June 17, 1958 D. V. WILLS 2,838,817

PAPER CLIP DEVICE

Filed April 9, 1956

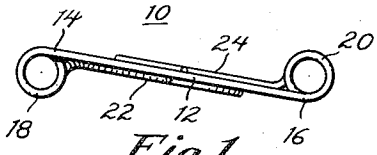


Fig. 1.

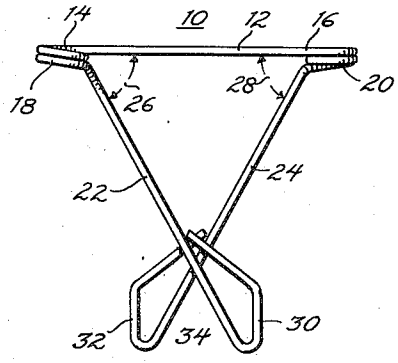


Fig. 2.

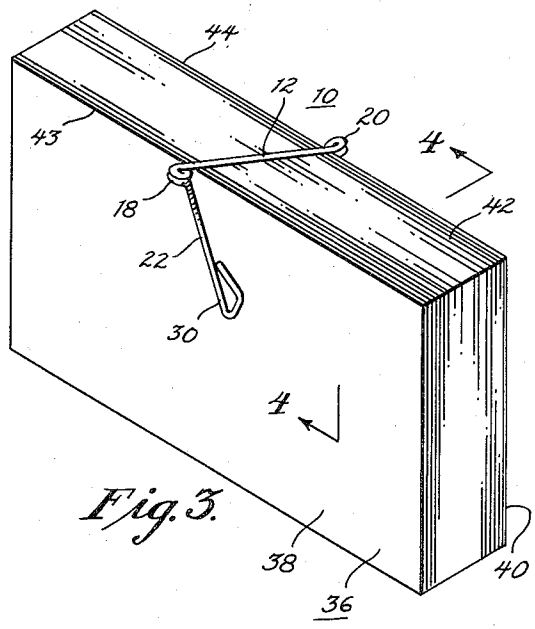


Fig. 3.

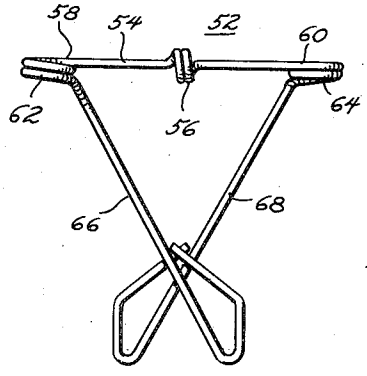


Fig. 6.

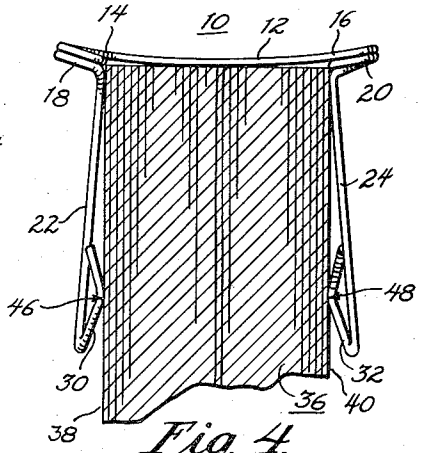


Fig. 4.

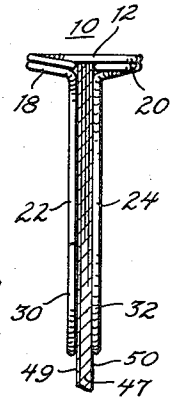


Fig. 5.

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PAPER CLIP DEVICE

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6 Claims. (Cl. 24—66)

The invention relates to a paper clip device, and more particularly has reference to a paper clip device of the expandable wire type.

The wire type paper clip devices of the prior art have been generally adapted to secure papers having a limited total thickness. Such paper clips when expanded for application to a heavy thickness of paper are generally unsatisfactory. Under such circumstances they become permanently deformed, fail to retain the papers to which they are applied, and in many cases become disengaged therefrom.

It is therefore a primary object of the invention to provide a new and improved paper clip device which is particularly adapted to retain papers of various total thicknesses.

Another object of the invention is to provide a new and improved paper clip device of the wire type of improved effectiveness for retaining materials of thin or heavy total thicknesses.

Another object of the invention is to provide a new and improved paper clip device of the wire type which has an increased retaining ability as the thickness of the material to which it is applied is increased.

Another object of the invention is to provide a new and improved paper clip device formed of a single piece of wire material.

Another object of the invention is to provide a new and improved paper clip device which does not become permanently deformed by application to materials of extreme thickness, can be used repeatedly for various applications, and is of long duration.

