April 30, 1963 H. C. FLINT 3,087,719

SPRING CUSHION CONSTRUCTION

Filed May 23, 1960 7 Sheets-Sheet 1

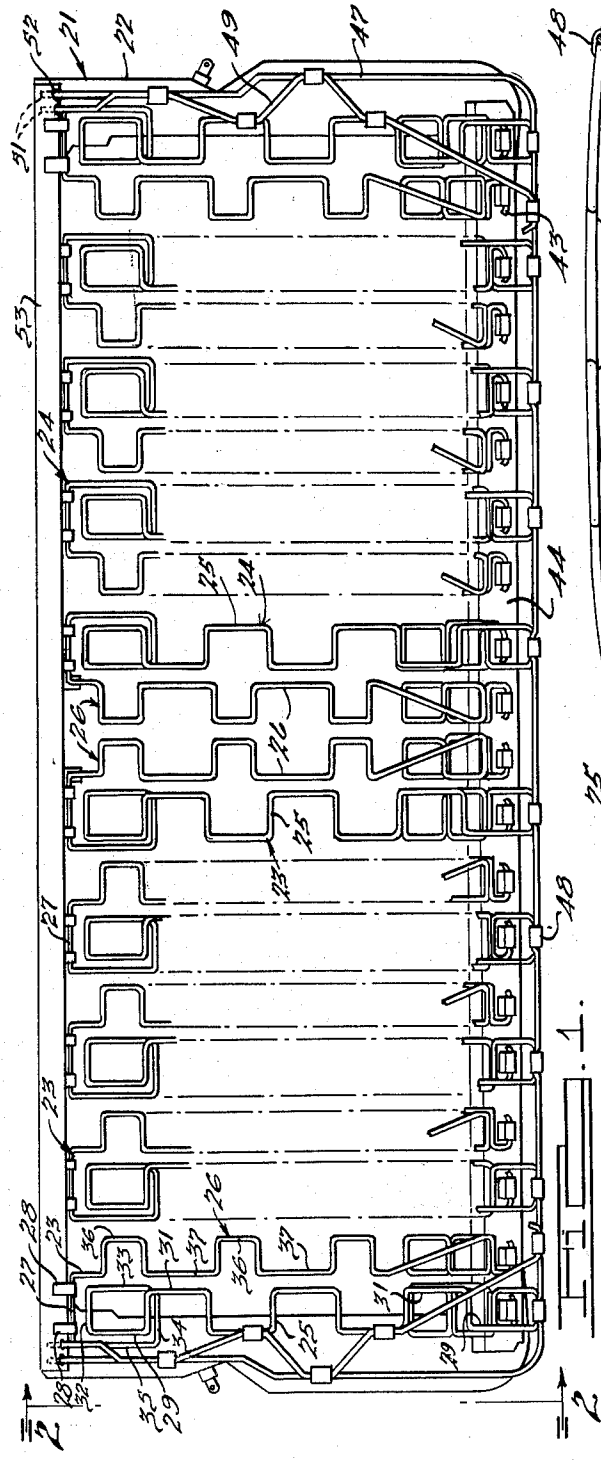


FIG. 1.

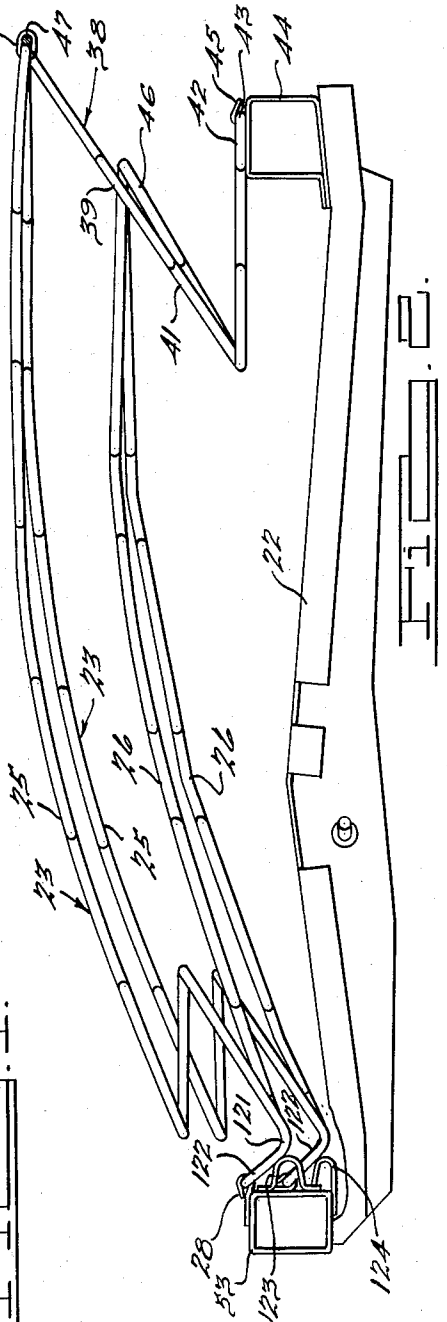


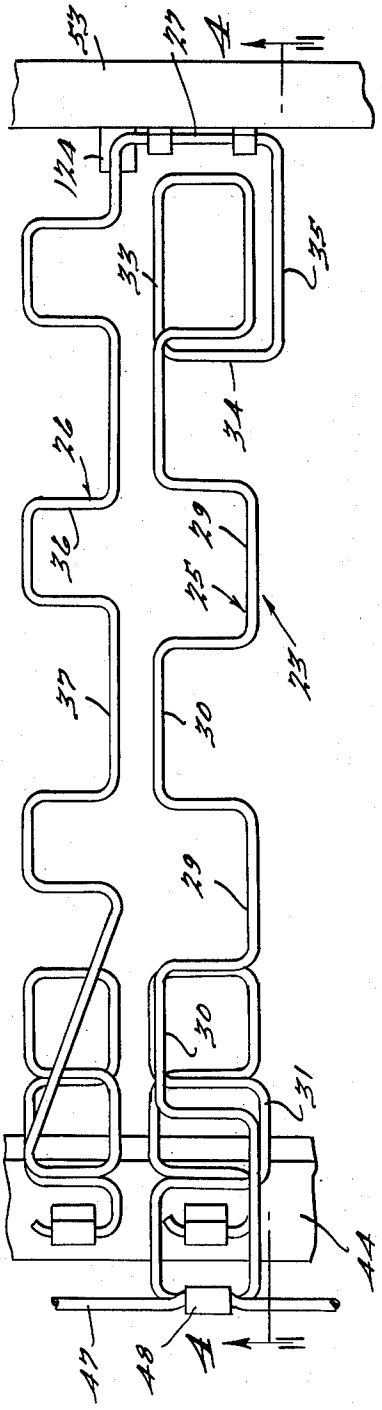
FIG. 2.

