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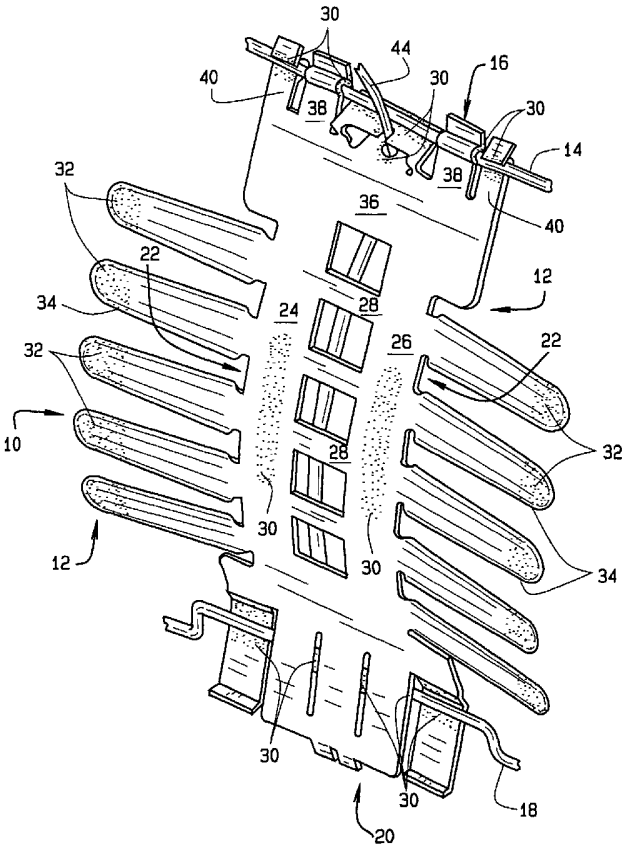
(54) Title: IMPROVED VARIABLE APEX BACK SUPPORT

(57) Abstract: A flexible back support for use in seats such as automobile seats or office chairs.



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Improved Variable Apex Back Support

Field of the Invention

The present invention relates to back supports and more particularly to back supports used in seatbacks.

Background of the Invention

A variety of seatback back support devices provide added support and comfort to a person's back. These devices are especially common in vehicle seats or office chairs as lumbar supports. Examples of such devices are described in U.S. Patent Nos. 5,518,294, 6,036,265; 6,254,187; 6,227,618; 6,158,300; 6,152,532; 6,050,641; 6,036,265; 6,007,151; 5,816,653; 5,681,005; and 5,609,394, the teachings of which are hereby expressly incorporated by reference herein. It would be attractive to reduce manufacturing costs associated with such devices while still preserving the many advantages derived by the general structure and operation of such devices.

Summary of the Invention

In its most general terms, this invention provides a flexible back support member. The support member preferably has a central body portion with a longitudinal axis and opposite ends at each end of the axis. A number of support fingers extend outwardly from the central body portion in a generally horizontal direction. A means for arching the support member is attached to the support member to arch the support member outwardly to support a person's back.

In one embodiment, the support member has a first end portion and a second end portion and includes an intermediate central body portion that is fabricated from a first material, which is preferably flexible. A seat attachment portion is coupled to the central body portion and is made of a second material, which is preferably a molded plastic. In one preferred approach, the attachment portion attaches the support member to a seat back at only one end portion (e.g., as a cantilever). In another preferred approach, the attachment portion attaches the support member to the seat back at both end portions.

In another embodiment, the support member is attached to a seat by connection of one of its end portions to a seat base, and preferably to a frame of the seat base. In yet another

embodiment, the support member is integrally packaged with a suitable actuating mechanism for arching the support member, and optionally one or more additional drive or control systems for adjusting the position, temperature or other condition of the seat.

In even still yet another embodiment, either the support member, bars or like structure upon which it is mounted, or both are selectively coated with a low friction material. The support fingers also are surface smoothed, such as by a vibratory technique. The result is a relatively low cost improved support member for use in a back support device.

As will also be appreciated from the following, the present invention contemplates that the support fingers need not be integrally attached to the central body portion of the support member. Rather, the function of the adjustable support fingers can be re-located elsewhere within the seat, such to the upholstery, the padding, suitable webbing, or the like, either in, on or adjacent the front of the seat, the back of the seat, or both.

These and other features and objects of the present invention will become apparent to a person skilled in the art from the following detailed description and the appended drawings.

Brief Description of the Drawings

FIG. 1 is a front perspective view of an embodiment of the inventive back support.

FIG. 2 is a perspective view of another embodiment of the inventive back support.

FIG. 3 is an elevational view of another back support embodiment.

FIG. 4 is an elevational view of yet another back support embodiment.

FIG. 5 is a perspective view of another embodiment showing a back support attached to a seat base frame.

FIG. 6a is an elevational view of the configuration illustrated in FIGS. 6b-6c.

FIGS. 6b-6c are side views showing an alternative approach for actuating a back support.

FIGS. 7a-c is a side view showing another alternative approach to actuation.

FIG. 8 illustrates a perspective view of a seat back insert for facilitating back support actuation.

FIGS. 9a-c illustrate an embodiment including a translatable member for providing adjustable support.

FIG. 10 illustrates another embodiment including plural tensionable members for local support.

FIG. 11 illustrates another alternative embodiment in which support members are associated with a seat covering.

