

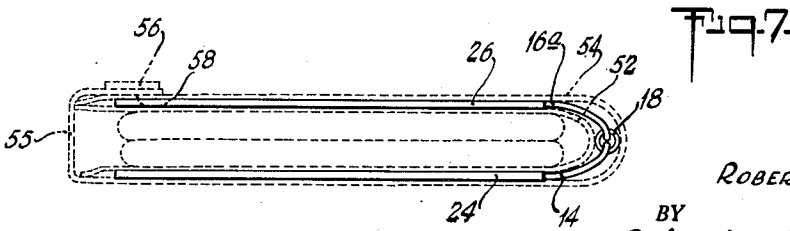
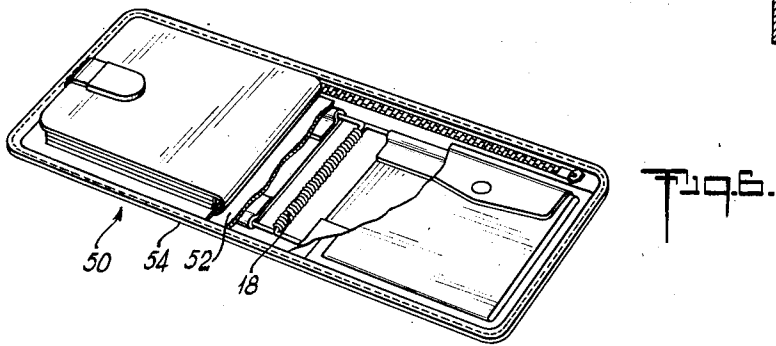
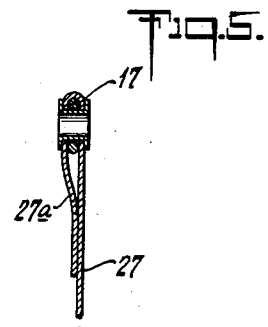
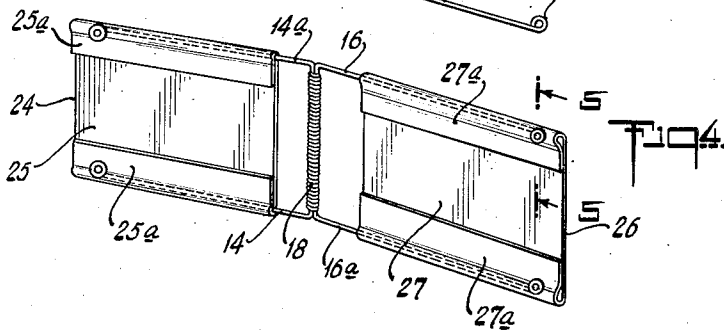
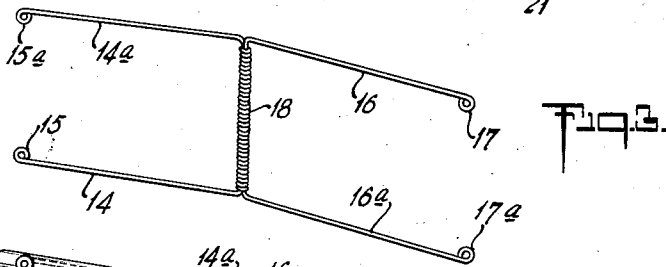
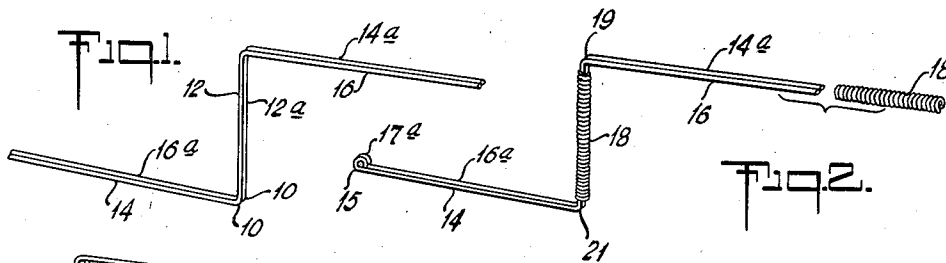
Aug. 14, 1951

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2,564,570

SPRING FOR FOLD-OVER ARTICLES

Filed Feb. 4, 1950



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UNITED STATES PATENT OFFICE

2,564,570

SPRING FOR FOLD-OVER ARTICLES

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Application February 4, 1950, Serial No. 142,414

8 Claims. (Cl. 267—1)

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The device of the present invention relates generally to fold-over articles, as for example, bill-folds or the like, and means for automatically unfolding same. Specifically, the present invention relates to a device for insertion in a fold-over article, which device can be bent medially against its normal biasing, and which will automatically open and flatten the article in which it is inserted on release of the bend holding means.

The main object of the present invention, therefore, is the provision of a device for insertion in a fold-over article which can be bent medially against its normal biasing, and which will automatically unfold to resume its normal flat condition on release of the bend holding means.

