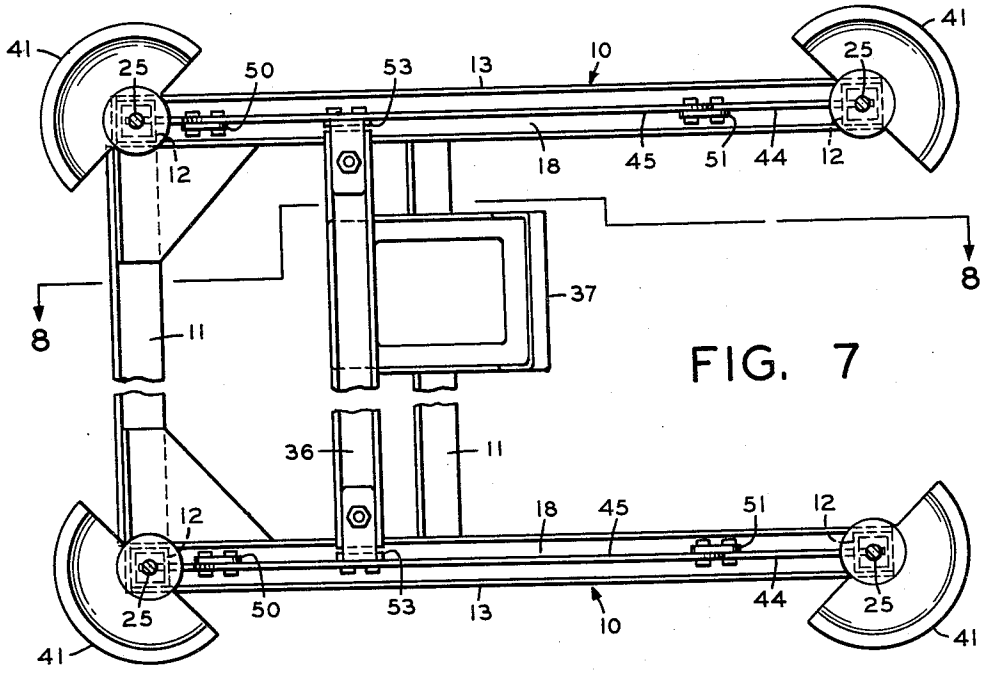


FIG. 7

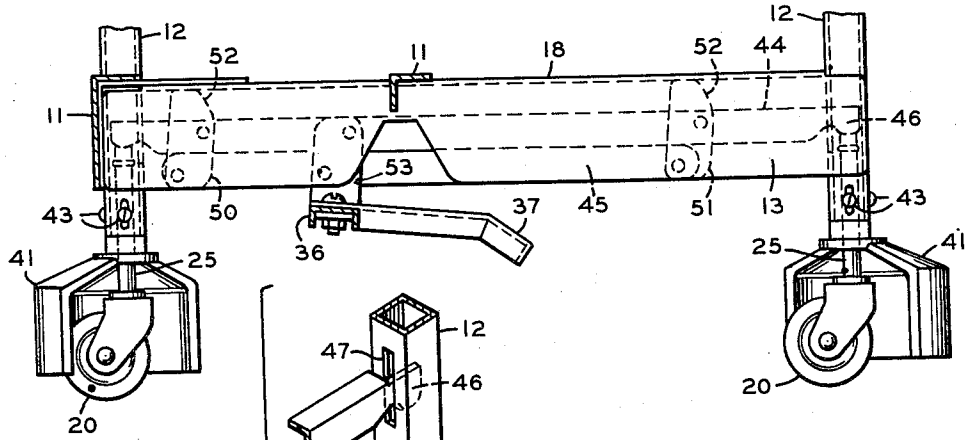


FIG. 8

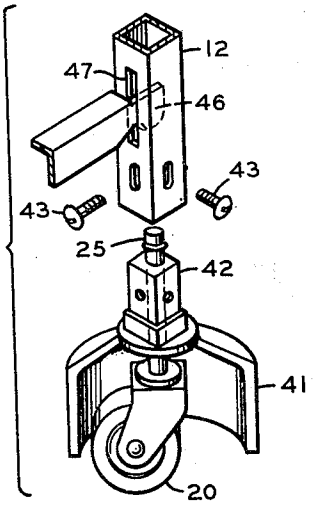


FIG. 9

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United States Patent Office 3,054,623 Patented Sept. 18, 1962

3,054,623
STAND HAVING RETRACTABLE CASTERS

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Filed Nov. 14, 1960, Ser. No. 68,864
10 Claims. (Cl. 280—43.14)

This invention relates generally to stands or tables, and more particularly relates to improvements in stands or tables having retractable casters.

