Aug. 26, 1958 W. L. SHEPHERDSON 2,849,054

FOLDING FURNITURE STRUCTURE

Filed Oct. 29, 1956 3 Sheets-Sheet 1

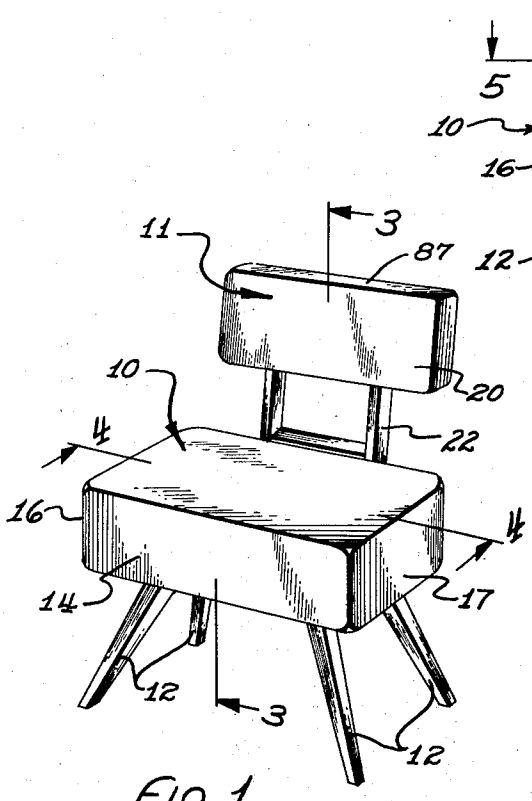


Fig. 1

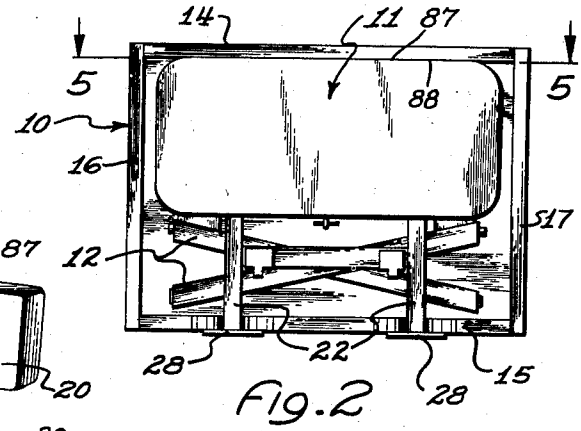


