Sept. 2, 1941. T. ELIAS 2,254,939

COLLAPSIBLE STRUCTURE

Filed Dec. 3, 1940 3 Sheets-Sheet 1

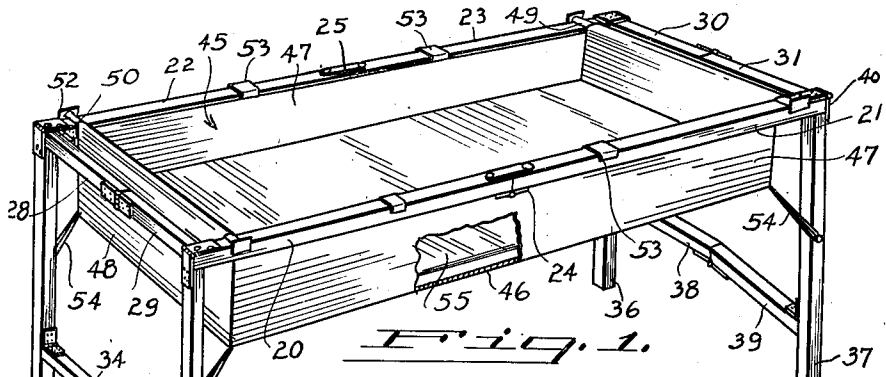


Fig. 1.

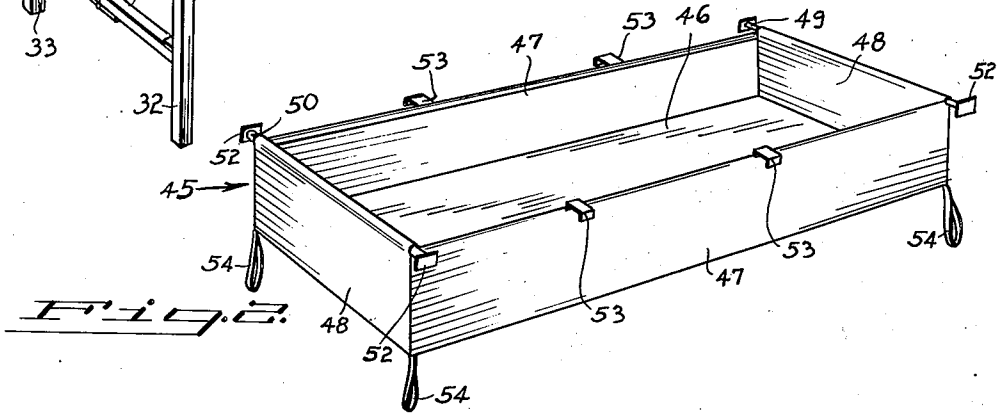


Fig. 2.

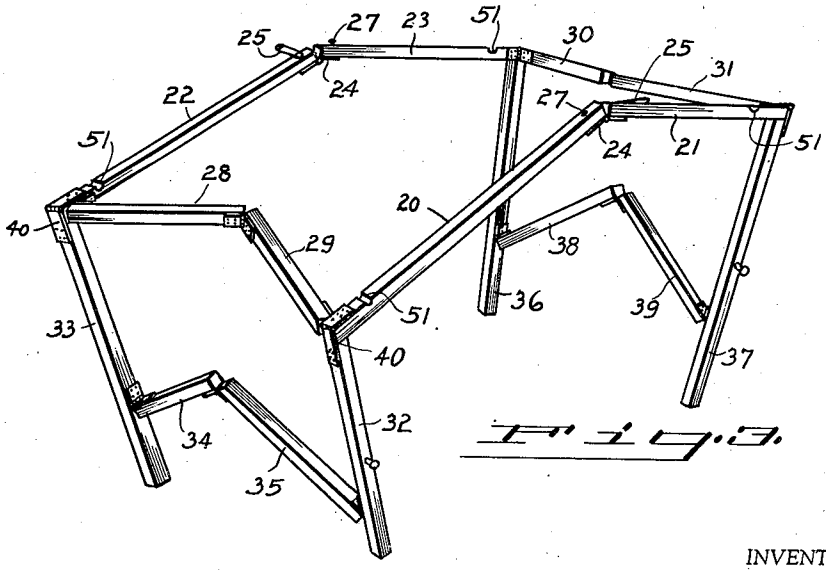


Fig. 3.

