

Dec. 6, 1966

N. GRIMSHAW

3,289,220

CUSHION SUPPORTS

Filed May 14, 1963

3 Sheets-Sheet 1

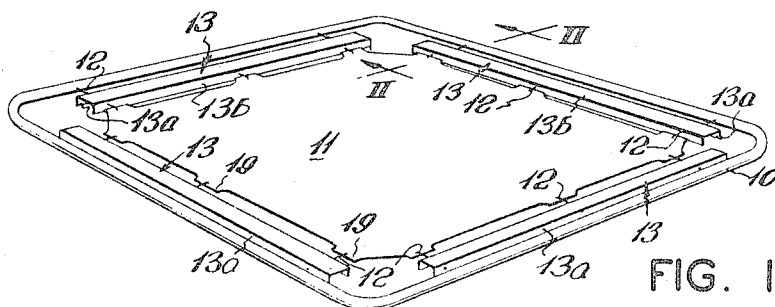


FIG. 1

FIG. 2

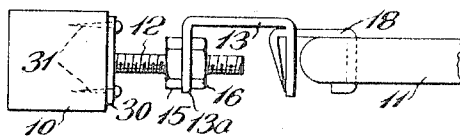
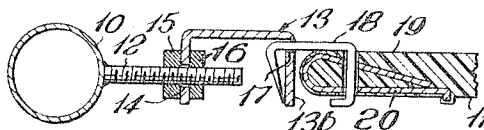


