March 26, 1929. P. E. KROEHLER 1,706,889

SPRING ASSEMBLING MECHANISM AND METHOD

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Fig. 1

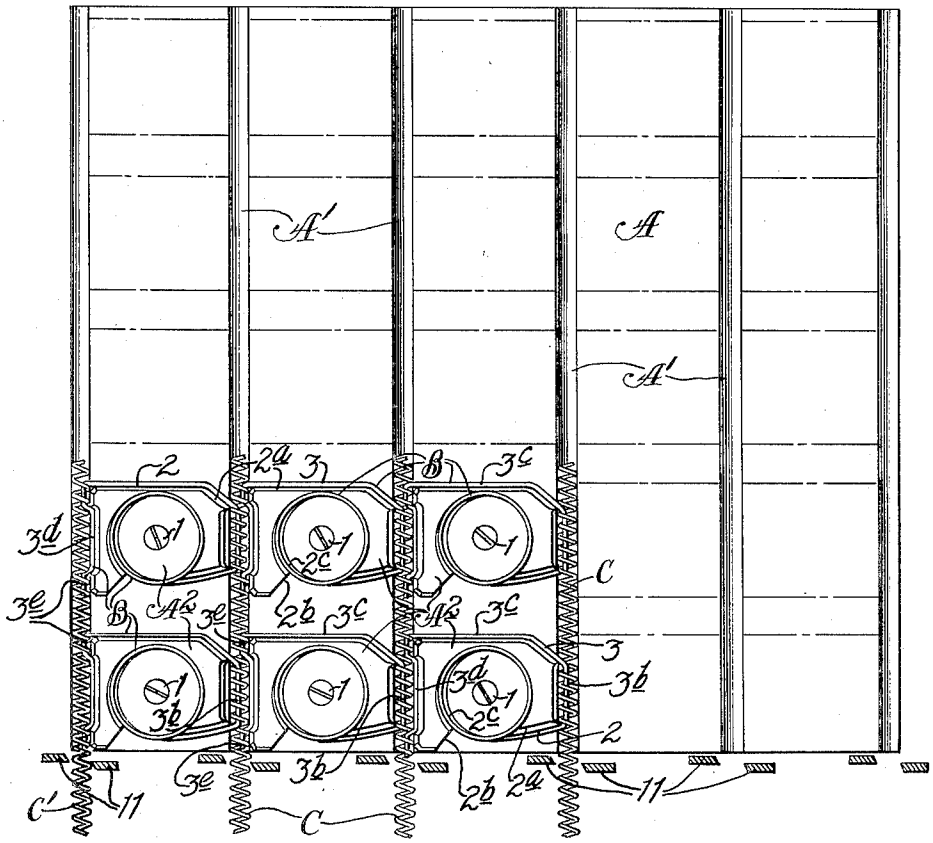

Fig. 2

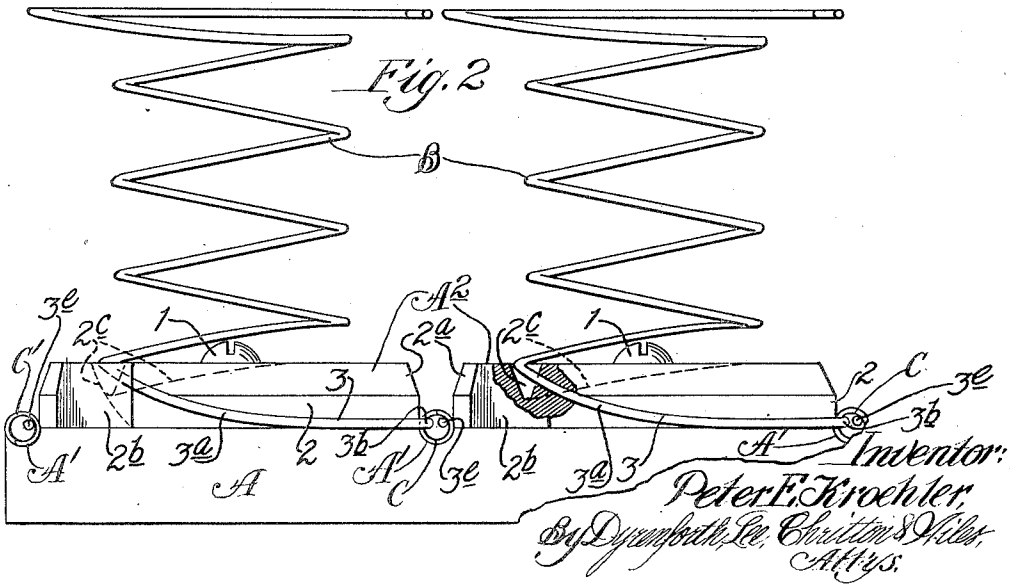

