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H. SKREBBA

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PAPER CLIP APPLYING TOOL

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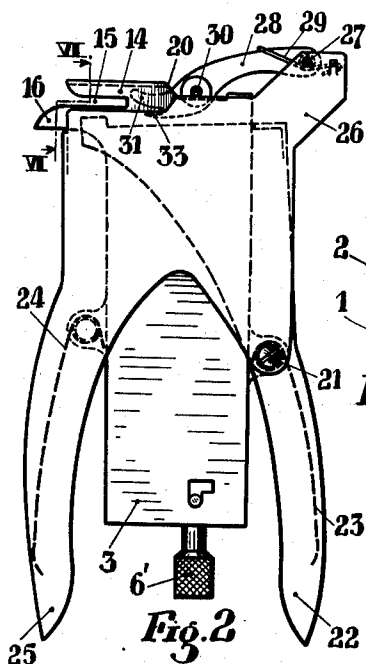


Fig. 1

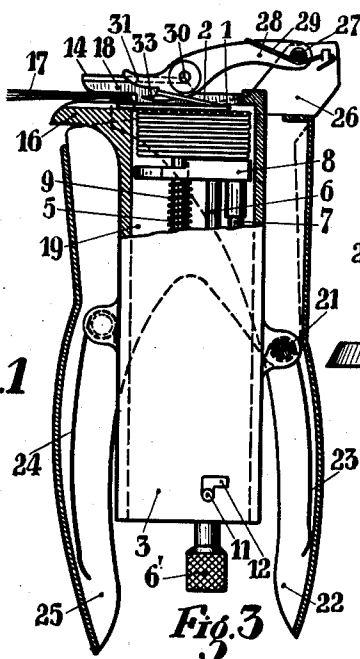


Fig. 2

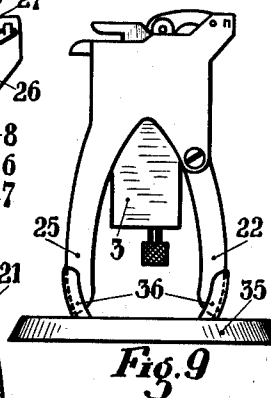


Fig. 3

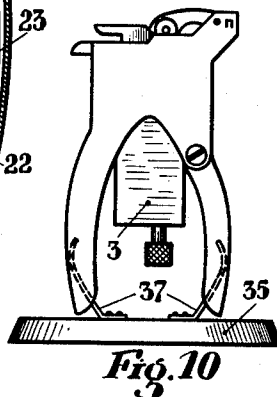


Fig. 4

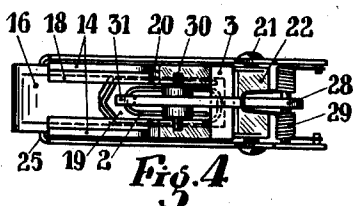


Fig. 5

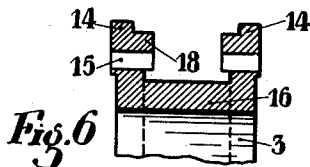


Fig. 6

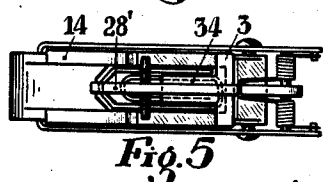


Fig. 7



Fig. 7'