FIG. 3

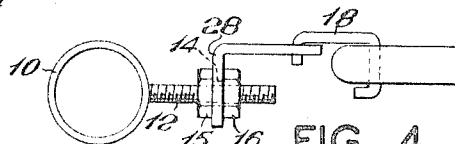


FIG. 4

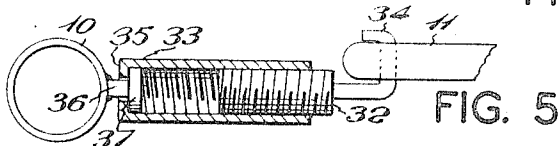


FIG. 5

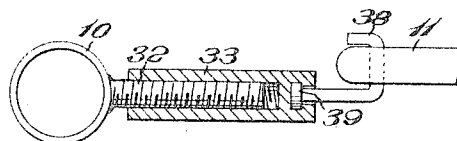


FIG. 6

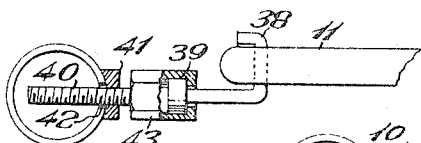


FIG. 7

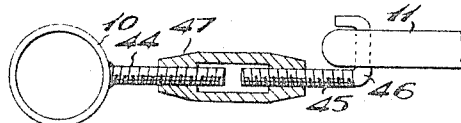


FIG. 8

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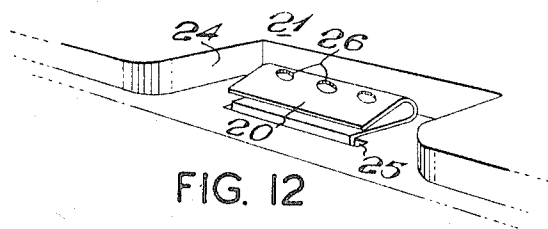
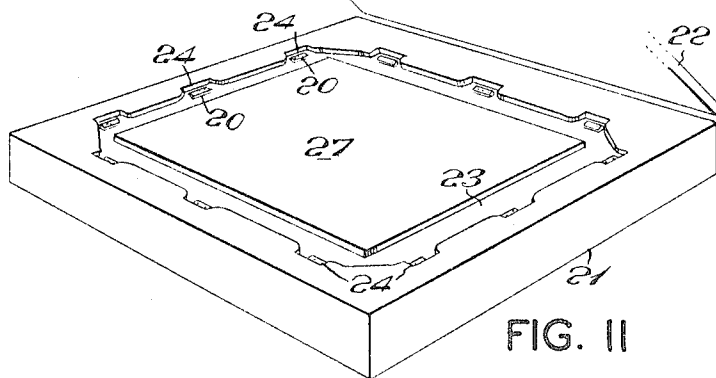
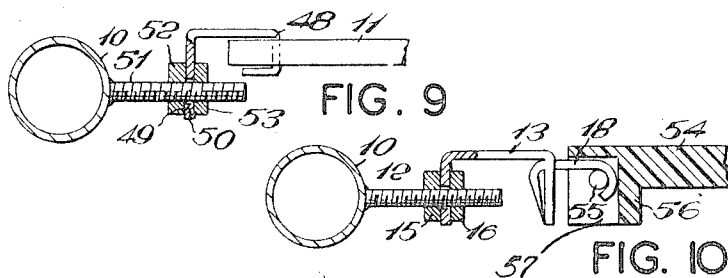
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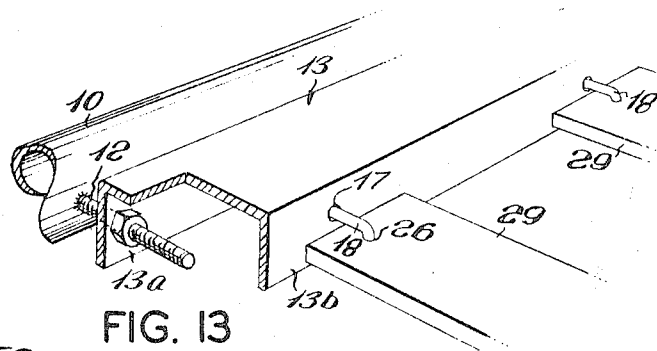


FIG. 13

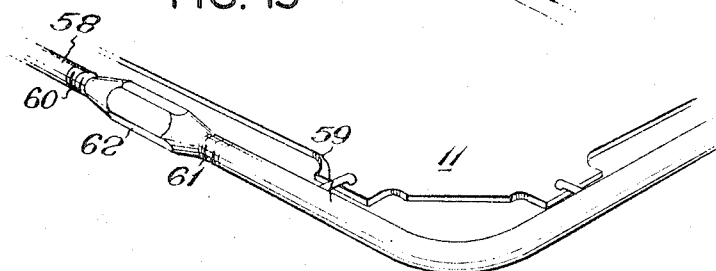


FIG. 14

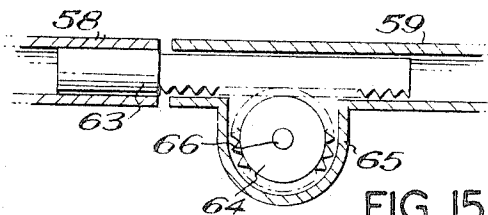


FIG. 15

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CUSHION SUPPORTS

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9 Claims. (Cl. 5—220)

This invention concerns cushion supports for use in conjunction with upholstered furniture. The term "furniture" is to be construed as including motor vehicle seating, household seating, bedding, and the like, and also rail, sea and aircraft seating and the like. In particular the term "cushion support" is to be construed as meaning a member adapted to be attached to the framework of an article of furniture to support for example, a cushion.

Recently and particularly in the motor industry, it has become accepted that one of the best forms of cushion support comprises either a series of interwoven or parallel moulded rubber straps and many manufacturers are using or proposing the use of such cushion supports in their vehicle seats.

It has also been ascertained that one disadvantage of a cushion support lies in the fact that when it has been positioned it cannot be adjusted for tension and thus although the tension chosen may be suitable for giving the cushion the amount of resilience which is satisfactory when the seat is new there is the possibility that after wear the tension will change and the comfort of the seat thereby be reduced.