Another object of the present invention is the provision of an H-spring, the wings of which are normally flat lying in a single plane but may be bent over against one another.

Another object of the present invention is the provision of an H-spring comprising two elements and a holding member therefor.

Still another object of the present invention is the provision of an H-spring comprising two elements and a holding member therefor, each element comprising a portion of each wing of the H-spring, at diagonally opposite sides thereof.

Other and further objects of the present invention will in part be obvious and in part pointed out specifically in the following description of an illustrative embodiment thereof. The present invention, as will be obvious, has many uses and applications. While I have described same in relation to a wallet of the bill-fold type, it is to be limited only by the scope of the claims appended hereto.

In the drawings annexed hereto and forming a part hereof,

Figures 1, 2, 3 and 4 are perspective views of the H-spring of my invention, illustrating the components and the several steps in the assembly thereof;

Figure 5 is a vertical section on the line 5—5 of Figure 4;

Figure 6 is a perspective view of the device of my invention positioned within a wallet of the bill-fold, or fold-over type; and

Figure 7 is an edge elevational view of the wallet according to Figure 6, in folded position.

Referring to Figures 1, 2 and 3, the device of my invention comprises a pair of elongated wires

or rods 10, 10 of thin section spring material both bent, as shown, to provide a body portion 12, 12a and leg portions 14, 14a, 16, 16a. Legs 14, 16a are bent at right angles to the body portions 12, 12a, respectively, and legs 14a, 16 are bent down at right angles to bodies 12, 12a, legs 14, 16 and 14a, 16a being parallel to each other. Each member 10 thus forms a zig-zag or Z-element and it will be so referred to hereinafter. The Z-elements 10, 10 are paired together, arranged as shown in Figure 1, with the body portions 12, 12a against one another in parallelism, and with leg 16a of one member coincident with leg 14 of the other, and with leg 14a of the one coincident with leg 16 of the other. The ends of legs 14, 16a may be inturned to form eyelets as 15, 17a.

An elongated flexible coil spring 18, normally expansible, is provided, of such internal diameter as to receive the paired legs 16, 14a there-through, and of length normally longer than body portions 12, 12a. Coil 18 is threaded over the paired legs 14a, 16, as in the right hand side of Figure 2, past the right angle at 19 until it reaches the right angle at 21. Spring 18 is then compressed so that its length is less than the body portions 12, 14. With one Z-member held firmly, the other Z-member is swung through 180° with respect thereto, into the position of Figure 3, and the free ends of legs 14a and 16 are inturned into eyelets as at 15a and 17 respectively. In this H-form, spring 18 is trapped between legs 14a, 16 along one side of the H, and legs 14, 16a along the other side thereof. Each member 10 may be swung freely about the other within coil 18, but the paired legs 14, 14a forming one wing of the spring can be swung with respect to the other wing formed of paired legs 16, 16a only against the resistance inherent in the material, since the relative movement of the wings causes torsional movement of the wires or rods along the length of their body portions 12, 12a.

While my H-spring will be completely operable as described hereinabove, I provide means to secure the parts in the relative positions shown in Figure 3. These means comprise plates 24, 26, of light, thin material, as acetate or other plastic sheet material. Each plate comprises a body portion 25, 27 and side flanges 25a, 25a and 27a, 27a respectively bent over against the body. Suitable rivets passing through the side flanges and the bodies of the plates, and through eyelets 15, 15a, 17, 17a secure the plates to the legs of the H-spring, as will be readily understood

from Figure 4. Thus, legs 14, 14a and sheet 24 comprise one wing of the spring of my invention, and legs 16, 16a and sheet 26 comprise the other and opposing wing, on the other side of the joint line of members 12, 12a held together by coil spring 18. Plates 24, 26 are preferably of such length as to extend beyond the eyelets at the outer ends of the spring. At the inner ends of plates 24, 26, they are so spaced from the body portions 12, 12a as to avoid interference with the flexion of the members 10, 10 near the body portions thereof.

Each component 10, 10 of my spring has five working portions. Those parts of legs 14, 16, and 16, 16a covered by the plastic plates to increase their stiffness comprise two portions of each component. The uncovered parts of the legs between the covered parts and the body portions comprise two portions of each component, with the body being the fifth working portion. The leg portions act in pure flexure, bending with different resistances, while the body portion acts in torsion, twisting on itself as the legs are bent toward each other.

The motion of the legs of each component 10, 10 relative to each other is through 180°; that is, one wing may swing through an arc 180° about the middle portion, or both wings may be bent simultaneously towards each other, the total of the movements being 180°. A single straight, elongated wire, round or flat, could not be satisfactorily employed, for the repeated 180° of movement would result in the acquisition of a permanent set, and the wire or rod would not return to the original flat-lying condition and position. The use of two wires 10, 10 and the offsets between the legs and the middle portion avoids the set and prevents its formation since there is no flexure but only torsion along and about the middle parts of the wires 10, 10.

The riveting of the plastic plates to the leg eyelets prevents longitudinal movement of the plates and alteration of the overall length of the spring.