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Fig. 3

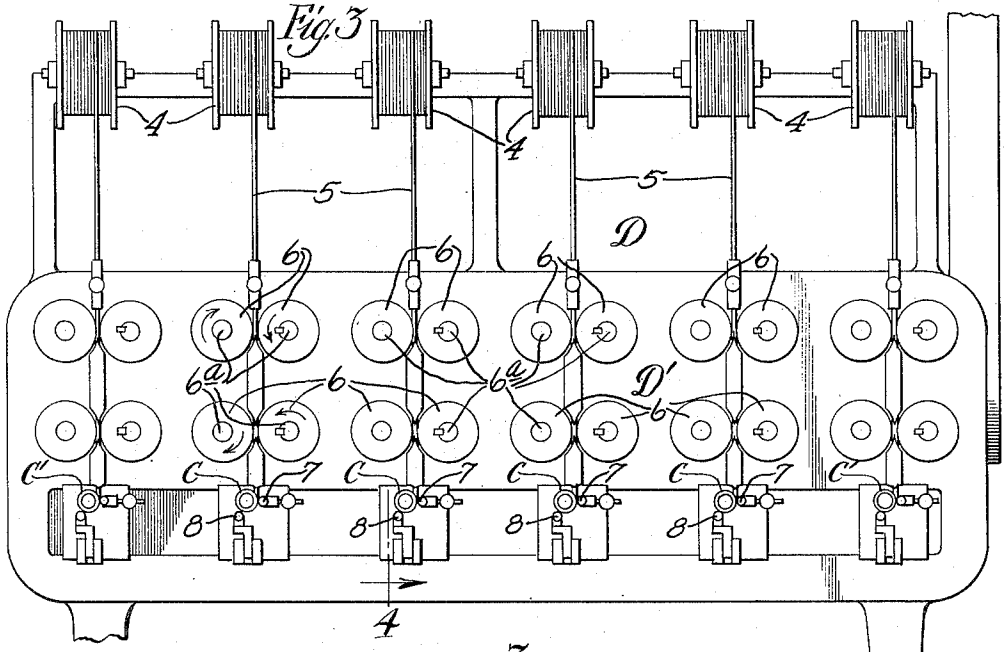
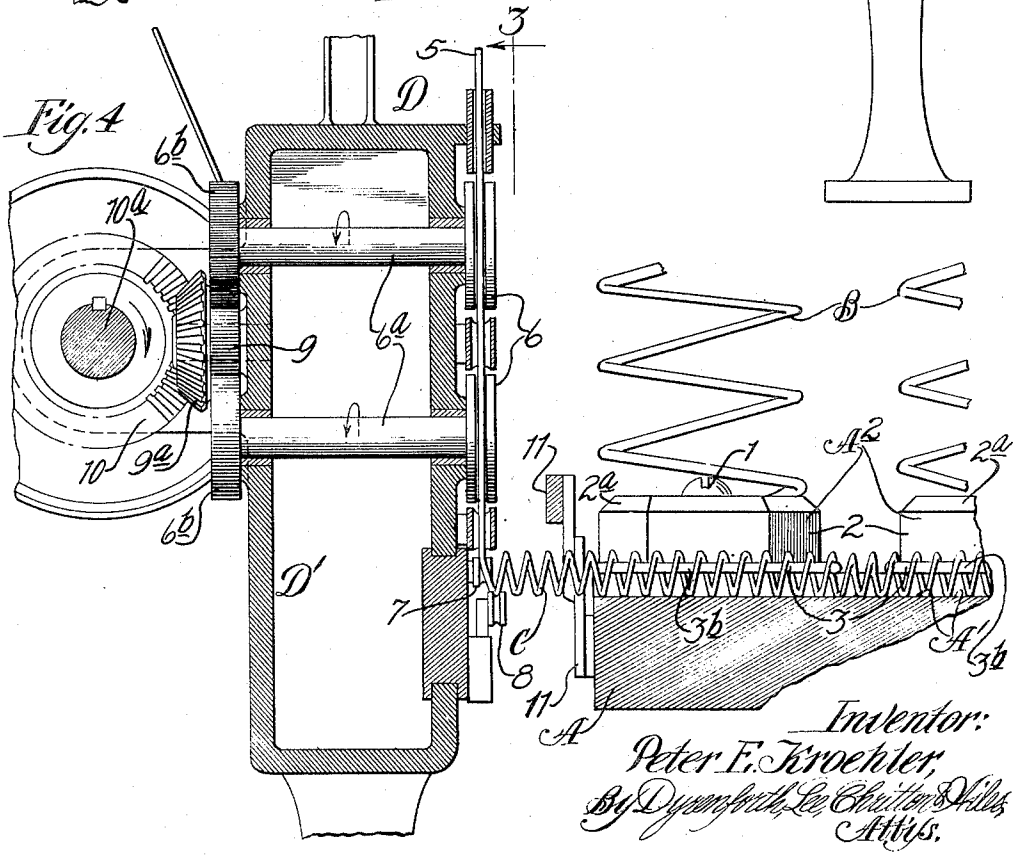


Fig. 4



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UNITED STATES PATENT OFFICE.

