CLIP DEVICE FOR HOLDING TOGETHER A STACK OF SHEETS

Field of Invention:

The invention relates generally to a clip device for holding together or binding a stack of sheets which may be made of paper, plastic, etc., and more particularly to a clip device having overall height dimensions which are collapsible in a rest position and which are adjustable to conform to the thickness of a stack of sheets when the clip is in an operative position.

Background:

There are many different devices for holding together a stack of sheets. One example is a binder clip as shown in Figures 5(a) to 5(c). The binder clip has a main body which is formed by a strip of bent spring steel. The binder clip body has a sidewall with a fixed thickness which is determined by the bent of the spring steel and which is to determine the maximum thickness of the stack of sheets that can be held together by the binder clip. As shown in Figures 5(a) to 5(c), the sidewall height remains unchanged whether or not the binder clip is in operative use. When several stacks of sheets, each stack being held by a binder clip, are arranged atop one another, the binder clips will bunch up at the corners of the stacks of sheets and result in an uneven or tilted stack since the height of each binder clip is fixed and usually greater than that of the sheets clamped therebetween.

In addition, since the height of the binder clip is permanently fixed even when it is not in use as shown in Figure 5 (b), this fixed sidewall height dictates the minimum space required for storing the binder clip. This necessarily follows that a binder clip with an increased sidewall height requires more space for storing. Accordingly, packaging, storing and transporting such binder clips, especially in bulk, results in wastage of space and resources.

Summary of Invention:

Embodiments of the invention provide a clip device which comprises two clipping panels, two resilient joint members, each having two opposed ends fixedly coupled to the clipping panels, and two actuating arms, each coupled to one of the resilient joint members, wherein each resilient joint member is disposed to resiliently bias the clipping panels to a closed position in which the overall height dimensions of the clip device are fully collapsed; wherein the actuating arms are operable to urge against at least the resilient joint members to move the clipping panels into an opened position for receiving a stack of sheets therebetween, and thereafter are releasable to recover the urged resilient joint members to an operative position in which the stack of sheets is secured between the clipping panels.

According to one embodiment of the invention, the each resilient joint member of the clip device may be a folded resilient strip which has a fold defining two folded parts which are spring-biased towards each other to resiliently bias the clipping panels to the closed position. An opening may be provided at the fold of the each resilient joint member for retaining the actuating arm therein, wherein the actuating arm may include an external part and an internal part which are wider than the opening and a middle part which is more narrow than the opening; the middle part of each actuating arm is disposed through the opening to pivotally couple the actuating arm to the resilient joint member. In this embodiment, the internal part of each actuating arm is secured between the two folded parts of a respective one of the resilient joint members when the device clip is in the closed position, and the external parts of the actuating arms are operable to urge against at least the resilient joint members to move the clipping panels into the opened position.

According to another embodiment of the invention, in order to further provide stronger resilience for increased clamping force, the each resilient joint member may have a non-uniform thickness, wherein a region on the resilient joint

member proximate to the fold is thicker than a region on the resilient joint member which is proximate to the clipping panels.

Since the overall height dimensions of the clip device are fully collapsible when the clip device is in a closed or rest position, the clip device of this invention has more compact height dimensions or form factor as compared to a prior art binder clip with a sidewall of permanently fixed height. Furthermore, even if the length of the resilient joint members is increased to enhance the binding capacity of the clip device, the overall height dimensions or form factor of the clip device would not become substantially greater because the clip device in the closed position appears to be a plurality of overlapped thin flats. Accordingly, the clip device of the invention has a smaller form factor and therefore packaging, storing and transporting the clip device of the invention requires lesser space and resources as compared to the prior art binder clips.

Brief Description of the Drawings:

Figure 1(a) is a top view of a clip device according to one embodiment of the invention.

Figure 1(b) is a perspective view of one example of the clip device of Figure 1(a).

Figure 1(c) is a rear view of the clip device of Figure 1(b) when the clip device is in a rest or closed position.

Figure 1(d) is a rear view of the clip device of Figure 1(b) when the clip device is in an opened position.