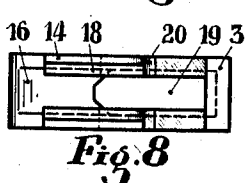


Fig. 8

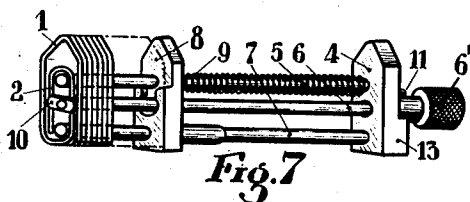


Fig. 9

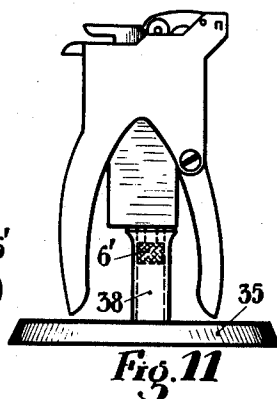


Fig. 10

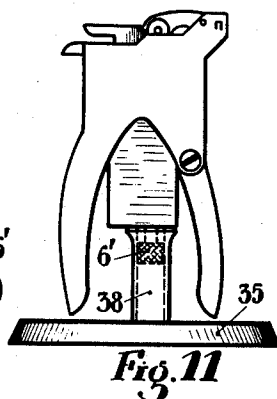


Fig. 11

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UNITED STATES PATENT OFFICE

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PAPER CLIP APPLYING TOOL

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11 Claims. (Cl. 120—8)

This invention relates to a tool for applying metal clips to superposed sheets of paper for the purpose of assembling them.

For assembling, without perforation, superposed sheets of paper, there are utilised attaching devices formed of a metal wire folded upon itself, so as to form a type of rectangle in which the wire, again folded, forms a second smaller rectangle. For assembling sheets of paper one of the rectangles is slid over and the other under the pile of sheets, whereby these are held resiliently.

The present invention has for its main object a device in the form of pliers comprising a magazine in which there is located a cartridge of superposed attaching devices, the two arms of the pliers being pivoted on the magazine; an open slot, formed by the upper end of the magazine being provided for the reception of the pile of sheets, this slot being combined with the end of one of the limbs of the pliers in such a manner that this end, during operation, acts on the pile of papers from underneath for the purpose of tightening them, the end of the other limb of the pliers being provided with a beak which engages from underneath with one of the rectangles of the attaching device discharged from the magazine by a discharging mechanism, and moves it towards the pile of sheets whilst raising one of the parts of the securing devices whilst the other part is maintained in its original plane and closes the attaching device, which has thus been opened, against the pile of sheets.

Other objects and advantages of the invention will appear from the following description with reference to the accompanying drawing, wherein

Fig. 1 is a plan view of a metal clip.

Fig. 2 is a front view in elevation of the pliers in the open position.

Fig. 3 is a similar view partly in section, during the operation.

Fig. 4 is a plan view of Fig. 2.

Fig. 5 is a plan view, corresponding to Fig. 4 of a slight modification.

Fig. 6 is a cross-section to a larger scale on the line VI—VI of Fig. 2.

Figs. 7 and 7' show details of the magazine for the clips with its feed mechanism for the clips.

Fig. 8 is a top plan of the magazine alone, without the limbs of the pliers.

Figs. 9, 10 and 11 show three modifications of the support for the device.

Referring to Fig. 1 it will be seen that the clip to which the invention relates, is of the type formed of a metal wire folded upon itself so as

to form two limbs 1 and 2, hereinafter referred to as the outer limb and the inner limb. For assembling a pile of sheets by means of a clip of this character it suffices to spread apart the two limbs by moving one of these in a plane inclined to that of the other. The method of folding the wire forming the clip may be otherwise as long as there are formed two limbs located in the same plane or in superposed planes.

The device according to the invention is provided with a magazine 3. This consists of a flattened tube open at the bottom. In this tube is mounted a pusher formed by a plate 4 capable of fitting exactly into the magazine 3, so as to close this and carrying three parallel rods 5, 6, 7 of which the middle one 6, passes through the plate 4 and terminates in a knob 6'. These three rods pass through a second plate 8 which is identical with the plate 4 and which constitutes the head of the pusher for the clips. This head can slide on the three rods under the action of a spring 9 threaded on the rod 5 and compressed between the two plates 4 and 8.

The rod 6 can be turned in the two plates by means of the knob 6'. The plates have an outline substantially similar to that of the clips and the two end rods are spaced apart in such a manner that the internal limb of a clip can be threaded exactly thereon. The middle rod 6 terminates at its free end in a small rectangular plate 10 which when the rod 6 is in one position, passes into the inner limb of a clip, but cannot pass therethrough when the rod 6 has been turned through 180°. On the outside of the plate 4 the rod 6 carries a small radial pin 11 and the wall of the tube 3 is provided with an angular slot 12.

