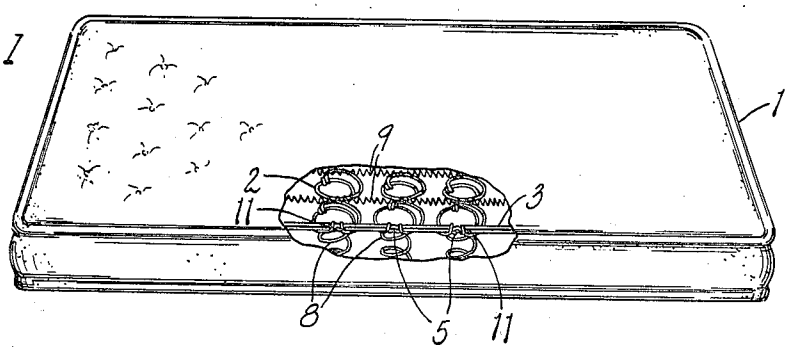
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SPRING ASSEMBLY

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Fig. 1



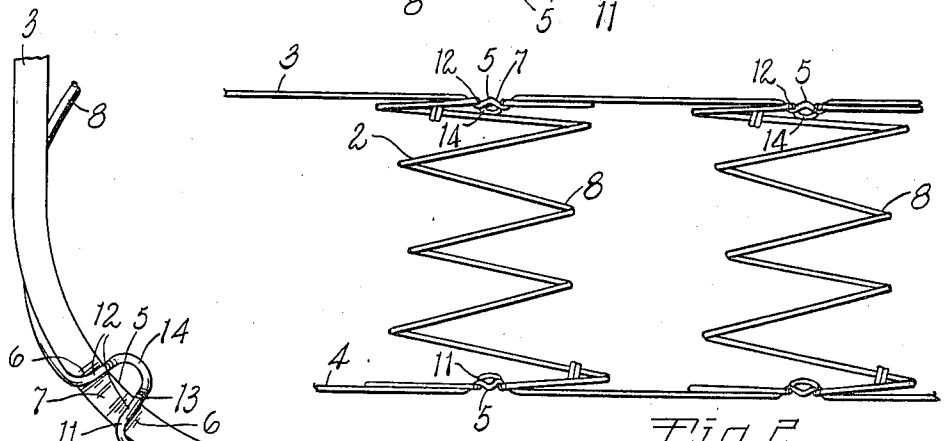


Fig. 2

Fig. 4

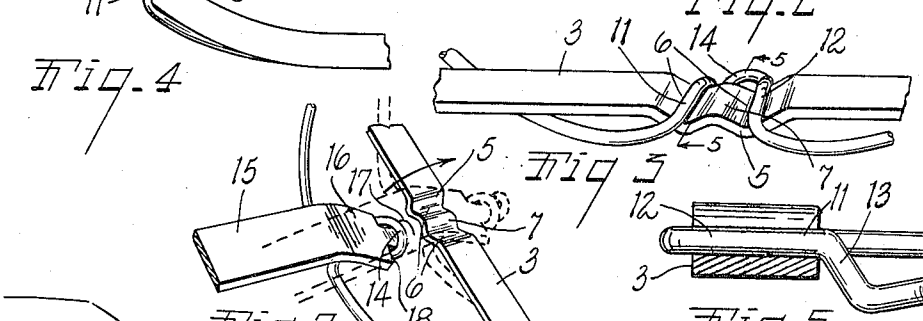


Fig. 3

Fig. 7

Fig. 5

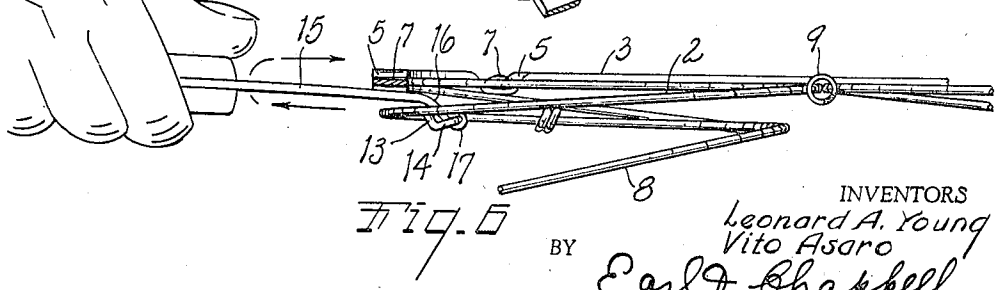


Fig. 6

INVENTORS
Leonard A. Young
Vito Asaro
BY Earle Chappell
ATTORNEYS

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SPRING ASSEMBLY

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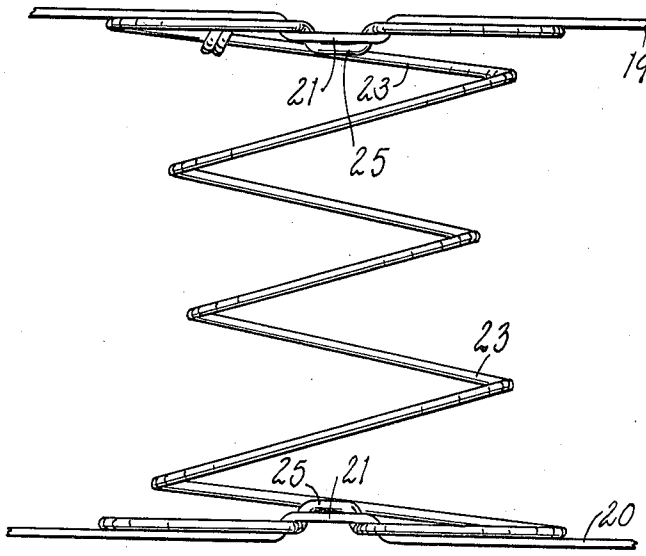


Fig. 8

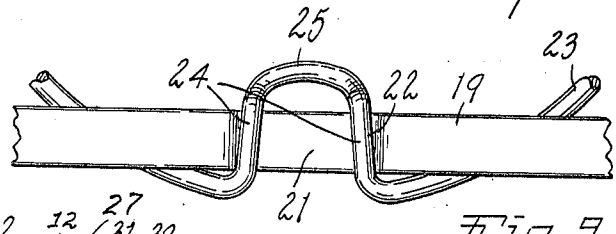