It has also been ascertained that, in the case of motor vehicles one cause of driver fatigue is lack of comfort, and thus even with very carefully chosen initial tension in the support, based upon what may be considered, after research, acceptable to the majority of drivers, the incidence of driver fatigue may well still be high because the tension is not adjustable to suit individual taste.

It is also well known that a motor vehicle seat frame will have a natural frequency of vibration and that the support attached thereto will have its own natural frequency of vibration. If these two frequencies should coincide the result will be additive and discomfort accompanied by fatigue will result.

The above comments all relate to disadvantages which can exist in motor vehicle seating and the principal object of the present invention is to provide a cushion support which will reduce or eliminate the disadvantages.

The support of the present invention will also have advantages in uses other than for motor vehicle seating in that it is basically designed to enable tension to be varied to suit individual requirements.

According to the present invention there is provided a cushion support including at least one resilient member moulded from a thermoplastic material which will flow when subjected to heat and pressure and which will be resilient when cold there being attached to the member means whereby it may directly or indirectly be attached to the frame of an article of furniture and at least one means formed on or capable of being attached to the frame of the article of furniture whereby, in use the tension in the cushion support may be increased or decreased as desired.

Preferably the cushion support consists of a moulded unitary sheet of thermoplastic material having at spaced intervals around its periphery a series of metal reinforced attachment points each of which is capable of receiving an attachment member, the attachment members along at least one side or portion of the sheet consisting of or including an arrangement which can be modified in effective length, whereby the tension in the sheet may, in use, be increased or decreased.

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In one form the thermoplastic sheet is substantially rectangular in shape and is provided with outwardly projecting spaced-apart tongues along each side, each tongue being reinforced by the provision of a metal clip secured to the tongue during a moulding operation, there being attached to each of the tongues, at least along one side of the support member, a metallic hook which is itself attached to a bar provided with a series of spaced-apart screw threaded rods each of which carries a nut and a lock nut, the arrangement being such that, in use, the bar can be moved along the screws towards or away from a furniture frame thereby to increase or decrease the tension in the support member, the screws being attached to the furniture frame.

The invention will be described further, by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a perspective, somewhat diagrammatic, view of part of a seat frame having attached thereto a resilient cushion support and tension adjusting means,

FIG. 2 is a section on the line II—II of FIG. 1,

FIG. 3 is a view similar to FIG. 2 showing a modification of the arrangement as adapted for attachment to, for example, a wooden seat frame,

FIG. 4 is a view similar to FIG. 2 of a further modification,

FIGS. 5 to 10 are views of still further modifications, FIG. 11 is a view of part of a mould used for producing a resilient cushion support,

FIG. 12 is a very much enlarged perspective view of part of the mould of FIG. 11,

FIG. 13 is a partial perspective view of a further modification,

FIG. 14 is a perspective view similar to FIG. 1 of a further modification, and

FIG. 15 is a part sectional detail view of a modification of the arrangement of FIG. 14.

In the following description reference will be made to a motor car seat but it will be appreciated that this does not restrict the invention to use in such seats only. Like parts in the drawings are indicated by like reference numerals.

Basically a motor car seat comprises a metallic framework, of which only a part 10 is shown, to which is attached an upholstered cushion mounted, preferably removably, on a resilient cushion support 11.

In an arrangement according to this invention, and as illustrated in FIGS. 1 and 2, there is provided around the seat frame 10, and a projecting inwardly thereof, a series of spaced-apart screws 12. Preferably there are two screws 12 along each side of the frame. Mounted on the screws 12 on each side of the frame is a channel sectioned bar 13, the screws 12 passing through holes 14 (see FIG. 2) in one web 13a of the channel. Between the seat frame 10 and the web 13a is a nut 15 and on the screws 12 between the web 13a and the web 13b of the bar 13 is a lock-nut 16.

A number of holes 17 are provided in the web 13b. Each hole 17 is arranged to receive one end of a hook 18, the other end of which is secured to the reinforced tongue 19 of the resilient cushion support 11.

