United States Patent [19]

Walker

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[11] **3,913,181**

[45] **Oct. 21, 1975**

[54] **PAPER CLIP HAVING A COATED INSIDE LOOP SURFACE**

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[22] Filed: **Nov. 29, 1973**

[21] Appl. No.: **420,084**

[52] **U.S. Cl.** ..... **24/67.9;** 24/259 PF; 24/261 PC

[51] **Int. Cl.²** **B42F 1/02**

[58] **Field of Search** ... 24/67.9, 73 C, 81 PC, 243 P, 24/255 P, 259 PF, 261 PC, 261 F, DIG. 8, DIG. 10

[56] **References Cited**

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2,047,129	7/1936	Randall	24/261 F
2,205,524	6/1940	Gareis	24/262 R
2,324,929	7/1943	Jennings	24/261 PC
3,604,067	9/1971	Brown	24/259 PF

Primary Examiner—Geo. V. Larkin

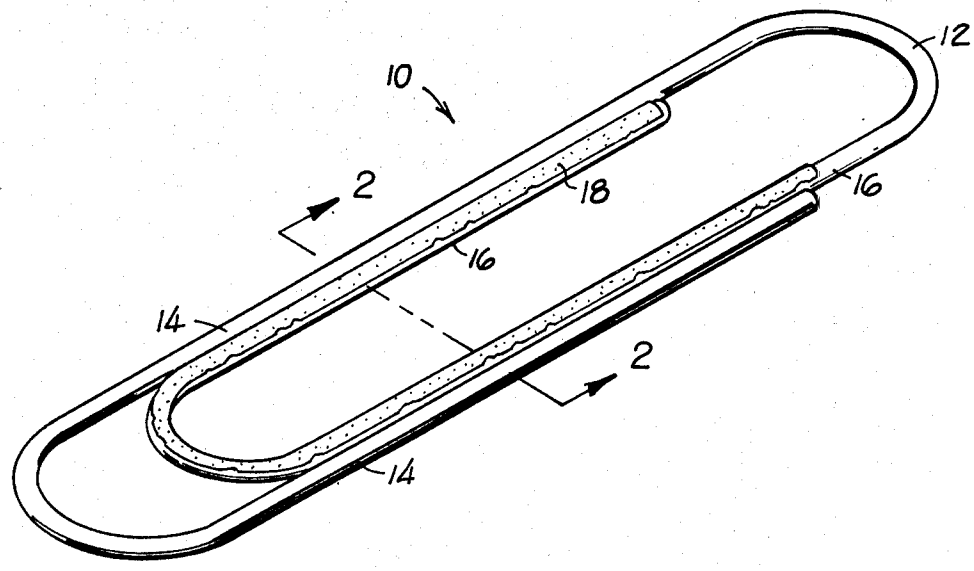
Attorney, Agent, or Firm—Owen, Wichersham & Erickson

[57] **ABSTRACT**

A paper clip of the kind having two resiliently biased gripping elements for gripping the opposite sides of paper sheets has a coating which increases the adhesion between the paper clip and the paper to which it is clipped. The coating is disposed on only an inside, paper contacting surface of one of the gripping elements.

A method of applying the coating to the surface includes clipping the paper clip over a side edge of a conveyor belt and spraying or rolling the coating on the outer exposed surface of one of the gripping elements and then removing the clip from the conveyor belt so that the coated surface can be used as the paper contacting surface.

