May 28, 1963 C. S. REED 3,091,450

SUPPORTING SPRING ASSEMBLY FOR SEATS

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FIG. 1

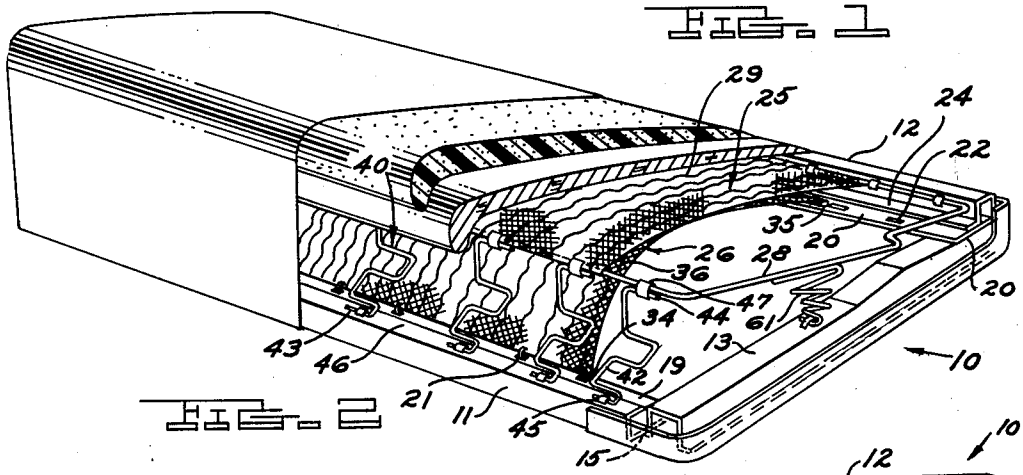


FIG. 2

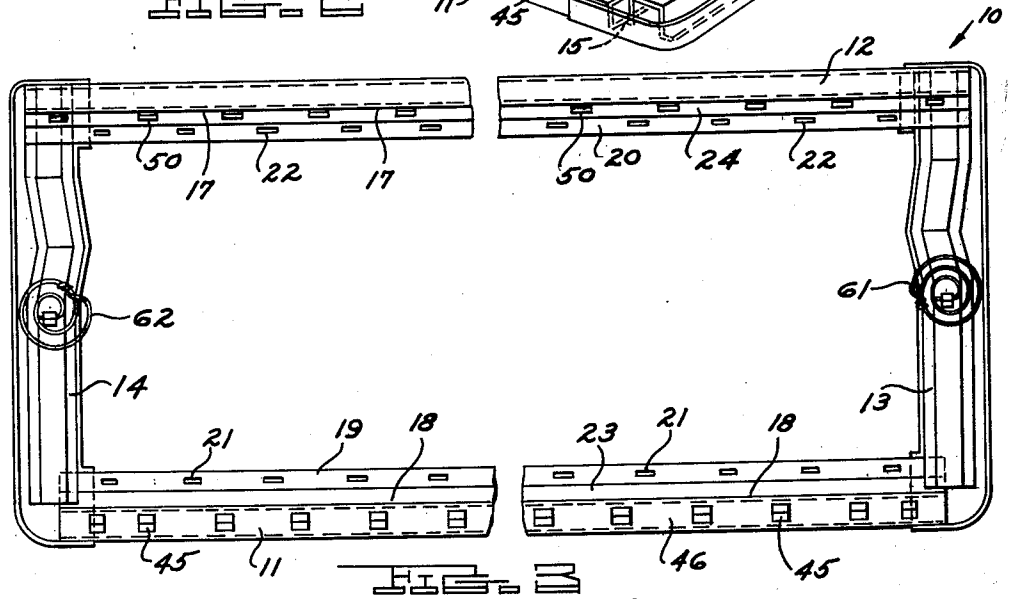
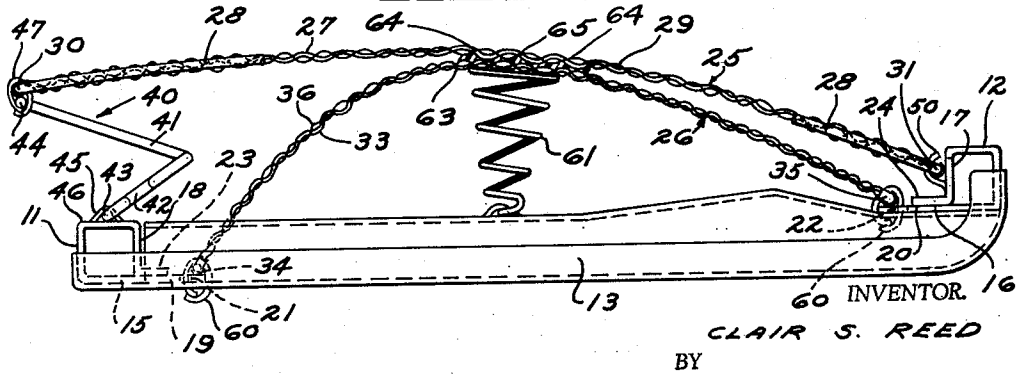