For use in any particular installation, my spring length is fitted to the length of the installation, in order to insure that the hinge or bend action takes place always along the center line of the installation.

In Figures 6 and 7, I have illustrated the use of the spring according to the present invention in a wallet of the bill-fold type; that is, a wallet which is folded along a center line. The wallet 50 is formed of a number of elongated sheets as 52, 54 of leather, plastic or the like, between two of which my spring is inserted as to fit snugly and be covered thereby. When one side of the wallet is bent over against the other, and locked as by a strap 55, extending from the end of one side over to the other and locked as by cooperating snaps 56, 58, the legs of the spring, stiffened by the enveloping plates will lie flatly and substantially as shown in Figure 7 against the tension built up against the normal, flat-lying biasing of the legs. The uncovered portions of the legs, adjacent the middles 12, 12a will flex adjacent the twist or torsion line within coil spring 18. When the bend-holding strap 55 is unsnapped and released, the wallet will automatically snap back, springing into the open flat position of Figure 6, due to the loading of the wings as a result of the fold-over.

My spring components are all of thin section material. Wires or rods 10, 10 may be of the order of .026" in diameter, with the wire of coil

18 of about .010" thick. Thus, with a minimum clearance of some .002" between body portions 12, 12a, the outside diameter of my spring at the torsion line is about .074". The acetate plate may be of .007" in thickness, and when doubled over the legs, which are of .026" thickness, the overall thickness will be about .040", which will not be objectionably bulky even when used in a bill-fold as 55.

It will thus be seen that, with my construction, there is provided an H-spring formed of two Z-members of thin metallic material reversed with respect to each other, but with their body portions held together, a laterally extending leg of one Z-member pairing with a laterally extending leg of the other member to form a wing of the H-spring. Flexion of the material is minimized, the bend-over of the spring resulting from torsion of the central body portions of the Z-members, whereby the spring thus created lasts longer and operates more satisfactorily than conventional spring hinge arrangements.

What I claim and desire to secure by Letters Patent is:

1. A normally flat-lying spring hinge comprising a pair of relatively thin and flexible elongated spring metal wires, each bent to provide a straight central body portion, a straight leg portion at one end of the body extending upwardly therefrom, and a straight leg portion at the other end of the body portion extending downwardly therefrom, the paired wires being disposed with their body portions against each other and with their legs extended in alignment from the body portions, and means coextensive in length therewith to hold the body portions against each other.

2. A spring hinge as in claim 1, in which the last named means comprise a tubular member encircling the body portions.

3. A spring hinge as in claim 1, in which the holding means comprise a flexible, tubular spring member encircling the body portions, said spring being axially expandable and under axial compression about the body portions.

4. A spring hinge as in claim 1, in which the legs extend from the body portions at right angles thereto, and the holding means comprise a flexible, tubular spring encircling the body portions under axial compression, the spring being trapped between the extended legs on opposite ends of the body members.

5. A normally flat-lying H-spring hinge composed of a pair of elongated members of relatively thin spring wire each bent to provide a straight central body portion and straight legs at the end thereof extending angularly therefrom in diametrically opposite directions, the wires being disposed and resiliently secured together with their body portions in coincidence forming the cross bar of the H, with their leg components extending from opposite sides and ends of the body portions in a single plane forming the side components of the H, the legs above the cross-bar defining one wing of the hinge, and the legs below the cross-bar defining the other wing of the hinge, the wings being bendable towards and into substantial parallelism with each other.

6. A normally flat-lying H-spring hinge composed of a pair of elongated members of spring wire each bent to provide a straight central body portion and straight legs at the end thereof extending angularly therefrom in opposite directions, the wires being disposed with their body portions in coincidence forming the cross bar of the H, means encircling the body portions along

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the length thereof to retain the said body portions in coincidence, with their leg components extending from opposite sides and ends of the body portions in a single plane forming the side components of the H, the legs above the cross-bar being connected for simultaneous movement as one wing of the hinge, and the legs below the cross-bar defining the other wing of the hinge also being connected for simultaneous movement, said wings being bendable towards and into substantial parallelism with each other.

7. An H-spring hinge composed of a pair of elongated members of spring wire each bent to provide a central body portion and legs at the end thereof extending angularly therefrom in opposite directions, the wires being disposed with their body portions in coincidence forming the cross bar of the H, with their leg components extending from opposite sides and ends of the body portions in a single plane forming the side components of the H, the legs above the cross-bar being connected for movement simultaneously as one wing of the hinge with respect to the legs below the cross-bar, said legs also being con-

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nected for movement simultaneously as the other wing of the hinge, the leg connections being plates of thin, flat material limiting the flexibility of the leg portions engaged thereby.

8. An H-spring as in claim 7, in which the plates engage portions of the legs on opposite sides of the body members spaced away from the body members, the plates limiting only the flexibility of the wing portions engaged thereby, the leg portion between the plates and the body portions flexing to a limited extent on movement of one wing with respect to the other simultaneously with the twisting of the body members.

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