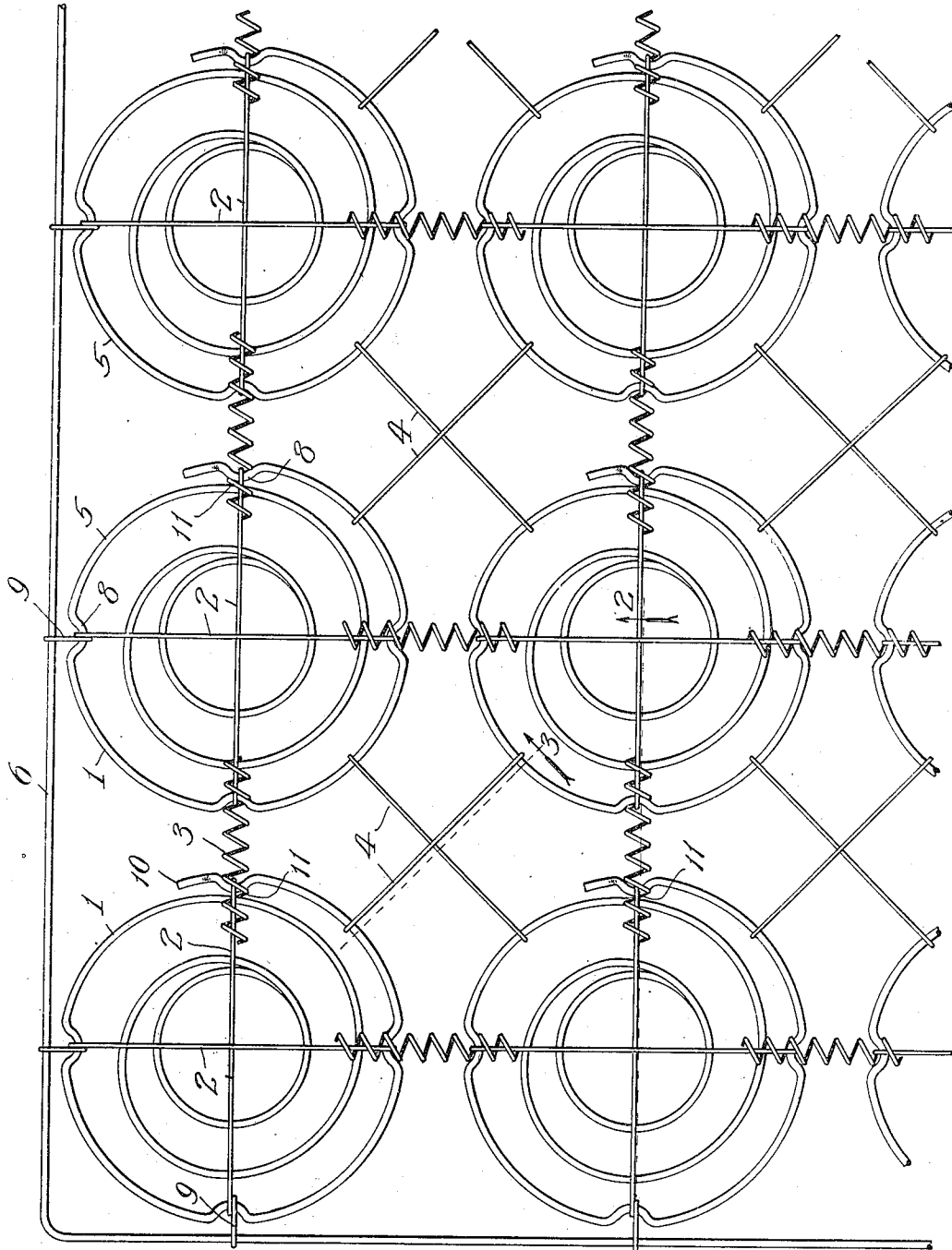


W. VAN MIDDLESWORTH.
 SPRING STRUCTURE.
 APPLICATION FILED SEPT. 19, 1911.

1,012,939.