Figure 2 (a) is a side view of the clip device (excluding the actuating arms) of Figure 1(b) when the clip device is in a fully opened position.

Figure 2 (b) is a side view of another example of a clip device (excluding the actuating arms) when the clip device is in a fully opened position.

Figure 2 (c) is a side view of the clip device (excluding the actuating arms) of Figure 2(b) when the clip device is in a closed position.

Figure 2 (d) is a perspective view of the clip device (excluding the actuating arms) of Figure 2(c) when the clip device is in a closed position.

Figure 3 (a) illustrates a plan view of a first example of the actuating arm of the clip device.

Figure 3 (b) illustrates a plan view of a second example of the actuating arm of the clip device.

Figure 3 (c) illustrates a plan view of a third example of the actuating arm of the clip device.

Figure 3 (d) illustrates a plan view of a fourth example of the actuating arm of the clip device.

Figure 4 is a rear view of a clip device (excluding actuating arms) according to another embodiment of the invention.

Figure 5 (a) is a perspective view of a prior art binder clip with a stack of papers secured therein.

Figure 5 (b) is a side view of a prior art binder clip in a rest or closed position.

Figure 5 (c) is a side view of a prior art binder clip with a stack of papers secured therein.

Figure 6 is a perspective view of a clip device in an operative position with a stack of papers secured therein according to one embodiment of the invention.

Detailed Description of Embodiments of the Invention:

In the following description, numerous specific details are set forth in order to provide a thorough understanding of various illustrative embodiments of the invention. It will be understood, however, to one skilled in the art, that embodiments of the invention may be practiced without some or all of these specific details. It is understood that the terminology used herein is for the purpose of describing particular embodiments only, and is not intended to limit the scope of the invention. In the drawings, like reference numerals refer to same or similar functionalities or features throughout the several views.

Figures 1(a)-(d) illustrate the structure of a clip device 10 according to one embodiment of the invention. Referring to Figures 1 (a)-(d), the clip device 10 comprises two clipping panels 11, two resilient joint members 12 and two actuating arms 13.

Figures 1(a) and (b) respectively show a top view and a perspective view of the clip device 10 according to one embodiment of the invention. As shown in Figures 1(a) and (b), the two clipping panels 11 are provided as planar strips which may be made of metal or other suitable materials, e.g. plastic. It is to be understood that the shape of the clipping panels 11 does not limit the scope of the invention. In certain other examples, the clipping panels 11 may be provided in other shapes including but not limited to, circle, triangle, or even an irregular shape. Figures 1 (c) and (d) show a rear view of the clip device 10 according to the one embodiment of the invention. Referring to Figures 1(b)-(d), the clipping panels 11 are coupled together by the two resilient joint members 12 which resiliently bias the clipping panels 11 to a rest or closed position of the clip device 10 where the clipping panels 11 may contact each other at gripping edges 110. The gripping edges 110 may include a free end which allows a stack of sheets to be secured between the clipping panels 11 without crimping the sheets. As shown in Figure 2(a), in one example of this embodiment, a free end of each gripping edge 110 is set flush against the corresponding clipping panel 11. In another example of this embodiment as shown in Figure 2(b), a free end of each

gripping edge 110 may be spring-biased so that the free end is disposed at an acute angle with the proximate clipping panel 11 and is projected towards an opposite clipping panel 11. This biased projection is to further improve the clamping capability of the clip device 10. In this example, when the clipping panels 11 are in a closed position, the free ends of gripping edges 110 contact each other as shown in Figures 2 (c) and (d); when the clip device 10 receives a stack of sheets to be held together, the free ends respectively push against the stack of sheets in opposite directions to more securely hold the stack of sheets.

As shown in Figures 1(b)-(d), each resilient joint member 12 is a folded resilient strip having a fold 121 which defines two folded parts. Each resilient joint member 12 may be made of a strip of spring-metal or other materials with the similar resilient properties. The two folded parts of each resilient joint member 12 are spring-biased towards each other to resiliently bias the clipping panels 11 to the closed position, i.e. in a rest position when the clip device 10 is not in use, where the two folded parts of each resilient joint member 12 come into close proximity or contact to each other.

