

**A. B. CHRISTLE**  
**COLLAPSIBLE STAND**

Filed Feb. 6, 1958

2 Sheets-Sheet 1

**Fig. 1**

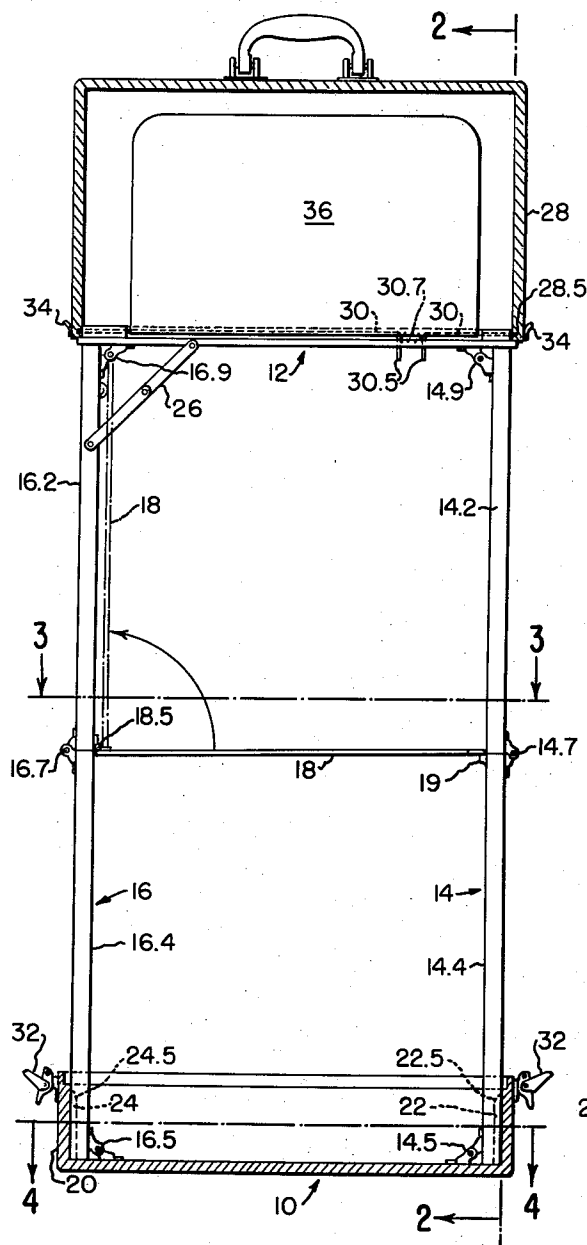
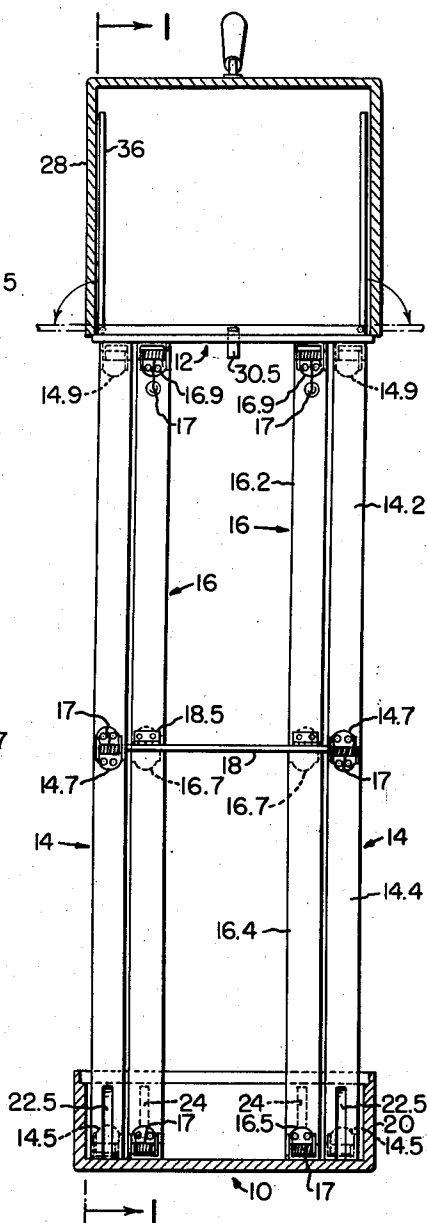