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COLLAPSIBLE STRUCTURE

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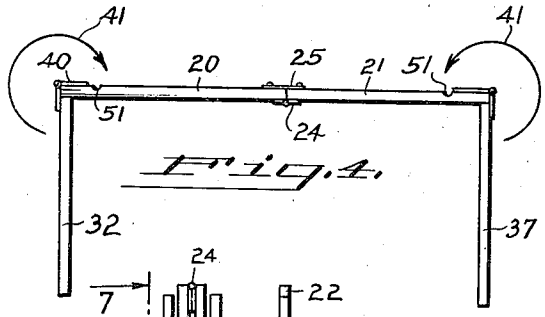


Fig. 4.

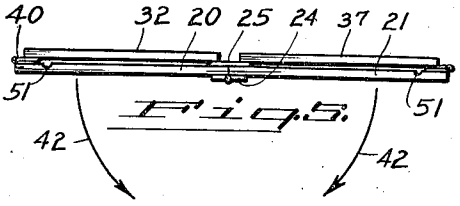


Fig. 5.

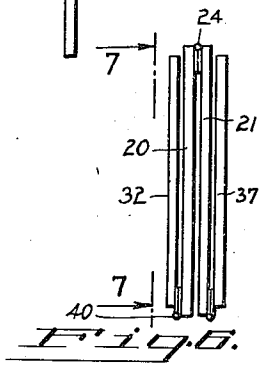


Fig. 6.

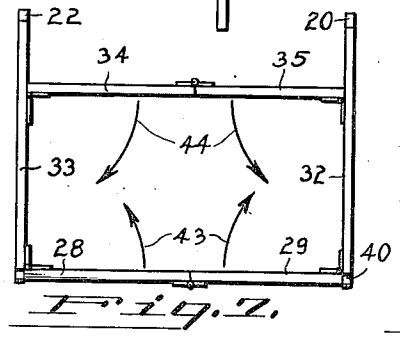


Fig. 7.

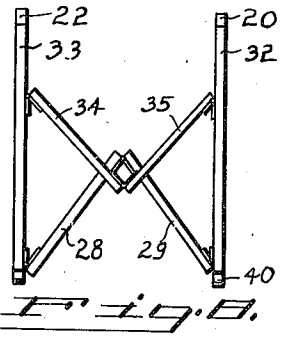


Fig. 8.

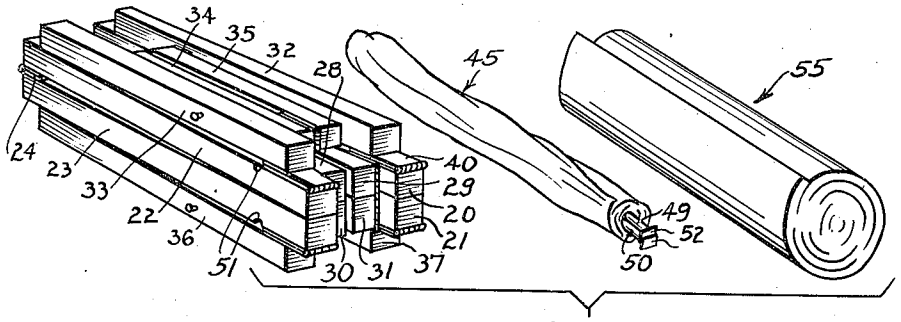


Fig. 9.

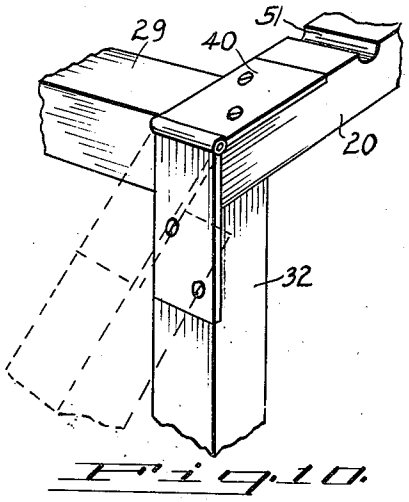


Fig. 10.