Fig. 9

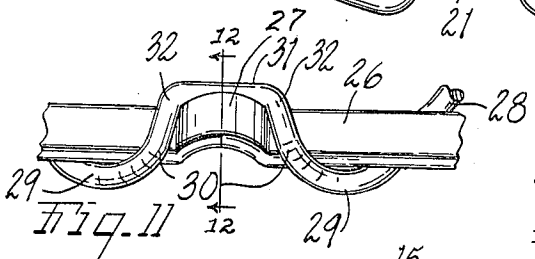


Fig. 11

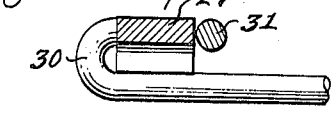


Fig. 12

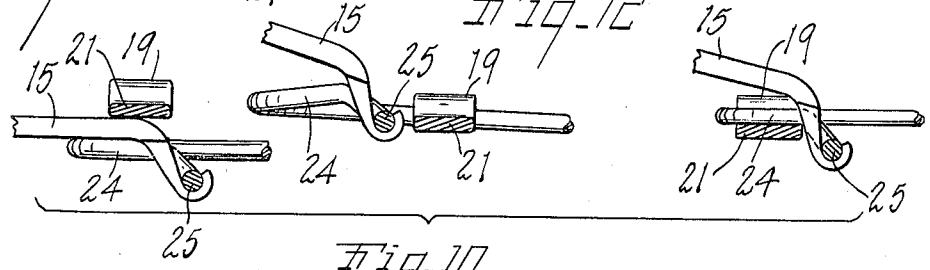


Fig. 10

INVENTORS
Leonard A. Young
Vito Asgro

BY Earl D. Chappell
ATTORNEYS.

Patented June 8, 1943

2,320,987

UNITED STATES PATENT OFFICE

2,320,987

SPRING ASSEMBLY

Leonard A. Young and Vito Asaro, Detroit, Mich., assignors to L. A. Young Spring & Wire Corporation, Detroit, Mich., a corporation of Michigan

Application April 12, 1941, Serial No. 388,226

10 Claims. (Cl. 5—260)

This invention relates to improvements in spring assemblies.