**Fig. 2**



INVENTOR.  
ARNOLD B. CHRISTLE

**BY**

*Romney, Jones, Walter & Kilbreth*  
ATTORNEYS

Jan. 3, 1961

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Fig. 3

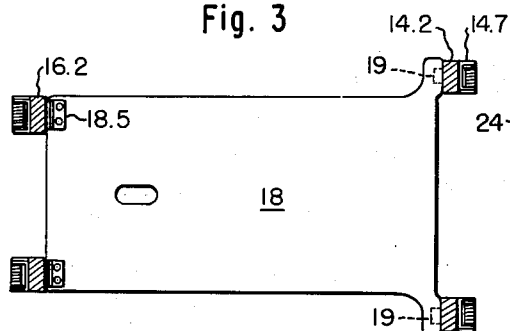


Fig. 4

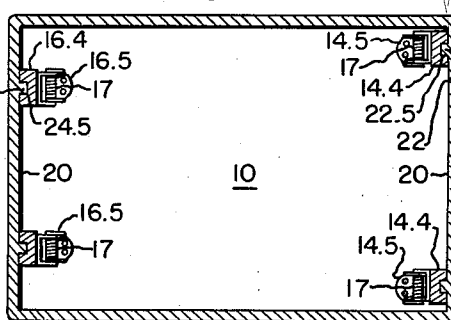


Fig. 5

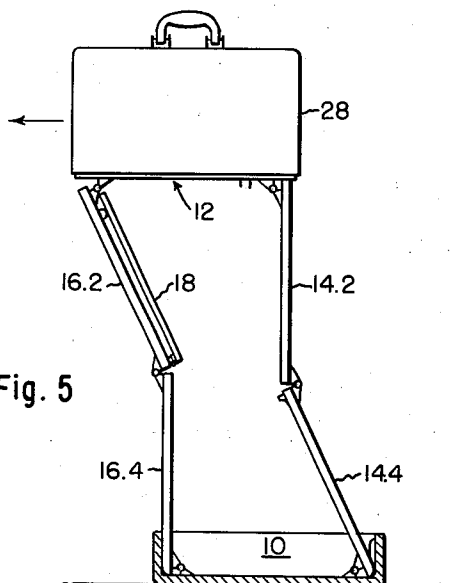


Fig. 6

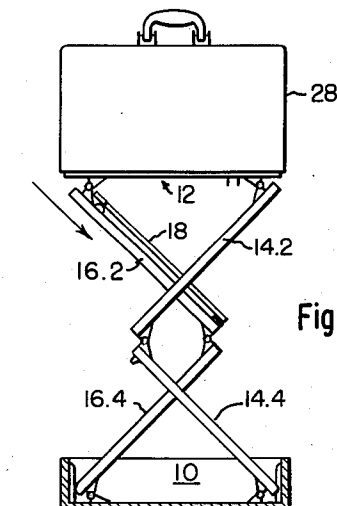
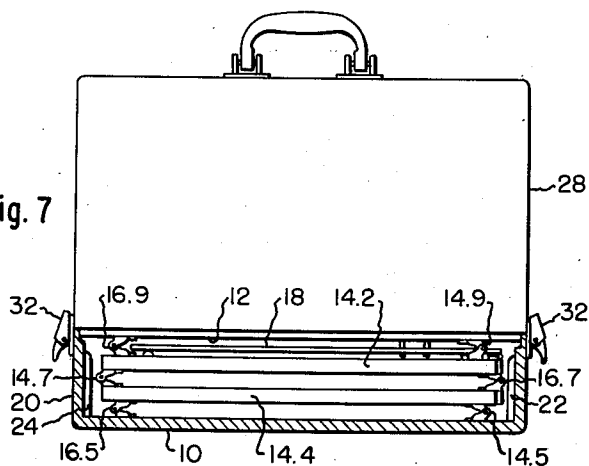


Fig. 7



INVENTOR.  
ARNOLD B. CHRISTLE

BY

*Kenway, Jennings, Witter & Hildreth*  
ATTORNEYS

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## COLLAPSIBLE STAND

Arnold B. Christle, Glezen Lane, Wayland, Mass.