For loading the magazine the rod 6 is first placed in such a position that the plate thereon can pass through the inner limb of the clip. The plate 8 is then moved towards the plate 4 (whilst compressing the spring 9) and a cartridge of clips is threaded on the three rods 5, 6, 7. When this cartridge covers substantially the entire free portion of these rods the knob 6' is turned through half a revolution so as to bring the pin 11 against the shoulder 13 on the plate 4 and thus bring the plate 10 into a position across the pile of clips. The plate 8 may then be released, the plate 10 holding the clips whilst the spring 9 remains compressed. This assembly is then inserted into the magazine 3. The knob 6 is then pushed so as to bring the pin 11 at the desired point of the opening 12, whereupon the knob is turned through half a revolution whereby the pin 11 engages with

the opening 12 and thus prevents any further movement of the plate 4. By this rotation the plate 10 is disengaged from the clips and the spring 9 tends to discharge the clips from the magazine 3.

The magazine, of which the internal cross-section corresponds with the shape of the clips, is open at the upper end, but the clips are prevented from passing out in the example shown in Fig. 2 by two lateral edges 14 forming part of the lateral walls of the magazine.

At its upper end the magazine is provided with a projection 16, slightly curved, which with the edges 14 forms an open slot 15 for the introduction of a pile of sheets 17 to be assembled. The edges 14, in Fig. 2, are formed by extensions or lugs on the two wide sides of the magazine. They are each bent inwardly as indicated at 18 so as to form stops which prevent the clips from passing out, these edges or stops 14, 18 only extend over half the opening 10 of the magazine 3. Normally the upper clip in the pile is thus discharged from the magazine 3, against the edges 18, and it is located exactly in the plane of the slot 15. At the rear the edges 14, 18 terminate in a ramp 20, of which the purpose will be described hereinafter.

On the magazine 3 or on a lateral projection thereof there are pivoted on the same pivot 21, two overlapping arm of pliers, of which one (22) is acted upon by a spring 23 which is weaker than the spring 24 acting on the other arm 25. These arms completely enclose the magazine 3, that is to say the arm 22 is extended beyond the pivot by two flat blades located on opposite sides of the magazine, the arm 25 extending over these blades and terminating at the top in two blades 26 supporting a pivot 27. The two blades of the arm 22, when the device is operated pass in front of the slot 15 and as the extension 16 is slightly narrower than the magazine 3 they engage underneath the lower edge of the edges 14 thus firmly holding the papers which have been introduced into the slot 15 between them and the edges. This movement is the starting movement, the spring 23 being weaker than the spring 24.

On the shaft 27 is pivotally mounted an arm 28 which is pressed downwardly by a spring 29. The downward movement of this arm is limited by the engagement of the transverse pin 30 with the lateral edges of the upper opening of the magazine 3 and, when this is loaded, with the uppermost clip. The arm 28 ends at the front in a projection 31 which is slightly higher than the bottom of the slot 15 in such a manner as to ensure that the projection passes over the sheets 17 during the operation. Under the projection and slightly to the rear thereof the arm is provided with a slightly flexible pin 33 which in the position of rest, shown in Fig. 1, is in engagement with the inner limb of the upper clip. The arm 22 of the pliers having been pivoted when the pliers are pressed, the arm 25 commences its pivotal movements, that is to say its arm 28 moves forwardly. The pin 30 immediately rises on the ramps 20 and consequently the front of the arm is raised thus lifting the inner limb of the clip of which the outer limb is retained by the edges 14, 18. The clip is thus opened. The forward movement of the arm 28 continuing, the pin is then moved forwardly whilst remaining open. The outer limb of the clip 1 slides on the extension 16, under the sheet 17 whilst the inner limb of the clip slides over the sheets. When releasing the pliers the arm 28

returns to its initial position, the pin 33 yielding resiliently so as to release the clip and the arm 22 no longer pressing on the sheets of paper, these may be withdrawn with the clip effectively attached thereto. The feed mechanism of the magazine has meanwhile brought a fresh clip into the discharge position and the apparatus is ready for a fresh operation.