Patented Dec. 26, 1911.

2 SHEETS-SHEET 1.



Witnesses:

E. S. Gaylord.
Chas. H. Buell.

Fig. 1.

Inventor:

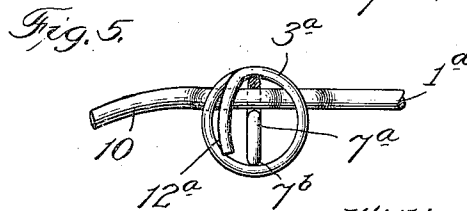
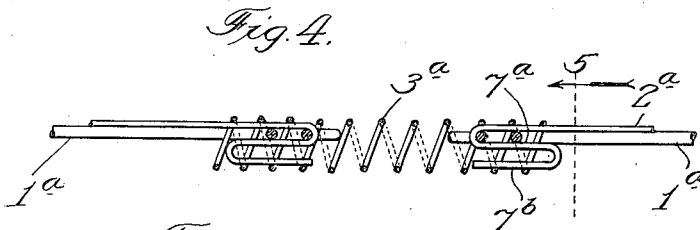
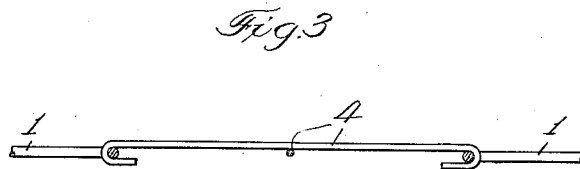
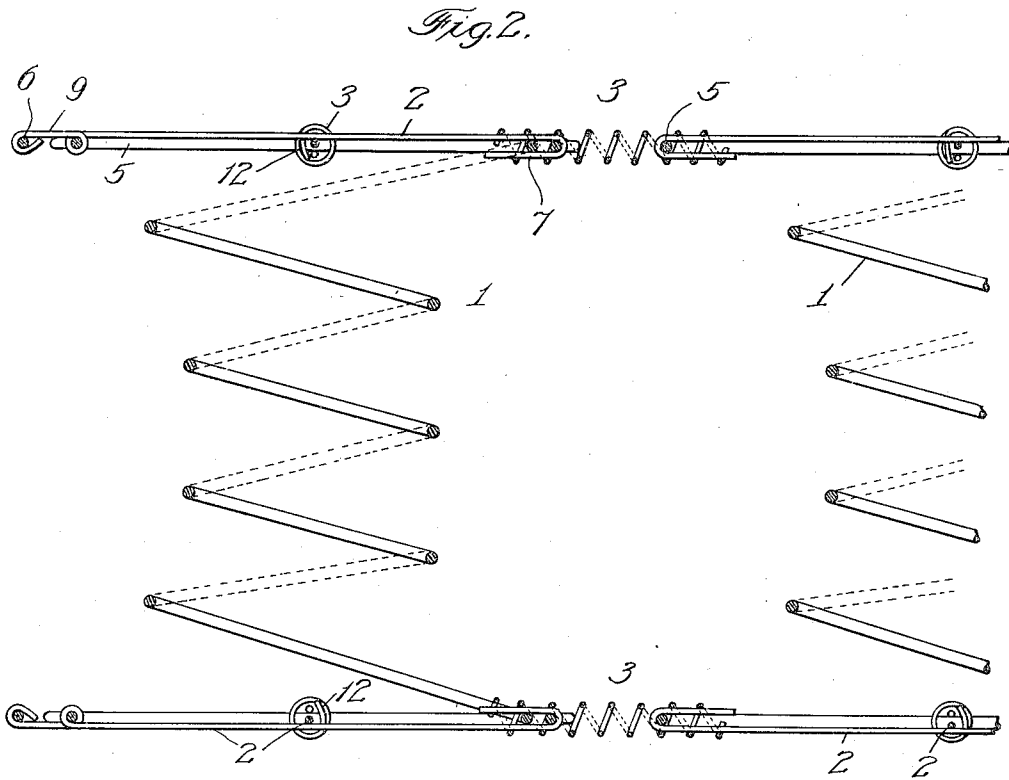
William Van Middlesworth,
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2 SHEETS—SHEET 2.



