United States Patent [19]

Botsford

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[45] **Apr. 3, 1973**

[54] **PAPER CLIP**

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[52] **U.S. Cl.** ..... **24/261 PC**

[51] **Int. Cl.** **B42f 1/02**

[58] **Field of Search** .....24/261 R, DIG. 10, 261 PC, 24/49 C, 139, 139.1, 261 GC, 261 FC, 261 GF, 261 F, 261 G, 67.9

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Attorney—Mason, Fenwick & Lawrence

[57] **ABSTRACT**

A paper clip bent from a length of wire and having U-shaped nested gripping members, with opposite legs of the gripping members being joined by a connecting member. The connecting member has an intermediate vertical offset to position the ends of the connecting member vertically spaced from, and on opposite sides of, the gripping members to permit substantial contact of the gripping members with the surfaces of paper sheaves over a wide range of thicknesses. In one form, the closed ends of the gripping members are bent toward one another to improve the gripping power of the clip. In another form, the inner gripping member consists of a single straight leg bent to form an eye at its end remote from its juncture with the connecting member.

5 Claims, 10 Drawing Figures

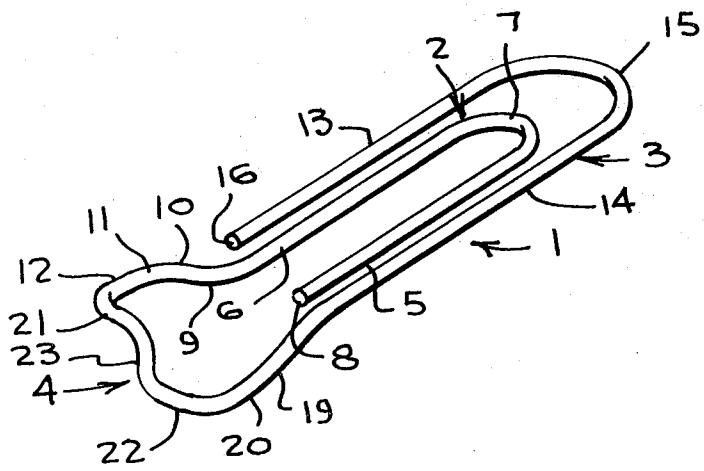
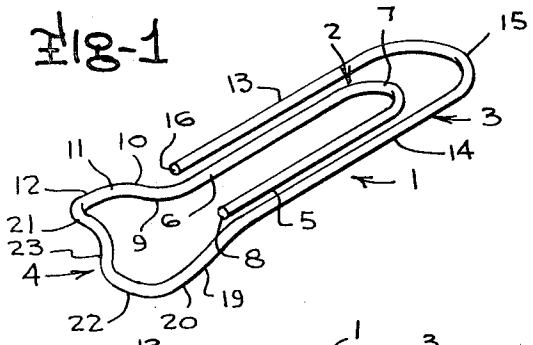