3 Claims, 5 Drawing Figures



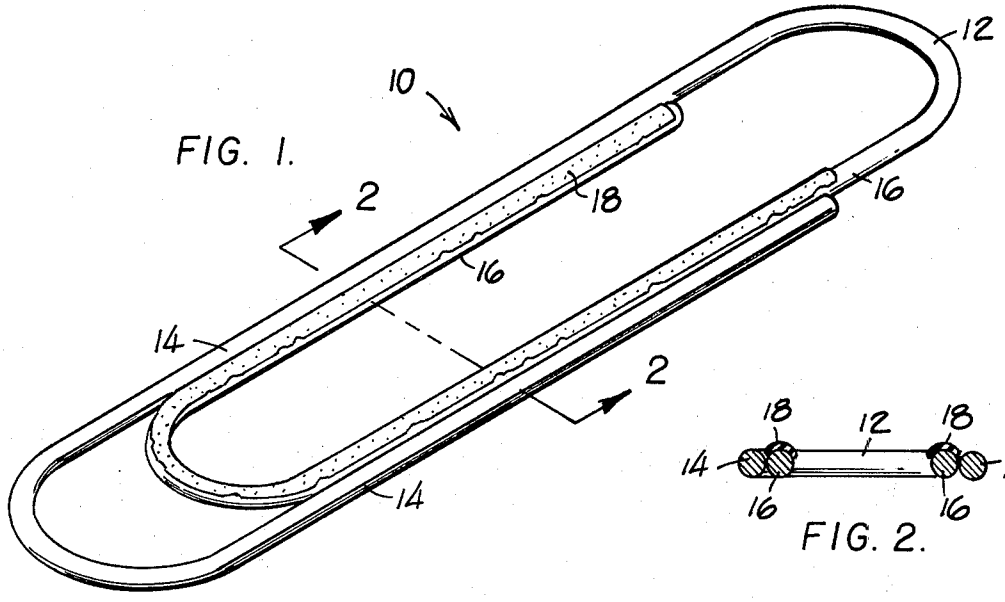


FIG. 1.

FIG. 2.

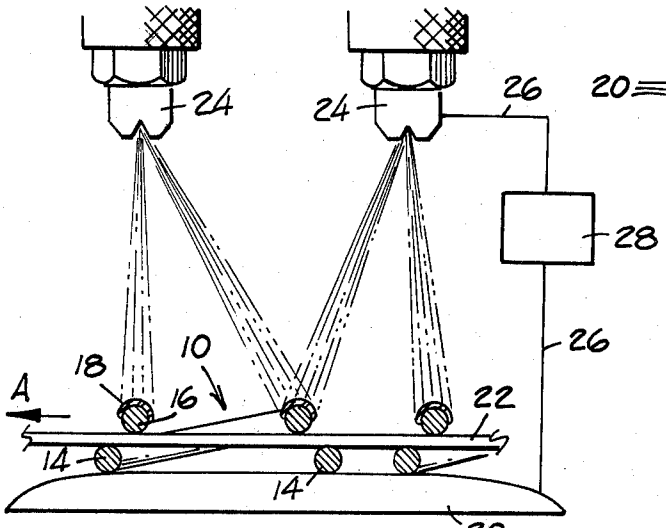


FIG. 4.

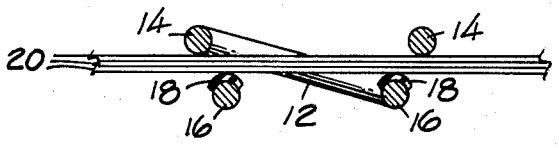


FIG. 3.

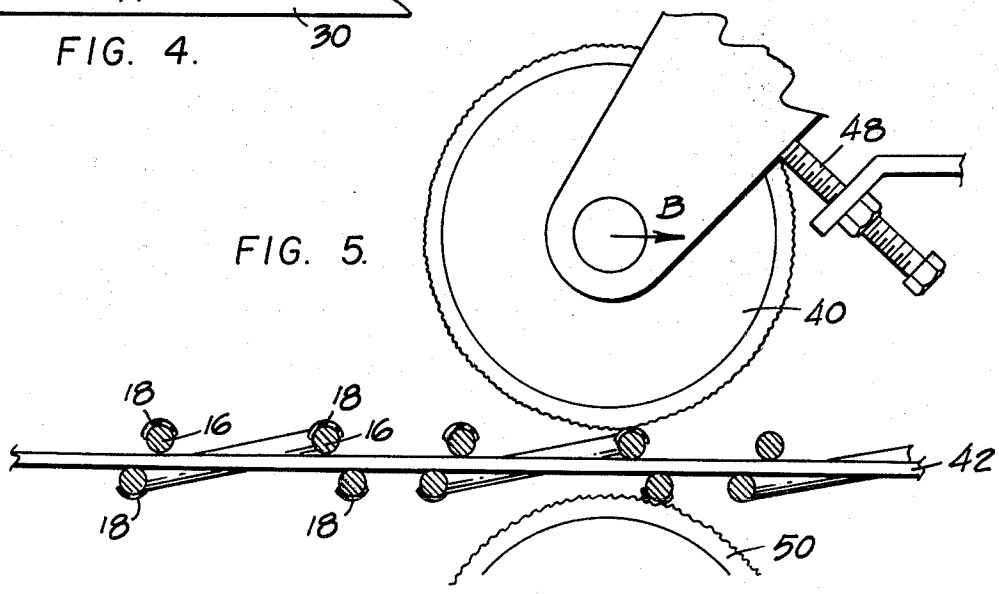


FIG. 5.