Witnesses:

Ed. J. Gaylord,
 Chas. H. Buell.

Inventor:

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UNITED STATES PATENT OFFICE.

WILLIAM VAN MIDDLESWORTH, OF CENTERVILLE, MICHIGAN, ASSIGNOR OF ONE-HALF TO OZELLO R. HUNT, OF CHICAGO, ILLINOIS.

SPRING STRUCTURE.

1,012,939.

Specification of Letters Patent.

Patented Dec. 26, 1911.

Application filed September 19, 1911. Serial No. 650,133.

To all whom it may concern:

Be it known that I, WILLIAM VAN MIDDLESWORTH, a citizen of the United States, residing at Centerville, in the county of St. Joseph and State of Michigan, have invented a new and useful Improvement in Spring Structures, of which the following is a specification.

This invention relates particularly to spring-structures, such as bed-springs, springs for sofas, cushions, etc.

The primary object of the invention is to provide a spring-structure of the character indicated which is durable, possesses a high degree of resilience, and affords a close-mesh top-surface or outer surface for contact with the mattress proper, or with the pad or fabric which may be used in connection with the spring-structure, as the case may be.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a fragmentary plan view of a spring-structure embodying the invention; Fig. 2, a broken vertical section, taken as indicated at line 2 of Fig. 1; Fig. 3, a broken vertical section taken as indicated at line 3 of Fig. 1; Fig. 4, a broken sectional view showing a modification; and Fig. 5, a broken section taken as indicated at line 5 of Fig. 4.

Referring to Figs. 1 to 5, inclusive, the construction, as there shown, comprises upholstering-springs 1 ranged in longitudinal and transverse rows; top-rods 2 mounted on the end-rings of the springs 1 and affording guides at their extremities; resilient spacers 3 having their convolutions threaded on to the end-rings of the springs 1 and embracing the guide-portions of the members 2; and diagonally-disposed tie-rods 4 occupying the junctions of the spaces between the longitudinal rows and the transverse rows of the springs 1.

The upholstering springs 1 may be of any desired form. The form shown is the "hour-glass" form, which is very commonly employed. In this form there are end-rings 5 of larger diameter than the intermediate convolutions of the coils. In the present construction, the extremities of the wires forming the end-rings are not knotted, but it will be understood that this is not an essential feature of the invention.

There are, preferably, two cross-members 2 for each end-ring, these cross-members being disposed at right angles to each other and extending diametrically across the end-ring. Except at the margin of the structure, where the end-rings are bounded by marginal rods 6, the members 2, which preferably lie on top of and serve as ties for the end-rings, have their extremities bent downwardly and recurved about the end-rings to afford portions 7, which are substantially parallel with the body-portions of the members 2, thus forming guides for the relatively small coils of which the resilient spacers 3 consist. Each end-ring is struck inwardly in its own plane at four points, as indicated at 8, for engagement with the end-portions of the members 2. At the outer ends of the members 2 of the marginal rows of springs 1 the end-portions of the members 2 are twisted about the end-rings and have extensions 9 which are hooked or clenched upon the marginal rod 6.

The small spiral springs 3, as indicated, are screwed on to the end-rings and embrace the guide-portions of the members 2, so that the springs 3, the members 2 and the end-rings are interlocked together. Thus, at the point of connection, the end-ring is embraced, both on its inner side and outer side, by convolutions of the springs 3, as will be readily understood by Fig. 2, so that the end-rings will not only be tied together, but will be spaced and stayed with relation to each other. That is, they will be resiliently tied together and also resiliently held apart by the manner of engagement with the convolutions of the springs 3. The members 7 are disposed sufficiently beneath the body-portions of the members 2, so that with the small coils 3 employed the upper or outer portions of the coils will lie practically flush with the outer surface of the spring-structure. In other words, there will be no objectionable projection of the springs 3 above the general outer surface of the spring-structure. The extremity 10 of each end-ring, when left free, is bent downwardly or inwardly slightly, as will be understood by reference to Fig. 5, so that there will be no danger of its projecting in a manner to tear the mattress or covering which may be placed upon the spring-structure. It will be noted that where the connection is made with the end-ring near the 11