Fig-1



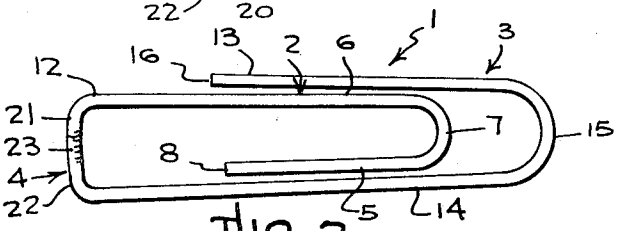


Fig-2

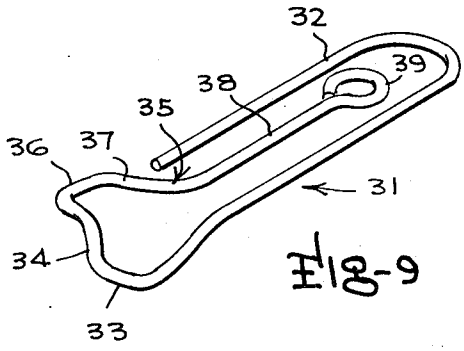


Fig-9

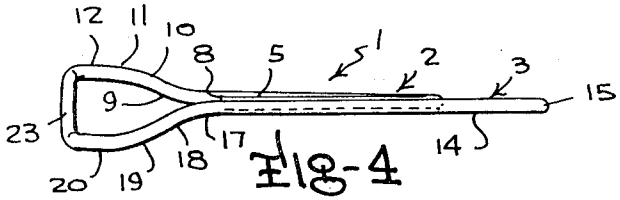


Fig-4

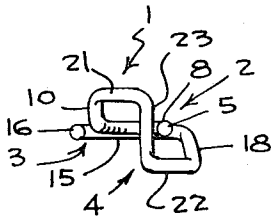


Fig-3

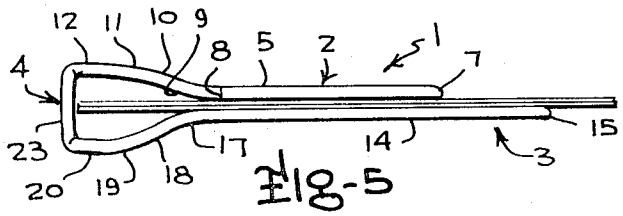


Fig-5

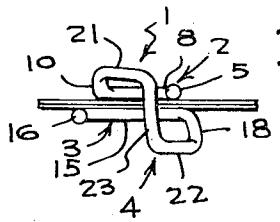


Fig-6

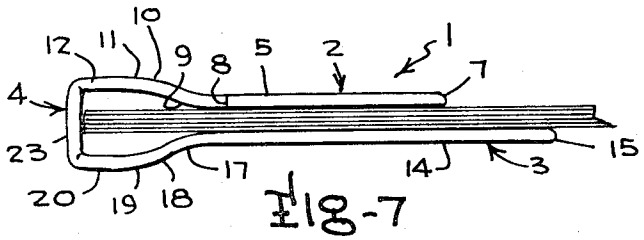


Fig-7

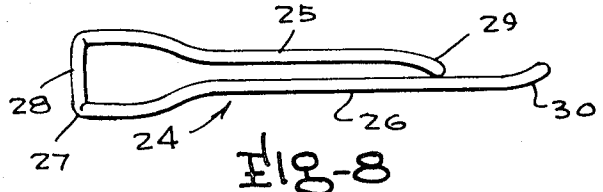


Fig-8

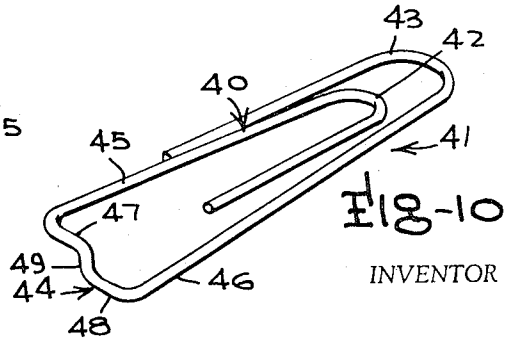


Fig-10

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PAPER CLIP

BACKGROUND OF THE INVENTION

This invention relates to improvements in articles for removably gripping and holding together two or more sheets of paper, and particularly to such articles of the type generally referred to as paper clips.

The conventional wire paper clip is formed from a length of wire bent to form two U-shaped gripping loops, one larger than the other, with the smaller nested within the larger, with the loops being connected at their open ends by a curved length of connecting wire. The entire clip is shaped so that all of its parts lie in a single plane. When the clip is to be placed upon the edge of a sheaf of papers, the clip is stressed, or sprung, to move the two gripping elements out of the same plane to straddle the edge of the paper sheaf. As the gripping loops separate, the connecting wire length is twisted, with the connecting loops projecting angularly from the connecting wire as from a pivot. The greater the separation of the loops, the larger the angular deflection between them and the more they diverge outwardly from the connecting wire. As the sole force tending to return the gripping loops toward their original plane is the torsional strain in the connecting wire, the gripping loops do not return to their state of parallelism, but remain angularly related upon the paper sheaf, with the free ends of the loops out of contact with the paper and the entire gripping force being located in a small area near the paper edge. The thicker the paper sheaf, the greater this distortion becomes and the closer to the paper edge the gripping force is located. Continued separation of the holding loops due to increase in sheaf thickness will cause the loops to loose all of their holding force, because of the great angular relationship of the loops.