Detailed Description of the Invention

The subject of the invention pertains to improvements to art-disclosed back support devices and associated components, such as those described in U.S. Patent 5,518,294, 6,036,265; 6,254,187; 6,227,618; 6,158,300; 6,152,532; 6,050,641; 6,036,265; 6,007,151; 5,816,653; 5,681,005; and 5,609,394, all of which are hereby incorporated by reference for all purposes. FIG. 1 is a front perspective view of one preferred embodiment 10 of a back support designed in accordance with this invention. A support member 12 is mounted in a conventional seatback upon a first bar 14 (e.g., a wire or like member, which is generally vertically or horizontally oriented) at a first longitudinal end 16 of the support member 12. An optional second bar 18 is positioned near the second longitudinal end 20 of single-piece support member 12 such that the mounting portion near the second longitudinal end 20 provides a pivotal and movable mount upon or about bar 18. In the embodiment depicted in Fig. 1, Bars 14 and 18 are preferably horizontally disposed within a seatback frame as generally shown in FIG. 2. The details of the mounting and movement of the single-piece support member 12 upon bars 14 and 18 are provided in U.S. Patent 5,5~I 8,294, which is hereby incorporated by reference for all purposes.

Support member 12 includes a central body 22 that may further include longitudinal strips 24 and 26. Transverse strips 28 may also be provided between longitudinal strips 24 and 26 to provide greater comfort to a user and to provide more integrity and stability to support member 12. In one embodiment the support member is a single piece. In another embodiment, the support member 12 is preferably formed of a metal, such as a resilient sheet of a metal, and more preferably a stamping of a spring steel, such as an alloy metal known as Martinsite®. The lightweight and durable nature of support member 12 may be further enhanced by providing transverse strips 28 between longitudinal strips 24 and 26 rather than providing a solid member as central body 22. As discussed in further detail, rather than powder coating or otherwise coating the entire support member 12 (which will typically be a stamping), or the selective use of grommets, improved results are possible by selectively treating the stamping with a coating 30 to impart a protective surface, a low friction surface or both over only a portion of the member 12.

Extending outward from central body 22 are support fingers 32. Support fingers 32

may be coplanar with or angled relative to a plane defined by central body 22. The angle of support fingers 32 may be selected to yield greater lateral support for a user and to enhance the comfort provided by the inventive back support. The peripheral edges 34 of support fingers 32 may be flat or bent back slightly relative to the forward projection of the support fingers 32. Optionally, the edges 34 (or optionally other edges of the member 12) are surface smoothed to avoid sharp edges, burrs or the like. One preferred approach is to vibratory smooth the edges such as by vibratory burnishing.

It is to be understood that the references within this description to the top or bottom of the support member are relative to the mounting of the illustrated preferred embodiment. The items described may be inverted and still fall within the present invention.

First plate 36 includes suitable mounting structure (e.g., clamping members 38 and 40, other gripping members, or the like) for mounting the first longitudinal end 16 of support member 12 on bar 14. When employed, clamping members 38 and 40 provide an easy installation of the support member 12 because clamping members 38 and 40 effectively "snap on" bar 14 as the support member is moved generally upward against bar 14. The mounting provided by clamping members 38 and 40 enables efficient assembly requiring a minimum amount of tools and a minimum amount of parts.

The actuation mechanism and other operational features of the present devices can be gleaned from the above cited U.S. Patents, which are hereby incorporated by reference. In one embodiment, as shown in FIG. 1, the two ends of the lumbar support member are supported by two bars (e.g., wires) that are part of the seat back. There is relative motion between the wires and the stamped element, primarily rotation at one end, and sliding at the other end. In order to prevent noise and galling of the wires, a lubricating material or a suitable plastic material sleeve or coating is used at the interface between the wires and the member 12. For instance, the material used may be a powder coat.

In another embodiment, at least a portion of the bar is treated to have a low friction surface. By way of example, the wire may be treated by extruding the wire with a low friction plastic. For instance, the wire might be treated by cross head extruding it with a plastic. Alternatively, the wire may be treated by placing or pressing an extruded plastic tube over said wire.

By way of illustration of the techniques for treating the member 12, the following are disclosed. In one example, a suitable tape is fabricated of a layer of low friction plastic (e.g.,

ultra high molecular weight polyethylene (UHMWPE), ultrahigh density polyethylene, or the low friction materials disclosed elsewhere herein) with a suitable adhesive (e.g., an acrylic pressure sensitive adhesive). The tape is applied to the member at the areas that are in contact with the seat back wire or where there is contemplated to be sliding contact between two parts under pressure. As mentioned a number of materials suitably would function for the intended purpose described above. In general, the materials will exhibit a relatively high sliding abrasion resistance, a relatively high notched impact resistance, a relatively low coefficient of friction for on-stick, self lubricated surfaces, relatively good toughness and ductility from -452°F to +194°F, relatively high noise reduction and shock absorption, and relatively good dimensional stability.

In another embodiment, in lieu of or in combination with a tape, a lubricant (e.g., a grease or an oil) is employed over at least a portion of the member. By way of illustration, one suitable lubricant is or has the characteristics of Krytox ®oil (available from DuPont). Such characteristics are summarized in Table A. For example, P.F.P.E. (k) (Krytox) oil with a viscosity index of about 124 and a useful temperature range of about -60° F to +355° F would provide the necessary lubricity to pass our screening.

