Nov. 30, 1948. C. J. ELDER 2,454,964

BED SPRING

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Fig. 1.

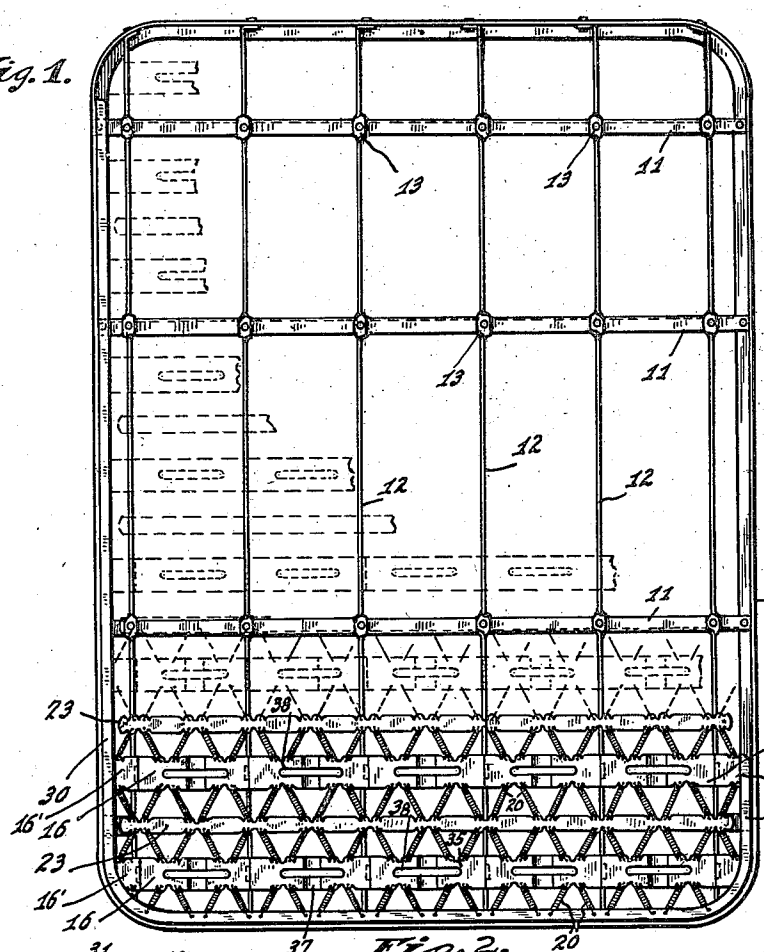


Fig. 2.

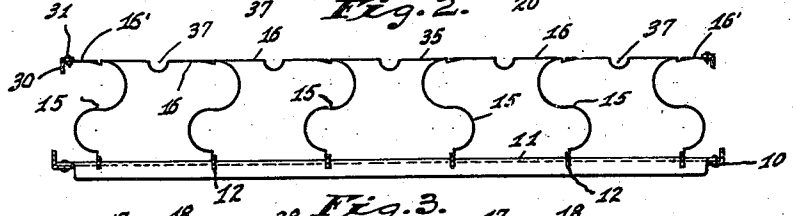
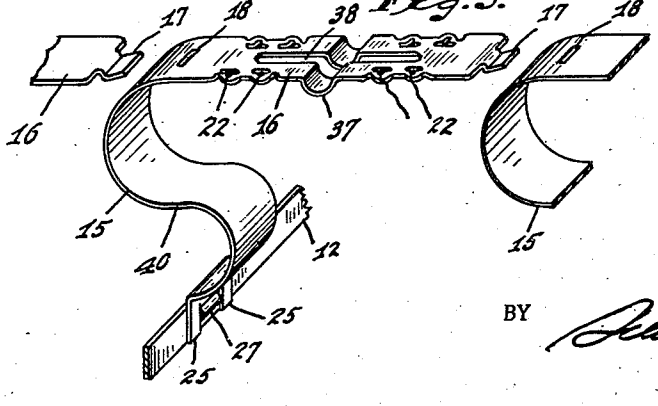


Fig. 3.