The main objects of this invention are:

First, to provide an improved and simplified spring assembly of rugged construction characterized by the fact that it is assembled in its entirety from parts which are entirely pre-conformed, which parts may be assembled and effectively locked together with ease and rapidity by unskilled persons to constitute a complete assembly.

Second, to provide a spring assembly or unit of the foregoing character wherein the parts in assembled condition are effectively prevented from undesired displacement relative to one another and are, moreover, associated in a stable mutually supporting and sustaining manner so that there is no tendency for looseness, rattling, scraping or the like in use.

Third, to provide an assembly of the type described, including frame members and springs associated in supporting engagement therewith, the frame members and springs being prefabricated and pre-conformed in such manner as to enable the quick and easy assembly thereof by inexperienced persons, especially with the aid of a simple tool.

Fourth, to provide a novel, improved and greatly expedited and simplified method of spring assembly.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

Preferred embodiments of the invention are illustrated in the accompanying drawings, in which:

Fig. 1 is a top perspective view illustrating an upholstered spring structure or spring mattress incorporating the improved spring unit or assembly of this invention, a portion of the mattress covering and padding being broken away.

Fig. 2 is a fragmentary view in side elevation, illustrating the spring unit or assembly in accordance with one embodiment of the invention.

Fig. 3 is an enlarged fragmentary top perspective view illustrating more clearly the assembly of the top or end coil of a spring with the top border frame of the unit.

Fig. 4 is an enlarged fragmentary top plan view further illustrating the structural relationship of the body springs and border members.

Fig. 5 is an enlarged fragmentary view in section on line 5—5 of Fig. 3.

Fig. 6 is a fragmentary view in end elevation illustrating steps of assembling a border spring of the unit with the top border frame as contemplated by the invention.

Fig. 7 is a fragmentary top plan view further illustrating in solid and dotted lines the steps or procedure followed in locking the border springs of the assembly to the frame.

Fig. 8 is an enlarged fragmentary elevational view generally similar to Fig. 2 illustrating a somewhat modified embodiment of the invention.

Fig. 9 is an enlarged fragmentary top plan view further illustrating the structure of the aforesaid modified form or embodiment.

Fig. 10 is a bracketed view illustrating successive, continuously performed steps involved in the assembly of the spring and border frame of Figs. 8 and 9.

Fig. 11 is a fragmentary perspective view illustrating the details of a still further modified embodiment of the invention.

Fig. 12 is a fragmentary view in section on line 12—12 of Fig. 11.

The present invention relates generally to improvements in the spring assembly or unit shown and described in the patent to Neil Ely, No. 2,250,013, dated July 22, 1941, and assigned to the assignee of the present application.

Generally stated the Ely patent relates to a spring assembly or unit including a top border frame of flat cross section provided with downward offsets therein adapted to lockingly receive inward loop-like offsets which are formed on one or both end coils of the several border springs of the assembly. As therein shown and described, the said top coil lappingly engages the under side of the flat border frame with the said loop-like offset disposed over the same in said frame offsets and locked to the frame by a final axial bending or offsetting of the end of the loop interiorly of the frame. Various advantages characterizing such a structure from the standpoint of elimination of top bulges on the frame and stabilization of the connection of springs thereto, etc., are described in that application.

The present structure has all of the advantages in the aforesaid Ely patent with the further advantage that the assembly of the component parts involves no final bending or offsetting of any of the elements to lock them in place. All of the parts are completely prefabricated and pre-conformed and are assembled by an exceedingly simple procedure involving, so far as the securement of the spring to the frame is concerned, merely a single orbital movement

of the hand of one assembler, preferably manipulating a special tool which is devised for the purpose. This assembly can be performed with speed and ease by unskilled or inexperienced workers, without any likelihood of improperly or loosely assembling or securing the parts.

Referring to the drawings in Fig. 1, numeral 1 illustrates and indicates a mattress incorporating the spring assembly 2 or unit of the present invention, it being understood, however, that the said assembly or unit is well adapted for incorporation in any comparable spring member such as a cushion, an upholstered automobile seat or back or the like.

It will be appreciated that the terms top and bottom or upwardly and downwardly as used in this specification are relative terms and the structure illustrated is designed to be used either side up in a mattress. In seat back cushions, the same arrangement of parts may be used or the bottom may be a general support upon which the bottoms of the springs are mounted.