In yet another illustrative embodiment, a laminated tape is employed having performance characteristics of the tapes disclosed in Table B. For example a plastic metal foil tape might be employed, having an adhesive for bonding on one of its surfaces. By way of illustration, a tape may be used having on the order of about .002 inch thick metal (e.g. aluminum), which has a pressure sensitive adhesive on one surface, and a plastic (e.g., PTFE or Teflon®) layer on the order of about .001 inch thick on the other metal surface. It is believed that this provides sufficient lubricity and toughness to withstand the sliding contact with the seat back wire. Of course, as mentioned above, the above techniques can be used in lieu of or in combination with treating the bars. Table C illustrates a range of characteristics for suitable UHMWPE materials.

FIG. 2 illustrates an alternative support member 42 for mounting on vertically oriented bars, for which the present invention may have like utility. In this regard, the inventive aspects described herein find utility with support members of the type disclosed in other seat back devices including but not limited to those described in U.S. Patent Nos. 6,158,300 (Klingler); 6,050,641 (Benson); 6,152,532 (Cosentino); 6,036,265 (Cosentino); 6,007,151 (Benson); 5, 816,653 (Benson), the teachings of which are hereby expressly

incorporated by reference herein.

The exact materials of Tables A-C (hereby incorporated by reference) need not be employed to be within the present invention. Other coatings might include powder coatings (e.g. graphite powder coatings), or the like. Further, some or all of the coating locations shown in FIG. I may be omitted (e.g. over the strips 26,28, the fingers (or tips thereof), or elsewhere), or coatings may be employed elsewhere over the, member surface. However, it is preferred that materials employed exhibit relatively comparable performance in the relevant properties.

Though it is appreciated that the present invention also contemplate that an entire part is coated, overall, it is preferred that a substantial portion of the member 12 be free of a coating (which encompasses traditional coatings as well as tapes, films or the like) in accordance with the present invention, and that any such coatings employed are selectively employed over wear or contact surfaces. In one preferred embodiment, no more than about 50% of the member surface is coated. In another embodiment, no more than about 30% of the member surface is coated. In another embodiment, no more than about 15% of the member surface is coated. In another embodiment, no more than about 10% of the member surface is coated. Further, it is preferred that the thickness of any such coating is less than about 0.1 inch, more preferably less than about 0.05 inch, and more preferably less than about 0.01 inch, and more preferably is about 0.005 inch.

Resulting articles in accordance with the present invention exhibit excellent, consistent and reproducible performance over a broad range of temperatures from about -40°F to 180°F.

Turning now to another aspect of the present invention, as shown in FIG. 3, in one embodiment, the support member 100 has a first end portion 102 and a second end portion 104 and includes an intermediate central body portion 106 that is fabricated from a first material, which is preferably flexible, or is a rigid material that is fabricated to be flexible (e.g., with suitable corrugations or variable section thicknesses at desired hinge points. The first end portion, the second end portion or both are adapted for coupling the support member 100 to a seat.

As will be appreciated, the central body portion 106 preferably includes a plurality of extending fingers, which may be the same or a different material as the balance of the material of the central body portion. Thus, as shown in FIG. 4, the central body portion 106

might have plastic fingers 108, with metal elsewhere (e.g., as a metal spine 110), or vice versa. The plastic fingers might be insert molded onto the metal spine or attached in a subsequent operation, e.g., by placing over metal fingers (or protrusions for receiving the plastic fingers), by a coating process, or the like.

In a preferred approach, the central body portion is a metal, such as a sheet spring metal, and the attachment portion is made of a molded plastic. In this manner, advantageously, the attachment portion may be provided as a self-lubricating material, or a material otherwise having a relatively low coefficient of friction. In turn, this permits for the elimination of the need for low friction sleeves or applying lubrication to contact surfaces, such as where the attachment portion is to move along guide wires in the seat back. Also, it is possible to fabricate intricately shaped attachment portion structures, e.g. including integrated sliding surfaces, and structures that permit for the performance of multiple functions within the seat. For instance, an attachment portion might have molded cable or wire guides for routing of cables, wires, conduits or the like within. It might include frames or supports for actuators, controls, electronics, or other components packaged within the seat. Likewise, fingers or other structure in the support member may be adapted for performing multiple functions, such as affording heating or cooling paths, or receiving suitable piezoelectric devices or other electromagnetic devices for providing a vibration source.

It is contemplated that the support member might have sheet metal in face to face contact with some or all of at least one surface of the plastic attachment portions. Alternatively, the metal portion of the support member might adjoin the plastic attachment portions at the respective ends thereof. Combinations of the two might also be employed.

In one embodiment, as shown in FIG. 5, a molded plastic, stamped metal or other suitable fabricated material is configured for defining a cantilever support member 112 including a central body portion 114, support fingers 116 or other support structure. The support member, in turn, is adapted for attachment to a seat, either to a frame member in the seat back (not shown), or to a base 118 of a seat, e.g., to a member inserted in the base, to a seat pan, a seat cushion frame, to a seat track attachment, or otherwise. Optionally, for an embodiment as shown in FIG. 5, the support member is hinged for pivotal rotation along with an adjustable seat back.