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Fig. 4.

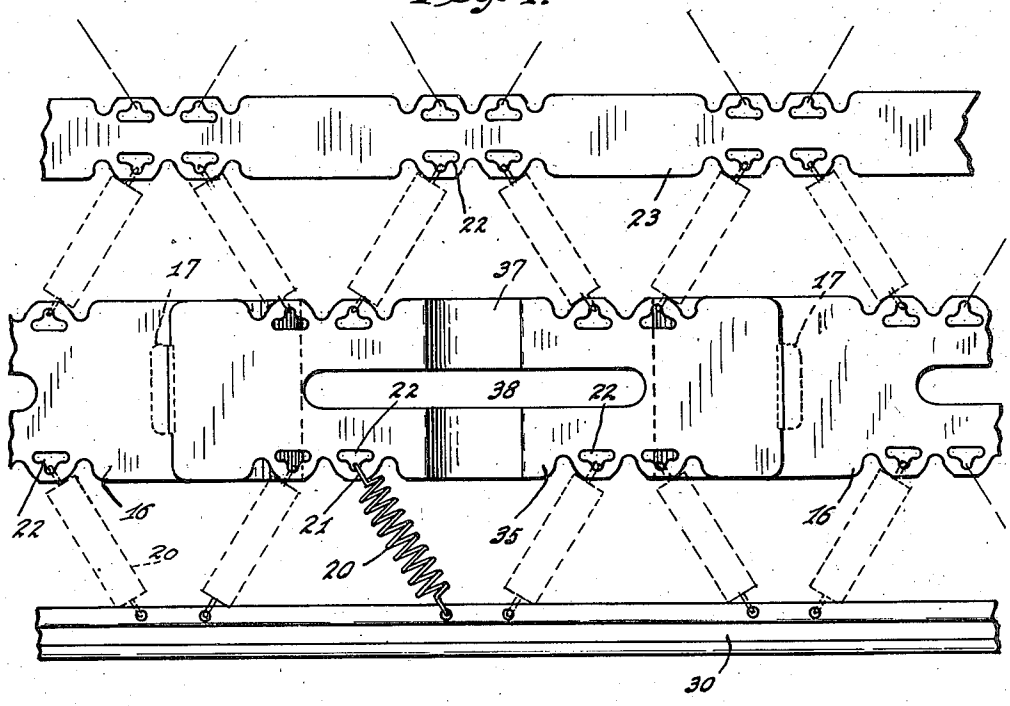
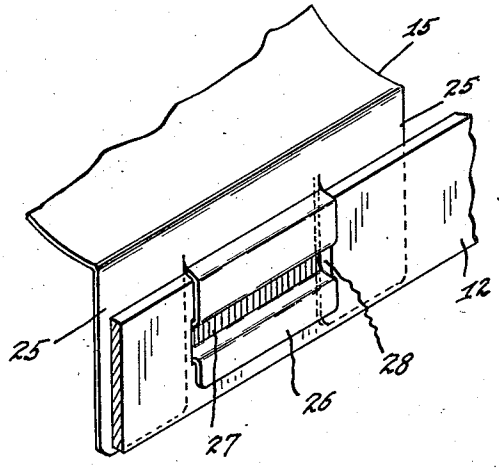


Fig. 5.



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BED SPRING

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7 Claims. (Cl. 5—247)

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My invention relates to bed springs, and more particularly to that form of bed spring in which the resilient load-sustaining elements are in the form of bent pieces of flat spring stock. It is the object of my invention to produce a spring of this type which will provide a satisfactorily flexible support, which will be made up of easily manufactured parts, and which can be quickly and economically assembled.