This assembly illustrated comprises the spaced border members 3 and 4 of resilient stock, flat in cross section which, in the embodiments illustrated, are of resilient stock flat in cross section with the wider dimension disposed in the horizontal plane. However, certain advantages may be obtained if round wire rod or stock is employed for the frames.

The frames 3 and 4 which are really duplicates arranged in reversed relation to each other are provided around the respective peripheries thereof with spaced aligned oppositely disposed offsets 5, these offsets of the two frame members being disposed toward each other. These offsets, in the preferred embodiment of the invention, are generally W-shape in outline providing a pair of spaced outwardly facing indentations or recesses 6 and an intermediate return bent ridge portion or spacer portion 7, the apex of which is slightly flush with or slightly within the horizontal outer surface of the frame members.

The body springs are indicated by the numeral 8 and may be of conventional hour-glass type having knotted ends. The springs of adjacent rows of the assembly are connected by helical tie members 9 of a well known type. The outer or border springs of the assembly are each provided in the end coils thereof with internally disposed and extending loop-like offsets 11, it being understood that in operative position these offsets of the border springs are arranged so as to open outwardly normal to the periphery of the frame with which they are engaged. Moreover, the offsets of the respective top and bottom end coils are in vertical alignment and in engaging register with the corresponding frame offsets 5.

As particularly illustrated in Figs. 3 and 5, the spring coil offsets include generally spaced arms 12 directed approximately radially of the coil and merging into relatively sharp axially bent portions 13 and in an inner terminal or bight portion 14, this latter portion being bent or offset or directed in outward axial relation to the portions 13. The dimensions of the offsets 11 are such that the arms 12 thereof are approximately co-extensive with the width of the frame and the portions 13 and 14 extend substantially axially inward of the inner edge of the border frame to enable ready access to the bight of a special assembly tool to be hereinafter described.

The arms of the loop-like offsets are spaced laterally a distance corresponding to the distance between the pairs of recesses or indentations 6 of the frame offsets 5, being laterally engaged by the ridge or crown 7 of the latter.

In assembling the springs with the frame (only the assembly with one frame will be described since it is obvious that similar steps are performed in assembling the opposite end coils of the spring) the upwardly facing coils of the border spring are disposed or lie below the border frame and in radially overlapping relation thereto, the same as illustrated in solid lines in Fig. 6 and in dotted lines in Fig. 7. The specially designed assembling tool 15 is then inserted beneath the border frame below an offset thereof to deflect the spring coil downwardly and is engaged with the bight 14 of the loop-like spring offset 11. This tool comprises a projecting tongue member 15 deflected downwardly at 16 and provided with a hook-like extremity 17, see Figs. 6 and 7, there being shoulders 18 in spaced relation to said extremity for limiting engagement with the arm portion 13 of the spring offset.

Having the tool engaged with the spring offset in the manner illustrated and described, an outward pull is then given to the tool to clear the innermost portion of the spring offset relative to the outer edge of the frame, then raised upwardly or tilted slightly, so as to direct the loop of the spring over the offset of the frame. The inherent tension of the spring tends to draw the spring offsets over the frame and this may be facilitated and guided by the operator when these spring coil offsets are in approximately the inner position shown for example in Figs. 3 and 4. The spring loops of the offsets snap or spring downwardly for secure retaining engagement with the frame. These engaging motions or steps are further illustrated in Fig. 10. It will be understood that these motions are continuous and that with very little practice an unskilled or inexperienced worker can effect the desired connection with great speed and ease. In Fig. 6 the arrows indicate the generally orbital direction of the assembly movement and in Fig. 7 the spring is shown in dotted lines prior to and in solid lines during the assembly operation. The final interlocked position of the spring and frame offsets is clearly illustrated in Figs. 2 to 5.

The foregoing arrangement, of course, eliminates need for any final bending or offsetting of the spring or frame elements to secure the same in locked relation. Moreover, the internal reception of the spring offsets in the frame offsets assures that there will be no upwardly projecting bump at this point, likewise that the spring offsets, by lateral engagement with the ends of the frame offsets 5 will prevent end shifting of the spring relative to the spring. Using stock of flat section for the border frame enables a substantial stabilizing engagement of the top spring coil therewith. However, even if a wire frame of conventional round section stock is employed, the substantial overlapping of the spring and frame provides considerable stability, this overlapping being, of course, the result of the inward disposition of the spring offsets 11.