Fig. 2

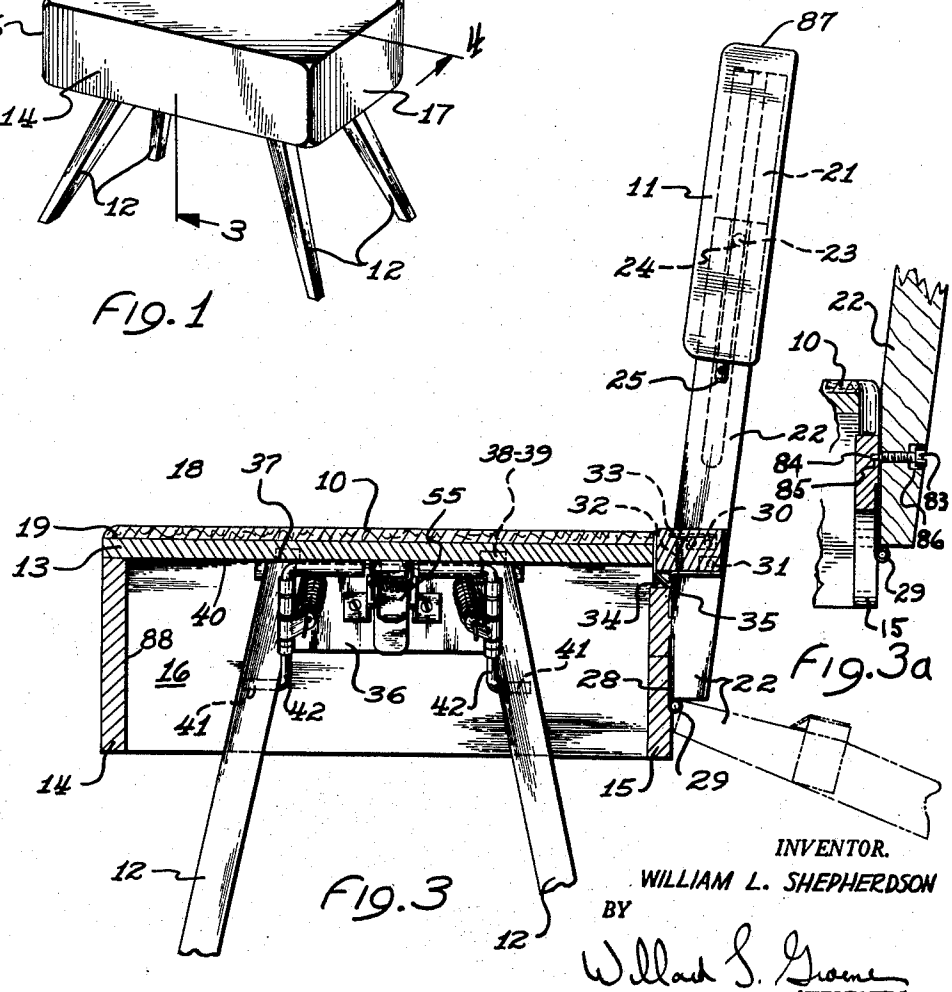


Fig. 3a

Fig. 3

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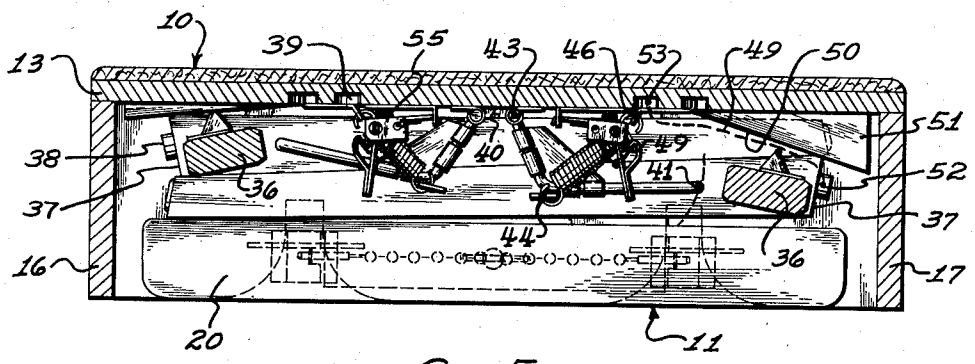