It is an important object of the present invention to provide a stand or table of the type described which includes improved means for raising it onto and lowering it from its casters.

Another important object is achieved by the provision of improved means for selectively maintaining the mechanism in caster-projecting position.

Other important advantages are realized by the provision of a parallelogram structure and means for selectively camming such structures to different vertical positions relative to the end frames incident to raising a stand onto its casters and to lowering the stand from such casters.

Still another important objective is realized in providing a caster-actuating mechanism that is simple and durable in construction, efficient and positive in operation, economical to manufacture, and which can be readily operated by anyone without requiring any instruction.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment and a modification thereof, particularly when considered in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of the bottom portion of the stand;

FIG. 2 is a bottom plan view of the stand shown in FIG. 1;

FIG. 3 is an elevational view, partly in cross section, as seen along line 3—3 of FIG. 1;

FIG. 4 is an elevational view similar to that shown in FIG. 1, but showing the caster-actuating mechanism in a caster-raised position;

FIG. 5 is an enlarged, fragmentary view, partly in cross section, as seen along line 5—5 of FIG. 3;

FIG. 6 is a fragmentary perspective view illustrating the connection of one arm of the parallelogram arm structure with the tubular frame leg and its associated caster;

FIG. 7 is a bottom plan view of a stand showing a modification of the caster-actuating mechanism;

FIG. 8 is an elevational view of the modified structure as seen along line 8—8 of FIG. 7, and

FIG. 9 is an exploded, fragmentary perspective view showing the operative connection of one arm of the parallelogram arm structure with the tubular frame leg and its associated caster in this modification of FIGS. 7 and 8.

Referring now by characters of reference to the drawings, and first to FIG. 1, it will be apparent that the stand includes a pair of side frames generally indicated at 10 arranged in spaced vertical position and interconnected by a plurality of cross frame elements 11, one of which is illustrated in FIG. 1.

Each of the side frames 10 includes a pair of spaced tubular legs 12. The bottom of the spaced legs 12 are interconnected by an inverted U-shaped channel 13 including a cross piece 18.

In the embodiment disclosed in FIGS. 1–4 inclusive, a foot generally referred to at 14 is attached to the lower end of each tubular leg 12, the feet 14 being adapted to support the stand on any subjacent supporting surface

such as a floor. Each foot 14 includes an angular channel frame 15 having a vertical portion 16 adapted to threadedly receive a base element 17. As is best illustrated in FIG. 5, the base element 17 is threadedly adjustable to different height positions in order to compensate for any unevenness in the support floor and thereby maintain a firm, solid foundation. The feet 14 are laterally offset from the vertical, longitudinal axes of the tubular legs 12 to accommodate the provision of casters 20 carried by such legs.

Fixed in the bottom end of tubular leg 12 is a bearing block 21 through which is formed a vertical longitudinal bore 22. The caster 20 is of the usual construction consisting of a wheel 23 rotatively mounted and carried by a yoke 24. A stem 25 anchored to the top of yoke 24 is slidably mounted and received in the longitudinal bore 22 of bearing block 21. As is best seen in FIGS. 4 and 6, the upper end of caster stem 25 is provided with an enlarged head 26 having a downwardly concave upper surface.

When the stem 25 of the caster is fully retracted within the tubular leg as is illustrated in FIG. 4, the stand rests on the feet 14. On the other hand, when the casters 20 are fully extended as is illustrated in FIG. 3, the feet 14 are raised off of the floor and the stand is supported by such casters 20. The stand is then conditioned to be rolled on the casters 20 to any desired position.

A caster-actuating mechanism is carried within the inverted U-shaped channel 13 on each side frame 10. Because the mechanism within each of the cross pieces 13 is identical in construction and arrangement, a detailed description of one will suffice for the other. Corresponding elements of the caster-actuating mechanism on each side frame are given identical reference characters.

For example, within each of the inverted U-shaped channels 13, there is disposed a pair of parallel, vertically aligned, elongate arms 27 and 30. For reasons which will appear later, the uppermost arm 27 is longer than the lowermost arm 30. Formed in each tubular leg 12 is an elongate vertical slot 31 that communicates with the interior of the inverted U-shaped channel 13. The outermost ends of the upper arm 27 extend through the slots 31 and operatively engage the enlarged top heads 26 of the casters 20 associated with legs 12. More particularly, the outer ends of arm 27 are provided with a rounded formation 28 adapted to seat in the concave top surface of the stem head 26.

