Oct. 9, 1962 E. P. BUGGE 3,057,027

PAPER CLIP

Filed May 9, 1960

Fig. 1

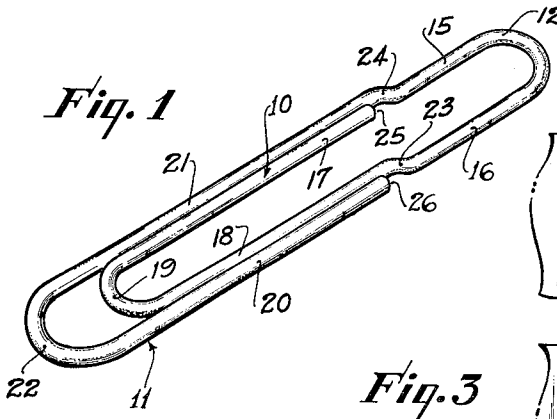


Fig. 2

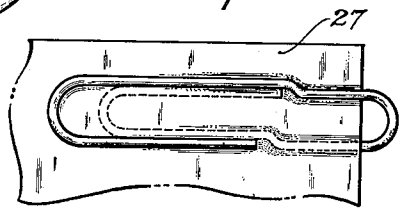
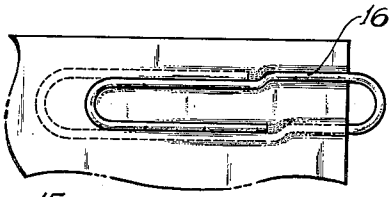


Fig. 3



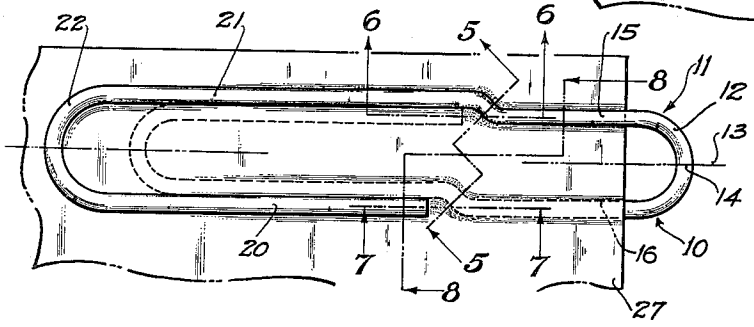


Fig. 4

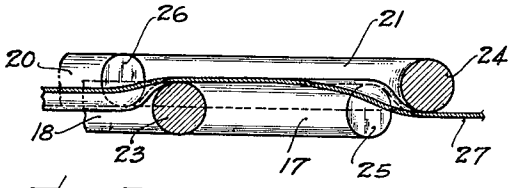


Fig. 5

Fig. 7

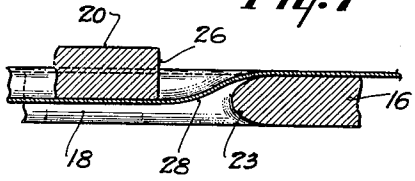
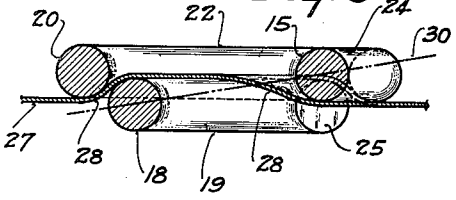


Fig. 8



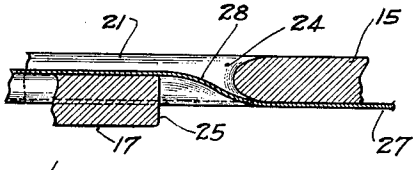


Fig. 6

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PAPER CLIP

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The present invention relates generally to fasteners and more particularly to an improved paper clip.

An object of my invention is to provide a paper clip having a greatly improved clamping action whereby to firmly and releasably secure papers together and also to more effectively resist lateral or longitudinal sliding movement of the clip on a clamped array of papers.

Another important object of the invention is to provide a paper clip of improved clamping efficiency but without any increase in the danger of tearing any of the clamped papers during removal of the clip, and as a matter of fact, greatly reducing the danger of such tearing.

It is also an object of the invention to provide a paper clip of the character described having portions adapted to positively inhibit the danger of any tearing of the clamped papers upon removal of the clip, such portions also being adapted to improve a clamping efficiency of the clip.

Yet another object of the invention is to provide a very attractive paper clip of this character having all its portions arranged in a substantially common plane and to achieve improved efficiency without any increase of dimension whereby the volume and weight of a package of my improved clips is no greater than in the case of conventional clips.

Another important object of the invention is to achieve the above enumerated and other advantages entirely as a result of a novel and improved configuration for a paper clip of the resilient wire one piece type. The utilization of my invention does not entail the use of any additional material and, as a matter of fact, can achieve greater efficiency than a conventional clip of similar overall size from a piece of lesser length and also of lesser diameter, if desired. My novel paper clip configuration also has the advantage of avoiding relatively complex forming operations. Thus, what is gained in efficiency of clamping and in the possibility of saving material is not lost as a result of increasing the complexity of forming the clip.