Fig. 5

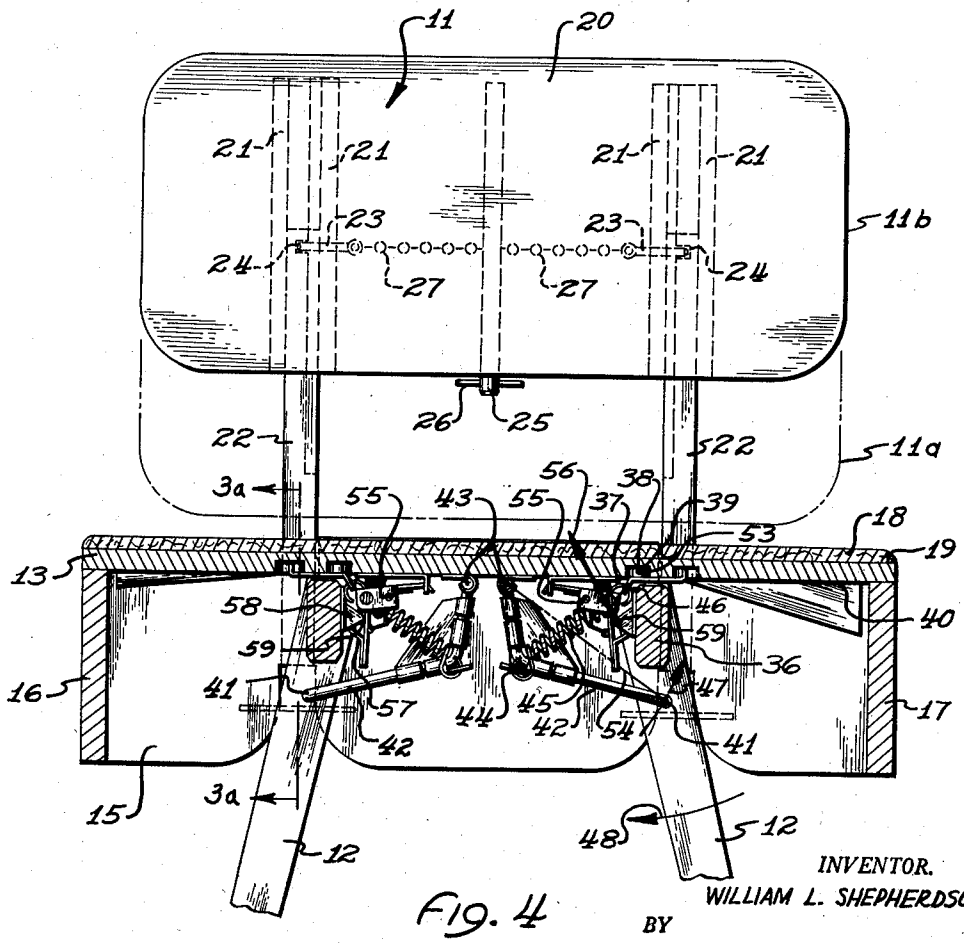


Fig. 4

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FOLDING FURNITURE STRUCTURE

Filed Oct. 29, 1956 3 Sheets-Sheet 3

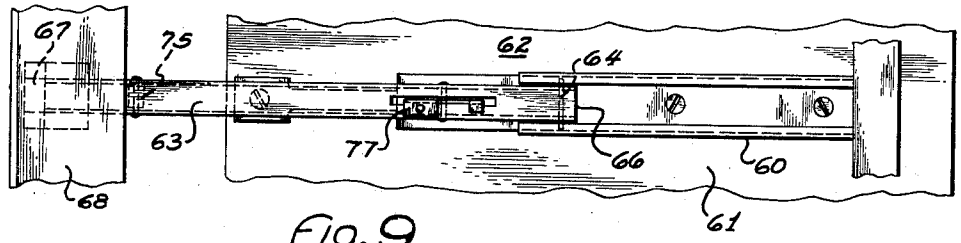


Fig. 9

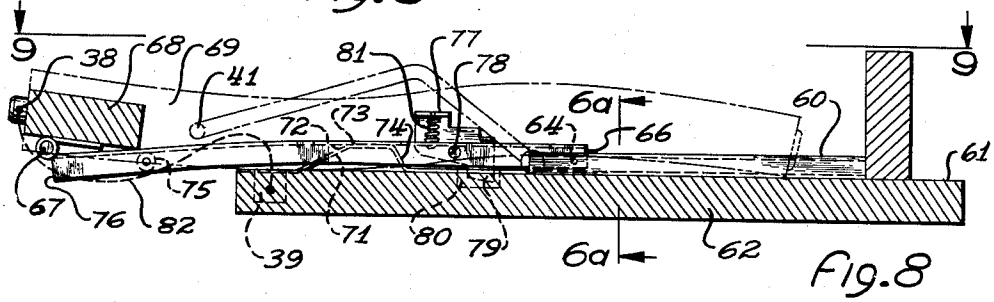


Fig. 8



Fig. 6b

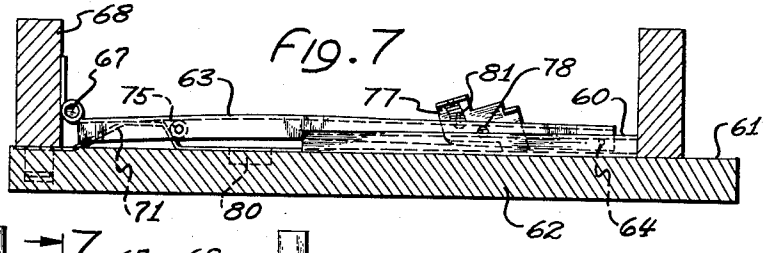


Fig. 7

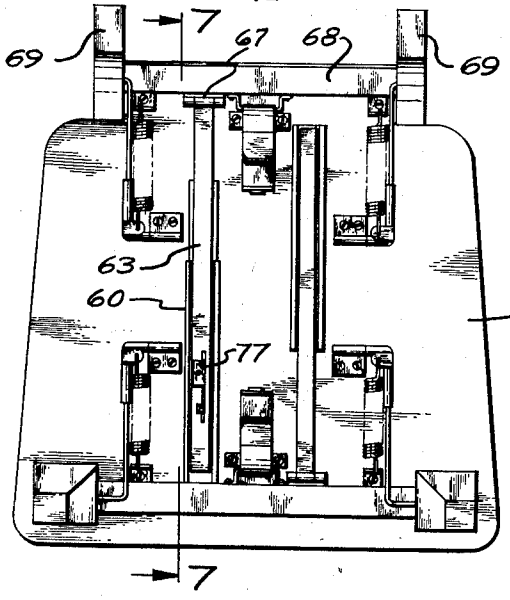


Fig. 6

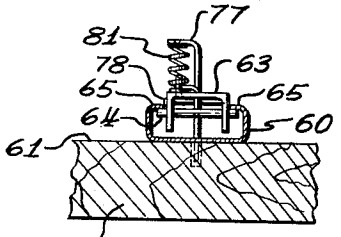


Fig. 6a

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United States Patent Office 2,849,054 Patented Aug. 26, 1958

2,849,054

FOLDING FURNITURE STRUCTURE

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Application October 29, 1956, Serial No. 618,744

4 Claims. (Cl. 155—139)

This invention pertains to improvements in folding furniture structures and is particularly directed to improvements in the mechanism for holding the movable furniture elements in opened and folded position in an efficient manner.

One of the objects of this invention is to provide novel mechanism to facilitate the opening and folding of the leg and back elements of a folding chair or table.

Another object of this invention is to provide an improved chair structure wherein the folding back and leg elements fold up within the confines of the seat elements of the chair in an efficient and automatic manner.

Still another object is to provide a yielding means in conjunction with the folding leg structures which is effective in both open and folded condition to rigidly secure the leg structures to the seat portion of the chair together with releasable locking means to positively hold the leg structure in open position.