In carrying out my invention, I employ spring elements of flat stock bent into a general S shape. These elements are arranged in rows on the base frame, the plane of curvature of each spring coinciding with the plane of the row in which the spring is located. The lower ends of the springs in each row are connected to the base frame, while the upper ends are connected together. Desirably, the interconnection of adjacent springs in each row is effected by providing each spring with a horizontal extension which is secured to the adjacent spring. The extensions are formed to be longitudinally extensible, and form the mattress-supporting surface of the assembly. At the ends of the rows, the spring-extensions are secured to a border frame, and the spring-extensions of each row are resiliently connected to the spring-extensions of the adjacent row or rows by some suitable flexible means, such as helical springs.

The accompanying drawings illustrate my invention: Fig. 1 is a plan view of a bed spring with portions of the upper border frame and assembly broken away; Fig. 2 is a transverse vertical section through the bed spring of Fig. 1; Fig. 3 is an isometric view illustrating the manner in which the spring-extension of each spring element is secured to the adjacent spring; Fig. 4 is a fragmental plan view similar to Fig. 1 but on an enlarged scale; Fig. 5 is a fragmental isometric view illustrating a preferred manner of securing the lower ends of the spring elements to the base frame.

The bed spring illustrated in the drawing comprises an open, generally rectangular base frame 10, conveniently formed of angle-iron. Extending across the frame 10 at longitudinally spaced intervals are transverse braces 11, also conveniently of angle-iron. Supporting members 12 extend longitudinally of the frame 10 and are secured to the cross members 11 where they cross them, as at the points indicated by the reference numeral 13.

The spring elements 15, by which the load is transmitted to the base frame 10, are formed of flat spring stock bent into the general shape of a

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letter S, as will be clear from Figs. 2 and 3, and are arranged in rows extending transversely of the base frame. Each of the spring elements 15 is secured at its lower end to a supporting member 12 of the base frame. At the upper end of each of the spring elements 15, the stock of which such spring element is formed continues horizontally tangentially to the upper curve of the element to form an extension 16 long enough to project into association with the next adjacent spring element 15 in the same row. The outer end of each extension 16 is secured to the next adjacent spring element desirably by providing it at its end with an offset tongue 17 adapted to enter a slot 18 in such next adjacent spring element.

To locate the extensions 16 of the several spring elements longitudinally of the bed spring, I employ helical tension springs 20 provided at their ends with hooks 21 adapted to be received in slots 22 in the extensions 16. If it is not desired to use helical springs 20 long enough to extend between adjacent transverse rows of spring elements I may, as indicated in Figs. 1 and 3, dispose between adjacent rows of spring elements and in the common plane of the extensions 16 a transversely extending strip 23 which, like each extension 16, is provided along its edges with slots 22 to receive the hooks 21 of the helical springs.

Various means may be employed for securing the lower ends of the spring elements 15 to the supporting members 12, but the preferred means is that illustrated in Fig. 5. As there shown, the lower end of each spring element 15 is bent to lie in a vertical plane and is provided with two spaced slits or cuts dividing the end of the element into a pair of outer tongues 25 and a center tongue 26. The tongues 25 are conveniently in one vertical plane and adapted to lie against one vertical face of the supporting member 12. The center tongue 26 is offset vertically at its base to lie against the opposite face of the supporting member 12. In addition, the tongue 26 is provided with an intermediate offset portion 27 adapted to enter a slot 28 in the supporting member 12.

As will be clear from Fig. 2, I prefer to dispose the spring elements 15 in each row in positions symmetrical with respect to the longitudinal center-line of the base frame 10, each spring element being disposed with its lower curve concave towards such center-line and with its extension 16 projecting in the opposite direction. The extensions 16' of the two spring elements at the end of each row may be shorter than the exten-

sions 16 of the other spring elements and are secured to a generally rectangular border frame 30 as by means of rivets 31. The extensions 16 of the remaining spring elements are secured respectively, through the medium of the tongues 17 and slots 18, to the elements lying respectively adjacent them.