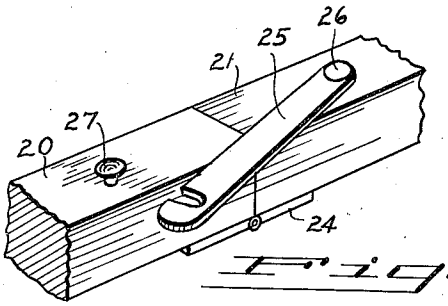


Fig. 11.

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COLLAPSIBLE STRUCTURE

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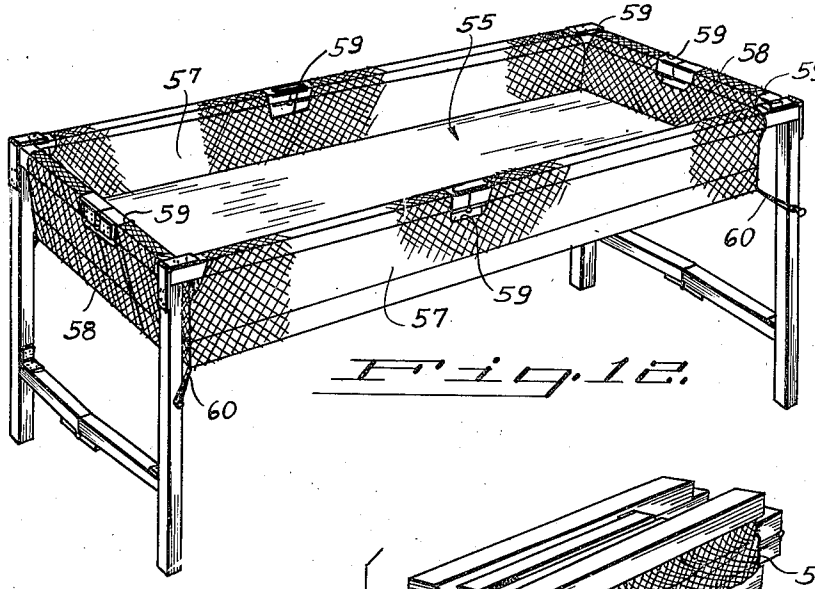


Fig. 12.

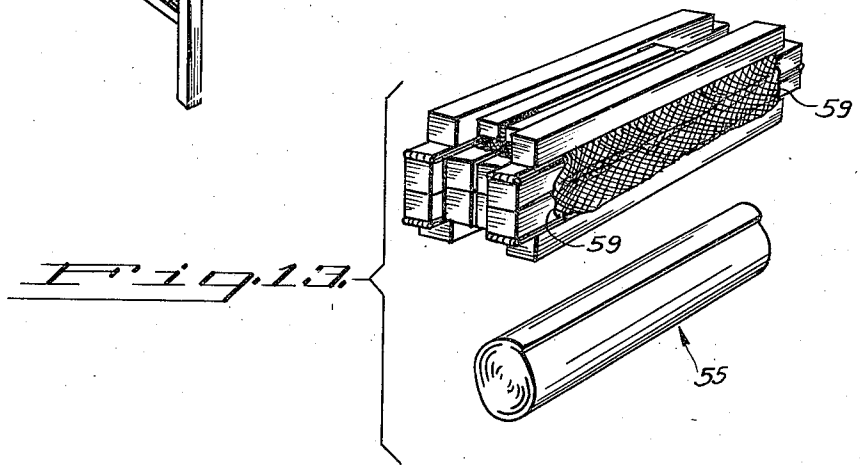


Fig. 13.

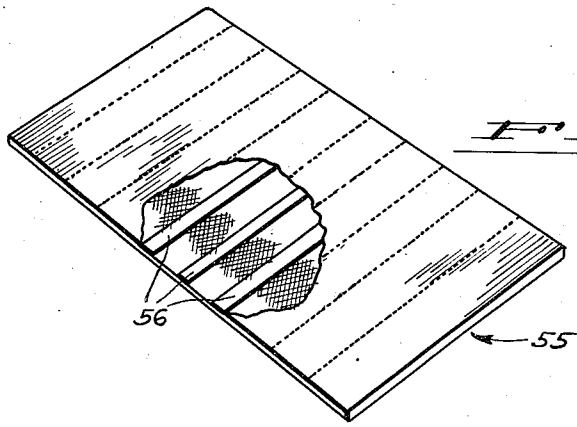


Fig. 14.