In Figs. 8, 9 and 10, there is illustrated a somewhat modified embodiment incorporating the principles discussed above and illustrating the

manner of manipulation of the spring in assembling. In this case, the flat border frames 19, 20 have the opposed vertically aligned, oppositely directed offsets 21 therein, which are offset substantially toward one another so as to be substantially spaced below and above the top and bottom frames respectively and are each of considerable longitudinal dimensions though otherwise plain and unridged. The internal loop-like offsets 22 of the top extreme spring coils 23 of the border springs have the generally parallel arms 24 in the plane of the coils for end engagement with the corresponding ends of the frame offsets, and these arms are downturned relatively sharply and connected directly to the bight 25, the further upward offsetting as incorporated in the modification of Figs. 1 to 6 being omitted. In this case, the tool 15 is engaged with loop 25 from beneath the border frame offset 21, and is manipulated continuously through the successive positions shown in Fig. 10 to complete the assembly.

In Fig. 11 a still further modified embodiment is shown in which the border frame 26 has the arcuate offsets 27 disposed upwardly, i. e., oppositely of the offsets 5, 21. The top spring coil 28 is curved upwardly at 29, inwardly at 30 and then downwardly to the bight 31 to provide the loop-like offset 32, the arms of which engage on either side of the frame offset to prevent lateral relative shifting of the spring on the frame. Bight 31 engages internally of the frame offset 27 to lock the parts against accidental displacement. In this embodiment the operation in assembling is identical to that described above. The upward offset 27 somewhat facilitates engagement of the hook of the tool with the loop-like offset bight.

Embodiments of the invention which incorporate the principles of the invention in a highly desirable manner have been illustrated and described. It should be understood that the foregoing terminology is used only descriptively rather than in a limiting sense and with full intention to include equivalents of the features shown and described, within the scope of the following claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A spring assembly fabricated entirely of preconformed parts comprising a continuous annular border frame of resilient stock of flat section disposed with the wider surfaces thereof in the plane of the frame, and a plurality of coiled border springs connected to said frame, the end coil of said springs being provided with an internally extending loop-like offset including spaced arms in the plane of the coil, said arms having inner extensions initially offset downwardly relative to said plane and a terminal bight integrally connecting said extensions and offset in the opposite direction from the latter, said frame having an offset receiving said loop-like spring offset, in the form of a recess of generally W-shaped configuration disposed beneath the outer horizontal surface of the frame, the arms of said loop-like spring offset being engageable in the recesses on the opposite sides of the center portion of said frame offset and the extensions and the bight thereof being disposed internally of the frame in locking engagement with the inner edge of said frame, said bight being in substantially spaced relation to the inner side of the frame for ready engagement of an assembling tool therewith.

2. A spring assembly fabricated entirely of preconformed parts comprising a continuous annular border frame of resilient stock of flat section disposed with the wider surfaces thereof in the plane of the frame, and a plurality of coiled border springs connected to said frame, the end coil of said springs being provided with an internally extending loop-like offset including spaced arms in the plane of the coil, said arms having inner extensions initially offset downwardly relative to said plane and a terminal bight integrally connecting said extensions and offset in the opposite direction from the latter, said frame having an offset receiving said loop-like spring offset disposed beneath the outer horizontal surface of the frame, the arms of said loop-like spring offset being engageable in said frame offset and the extensions and the bight thereof being disposed internally of the frame in locking engagement with the inner edge of said frame, said bight being in substantially spaced relation to the inner side of the frame for ready engagement of an assembling tool therewith.

3. A spring assembly fabricated entirely of preconformed parts comprising a continuous annular border frame of resilient stock of flat section disposed with the wider surfaces thereof in the plane of the frame, and a plurality of coiled border springs connected to said frame, the end coil of said springs being provided with an internally extending loop-like offset including spaced arms in the plane of the coil, said arms having an offset terminal bight integrally connecting the same, said frame having an offset receiving said loop-like spring offset in the form of a recess of generally W-shaped configuration disposed beneath the outer horizontal surface of the frame, the arms of said loop-like spring offset being engageable in the recesses on the opposite sides of the center portion of said frame offset and the extensions and the bight thereof being disposed internally of the frame in locking engagement with the inner edge of said frame, said bight in substantially spaced relation to the inner side of the frame for ready engagement of an assembling tool therewith.