Using this type of approach, or any of the above approaches in which a molded plastic component is fabricated as part of the support member, it again is possible to increase the

functionality of the back support device. For example, one embodiment contemplates the formation of a suitable molded fixture that is adapted to receive or house other vehicle components such as a thermoelectric device for heating or cooling the seat, electronics, sensors, air bag components, controls, actuators or the like.

Turning to FIGS. 6a-6c, the present invention also contemplates the variation of conventional packaging designs for back rest actuators. Thus, as an alternative to laterally spaced motors for driving or relieving arching of the central body portion, a single actuator 120 may be pivotally secured to a seat or a support arm such as a pivot bar (e.g., shown in FIG. 6a). The actuator is equipped with an arm or push rod 122, cable or the like, for driving one end of a support member 124 (shown in FIG. 6a in phantom) relative to the other, such as for arching or releasing an arch of the central body portion. In this manner, increased flexibility is possible from the use of a cantilevered support member.

It should be appreciated also that this longitudinally aligned actuator packaging is not limited to cantilevered structures, but can be used for support members that are attachable at both of their respective ends to the vehicle seat assembly. For example, per FIG. 7, one type of longitudinally aligned actuator 130 might be disposed intermediate of the two end portions 126, 128 of a support member 132. The actuator preferably has at least two arms 134, 136 that are translatable relative to each other. For instance, in FIG. 7c the arms 134 and 136 are spaced about a rotatable sprocket 138 for extending or retracting them. Other like configurations are also possible.

FIG. 8 illustrates another option for facilitating actuation of a support member. In this option, a seat back insert plate 140 or like structure is provided. The insert 140 has at least one guide track 142 (elevated or recessed relative to a surface 144 of the insert. The track can be self lubricating, e.g. by selection of the material (e.g. PTFE, polyethylene, or the like) or a lubricant can be applied to it, such as an oil, graphite, the lubricants discussed previously, or the like.

The concepts of the present invention also contemplate the relocation of various functions of the assemblies discussed previously to other places within the seat, in order to help simplify assembly operations, reduce parts or otherwise improve assembly manufacture. By way of example, turning to FIG. 9, the present invention contemplates that the support member need not include fingers or flex for bowing. A support member 146 (such as a

manually or motor driven translatable bar, web, molded plastic structure, or the like) is adapted to be translated along a guide frame 148 or other suitable guide surface. For instance the support member 146 might be configured with ends 150, 152 for gripping (e.g., frictionally, clamping, snapping or the like) a nub formed on the frame, as seen from the sectional view of FIG. 9. Or a support member 146' might simply have an end (e.g., the above partially opened end of FIG. 9b or the enclosed end 150' of FIG. 9c) adapted to run along a guide wire or rod 154 as in FIG. 9c. The guide surface on the guide frame might have differing profiles or thicknesses that vary along the length for directing the support member. To help secure the support member along the guide surface, the system may include notches or cut outs on the guide surface, the support member or both, for a ratchet and pawl locking adjustment. It may likewise have a screw down attachment, such as for clamping, employ locking pins, or the like.

The function of the adjustable support fingers can also be re-located elsewhere within the seat, such to the upholstery, the padding, suitable webbing, or the like, either in, on or adjacent the front of the seat, the back of the seat, or both. In another embodiment (shown in FIG. 10), a plurality of individually tensionable webs, straps or wires 156 are disposed across a frame 158. When tension is applied to one of the webs 156, it becomes tight and applies increased local pressure toward the back of a user.

FIG. 11 illustrates another embodiment in which the support finger function is re-located to the upholstery, either on an interior or exterior surface. For instance, an upholstery layer 160 might have padded generally horizontally disposed ribs 162 or other horizontally thickened sections. A membrane 164 or wall may be attached thereto or otherwise disposed adjacent to the ribs for providing a surface against which a translatable bar or roller 166, tensionable web or the like may contact for selectively imparting rigidity to certain locations within the seat back. The ribs (which may be rigid insert of thin dimension, a foam of thicker dimension or some other like structure) can be located on a front or rear surface of the upholstery.

The embodiments of the present invention offer many unique advantages relative to existing systems. For example it is contemplated that the embodiments of FIGS. 9-11 as well as the others disclosed are employed in seat backs that are less than 10 cm thick, more preferably less than 8 cm thick, and still more preferably less than 6 cm thick. It is also contemplated that these embodiments are employed in seat backs that are substantially free of

conventionally employed foam padding.

The present invention also may be used in combination with other comfort and convenience features for a seat, such as side supports, thigh supports, recliners, pressure equalization bladders, or the like.

The illustrative embodiments set forth in the above constitute examples of the principles of the present invention. Numerous alternatives will readily occur to the person skilled in the art, without departing from the scope of the present invention as set forth in the following claims.

