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(54) IMPROVEMENTS IN AND RELATING TO PAPER CLIPS

(71) I, DWIGHT COLLIER BROWN, a citizen of United States of America, of 1516 N Nicholas Street, Arlington, Virginia 22205, U.S.A., do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to fasteners generally referred to in the trade as paper clips, and more particularly to a clip having a formed hinged plastics body which incorporates one or more longitudinal members of wire or other relatively flat shaped metal, for the purpose of providing additional friction holding power.

15 In my prior U.S. Patent No. 3,604,067 entitled "Clip Structure" and granted September 14, 1971, and Canadian Patent No. 934,525 issued October 2, 1973, I disclosed various modifications of a combination flat metal and plastics foam fastener. This clip structure has an exposed surface of metal and the inner side is lined with spongy plastics foam material for providing additional frictional holding power and additional protection to the papers fastened.

20 Such clips perform very satisfactory for fastening a relatively small number of thin paper sheets, but lack sufficient friction holding power for securely fastening a large number of sheets. In addition, such clips require painting or other protective coating of the exposed metal surface to prevent rusting. To increase friction holding power and provide full protection of the metal from rusting, I have found that the use of a flat type clip comprising a wire, strip or other longitudinal shaped metal member on or otherwise embedded in a flexible plastics body member, or positioned between two sheets or strips of such plastics, has distinct advantages and it is to that end that the present invention is directed.

25 Paper clips now in use are generally those of metal or plastics construction. Although most clips made of plastics provide an ample amount of flat surface for contact with the papers fastened, their friction holding

power is limited and is usually less than that provided by a metal type clip.

At present, the most common type of paper clip is in the form of a wire shaped unit providing spring gripping action for holding sheets of paper together. These clips have the disadvantage that they mark, mar, indent, or distort fastened paper material. If the paper has to be duplicated, the duplicated sheet will frequently bear a mark where the clip indented the master. Moreover, this problem can be serious in computer cards, wherein an indentation on the card could result in improper processing of the card and costly machine down time. To eliminate this indentation both on paper and cards, it is a general practice to use small pieces of folded paper or card stock, placed between the wire gripper surfaces, to serve as protection pads. This is costly in terms of both material and time.

Other disadvantages of the wire clip include frequent discoloration of the paper caused by rust formed on the clip, and undesired easy detachment of the clip during stacking and filing of the fastened groups of papers. Although there have been several attempts to provide a low cost flat type clip to eliminate the deficiencies of the wire clip, the metal or plastics construction used does not provide sufficient friction holding power for good paper fastening.

In accordance with one aspect of the present invention, there is provided a paper clip for clampingly engaging at least two sheets of paper, said paper clip comprising: a body member which is substantially U-shaped in longitudinal cross-section and constructed of semi-rigid generally flexible plastics sheet material, the body member having a pair of legs presenting two substantially planar interior surfaces between which at least two sheets of paper may be clamped, one of the legs being longer than the other; and a longitudinally-extending substantially-rigid but slightly-flexible rigidifying metal member of substantially smaller transverse cross-section than that of the body member, fixedly secured to the legs away from the interior surfaces thereof so

50 papers fastened, their friction holding 100

as to present only the planar interior surfaces of the body member to paper sheets clamped therebetween, the metal member being not coextensive with the part of the longer leg which extends beyond the other leg, whereby that part of the longer leg is more flexible than any part secured to the metal member.