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Patented Sept. 2, 1941

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UNITED STATES PATENT OFFICE

2,254,939

COLLAPSIBLE STRUCTURE

Thias Elias, New York, N. Y.

Application December 3, 1940, Serial No. 368,277

1 Claim. (Cl. 5—99)

My present invention relates generally to collapsible furniture and has particular reference to a portable device primarily intended for use as a child's bed or crib.

A general object of the invention is to provide a device that is simple and inexpensive, easy to set up for use and to disassemble or collapse when its usefulness has ended, and intended to be not only of general household use, but of particular value to persons who may have occasion to travel with children.

A more particular object of the invention is to provide a device which is so constructed that it may be collapsed into a relatively small amount of space to form a bundle or hundles of compactness and of light weight.

The present device consists essentially of a collapsible supporting structure, and an element in the nature of a hammock intended to be supported thereby. The supporting structure is of such a character that, when set up, it is adapted to define a substantially rectangular frame and legs upholding it in a horizontal plane. The hammock may be permanently associated with this supporting structure, or it may be removably applicable to it. Preferably, a mattress is provided, either in permanent or separable association with the hammock.

It is a particular feature of my invention to construct the supporting framework in such a manner that it may be conveniently collapsed into a compact bundle of substantially parallel elements, and may be adjusted into or out of its set up condition without requiring any special skill on the part of the user.

I achieve the foregoing objects, and such other objects as may hereinafter appear or be pointed out, in the manner illustratively exemplified in the accompanying drawings, in which:

Figure 1 is a perspective view of a collapsible device of the present character shown in set up condition;

Figure 2 is a perspective view of the hammock element by itself;

Figure 3 is a perspective view of the supporting structure by itself, with the parts arbitrarily adjusted to illustrate the manner in which they are jointed;

Figure 4 is a side view of the supporting structure in set up condition;

Figure 5 is a similar view showing the first step in the collapsing process;

Figure 6 is a view similar to Figure 5, showing a further step in the collapsing process;

Figure 7 is an end view along the direction 7—7 of Figure 6;

Figure 8 is a view similar to Figure 7 showing the final step in the collapsing process;

Figure 9 is a perspective view of the various elements of the device shown in completely collapsed condition;

Figure 10 is an enlarged fragmentary perspective view of a corner of the supporting structure;

Figure 11 is a fragmentary perspective view of another detail of construction;

Figure 12 is a perspective view of a modified device shown in set up condition;

Figure 13 is a perspective view of the elements of Figure 12 shown in completely collapsed conditions; and

Figure 14 is a perspective view of a preferred type of mattress, with a part broken away to reveal the interior.

The supporting framework of the present device consists essentially of a rectangular main frame and end structures for supporting the frame in an elevated horizontal plane when the device is set up. The main frame consists of side rails and end rails, and in the preferred construction herein illustrated, each end structure consists of two legs and a cross brace. Each of the side rails, the end rails, and the cross braces is formed of hinged sections adapted to be doubled upon themselves.

In the present drawings I have illustrated a construction composed essentially of wooden elements, but it will be understood that the parts may be formed of metal or other adequately strong material, if desired. The two sections 20 and 21 of one of the side rails are hinged to each other so as to converge upwardly when the rail is collapsed. The same is true of the two sections 22 and 23 of the other side rail. This result may be achieved by arranging the hinges 24 on the undersides of these rail sections.

When the device is set up, the adjacent squared ends of the hinged sections are brought into abutment, as shown most clearly in Figure 11, whereby the sections 20 and 21 conjointly define one elongated side rail, while the sections 22 and 23 cooperate in a similar manner to form the other side rail of the supporting frame. To aid in holding these rails in set up condition, each rail may be provided with a hook 25, or similar device, pivoted to one of the sections, as at 26, for separable engagement with a complementary pin 27 carried by the other section.