Typical Properties of Krytox® General Purpose Oil and Greases[1]

GPL Oil Grades	100	101	102	103	104	105	106	107
GPL Standard Grease Grades	200	201	202	203	204	205	206	207
GPL Extreme Pressure Grease Gr.	210	211	212	--	214	215	216	217
GPL Anti Corrosion Grease Gr	220	221	222	223	224	225	225	227
ISO Grade of Oil[2]	5	7	15	32	68	150	220	460
Estimated Useful Range[3]								
°C	<-70/66	<-70/104	-63/132	-60/154	-51/179	-38/204	-36/260	-30/288
°F	<-94/150	<-94/220	-81/270	-76/310	-60/355	-33/400	-33/500	-22/550
Oil Viscosity, cST	ASTM D445							
20°C (68°F)	7	15	36	80	180	550	810	1600
40°C (104°F)	4	8	15	30	60	160	240	440
100°C (212°F)	--	2	3	5	9	18	25	42
204°C (400°F)	--	--	--	--	--	3	3.9	6
260°C (500°F)	--	--	--	--	--	--	2.1	3
Oil Viscosity Index D2270	--	--	59	121	124	134	134	144
Oil Pour Point D97								
°C	<-70	<-70	-63	-60	-51	-36	-36	-30
°F	<-94	<-94	-81	-76	-60	-33	-33	-22
Oil Density, g/ml								
0°C (32°F)	1.87	1.89	1.91	1.92	1.93	1.94	1.95	1.95
100°C (212°F)	1.67	1.70	1.72	1.74	1.75	1.76	1.77	1.78
Maxmum Oil Volatility % In 22 hrs D972(Modified)								
@66°C (150°F)	11	2	2	1	1	1	<1	--
@121°C (250°F)	87	35	20	7	3	2	1	--
@204°C (400°F)	--	--	--	--	--	10	<5	<1
Oil Separation From Grease FTMS 791B 321.1								
Wt Loss, %/30 hrs								
@99°C (210°F)	18	9	7	5	4	4	3	3
@204°C (400°F)	--	--	--	--	--	--	11	10
Oil, 4-Ball Wear Test (20 kg/107°C) ASTM D4172								
(225°F)/1200 rpm/60 min								
Wesr. Scar. mm (±0.01)[4]	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4
Friction Coefficient (±0.003)[4]	0.08	0.07	0.07	0.08	0.07	0.07	0.08	0.08
Oil, Falex Pin/V-Block Load Carrying ASTM D3233								
Ability, Max Load, lbs. (gauge)	1375	1400	1250	1555	1450	>4500	>4500	>4500
Torque at Max Load, in-lb	30	31	32	35	32	56	65	65

[1]This table gives typical properties (not specifications) based on historical production performance. Viscosity may vary within ±10%. DuPont does not make any express or implied warranty that these products will continue to have these typical properties.

[2] Approximate

[3] Based on pour point where evaporation is approximately 10%

[4] Average standard derivation.

TABLE A

Pressure Sensitive Tapes
Tape Products Engineered to your Specifications

PRODUCT:	TF12-53PS
CONSTRUCTION:	Backing: 0.001" FEP Teflon*/0.002" Aluminum Foil Adhesive: 0.001" Acrylic Pressure Sensitive Adhesive
APPLICATION:	High slip/low coefficient of friction qualities of Teflon* combined with excellent formable characteristics of foil and long term acrylic pressure sensitive adhesive. Protective tape and sheeting in plating room, chute liners, hoppers, etc. *Reg. TM, DuPont

PROPERTY	VALUE	TEST METHOD
Thickness:	0.004 inch +/- 10%	ASTM-D-3652
Peel Strength:	32 oz./inch of width	ASTM-D-1000 15 minute dwell
Breaking Strength:	13 lbs./inch of width	ASTM-D-1000
Enlongation at Break:	5%	ASTM-D-1000
Color:	Silver	
Shelf Life:	1 year when stored under conditions of 70 degrees F. (21 degrees C.) and 50% R.H.	

P/N 924 date 2/15/95

TABLE B

UHMW TAPE

	150-3 150-3L	150-5 150-5L	150-10 150-10L		
PRODUCT:		Ultra high molecular weight polyethylene film with an aggressive pressure sensitive adhesive. 50DK silicone release liner available.			
APPLICATIONS:		UHMW has low coefficient of friction, therefore offers excellent abrasion resistance. Perfect for sound dampening applications in the appliance and transportation industries and for conveyance applications where a slick, wear resistant surface is needed. Available in both logs and slit rolls.			
PROPERTY		VALUE			TEST METHOD
	150-3	150-5	150-10		
Film Thickness:	0.003"	0.005"	0.010"	(+/- 10%)	ASTM-D-3652
Adhesive Thickness:	0.0018"	0.0018"	0.0018"	(+/- 10%)	ASTM-D-3652
Total Thickness:	0.0048"	0.0068"	0.0118"	(+/- 10%)	ASTM-D-3652
Liner Thickness:	0.0032"	0.0032"	0.0032"	(+/- 10%)	ASTM-D-3652
Adhesion to Steel:	35 oz./inch	40 oz./inch	28 oz./inch		ASTM-D-1000 (15 min. dwell)
Breaking Strength:	18#	30#	60#	(lbs/inch of width)	ASTM-D-882
Enlongation:	270%	300%	450%		ASTM-D-882
Taber Abrasion:	<2.0 mg	<2.0 mg	<2.0 mg	(mg mass loss)	SAE-J-1847
Dry Dynamic Coefficient of Friction:	0.11-0.25	0.11-0.25	0.11-0.25		ASTM-D-1894

Shelf Life: 1 year when stored under conditions of 70 degrees F. (21 degrees C.) and 50% R.H.