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6 Claims. (Cl. 248—166)

This invention relates in general to a portable collapsible stand and provides a stand that may be collapsed into a compact, easily transported bundle which may be erected rapidly by a simple lifting of the stand to erect position. When erected the stand assumes a rigid posture such that it may be used as a sturdy support without danger of accidentally collapsing. This stand moreover requires no adjusting or fastening operations and may be erected or collapsed without tools of any sort.

The stand of this invention is admirably suited for use with many kinds of portable equipment and may be embodied in the construction of a case for the equipment. It may, for instance, be used as a stand and/or case for a typewriter, stenotyper, moving picture or slide projector, microscope, artist's kit, sewing machine, and many other types of equipment that it may be desired to move about, or it may be used simply as a compact portable stand without accessory equipment.

Numerous types of portable stands have heretofore been devised but in practically all cases they require time-consuming manipulations in being collapsed or erected, and they frequently lack the rigidity and load capacity that is needed for such equipment as a projector or typewriter. In general the stand of this invention consists of a base member which provides basic support for the stand, and a support member or platform which forms the upper supporting structure. The base member and support member are joined by folding legs which may be unfolded to an erect position at which the legs are rigid. Each leg is pivoted at its top and bottom respectively to the support member and to the base member, and is jointed at a mid section so as to fold upon itself to lie in a collapsed position between the base member and support member. Two of the legs function in unison and fold in the same general direction, and at least one additional leg is located generally opposite and aligned between the two legs to fold in the opposite direction so as to nest between the pair of legs. The two legs are designated herein as outer nesting legs and the additional leg or legs are designated as inner nesting legs.

An important feature of the invention is the provision of a spring at each of the three joints of each of the legs, each spring urging the legs to erect position so that at all times there is a spring tension at each of the joints. When the stand is being erected these springs assure proper coordination of the action of the several legs in unfolding to erect position, and when the stand is being collapsed these springs help to control and coordinate the folding of the legs. In the preferred embodiments of this invention there is also provided a movable rigid span extending between the outer nesting legs and the inner nesting legs which holds them spread in fixed spaced relation and thereby prevents them from accidentally collapsing inwardly. The rigid span is preferably pivoted to the inner nesting leg or legs at a point just above the mid joint so as to swing outwardly and downwardly into engagement with the opposite pair of outer nesting legs

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when the stand is erected. In this preferred arrangement the span will drop into position when the stand is unfolded to erect position, and may be easily folded upwardly when the stand is to be collapsed.

The stand is conveniently embodied in a carrying case in which the base member forms the lower portion of the case and takes the form of a flat tray onto which the support member rests when the stand is collapsed. A removable cover may be detachably secured to the support member, and to the base member when the stand is collapsed, to form the upper cover portion of the carrying case.

Numerous other features and the advantages of them are shown in the following detailed description of the preferred embodiment of this invention, wherein reference is made to the drawings in which:

Fig. 1 is a cross-sectional side elevation showing the preferred embodiment of this invention in erected position;

Fig. 2 is an elevational end view taken at section 2—2 of Fig. 1;

Fig. 3 is a plan view taken at section 3—3 of Fig. 1;

Fig. 4 is a plan view taken at 4—4 of Fig. 1;

Figs. 5 and 6 are side elevational views showing sequential steps in the collapsing of the stand of this invention; and

Fig. 7 is a side elevation partly in section showing the stand of this invention in its fully collapsed position.

The preferred embodiment of this invention is described with reference to a portable collapsible stand formed as part of a carrying case for equipment such as a slide projector or typewriter.

