No. 795,661. PATENTED JULY 25, 1905.

J. A. STAPLES.

KNOCKDOWN SPRINGWORK.

APPLICATION FILED OCT. 31, 1903.

2 SHEETS—SHEET 1.

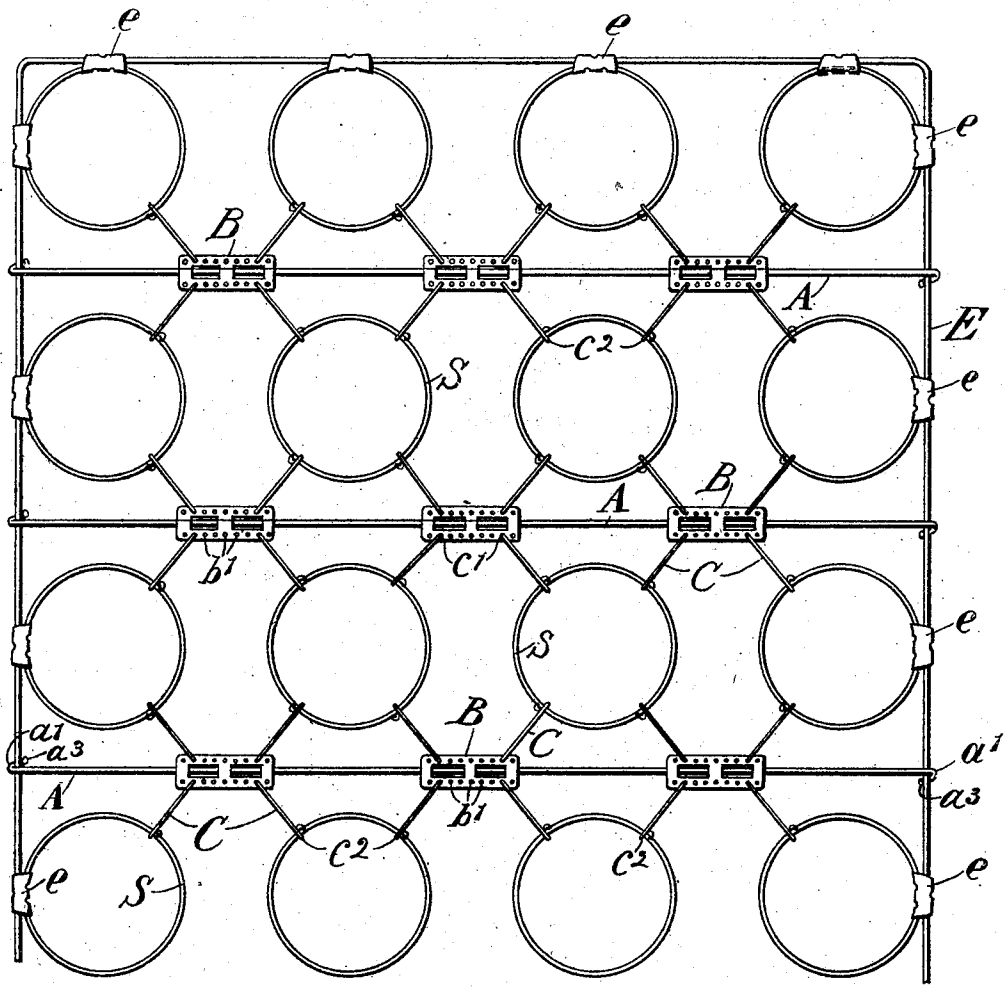


Fig. 1.

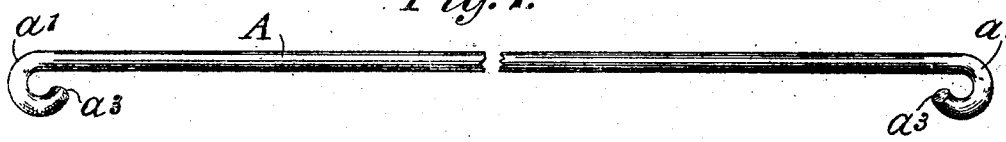


Fig. 12.

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2 SHEETS—SHEET 2.

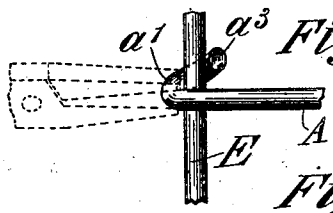


Fig. 2.



Fig. 3.