In accordance with another aspect of this invention, there is provided a paper clip for clampingly engaging at least two sheets of paper, said clip comprising: a body member which is substantially U-shaped in longitudinal cross-section and constructed of semi-rigid generally flexible plastics sheet material, the body member having a pair of legs presenting two substantially planar interior surfaces between which at least two sheets of paper may be clamped; one of the legs terminates in a free edge and comprises a pair of first longitudinally-extending leg members transversely spaced from each other to define a longitudinally-extending slot therebetween which extends inwardly from the free edge of the one leg; the other of the legs comprises a second leg member which is substantially coextensive with the slot and having a width slightly less than that of the slot and which may extend through the slot when paper sheets are not clampingly-engaged between the first and second legs; a pair of substantially longitudinally-extending substantially-rigid but slightly-flexible rigidifying metal members of substantially smaller transverse cross-section than that of the body member and fixedly secured to the body member away from the interior surfaces thereof so as to present only the planar interior surfaces of the body member to paper sheets clamped therebetween; one of the pair of metal members being substantially centrally disposed relative to and fixedly secured to one of the first pair of first leg members, the one metal member also being fixedly secured to a portion of the other of the legs other than the second leg member; and the other of the pair of metal members being substantially centrally disposed relative to and fixedly secured to the other of the pair of first leg members, the other metal member also being fixedly secured to a portion of the other of the legs other than the second leg member whereby the second leg member is more flexible than any part of the body member secured to the metal members.

A paper clip provided in this way has relatively flat or planar interior surfaces which will not mar, mark, indent or distort the paper and will provide sufficient friction holding power to fasten separate sheets of paper, cards or other flat material securely together.

Preferred methods of fabrication of paper clips according to this invention involve the

use of metal wire or rod, metal strip, or other longitudinally-extending relatively flat or planar metal member, laminated, embedded or otherwise enclosed in or attached or fixedly secured to plastics in sheet or roll strip form, or laminating or embedding such metal between two such forms of such flexible plastics to form a continuous strip which is then run through a machine for cutting and shaping the individual clips in accordance with the construction and modifications shown in the drawings. Other alternate methods of construction can be used such as molding, thermoforming, or spraying the plastics compound over the wire, rod, strip or other longitudinal flat metal member, in such a way as to provide a relatively flat surface on at least one side which becomes the interior sides of the legs of the finished fastener which contacts the papers to be fastened.

The invention is described further, by way of illustration, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of one form of paper clip forming the subject of the present invention;

Figure 2 is a perspective view of a continuous strip of wire between two layers of plastics prior to cutting and shaping of the clip;

Figure 3 is a side view of the clip shown in Figure 1;

Figure 4 is a transverse cross-sectional view of an alternative embodiment of the invention;

Figure 5 is a cross-sectional view of another alternative embodiment of the invention having one layer of plastics material, into which is pressed a continuous wire using heat or other means;

Figure 6 is a cross-sectional view of another alternative embodiment of the invention having one layer of plastics material adhesively or otherwise attached to a longitudinal strip of relatively narrow flat metal in strip form treated or sprayed for weather protection;

Figure 7 is a perspective view of another alternative embodiment of the invention having a single strip of wire between two layers of plastics material and having a hole in the longer gripping leg for insertion of the thumb or finger therethrough;

Figure 8 is a perspective view of another alternative embodiment of the invention having two strips of wire between two layers of plastics material;

Figure 9 is a side view of the clip shown in Figure 8; and

Figure 10 is a plan view of the back side of the clip shown in Figure 8.

In Figure 1 is shown a paper clip hinged at one end 18. The clip 10 is cut and formed from a continuous strip 26 consist-

ing of a wire 12 laminated between a body member comprising two flat strips of plastics 14 and 15. The bottom layer of plastics 15 is relatively flat and the top layer of plastics 14 is formed over the wire 12. The flat bottom layer 15 of the laminated continuous strip 26 after clip production becomes the planar interior sides of the legs of the finished clip 10. The clip 10 is substantially U-shaped in longitudinal cross-section and comprises a hinge 18 (the bight of the U) and a pair of gripping legs 20 and 22. The leg 20 is longer than the leg 22. The broken lines in Figure 2 indicate that portion of the wire and plastics which is cut out and removed to form a slot 24 in the longer gripping leg 20 after the cutting and forming operation. Removal of the wire as indicated by the broken lines, increases the flexibility of the end portion of the longer gripping leg 20 thus making it easier to bend and feed on the papers to be fastened. After cutting of the longitudinal laminated wire-plastics strip 26, the individual cut piece is shaped to form the clip 10 by bisecting the individual cut piece to form the hinge 18 and the two unequal length spaced-apart gripping legs 22 and 24.