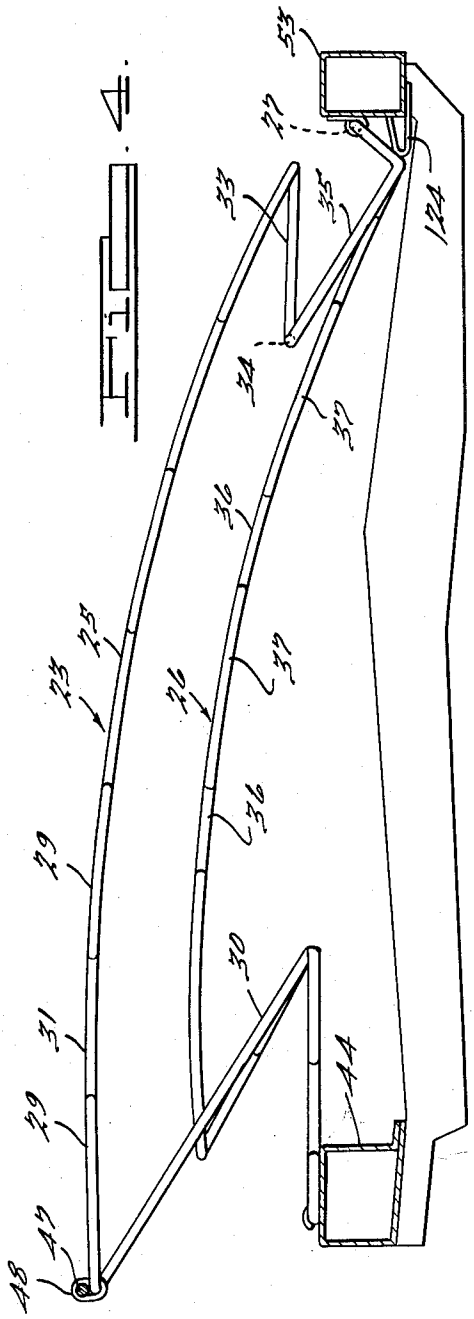
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SPRING CUSHION CONSTRUCTION

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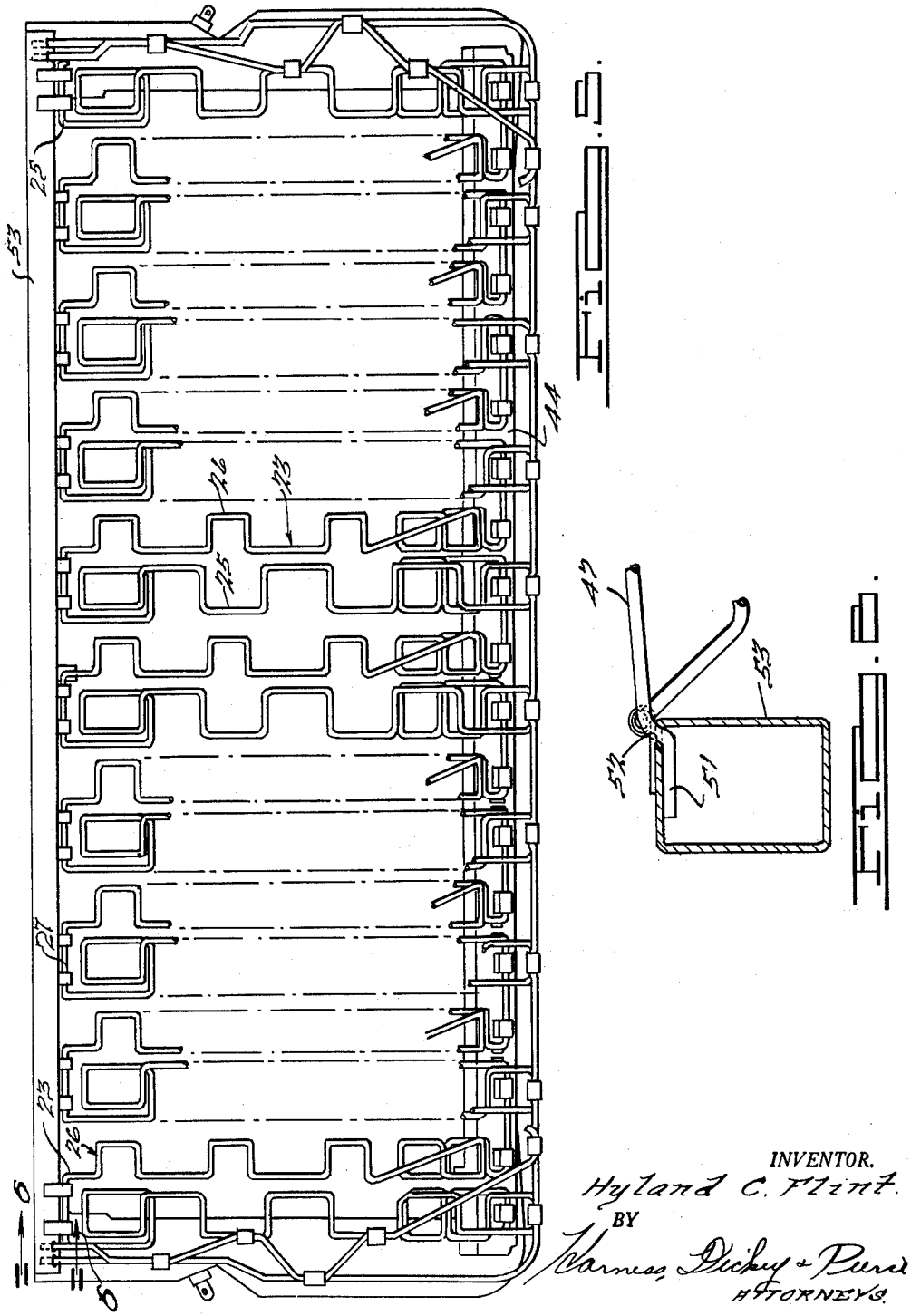


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SPRING CUSHION CONSTRUCTION

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SPRING CUSHION CONSTRUCTION

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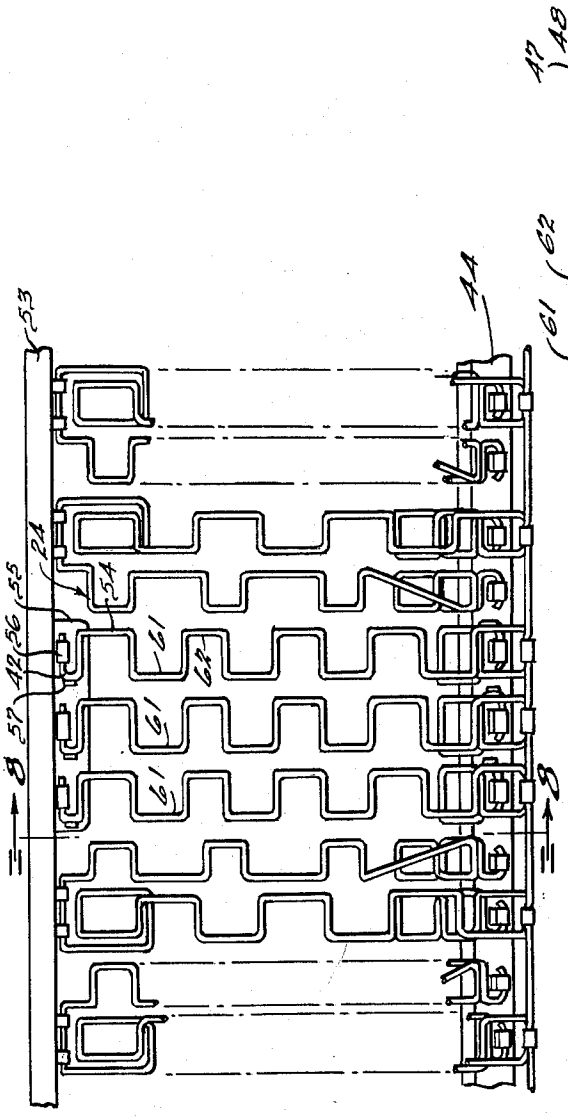


FIG. 4.