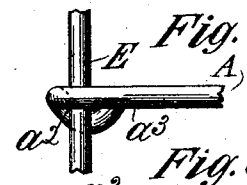


Fig. 4.

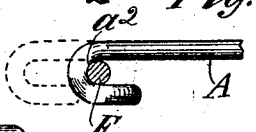


Fig. 5.

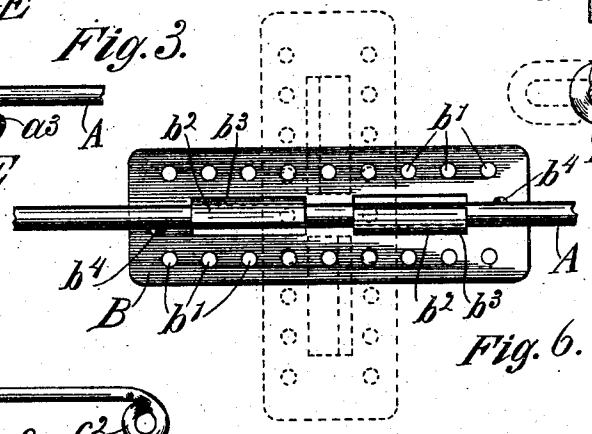


Fig. 6.

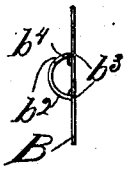


Fig. 7.

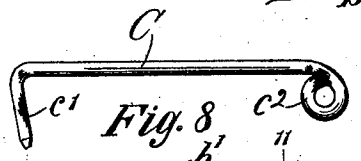


Fig. 8.

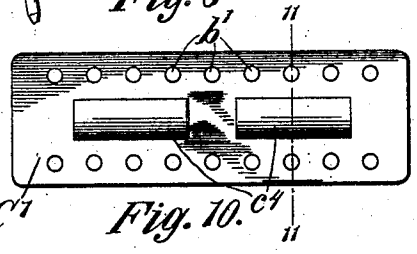


Fig. 10.

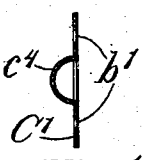


Fig. 11.



Fig. 9.

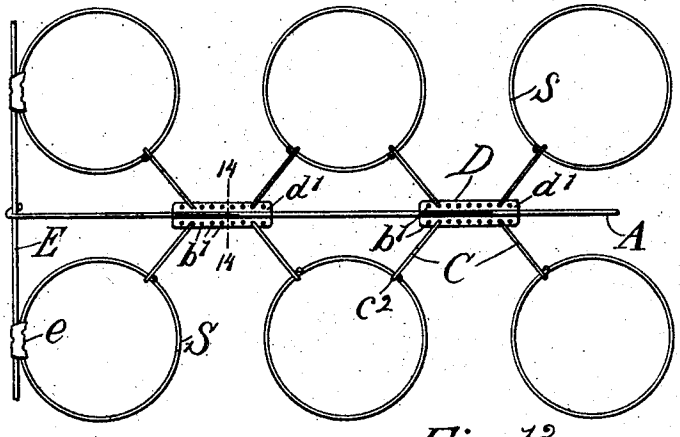


Fig. 13.



Fig. 14.

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UNITED STATES PATENT OFFICE.

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KNOCKDOWN SPRINGWORK.

No. 795,661. Specification of Letters Patent. Patented July 25, 1905.

Application filed October 31, 1903. Serial No. 179,282.

To all whom it may concern:

Be it known that I, JOHN A. STAPLES, a citizen of the United States, residing at Newburgh, in the county of Orange and State of New York, have invented certain new and useful Improvements in Knockdown Springwork, of which the following is a specification.

My invention relates to improvements in springwork for spring-beds, sofas, sofa-beds, chairs, and all similar articles of furniture or the like in which springs are employed.

One of the objects of my invention is to provide certain improvements in this class of springwork relating especially to the means or devices employed in connection with the bracing of the tops of the springs and which are of such character as to produce a strong and improved flexible top for the springwork.

A further object is to provide knockdown springwork which shall be capable of being packed within small compass for shipping purposes and adapted to be readily set up when desired.