Separate paper sheets or other material to be fastened together are inserted between the facing resilient and compressible gripping legs in contact with the lower end of face of clip 10 by bending the lower end of the longer gripping leg 20 and sliding the two gripping legs 20 and 22 over the papers until the top part of the papers come in contact with the underside of the hinge 18.

After removal of the clip 10 from the fastened papers, the resilient clip will return to its original Figure 1 shape ready for re-use. The resilient layers 14 and 15 together with the spring quality of the metal wire 12 will generate sufficient friction holding power to prevent the secured papers from slipping from the interior of the clip.

The selection of both the semi-rigid plastics material of the layers 14 and 15 of the body member and the substantially rigid, but slightly resilient metal wire 12 material is important. The plastics and metal must have the proper thickness and temper to enable repeated use and bending at the hinged section 18 without breaking or deforming. In addition, the spring qualities of the metal wire 12 must provide sufficient compression and the necessary friction holding power in the gripping legs 20 and 22 for the intended fastening application.

It will be noted that the lower edge of the longer gripping leg is substantially arcuate to facilitate attachment of clip 10 over the edges of the papers to be fastened.

Figure 4 shows an alternative embodiment

of the invention in which a clip 10¹ comprises a plastics body member formed in two layers 14, 15 between which a metal member 12¹, oval in cross-section, is positioned. Other than the shape of the metal member, the clip 10¹ is substantially identical to the clip 10 shown in Figure 1.

Figure 5 illustrates an alternative embodiment of the invention in which a clip 10², substantially U-shaped in longitudinal cross-section, is formed by pressing and embedding a continuous wire 12 into a body member comprising a single layer of plastics material 16 by use of heat or other means. The wire or other metal strip may or may not be fully embedded in the plastics but should be sufficiently embedded to prevent detachment and provide a relatively flat surface for at least one side, which becomes the interior side of the clip after cutting and forming. The plastics used may be in flat strip or sheet form or may be extruded or otherwise formed, shaped or molded fully or partly around the metal wire or other metal strip 12 to form an integrated plastics-metal construction which, if desired, can be assembled in roll form for later processing through a machine which cuts and shapes the finished clip.

Figure 6 illustrates an alternative embodiment of the invention in which a clip 10¹¹, substantially U-shaped in longitudinal cross-section, consists of a longitudinally relatively flat and narrow strip of metal 17 adhesively or otherwise attached to one layer 16 of plastics material. In the machine cutting and forming of the Figure 6 embodiment, the side to which the metal is attached becomes the exterior side of the clip and the flat plastics side 16 becomes the interior surfaces of the clip which contact the papers to be fastened.

The Figure 7 clip designated by the numeral 30 is another embodiment of the invention. The clip 30 is substantially U-shaped in longitudinal cross-section and may be longer and wider than the previously described embodiments to form a large clip having two unequal length gripping legs 20 and 22¹ both closed at their free ends. The longer gripping leg 20¹ has a hole 32 defined therein near the free end thereof for insertion of the end of a thumb or finger there-through to facilitate spreading the two-gripping legs 20¹, 22¹ for easy threading and attachment of the clip 30 to the papers to be fastened. In this embodiment, the relatively flat interior surfaces of the legs of the clip 30 are coated or lined with an abrasive material 34 or other material having qualities which will provide additional holding power for securing the papers fastened. Alternatively, the plastics material layer on the inside of the clip may be roughened and such roughened surface will form the inside

of the cut and formed clip 30, giving the clip additional frictional holding power. The wire 12 on the longer gripping leg 20¹ extends to the edge of the hole 32 whereas on the shorter gripping leg 22¹ the wire 12 extends to its free edge. The leg 22¹ is the back side of the clip 30 when in use. The absence of the wire 12 in the end portion of the longer gripping leg 20¹, from the bottom edge of the hole to the free or bottom edge of said gripping leg 20¹, provides easy bending of the flexible semi-rigid plastics material and facilitates threading and attaching the clip to the papers to be fastened.