The resilient joint member 12 may be unfolded to move the clip device 10 to an opened position where the clip device 10 is ready to receive a stack of sheets to be held together. Referring to Figure 1 (b), on each resilient joint member 12 along the fold 121, an opening 122 is provided through which an actuating arm 13 is retained and pivotally coupled to the resilient joint member 12. To move the clip device 10 from a closed position to an opened position, a force is applied to each actuating arm 13 which, when suitably actuated, pivots about the edge of the opening 122 and urges against a respective resilient joint member 12 to move the clipping panels 11 into an opened position. In some circumstances, an external part 131 of each actuating arm 13 may additionally urge against a clipping panel 11 to further assist in moving the clipping panels 11 into the opened position. In the opened position, the resilient joint members 12 are at least partially unfolded (see Figure 1(d)).

Figure 2 illustrates a side view of a resilient joint member 12 of the clip device 10 when the clip device 10 is in a fully opened position according to one embodiment of the invention. As shown in Figure 2 and Figures 1 (c) and (d) , each resilient joint member 12 is provided in a strip form having opposed ends where each end is fixedly coupled to one of the clipping panels 11, such as by welding. The opening 122 positioned along the fold 121 is provided as a rectangular shape. It should be appreciated that both the resilient joint members 12 and the openings 122 on the resilient joint members 12 may be provided in other shapes as long as the actuating arms 13 are capable of being inserted though the openings 122 on the resilient joint members 12 and retained therein.

Figures 3 (a)-(d) illustrate plan views of four examples of the actuating arm 13 that may be used with the clip device 10. In these examples, the actuating arm 13 includes an external part 131 (handle), an internal part 132 and a middle part 133. The width of the middle part 133 is more narrow than the width of the opening 122 on each resilient joint member 12. The external part 131 and the internal part 132 are wider than the opening 122 on each resilient joint member 12. Preferably, the width of the internal part 132 is no wider than the maximum width of the resilient joint member 12, in order to provide a complete space between the clipping panels 11 to receive a stack of sheets to be held together. In the first example, referring to Figure 3 (a), the internal part 132 of the actuating arm 13 has two free ends which are capable of being urged into proximity or contact with each other to pass through the opening 122 on one of the resilient joint members 12. When the more narrow middle part 133 reaches the opening 122 on one of the resilient joint members 12 and the internal part 132 returns back to the original relaxed state, the actuating arm 13 is pivotally coupled to one of the resilient joint members 12. The actuating arm 13 may be made of spring metal or other materials with the similar resilient properties.

The second example of the actuating arm 13 of the clip device 10 as shown in Figure 3 (b) is similar to the first example shown in Figure 3 (a). The only difference is that the actuating arm 13 in the second example resembles the

shape of number "8". Specifically, the internal part 132 has two ends which are in contact with each other to form a spring-biased loop. The internal part 132 is capable of being urged to pass through the opening 122 on one of the resilient joint members 12 and being returned to the original relaxed state after passing through the opening 122. The actuating arm 13 may be made of spring metal or other materials with the similar resilient properties.

In the third example shown in Figure 3 (c), the external part 131 and the internal part 132 of the actuating arm 13 are substantially symmetrical to each other and in the same shape as the external part 131 of the actuating arm 13 in the first example as shown in Figure 3 (a).

In the fourth example shown in Figure 3 (d), the actuating arm 13 comprises a rectangular external part 131, a more narrow rectangular middle part 133 and a rectangular internal part 132. The middle part 133 passes through the opening 122 of one of the resilient joint members 12 such that the actuating arm 13 is pivotally coupled to one of the resilient joint members 12.