As shown in the drawings, the base member 10 of the carrying case, in the form of a flat tray, is joined to an upper supporting member 12 which serves as the platform or supporting surface for the encased equipment, and as a closing member for the base member 10 when the stand is collapsed. The support member 12 and base member 10 are joined by a pair of folding outer nesting legs 14 and an additional pair of opposed inner nesting legs 16, each of which legs is pivoted at its lower end to the base member 10 so as to fold from a position generally flat and parallel to the bottom of the base member to an erect position where the leg lies against the side portion 20 of the base 10 and where their lower ends abut against the bottom of the base member 10. At their upper ends, the legs are pivoted to the underside of the support member 12 in a manner such that they may be swung from a position generally parallel to the support member 12 to an extreme erect position where their upper ends abut the underside of the support member 12. At their mid portions the legs are jointed such that the outer nesting legs are separated into upper portions 14.2 and lower portions 14.4 and the inner nesting legs 16 are separated similarly into upper portions 16.2 and lower portions 16.4. In each case the ends of the upper portions 14.2 and 16.2 abut against the upper ends of the lower portions 14.4 and 16.4 when the legs are erect, and the pivots are positioned outwardly from the legs so that they may not be flexed beyond their erect position. The pivotal connections for the outer supporting legs 14 are provided by lower hinges 14.5 situated at the inner side of the legs 14, center hinges 14.7 situated at the outer side of the legs 14, and upper hinges 14.9 situated at the inner side of the legs 14. In a similar manner the pivotal connections for the inner nesting legs 16 are provided by lower hinges 16.5, center hinges 16.7, and upper hinges 16.9. Each of the hinges 14.5, 14.7, 14.9, 16.5, 16.7 and 16.9 includes a spring, designated generally as 17, which urges each joint to its erect position, and tends therefore to assist in erecting

the stand and in holding it in erect position. Most conveniently, commercially available spring hinges of well-known type are employed.

The collapsible stand may be locked in erect position by means of a spanning member 18 in the form of a panel hinged at one edge to the inner nesting legs 16, preferably at the lower portion of the upper legs section 16.2. As shown in Fig. 3, the spanning panel 18 is formed at its free edge with outward extensions which may be brought into engagement at their outer edges with the inner sides of the outer nesting legs 14. The panel 18 is conveniently held in spanning position by stop members 19 provided at the top ends of the lower leg portions 14.4. When the stand is to be collapsed, or when it is in folded position, the panel 18 may be swung up parallel to the upper portions of the inner nesting legs 16.2 so that the legs 14 and 16 may be folded inwardly toward each other, as suggested by the dotted lines in Fig. 1 and as shown in Fig. 7.

Where additional rigidity of the legs is desired the lower leg portions 14.4 and 16.4 may be keyed to the wall portions 20 of the base member 10 and for this purpose the wall portions may be formed with outwardly projecting keys 22 and 24 and the leg portions 14.4 and 16.4 are formed with complementary grooves 22.5 and 24.5 respectively.

The cover 28 of the case is fastened to the upper support member 12 by spring tensioned draw bolts 30 extending outwardly from opposite edges of the support member 12 and received within openings 28.5 formed at the edges of the cover. The bolts 30 terminate in closely spaced depending finger grips 30.5, with a spring 30.7 located between them to urge them outwardly. The finger grips 30.5 may accordingly be pressed together to release the cover from the upper support member 12.

When the stand is in collapsed position, the cover 28 and base member 10 are held together by means of conventional claw fasteners 32 fastened to the base member 10 to engage catches 34 fastened to the lower outer portions of the cover 28.

Additional features which are considered as being more or less optional include upwardly folding leaves 36 hinged to the edges of the support member 12 to provide additional supporting space. The leaves 36 are arranged to allow them to be folded upwardly so that the cover 28 may be lowered over them.

A folding brace 26 extending diagonally from one of the legs to the support panel 12 may also be provided if desired to add rigidity to the stand. Such a brace is particularly desirable in embodiments in which the spanning panel 18 is omitted, and serves to hold the legs in erect position.