In Figure 8 is shown another embodiment of the invention in the form of a clip 40 which is also particularly applicable for large clip construction. Clip 40 is substantially U-shaped in longitudinal cross-section and is made of two or more wires 12 or flat metal strips laminated between two layers of plastics material 20¹¹ and 22¹¹ and has two unequal length gripping fingers or legs. One of the legs comprises a pair of leg members 44 and 46 on the top side when in use and the other leg comprises one gripping leg member 42 on the opposite or bottom side of the clip 40 when in use. The gripping leg member 42 extends through the slot defined between the spaced-apart gripping leg members 44 and 46. The upper part of clip 40 is full width on both sides of the upper sections extending from hinge 18. On the gripper leg member 42 side, two wires 12 extend downward from hinge 18 to a point approximately one third the length of the longer gripping leg members 44 and 46 to provide maximum friction holding power. Although no wire is incorporated in the shorter gripping leg member 42, that leg member provides supplemental friction holding power since it is off-set from the two other gripping leg members 44 and 46. Alternatively, wire could be incorporated in the leg member 42 to modify it if desired. The gripping leg member 42 may extend to any degree required through the spaced-apart gripping leg members 44 and 46. For attaching clip 40 to papers, the gripping leg member 42 is pressed back through the slot between the leg members 44, 46 to provide the necessary spacing between the leg member 42 and the gripping leg members 44 and 46 for threading the clip on the papers to be fastened. The inside surfaces of clip 40, as with clip 30, may be coated or lined with an abrasive or other friction holding material, or may be roughened to provide additional friction holding power. The off-set of the shorter gripping leg member 42 from the other equal length gripping leg members 44 and 46 on the opposite side of the clip 40 is illustrated in Figure 9.

Figure 10 illustrates the back side of the large clip 40, the top side of which when

in use, is illustrated in Figure 8. The exposed planar interior sides of the gripping leg members 44 and 46 show the coated abrasive or other friction holding material, or roughened surface which covers all of the interior surfaces of the clip 40 including hinge section 18. The wires 12 are laminated between two layers of plastics material so as to provide the relatively flat or planar interior surfaces of the legs of the clip 40. The thickness of the plastics material of the two layers may differ or the two layers may be of the same thickness. The hinge section 18, starting at the top edge has two wires 12¹¹ which extend downward approximately one-third the length of the two gripping leg members 44 and 46. The configuration of clip 40 provides good utilization of the wire laminated plastics strip material from which the clip is cut and formed. This is due to the fact that the single gripping leg member 42 is formed from the material cut between the two equal length gripping leg members 44 and 46. The dotted line in Figure 10 illustrates the point where the leg member 42 is bent and shaped to protrude through the slot between the spaced-apart gripping leg members 44 and 46.

In each of the embodiments described above, it is apparent that the transverse cross-sectional area of the metal member is considerably less than that of the body member and yet the metal member sufficiently rigidifies the larger body member. For example, in the Figure 5 embodiment, the cross-sectional area of the metal wire or rod 15 is less than 1/15th that of the body member 16. In each of the embodiments, the cross-sectional area of the metal member is less than 1/5th that of the plastics body member.

It will be apparent from the foregoing that a relatively flat type clip, at least on the interior surfaces, incorporating an integral combination plastics and metal constructed clip, has been disclosed, and that such clip lends itself to a variety of applications. The clip is easily attached to paper sheets and does not require extreme care in threading such as is applicable to the wire clip in wide use today. The metal part being rigidly enclosed or attached to the plastics material forms a clip body structure which, unlike conventional wire type clips, cannot get distorted and out of shape after use. The relatively flat surface on the exterior side of the clip is ample and conducive to color coding and marking for identification purposes of the papers attached. This is a distinct advantage over the common wire type clip which has no flat surface for color coding or printing.