These and other objects and advantages of the invention will be apparent from the following description of a presently preferred embodiment thereof when taken in conjunction with the annexed drawing wherein:

FIGURE 1 is a perspective view of a paper clip embodying the invention;

FIGURE 2 is a plan view of the paper clip as it appears in use and showing the configuration of one of the clamping arms of the clip;

FIGURE 3 is a view similar to FIGURE 2 but illustrating the opposite arm of the paper clip;

FIGURE 4 is a view similar to FIGURE 2 but one a larger scale;

FIGURE 5 is a sectional view taken along the line **5—5** of FIGURE 4 and particularly illustrating the cooperative relationship of the primary clamping portions of the clip;

FIGURE 6 is a sectional view along the line **6—6** of FIGURE 4;

FIGURE 7 is a sectional view along the line **7—7** of FIGURE 4; and

FIGURE 8 is a sectional view taken along the line **8—8** of FIGURE 4.

As presently constructed, the preferred embodiment of my paper clip is made of a single length of resilient wire or like material. The clip comprises two clamping portions, the free ends of which can be separated to admit the papers to be clipped together between the clamping

portions. These clamping arms or portions are of unequal length and the shorter of these is designated generally by the numeral **10** and the longer is designated generally by the numeral **11**.

More specifically, the clamping portions **10** and **11** are joined in a common U-shaped loop portion **12**, which is normally the upper end of the clip. Referring to FIGURE 4, this loop portion has a neutral axis or axis of symmetry **13** which may be thought of as defining a separation or division of that part of the loop comprising a portion of the longer clamping member **11** and the shorter clamping portion **10**. Thus, the axis **13** intersects the loop portion **12** at **14** and has a leg **15** which is a portion of the longer clamping member **11** and that is parallel to another leg **16** of the loop which comprises a portion of the shorter clamping member **10**.

The remainder of the shorter clamping member **10** comprises a continuation or downward extension of the leg **16** and, similarly, the remainder of the longer clamping member **11** comprises an extension of the other leg portion **15**. Thus, the lower end continuation of the shorter clamping member **10** is U-shaped comprising a terminal leg **17** joined to a parallel leg **18** by a semi-circular portion **19**. Similarly, the lower end continuation of the longer clamping member **11** is also U-shaped and comprises a terminal leg **20** that is parallel to another leg **21** to which it is joined by a semi-circular portion **22**. The U-shaped lower end portion of the shorter clamping member **10** is connected to the upper end loop portion **12** by a joggle **23**, intermediate the leg **16** and leg **18**. Similarly, the lower end U-shaped portion of the longer clamping member **11** is joined to the upper end loop **12** by a joggle **24**, intermediate the leg **15** and the leg. **21**.

It will be noted from FIGURE 4 that the width included by the U-shaped lower end portion of the clamping member **10** is such as to permit it to be nested within the parallel legs **20**, **21** of the other clamping member **11**. Accordingly, in normal unstressed configuration all of the parts of the paper clip lie within a substantially common plane. It is particularly to be noted that the legs **15** and **16** of the upper end loop portion **12** are in alignment, respectively, with the legs **17** and **20**. The joggles **24** and **23** have an offset dimension which is substantially the same as the diameter of the wire material from which the clip is made and the joggles are disposed in confronting relationship to the end faces **25** and **26** of the legs **17** and **20**, respectively. These end faces **25** and **26** are spaced apart longitudinally of the paper clip as a whole although they may be positioned directly opposite one another, as may also the preferably offset joggles **23** and **24**.

In the drawing, the paper clip is shown as applied to a single sheet of paper **27**, rather than to several sheets of paper, in order to clearly illustrate the mode of operation of the paper clip. It will be seen that the clip may be applied in the usual manner by spreading apart the lower end U-shaped portions of the clamping members **10** and **11**, thereafter slipping the paper **27** between the spread apart portions. The clip is then pushed longitudinally inwardly until the edge of the paper has passed beyond the joggles **23** and **24** and has passed into the upper end U-shaped portion **12**.

For any given thickness of papers to be held together, my paper clip will exert a clamping force more than double that of a conventional clip. This result is due to the concentration of the clamping forces on the paper in the vicinity of the joggles **23** and **24**, in opposition to the ends **25** and **26**. Moreover, for any given thickness of papers, my improved clip will be deformed more or to a greater extent than a conventional clip of comparable

size, whereby a greater clamping force is exerted by the wire material of the clip.

Due to the joggle **24**, the leg **15** of the upper end loop **12** is brought closer to the leg **18**. This will be clear if an upward prolongation of the leg **18** is visualized and the normal distance between such prolongation and the leg **15** then measured. Such measurement would correspond to the normal distance between the legs **17** and **18**. It is this spacing which determines the extent to which the paper clip is deformed. As compared to a conventional paper clip this distance is less by a dimension approximately equal to the diameter of the wire stock from which the paper clip is made.