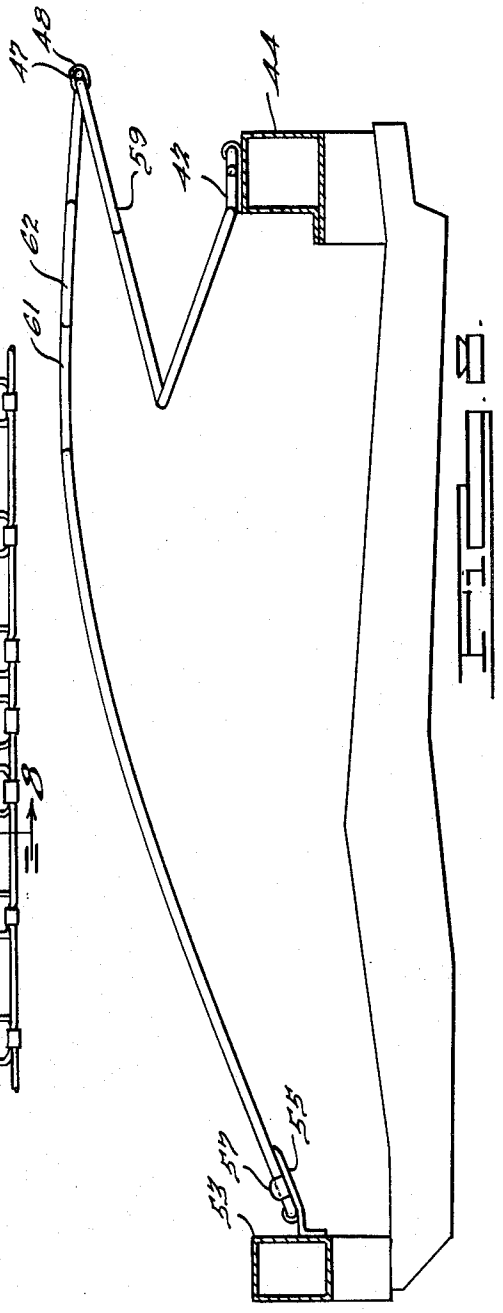


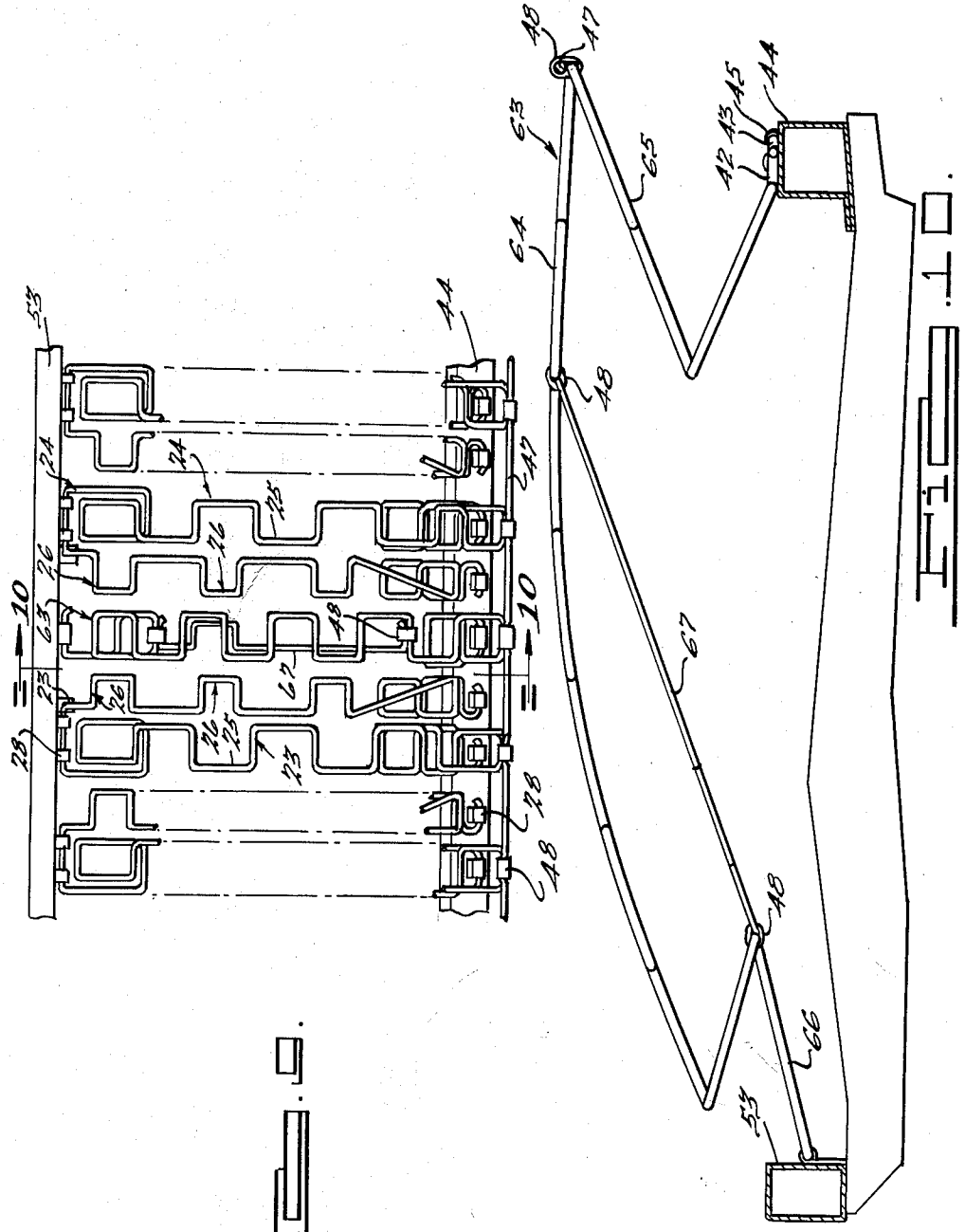
FIG. 5.