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SPRING-ASSEMBLING MECHANISM AND METHOD.

Application filed October 8, 1927. Serial No. 224,958.

This invention relates particularly to a method and mechanism for enabling spiral springs, such as upholstery springs, cushion springs, or the like, to be readily assembled into a spring structure.

For illustration, a spring structure, for the assembly of the members of which the present invention is particularly suited, may consist of a plurality of adjacent rows of spiral springs having their base-portions connected by spiral connector-wires, it being understood that the "base-portion" of the spiral spring is either the upper end-portion or the lower end-portion of the spring.

In accordance with the present invention, means are provided whereby a plurality of spiral connector-wires may be simultaneously turned or threaded into engagement with the base-portions of the springs, thus greatly facilitating the assembling operation.

If desired, the base-portions at one side of the spring-structure (upper side or lower side) may be connected by means of the spiral connector-wires, and the spring-structure may then be inverted and the base-portions of the springs at the other side of the structure may be connected by means of spiral connector-wires. On the other hand, if desired, the upper and lower sets of spiral connector-wires may be simultaneously turned or screwed into position, so that both the upper base-portions and the lower base-portions of the springs may be connected together during a single operation.

The primary object of the present invention, therefore, is to provide means for facilitating the operation of connecting together the base-portions of upholstery springs, or cushion springs. After a spring-structure has been assembled, it may be introduced into a casing, or jacket, suitable padding of cotton, hair, moss, or the like, being introduced at the same time, if desired.

In the preferred embodiment of the invention, the spiral connector-wires pass from a forming machine directly into the form which supports the springs and effects interlacing connections between the springs.

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

Fig. 1 shows brokenly and diagrammatically a form constituting a portion of mechanism adapted to effect connections between the base-portions of cushion springs; Fig. 2 shows a broken elevational view of the same, on a larger scale; Fig. 3 is a broken elevational view, taken as indicated at line 3 of Fig. 4, of mechanism for forming the spiral connector-wires and turning them through parallel guide-grooves in the form employed, in which operation the spirals are screwed through the adjacent base-portions of the springs, which base-portions project over the guide-grooves; and Fig. 4 is a broken vertical sectional view showing the relation between the spring-supporting form and the connector-forming mechanism.

Referring to the construction illustrated, A designates a base-plate, or support, provided with rows of parallel guide-grooves A′ and having rows of spring-sockets, or spring-supports, A^2 intervening between said grooves; B, B designate rows of upholstery springs, or cushion springs, having their base-portions engaging the sockets A^2 in such manner as to support the springs in a position at right angles to the bed-plate; C, C designate spiral connector-wires which serve to connect the base-portions of the springs; and D designates mechanism for forming the spiral connector-wires and driving them through the guide-grooves.

In the illustration given, the bed-plate A, which may be of wood or metal, has the spring-sockets A^2 secured to it by means of screws 1. It should be understood, however, that the spring-sockets may be formed on or applied to the bed-plate in any suitable manner.

The spring-sockets A^2 are shown as comprising non-circular blocks of a general rectangular outline and having peripheral walls 2 adapted to be embraced by the open rectangular end-ring 3 of the cushion spring. The blocks are beveled at their upper portion, as indicated at 2^a, so that the end-ring (incomplete) of the spring can be forced down over the block so as to clampingly engage the peripheral portion 2. One side of the block is recessed, as indicated at 2^b, and a spiral groove 2^c is cut in the upper portion of the block and intersects the peripheral portion of the block at this point. This accommodates the spiral portion of the spring rising from the open end-ring.

The base-portions of the cushion springs are similar in shape. Thus, each base-portion comprises a spiral-portion 3^a, a loop-

portion 3^b, a member 3^c, and a free end-portion 3^d.

When the springs are properly supported on the holder, the loop-portion 3^b of one spring is disposed slightly out of alignment with portions 3^e of an adjacent spring. Thus, when a spiral connector is screwed through the connector-guide A′, the spirals engage the portions 3^e of one spring and the intervening loop 3^b of the adjacent spring, thus connecting the springs together.

It will be understood from Fig. 2 that the portions 3^b and 3^e of adjacent springs project over the guide-groove A′ and into the path of the spiral-connector C, so that the action of screwing the connector home will cause the base-portions of the springs to be connected.