FIG. 3



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FIG. 4

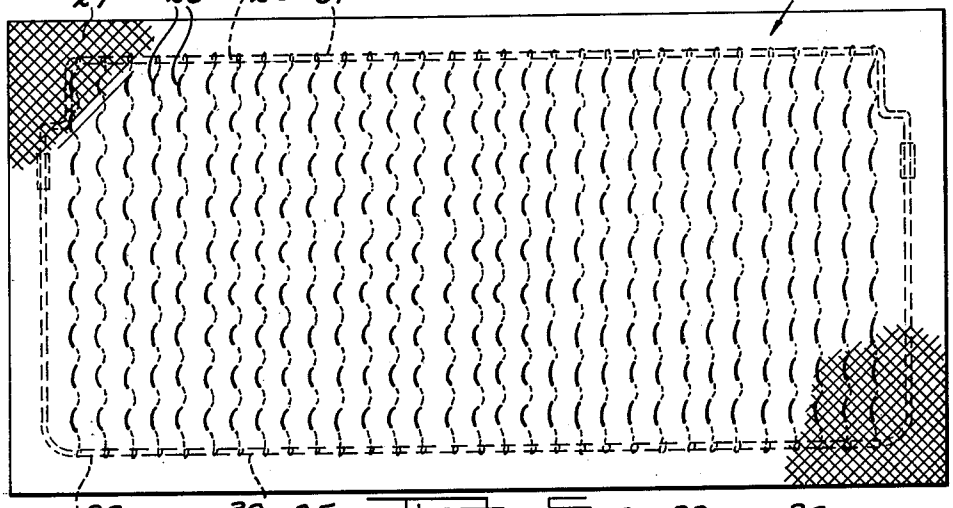
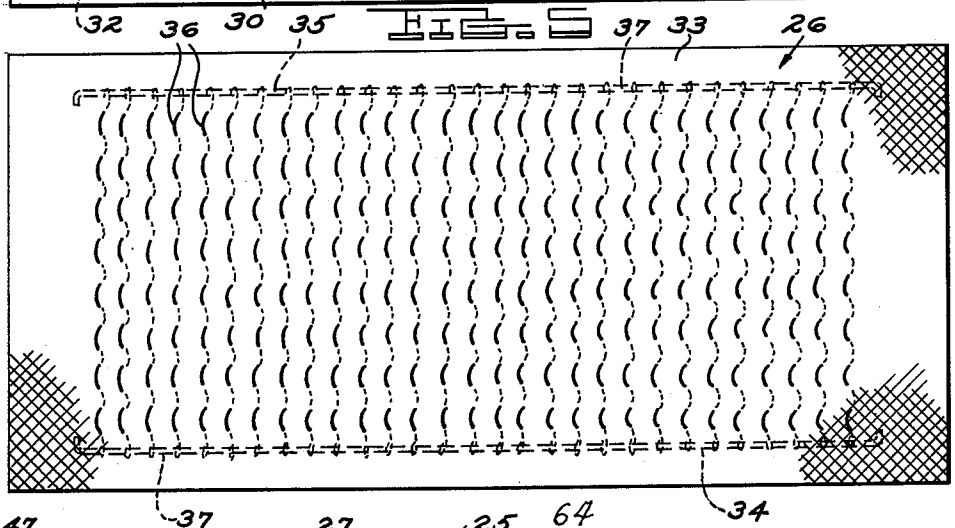