If the conventional loop is viewed from the connecting wire end when in use, it will appear to have an "S" shape, with the wire ends forming the ends of the "S." Usually, these ends, due to the transversely canted distortion of the loops, dig into the paper, frequently gouging the paper when the clip is removed. At the same time, the transverse canting lifts much of the gripping loop surface off of the paper.

Often, only one use will permanently distort the loop relationship, and the loops must be forcibly bent back into shape, reversed in position, to restore holding power. Metal fatigue soon causes the clip to be useless.

Another result of the spread angular relationship of the loops in use is the inadvertent attachment to other papers placed upon a desk, or in a basket, with the risk that the papers accidentally attached will be moved with the original group and misplaced.

SUMMARY OF THE INVENTION

The general object of the present invention is to provide a paper clip which will have greater holding power, longer life and greater ease of use than the conventional clip.

A more specific object of the present invention is to provide a wire paper clip which obtains its holding force as a result of linear springing, rather than torsional twist.

Another object is to provide a clip of this type wherein the gripping force will be applied substantially equally along the entire gripping loops, and the loops

will be in contact with the paper virtually throughout their length when used to attach papers over a wide range of thicknesses.

A further object is the provision of a wire clip in which distortion of the loops is substantially eliminated, while the range of paper sheaf thickness with which the clip can be used is greatly increased.

It is also an object to provide such a clip which will retain the same general shape as the conventional clip, which can be used in the same manner, and in which the connecting wire between the gripping loops will serve as a stop when a clip is fully seated on a paper sheaf.

A still further object of the invention is to provide a paper clip which can be made in a range of sizes for use with paper stacks of various thicknesses, even to such thickness as has normally required complicated and expensive clamps, and which, due to the improved contact of the gripping loops with the paper, may be made smaller than normally would be required, thus resulting in a cost saving.

Another object is to provide a clip in which the gripping loops cannot be reversed in position, as can the loops of conventional clips, and to provide inturned ends on the loops for greater gripping power at the loop tips.

Yet a further object is the provision of a clip operating upon a linear spring action principle which will spread easier to engage papers than will the torsion principle type, yet will provide a greater grip upon papers to which it is applied due to the lack of distortion of the gripping loops and increased surface contact of the loops with the paper.

It is also an object to provide a clip which has its greatest gripping force at the ends of the U-members, thus eliminating paper gouging by the wire ends.

A still further object of the invention is to provide a paper clip of the type described which will have a wire connection between the gripping loops of such configuration that it will provide a grasping means when removing the clip from the paper.

Other objects of the invention will become apparent from the following description of practical embodiments thereof, when taken in conjunction with the drawings which accompany, and form part of, this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a paper clip embodying the principles of the present invention;

FIG. 2 is a top plan view of the paper clip shown in FIG. 1;

FIG. 3 is an end view of the paper clip;

FIG. 4 is a side view of the paper clip as it appears when not in use;

FIG. 5 is another side elevation of the paper clip shown attached to a relatively thin sheaf of papers;

FIG. 6 is an end view of the paper clip as shown in FIG. 5;

FIG. 7 is another side elevation of the clip, the clip being shown in position attached to a relatively thick sheaf of papers;

FIG. 8 is a side elevation of a slightly modified form of clip;

FIG. 9 is a perspective view of a still further modified form of clip; and

FIG. 10 is a perspective view of yet another form of clip.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings in detail, and first to that form of the invention shown in FIGS. 1 through 7, the clip 1 is formed of a single length of wire bent to provide a pair of U-shaped gripping loops 2 and 3, joined at their open ends by an intermediate interconnecting wire length 4. The two loops are of different widths and lengths, so that the smaller loop 2 lies wholly within the outline of the larger loop 3.

Inner loop 2 has legs 5 and 6, which are joined at their outer ends by a curved section 7. Leg 5 is formed from one end of the wire length, and its end 8 lies adjacent, but spaced from, the loop connector 4. The legs are substantially parallel, as with the conventional clip. Leg 6 is longer than leg 5, and extends to the loop connector. The legs of loop 2 lie in a common plane throughout most of their coextensive length, but the extended portion of leg 6 is bent upwardly, as at 9, and extends upwardly and toward the loop connector 4 along an inclined section 10, then is bent back, as at 11, to provide a length 12 parallel, or substantially parallel, to the plane of loop 2. Wire length 12 extends from bend 11 to the loop connector 4.