It should be noted that these four examples are just provided to illustrate the possible structures of the actuating arms 13, which do not limit the scope of the invention. Any variations and modifications of the structures of the actuating arms 13 are still covered by the invention as long as each actuating arm 13 can be pivotally coupled to one of the resilient joint member 12 and urged against the resilient joint members 12 to move the clipping panels 11 into an opened position. As mentioned above, in some circumstances, an external part 131 of each actuating arm 13 may additionally urge against a clipping panel 11 to further assist in moving the clipping panels into the opened position. The outer edge of the actuating arm 13 in the fourth example shown in Figure 3 (d) may be provided in other shapes, e.g. a rounded smooth outer edge to avoid snagging and/or injury; the external part 131 in the fourth example may be unsymmetrical to the internal part 132, which may be longer than the internal part 132 to provide a more convenient and effective handle to be operated.

When the clip device 10 is in a closed or rest position as shown in Figure 1(c), the internal part 132 of each actuating arm 13 is secured between the two folded parts of one of the resilient joint members 12. The external parts 133 of the two actuating arms 13 respectively extend from two sides of the clip device 10 as protrusions therefrom. When the clip device 10 is moved to the opened position in preparation to hold a stack of sheets (see Figure 1 (d)), both actuating arms 13 are rotated in opposite directions at the same time to unfold the two folded parts of each resilient joint member 12. Specifically, a force is applied to the external part 133 of each actuating arm 13 to actuate the actuating arms 13 to pivot about the edge of the opening 122 such that the internal part 132 of each actuating arm 13 urges the corresponding resilient joint member 12 to unfold. Further, in some circumstances, the external part 131 of each actuating arm 13 additionally urges against the clipping panels 11 to assist the internal part 132 of each actuating arm 13 urge the clipping panels 11 into an opened position. After a stack of sheets is suitably positioned at the clipping panels 11, the actuating arms 13 may be released which will allow the resilient joint members 12 to recover to the closed position, however, since a stack of sheets is interposed between the clipping panels 11, the resilient joint member 12 would not be able to fully recover to the closed position but would exert a bias force that allows the clipping panels 11 to securely bind or hold together the stack of sheets in an operative or binding position.

In order to effectively urge the corresponding resilient joint member 12 to unfold, the internal part 132 of each actuating arm 13 may be set to be equal to or shorter than one of the folded parts of each resilient joint member 12. In this embodiment, the two folded parts of each resilient joint member 12 have equal length, then the internal part 132 of each actuating arm 13 may have a length substantially same as or shorter than that of each folded part of the each resilient joint member 12 (see Figures 1 (c) and (d)).

Although in this embodiment, each resilient joint member 12 may be formed by folding a strip of spring metal, or other materials with similar resilient

properties, along a predetermined fold, it is to be appreciated that in other embodiments, the resilient joint members 12 may be formed in different ways, for example, each resilient joint member 12 may be formed by coupling two separate parts to each other by a resilient mechanism which resiliently biases the two separate parts to bias towards one another.

In addition, each resilient joint member 12 of the clip device 10 in this embodiment as shown in Figures 1(b)-(d) has a uniform thickness, however in order to further provide stronger resilience for increased clamping force, the resilient joint members 12 in another embodiment of the invention may have a non-uniform thickness (see Figure 4). For example, a region on the resilient joint member 12 which is proximate to the fold 121 is thicker than a region on the resilient joint member 12 which is proximate to the clipping panels 11. Further the thickness of the resilient joint member 12 may taper from the fold 121 towards the clipping panels 11.

Figure 6 shows a perspective view of a clip device 10 in an operative position with a stack of papers secured therein according to one embodiment of the invention. Referring to Figure 6, the overall height dimensions of the clip device 10 are adjustable to conform closely to the thickness of the stack to be clamped when the clip device 10 is in an operative or binding position. Accordingly, when a stacked arrangement of files each having papers clamped by a clip device 10 of the invention, the files may be stacked neatly one atop one another. This is in contradistinction to prior art binder clips (Figures 5(a) to (c)) which will result in bunching up at the corners of the papers and an uneven or tilted stack as the overall height dimensions of the prior art binder clips does not conform closely to the thickness of the stack to be clamped.