WHAT I CLAIM IS:—

1. A paper clip for clampingly engaging

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at least two sheets of paper, said paper clip comprising:

5 a body member which is substantially U-shaped in longitudinal cross-section and constructed of semi-rigid generally flexible plastics sheet material,

10 said body member having a pair of legs presenting two substantially planar interior surfaces between which at least two sheets of paper may be clamped, one of said legs being longer than the other; and

15 a longitudinally-extending substantially-rigid but slightly-flexible rigidifying metal member of substantially smaller transverse cross-section than that of the body member, fixedly secured to said legs away from the interior surfaces thereof so as to present only the planar interior surfaces of the body member to paper sheets clamped therebetween,

20 said metal member being not coextensive with the part of the longer leg which extends beyond the other leg, whereby that part of the longer leg is more flexible than any part secured to the metal member.

25 2. The paper clip of claim 1 wherein said longer leg terminates in a free edge having a central longitudinal notch defined therein which extends inwardly from the free edge.

30 3. The paper clip of claim 2 wherein said free edge is substantially arcuate.

35 4. The paper clip of claim 1 wherein said metal member is embedded in said body member.

40 5. The paper clip of claim 4 wherein said metal member is a rod.

40 6. The paper clip of claim 1 wherein said metal member is secured to the exterior of the body member.

45 7. The paper clip of claim 6 wherein said metal member is a strip.

45 8. The paper clip of claim 1 wherein the interior surfaces of the legs are coated with an abrasive material.

50 9. The paper clip of claim 1 wherein the interior surfaces of the legs are roughened to be non-slipping.

50 10. The paper clip of claim 1 wherein said longer leg has a hole defined there-through adjacent the end thereof most remote from the bight of the U and through which a finger may be inserted to move the legs away from each other for insertion of sheets of paper therebetween, and said metal member is not coextensive with the hole.

55 11. A paper clip for clampingly engaging at least two sheets of paper, said clip comprising:

60 a body member which is substantially U-shaped in longitudinal cross-section and constructed of semi-rigid generally flexible plastics sheet material,

65 said body member having a pair of legs presenting two substantially planar interior

surfaces between which at least two sheets of paper may be clamped;

one of said legs terminates in a free edge and comprises a pair of first longitudinally-extending leg members transversely spaced from each other to define a longitudinally-extending slot therebetween which extends inwardly from the free edge of said one leg; the other of said legs comprises a second leg member which is substantially coextensive with said slot and having a width slightly less than that of the slot and which may extend through the slot when paper sheets are not clampingly-engaged between said first and second legs;

70 a pair of substantially longitudinally-extending substantially-rigid but slightly-flexible rigidifying metal members of substantially smaller transverse cross-section than that of said body member and fixedly secured to said body member away from the interior surfaces thereof so as to present only the planar interior surfaces of the body member to paper sheets clamped therebetween;

75 one of said pair of metal members being substantially centrally disposed relative to and fixedly secured to one of said first pair of first leg members, said one metal member also being fixedly secured to a portion of the other of said legs other than said second leg member; and

80 the other of said pair of metal members being substantially centrally disposed relative to and fixedly secured to the other of said pair of first leg members,

85 said other metal members also being fixedly secured to a portion of the other of said legs other than said second leg member whereby said second leg member is more flexible than any part of the body member secured to said metal members.

90 12. A paper clip for clampingly engaging at least two sheets of paper, said paper clip comprising:

95 a body member which is substantially U-shaped in longitudinal cross-section and constructed of flexible plastics sheet material,

100 said body member having a pair of legs presenting two substantially planar interior surfaces between which at least two sheets of paper may be clamped,

105 one or more longitudinally-extending resilient rigidifying metal members of substantially smaller transverse cross-section than that of the body member, fixedly secured to said legs away from the interior surfaces thereof so as to present only the planar interior surfaces of the body member to paper sheets clamped therebetween, and

110 said metal member(s) being substantially coextensive with the other said leg whereby that a distal part of said other leg is more

flexible than said one leg or the remainder of said other leg.