Referring now to FIGURE 8, it will be noted that a line **30** has been drawn between the longitudinal axis of the leg **18** and the longitudinal axis of the leg **15**. This line **30** defines an angle relative to the normal plane of the paper **27** which is greater than an angle similarly defined by the use of a conventional paper clip. Thus, a greater torsional shear stress is imposed at **14** than in a conventional clip whereby greater clamping force is brought to bear in the vicinity of the paper clip end **25** and joggle **24**.

This increase in force in the vicinity of the clip end **25** and joggle **24** also causes a greater exertion of force at the other paper clip end **26**. This end **26** thus has a greater tendency to dig into the paper than the corresponding end of a conventional clip. Therefore, in order to cause a smooth flowing of the paper over the end **26** without tearing, the joggle **23** is provided. Thus a portion of paper **27** in the region of the joggle **23** and the end **26** and also in the region of the end **25** and joggle **24**, is caused to assume a compound curvature as shown at **28**. This curvature is more pronounced between the legs **20** and **18**, for example, than between the end face **26** and joggle **23**. As is shown in FIGURE 7, this latter curvature is relatively gentle and, due to the spacing between the end **26** and the joggle **23**, the paper is guided and has time to flow out of abutting relationship to the end **26** when the clip is moved to the right as shown in FIGURE 7. The joggles **23** and **24** thus not only serve to concentrate the clamping force of the paper clip but also ensure a smooth flowing of the paper through the compoundly curved running sections **28** so that the paper is positively inhibited from tearing.

It should also be pointed out that the terminal leg portions **17** and **20** are somewhat shorter than the comparable leg portions of a conventional paper clip. This serves to save material since a clip of my improved design can be made from a shorter length of wire or other suitable material than a conventional clip, while yet retaining the same over-all dimensions as to width and length. The shortening of the terminal leg sections **17** and **20** also serves to give a greater clamping force at the clip ends **25** and **26**.

As has been pointed out, the clip ends **25** and **26** and the joggles **24** and **23** may be positioned directly opposite to one another, rather than being off-set longitudinally of the paper clip. However, I prefer the positioning of these elements shown in the drawing in order to avoid wrinkling of the paper captured within the clip, such wrinkling being avoided by maintaining the distance, measured normally, between the joggles **23** and **24** at substantially the same distance as the normal spacing between the legs **21** and **18** and the legs **15** and **16**. With this arrangement, creasing of the paper in the running sections **28** is avoided to ensure a smooth flow without tearing any sheets of paper around the ends **25** and **26**.

While I have disclosed and described a presently preferred embodiment of paper clip configuration, it will be apparent to those skilled in the art that changes may be made without departing from the spirit of the invention. It will be obvious that the clip may be made of other than a wire material and of other than circular section. I do not mean to be limited to the specific clip herein disclosed and described but only by the spirit and scope of the following claims.

I claim:

1. In a paper clip, a pair of substantially U-shaped clamping arms of unequal length integrally joined together by an upper end loop of inverted U-shape configuration, the shorter one of said arms being normally nested within the longer one of said arms, both of said arms having straight terminal leg portions and other straight leg portions connected to the legs of said upper end loop, all of said leg portions and legs being substantially parallel to each other, each of the legs of said end loop being coaxially aligned with the terminal leg portion of one of said clamping arms and connected to the other leg portion of the other clamping arm by a joggle confronting the end of the terminal leg portion with which the leg of the loop is aligned.

2. In a paper clip, a pair of substantially U-shaped clamping arms of unequal length integrally joined together by an upper end loop of inverted U-shape configuration, the shorter one of said arms being normally nested within the longer one of said arms, both of said arms having straight terminal leg portions and other straight leg portions connected to the legs of said upper end loop, all of said leg portions and legs being substantially parallel to each other, each of the legs of said end loop being coaxially aligned with the terminal leg portion of one of said clamping arms and connected to the other leg portion of the other clamping arm by a joggle confronting the end of the terminal leg portion with which the leg of the loop is aligned, said joggles being offset in the same direction so that one is offset internally of said upper end loop and the other externally of said loop, said joggles having an offset dimension relative to the legs of said loop substantially equal to the thickness of the material of the clip.

3. In a paper clip, a pair of substantially U-shaped clamping arms of unequal length integrally joined together by an upper end loop of inverted U-shape configuration, the shorter one of said arms being normally nested within the longer one of said arms, both of said arms having terminal leg portions and other leg portions connected to the legs of said end loop, all of said leg portions and legs being substantially parallel to each other, the legs of said loop being of unequal length, with the shorter of the legs of said loop being substantially coaxially aligned with the terminal leg portion of the shorter clamping arm and the longer of the legs of said loop being substantially coaxially aligned with the terminal leg portion of the longer clamping arm, the legs of said loop being joined to the other leg portions of said clamping arms by joggles offset from the axes of the legs of the loop and confronting the ends of the terminal leg portions of said clamping arms.

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