One of the end rails is formed of the sections

28 and 29. These sections are hinged to each other and to the side rails so as to converge inwardly when the end rail is collapsed. The term "inwardly," as used in connection with the end rail, is intended to signify that the convergence of the sections 28 and 29 is toward the opposite end rail when the device is in set up condition.

The sections 30 and 31 of the opposite end rail are hinged to each other and to the side rails in a similar manner.

Hingedly connected to this rectangular main frame are end structures for supporting the frame in an elevated horizontal plane when the device is set up. One of these end structures consists of the legs 32 and 33, and a cross brace composed of the two hinged sections 34 and 35. The sections 34 and 35 are hinged to each other and to the legs so as to swing upwardly when the brace is collapsed. This is indicated most clearly in Figure 3.

The opposite end structure consists of the similar legs 36 and 37, and the similar cross brace formed of the hinged sections 38 and 39.

Each end structure is hinged to the rectangular main frame so as to allow the end structures to be swung outwardly and upwardly into positions overlying the main frame. This is preferably accomplished in the manner shown most clearly in Figure 10, in which I have shown, upon an enlarged scale, the relationship of the leg 32 to the side rail section 20. It will be observed that a hinge 40 is so associated with these parts that, when the device is set up, the upper squared end of the leg 32 lies directly beneath the end of the side rail section 20, the hinge nevertheless allowing the leg 32 to swing outwardly and upwardly, as indicated in dot-and-dash lines, until ultimately the leg 32 can be brought into a position lying directly above and parallel to the section 20.

The other legs of the structure are similarly hinged to the respective side rail sections.

It will be understood that the structure is not intended at any time to assume the oddly-adjusted position shown in Figure 3. The various parts have been shown in partially collapsed conditions, in this figure, merely to depict the manner in which they are hinged to one another. The procedure that is followed in practice, when the device is collapsed, is shown most clearly in Figures 4–9.

In Figure 4, the supporting structure is shown in set up condition. The first step in the process of collapsing the device is to swing the end structures outwardly and upwardly in the direction of the arrows 41. This brings the parts into the relationship shown in Figure 5. The hooks 25, if any, are then released, and the side rails are then doubled upon themselves by adjusting the parts in the direction of the arrows 42. This brings the parts into the relationship shown in Figures 6 and 7. The final step is to collapse the end rails along the directions indicated by the arrows 43, and to collapse the cross braces along the directions indicated by the arrows 44. During this procedure, the parts are passed through the relationship shown in Figure 8 and finally brought into the compact relationship shown in Figure 9. When completely collapsed, as indicated in Figure 9, the various hinged sections, and the legs, form a compact bundle of substantially parallel elements.

When the device is to be set up, the foregoing procedure is carried out in reverse order.

Referring now to Figures 1 and 2, it will be observed that I have shown an element 45 which is of substantially rectangular contour and of such a size that it may be accommodiated, as shown in Figure 1, within the confines of the rectangular main frame of the supporting structure. I have chosen to designate this element as a "hammock," in lieu of a better descriptive term. It may be composed of any suitable non-rigid material, such as fabric, netting, or the like, and it comprises a bottom wall 46, side walls 47, and end walls 48.

This element is shown by itself in Figure 2 and is intended to be suspended from the side rails of the supporting structure. I have illustratively shown rigid transverse bars 49 and 50 carried by the upper edges of the end walls 48 of the hammock. Each of these bars is adapted to extend transversely across the supporting frame, with its ends on the side rails of the frame. To facilitate this association of parts, the upper surfaces of the side rails are preferably provided with notches 51 (see Figures 3 and 10), and the ends of the bars 49 and 50 are preferably provided with enlargements 52. The bars are intended to find support within the notches 51, and the enlarged end portions 52 prevent the bars from slipping off the side rails, after they have been properly positioned.

As an auxiliary means for supporting the hammock, I have shown the possibility of providing rigid hooks 53 along the upper longitudinal edges of the hammock. These hooks are adapted to engage over the side rails, as shown most clearly in Figure 1, and may be of any convenient nature or shape, the ones shown being merely illustrative of a large variety of auxiliary supports that could be used for the purpose.