The above and other objects and advantages of the invention are hereinafter more fully set forth, the invention consisting in the construction and organization of parts particularly described in the following specification, specifically designated in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a section of springwork made in accordance with my invention and in which the springs are represented only by their top coils in order to more clearly illustrate the nature of the invention. Fig. 2 is a plan, on an enlarged scale, of the connection between one of the brace or tie rods and the edge or border wire. Fig. 3 is a side elevation of the same, the edge wire being shown in section. Fig. 4 is a view similar to Fig. 2, but showing the hook in the position it occupies when rotated to permit of its engagement with the edge wire. Fig. 5 is a side elevation of the tie-rod in the position shown in Fig. 4. Fig. 6 is a bottom view of a modified form of the member to which the bracing-links are attached. Fig. 7 is an end elevation of the same. Fig. 8 is a side elevation of one of the bracing-links. Fig. 9 is a detail showing the manner of attaching the bracing-links to the top wire of a spring. Fig. 10 is a further modification of the member to which the bracing-links are attached. Fig. 11 is a section on the line 11 11 of Fig. 10. Fig. 12 is a side elevation, on an enlarged scale, of one of the brace-rods. Fig. 13 illustrates the preferred form of the members to which the links are attached and showing a plurality of such members in connection with a brace-rod, the bracing-links, and springs; and Fig. 14 is a section on the line 14 14 of Fig. 13.

The supporting-frame of the structure is composed of suitable side and end pieces (not shown) of the desired size and shape, depending on the character of the article to be constructed. In "springing up" the frames or mounting the springs thereon the foundation for the springwork is provided in any suitable manner, preferably by employing supporting-wires of the well-known drop type. The drop-wires are preferably placed both longitudinally and transversely on the frame at such distances apart as are suitable or necessary for the character of the structure being made, and the springs S are carried thereon in rows or banks, being supported thereon in any suitable manner, preferably by providing the supports with bends or corrugations adapted to receive the ends of the springs and whereby the springs may be seated and sustained at the crossing-points of the supporting-wires by interweaving their lower coils with the wires in a manner now well understood in the art. After securing the springs to their supports or foundations the frame, such as the border-wire or edge wire E, (usually metallic,) is attached to the outer edges of the outside rows of springs all the way around, preferably by means of suitable sheet-metal clips *e*—such, for example, as those of United States Patent No. 608,048, granted to J. H. Jackson, July 26, 1898. The structure thus far described is or may be of any usual or preferred character and need not be described with greater particularity.

One of the novel features of the present invention relates to the rods or wires for bracing and tying together the edge wires. In this class of springwork brace or tie rods are required to prevent the side edge wires from drawing inwardly when pressure is put on the springwork or when the padding or cushion top is tied on. The bracing or tying rods or wires provided by me are designed to obviate the inward movement of the edge wires as well as lateral movement in the opposite di-

rection and are so constructed as to be capable of being easily and readily connected or attached when it is desired to set up the springwork and as readily detached. These rods or wires (designated by the letter A) are attached to the edge wires or border-wires E at the sides of the spring structure, there being as many of them employed as is desired and preferably one between adjacent rows of springs, as shown in Fig. 1. The brace-rods are made in lengths to correspond to the widths of standard sizes of beds, sofas, &c., and are attached to the edge wires in such manner as to provide a secure lock between the same and the edge wires, whereby slippage of the brace-rods along the edge wires is prevented and are sufficiently rigid to prevent the inward lateral movement mentioned. To this end and in the present embodiment of the invention each brace-rod A is constructed as shown in Fig. 1 and on an enlarged scale in Figs. 2, 3, 4, 5, and 12. As illustrated, each end of each rod A is provided with an integral grip consisting of a rebent end which is in the form of a laterally-inclining curved hook a', providing a seat a^2 for the edge wire E, the end a^3 of the hook extending back of the edge wire far enough to form, preferably, a nearly-complete convolution and terminating at a distance from the rod A greater than the thickness of the said edge wire, as shown in Fig. 3. As thus constructed and secured outward movement of the edge wire is prevented by the rear side of the hook a', while inward movement is resisted by the end a^3 of the hook, which extends upwardly far enough to prevent the edge wire from riding up out of the seat of the hook when the latter is in the normal position, as shown in Figs. 2 and 3. The hooks a' at the ends of each brace-rod are preferably inclined or bent laterally in opposite directions, as shown in Figs. 1 and 12, both ends engaging the edge wire. I do not confine myself, however, to a brace-rod having the hooks a' at both ends, as one end may be provided with any other desired attachable connection with its associated edge wire, but only to a brace-rod provided at one end with the particular character of hook described. Preferably, however, both ends of the rods are constructed as described.