Outer loop 3 is substantially parallel to inner loop 2, although the two loops may have a slight convergence outwardly, as shown. Loop 3 has parallel legs 13 and 14, connected by arcuate wire section 15, with leg 13 being the shorter leg and terminating at 16, which is the opposite end of the wire from which the clip is formed. Longer leg 14, at a point transversely opposed to the bend 9 of leg 6, is bent downwardly, as at 17, and declines along a straight section 18 of substantially the length of the inclined section 10 of leg 6. The wire is then bent forwardly at 19, to provide a straight section 20 from the bend 19 to the loop connector 4, the section 20 being parallel to, but at a lower plane than, the section 10 of leg 6.

By reason of the opposite bending of legs 6 and 14, of loops 2 and 3, the connections of loops 2 and 3 to the loop connector 4 is at different vertical levels. This allows the connector to be vertically offset, with parallel, but vertically spaced, side sections 21 and 22 connected, respectively, to legs 6 and 14 of the loops 2 and 3, and joined at their inner ends to the opposite ends of a vertical member 23, which spans the plane, or planes, of the gripping loops 2 and 3. By having the plane, or planes, of the gripping loops midway of the vertical member 23, the movement of the gripping loops from their at rest position will be in opposite directions from a plane which intersects the vertical member 23 at its mid-point.

The clip just described functions upon an entirely different principle from the conventional wire clip. As mentioned previously, the conventional clip creates a torsional stress in the loop connector when the gripping loops are separated, which causes the loops to diverge outwardly from the connector, and the loops themselves to twist out of their normal planes so as to concentrate the holding force upon a sheaf of papers at the ends of the shorter legs of the gripping loops. This factor is greatly multiplied as the separating movement increases. Consequently, if a grip is obtained, it is extremely localized, and, as the separation continues this tendency increases, and as the angle of deflection increases, the hold decreases to the point where the clip slides rearwardly off of the paper sheaf. If the holding force is effective and concentrated at the end of the shorter legs, these ends will dig into the paper of the outermost sheets, frequently permanently damaging the paper.

With the present clip, due to the vertical offset of the connector, the spreading of the loops creates a linear spring action in the vertical member and in the loop longer arms, resulting in maintaining the loops in an uncanted position and concentrating the greatest holding force at the loop tips, as shown in FIG. 5. As the loop connections to the connector 5 are substantially separated in a vertical direction, the loops may separate to a large degree without loss of substantial parallelism of the loops, as shown in FIG. 7. Thus, there is little likelihood of a clip on one sheaf of papers accidentally becoming attached to another paper, or group of papers. Due to the linear spring action, the clip does not become so sprung that it cannot be used again without substantial bending to restore the parts to their original condition, as does the conventional clip with torsion spring action.

The shape of the connector 4 and the adjacent portions of the longer arms of the gripping loops will not interfere with normal application of the clip, and the clip can be applied so that the connector 4 is in contact with the edges of the papers held in the same manner as with a conventional clip. Thus, there is no overhang beyond the paper edge to add to the space needed to receive the sheaf with the clip applied. The vertical offset of the connector does not interfere with the application of the clip in the usual manner, yet it does provide a gripping member to facilitate removal of the clip from a sheaf of papers.

In FIG. 8, a slightly modified version of the clip is shown. Here, the clip 24 is formed from a single length of wire, as before, to provide an inner loop 25 and an outer loop 26, with the loops nested one within the other and joined by a connecting member 27. The connecting member has a vertical offset 28, so that the juncture of the inner loop and the connecting member is on a higher level than the juncture of the outer loop with the connecting member, in the same manner as in the previously described form.

The only difference between the form shown in FIG. 8 and the first described embodiment is the shape of the closed ends of the inner and outer loops. The FIG. 8 form has the closed end 29 bent slightly toward the plane of the outer loop, and the closed end of the outer loop 30 bent in the direction of the inner loop. This slight difference in construction results in contact being made with a sheaf of papers by the closed ends 29 and 30, so that the spring action of the clip concentrates its loading power at these points. While less surface contact may be had with the paper, there will be a tighter holding due to concentration of the grip at the loop ends. In all other respects, the modified clip will be used in exactly the same way as the one previously described, and will function in the same manner.