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SPRING CUSHION CONSTRUCTION

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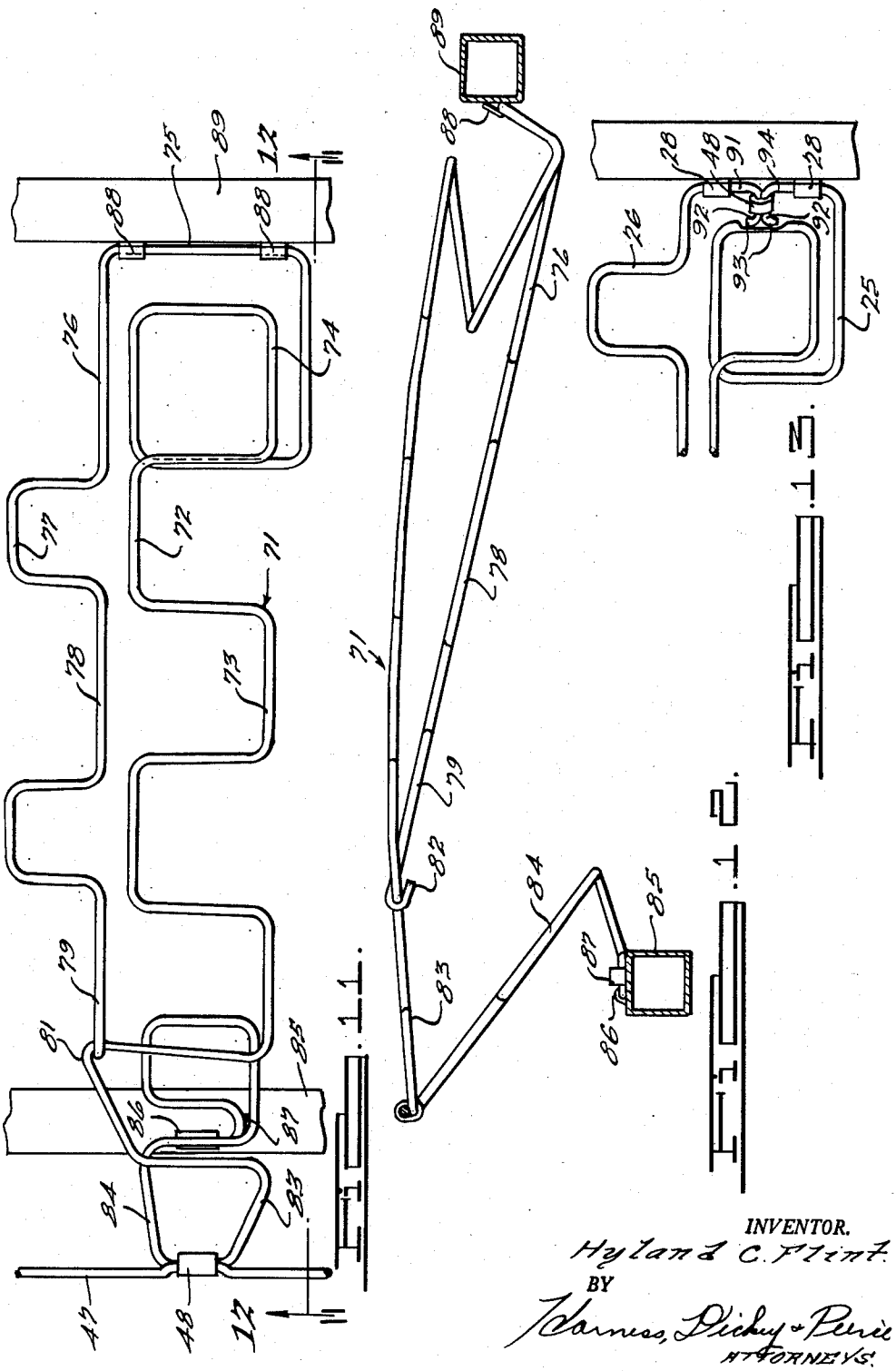


FIG. 11.

FIG. 12.

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SPRING CUSHION CONSTRUCTION

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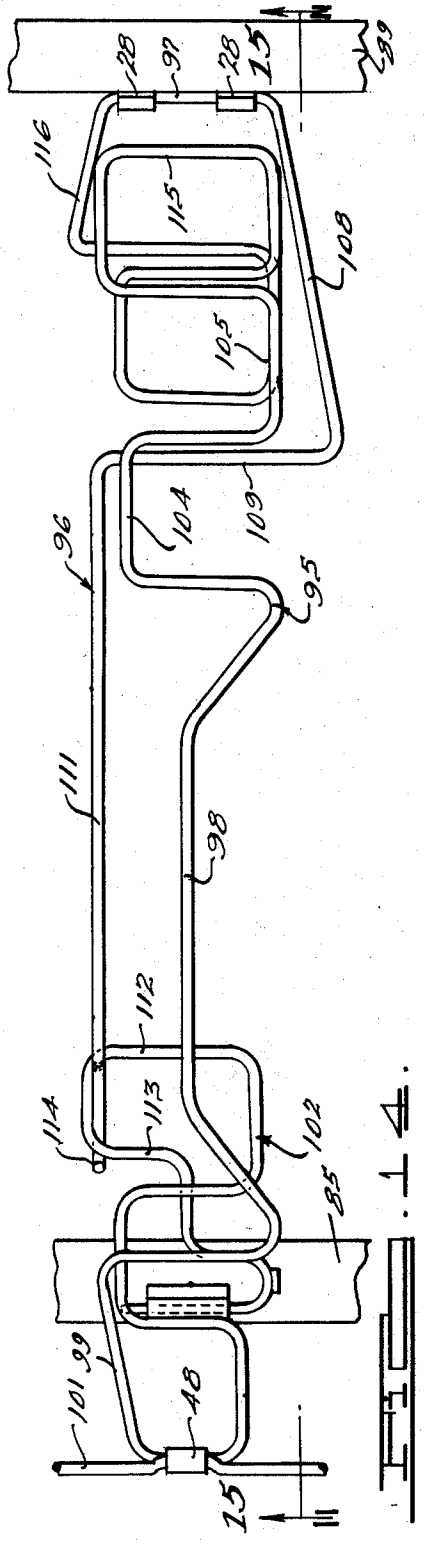


FIG. 14.