A further feature of this invention is to provide a chair structure as above recited in which the legs and back fold within the seat structure of the chair in which back has means for adjustably positioning it to selected heights above the seat portion.

Further features and advantages of this invention will appear from a detailed description of the drawings in which:

Fig. 1 is a perspective view of a folding chair incorporating the features of this invention.

Fig. 2 is a view showing the chair of Fig. 1 folded up.

Fig. 3 is an enlarged fragmentary section on the line 3—3 of Fig. 1.

Fig. 3*a* is an enlarged fragmentary section on the line 3*a*—3*a* of Fig. 4.

Fig. 4 is an enlarged fragmentary sectional view on the line 4—4 of Fig. 1.

Fig. 5 is an enlarged sectional view on the line 5—5 of Fig. 2.

Fig. 6 is a view showing guide devices for automatically controlling the opening and folding movements of the leg structures of the folding furniture.

Fig. 6*a* is an enlarged sectional view on the line 6*a*—6*a* of Fig. 8.

Fig. 6*b* is a perspective view of a chair incorporating the features of this invention.

Fig. 7 is an enlarged section on the line 7—7 of Fig. 6.

Fig. 8 is a view similar to Fig. 7 but showing the guide devices in latched folded position.

Fig. 9 is a view of the device of Fig. 8 indicated by the line 9—9 of Fig. 8.

As an example of one embodiment of this invention there is shown a folding chair comprising the seat element 10, the back element 11, and the leg elements 12. The seat element comprises a top board 13 to which is fixed the front and back pieces 14 and 15 and the end pieces 16 and 17. A suitable cushion piece 18 is placed on the top surface 19 of the top board 13, this cushion and the front, back and sides being appropriately

covered with suitable upholstery material to complete the seat element of the chair.