PAPER CLIP HAVING A COATED INSIDE LOOP SURFACE

BACKGROUND OF THE INVENTION

This invention relates to clips of the kind used for clipping together sheets of paper or other similar materials. It relates particularly to a paper clip having a coated inside surface for increasing the adhesion between the paper clip and the material to which it is clipped and to a method of applying the coating to only an inside, paper contacting surface of one of the gripping elements.

Most paper clips in commercial use are formed from a single wire or metal strip, usually by bending the wire or stamping the strip, and have a configuration in which the part of the clip which engages one side of the paper is disposed more or less in the same plane as the part of the clip which grips the other side of the paper. The gripping elements may be formed as internestled loops or may be formed in circular or triangular configurations, and the clip depends primarily on the resiliency of the wire or metal strip for exerting the gripping force. With such paper clips there is a practical limitation on the amount of the gripping force that can be developed, and the geometry of the clip construction is such that in some cases only a relatively small part of the paper clip surface is engaged with material to be clipped. This may happen when the loops have to be spread wide apart to clip a large number of sheets presenting a substantial width.

Various techniques have been proposed and incorporated into such paper clips in the past in order to enhance the gripping action. Thus, roughened surfaces, such as knurled surfaces, have been used, and friction increasing coatings have also been used.

U.S Pat. No. **2,324,929** to Jennings shows a paper clip construction in which the inside surfaces **9** and **10** are roughened to enhance the gripping action.

U.S. Pats. Nos. **2,101,195** and **2,047,129** to Randall show a paper clip having a coating of friction material **6** which covers the paper clip.

Roughening the surfaces of paper clips can present the problem of tears with soft papers, particularly if burrs are formed when the surface is roughened.

Coatings can be more effective than roughened surfaces, but such coatings add to the expense of manufacture and are undesirable on the surfaces that do not actually engage the paper to be clipped.

SUMMARY OF THE INVENTION

The present invention recognizes that it is necessary that only the surfaces of the clip that contact the paper need to be coated and further, that it is necessary for most applications that only one of such surfaces be coated.

In a specific form of the present invention a conventional paper clip (of the kind formed by bending a wire into an outer loop and an internesting inner loop) has a coating applied to the inside surface of only one of the loops.

The coating is applied to this surface by clipping the clip over a side edge of a conveyor belt or sheet and then spraying or rolling the coating on the outer surface as the clip is transported past the coating station by the conveyor belt or the roller is rolled over the clip.

The clip is removed from the belt and can then be used with the coated surface as one of the paper contacting surfaces.

Paper clip apparatus and methods which incorporate the techniques and structures described above and which are effective to function as described above constitute specific objects of this invention.

Other objects, advantages and features of my invention will become apparent from the following detailed description of the preferred embodiments taken with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is an isometric view of a paper clip constructed in accordance with one embodiment of the present invention;

FIG. **2** is an end elevation view in cross-section taken along the line and in the direction indicated by the arrows **2—2** in FIG. **1**;

FIG. **3** is a view like FIG. **2** but showing the paper clip in use with the coated surface engaging one side of the papers being clipped together;

FIG. **4** is an elevation view in section along the same line **2—2** as in FIG. **2** and illustrates one embodiment of a method for applying the coating by spraying; and

FIG. **5** is a view like FIG. **4** but showing another embodiment of a method for applying the coating by a roller.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A paper clip constructed in accordance with one specific embodiment of the present invention is indicated generally by the reference numeral **10** in FIG. **1.**

The paper clip **10** of the FIG. **1** embodiment is a conventional wire formed clip, except for the coating of the present invention, and comprises a steel wire **12** bent to form an outer, oblong, partial loop **14** and an inner, oblong, partial loop **16.** As will be apparent from the description to follow, the present invention can be equally well applied to clips having other structural elements, such as stamped strips, and other geometric configurations, such as circles, triangles, etc.

In accordance with the present invention a coating **18** is disposed on an inside surface of the inner loop or gripping element. The coating **18** may be composed of any substance which substantially increases the effectiveness of the frictional engagement with the paper or other material to be gripped over the effectiveness of the wire **12** surface alone. Rubber compositions have been found to be particularly suitable. Dry adhesive compositions, that is, compositions which, after drying on the clip increase the frictional engagement with the paper on contact with the paper, but do not stick to the paper or printing on the paper or mark the paper or printing, have also been found quite suitable.