The resilient cushion support consists of a unitary sheet of moulded rubber of substantially rectangular shape. Each side of the support 11 is provided with the integral outwardly projecting tongues 19 into each of which is moulded, during the formation of the support, a substantially closed U shaped metallic reinforcement clip 20. The method of manufacture of the resilient support member is as follows, particular reference being made to FIGS. 11 and 12.

The mould consists of a base 21 and a lid 22.

The base 21 is provided with a depression 23 which conforms to the required finished contour of the resilient cushion support 11, there being outward extensions 24 of the depression 23 at positions corresponding to the tongues 19 of the cushion support 11.

Within each outward extension 24 is provided a groove 25 into which can be located a flange formed along one edge of one of the arms of the metallic reinforcing clip 20.

As can be seen from FIG. 12 the metallic clip 20 is provided with aligned holes 26 in the two limbs thereof, and, in the clip illustrated the limbs are formed so as to have their extremities in close proximity to each other. Alternatively the metallic clip may initially be of open U or V shape and will be deformed to the shape shown upon closing the mould lid 22.

To produce the cushion support 11 a piece of uncured rubber compound 27 is placed within the mould depression 23 (the size of the piece of compound 27 is less than the size of the depression) and the mould lid is closed. Heat and pressure are applied to the mould to cause the compound to flow completely to fill the depression 23 and to encase the clips 20 and also to vulcanise the rubber. Waste of compound is avoided by selecting the size of the piece 27 so that there is the minimum of flash to be trimmed from the cushion support 11 after moulding.

Preferably the metal used for the clips is brass and it has been found that in certain cases an extremely strong bond is formed between the rubber and the brass without the use of a bonding agent.

The bond is mechanically strengthened by virtue of the closed shape of the clip arms (which ensures the formation of a wedge of rubber therebetween) and also by the provision of the holes 26 in the arms of the clip 20.

In use, a resilient cushion support 11 of the kind described above is secured to a motor car seat frame 10 by removing the lock-nuts 16 from the screws 12 and locating the channel sectioned bars 13 on the screws 12. The lock-nuts 16 are then replaced to prevent the bars 13 from sliding off the screws 12. It will be appreciated that the bars 13 when initially positioned on the screws 12 are located approximately mid-way between the ends of the screws 12. The moulded cushion support 11 in this condition is under tension. Adjustment to increase or decrease the tension respectively can be achieved by releasing the nuts 15 and moving the bars 13 towards the frame 10 by tightening the lock-nuts 16 or by releasing the lock-nuts 16 and screwing up the nuts 15.

Preferably an increase or decrease of tension of up to 10% is catered for.

The invention is not restricted to the support described above. For example, a bar 13 need only be provided along one side of the moulded cushion support 11, the remaining three sides being secured directly to the seat frame 10 by means of the hooks 18, alternatively the moulded cushion support 11 may be provided with two bars 13 along sides adjacent to each other.

If desired, the bars 13 may be of a shape other than channel shape as shown in FIG. 4 where they are in fact of angle shape, as indicated at 28.

If it is desired to provide a cushion support consisting of a plurality of moulded rubber webs 29 as shown in FIG. 13, several of these can be attached at spaced intervals along a single bar 13 and either have a second bar at their other ends (not shown) or alternatively be arranged to be attached directly to the seat frame 10 by the hooks 18.

If desired each web 29 may have its own individual bar 13 or bars 13.

As shown in FIG. 3 the means of attachment of the cushion support 11 or the webs 29 to a wooden, or other

solid frame 10 may be achieved by mounting the screw 12 on an end plate 30 and securing this by screws 31, or by welding in the case of a metal frame 10.

In yet a further modification, as shown in FIG. 5 tension adjusting means may consist of an arrangement having an externally screw threaded rod 32 attached to the moulded cushion support 11 or the webs 29, there being an internally threaded tube 33 arranged to be screwed onto the rod 32 and attached to the frame 10.