P/N:	Self wound:	6893	6903	6904	
	linered:	6997	6998	6999	date 1/31/95

TABLE C

Claims

What is claimed is:

1. A seat comprising:

a base member;

a seatback member attached to one end of said base member;

a flexible support member having two longitudinally spaced ends, and means, attached to said support member, for longitudinally subtending said support member, whereby said support member arches outwardly to support a user's back;

wherein (a) said flexible support member is coated over a portion of its surface for selectively varying the coefficient of friction at said coated portions, (b) edges of said support member are smoothed by a vibratory material removal process; or a combination of (a) and (b).

2. An automotive vehicle seat, comprising:

a base member adapted for attachment to a floor of an automotive vehicle;

a seatback member attached to one end of said base member;

a guide assembly associated with said seat back member;

a rigid support member translatable along said guide assembly; and means, attached to said support member, for translating said rigid support member to selectively support a user's back.

3. An automotive vehicle seat, comprising:

a base member adapted for attachment to a floor of an automotive vehicle;

a seatback member attached to one end of said base member;

a frame associated with said seat back member;

a plurality of tensionable support members attached to said frame; and means, associated with said support members, for selectively tensioning said support members to selectively support a user's back.

4. An automotive vehicle seat, comprising:

a base member adapted for attachment to a floor of an automotive vehicle;

a seatback member attached to one end of said base member;

a seat cover disposed over said seatback member and having a plurality of horizontally disposed ribs on one of its surfaces;

a guide assembly associated with said seat back member;

a rigid member translatable along said guide assembly; and means, attached to said support member, for translating said rigid member to selectively support a user's back.

5. A seat comprising:

a base member;

a seatback member within a seatback attached to one end of said base member;

a flexible support member having two longitudinally spaced ends, one of which is cantilever mounted within said seatback and means, attached to said support member, for longitudinally subtending said support member, whereby said support member arches outwardly to support a user's back.

6. A seat comprising:

a base member;

a seatback member attached to one end of said base member;

a support member having a longitudinal axis and two longitudinally spaced ends, and means, attached to said support member, for subtending said support member, whereby said support member arches outwardly to support a user's back; wherein said means includes an actuator having a longitudinal axis that is disposed generally in axial alignment relative to said longitudinal axis of said support member.

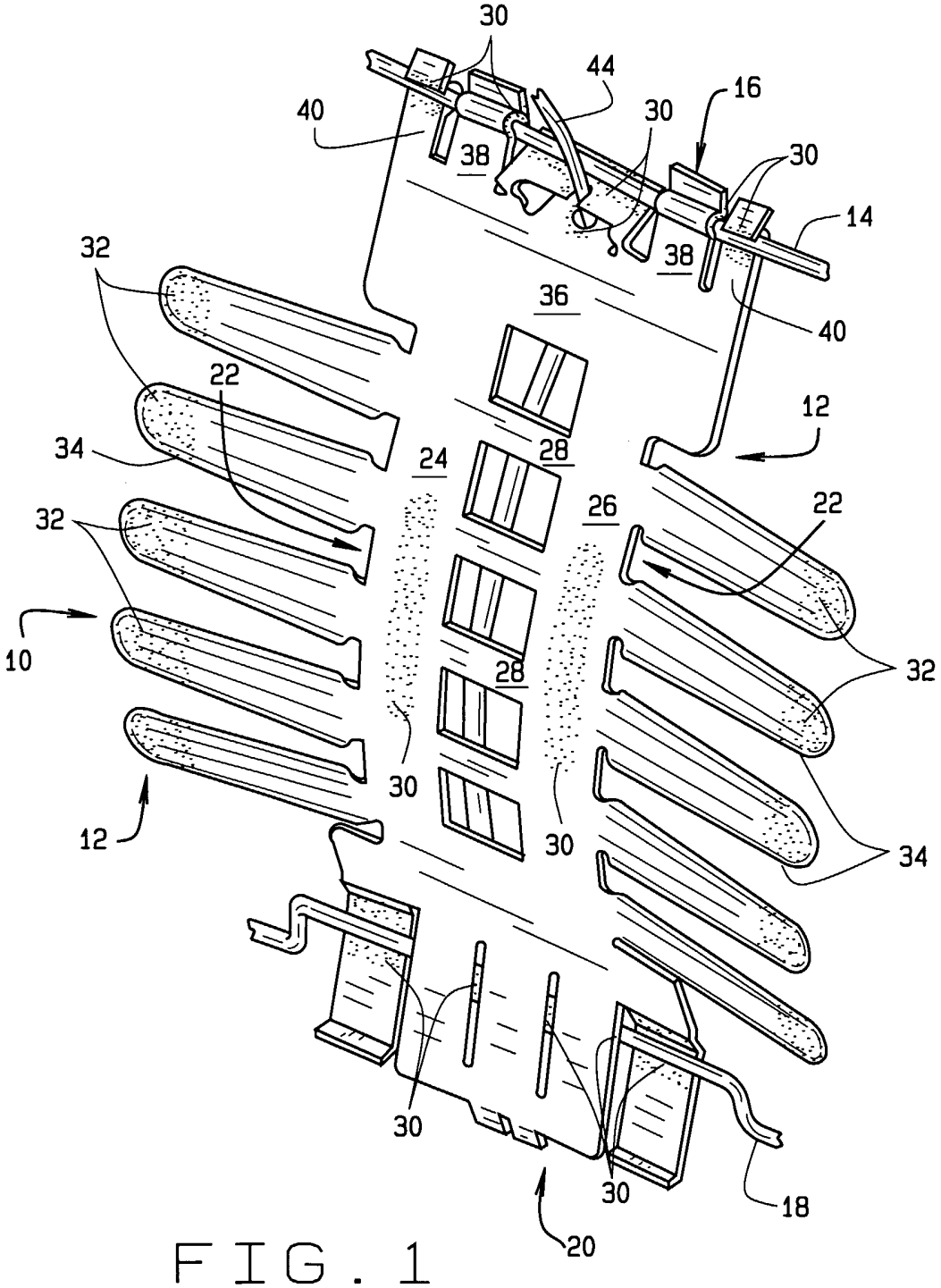
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FIG. 1