extremity 10, the convolutions of the coils 3 not only embrace the free extremity of the wire, but also embrace the adjacent wire at the point of overlapping, so that the extremity of the end-ring is thereby tied to the body of the end-ring. Instances are indicated at the points 11 in Fig. 1.

The tie-rods 4 preferably comprise short pieces of wire having hooked end-portions which engage the end-rings, the extremities of the hooked portions being turned downwardly or inwardly and recurved. The members 4 may be made slightly shorter than the spaces which they are to fill and the coil-springs 3 may be placed under compression while the members 4 are being applied, so that there will be no tendency for the members 4 to become disengaged, even though the hooked portions are not closed.

It is obvious that the end-rings may be spaced with relation to each other at any desired distance by adjustment of the coil-springs 3. After the adjustment is made it is preferred to bend or distort the end convolutions of the springs 3, as indicated at 12 in Fig. 2, so that there will be no tendency for the connections to work loose.

In the modification shown in Figs. 4 and 5, the upholstering springs are designated 1^a; the members which cross the end-rings are designated 2^a; and the resilient spacers are designated 3^a. In this form, the members 3^a are of larger diameter than in the form above described, and the extremities of the members 2^a are given a double bend, thus forming the parts 7^a and 7^b, which are located below the plane of the end-ring, so that the coil-spring 3^a, notwithstanding its larger diameter, will have its outer or top portion substantially flush with the general outer surface of the spring-structure. In Fig. 5, the end-portion of the member 3^a is shown bent or distorted, as indicated at 12^a.

From the foregoing description it will be readily understood that the invention provides a highly resilient structure which is adapted to yield to stresses in every direction, thereby increasing the durability of the structure, obviating breakage, and enhancing the comfortableness of the structure in use. Moreover, the structure affords comparatively close-mesh outer surfaces, so that the mattress, pad or covering will be supported at close intervals, thus enhancing the life of the covering, as well as affording substantial support to the person. Again, a structure having upholstering springs resiliently tied and stayed with relation to each other in the manner set forth is adapted to so distribute the strains

upon it as to render it feasible to use smaller gage wire in the formation of the upholstering springs.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new and desire to secure by Letters Patent is—

1. In a spring-structure of the character set forth, the combination with upholstering springs provided with end-rings, of transverse guides on said end-rings, and relatively small coil-springs having convolutions spirally engaging said end-rings and embracing said guides.

2. In a spring-structure of the character set forth, the combination with upholstering springs provided with end-rings, of transverse wires crossing said end-rings and having bent end-portions affording guides, and connecting coils having spiral engagement with said end-rings and embracing said guides.

3. In a structure of the character set forth, the combination with upholstering-springs having end-rings, provided with indents, of cross-wires crossing said end-rings and having their extremities bent into engagement with said indents, and connecting springs having spiral engagement with said end-rings at said indents and embracing the end-portions of said cross-wires.

4. A spring-structure of the character set forth, comprising upholstering springs of hour-glass form ranged in longitudinal and transverse rows, cross-rods on the end-rings at the opposite sides of the structure, and relatively small coil-springs having spiral engagement with said end-rings and embracing the end-portions of said cross-rods.

5. In a spring-structure of the character set forth, the combination of upholstering-springs ranged in longitudinal rows and provided with end-rings, cross-rods on said end-rings, coil-springs connecting said end-rings and having spiral engagement therewith and embracing the end-portions of said cross-rods, and diagonally-disposed tie-rods connecting said end-rings at the junctions of the spaces between the longitudinal rows and transverse rows.

WILLIAM VAN MIDDLESWORTH.

In presence of—
L. A. CLAPP,
H. C. KAAS.