In this case there may be provided a hook 34 integral with the rod 32. The tube 33 would be so secured to the frame 10 as to allow for rotation of the tube and one means of achieving this is to provide an internally directed flange 35 on the tube and to secure to the frame 10 a lug 36 having an enlarged head 37.

In the case of a unitary support 11 there would be rods 32 at spaced intervals along at least one side thereof.

In the case of individually moulded webs 29 each would be provided, at least at one end, with a rod 32. Alternatively, as shown in FIG. 6, the tube 33 could be attached to the support 11 by means of a hook 38 having an enlarged head 39. The end of the tube 33 is swaged over the head 39. The rod 32 would be attached to the frame 10 in this instance. Again the arrangement may be used with a unitary support 11 or with webs 29.

Any other attachment device whose effective length is capable of being adjusted may in fact, be used between the seat frame 10 and the support 11 and some examples are illustrated in FIGS. 7 to 10.

The lug may be attached to an end plate which latter is provided with holes whereby it may be secured to a solid, for example, a wooden frame.

Referring now to FIG. 7, it will be seen that a hook 38 identical to that of FIG. 6 is used and in this case it is attached to a screwed rod 40 which passes through an internally threaded collar 41 secured directly to the frame 10 and aligned with a hole 42 formed therein. As shown the rod 40 is provided with an integral hexagonal nut 43 which is swaged over the enlarged head 39.

Referring now to FIG. 8, an arrangement including two screwed rods is shown. One rod 44 is attached to the frame 10 and the other, 45, is attached, by means of an integral hook 46 to the cushion support 11 or web 29.

The screw threads of the rods 44 and 45 are of opposite hand and a connector 47 is provided with a hexagonally formed central region to allow it to be rotated to vary cushion support or web tension.

In the arrangement of FIG. 9 there is provided a hook 48 having an elongated arm 49 thereon. The arm is provided with a hole 50 to allow a screwed rod 51 (attached to the frame 10) to pass therethrough and a nut 52 and lock-nut 53 are provided for allowing adjustment of the tension in the support 11 or web 29.

The arrangement illustrated in FIG. 10 is identical with that of FIG. 2 with the exception that the cushion support 54 is provided with hook receiving rods 55 moulded into the end regions of the tongues. The hook receiving rods 55 are located in thickened up portions 56 of the tongues.

The manufacture of the cushion support 54 is basically similar to that described above in that a piece of uncured rubber compound is located in the base of a two part mould and in that the hook receiving rods are positioned in the mould prior to applying heat and pressure thereto. In this case, however, the mould depression is provided, at the end regions of the outward extensions 24, with slots into which rubber compound flows to form the thickened parts 56. The rods 55 are supported in the slots on locating pins and a lug which project from the base of the slot. The lug is located centrally of the slot and projects inwardly from the outermost wall thereof to define the size and position of the cavity 57.

Referring now to FIG. 14, there is provided a cushion support 11 and a frame consisting of two parts 58 and 59. Each frame part is of tubular form and of substantially

U-shape. The ends of the arms of the part 58 are externally screw threaded at 60 and the ends of the arms of the part 59 are also externally screw threaded at 61, the threads being of opposite hand to the threads 60. A connector 62 is provided to enable the two frame parts 58 and 59 to be secured together and also to enable the effective length of the frame to be modified.

The arrangement above described may be modified as shown in FIG. 15 in which one frame part 58 is provided with a ratchet bar 63 secured therein and the other part 59 (into which the ratchet bar 63 can move) is provided with a ratchet wheel 64, mounted in a housing 65 formed on the frame part, by means of a spindle 66. The ratchet wheel 64 is keyed or otherwise secured to the spindle 66 and the spindle may be provided with a handwheel (not shown) for enabling adjustment of the frame length to be made. If desired there may be a handwheel for each ratchet wheel 64 or a single handwheel, adapted to rotate the ratchet wheels 64 in unison.