FIG. **3** illustrates how the paper clip **10** is used to clip sheets **20** of paper or other material together. As illustrated in FIG. **3** the paper clip **10** is clipped onto a stack of sheets **20** so that the coating **18** engages one surface of the stack to hold the clip in nonslipping contact, except when a force is applied to the dip to remove the clip without damaging the paper or printing thereon or leaving an adhesive coating on the paper.

In accordance with the present invention the coating **18** can be quickly and easily applied in a low cost pro-

duction operation by clipping the clips on a conveyor belt which transports the clips past a coating station; and the conveyor belt which transports the clips serves the additional function of confining the coating to just the inside surface on one loop of the paper clip. That is, the conveyor belt acts as a barrier and transporter to prevent the application of the coating to other surfaces of the clip or to present only limited surfaces of the dip to the coating application, as will be apparent from FIGS. **4** and **5**.

In FIG. **4** a paper clip **10** is shown slipped over a side edge of a conveyor belt **22** with the inner loop **16** on one side of the belt and the outer loop **18** on the other side of the belt.

The coating **18** is applied by one or more spray nozzles **24** as the clip **10** is transported (in the direction indicated by the arrow A) through the spraying station provided by the spray nozzles.

The belt **22** could, of course, be stationary, and the spray nozzle **24** could be moved along the belt in an alternate embodiment.

In either case the belt **22** is sufficiently wide to cover the lower loop beneath the belt so that no coating is applied to this loop at the time the coating **18** is sprayed on the outer surface of the upper loop **16.**

To increase the efficiency of the spraying operation the nozzle **24** can be connected by an electrical conduit **26** to an electrolytic spray control **28** and a grounding or charged plate **30** according to known electrolytic spraying techniques to increase the attraction of the spray to a portion of the clip and not to the belt transporting the clips.

FIG. **5** shows another method for applying the coating **18.** In the FIG. **5** embodiment a roller **40** is rolled over the outer surfaces of the loops **16** (in the direction indicated by the arrow B) to apply the coating **18.** The belt or sheet **42** (which acts as a support and a barrier in the same way as the belt **22** in FIG. **4**) is either held stationary as the roller **40** is rolled down the length of the sheet **42,** or the sheet **42** is pulled beneath the roller to serve as a conveyor belt. A suitable stop **48** prevents the roller from contacting the belt and suitable means not shown applies the proper adhesive to the roller.

After the clip **10** is removed from the belt **22** or sheet **42,** the coated surface **18** is then used as the surface which engages the paper, as illustrated in FIG. **3.**

While the present invention has been described in detail with reference to a specific wire loop type of paper clip, the invention is equally applicable to clips having other structural elements and other geometric configurations.

It is also possible to apply a second adhesive coating on the other paper engaging surface of the loop **18** by leaving the clips on the conveyor belt **22** or sheet **42** and turning the belt or sheet over to repeat the coating operations as shown in FIGS. **4** and **5** on the outer surface of the loop **18** or applying a roller or spray on the underside of the belt carrying the clips. Alternatively the second coating may be applied by spraying from the underside of the belt simultaneously with the spraying from the top side as illustrated in FIG. **4** or by a roller **50** on the underside of the belt (see FIG. **5**). The roller **50** also helps support the belt in the same way as the support plate **30.**

The present invention thus provides a paper clip construction having a coating surface on only the surface which engages the paper or only in the area of the clip that engages the paper when the clip is properly applied to the paper, and the present invention also provides a simple method for applying the coating to just that surface.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. A paper clip formed of a single wire bent to have an outer half loop and an internesting inner half loop at one end, a single half loop at the other end and two adjacent straight wire sections extending generally parallel to one another at each side of the paper clip between said opposite ends for forming the gripping elements in combination with the internesting outer and inner half loops at said one end, said paper clip including a coating of non-metallic material for increasing the friction between the clip and the paper disposed on a portion not greater than half of the peripheral surface of that part of the wire which forms the straight wire sections and the internesting outer and inner half loops and wherein the coated portion of the peripheral surface of the inside half loop and straight wire sections is disposed on a side opposite to that of the outside half loop and straight wire sections so as to present opposed coated surfaces effective to grip the opposite sides of the paper inserted between the half loop ends and straight wire sections.

2. The invention defined in claim **1** wherein the coating is a rubber composition.

3. The invention defined in claim **1** wherein the coating is an adhesive which adheres to the paper or other sheet material but does not stick to the paper when the clip is removed.

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