FIG. 5



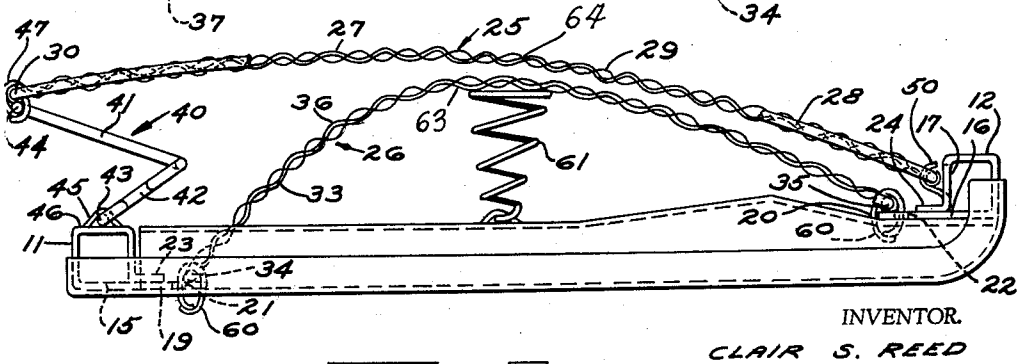


FIG. 6

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FIG. 7

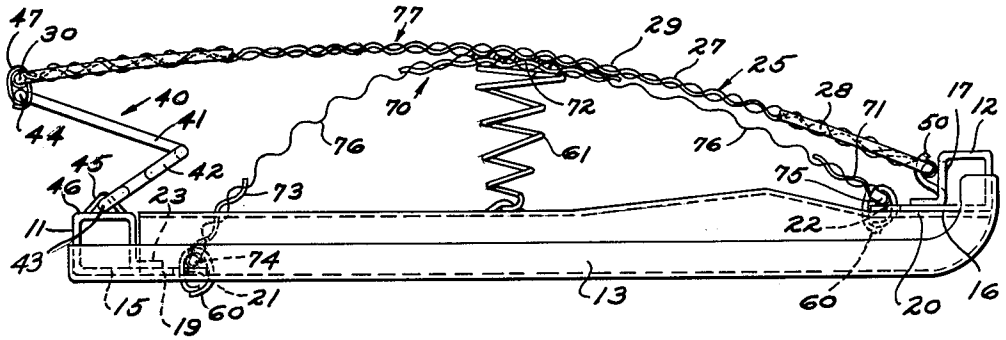
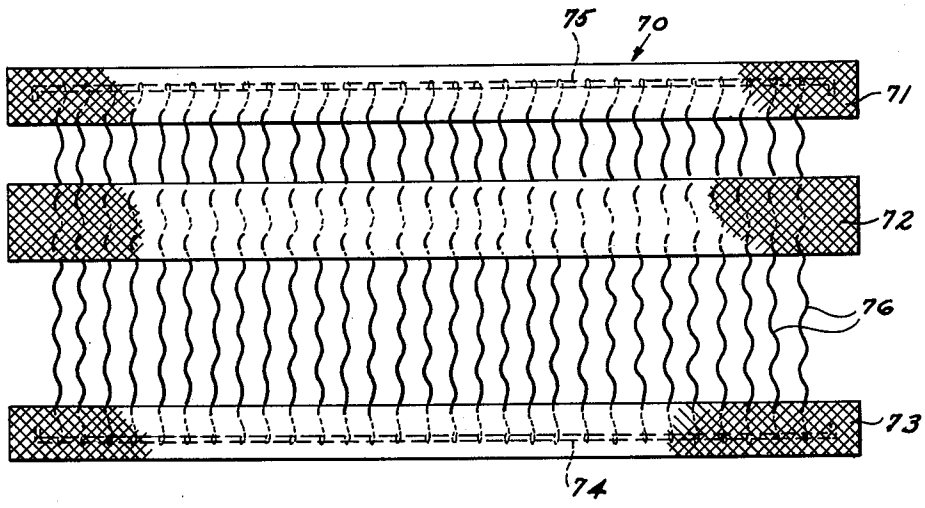


FIG. 8



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FIG. 9

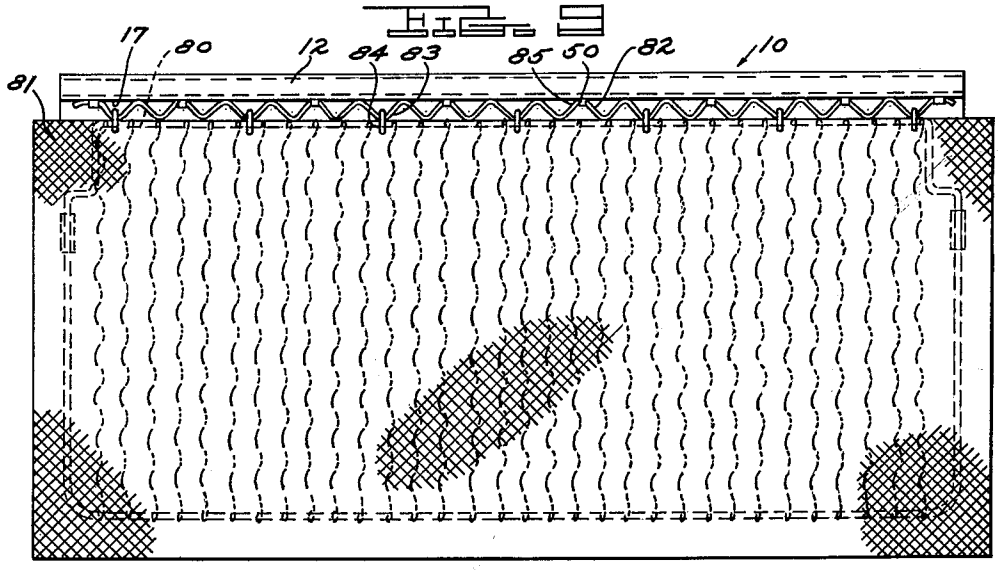
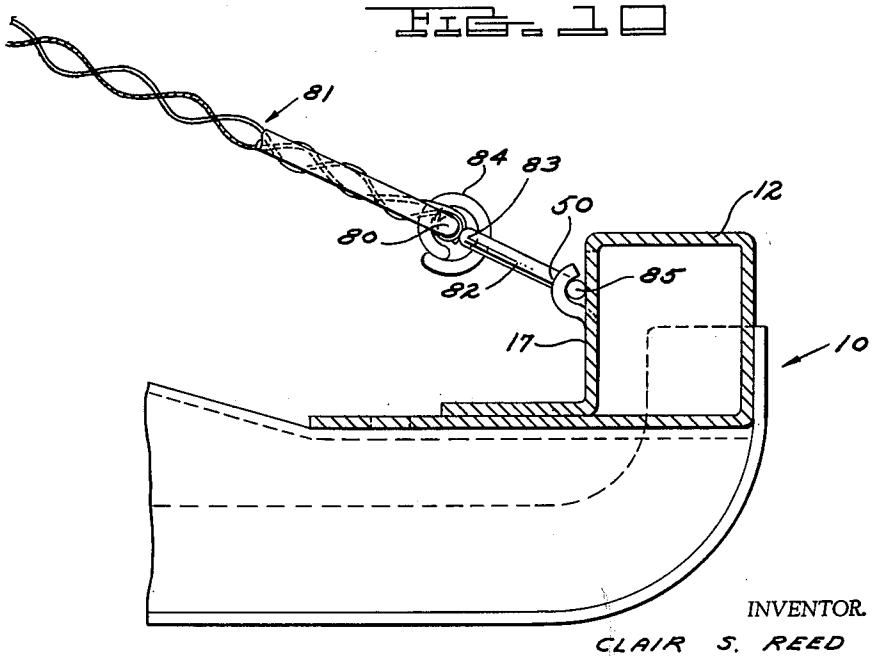