The back element 11 of the chair comprises the member 20 having guideways 21 which slide longitudinally of the supports 22 from a lowered position 11*a* to a raised position 11*b*. Spring urged locking pins 23 enter detent notches 24 in the supports 22 to hold the back element 11 in raised position 11*b*. A releasing means comprising the shaft 25 rotatably journaled in the back 20 and having a T-handle 26 for manually rocking the shaft 25 is connected by suitable linkage 27 to the pins 23 so that by rotating the shaft 25 the pins 23 may be withdrawn to permit the lowering of the back 20 to position 11*a*. The lower ends of the supports 22 are connected by suitable hinge means 28 to rock about an axis 29 on the back piece 15 of the seat element 10 so that when the back element 11 is in lower position 11*a* it may be swung into folded position shown in Fig. 2 within the confines of the seat element 10.

A latch bar 30 is pivotally mounted on suitable pins 31 carried on the supports 22. Compression springs 32 acting between the abutment bracket 33 fixed on the supports 22 and engaging the latch bar 30, normally swing said latch bar counterclockwise, Fig. 3, to cause its latching projections 34 to lock behind the keeper pieces 35 fixed to the back piece 15. When the back is swung out and upwardly to open position, the latching projections automatically snap into locked position by the springs 32. To release the latch bar it is merely rocked clockwise, Fig. 3, to release the latching projections 34 from behind the keepers 35 and with the back 20 released to lowered position 11*a*, the back element 11 may be swung clockwise as seen in Fig. 3 to folded position where frictional engagement between the top 87 of the cushion back 20 and the inner surface 88 of the front piece 14 serves to hold the back element in folded position. Any other suitable friction catch (not shown) interacting between the seat element and the back element may be utilized. Adjustable screws 83 threadedly mounted in the counter bores 86 in the lower portions of the supports 22, Fig. 3*a*, have abutment ends 84 bottoming in the bores 85 in the back piece 15 so that the forward swung position of the back element 11 is positively limited to maintain proper tight engagement between the latching projections 34 and the keeper pieces 35.

Each of the leg elements 12 are identical so far as their mounting is concerned so that a description of one will suffice for both. Preferably a structure as shown in my co-pending application, Ser. No. 591,896, filed June 18, 1956, now Patent No. 2,817,567, granted Dec. 24, 1957, may be utilized. The leg elements 12 are rigidly tied together by the stretcher bar 36 and the upper ends of the legs have abutment surfaces 37 from which project the dowel pins 38 received in mating dowel pin holes 39 formed in the bottom surface 40 of the top board 13 when the leg elements 12 are in opened out position. The legs 12 are pivotally mounted at 41 on the outer ends of the support arms 42 which are pivotally mounted at their inner ends 43 on the surface 40 of the top board 13. The support arms 42 are bent at 44 at which point tension springs 45 are attached, the springs in turn being fixed at their inner ends 46 to the surface 40 of the top board 13 to provide a yielding force at all times tending to swing the outer ends 41 in the arcuate path indicated by arrow 47.

Fig. 4 shows the leg element 12 in opened out position while in Fig. 5 it is shown in folded up condition. To fold up the leg it is merely necessary to swing the leg 12 inwardly in the direction of the arrow 48 which causes the dowel pins 38 to withdraw from the dowel pin holes 39 and to follow a path of travel 49, Fig. 5,

with the end of the dowel pin slidingly engaging the surface 40 of the top board 13 and then along the surface 50 of the positioning wedge piece 51 fixed to the surface 49, the dowel pin 38 finally arriving at the position 52 when the leg has fully folded in as shown in Fig. 5. Opening the leg by swinging it outwardly in the opposite direction indicated by the arrow 48 causes the dowel pin 38 to slide along the path of travel 49 and drop in the dowel pin hole 39 at point 53 as described. It is important to note that the tension springs are connected intermediate the pivotal connections 41 and 43 of the ends of the support arms 42 at the bend 42 thereof which is located on the other side of a line 54 between the points 41 and 43 and the other fixed end 46 of the springs 45. This causes the springs 45 to function to not only hold the leg elements in opened position of firm engagement of the surface 37 and dowel 38 of the legs with the surface 40 and dowel pin hole 39 of the top board 13 but also maintains sliding contact of the dowel pins 38 against the surfaces 40 and 50 as described to automatically cause the leg elements to snap to closed position shown in Fig. 5.