Another object of the invention is to provide a new and improved paper clip device which is readily fabricated, efficient in operation and inexpensive in cost.

The above objects as well as many other objects of the invention are achieved by providing a paper clip device formed of a unitary elongated resilient wire member comprising a substantially linear top portion having first and second extremities. First and second coil spring elements are respectively formed by the wire member at the extremities of the top portion, while first and second arm portions are also formed by the wire and respectively joined with the extremities of the top portion by the spring elements. The arm portions form acute angles with the top portion and extend from the extremities of the top portion in a direction across each other.

The arm portions are in a contracted position when the device is in its engaged state. The arm portions are urged toward their contracted position by the spring elements and cross and contact each other when the device is disengaged.

With the foregoing discussion in mind, this invention will be most readily understood from the following detailed description of several representative embodiments thereof, reference for this purpose being had to the accompanying drawings, in which:

Figure 1 is a plan view of a paper clip device embodying the invention,

Figure 2 is a front elevational view of the device shown in Figure 1,

Figure3 is a perspective view illustrating the device of Figure 1 as applied to a plurality of paper cards,

Figure 4 is an enlarged sectional view taken on the line 4—4 of Figure 3,

Figure 5 is a view similar to Figure 4 illustrating the device applied to a smaller number of paper cards, and

Figure 6 is a front elevational view illustrating a modified form of the paper clip device.

Like reference numerals designate like parts throughout the several views.

Refer now to the Figures 1 to 5 inclusive which illustrate a paper clip device **10** embodying the invention. The paper clip device **10** is made of a unitary resilient wire member preferably of a material such as spring steel.

The paper clip device **10** has a substantially linear top portion **12** with extremities **14** and **16**. A pair of coiled spring elements **18** and **20** are formed in the wire member at the respective ends **14** and **16** of the top portion **12**. The spring elements **18, 20** may be coiled in the same direction while extending in opposite directions with respect to the longitudinal axis of the top portion **12**.

A pair of arm portions **22, 24** are respectively joined with the ends **14, 16** of the top portion **12** by the spring elements **18, 20**. The arm portions **22, 24** respectively extend from the end portions **14, 16** of the top portion **12** forming acute angles **26, 28** with the top portion **12**. The extending ends **30, 32** of the arm portions **22, 24** cross each other and may be folded back as illustrated.

The paper clip device **10** when disengaged has its arm portions **22, 24** in the contracted position shown in the Figures 1 and 2. The spring elements **18** and **20** urge the arms **22, 24** toward the contracted position. The device **10** when in its contracted position provides four points of contact between the arms **22, 24** where they cross each other. The extending ends **30, 32** of the arm portions **22, 24** of the device **10** provide a converging entrance or opening area **34** which is useful in the application of the device **10** to the material to be retained.

The Figures 3 and 4 illustrate the device **10** as applied to a thick stack of paper cards **36**. In this application of the device **10**, the arm portions **22** and **24** are separated receiving between them the stack of cards **36** and respectively contact the opposite outer surfaces **38, 40**. The top portion **12** of the device **10** extends across the top end **42** of the cards **36**. It is noted that with the increase of the total thickness of the cards **36**, the internal transverse angles formed by the top portion **12** with the edges **43, 44** of the cards **36** increase towards 90 degrees. This results in an increased spring tension exerted by the spring elements **18, 20** on their respective arm portions **22, 24**. This increases the retaining force applied to the sides **38, 40** of the cards **36**.

Thus, the increased displacement or separation of the arms **22, 24** when applied to an increased thickness of cards **36** results in increased retaining power by the paper clip device **10**.

In addition to the increased tensioning force applied by the spring elements **18, 20** the extreme expansion of the arm portions **22, 24** twists them so that the force applied to the sides **38, 40** of the cards **36** is now concentrated at the regions **46, 48** as illustrated in Figure 4. This results in the compression of the material of the cards **36** at these regions and tends to firmly maintain the device **10** in position binding the cards **36**.

The Figure 4 also illustrates a concave bowing of the top portion **12** of the device **10** when applied to a large thickness of cards **36**. The bowing also has the effect of producing a tensioning force which increases the retaining action of the arm portions **22, 24** by urging them towards their retracted position.

The Figure 5 illustrates the application of the device **10** to a plurality of cards **47** of reduced total thickness. In this case the extending ends **30, 32** of the arms **22, 24** are positioned substantially flat against the outer vertical surfaces **49, 50** of the cards **47**. This maximizes the contact area.