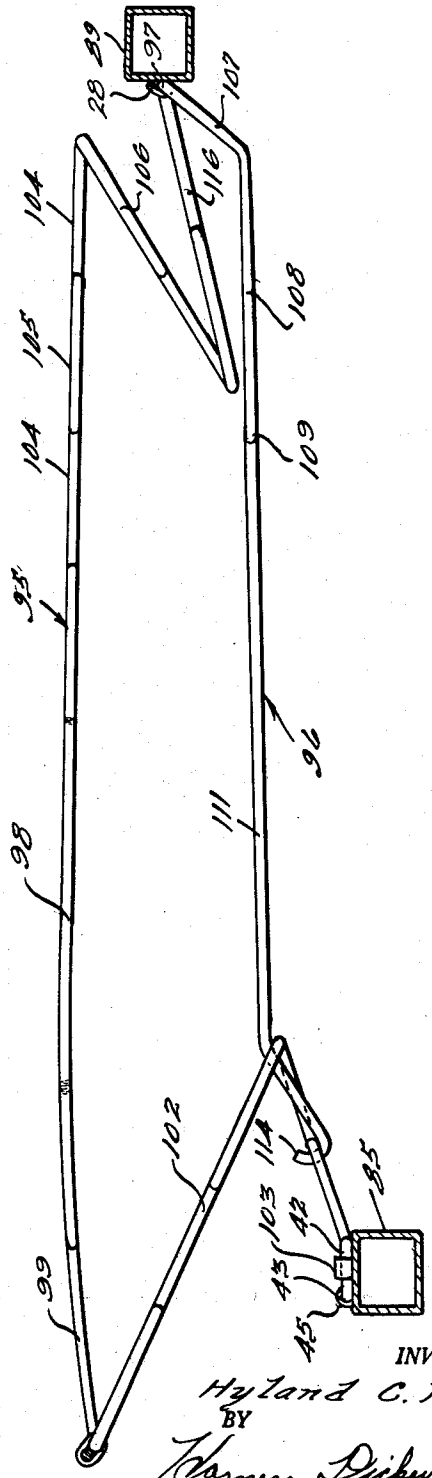


FIG. 15.

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3,087,719

SPRING CUSHION CONSTRUCTION

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Filed May 23, 1960, Ser. No. 31,029
24 Claims. (Cl. 267—85)

This invention relates to spring elements of double unit construction, and particularly to a spring element having a main load supporting portion and a helper portion disposed adjacent thereto.

In the patent to H. C. Flint, No. 2,868,276, a spring cushion is illustrated having main load bearing spring strips interspersed with helper spring strips disposed therebetween which are constructed independently of each other. The separate units in this construction resulted in the use of an increasing number of attaching elements for the cushion even though either or both of the elements are made of substantially straight wire. While straight wire elements reduce the length of wire employed, it was found that to provide softness the ends of the straight sections must have coil springs, rubber blocks, loops, reversely bent sections and the like applied thereto. The provision of the flexibility near the ends of the elements did not produce as satisfactory a result as when the flexibility or yield point is disposed adjacent to the A point of the load bearing area which is approximately one-third the length of the load bearing portion of the spring strip as measured forwardly from the rear edge. To this end torsion bars are preferably provided in both of the elements between the ends thereof. To maintain the flexibility and the desired support at the point where the main load is applied, that is to say, at the A point, it was found desirable to control the deflection and contouring of the load bearing area, and this was successfully accomplished by the use of a brace rod extending from the lower supporting element at the rear of the unit to the forward portion of the main load bearing section. By connecting the helper portion of the spring unit of the present invention at its rear end to the rear end of the load bearing section and so form the end as to permit it to pivot, the same effect is produced in the main load bearing section of the spring unit, thereby eliminating the brace rod, which adds further to the simplicity and usefulness of the present double section construction.

The high-low sections of the spring unit have the advantage of providing a desirable contour to the support for a light as well as a heavy person, the support for the latter being substantially assisted by the lower or helper section which is located between the high or main load bearing section. The main load bearing section is so constructed as to permit the rear end to have a high degree of vertical flexibility to avoid building up pressure at the base of the spine of a seated person. This is accomplished by a 360° turn of the last loop at the rear of the load bearing section, and two additional 90° turns carry the wire to a pivot point on the rear rail. The wire sections disposed on the axis in the pivot point are then bent at another 90° angle and continued forwardly and formed into the lower helper section of the spring at the side of the main load bearing section thereof. The axle section joining the two units is freely pivoted in the supporting clips on the rear frame member and the need for the brace rod mentioned above, as disclosed in the H. C. Flint Patent 2,719,578, is eliminated.

When additional strength is desired in the spring units, instead of increasing the gauge of the wire thereof, stop elements are provided on the frame to engage an arm on either or both of the sections of the unit at the front or rear of the frame member to prevent the rotation of the supporting ends, which thereby substantially strengthens

the load bearing section and the helper section from deflecting. This is most desirable for the end springs of the assembled cushion and also at the central tunnel portion of the floor, if such a tunnel portion is employed. When the brace rod was used in the manner as illustrated in the drawings of the mentioned patent, the amount the rear end of the unit could pivot was limited and the Z-shaped rear supporting portion of the load bearing surface was restricted also in vertical flexibility. Such restrictions are eliminated in the present spring unit and the rear end may move vertically to the degree as required by the load even to the extent of portions of the load bearing section passing downwardly beyond portions of the helper section or the axle portion of the wire joining the two sections together. The thickness of the resulting seat is substantially reduced, accomplished by the reduction in height of the end supporting portions and the directing of the joining sections downwardly before being extended forwardly adjacent to the main load bearing section.

When load is applied to the A point of the load bearing sections of a spring unit, the downward movement of the surface causes the pivoted portions or axle which joins the two sections to transfer a load to the helper section, thereby causing its surface to begin to lower but at a slower rate than the deflection of the main load bearing section which has a softer construction. In practice, this ratio of vertical travel at the A point shows that the upper surface will move downwardly about 2½" before the applied load contacts the lower section and that before this contact occurs the lower section will have moved downwardly about ¾". Thereafter, both sections support the load and move downwardly together until a predetermined static load point is reached which determines the location of the eye level of the occupant. It will thus be seen that the higher surface of the load bearing section moves substantially faster than the lower surface of the helper section. This is due to the highly flexible rear end of the load bearing section and the larger V supporting portion at the front end thereof in contrast to the helper section which has only limited flexibility at the rear end and a much smaller V supporting portion at its front end.

As more and more of the load is applied to the load bearing section of the unit, the lower helper section slowly deflects until the deflection of the load bearing section catches up with that of the helper section which begins to pick up load so that both sections operate in unison thereafter to support the load with a maximum degree of comfort. By employing V-shaped supporting portions at the front ends of the load bearing and helper sections, the front border wire connecting the point of juncture of the V supports with the load bearing sections appears substantially softer to a person of light weight than would occur if each section, rather than alternate sections, were attached to the border wire. This will also be true of a heavy person, with the softness being maintained when the front end of the load bearing sections is deflected into the plane of the V supports for the helper sections. Therefore, it was found that there is no necessity for interconnecting the V supporting portions of the helper section of the unit and that such portions were sufficiently stabilized by contact with the seat pad when applied thereover. This arrangemtnt eliminates substantial cost, time, labor and material.

The unit having the joined load bearing and helper sections provides substantial flexibility for the construction of cushions. The same unit may be employed over the entire seating area with the one end area having the helper section omitted, or right and left-hand units may be employed, with the two helper sections being adjacent the center of the frame. It is within the purview of the invention to have the plurality of the units constructed continuously so as to have an entire frame spanned by

the connected units to eliminate handling of the separate units and the difficulty of untangling a plurality of the units.