Still another form of the invention is shown in FIG. 9. The clip shape is different in this form, however, insofar as the inner gripping member is concerned. This

clip **31** has an outer loop, or gripping member, **32**, of the same shape as before, having its long arm joined to one end of a connecting member **33**. The connecting member has a vertical offset **34**, exactly as in the two previously described forms. The inner gripping member **35** consists of but one arm, or leg, joined to the connecting member. The leg extends away from the connecting member, as at **36**, and then declines from the upper level and turns slightly inwardly along a length **37**. At this point, the single leg **38** extends substantially in the plane of, and midway between the legs of, the outer gripping member **33**. At its end, the single gripping leg is bent to form a closed eye **39**. Eye **39** bears against the uppermost sheet of paper in the sheaf gripped by the clip in the same manner as the inner loop of the first described form.

The FIG. **9** modified form of clip will be used similarly to the forms previously described. It will be somewhat cheaper to make, due to the fact that less material will be used. It also has some of the advantages of the clip shown in FIG. **8**, for the eye will serve as a localized point for pressure application upon papers gripped by the clip.

FIG. **10** shows a different form of the invention, and one which is probably the easiest to make and the most practical from a commercial standpoint. It is similar to the form shown in FIGS. **1** to **7** and first-described, except that the extended gripping member legs which join the connecting member are straight instead of being offset adjacent the connecting member.

The paper clip shown in FIG. **10** comprises a pair of gripping members **40** and **41**, consisting of an inner loop **42** and an outer loop **43**, joined by a connecting member **44**. The inner loop **42** has an extended leg **45** which joins the connecting member **44**, and the outer loop **43** has an extended leg **46** joining the opposite end of the connecting member. The extended legs **45** and **46** are straight from their juncture with the curved ends of the respective loops to their joinder to the connecting member.

The connecting member of this form of the invention is the same as in the previously-described forms, consisting of upper and lower parallel end sections **47** and **48**, each joined at one end to one of the gripping member extended arms, and a center member **49** substantially at right angles to the end sections **47** and **48**, and connected at its ends to the respective end sections.

The clip shown in FIG. **10** will be much easier to make than the previously-described forms, for there are fewer bends necessary to shape the wire. While the gripping members will not be precisely in alignment with one another, which is the arrangement in the other forms, spreading the gripping members sufficiently to receive even a very thin sheaf of papers will bring them into substantial parallelism. In any event, the characteristic of applying the greatest pressure adjacent the clip tip is present to the fullest degree. The other characteristics of lineal spring action, non-reversibility and the connecting member serving as an end stop and as a grasping member in handling are also retained.

This last-described clip will be used in exactly the same manner as those described before.

While in the above several practical embodiments of the invention have been disclosed, it will be understood that the precise details of construction shown and described are merely by way of illustration, and the invention may take other forms within the scope of the appended claims.

I claim:

1. A paper clip comprising a pair of elongated U-shaped gripping members with one gripping member being transversely narrower than the other for nesting relation; each U-shaped gripping member having a leg extending in the same direction from its respective gripping member with said legs extending from opposite sides of the open ends of said respective gripping members, a connecting member joined to the extending legs; said connecting member having an intermediate offset so that the junctures of the connecting member and the extended gripping member legs are spaced in a direction normal to the elongated gripping members; and wherein the offset in the connecting member comprises a straight leg, and the end portions of the connecting member extend in opposite directions from the top and bottom of the offsetting leg.

2. A paper clip as claimed in claim **1** wherein, the transversely narrower gripping member has its extending leg joined to the upper end of the connecting member.

3. A paper clip as claimed in claim **2** wherein, the extended legs are angularly bent to join the offset ends of the connecting member.

4. A paper clip as claimed in claim **3** wherein, the end portions of the connecting member are at substantially equal distances above and below a plane normal to the straight offsetting leg and passing through the gripping members.

5. A paper clip as claimed in claim **3** wherein, the closed ends of the respective U-shaped gripping members are bent, each toward the other gripping member.

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