FIG. 10



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FIG. 11

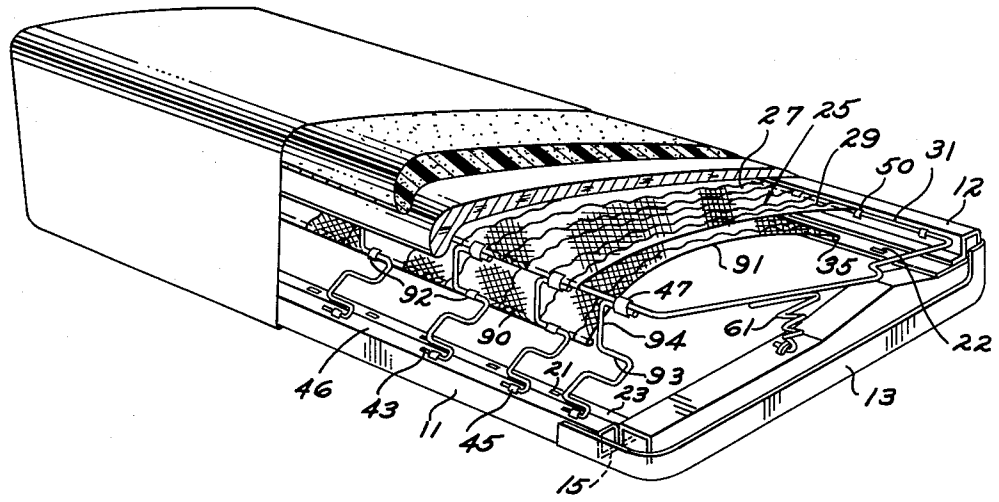
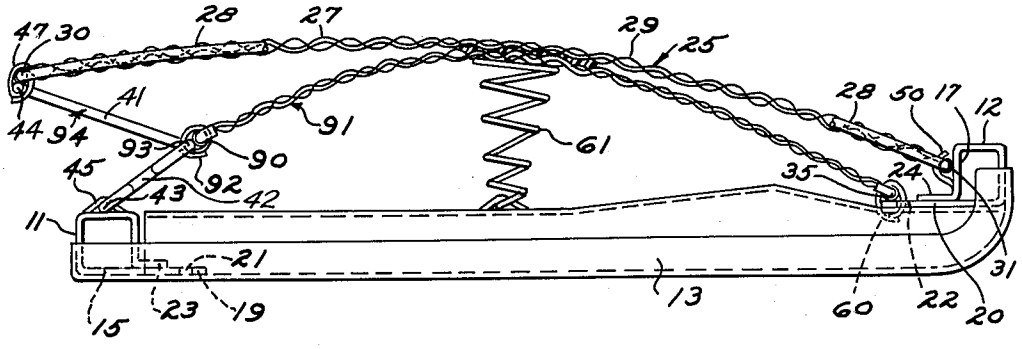


FIG. 12



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United States Patent Office 3,091,450 Patented May 28, 1963

3,091,450

SUPPORTING SPRING ASSEMBLY FOR SEATS

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Filed Apr. 6, 1962, Ser. No. 185,543
18 Claims. (Cl. 267—86)

This invention relates generally to upholstered spring structures, and refers more particularly to an improved supporting spring assembly for seats.

One of the essential objects of the invention is to provide an improved supporting spring assembly wherein two spring wire reinforced composite layers arranged in superimposed relation have been substituted for the usual separate wire reinforced fabric insulators and their separate wire or spring supports.

Another object is to provide an improved supporting spring assembly wherein each layer includes reinforcing wires of sufficient strength to serve as spring supports.

Another object is to provide an improved supporting spring assembly wherein each layer includes border wires which are suitably anchored to a supporting seat frame.

Another object is to provide an improved supporting spring assembly wherein the reinforcing wires aforesaid are threaded through fabric in either sheet or strip form and are terminally connected to said border wires.

Another object is to provide an improved supporting spring assembly wherein the upper of the two spring wire reinforced composite layers is preferably arched upwardly throughout its length and serves as a support for the upholstery, such as the usual cotton layer, sponge rubber layer, and exterior trim material.

Another object is to provide an improved supporting spring assembly wherein the lower of the two layers is preferably arched upwardly throughout its length toward and serves as a booster for the upper layer to provide the latter with a spring support when subjected to compression and to provide a soft cushioning movement for the upper layer.

Another object is to provide an improved supporting spring assembly wherein the lower booster layer may be either secured or in spaced relation to the upper layer.

Another object is to provide an improved supporting spring assembly that is simple in construction, economical to manufacture, and durable in use.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings wherein:

FIGURE 1 is a perspective view of an upholstered assembly provided with a spring structure embodying my invention, and showing parts broken away and in section.