From the foregoing it will be seen that this invention provides a sturdy dependable stand which may be folded into a compact, easily transported case. In erecting the stand the only operations required are the unfastening of the fasteners 32, whereupon the upper portion, including the cover 28 and upper supporting member 12, may be lifted to erect position. The legs 14 and 16 which were compactly folded and nested in the space between base member 10 and support member 12 unfold upwardly with the raising of the support member 10 and under the force of the springs 17 at each one of the folding joints. When fully erected the spanning panel 18 will ordinarily drop into place to lock the legs in erect posture. If such a panel is not provided a brace such as that at 26 may be pressed to locked position. When erected the cover 28 may be removed by pressing the finger grips 30.5 together to release the clips 30, and lifting the cover 28 from the support member 12.

In collapsing the stand only a simple manipulation is required, as shown sequentially in Figs. 5 and 6. After the panel 18 has been swung upwardly against the upper portions 16.2 of the inner nesting legs 16, the support member 12, with the cover 28 attached, may be shifted

horizontally sideways, as shown by Fig. 5. Such motion will cause an initial inward folding of the upper portions (shown as 16.2) of the legs at the side in the direction of the shift and of the lower portions (shown as 14.4) of the legs at the side opposite the direction of the shift. Thereupon a diagonally downward motion of the support member in the general direction parallel to the folded portions of the legs, will cause the unfolded portions of the legs to fold inwardly, and continued downward motion will collapse the legs to nest together on the base member 10. When completely collapsed the support member 12 is received by the upper edges of the wall portions 20 of the base member 10, and the fasteners 32 may be secured to the cover 28.

In both the erecting and collapsing operations it will be seen that the cover serves as a member by which the manipulations of raising and lowering the stand may be facilitated. During these operations the coordination of the folding of the several legs is assured by the tension of the springs 17 at each of the three joints of each of the legs. Every joint involved in erecting or collapsing the stand is thereby subjected to equal tension which in each case tends to urge the stand to its erected position.

Although this invention has been described with specific reference to the presently preferred embodiment, it is contemplated that modifications will occur to those skilled in the art and that such may be made without departing from the scope of this invention.

Having thus disclosed my invention I claim and desire to secure by Letters Patent:

1. An erectable stand comprising in combination a base member, an upper support member, an outer nesting pair of erectly rigid spaced foldable legs joining said base member and said support member, an inner nesting erectly rigid foldable leg opposite said pair of legs joining said base member and support member, means pivotally joining each of said legs at its top to said support member, means pivotally joining each of said legs at its bottom to said base member and means pivotally joining each of said legs together at a midpoint, said means being adapted to permit each of said legs to be folded upon itself to lie in a collapsed position between said base member and said support member, said outer pair of nesting legs being foldable in the same general direction and said inner nesting leg being foldable in the opposite direction so as to nest between said outer nesting pair of legs, and spring means at each of the three pivoted junctures of each of said legs, each spring means urging the leg to erect position.

2. An erectable encased stand comprising in combination a base member having a bottom and opposed wall portions, an upper support member of length to span the distance between said wall portions, an outer nesting pair of erectly rigid spaced foldable legs joining said base member and said support member, an inner nesting erectly rigid foldable leg opposite said pair of legs joining said base member and said support member, means pivotally joining said outer nesting pair of legs at their bottoms to said base member adjacent to one of said wall portions, means pivotally joining said inner nesting leg to said base member adjacent to the other of said wall portions, means pivotally joining each of said legs at its top to said support member, and means pivotally joining each of said legs at a mid point, said means being adapted to permit each of said legs to be folded upon itself to lie in a collapsed position between said base member and said support member with said support member received on said wall portions, said outer nesting pair of legs being foldable in the same general direction and said inner nesting leg being foldable in the opposite direction so as to nest between said pair of legs, and spring means at each of the three pivoted junctures of each of said legs, each spring means urging said legs to erect position, and a cover detachably secured over said support member providing and including a handle for manipulating

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the support member when the stand is raised or lowered.