With the elements 15 arranged on the base frame as above described, no extension 16 is available to interconnect the two central elements of each row. I prefer that the central elements be interconnected, and for this purpose I may use a strip of spring stock 35, desirably the same stock as that of which the spring elements 15 are formed. The strip 35 is provided at its ends with tongues 17 corresponding in form to the tongues 17 of the extensions 16 and adapted to enter the slots 18 in the two center elements 15 of each row. In addition, the strip 35 is provided along its edges with slots 22 adapted to receive the hooks of helical springs 20.

When the bed spring is not subjected to any load, the extensions 16 will lie substantially in a common plane, which is also the plane of the border frame 30. The extensions 16 and the central connecting strip 35 of each row of spring elements 15 form a substantially continuous tension-transmitting chain extending across the border frame 30 and secured at its ends to the sides of such border frame. In order to reduce the tendency of loads on this chain to draw the sides of the border frame toward each other, the strip 35 and at least some of the extensions 16 in each row are desirably made extensible longitudinally of the row. To accomplish this result, I provide in the strip 35 and in the extensions 16 of all but the end elements 15 a downwardly projecting offset 37 and a longitudinal slot 38. The offsets 37 are desirably U-shaped in form, and each of them operates as a U-shaped spring acting to permit but to oppose separation of its ends. The central slot 38 reduces the width of the offset portions 37 and hence increases their resilience.

In order to remove any lost-motion in the connection between the upper ends of adjacent spring elements, the offset tongues 17 are desirably formed so that they will be strained slightly in the assembled bed spring. This result is accomplished by inclining the offset portion of the tongue 17 upwardly to a point such that its distance below the upper surface of its associated extension will be less than the thickness of the stock. As a result, when the tongue 17 is inserted into the slot 18 of the adjacent-element and the extensions 16 of such two spring elements are brought into the same plane the tongue 17 will be strained and its outer end will bear upwardly with considerable force against the lower surface of the associated spring element.

I have found that it is desirable in forming each spring element 15 to bend its lower portion on a radius materially smaller than the radius on which the upper portion of the spring element is bent. In the preferred element-shape each bend is substantially 180° in extent, and the two bends are interconnected by a relatively narrow plane portion 40. I find that spring elements so shaped are highly resilient and will permit a large extent of downward displacement.

I claim as my invention:

1. A bed spring, comprising a generally rectangular base frame, a plurality of rows of spring elements having their lower ends secured to said base frame, each of said elements being formed of flat spring stock bent into a general S shape,

an open, generally rectangular border frame disposed over said base frame, the upper end of each spring element at each end of each row being provided with an integral extension disposed substantially in the plane of the border frame and secured to the adjacent side of said border frame, each of the remaining elements of each row being provided with an integral extension projecting toward the adjacent side of the border frame and secured to the upper end of the next element in the same row, a strip of spring stock interconnecting the upper ends of the middle pair of elements in each row, resilient means connecting said element-extensions and strip of each end row of elements to the adjacent end of the border frame, and resilient means interconnecting the element-extension and strips of adjacent rows of elements.

2. The invention set forth in claim 1 with the addition that said strip and at least some of the extensions in each row of elements are provided with offset portions rendering them elastically extensible.

3. The invention set forth in claim 1 with the addition that said interconnecting means comprise helical tension springs provided at their ends with hooks, said extensions and strips being provided along their edges with openings for receiving said hooks.

4. The invention set forth in claim 1 with the addition that said interconnecting means comprise helical tension springs.

5. In a bed spring, a base frame, a row of spring elements having their lower ends secured to said base frame, each of said elements being formed of flat spring stock bent into a general S shape and each element intermediate the elements at opposite ends of the row having at its upper end an integral extension projecting horizontally into superposed load-transmitting relation with the upper end of an adjacent element of the row, and means for securing said extension to such adjacent element.

6. The invention set forth in claim 5 with the addition that said securing means comprises an offset tongue at the end of the extension, the adjacent element being provided with a slot in which said tongue is received.

7. The invention set forth in claim 5 with the addition that said extension is provided at a point intermediate its length with a transverse offset rendering it longitudinally extensible.

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