5 13. A paper clip substantially as herein-before described with reference to and as shown in Figures 1 to 3, Figure 4, Figure 5 or Figure 6.

14. A paper clip substantially as herein-before described with reference to and as shown in Figure 7.

15. A paper clip substantially as herein- 10
before described with reference to and as
shown in Figures 8 to 10.

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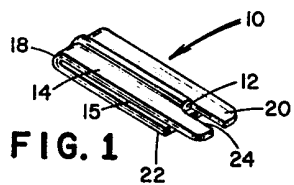


FIG. 1

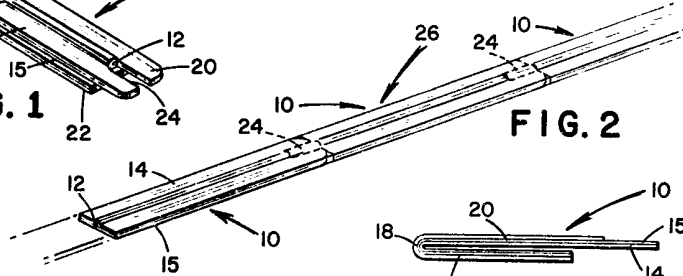


FIG. 2

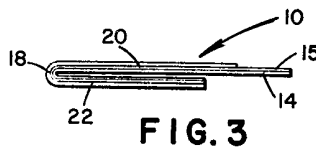


FIG. 3

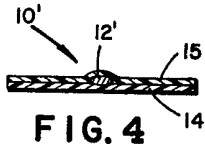


FIG. 4

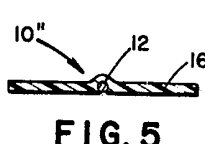


FIG. 5

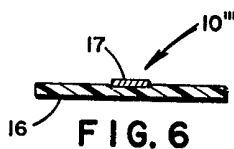


FIG. 6

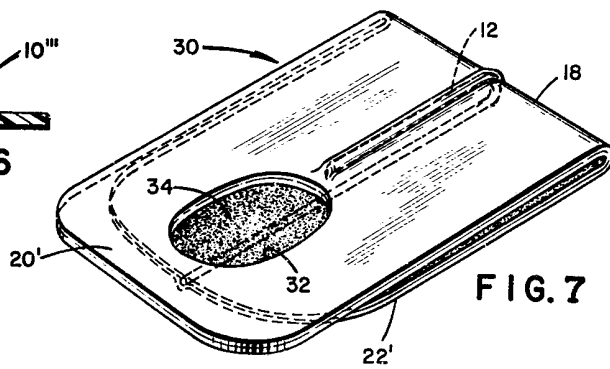


FIG. 7

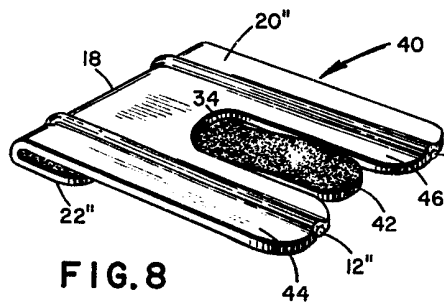


FIG. 8

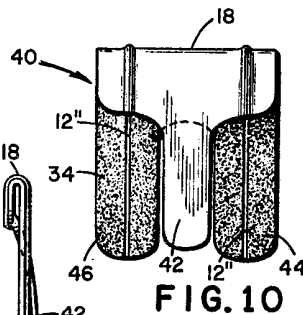


FIG. 10

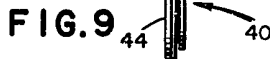


FIG. 9