FIGURE 2 is a fragmentary top plan view of the supporting frame and of the vertical coil springs at opposite ends thereof.

FIGURE 3 is an end view of the spring structure and supporting frame therefor.

FIGURE 4 is a top plan view of the upper layer before being applied to the supporting frame therefor.

FIGURE 5 is a top plan view of the lower layer before being applied to the supporting frame therefor.

FIGURE 6 is an end view of a slightly modified structure wherein the arched portions of the upper and lower layers are spaced apart.

FIGURE 7 is an end view of another modification wherein the lower layer includes three laterally spaced longitudinally extending strips of fabric, border wires, and longitudinally spaced transversely extending reinforcing wires threaded through the strips and terminally connected to the border wires.

FIGURE 8 is a top plan view of the modified lower layer shown in FIGURE 7.

FIGURE 9 is a top plan view of another modification wherein a wavy length of spring wire is between and connected to the rear border wire of the upper layer and the rear longitudinally extending member of the supporting frame.

FIGURE 10 is an enlarged fragmentary cross sectional view through a portion of the structure illustrated in FIGURE 9.

FIGURE 11 is a perspective view of an upholstered assembly provided with a slightly modified spring structure wherein the longitudinally extending front border wire of the lower layer is connected by clips to the intermediate longitudinally extending arms of the formed wire springs.

FIGURE 12 is an end view of the spring structure and supporting frame therefor illustrated in FIGURE 11.

Referring now to the drawings, **10** is a supporting frame having laterally spaced front and rear longitudinally extending members **11** and **12** respectively and having longitudinally spaced transversely extending members **13** and **14** respectively extending between and secured to said longitudinally extending members **11** and **12** at opposite ends thereof. Preferably the longitudinally extending members **11** and **12** are hollow and are substantially rectangular shape in cross section. The bottom walls **15** and **16** respectively of said longitudinally extending members **11** and **12** are flat and extend beneath the inner side walls **17** and **18** thereof. Such flat bottom walls **15** and **16** have extensions **19** and **20** that project laterally inward beyond the inner side walls **17** and **18** and are provided adjacent their inner edges with longitudinally spaced holes or openings **21** and **22**. The inner side walls **17** and **18** of said longitudinally extending members **11** and **12** have lateral flanges **23** and **24** that rest upon and are secured to the inward extensions **19** and **20**.

25 and **26** respectively are two spring wire reinforced composite layers arranged in superimposed relation and extending longitudinally of and anchored to the supporting frame **10** at the front and rear thereof for supporting the usual upholstery of the seat.

Preferably the upper layer **25** can be used alone or with a bottom layer **26**, as desired. Such upper layer **25** comprises a substantially rectangular sheet **27** of fabric, a substantially rectangular border frame **28** upon one side of and centered relative to said sheet **27**, and longitudinally spaced transversely extending reinforcing wires **29** threaded through the sheet **27** and terminally connected to opposite longitudinally extending sides **30** and **31** respectively of the border frame **28**. The sheet **27** of fabric may be burlap or any other suitable material. The border frame **28** is preferably covered or wrapper with paper **32** and may be any desired shape and of any gauge steel to provide the proper strength. The reinforcing wires **29** may be helical, spiral, sinuous, or undulated or straight, as desired, and of any gauge spring steel or other suitable material consistent with resiliency and the strength required to serve as spring supports. Such reinforcing wires **29** may be spaced longitudinally apart as desired and may be light gauge at opposite ends and heavy gauge at the center of the supporting frame **10**, or vice versa depending upon the requirements.

The lower layer **26** comprises a substantially rectangular sheet **33** of fabric, two separate transversely spaced longitudinally extending front and rear border wires **34** and **35** respectively upon one side of and centered relative to said sheet **33**, and longitudinally spaced transversely extending reinforcing wires **36** threaded through the sheet **33** and terminally connected to said border wires **34** and

35. The sheet 33 of fabric may be burlap or any other suitable material and holds the spaced reinforcing wires 36 in proper spaced relation to each other and to the front and rear border wires 34 and 35. The two separate longitudinally extending border wires 34 and 35 may be covered or wrapped with paper 37 and may be any desired shape and of any gauge spring steel or other suitable material to provide the proper strength. The reinforcing wires 36 may be helical, spiral, sinuous, or undulated or straight, as desired, and of any gauge spring metal consistent with resiliency and the strength required to serve as spring supports. Such reinforcing wires 36 may be spaced longitudinally apart as desired and may be light gauge at oposite ends and heavy gauge at the center of the supporting frame 10, or vice versa, depending upon the requirements.

Located at longitudinally spaced points of the front edge of the upper layer 25 are separately formed wire springs 40 having outwardly opening vertically diverging arm portions 41 and 42 terminating in lower and upper longitudinally extending end portions 43 and 44. The lower end portions 43 of such springs are anchored in longitudinally aligned loops 45 struck out from the top wall 46 of the front longitudinally extending member 11, while the upper end portions 44 of such springs are secured by clips 47 to the front longitudinally extending side 30 of the border frame 28 of the upper layer 25, so that the said front longitudinally extending side 30 of the border frame of the upper layer 25 is spaced above the longitudinally extending member 11.