From the above description it is evident that the paper clip device **10** is highly effective for retaining material having either a reduced or increased thickness. Thus, the material retained by the device **10** may be varied within large limits without decreasing its effectiveness. The simplicity of operation and form of the device **10** provides a highly efficient and easily manufactured device of low cost.

The Figure 6 illustrates a paper clip device **52** which is a modified form of the device **10**.

The device **52** has a top portion **54** provided with an intermediate coil **56** allowing relative displacement of the extremities **58, 60** of the top portion **54** away from each other against the action of the coil spring **56**. The extremities or ends **58, 60** of the top portion **54** are respectively provided with coil spring elements **62, 64** which are joined with arm portions **66, 68** in a manner similar to that of the device **10**.

In the application of the device **52**, the expandable spring element **56** of the top portion **54** allows the device to be extended, thereby expanding its capacity and allowing it to encompass a greater thickness of material. The spring action of the coiled element **56** also serves to apply a retaining tension to the arms **66, 68** for assisting their retaining action.

While only a few representative embodiments of the invention are disclosed herein, there will be obvious to those skilled in the art many modifications or variations accomplishing the foregoing objects and realizing many or all of the advantages, but which yet do not depart essentially from the spirit of the invention.

What is claimed is:

1. An integral paper clip device comprising a horizontal substantially linear top portion having first and second extremities, a first coiled spring element joined to the first extremity of said top portion, having a substantially vertical axis, a second coiled spring element joined to the second extremity of said top portion having a substantially vertical axis, and first and second arm portions respectively joined with the extremities of said top portion by said spring element, said first arm portion being joined with the first extremity of said top portion by said spring element, said second arm portion being joined with the second extremity of said top portion, said arm portions extending downwardly from the extremities of said top portion in the direction across each other, said first arm portion being urged by said spring element towards said second arm portion for retaining a body between said arm portions.

2. An integral paper clip device derived from a unitary elongated member comprising a horizontal substantially linear top portion having first and second extremities, first and second coiled spring elements respectively disposed at the extremities of said top portion each spring element having a substantially vertical axis, and first and second arm portions respectively joined with the extremities of said top portion by said spring elements, said arm portions forming acute angles with said top portion and extending from the extremities of said top portion in the direction across each other and being urged by said spring elements towards a common plane with said top portion.

3. An integral paper clip device derived from a unitary elongated member comprising a horizontal substantially linear elongated top portion having first and second extremities, first and second coiled spring elements respectively disposed at the extremities of said top portion each having a substantially vertical axis, and first and second arm portions respectively joined with the extremities of said top portion by said spring elements, said arm portions forming acute angles with said top portion and extending from the extremities of said top portion in the direction across each other, said arm portions being in a contracted position when said device is in its disengaged state while assuming an expanded position when said device is in its engaged state, said spring elements respectively urging said arm portions toward their contracted position.

4. An integral paper clip device derived from a unitary elongated member comprising a horizontal substantially linear elongated top portion having first and second extremities, first and second coiled spring elements respectively disposed at the extremities of said top portion each having a substantially vertical axis, and first and second arm portions respectively joined with the extremities of said top portion by said spring elements, said arm portions forming acute angles with the top portion and extending from the extremities of said top portion in the direction across each other, said arm portions being in a contracted position when said device is in its disengaged state while assuming an expanded position when said device is in its engaged state, said arm portions crossing and contacting each other when said device is in its disengaged state, said spring elements urging said arm portions towards their contracted position.

5. An integral paper clip device derived from a unitary resilient wire member comprising a horizontal substantially linear elongated top portion having first and second extremities, first and second coiled spring elements respectively disposed at the extremities of said top portion each having a substantially vertical axis, and first and second arm portions respectively joined with the extremities of said top portion by said spring elements, said arm portions forming acute angles with the top portion of and extending from the extremities of said top portion in the direction across each other, said arm portions being in a contracted position when said device is in its disengaged state while assuming an expanded position when said device is in its engaged state, said arm portions crossing and contacting each other when said device is in its disengaged state while said arms are separable for receiving a body between them and placing said device in its engaged state, said spring elements urging said arm portions towards their contracted positions for firmly retaining said body between said arm portions.

6. The paper clip device of claim 5 in which the top portion is provided with a coiled spring constituting a part of said unitary member and positioned intermediate the extremities of said top portion, said coiled spring allowing relative displacement of the extremities of said top portion away from each other against the action of the coil spring for increasing the expanding capacity of said device.

References Cited in the file of this patent

UNITED STATES PATENTS

807,151	Calder	Dec. 12, 1905
819,766	Klein	May 8, 1906
1,098,789	English	June 2, 1914
1,321,592	Brown	Nov. 11, 1919

FOREIGN PATENTS

24,132	Switzerland	of 1902