The mechanism D is a multiple coiling device adapted to form a plurality of spiral connectors and "drive" them (while they rotate) into the grooves of the form which supports the springs. In the illustration given, a frame D′ supports a series of reels 4 from which the wires 5 are fed by feed-rolls 6 to the spiral-forming rolls 7 and 8, which are grooved and are offset with respect to each other sufficiently to give the required pitch to the spirals of the connectors.

As the connectors are formed, they issue at right angles to the plane of the forming-rolls and pass with a cork-screw action through the grooves A′ of the spring-supporting form. One edge of the form is located adjacent the forming rolls, and the spacing of the grooves A′ of the form corresponds with the spacing of the connector-formers.

The feed-rolls are mounted on shafts 6^a fitted with gears 6^b which mesh with idlers 9 driven by integral bevel-pinions 9^a which mesh with bevel-gears 10 mounted on a drive-shaft 10^a. The connectors are formed and issue at the same speed. After the issuing spirals have been cork-screwed into connection with the springs, the feeding of the wires to the forming-rolls is stopped and spirals are severed at a plane adjacent the edge of the spring-supporting form.

Shears 11, operated in any suitable manner, may be used for the purpose.

If desired, the spiral connectors may be formed and severed and afterward turned or screwed through the guide-grooves by any suitable mechanism.

I have shown means for connecting the springs at one side of the spring-structure at a time, but it is to be understood that the invention is not limited in this respect.

At the margin of the spring-structure, a spiral-connector C′ is employed to connect the springs of the marginal row; and it is to be understood that after the spring-structure has been assembled in the manner described, that is, with the springs connected together by the spiral-connectors, marginal connectors extending at right angles to the connector C may be applied to the spring-structure, if desired.

After rows of springs have been connected by spiral-connectors in the manner illustrated in Fig. 1, the structure may be lifted from the bed-plate, or form, A; and the structure may be overturned and placed again on the bed-plate with the springs engaging the sockets of the form after which the other ends of the springs may be connected by spiral-connectors in the manner described above.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations 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 combination, a form provided with rows of spring-holders for engaging the base-portions of springs of the character set forth and provided with intervening guide-passages over or into which said base-portions may extend, and means for forming and driving spiral connector-wires through said guide-passages, whereby the connector-wires will be caused to connect said base-portions.

2. In combination, a support provided with parallel guide-grooves and between said grooves with rows of non-circular sockets adapted to hold the non-circular base-portions of rows of spiral springs with adjacent base-portions projecting over a common guide-groove, and means for forming and driving spiral connector-wires in said grooves, whereby the connector-wires will be threaded through adjacent base-portions of said spiral springs.

3. In combination, a form provided with a plurality of parallel guide-grooves and intervening rows of spring-sockets adapted to support spiral springs upon said form with the base-portions of the springs projecting into the paths of spiral connector-wires entering through said grooves, and means for forming and driving spiral connector-wires with a rotative and longitudinal movement through said grooves.

4. In combination, means for holding the ends of upholstery springs in assembly relation, and means for forming and cork-screwing spiral connector-wires into connecting engagement with the end-rings of adjacent rows of springs.

5. The method of assembling and connecting upholstery springs which comprises: arranging and supporting the springs in parallel rows with the end-rings in a common plane; and simultaneously forming a plurality of spiral connectors in proximity to

the spaces between the end-rings and causing the connectors as they issue from the formers to interlace the end-rings of adjacent rows of springs.

6. In combination, means for holding the ends of upholstery springs in assembly relation, said means including a form provided with rows of spring-sockets and intervening guides, and means for forming and cork-screwing spiral connector-wires through said guides into connecting engagement with the end-rings of adjacent rows of springs.

7. In combination, means for holding the ends of upholstery springs in assembly relation, said means including a form provided with rows of spring-sockets and intervening guides, means for forming and cork-screwing spiral connector-wires through said guides into connecting engagement with the end-rings of adjacent rows of springs, and means for severing said spiral connector-wires at a plane adjacent the edge of said spring-supporting form.

8. In combination, a form provided with rows of spring-holders for engaging the base-portions of springs of the character set forth and provided with intervening guide-passages over or into which said base-portions may extend, and means for forming and driving spiral connector-wires through said guide-passages, whereby the connector-wires will be caused to connect said base-portions, said forming means including a series of spiral-forming rolls positioned to extrude said spiral-connector wires along a plane at right angles to the plane of the rolls and in alinement with the guide-passages of said form.

9. In means of the character set forth, a form for the assembly of spiral-springs of the character set forth, said form being provided with parallel guide-grooves and between said grooves with rows of non-circular spring-support blocks having beveled edges to facilitate clamping of the spring thereon.

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