As will be apparent upon later description of parts, the engagement of the arm 27 with the vertical margins defining slots 31 constrain movement of the arms 27 and 30 to a vertical plane. To assist in constraining the arms 27 and 30 to vertical movement, the upper arm 27 is provided with a horizontal portion 32 that engages one side of the inverted U-shaped channel 13.

Pivotally interconnecting the arms 27 and 30 are a pair of spaced links 33 and 34. It will be readily realized that the arms 27 and 30 together with the links 33 and 34 form a parallelogram. The lengths of links 33 and 34 and the length of the lowermost arm 30 are selected so that the arms 27 and 30 can be moved from one closed parallelogram position illustrated in FIG. 4 in which arms 27 and 30 abut to another closed parallelogram position illustrated in FIG. 3 upon pivotal adjustment of the links 33 and 34.

The upper end of each link 33 and 34 projects above the uppermost arm 27 as the links 33 and 34 are moved from the closed parallelogram position of FIG. 4 to the other closed parallelogram position of FIG. 3. The upper end of each link 33 and 34 is provided with a cam portion 35 that engages the cross piece 18. Because the outer ends of arm 27 engage the enlarged stem head 26 of the casters 20, the casters 20 are lowered or extended rela-

tive to the side frame 10 below the feet 14. The links 33 and 34 engaging the cross piece 18 maintain the casters in such extended position under the weight of the stand because the pivotal connection of the links 33 and 34 with the lower arm 30 has shifted over-center relative to the pivotal connection of such links 33 and 34 with the upper arm 27. The links 33 and 34 are held in this position by abutment of arms 27 and 30.

Extending between and operatively interconnecting the link 33 of the caster-actuating mechanism at each side of the stand is a cross bar 36. A treadle 37 is fixed to the bar 36 and is adapted to be actuated by the operator to cause extension or retraction of the casters 20.

It is thought that the operation and functional advantanges of the caster-operating mechanism has become fully apparent from the foregoing detailed description of parts, but for completeness of disclosure, it will be assumed that the stand is resting on its feet 14 as is shown in FIG. 4 and that the casters 20 are fully retracted. Under these conditions, the arms 27 and 30 are located in abutment in one closed parallelogram position with the cam portions 35 of the links 33 and 34 located closely adjacent the top surface of the upper arm 27. When the casters 20 are retracted, the stem heads 26 hold the upper arm 27 closely adjacent the cross piece 18. In this position, the treadle 37 is raised. The inner wall of the U-shaped channel 13 is provided with a recess 40 adapted to receive the bar 36.

To raise the stand and thereby extend the casters 20 to support the stand, the operator depresses the treadle 37 from the position shown in FIG. 4 to the position shown in FIG. 3. As a result, the arms 27 and 30 are moved from the closed parallelogram position of FIG. 4 to the other closed parallelogram position of FIG. 3. At the same time the cam portions 35 of the links 33 and 34 engage the cross pieces 18 to cam the arms 27 and 30 downwardly away from the cross piece in a vertical plane. As the upper arm 27 of each parallelogram moves downwardly, the interconnection of such arm 27 with the stem heads 26 lower the casters 20 relative to the side frames 10 and extend such casters below the feet 14.

The weight of the stand is now supported on the casters and is transmitted through the interengagement of the stem heads 26 with the rounded end formations 28 of the arms 27, and thence transmitted from the links 33 and 34 to the cross pieces 18. As explained previously, the weight of the stand holds the arms 27 and 30 of each parallelogram in the closed parallelogram position illustrated in FIG. 3 because the pivotal connection of links 33 and 34 with the lower arm 30 is disposed at one side of a vertical plane passed through the pivotal connection of such links 33 and 34 with the upper arm 27.

After the stand has been transported by the casters 20 to the desired position, the stand can then be lowered and firmly anchored on the feet 14. To accomplish this result, the operator merely raises the treadle 37 from the position of FIG. 3 to the position of FIG. 4. The cam portions 35 of links 33 and 34 are moved downwardly toward the arm 27 of each parallelogram as the links 33 and 34 are angularly moved. Also, as the lower arm 30 is shifted to the other parallelogram position, the weight of the stand on the casters 20 causes the casters 20 to retract automatically within the tubular legs 12. The caster stem heads 26 shift the arms 27 and 30 vertically to a raised position within the U-shaped channel 13 closely adjacent the cross piece 18. The stand is now supported on feet 14.

The interconnecting bar 36 causes identical and simultaneous operation of the caster-actuating mechanisms carried by the side frames 10.

FIGS. 7–9 inclusive pertain to a slightly modified embodiment of the invention. The stand of this embodiment is constructed in a similar manner having side frames 10 that include spaced tubular legs 12 interconnected by an inverted U-shaped channel 13 having a top cross piece 18.