Accordingly, the main objects of the invention are: to provide a spring unit of two joined sections, one a load supporting section and the other a helper section disposed adjacent thereto; to join a load bearing and helper section of a spring unit with a pivotal bar at their rear ends by which the rear ends of the composite unit are pivotally supported on the rear frame element of a cushion; to form a cushion of composite load bearing and helper sections which are of the same hand and which extend across the frame, with the helper section at one end omitted therefrom; to form a spring cushion from composite units of joined load bearing and helper sections of the right and left-hand type, with the helper sections disposed adjacent to each other at the center of the frame or spaced apart with a single spring unit disposed therebetween; to form a spring cushion from a plurality of composite units made up of a load bearing and helper section which are joined together in continuous construction and which are directly applied to a frame to eliminate the handling, tangling and individual application of the units thereto; to provide a more rugged spring unit at substantially reduced cost, and, in general, to construct a spring cushion from units which are simple in construction and economical of manufacture and assembly.

Other objects and features of novelty of the invention will be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a plan view of a seat cushion constructed on a frame from spring units, embodying features of the present invention;

FIG. 2 is an enlarged end view of the structure illustrated in FIG. 1, as viewed from the line **2—2** thereof;

FIG. 3 is a plan view of the spring unit illustrated in FIG. 1;

FIG. 4 is a view in elevation of the spring unit illustrated in FIG. 3;

FIG. 5 is a plan view of a seat cushion construction, similar to that illustrated in FIG. 1, showing another form thereof;

FIG. 6 is an enlarged sectional view of the structure illustrated in FIG. 5, taken on the line **6—6** thereof;

FIG. 7 is a view of structure, similar to that illustrated in FIG. 5, showing a still further form of the invention;

FIG. 8 is an enlarged sectional view of the structure illustrated in FIG. 7, taken on the line **8—8** thereof;

FIG. 9 is a broken plan view of a seat cushion, similar to that illustrated in FIG. 7, showing a still further form of the invention;

FIG. 10 is an enlarged sectional view of the structure illustrated in FIG. 9, taken on the line **10—10** thereof;

FIG. 11 is a view of a spring unit, similar to that illustrated in FIG. 3, showing another form thereof;

FIG. 12 is a view in elevation of the spring unit illustrated in FIG. 11;

FIG. 13 is a broken view of a spring unit, similar to that illustrated in FIGS. 3 and 11, showing a further form of construction thereof;

FIG. 14 is a plan view of a spring unit, similar to that illustrated in FIG. 11, showing still another form which the unit may assume, and

FIG. 15 is a view in elevation of the spring unit illustrated in FIG. 14.

In FIGURES 1 to 4, a seat cushion **21** is illustrated as being constructed on a frame **22** from composite spring units **23** and **24**. The spring units **23** and **24** are of the same construction except that of being of the opposite hand. The units are constructed to have a load bearing section **25** and a helper section **26** which are joined together at the rear end by a length of wire **27** which forms an axle by which the rear end is supported in one or a pair of clips **28** for pivotal movement therein. The load bearing section **25** is formed back and forth to provide oppositely facing loops **29** and **30** with a V-shaped supporting portion **31** at the front end. The loops may be of the same or varying dimensions to control the contour assumed by the load bearing section **25** when a load is applied thereto. Such a load-bearing section may follow the construction of the spring strips of the H. C. Flint et al. Patent No. 2,684,844 on formed wire. At the rear end **32** of the load bearing area, the wire is formed forwardly and downwardly at **33**, transversely at **34**, and rearwardly and downwardly at **35** to join with the axle portion **27** which is connected to the helper section **26** of the unit. The helper section is disposed alongside of and spaced from the load bearing section. The helper section has loops **36** and **37** which are oppositely facing and of different width for the purpose of regulating the strength of the section.

The forward end of the load bearing section has a supporting portion **38** of V shape containing oppositely disposed loops **39** and **41** in the upper and lower arms thereof. The lower arm has the end formed into a U-shaped element **42**, the transverse end **43** of which is secured on top of the front frame member **44** by a clip **45** which retains the end against downward pivotal movement. A similar supporting portion **46** but of substantially less height is provided at the forward end of the helper section of the unit, with its lower arm provided with a U-shaped element **42** having a transverse end **43** which rests upon the frame element **44** and is secured thereon by a clip **45**. The spring units **23** and **24** are exactly the same as pointed out hereinabove except for the helper sections **26** being located on the left or right-hand side of the load bearing section **25** of the unit.

In FIG. 1, the units **23** on the left of the frame **22** can be said to be right-handed, while the units **24** on the right thereof can be said to be left-handed. With this arrangement, the helper sections **26** of both units are disposed adjacent to each other on the center line of the frame. A U-shaped border wire **47** extends along the sides and across the front of the spring units, being secured by bands **48** to the forward ends of the load bearing sections **25** above and forwardly of the forward end of the helper sections **26**. The arch or spanning units **49** are secured to the side portions of the border wire **47** and to portions of the end load bearing sections **25** of the end units, with offset ends **51** extending into apertures **52** in the rear frame element **53**, as more clearly illustrated in FIG. 6.

In FIG. 5, the units **23** of right-hand construction are illustrated as being joined together to form the entire spring supporting portion of the cushion, with all of the units constructed from a continuous length of wire. The right-hand helper section **26** is removed from the assembly, leaving the right-hand end unit a load bearing section **25**. It is contemplated that the same type of forming dies will be utilized for constructing the continuous wire spring surface of FIG. 5 as is employed in making the single units **23** of FIG. 1. It will be only necessary to move the joining section **27** outwardly as the corners are formed by a 90° bend at the punction with the prior formed unit and at both ends of the section **27** and at the forward end of the helper section **26** to fold the sections upon themselves, as illustrated in the figures. As the sections are folded and moved rearwardly with the sections already folded, another length of wire to be formed is drawn through straightening elements and the now opened forming dies from a large roll of wire provided therebeyond. As the folding of the wire occurs, the sections already folded are moved forwardly toward the forming dies and along therewith to be in direct continuation of the new sections. After a sufficient number of the units have been folded upon themselves in this manner, ten units as illustrated in FIG. 5, the end helper section **26** is cut from the multiple unit and the multiple unit is ad-

vanced over a seat frame which is raised to have open clips **28** thereon receive the joining or axle portions **27** at the rear and the transverse ends **43** at the front by open clips **45**. The clips are bent over to secure the axles **27** and ends **43** by adjacent clinching tools which are automatically operated to have the continuous unit supported directly on the frame without any handling and with the elimination of tangling as often occurs. After one or more pairs of a section are formed for the next multiple unit assembly, the helper section cut from the prior multiple unit is cut from the forward end of the multiple unit being formed. The frame with the multiple unit thereon is advanced through a normalizing furnace and a paint spray booth before or preferably after the border wire **47** and spanning units **49** are applied thereto.

In FIGS. 7 and 8, a central section of the frame is illustrated which is of exactly the same construction as that illustrated in FIG. 1, with the exception that the adjacent helper sections **26** of the spring units **23** and **24** at the center of the frame are spaced a substantial distance apart to uncover a tunnel area in the floor of the vehicle. In the tunnel area spring units **54** are employed having the U-shaped ends **42** secured rigidly on a ledge **55** of the frame **53** by a tunnel element **56** and an upstanding retaining flange **57** in the conventional manner. The opposite end of the spring units **54** contains a V supporting section **59** having a U-shaped supporting end **42** thereon which is secured in the tunnel element **56**. The spring units **54** are more or less of a standard type, being made from formed wire to have oppositely disposed loops **61** and **62** in the load bearing portion, the forward ends of which are secured to the border wire **47** by the bands **48**.