The rear longitudinally extending side 31 of the border frame 28 of the upper layer 25 is anchored in longitudinally aligned substantially U-shaped arms 50 that are struck out from and that open toward the inner upright wall 17 of the longitudinally extending member 12. The rear longitudinally extending side 31 of the border frame 28 is received in such U-shaped arms 50 when the latter are struck out from the inner upright wall 17 of the longitudinally extending member 12, and are anchored in said arms 50 when the latter are pressed toward the inner upright wall 17 of the longitudinally extending member 12. Preferably, the rear portion 31 of the border frame 28 of the upper layer 25 is anchored first to the U-shaped arms 50, then the upper layer 25 is bent upwardly or arched under compression, and finally the upper layer 25 is anchored to the formed wire springs 40. Thus the upper layer 25 is arched upwardly throughout its length and is anchored in such upwardly arched position between the formed wire springs 40 and the rear longitudinally extending member 12 of the supporting frame 10. Such arched upper layer 25 serves as a support for the seat upholstery, such as the usual cotton layer, sponge rubber layer, and exterior trim of a seat.

The lower layer 26 is also anchored in an upwardly arched position beneath the upper layer 25 to the lateral inward extensions 19 and 20 of the longitudinally extending members 11 and 12. As shown, the longitudinally extending border wires 34 and 35 of the lower layer rest on said extensions 19 and 20 and are secured thereto by clips 60 that embrace such border wires and that extend through the holes or openings 21 and 22 respectively in the inward extensions 19 and 20. Preferably the rear longitudinally extending border wire 35 of the lower layer 26 is anchored first to the extension 20, then the lower layer 26 is bent upwardly or arched under compression, and finally the front longitudinally extending border wire 34 is anchored to the other extension 19. Thus the lower layer 26 is arched upwardly throughout its length and is anchored in such upwardly arched position between the inward extensions 19 and 20 respectively of the front and rear longitudinally extending members 11 and 12 of the supporting frame 10.

Vertical coil springs 61 and 62 respectively extend between and are terminally anchored to the transversely extending end members 13 and 14 respectively of the supporting frame 10 and to the lower layer 26 intermediate the front and rear thereof to support the lower and upper layers 26 and 25 respectively at opposite ends of the supporting frame.

The arched portion 63 of the lower layer 26 serves as a booster for the arched portion 64 of the upper layer 25 to provide such upper layer with a spring support when subjected to compression and to provide a soft cushioning movement for the upper layer 25. The arched portion 63 of the lower layer 26 causes the arched portion 64 of the upper layer 25 to return to its original arched position after the latter has been relieved of a load. Preferably, the arched portions 64 and 63 respectively of the upper and lower layers 25 and 26 are secured together just to the rear of the longitudinal median line thereof, however, they may be secured together at any desired points thereof. As shown, the arched portions 64 and 63 respectively of the upper and lower layers 25 and 26 are secured together by adhesive 65, however they may be secured together by any other suitable means, such as rings, clips, staples and the like.

If desired, the arched portions 64 and 63 respectively of the upper and lower layers 25 and 26 may be spaced apart as shown in FIGURE 6, so that the arched portion 64 of the upper layer 25 may have a limited downward movement before the arched portion 63 of the lower layer 26 serves as a booster therefor.

In FIGURES 7 and 8, I have shown a slight modification wherein the lower layer 70 comprises three laterally spaced longitudinally extending strips 71, 72 and 73 respectively of fabric, such as burlap, or any other suitable material, two separate longitudinally extending border wires 74 and 75 respectively extending lengthwise of the outermost strips 71 and 73, and longitudinally spaced transversely extending reinforcing wires 76 threaded through the strips 71, 72 and 73 respectively and terminally connected to the border wires 74 and 75. This lower layer 70 may be substituted for the lower layer 26 to serve as a booster for an upper layer 77 coresponding to the upper layer 25. The lower layer 70 is curved upwardly or arched upwardly like the lower layer 26, and the separate border wires 74 and 75 thereof are anchored to the lateral inward extensions 19 and 20 respectively of the longitudinally extending members 11 and 12 like the border wires 34 and 35.

In FIGURES 9 and 10, I have shown another slight modification wherein the rear longitudinally extending border wire 80 of the upper layer 81 is spaced from the rear longitudinally extending member 12 of the supporting frame 10, and a wavy length 82 of spring wire extends lengthwise of the space between such rear longitudinally extending border wire 80 and the rear longitudinally extending member 12. The length 82 of spring wire has wavy portions 83 adjacent and secured to the rear longitudinally extending border wire 80 by means of clips or rings 84, and has other wavy portions 85 adjacent and secured to the U-shaped arms 50 struck out from the inner upright side wall 17 of the rear longitudinally extending member 12. Such length 82 of spring wire provides the desired elasticity at the rear of the supporting frame.

In FIGURES 11 and 12, I have shown another slight modification wherein the longitudinally extending front border wire 90 of the lower layer 91 is connected by clips 92 to the intermediate longitudinally extending arms 93 of the separately formed wire springs 94, instead of by clips 60 to the inward extensions 19 of the flat bottom walls 15 of the longitudinally extending front member 11. Otherwise, the structure in FIGURES 10 and 11 is the same as that shown in FIGURES 1 and 3 respectively.