In setting up the springwork the brace-rod A is turned so that the hook a' occupies the position shown in dotted lines in Fig. 5, when the said hook may be slipped over the edge wire, as shown in full lines in said figure. The wire is then partially rotated in the opposite direction, so that the end a^3 of the hook moves up behind the edge wire, as shown in Figs. 1, 2, and 3. The hook a' at the opposite end of the brace-rod is then gripped by a pair of pliers, as shown in Fig. 2, and rotated or twisted into the position shown in dotted lines in Fig. 5, so that the end of the hook occupies a substantially horizontal position, permitting the edge wire to slip into the seat a^2. When the hook is released, its end a^3, due to the torsion of the twisted rod A, such torsion being resisted by already attached opposite end of the rod, slips up back of the edge wire, as shown in Fig. 3, securely gripping it. In detaching the brace-rod the hook is engaged by the pliers, as shown in Fig. 2, and rotated through substantially ninety degrees or into the position shown in Fig. 5, and the edge wire may then be slipped out, as will be readily understood. The opposite end of the brace-rod is then detached by rotating the said rod or wire in the opposite direction. The brace-rods, in addition to the function already stated, serve to carry weight, and therefore a lesser number of springs S may be used than would be necessary were the brace-rods, arranged and attached as shown, not employed.

Means are provided for adjustably securing adjacent springs S, so that the flexibility of the springwork may be varied as desired and also, preferably, so arranged that all parts may be readily attached or detached. To this end I may provide a series of members, one of which is located intermediate the tops of each set of four adjacent springs if the springs be arranged in the rows or banks shown in Fig. 1 or between adjacent springs of each set under any other arrangement and connect the springs by suitable means to such members. These members, which may take the form of plates or other suitable devices, may be but are not necessarily mounted on or carried by the brace-rods A and may be secured in any suitable manner. In the present embodiment of the invention I provide a plate which may be readily attached to or detached from the brace-rod. This feature of the invention may be embodied in various forms, and while I have shown three of such forms in the drawings I do not wish to be understood as confining myself thereto, but that my invention contemplates any equivalent capable of the same use and having the same end in view. One form of such members is illustrated in Figs. 1, 6, and 7 and comprises a plate B, which may be in the shape of a rectangle or of any other suitable shape. That shown consists of an elongated rectangular plate and is provided adjacent each side edge with apertures b', designed to be engaged by the brace-links C, as hereinafter described. In constructing this plate I stamp up from the opposite ends thereof and on opposite sides of the longitudinal median line thereof the longitudinal wings b^2, which are curved inwardly in opposite directions and spaced apart at their attached side edges b^3 a distance at least as great as the thickness of the brace-rods, the free edges extending over so as to embrace the brace-rod A, associated therewith. In attaching these plates in position the plate is placed across the brace-rod with

its longitudinal axis at a right angle thereto and with the brace-rod passing between the adjacent ends of the wings b^2, as shown in dotted lines in Fig. 6, and the plate is then rotated ninety degrees in a direction to cause the wings to embrace or overlap the brace-rod, and so as to lie longitudinally parallel with the brace-rod, as shown in full lines in said figure. The wings b^2 may be of such length and curvature as to spring over the brace-rod in order to hold the plate in position, or, as shown, a boss b^4 may be formed at each end of the plate in such position as to be behind the wire when the plate is in place. With this latter construction when the plate is turned to secure it on the brace-rod the latter springs over the bosses, holding the plate securely in position. These plates may be readily detached by reversing the movement described. Preferably, however, the said members take the form illustrated in Figs. 13 and 14. As there shown, each member consists of a plate D, which is folded back upon itself to provide the leaves d' and d^2; between which when the plate is in position of use the brace-rod A passes. The leaves may be elongated longitudinally in order to accommodate a greater number of the apertures b', which are provided in the leaves adjacent to the side edges of the same and arranged to coincide, so as to be engaged by the links in a like manner as the plate shown in Fig. 6. At least one of the leaves is provided with a seat or retaining means on its inner face to receive the brace-rod, and this seat may take the form of a groove or channel d^3, stamped up from the metal of the plate and serves to prevent lateral or rocking movement of the plate on the rod when the leaves are folded over the latter, or, as shown in the drawings, each leaf may be provided with a groove d^3, coinciding with the groove of the other leaf and together forming a seat substantially the cross-sectional area of the brace-rod A. These plates may be made of thin resilient metal, and when it is desired to attach them they may be readily slipped on the brace-rods by slightly separating the leaves, the resiliency of the metal then returning them to normal position, so as to embrace the rod A. Both forms of plate heretofore described may be readily attached after the brace-rods A have been assembled with the edge wire and springs.