In FIGS. 9 and 10, a still further form of the invention is illustrated, that wherein the seat cushion structure **21** has been modified to have the central spring units **23** and **24** spaced apart sufficiently to have a single spring element **63** disposed on the center line of the frame between the helper sections **26** of the units. The spring element **63** has a load bearing section **64**, a V-shaped supporting section **65** at the front end, and a V-shaped supporting section **66** at the rear end. A brace rod **67** interconnects the apex of the rear V section **66** to the load bearing section **64** near the forward end thereof, being secured in position by a clamping band **48**. The spring follows the contour of the load bearing sections **25** of the units **23** and **24** at the center of the frame.

In FIGS. 11 and 12, a still further form of spring unit is illustrated, that wherein the load bearing section **71** is formed of oppositely disposed loops **72** and **73** and a coiled rear end **74** joined to the pivoted axle portion **75**. The axle portion is connected to a helper section **76** having oppositely disposed loops **77** and **78** of different lengths and an extending end **79** which is disposed over a corner of a loop **81** and secured in position by a hook **82**. The forward end **83** of the load bearing section has a downwardly extending V-shaped portion **84** which is secured to the frame **85** by a tunnel element **86** and retaining flange **87**. The axle portion **75** of the unit is supported in a pair of clips **88** for pivotal movement therein on the rear frame element **89**.

In view of the substantial length of wire required to construct any of the units **23**, **24** and **71**, it is within the purview of the invention to construct the load bearing and helper sections independently of each other and have the rear ends rigidly joined to form the axle portion between the sections. Such an arrangement is illustrated in FIG. 13 wherein the axle portion **91** on the helper section **26** is extended at right angles at **92** and further flanged at **93**, with the pivoted end **94** of the load bearing section **25** similarly bent to provide a right angle portion **92** and a bent end **93**. A band **48** connects the right angle portions **92** in fixed relation to each other, retained in position by the bent ends **93**. The rear ends **91** and **94** of both sections will pivot in unison in the same manner as when the single axle portion **27** was a continuous length of wire supported in the clips **28**.

A further form of composite spring unit is illustrated in FIGS. 14 and 15 wherein the load bearing section **95** of the unit has a helper section **96** connected thereto by a section of wire **97** which is supported for pivotal movement in the clips **28** in the manner as pointed out hereinabove. The load bearing section has a straight portion **98** forwardly of the A point thereof which terminates in a loop **99** which is secured to a border wire **101** by a band **48**. The front end of the load bearing section **95** has a V portion **102** extending downwardly thereof and provided with a U-shaped supporting end **42** having the transverse end portion **43** secured in a tunnel element **45** and retained in position by an upwardly extending flange **103**. Rearwardly of the straight portion **98** of the load bearing section of the unit, oppositely disposed loops **104** and **105** are provided which terminate in a V end section **106** which is joined by the pivoted axle portion **97** to the helper section **96** which has a downwardly extending portion **107**, a forwardly extending portion **108**, a transverse portion **109** and a forwardly extending portion **111**. The forward end of the extending portion **111** is disposed over a torsion bar **112** of the front V supporting element **102** and beneath the torsion bar **113** forwardly thereof. A hooked end portion **114** on the forwardly extending straight portion **111** extends upwardly over the torsion bar **113** to anchor the end to the apex portion of the front V supporting portion **102**. It will be noted that the end torsion bar **115** of the load bearing section **95** is narrower than the portions **108** and **116** with which the torsion bar **115** might otherwise engage when deflected. In all of the spring constructions, the rear end of the load bearing section is soft so that it may deflect a substantial amount when loaded without having the rearmost torsion bar contact the rear V-shaped supporting elements of both the load bearing and helper sections which are constructed of greater width so as to be out of engagement therewith.

The spring cushion constructed from the composite units provides substantial durability and comfort at a substantial saving of time and money. Heretofore, when greater support was desired at each side edge of the cushion or in the area about the tunnel at the center of the cushion, heavier gauge wire was employed which added further to the difficulty of separating the springs and having them disposed at different points along the frame. In the present arrangement, the endmost spring units are mounted higher on the supporting frame, as illustrated in FIG. 2. The end portion **121** of the end section **25** is pivotally supported in clips **28** and abuts the outwardly extending bracket **123** attached to the inner face of the rear frame element **53**. By mounting the rear end of the load bearing section **25** higher, pull-down height is provided which tensions the cover material applied over the face of the cushion in the conventional manner. The presence of the bracket **123** prevents the rotation of the end portion **121** downwardly, thereby resisting the downward deflection of the load bearing section which therefore is able to support a substantially greater load. It will be further noted that a bracket **124** is provided forwardly of the face of the rear frame element **53** in position to engage an arm **122** of the load bearing section of the spring which is adjacent to the tunnel or at some other point along the frame to strengthen one or more of the spring sections at that point. It is to be understood that the bracket **124** may intercept the arm **122** of the load bearing section or an arm on the helper section, or both, depending upon the amount of strength required in the spring sections. Thus, the entire cushion may be made from the same gauge wire and the same unit structure while strengthening certain of the spring sections by controlling the degree of pivotal movement of the joining axle portion of the spring units. This makes possible the construction of the entire spring

area of the frame from a single, continuous wire and the controlling of the supporting strength of each of the units thereof at any point along the frame. It was found that in a bucket seat type of construction, when employing the bracket **123** on the right and left-hand load bearing sections, the sections were retained elevated above the inner sections which were capable of deflecting a substantial amount below the side sections which encompassed the occupant. Therefore, the usefulness of the brackets **123** and **124** is not limited to the example illustrated since, as pointed out with regard to the tunnel area and the bucket seat, there are many applications where it is desired to add strength at certain points of the cushion surface. The restricted pivoting at the rear of the load bearing section of the spring units and in some instance of the helper sections thereof will have substantial bearing on strengthening areas of the cushion.

What is claimed is:

1. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members, and means for securing the front and rear ends of each strip to the front and rear frame members in aligned relation along the length thereof, said spring strips being made from a continuous length of wire.

2. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members having downwardly extending front end supporting portions of different heights, and means securing the front and rear ends of the spring strips to said frame members in aligned relation along the length thereof, the sidemost spring strips and certain of the medial spring strips having the front ends extending upwardly above other spring strips located therebetween as a result of the portions of different heights.

3. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members and with the ends secured thereto in aligned relation along the length of the members, the sidemost spring strips and certain of the medial spring strips having the front ends extending upwardly above other spring strips located therebetween, and a border wire joining the spring strip having the upwardly extending front ends of greater height.

4. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members and with the ends secured thereto in aligned relation along the length of the members, the sidemost spring strips and certain of the medial spring strips having the front ends extending upwardly above other spring strips located therebetween, and a border wire joining the spring strip having the upwardly extending front ends of greater height, the rear ends of the sidemost spring strips being supported higher than spring strips disposed therebetween.