What I claim as my invention is:

1. The combination with a supporting frame having transversely spaced front and rear longitudinally extending members and end members extending transversely between and secured to said longitudinally extending mem-

bers at opposite ends thereof, of formed wire springs spaced longitudinally along the front longitudinally extending member, each wire spring having upwardly extending diverging arm portions provided at opposite ends with longitudinally extending end portions, the lower end portion of each of said formed wire springs being secured to said front longitudinally extending member, and two longitudinally extending spring wire reinforced composite layers arranged in upwardly transversely arched superimposed relation upon said supporting frame, the upper of said two layers including longitudinally extending border wires respectively connected to said rear longitudinally extending member and to the upper end portion of each formed wire spring, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said border wires, and the lower of said two layers including longitudinally extending border wires respectively connected to said front and rear longitudinally extending members, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said last mentioned border wires.

2. The structure defined in claim 1, wherein the upwardly transversely arched portions of said two layers are secured together adjacent the longitudinal median lines thereof.

3. The structure defined in claim 1, wherein the upwardly transversely arched portions of said two layers are spaced apart.

4. The structure defined in claim 1, wherein the upper of said two layers includes a fabric sheet on the underside of the border wires thereof, and longitudinally spaced transversely extending reinforcing wires threaded through said sheet and terminally connected to said border wires.

5. The structure defined in claim 1, wherein the lower of said two layers includes a fabric sheet on the underside of the border wires thereof, and longitudinally spaced transversely extending reinforcing wires threaded through said sheet and terminally connected to said border wires.

6. The structure defined in claim 1, wherein the upper of said two layers includes a fabric sheet on the underside of the border wires thereof, and longitudinally spaced transversely extending reinforcing wires threaded through said upper sheet and terminally connected to said border wires, and the lower of said two layers includes a fabric sheet on the underside of the border wires thereof, and longitudinally spaced transversely extending reinforcing wires threaded through said lower sheet and terminally connected to the border wires thereof.

7. The structure defined in claim 1, wherein the rear longitudinally extending border wire of the upper of said two layers is spaced from and substantially parallel to the rear longitudinally extending frame member, and a wavy length of spring wire extends lengthwise of said space, said length of spring wire having wavy portions adjacent and secured to the rear longitudinally extending border wire and having wavy portions adjacent and secured to the rear longitudinally extending member.

8. The structure defined in claim 1, wherein the rear longitudinally extending border wire of the upper of said two layers is spaced from and substantially parallel to the rear longitudinally extending frame member, and spring means extends lengthwise of said space, said spring means having portions adjacent and secured to the rear longitudinally extending border wire and having portions adjacent and secured to the rear longitudinally extending member.

9. The structure defined in claim 1, wherein two upright coil springs respectively extend between and are terminally anchored to the transversely extending end members of said supporting frame and to said lower layer intermediate the front and rear thereof to support the lower and upper layers at opposite ends of said supporting frame.

10. The structure defined in claim 1, wherein the longitudinally extending upwardly transversely arched lower layer serves as a booster for the upper layer to provide the latter with a spring support when subjected to compression and to provide a soft cushioning movement for the upper layer.

11. The combination with a supporting frame having transversely spaced front and rear longitudinally extending members, of formed wire springs spaced longitudinally along the front longitudinally extending member, each wire spring having upwardly extending diverging arm portions provided at opposite ends with longitudinally extending end portions, the lower end portion of each of said formed wire springs being secured to said front longitudinally extending member, and two longitudinally extending spring wire reinforced composite layers arranged in upwardly transversely arched superimposed relation upon said supporting frame, the upper of said two layers including longitudinally extending border wires respectively connected to said rear longitudinally extending member and to the upper end portion of each formed wire spring, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said border wires, and the lower of said two layers including three laterally spaced longitudinally extending strips of fabric, longitudinally extending border wires respectively upon the outermost two of said strips and respectively connected to said front and rear longitudinally extending members, and longitudinally spaced transversely extending reinforcing wires threaded through said strips and terminally connected to said last mentioned border wires.

12. The combination with a supporting frame having front and rear longitudinally extending members having laterally inward substantially flat extensions, of formed wire springs spaced longitudinally along the front longitudinally extending member, each wire spring having upwardly extending diverging arm portions provided at opposite ends with longitudinally extending end portions, the lower end portion of each of said formed wire springs being secured to said front longitudinally extending member, and two longitudinally extending spring wire reinforced composite layers arranged in upwardly transversely arched superimposed relation upon said supporting frame, the upper of said two layers including longitudinally extending border wires respectively connected to said rear longitudinally extending member and to the upper end portion of each formed wire spring, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said border wires, and the lower of said two layers including longitudinally extending border wires respectively connected to the laterally inward substantially flat extensions of said front and rear longitudinally extending members, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said last mentioned border wires.

13. The combination with a supporting frame having laterally spaced front and rear longitudinally extending members and having longitudinally spaced transversely extending members extending between and secured to said longitudinally extending members at opposite ends thereof, of two longitudinally extending spring wire reinforced composite layers arranged in superimposed relation upon said supporting frame and having laterally spaced longitudinally extending border wires, means for anchoring the laterally spaced longitudinally extending border wires of said two superimposed layers to the laterally spaced longitudinally extending frame members, and two upright coil springs respectively extending between and terminally anchored to the transversely extending members of said supporting frame and to said

lower layer intermediate the front and rear thereof to support the lower and upper layers at opposite ends of said supporting frame.