A further modification of the plate to which the links are attached is illustrated in Figs. 10 and 11. In this form of plate (designated C') loops c^4 are provided by stamping them up from the material of the plate, such loops being of a size corresponding substantially to the size of the wire of the brace-rod. With this style of plates it is necessary to attach them on the brace-rods before the ends are provided with the hooks a', and this is accomplished simply by slipping the plate over the ends of the rods; but as these plates take up but little space in shipping their permanent attachment is not particularly material.

Each spring S is attached or connected to the plate, as shown in Fig. 1, and the means employed are, with the other devices heretofore described, so constructed and arranged as to be readily attached for the purpose of setting up the springwork. In the embodiment of the invention illustrated such means consist of links adapted to be easily connected at their ends with the plates D, B, or C', depending upon which are employed, and the springs S. A simple and desirable device for this purpose is shown in Figs. 8 and 9 and comprises a link C, formed at one end with a hook c', designed to engage one of the apertures b' in the plates and having its other end bent into a coil c^2, preferably of a single convolution, the end of the hook taking the form of an open coil, being spaced from the adjacent portion of the link a distance at least as great as the thickness of the wire from which the springs S are made and as illustrated in Fig. 9 and providing a rearward extension or wing engaging the wire of the spring when in assembled position. The link is first attached to the spring S, and this is accomplished by passing the coil of the link under the top wire of the spring, with the length of the link passing over the top wire, and then moving the link upwardly, so that the wire of the spring S will enter between the end of the coil c^2 and the body of the link, the link then being in the tangential position. (Shown in Fig. 9.) The link is then turned outwardly, so as to occupy a substantially radial position with reference to the spring, when the end of the coil c^2 moves over the top wire of the spring, whereby the spring is securely embraced and held. The other end of the link is then engaged with one of the openings in the adjacent plate, and in order to prevent its accidental disengagement the hook may be bent slightly inwardly, as shown in Fig. 8. When the plates illustrated in Figs. 13 and 14 are employed, in order to overcome any tendency of the leaves to separate and the brace-rod to work out of the seat provided therefor the hooks engaging the apertures at the free edge of the leaves may be bent up or closed more or less, as shown in Fig. 14.

A suitable number of openings b' being provided in the plate members, the hooks of the links may be made to engage any desired openings to secure the requisite adjustment and flexibility of the top of the springwork. A link such as herein shown and described may be securely attached to the springs without using pliers or other tools to secure it in position. At the same time it may be readily detached when necessary. Any desired adjustment may be attained, and while the brace-

rods A hold the edge wires properly apart the links C draw the top perfectly tight and snug all the way across.

With the construction illustrated all the parts—that is to say, the edge wires, brace-rods, clips, attaching-plates, links, and springs may be manufactured in any suitable sizes and dimensions and shipped separately to furniture and upholstery factories which manufacture the necessary framework, but are not provided with facilities for making the metal-work, and the parts are so constructed that the numerous metal elements may be readily and easily assembled to produce the desired article of furniture, &c, and if it be necessary to reship the springwork after it has once been set up it is so constructed that it may be readily disassembled; also, in case of breakage any part may be readily removed and a similar part easily substituted.

Having described my invention, what I claim is—

1. In a device of the class described, the combination with a group of springs, of a plate located between the tops of the springs, and a plurality of links connected to the plate and each of which is provided with a coil adapted to be engaged with a coil of an associated spring by lateral movement of the link.

2. In a device of the class described, the combination with a series of springs having a frame, a rod extending between the tops of the springs and engaging the frame at opposite points, a member carried by the rod, and links connecting the springs and the said member.

3. In a device of the class described, the combination with a series of springs, of a rigid plate located between the tops of the series, and links attached to the springs and provided with hooks having adjustable engagement with the plate.

4. In a device of the class described, the combination with a series of springs, of a rigid plate located between the tops of the springs and provided with a series of adjusting-apertures, and independently-adjustable links attached to the springs and engaging the apertures.

5. In a device of the class described, the combination with a plurality of sets of springs, a plate located between the upper ends of each set and having a series of openings adjacent its side edges, a plurality of links each of which is provided at one end with a spiral coil of substantially a single convolution adapted to be engaged with the top coil of an associated spring by lateral movement of the link and having a hook at its other end adjustably engaging the series of apertures in the associated plate.