One of the features of the present construction lies in the provision of releasable stabilizing elements extending between the hammock and the end structures of the supporting frame. In the embodiment herein illustrated, these stabilizing elements take the form of tie elements 54 carried by the hammock 45 at its lower corners. When the parts are assembled, as shown in Figure 1, these tie elements are caused to engage with the adjacent legs of the supporting structure. This may be accomplished by providing suitable pins on the legs, and making the elements 54 in the form of loops to engage over these pins, although it will be understood that this is merely illustrative of various ways in which the desired result could be accomplished.

The stabilizing elements 54 serve not only to anchor the lower corners of the hammock, but also hold the legs against inadvertent outward movement. Since it is this outward movement that is relied upon for the collapsing procedure, the elements 54 thus serve to prevent inadvertent collapse of the device.

The hammock is preferably provided with a rectangular mattress 55 that is of such a size that it fits snugly over the bottom wall 46 of the hammock. This mattress may be of any suitable kind or construction, and may be permanently associated with the hammock, or may be an entirely separate element.

I prefer to construct the mattress separately, and I have found it of particular advantage to use a mattress in which there are a series of spaced transverse rigid elements or slats 56, as shown most clearly in Figure 14. A mattress that is constructed in this way is transversely rigidified, and thereby serves to lend additional support and rigidity to the hammock and to the device as a whole. The mattress may neverthe-

less be rolled up into a compact bundle, as shown in Figures 9 and 13.

In Figures 1–9, I have shown the hammock formed as a separate element. When the device is disassembled and collapsed, this separate element is adapted to be rolled into a compact bundle, as shown in Figure 9.

In Figures 12 and 13 I have shown a modified construction in which the hammock element is permanently associated with the supporting structure. The hammock is in this case composed of relatively thin material, preferably openwork netting or the like. It has side walls **57**, end walls **58**, and a bottom wall which does not show in Figure 12 because I have illustratively shown the device provided with a mattress. Since this mattress is a separate element, it may be the same mattress as that which is shown in the other figures of the present device. The use of a mattress is of particular advantage in this construction, especially where the mattress is of rigidified character, as shown in Figure 14, because it lends strength and relative rigidity to the hammock element.

The hammock of Figure 12 is permanently associated with the supporting structure by having the upper portions of the walls **57** and **58** formed as tubes within which the side rail sections and the end rail sections are accommodated. These tubular portions of the hammock are interrupted, however, at the hinge regions **59**, so that the collapse of the supporting structure, as hereinbefore described in connection with Figures 4–9, will not be interfered with.

Releasable stabilizing elements, such as the ties **60**, are provided on the hammock of Figure 12, to function in the same manner as the elements **54** hereinbefore described.

The utility of the present device will be obvious from the foregoing description. It is believed to be of particular utility to persons traveling with a child. Accommodations for a child, at low expense, are not always available. This difficulty can be obviated by means of the present device. In its collapsed condition, as indicated in Figures 9 and 13, the device can be feasibly transported, either as a separate bundle, or packed into a trunk or suitcase along with clothing and other traveling accessories. Whenever the child is to be put to bed, it is a relatively simple matter to adjust and assemble the various parts into set up condition as shown in Figures 1 and 12, and a safe, comfortable, and convenient bed or crib is immediately available for the child.

It is contemplated that the device will also be useful to those who may receive a child visitor from time to time, and wish to have available a sleeping accommodation that can be collapsed and conveniently set aside during idle periods.

In general, it will be understood that those skilled in the art may make changes in the details herein described and illustrated without departing from the spirit and scope of the invention as expressed in the appended claim. It is, therefore, intended that these details be interpreted as illustrative, and not in a limiting sense.

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

In a collapsible device of the character described, a rectangular main frame and end structures for supporting said frame in an elevated horizontal plane when the device is set up; said main frame comprising side rails and end rails, each side rail being formed in two sections hinged to each other so as to converge upwardly when the rail is collapsed, each end rail being formed in two sections hinged to each other and to said side rails so as to converge inwardly when the end rail is collapsed; each end structure comprising two legs and a cross brace, said brace being formed in two sections hinged to each other and to said legs so as to swing upwardly when the brace is collapsed, each leg being hinged to the end of one of said side rails so as to swing outwardly and upwardly into a position overlying said side rail; whereby said legs and sections may be collapsed into a bundle of substantially parallel elements.

THIAS ELIAS.