14. The combination with a supporting frame having laterally spaced front and rear longitudinally extending members, of formed wire springs spaced longitudinally along the front longitudinally extending member, each wire spring having upwardly extending diverging arm portions provided at opposite ends with longitudinally extending end portions and provided at the juncture of said diverging arm portions with longitudinally extending arm portions, the lower end portion of each of said formed wire springs being secured to said front longitudinally extending member, and two longitudinally extending spring wire reinforced composite layers arranged in upwardly transversely arched superimposed relation upon said supporting frame, the upper of said two layers including longitudinally extending border wires respectively connected to said rear longitudinally extending member and to the upper end portion of each formed wire spring, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said border wires, and the lower of said two layers including longitudinally extending border wires respectively connected to said longitudinally extending arm portions at the juncture of said diverging arm portions and to said rear longitudinally extending member, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said last mentioned border wires.

15. The combination with a supporting frame having laterally spaced front and rear longitudinally extending members and having longitudinally spaced transversely extending members extending between and secured to said longitudinally extending members at opposite ends thereof, of formed wire springs spaced longitudinally along the front longitudinally extending member, each wire spring having upwardly extending diverging arm portions provided at opposite ends with longitudinally extending end portions and provided at the juncture of said diverging arm portions with longitudinally extending arm portions, the lower end portion of each of said formed wire springs being secured to said front longitudinally extending member, and two longitudinally extending spring wire reinforced composite layers arranged in upwardly transversely arched superimposed relation upon said supporting frame, the upper of said two layers including longitudinally extending border wires respectively connected to said rear longitudinally extending member and to the upper end portion of each formed wire spring, and longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said border wires, the lower of said two layers including longitudinally extending border wires respectively connected to the longitudinally extending arm portions at the juncture of said diverging arm portions and to said rear longitudinally extending member, longitudinally spaced transversely extending reinforcing wires of sufficient strength to serve as spring supports terminally connected to said last mentioned border wires, and upright coil springs respectively extending between and terminally anchored to the transversely extending members of said supporting frame and to said lower layer intermediate the front and rear thereof to support the lower and upper layers at opposite ends of said supporting frame.

16. The combination with an elongated supporting frame having front and rear longitudinally extending members, of two longitudinally extending spring wire reinforced composite layers arranged in superimposed relation upon said supporting frame, the upper of said two layers being substantially coextensive with said supporting frame and arranged throughout its length in upwardly transversely arched relation to the lower of said two layers, the lower of said two layers being substantially coextensive with said supporting frame and arranged throughout its length in upwardly transversely arched relation to said supporting frame, formed wire springs disposed between the front of said upper layer and the front longitudinally extending member of said supporting frame and having outwardly opening vertically diverging arm portions provided with upper and lower longitudinally extending end portions, means securing the upper end portions of said formed wire springs to the front of said upper layer, means securing the lower end portions of said formed wire springs to the front longitudinally extending member of said supporting frame, means provided at the front of the lower layer for securing said lower layer to the front longitudinally extending member of said supporting frame, and means provided at the rear of said superimposed layers for anchoring such layers to portions respectively of the rear longitudinally extending member of said supporting frame.

17. The combination with an elongated supporting frame having transversely spaced front and rear longitudinally extending members, of two longitudinally extending layers of fabric arranged in superimposed upwardly transversely arched relation upon and substantially coextensive with said supporting frame, said layers having transversely spaced longitudinally extending front and rear border wires, and longitudinally spaced reinforcing wires threaded transversely through said fabric layers and terminally connected to said border wires, formed wire springs disposed between the front of said upper layer and the front longitudinally extending member of said supporting frame and having outwardly opening vertically diverging arm portions provided with upper and lower longitudinally extending end portions, means securing the upper end portions of said formed wire springs to the front border wire of said upper layer, means securing the lower end portions of said formed wire springs to the front longitudinally extending member of said supporting frame, means securing the rear border wire of said upper layer to the rear longitudinally extending member of said supporting frame, and means securing the front and rear border wires of said lower layer to the front and rear longitudinally extending members respectively of said supporting frame.

18. The combination with an elongated supporting frame having transversely spaced front and rear longitudinally extending members, of two longitudinally extending layers arranged in upwardly transversely arched superimposed relation upon and substantially coextensive with said supporting frame, the upper of said two layers including a sheet of fabric substantially coextensive with said supporting frame, longitudinally spaced transversely extending reinforcing wires threaded through said sheet of fabric, and front and rear longitudinally extending border wires connected to said transversely extending reinforcing wires, the lower of said two layers including a plurality of laterally spaced longitudinally extending strips of fabric, longitudinally extending front and rear border wires respectively extending lengthwise of the outermost two of said strips, and longitudinally spaced transversely extending reinforcing wires threaded through said strips and terminally connected to said last mentioned border wires, formed wire springs having outwardly opening vertically diverging arm portions disposed between the front of said upper layer and the front longitudinally extending member of said supporting frame and having upper and lower longitudinally extending end portions, means connecting the lower end portions of said formed wire springs to the front longitudinally extending member of said supporting frame, means connecting the front border wire of said upper layer to the upper end portions of said formed

wire springs, means connecting the rear border wire of said upper layer to the rear longitudinally extending member of said supporting frame, and means securing the front and rear border wires of said lower layer to the front and rear longitudinally extending members respectively of said supporting frame.

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