4. A spring assembly fabricated entirely of preconformed parts comprising a continuous annular border frame of resilient stock of flat section disposed with the wider surfaces thereof in the plane of the frame, and a plurality of coiled border springs connected to said frame, the end coil of said springs being provided with an internally extending loop-like resilient spring offset including spaced arms in the plane of the coil springable transversely of said plane, said arms having an offset terminal bight integrally connecting the same and inclined inwardly and downwardly therefrom, said frame having an offset receiving said loop-like spring offset disposed beneath the outer horizontal surface of the frame, the arms of said loop-like spring offset being engageable in said frame offset and the bight thereof being disposed internally of the frame in locking engagement with the inner edge of said frame, said bight being in substantially spaced relation to the inner side of the frame for ready engagement of an assembling tool therewith.

5. A spring assembly fabricated entirely of preconformed parts comprising a continuous annular border frame of resilient stock, and a plurality of coiled border springs connected to said frame, the end coil of said springs being provided with

an internally extending loop-like resilient spring offset including spaced arms having inner extensions initially offset downwardly and a terminal bight integrally connecting said extensions and offset inwardly of the latter, said frame having an offset receiving said loop-like spring offset disposed beneath the outer horizontal surface of the frame, the arms of said loop-like spring offset being engageable in said frame offset and said extension being disposed internally of the frame in locking engagement with the inner edge of said frame, said bight being in substantially spaced relation to the inner side of the frame for ready engagement of an assembling tool therewith.

6. A spring assembly fabricated entirely of preconformed parts comprising a continuous annular border frame of resilient stock of flat section disposed with the wider surfaces thereof in the plane of the frame, and a plurality of coiled border springs connected to said frame, the end coil of said springs being provided with an internally extending loop-like resilient spring offset including spaced arms substantially in the plane of the coil springable transversely of said plane, said arms having an offset terminal bight integrally connecting the same and inclined inwardly and downwardly therefrom, said frame having offsets engageable by said loop-like offsets, the arms of said loop-like spring offset being engageable on the opposite sides of said frame offset and said bight being disposed internally of the frame in locking engagement with the inner edge of said frame.

7. In a spring assembly of the type described, a border frame member having a plurality of offsets therein, and a plurality of border springs connected to said frame and having preconformed springable loop-like offsets in the end coil thereof substantially in the plane of said coil, said loop-like offsets comprising spaced internally extending arms and a downwardly extending connecting bight integral with said arms and disposed in substantially spaced relation inwardly of said border frame for ready engagement of an assembly tool therewith.

8. In a spring assembly of the type described, a border frame member having a plurality of offsets therein, and a plurality of border springs connected to said frame and having preconformed springable loop-like offsets therein, said loop-like offsets comprising spaced internally extending arms and a downwardly extending bill having an inwardly directed connecting bight integral with said arms and disposed in substantially spaced relation inwardly of said border frame for ready engagement of an assembly tool therewith.

9. In a spring assembly of the type described, the combination of a border frame member having a plurality of spaced offsets therein disposed within the plane of the outer horizontal surface of the border member, and a plurality of border springs connected to said frame and having coils thereof provided with preconformed springable loop-like offsets in said coils substantially in the plane of the latter and springably transversely of said plane comprising spaced internally extending arms terminating in axially and radially inclined offset bights integral with said arms, the bights constituting shoulders wedgingly engaging the inner edge of the frame member for clampingly retaining the offset of the spring in engagement with the offset of the frame, and likewise constituting a loop with which an assembling tool may be engaged.

10. In a spring assembly, the combination of a border member provided with spaced offset portions, and a plurality of border springs having inwardly disposed loop-like resilient spring offsets substantially in the plane of the end coil of the springs and springable transversely of said plane, the arms of said last named offsets being spaced to engage the offsets in said border member with the border member and the end coils of the springs in coacting supporting relation, the arms of said loop-like spring offsets being axially offset to provide inwardly inclined shoulders at an angle to and wedgingly engaging the inner side of the border frame member and being extended inwardly from said shoulders to provide open loops adapted to receive an assembling tool.

LEONARD A. YOUNG.
VITO ASARO.