Attached to the lower end of each leg 12 is a foot 41 of different construction than foot 14 previously described. Particularly, each of the feet 41 includes an inverted cup structure that partially embraces and receives the casters 20. A bearing block 42 is fixed to the foot 41 and is adapted to be received within the lower end of tubular leg 2. The caster stem 25 is reciprocally received within a bore formed in the bearing block 42. The foot 41 and the bearing block 42 are attached to leg 12 by screws 43.

The caster-actuating mechanism located within each of the inverted U-shaped channels 13 includes a pair of elongate, parallel, vertically aligned arms 44 and 45 disposed in a substantially horizontal position. The outer ends 46 of the upper arm 44 extend through slots 47 formed in tubular leg 12 and seat on the top of the caster stems 25. A pair of links 50 and 51 are pivotally connected to the arms 44 and 45 to provide a parallelogram as is best seen in FIG. 8. The upper ends of these links 50 and 51 extend above the upper arm 44 when the arms 44 and 45 are located in abutment in the closed parallelogram position illustrated in FIG. 8. These upper ends of links 50 and 51 include cam portions 52 that engage the cross piece 18 of the inverted U-shaped channel 13. These links 50 and 51 operate in the same manner as links 33 and 34 in the previously described embodiment to cause a shifting of the vertical position of the arms 44 and 45 and to provide extension or retraction of casters 20.

However, in this embodiment a third link 53 pivotally interconnects the arms 44 and 45, the third link 53 being located between and parallel to the spaced links 50 and 51. This third link 53 is used to move the arms 44 and 45 and the links 50 and 51 from the closed parallelogram position shown in FIG. 8 in which the casters 20 are extended, to the other closed parallelogram position in which the casters 20 are retracted.

The bar 36 is attached to and extends between the third link 53 of the caster-actuating mechanisms carried by the spaced side frames 10. As is usual, a treadle 37 is fixed to the bar 36.

The operation and functional advantages of the caster-actuating mechanisms of FIGS. 7–8 are exactly the same as those previously described with respect to the embodiment disclosed in FIGS. 1–6 inclusive, the only exception being that the parallelogram positions of the arms 44 and 45 and links 50 and 51 are determined by pivotal movement of the third link 53.

Although the invention has been described by making detailed reference to a preferred embodiment and a modification thereof, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a stand of the character described, a frame having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece supported by said legs, a pair of parallel, vertically aligned arms extending between said legs, one of said arms being operatively connected to said casters, a pair of spaced links pivotally interconnecting said arms to provide a parallelogram, each of said links including a cam portion engaging said cross piece to move said arms away from said cross piece and to extend said casters as said arms are moved to one parallelogram position, said cam portions engaging said cross piece to move said arms towards the cross piece and to retract said casters as said arms are moved to another parallelogram position, and means operatively connected to said parallelogram and adapted to change the parallelogram position.

2. In a stand of the character described, a frame having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece supported

by said legs, a parallelogram including a pair of arms parallel to said cross piece and a pair of pivotally interconnected links, one of said arms being operatively connected to said casters, at least one of said links including a cam portion engaging said cross piece as the parallelogram is moved from closed position in which said arms abut to another closed position so as to shift the vertical position of said parallelogram and thereby extend or retract said casters, and means operatively connected to said parallelogram and adapted to change the parallelogram position.

3. In a stand of the character described, a frame having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece supported by said legs, a pair of vertically aligned arms extending between said legs, one of said arms being operatively connected to said casters, a pair of spaced links pivotally interconnecting said arms to provide a parallelogram, a bar pivotally connected to said arms, a treadle attached to said bar and adapted to pivot said bar relative to said arms to move said arms to different parallelogram positions, each of said links including a cam portion engaging said cross piece as said arms are moved pivotally to different parallelogram positions so as to shift the vertical position of said arms and thereby extend or retract said casters.

4. In a stand of the character described, a frame having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece supported by said legs, a pair of parallel, vertically aligned arms extending between said legs and located immediately below said cross piece, one of said arms being operatively connected to said casters, a pair of spaced links pivotally interconnecting said arms to provide a parallelogram, each of said links including a cam portion projecting above said arms to engage said cross piece to move said arms away from said cross piece and to extend said casters as said arms are moved to one parallelogram position, said cam portions engaging said cross piece to move said arms toward the said cross piece and to retract said casters as said arms are moved toward another parallelogram position, means engaging at least one of said arms to constrain said arm to vertical movement, and means operatively connected to said parallelogram and adapted to be actuated by the operator to change the parallelogram position.