In certain instances it may be desirable to utilize a latch means indicated generally at 55, such, for example, as shown in my co-pending application Serial No. 614,697, filed Oct. 8, 1956, now Patent No. 2,790,688, granted Apr. 30, 1957, interacting between the stretcher bar 36 and the top board 13 so as to apply a force in the direction indicated by the arrow 56 to positively hold the leg elements in open position. Since the details of the latch means are fully set forth and claimed in said application Serial No. 614,697, Patent No. 2, 790,688, it is believed sufficient to point out that the latch piece 57 carried on the top board 13 engages the keeper 58 at the point 59 to exert a force 56 in a direction lying intermediate the point of inner pivotal mounting 43 of the support arms and the point of open position engagement 53 of the dowel pin 38 with the dowel pin hole 39, the force 56 acting at substantially right angles to the direction of tension action of the springs 45.

It may be desirable to control the path of travel 49 of the dowel pins 38 of the leg elements independent of the sliding contact with the surfaces 40 and 60, Figs. 4 and 5, as when applying the support arm mechanism to a chair such as shown in Figs. 6, 7, 8 and 9. In this arrangement there is provided a guideway member 60 which is securely fixed to the bottom surface of the seat 62 of the chair. An inverted channel piece 63 slidingly fits into the guideway member 60 and has a transverse pin 64 extending behind the turned over edges 65 of the channel piece 60 to confine the outer end 66 of the channel piece 63 in the guideway member 60. The other end 76 of the channel piece 63 is pivotally mounted at 67 on a stretcher bar 68 of the legs 69 of the chair structure 70. A cam piece 71 having a riser surface 72, a straight surface 73, and a drop down and withdrawal surface 74 is fixed to the bottom surface 61 of the seat 62 and is engaged by a transversely disposed cam roller 75 journaled adjacent the other end 76 of channel piece 63. A suitable latching pawl 77 is pivotally mounted on a pin 78 carried in the channel piece 63 and has an end 79 adapted to enter the cavity 80 formed in the bottom surface 61 of the seat when the leg element is in folded up condition. A compression spring 81 interacting between said channel piece 63 and said latching pawl serves to normally engage and hold said end 79 in the cavity 80 when the legs are folded up. By this arrangement the dowel pins are caused to follow a path of travel 82 for automatic engagement and disengagement of the dowel pins 38 in the dowel pin holes 39 in the bottom surface of the seat 62.

While the apparatus herein disclosed and described constitutes a preferred form of the invention, it is also to be understood that the apparatus is capable of mechanical alteration without departing from the spirit of the invention and that such mechanical arrangement and commercial adaptation as fall within the scope of the appended claims are intended to be included herein.

Having thus fully set forth and described this invention what is claimed and desired to be obtained by United States Letters Patent is:

1. A folding furniture structure having a top board, a leg element including a leg, a support arm having one end pivotally connected to said top board and its other end pivotally connected intermediate the ends of said leg, a yielding tension means connected to said support arm to one side of a plane defined by the axes of pivotal mounting of the ends of said support arm with said top board and said leg, means on the upper end of said leg to automatically connect the upper end of said leg to said top board when said legs are opened to load carrying position, and means to connect the other end of said yielding tension means to said top board.

2. A folding furniture structure having a top board, a leg element including a leg, a support arm having one end pivotally connected intermediate the ends of said leg and the other end connected to the underside of said top board, a yielding tension means connected to said support arm to one side of a plane passing through the axes of pivotal mounting of the ends of said support arm with said top board and said leg, means on the upper end of said leg to demountably connect said leg to said top board, means to connect the other end of said yielding tension means to said top board, and a latch means interconnected between said leg and said top board adapted to apply a clamping force therebetween in a direction substantially at right angles to the force applied by said yielding tension means.

3. In a folding furniture structure as set forth in claim 2 wherein means are provided interacting between said seat element and said leg elements to automatically guide said leg elements to and from opened position of demountable connection with said seat element.

4. A folding furniture structure including a seat element, a back element and a pair of leg elements, means on the underside of said seat element to guide and hold said leg elements in opened position and in folded position within the confines of said seat element, means on a back piece of said element to guide and hold said back element in open position and in folded position within the confines of said seat element below said folded leg elements, and means to selectively position said back in raised and lowered position when said back element is in open position, said back element being positioned in lowered position when folded up in said seat element below said folded leg elements to effect frictional holding between the top of said back element and the inner surface of the front piece of said seat element.

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