6. In a device of the class described, the combination with a plurality of rows of springs having a border-wire, brace-rods connecting the opposite sides of the border-wire and extending between the rows of springs, members adapted to be slipped on and be carried by the brace-rods, and links connecting the springs and the said members.

7. In a device of the class described, the combination with a plurality of rows of springs having a border-wire, brace-rods connecting the opposite sides of the border-wire and extending between the rows of springs, members adapted to be sprung on and be carried by the brace-rods, and a plurality of independently-attachable links connecting the springs and the said members.

8. In a device of the class described, the combination with a plurality of rows of springs having a border-wire, a brace-rod engaging the border-wire at opposite points and extending between the rows of springs, a plate carried by the brace-rod, and links connecting the springs to the plate.

9. In a device of the class described, the combination with a plurality of rows of springs having a frame, a rod extending between the rows of springs, a plate adapted to be slipped on and be carried by the rod and having openings adjacent to its side edges, and links connected to the springs and adapted to engage the openings in the plate.

10. In a device of the class described, the combination with a plurality of rows of springs, a rod extending between the rows of springs, a plate adapted to be sprung on and be carried by the rod, and links connecting the springs and the plate.

11. In a device of the class described, the combination with rows of springs having a border-wire, of a brace-rod between the rows and engaging the border-wire at its ends, a plate carried by the rod and having apertures, and links each of which is provided at one end with a coil adapted to be engaged with a coil of a spring and engaged therewith by lateral movement of the link, and at its other end with a hook adapted to an aperture in the plate.

12. In a device of the class described, the combination with springs having a border-wire, of a brace-rod between the springs and held in engagement with the border-wire by torsion of the rod, a plate carried by the rod, and links connecting the springs with the plate.

13. In a device of the class described, the combination with springs having a border-wire, of a brace-rod between the tops of the springs and engaging the border-wire at its ends and held from disengagement therewith by the torsion of the rod, a plate carried by the rod, and links connecting the tops of the springs with the plate.

14. In a device of the class described, the combination with springs arranged in rows and having a border-wire, of a brace-rod be-

tween the tops of adjacent rows of springs and having hooks receiving the border-wire at opposite points and held in engagement therewith by the torsion of the rod, the end of each hook extending back of the border-wire, plates carried by the brace-rods, and links connecting the tops of the springs and the plates.

15. In a device of the class described, the combination with springs arranged in rows and having a border-wire, of a brace-rod between the tops of adjacent rows of springs and having reversely-arranged end hooks engaging the border-wire at opposite points and held in engagement therewith by the torsion of the rod, the end of each hook extending back of the border-wire, plates carried by the rods, and links attached to the springs and having adjustable engagement with the plates.

16. In a device of the class described, the combination with a plurality of rows of springs, rods extending between the rows of springs, plates comprising pairs of leaves embracing the rods, and links connected to the springs and plates.

17. In a device of the class described, the combination with a plurality of rows of springs, rods extending between the rows of springs, plates comprising pairs of leaves embracing the rods and one of which leaves is provided with a seat to receive the rod, and links connecting the springs and plates.

18. In a device of the class described, the combination with a plurality of rows of springs having a border-wire, brace-rods connecting the opposite sides of the border-wire, plates between adjacent sets of springs and comprising pairs of leaves extending on the opposite sides of and embracing the brace-rods and having coinciding grooves on the inner faces of the leaves to receive the said rods, and links connecting the springs and plates.

19. In a device of the class described, the combination with a plurality of rows of springs having a border-wire, brace-rods connecting the opposite sides of the border-wire, plates comprising pairs of resilient leaves embracing the brace-rods, and links connecting the springs and plates.

20. In a device of the class described, the combination with a plurality of rows of springs having a border-wire, brace-rods connecting the opposite sides of the border-wire, plates between adjacent sets of springs and comprising pairs of resilient leaves provided with coinciding grooves on their adjacent faces to receive the brace-rods and having a series of apertures adjacent each side edge of the plates, links provided with coils detachably engaging the springs and hooks on the links engaging the apertures of the plates.

21. An article of manufacture for knock-down springwork comprising a plate folded upon itself to provide a pair of resilient leaves and having apertures at opposite edges thereof, and one of said leaves being provided with a longitudinal seat for a supporting-wire.

22. An article of manufacture for knock-down springwork comprising a pair of resilient leaves folded upon each other and having coinciding longitudinal grooves on the inner faces thereof to receive a supporting-wire, and coinciding apertures at the side edges thereof.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. STAPLES.

Witnesses:
ALEX. D. DARRAGH,
C. H. HANFORD.