5. In a stand of the character described, a frame having tubular legs provided with feet, casters reciprocally mounted in said legs for extension beyond said feet, an inverted U-shaped channel extending between and supported by said legs, a pair of parallel, vertically aligned arms located in said channel and extending between said legs, said legs being provided with an elongate slot communicating with said channel, one of said arms extending through said slot and operatively connected to said casters, a pair of spaced links pivotally interconnecting said arms to provide a parallelogram, each of said links including a cam portion extending above said arms to engage said channel to move said arms downwardly away from said cross piece and to extend said casters as said arms are moved to one parallelogram position, said slots constraining said arms to vertical movement, said cam portion engaging said channel to move said arms upwardly toward the said cross piece and to retract said casters as said arms are moved to another parallelogram position, a cross bar attached to one of said links adapted to be actuated to move said arms to the different parallelogram positions.

6. In a stand of the character described, a frame having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece supported by said legs, a pair of parallel, vertically aligned arms extending between said legs, one of said arms being operatively connected to said casters, a pair of spaced links pivotally interconnecting said arms to provide a parallelogram, a third link extending between and pivotally connected to said arms, said third link being disposed parallel to said other links, a bar attached to said third link and adapted to be actuated to move said arms to different parallelogram positions, at least one of said pair of spaced links including a cam portion engaging said cross piece as said arms are moved from one parallelogram position to another so as to shift the vertical position of said arms and thereby extend or retract said casters.

7. In a stand of the character described, a pair of end frames having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece mounted on said end frame between said legs, a pair of parallel, vertically aligned arms extending between the legs of each end frame, one of said arms being operatively connected to the casters of its associated end frame, a pair of spaced links pivotally interconnecting each said pair of arms to provide a parallelogram, a bar extending between and operatively interconnecting the pairs of arms of said end frames so as to move said pairs of arms to different parallelogram positions, at least one of said links of each parallelogram including a cam portion engaging one of said cross pieces to extend or retract said casters.

8. In a stand of the character described, a pair of end frames having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece mounted on each end frame between said legs, a pair of parallel, vertically aligned arms extending between the legs of each end frame immediately below said cross piece, one of said arms being operatively connected to the casters of its associated end frame, a pair of spaced links pivotally interconnecting each said pair of arms to provide a parallelogram, at least one of said links of each parallelogram including a cam portion extending above the arms to engage the cross piece so as to shift the vertical position of said arms and thereby extend or retract said casters as the arms are pivotally moved to different parallelogram positions, and a bar extending between and operatively interconnecting the pairs of arms of said end frames so as to move said pairs of arms to said different parallelogram positions.

9. In a stand of the character described, a pair of end frames having legs provided with feet, casters mounted on said legs for extension beyond said feet, a cross piece mounted on each end frame between said legs, a pair of parallel, vertically aligned arms extending between the legs of each end frame, one of said arms being operatively connected to the casters of its associated end frame, a pair of spaced links pivotally interconnecting each said pair of arms to provide a parallelogram, a third link extending between and pivotally connected to said arms, said third link being disposed parallel to said other links, and a bar extending between and operatively interconnecting the third links of the pairs of arms of said end frames so as to move said pairs of arms to different parallelogram positions, at least one of said pair of spaced links of each parallelogram including a cam portion engaging its associated cross piece to extend or retract said casters as said arm pairs are moved to different parallelogram positions.

10. In a stand of the character described, a pair of end frames having tubular legs provided with feet, casters reciprocally mounted on said legs for extension beyond said feet, and inverted U-shaped channel extending between and mounted on the legs of each end frame, a pair of parallel, vertically aligned arms extending between the legs of each end frame and disposed within said U-shaped channel, said tubular legs being provided with elongate vertical slots communicating with the interior of said channel, one of said arms having its ends extending through said slots and into said legs for operative connection with the casters, a pair of spaced links pivotally interconnecting each said pair of arms to provide a parallelogram, each of said pair of spaced links including a cam portion projecting above said arms into engagement

with said channel, said cam portions engaging said channel to move said arms downwardly away from said channel to extend said casters as said arms are moved to one closed parallelogram position in which said arms abut, and said cam portions engaging said channel to move said arms upwardly to retract said casters as said arms are moved to another closed parallelogram position in which said arms abut, said slots constraining the arms to vertical movement, a third link extending between and pivotally connected ot said arms, said third link being disposed parallel to said other links, and a bar extending between and operatively interconnecting the said third links of the two pair of arms of said end frames, said bar being adapted to move said two pair of arms to said different parallelogram positions.

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