5. In a seat construction, a seat frame having front and rear members spaced by side members, and a plurality of spring strips extending between said front and rear members, the ends of each spring strip being secured to the front and rear frame members in aligned relation along the length thereof, the adjacent pairs of said spring strips being joined together at the rear end.

6. In a seat construction, a seat frame having front and rear members spaced by side members, and a plurality of spring strips extending between said front and rear members with the ends of each spring strip secured thereto, the adjacent pairs of said spring strips being joined together at the rear end, the front end of one spring strip of said pairs being lower than the front end of the other spring strip.

7. In a seat construction, a seat frame having front and rear members spaced by side members, and a plurality of spring strips extending between said front and rear members and secured thereto, the adjacent pairs of said spring strips being joined together at the rear end, the front end of one spring strip of said pairs being lower than the front end of the other spring strip, the spring strip at the left side and at the right side of the frame being the one having the greater height at the front.

8. In a seat construction, a seat frame having front and rear members spaced by side members, and a plurality of spring strips extending between said front and rear members and secured thereto, the adjacent pairs of said spring strips being joined together at the rear end, the front end of one spring strip of said pairs being lower than the front end of the other spring strip, the spring strip at the left side and at the right side of the frame being the one having the greater height at the front, the adjacent spring strips of the pair at the center of the frame being the ones of lesser height at the front.

9. In a seat construction, a seat frame having front and rear members spaced by side members, and a plurality of spring strips extending between said front and rear members and secured thereto, the adjacent pairs of said spring strips being joined together at the rear end, the front end of one spring strip of said pairs being lower than the front end of the other spring strip, the endmost spring strips and certain of those therebetween having front edges of greater height than spring strips disposed therebetween.

10. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members and secured thereto, the adjacent pairs of said spring strips being joined together at the rear end, the front end of one spring strip of said pairs being lower than the front end of the other spring strip, the spring strip at the left side and at the right side of the frame being the one having the greater height at the front, the adjacent spring strips of the pair at the center of the frame being the ones of lesser height at the front, the adjacent spring strips being spaced apart, and a spring strip having its front end of greater height disposed therebetween.

11. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members and secured thereto, said spring strips being made up into pairs of sections, and a load bearing section joined to an adjacent helper section, the front end of the latter section being lower than the front end of the former section.

12. In a seat construction, a seat frame having front and rear members spaced by side members, a plurality of spring strips extending between said front and rear members and secured thereto, said spring strips being made up into pairs of sections, and a load bearing section joined to an adjacent helper section, the front end of the latter section being lower than the front end of the former section, said two sections being joined at the rear end providing a straight portion by which the two sections are supported for pivotal movement on said frame.

13. In a spring unit for a seat frame, a load bearing section made of wire bent back and forth to form a seating area having a downwardly extending front supporting portion and a downwardly extending rear supporting portion the end of which is extended laterally and joined to a helper section disposed adjacent to the load bearing section.

14. In a spring unit for a seat frame, a load bearing section made of wire bent back and forth to form a seating area having a downwardly extending front supporting portion and a downwardly extending rear supporting portion the end of which is extended laterally and joined to a helper section disposed adjacent to the load bearing section, and means for supporting the laterally extending end portion of the unit to a frame for pivotal movement relative thereto.

15. In a spring unit for a seat frame, a load bearing section made of wire bent back and forth to form a seating area having a downwardly extending front supporting portion and a downwardly extending rear supporting portion the end of which is extended laterally and joined to a helper section disposed adjacent to the load bearing section, means for supporting the laterally extending end portion of the unit to a frame for pivotal movement relative thereto, and a bracket in engagement with said rear supporting portion for strengthening the load bearing section of the spring unit.

16. In a spring unit for a seat construction, a load bearing section having oppositely disposed loops and downwardly extending supporting portions at the front and rear, the rear supporting portions extending laterally and joined to the rear end of an adjacent helper section which has a downwardly extending supporting portion at the front end of less height than the height of the supporting portion of the front end of the load supporting section.

17. In a spring unit for a seat construction, a load bearing section having oppositely disposed loops and downwardly extending supporting portions at the front and rear, the rear supporting portions extending laterally and joined to the rear end of an adjacent helper section which has a downwardly extending supporting portion at the front end of less height than the height of the supporting portion of the front end of the load supporting section, and pivot means on the frame for supporting the laterally extending portion which transfers a load on the load bearing section to the helper section which deflects at a slower rate while strengthening the former section at an increasing rate until it reaches the plane of the helper section whereby both sections directly support the load.

18. In a spring unit for a seat construction, a load bearing section having oppositely disposed loops and downwardly extending supporting portions at the front and rear, the rear supporting portions extending laterally and joined to the rear end of an adjacent helper section which has a downwardly extending supporting portion at the front end of less height than the height of the supporting portion of the front end of the load supporting section, pivot means on the frame for supporting the laterally extending portion which transfers a load on the load bearing section to the helper section which deflects at a slower rate while strengthening the former section at an increasing rate until it reaches the plane of the helper section whereby both sections directly support the load, and a bracket on the frame engageable with the rear portion of one of the sections for the purpose of strengthening the section for supporting a load.

19. In a spring unit, a load bearing section containing oppositely disposed loops and a downwardly extending front and rear supporting portion by which the load bearing section is supported on a frame, the end of the downwardly extending rear supporting portion being extended laterally and projected forwardly to widen the unit and form a helper section the front end of which is hooked over the front portion of the load bearing section.

20. In a spring construction, a load bearing section having front and rear downwardly disposed supporting portions which are secured to spaced frame elements, the end of the rear supporting portion being extended laterally and forwardly with the forward end secured to the downwardly extending supporting portion at the front end of the load bearing portion.

21. In a spring unit, a load bearing section disposed adjacent to a helper section having a joining rear portion by which the rear end of each section is pivotally supported, and means for securing the joining rear portions in fixed relation to each other.

22. A spring unit made up of adjacent load bearing and helper sections which are joined together at the forward and rear ends and with the endmost helper section removed between the units so that each unit will have a load bearing section at each end, a frame upon which the assembled spring unit is disposed, and securing means on said frame for the ends of said sections.

23. A spring unit made up of adjacent load bearing and helper sections which are joined together at the forward and rear ends and with the endmost helper section removed between the units so that each unit will have a load bearing section at each end, a frame upon which the assembled spring unit is disposed, securing means on said frame for the ends of said sections, a border wire at the sides and forward ends of the load bearing sections of the spring unit, and means for securing the border wire to the forward ends of said load bearing sections.

24. A spring unit made up of adjacent load bearing and helper sections which are joined together at the forward and rear ends and with the endmost helper section removed between the units so that each unit will have a load bearing section at each end, a frame upon which the assembled spring unit is disposed, securing means on said frame for the ends of said sections, a border wire at the sides and forward ends of the load bearing sections of the spring unit, and means for securing the border wire to the forward ends of said load bearing sections, the ends of said border wire being offset and locked in apertures in the frame.

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