In the rest or closed position (see Figure 1 (c)), the overall height dimensions of the clip device are fully collapsible, i.e. the overall height dimensions of the clip device 10 conform to an absence of a stack, to provide a more compact form factor as compared to prior art binder clip with sidewall of permanently fixed height. As shown in Figure 1(c), when the clip device 10 is in

the rest position, the clip device 10 appears to be a plurality of overlapped thin flats and has compact height dimensions or form factor. Hence, even if the length of the resilient joint members 12 is increased to enhance the binding capacity of the clip device 10, the overall height dimensions or form factor of the clip device 10 would not become substantially greater. Thus, the collapsible height dimensions of the clip device are in contradistinction to prior art binder clips which has a permanently fixed sidewall height. Accordingly, the clip device of the invention has a smaller form factor and therefore packaging, storing and transporting the clip device of the invention requires lesser space and resources.

Other embodiments will be apparent to those skilled in the art from consideration of the specification and practice of the invention. Furthermore, certain terminology has been used for the purposes of descriptive clarity, and not to limit the disclosed embodiments of the invention. The embodiments and features described above should be considered exemplary.

CLAIMS:

1. A clip device comprising:

two clipping panels;

two resilient joint members, each having two opposed ends fixedly coupled to the clipping panels; and

two actuating arms, each coupled to one of the resilient joint members ,

wherein each resilient joint member is disposed to resiliently bias the clipping panels to a closed position in which the overall height dimensions of the clip device are fully collapsed,

wherein the actuating arms are operable to urge against at least the resilient joint members to move the clipping panels into an opened position for receiving a stack of sheets therebetween, and thereafter are releasable to recover the urged resilient joint members to an operative position in which the stack of sheets is secured between the clipping panels.

2. The clip device of claim 1, wherein the each resilient joint member is a folded resilient strip having a fold defining two folded parts which are spring-biased towards each other to resiliently bias the clipping panels to the closed position.

3. The clip device of claim 2, wherein the resilient strip includes a spring metal.

4. The clip device of claim 3, wherein the each resilient joint member has a non-uniform thickness, wherein a region on the resilient joint member proximate to the fold is thicker than a region on the resilient joint member which is proximate to the clipping panels.

5. The clip device of any one of claims 2 to 4, wherein an opening is provided at the fold of the each resilient joint member for retaining the actuating arm therein,

wherein the actuating arm has an external part and an internal part which are wider than the opening and a middle part which is more narrow than the opening,

wherein the middle part of each actuating arm is disposed through the opening to pivotally couple the actuating arm to the resilient joint member,

wherein in the closed position, the internal part of each actuating arm is secured between the two folded parts of a respective one of the resilient joint members, and

wherein the external parts of the actuating arms are operable to urge against at least the resilient joint members to move the clipping panels into the opened position.

6. The clip device of claim 5, wherein the internal part of the each actuating arm has a length substantially same as that of one of the two folded parts of the each resilient joint member.

7. The clip device of claim 6, wherein the lengths of the two folded parts of the each resilient joint member are substantially equal.

8. The clip device of claim 5, wherein each actuating arm is provided as a rectangular strip.

9. The clip device of claim 5, wherein the internal part of each actuating arm includes two free ends which are capable of being forced towards each other to pass through the opening of one of the resilient joint members and being returned to a relaxed original state after passing through the opening.

10. The clip device of claim 5, wherein each actuating arm is provided in a shape resembling the number "8", the internal part of each actuating arm having two ends in contact with each other to form a spring-biased loop, which is capable of being forced to pass through the opening of one of the resilient joint members and being returned to an original relaxed state after passing through the opening.

11. The clip device of claim 1, wherein each clipping panel has a gripping edge which includes a free end to allow a stack of sheets to be secured between the clipping panels,

wherein the free ends of the gripping edges contact each other when the clipping panels are in a closed position.

12. The clip device of claim 11, wherein the gripping edge of each clipping panel includes a spring-biased free end which is disposed at an acute angle with the corresponding clipping panel and is projected towards an opposite clipping panel.

13. The clip device of claim 11, wherein the free end of each gripping edge is set flush against the corresponding clipping panel.