I claim:

1. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, metallic reinforcing means in the form of substantially U-shaped metallic clips, the arms of which are, at their extremities, in close proximity moulded into said resilient member at least at the ends thereof, hook means removably attached to said metallic clips, and tension adjusting means attached to said hook means at least at one end of said resilient support, said tension adjusting means including at least one metal bar adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bar, and nuts and lock-nuts on said threaded rods to retain said metal bar in position after tension adjustment of said resilient member.

2. A cushion support comprising a unitary resilient member of substantially rectangular shape moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially U-shaped metallic clips, the arms of which are, at their extremities, in close proximity moulded into said resilient member at least at the ends thereof, hook means removably attached to said metallic clips and tension adjusting means attached to said hook means at least at one end of said resilient support, said tension adjusting means including at least one metal bar adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bar, and nuts and lock-nuts on said threaded rods to retain said metal bar in position after tension adjustment of said resilient member.

3. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially U-shaped metallic clips, the arms of which, at their extremities, are in close proximity moulded into said tongues, hook means removably attached to said metallic clips and tension adjusting means along at least one side of said resilient support, said tension adjusting means including at least one channel sectioned metal bar adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bar, and nuts and lock-nuts on said threaded rods to retain said metal bar in position after tension adjustment of said resilient member.

4. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially

U-shaped metallic clips, the arms of which, at their extremities, are in close proximity moulded into said tongues, hook means removably attached to said metallic clips and tension adjusting means along two adjacent sides of said resilient support, said tension adjusting means along each of said adjacent sides including channel sectioned metal bars adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bars and nuts and lock-nuts on said threaded rods to retain said metal bars in position after tension adjustment of said resilient member.

5. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially U-shaped metallic clips, the arms of which, at their extremities, are in close proximity moulded into said tongues, hook means removably attached to said metallic clips, and tension adjusting means along each side of said resilient support, said tension adjusting means along each side of said resilient support including a channel sectional metal bar adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bars and nuts and lock-nuts on said threaded rods to retain said metal bars in position after tension adjustment of said resilient member.

6. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially U-shaped metallic clips, the arms of which, at their extremities, are in close proximity moulded into said tongues, hook means removably attached to said metallic clips and tension adjusting means in the form of an angle sectioned bar along at least one side of said resilient support, said angle sectioned metal bar adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bar and nuts and lock-nuts on said threaded rods to retain said metal bar in position after tension adjustment of said resilient member.

7. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially U-shaped metallic clips, the arms of which, at their extremities, are in close proximity moulded, into said tongues, hook means removably attached to said metallic clips and tension adjusting means in the form of an angle sectioned bar located along two adjacent sides of said resilient support, each of said angle sectioned metal bars adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bars and nuts and lock-nuts on said threaded rods to retain said metal bars in position after tension adjustment of said resilient member.

8. A cushion support comprising a unitary resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, integral tongues located at spaced intervals around the periphery of said resilient member, metallic reinforcing means in said tongues in the form of substantially U-shaped metallic clips, the arms of which, at their extremities, are in close proximity moulded into said tongues, hook means removably attached to said metallic clips and tension adjusting means in the form of an angle sectioned bar located along each side of said resilient support, each of said angle sectioned metal bars adapted to be adjustably mounted relative to a furniture frame, threaded rods secured to said metal bars, and nuts and lock-nuts on said

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threaded rods to retain said metal bars in position after tension adjustment of said resilient member.

9. A cushion support having at least one resilient member moulded from a material which will flow when subjected to heat and pressure and will be resilient when cold, hook means on said member, and cushion support tension adjusting means in the form of at least one metallic bar connected to said resilient support, said metallic bar being mounted upon two spaced-apart screw threaded rods each having an end plate, holes in said end plates to enable fastening means to pass therethrough and secure said end plates and thus said externally screw threaded rods to said furniture frame, a nut and a lock-nut on said externally screw threaded rod to cause, when moved, tension adjustment of said resilient support.

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