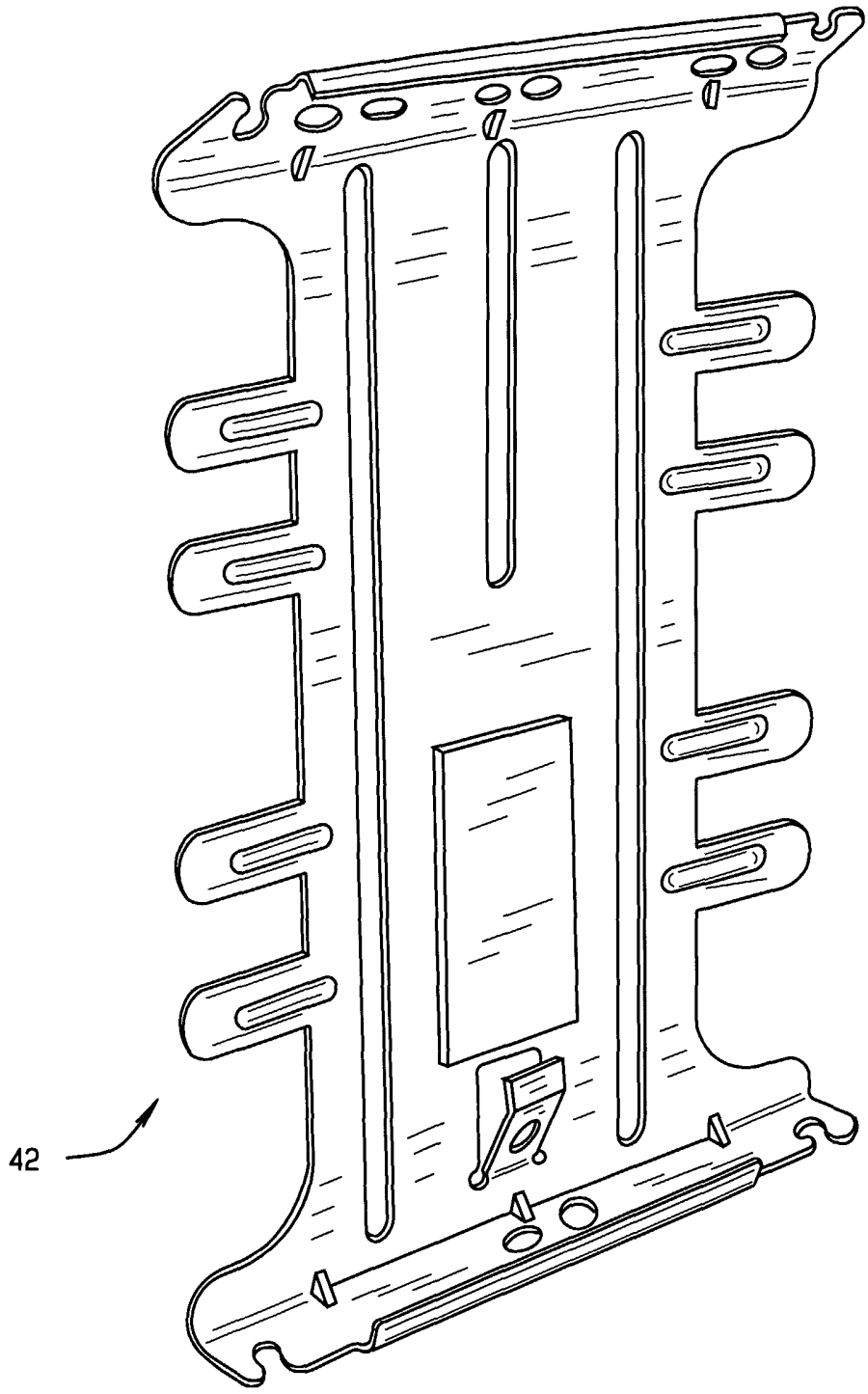

FIG. 2

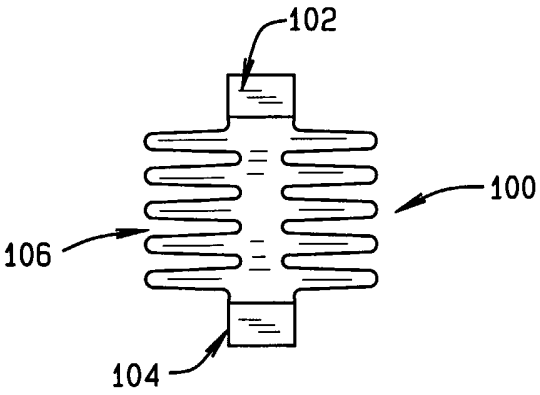

FIG. 3

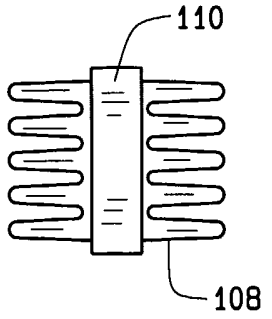

FIG. 4

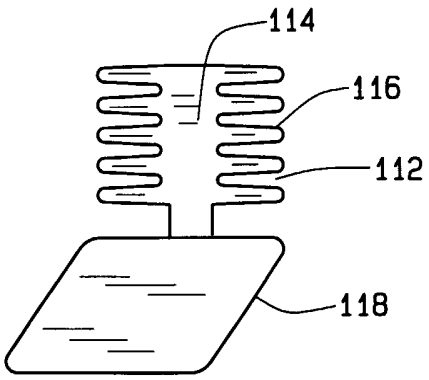

FIG. 5

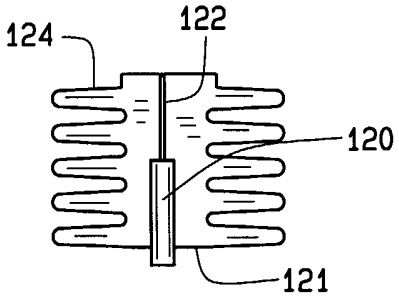

FIG. 6A

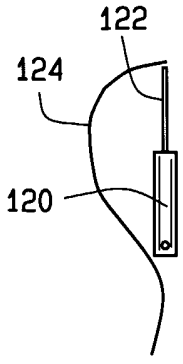

FIG. 6B

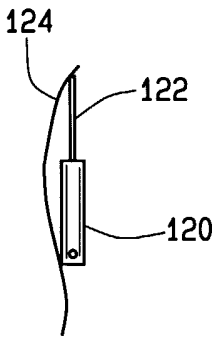

FIG. 6C

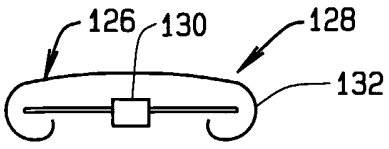

FIG. 7A