3. An erectable stand comprising in combination a base member, an upper support member, an outer nesting pair of erectly rigid spaced foldable legs joining said base member and said support member, an inner nesting pair of erectly rigid foldable legs opposite said outer nesting pair of legs joining said base member and support member, means pivotally joining each of said legs at its bottom to said base member, means pivotally joining each of said legs at its top to said support member, and means pivotally joining each of said legs together at a mid point, said means being adapted to permit each of said legs to be folded upon itself to lie in a collapsed position between said base member and said supporting member, said outer pair of nesting legs being foldable in the same general direction and said inner pair of nesting legs being foldable in the opposite direction so as to nest between said outer nesting pair of legs, and spring means at each of the three pivoted junctures of each of said legs, each spring means urging the leg to erect position.

4. An erectable stand comprising in combination a base member, an upper support member, an outer nesting pair of erectly rigid spaced foldable legs joining said base member and said support member, an inner nesting pair of erectly rigid foldable legs opposite said outer nesting pair of legs joining said base member and support member, means pivotally joining each of said legs at its bottom to said base member, means pivotally joining each of said legs at its top to said support member, and means pivotally joining each of said legs together at a mid point, said means being adapted to permit each of said legs to be folded upon itself to lie in a collapsed position between said base member and said support member, said outer pair of nesting legs being foldable in the same general direction and said inner pair of nesting legs being foldable in the opposite direction so as to nest between said outer nesting pair of legs, spring means at each of the three pivoted junctures of each of said legs, each spring means urging said legs to erect position, and means pivoted to said inner nesting pair of legs spanning the distance between said inner nesting pair of legs and said outer nesting pair of legs adapted to hold said legs rigidly in erect position.

5. An erectable encased stand comprising in combination a base member having a bottom and opposed wall portions, an upper support member of length to span the distance between said wall portions, an outer nesting pair of erectly rigid spaced foldable legs joining said base member and said support member, an inner nesting pair of erectly rigid foldable legs opposite said outer nesting pair of legs and joining said base member and said support member, means pivotally joining said outer nesting pair of legs at their bottoms to said base member adjacent to one of said wall portions, means pivotally joining said inner nesting pair of legs to said base member adjacent to the other of said wall portions, means pivotally joining each of said legs at its top to said support member, and means pivotally joining each of said legs at a mid point,

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said means being adapted to permit each of said legs to be folded upon itself to lie in a collapsed position between said base member and said support member with said support member received on said wall portions, said outer nesting pair of legs being foldable in the same general direction and said inner nesting pair of legs being foldable in the opposite direction so as to nest between said pair of legs, and spring means at each of the three pivoted junctures of each of said legs, each spring means urging said legs to erect position, and a cover detachably secured over said support member providing and including a handle for manipulating the support member when the stand is raised or lowered.

6. An erectable encased stand comprising in combination a base member having a bottom and opposed wall portions, an upper support member of length to span the distance between said wall portions, an outer nesting pair of erectly rigid spaced foldable legs joining said base member and said support member, an inner nesting pair of erectly rigid foldable legs opposite said outer nesting pair of legs and joining said base member and said support member, means pivotally joining said outer nesting pair of legs at their bottoms to said base member adjacent to one of said wall portions, means pivotally joining said inner nesting pair of legs to said base member adjacent to the other of said wall portions, means pivotally joining each of said legs at its top to said support member, and means pivotally joining each of said legs at a mid point, said means being adapted to permit each of said legs to be folded upon itself to lie in a collapsed position between said base member and said support member with said support member received on said wall portions, said outer nesting pair of legs being foldable in the same general direction and said inner nesting pair of legs being foldable in the opposite direction so as to nest between said pair of legs, and spring means at each of the three pivoted junctures of each of said legs, each spring means urging said legs to erect position, means pivoted to said inner nesting legs spanning the distance between said inner nesting legs and said outer nesting legs adapted to hold said legs rigidly in erect position, and a cover detachably secured over said support member including a handle for manipulating the support member when the stand is raised or lowered.

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