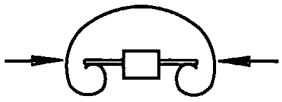

FIG. 7B

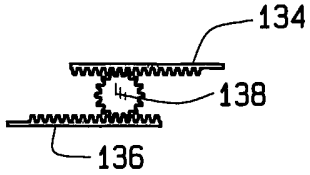

FIG. 7C

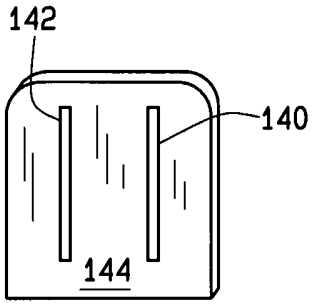

FIG. 8

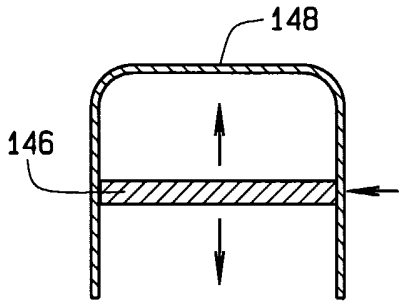

FIG. 9A

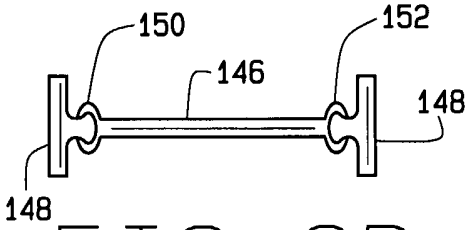

FIG. 9B

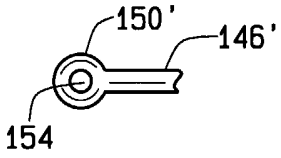

FIG. 9C

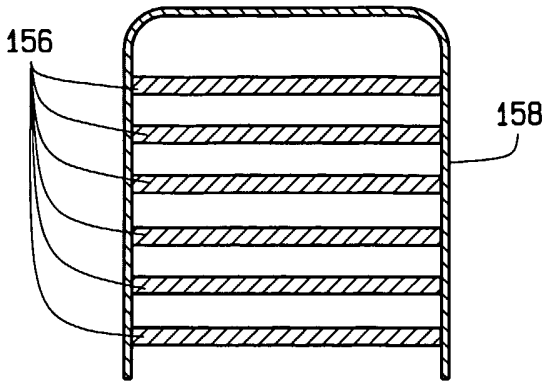

FIG. 10

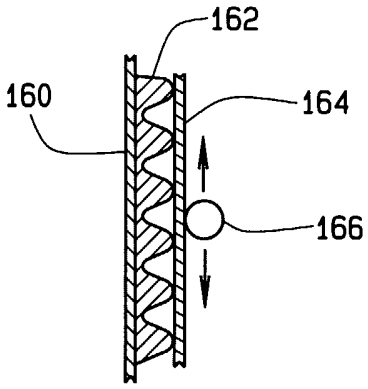

FIG. 11