In the example shown in Fig. 5 the clip is engaged by its outer limb. In this case the arm 28' is longer as it is necessary for it to engage more forwardly and the clip is no longer retained by the edges 14, 18, which are displaced laterally. The retention of the clip is effected by the inner limb which is engaged by a blade 34 forming a tongue which is folded over the rear edge of the upper opening of the magazine 3. Otherwise the mechanism is the same as in the preceding example.

As an accessory to the pliers above described there is provided a support enabling the apparatus to be supported vertically on a desk or work table in such a manner that the instrument can be picked up suitably and directly when it is to be used. This support, Fig. 9 consists of a small base 35 provided with two resilient lugs 36 between which the arms of the pliers are engaged and held resiliently.

Instead of these two lugs there may be provided (Fig. 10) two spring blades 37 over which the arms of the pliers are passed.

Finally, Fig. 11, the base 35 is provided with a simple central tube 38 into the upper open end of which there is engaged the knob 6'.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:

1. Pliers for applying metal clips to superposed sheets of paper, for the purpose of assembling the sheets, comprising in combination a magazine in which is located a cartridge of superposed clips, a feed mechanism in said magazine for causing the clips to be discharged one by one from the magazine through an upper opening in this magazine, means at the upper end of the magazine for holding in position one of the lugs or limbs of the clip thus ejected, an open slot above the magazine for the introduction of a pile of sheets to be assembled, this slot being exactly on a level with the ejected clip, two arms of pliers pivotally mounted on the magazine, one of these arms being acted upon by a weak spring which, when starting the operation brings two terminal lugs under the sheets of paper so as to raise them and to grip them between these lugs and the upper edge of the said slot, the other arm of the pliers moving towards the sheets a pivoted arm located above the magazine and of which a lower terminal pin is normally in engagement, from underneath, with the limb or lug of the clip which is not held, this arm having a rising path followed by a straight line path in such a manner that its pin firstly raises the lug or limb of the clip, the other limb being held, then this arm moves horizontally towards the sheets of paper, the clip which has thus been opened so as to bring it into engagement with the sheets, one limb of the clip engaging with the sheets above and the other below.

2. Pliers according to claim 1, characterised in that the arm engaging with the clip carries at the front a transverse pin which normally rests on the clip to be moved and during the movement of this arm as a result of the closing of the pliers, slides on inclined surfaces of the magazine, then

on a horizontal portion, whilst a spring presses the arm downwardly around its pivot which is carried by the end of the corresponding arm of the pliers.

5 3. Pliers according to claim 1, wherein the arm engaging with the clip carries at the front a transverse pin which normally rests on the clip to be moved and during the movement of this arm as a result of the closing of the pliers, slides on inclined surfaces of the magazine, then on a horizontal portion, whilst a spring presses the arm downwardly around its pivot which is carried by the end of the corresponding arm of the pliers, the edges upon which there slides the said pin being lined internally by a blade against which bears the outer limb of the clip to be moved.

4. Pliers according to claim 1, characterised in that the clip to be moved is held by its inner limb, by a folded tongue of the magazine.

5. Pliers according to claim 1, characterised in that the magazine is a flat box of which the inner section has the same outline as the clips, this box being open at the bottom for the introduction of feed mechanism which comprises a plate capable of exactly closing the magazine and carrying three parallel rods of which the two outer ones are spaced apart in such a manner as to receive exactly the inner limb of the clips, these rods passing freely through a second plate identical with the first and acted upon by a spring threaded on one of the rods between the two plates, so as to press the clips threaded on the rods outwardly, the first plate being provided with means for ensuring its securing in the magazine.

6. Pliers according to claim 1, wherein the magazine is a flat box of which the inner section has the same outline as the clips, this box being open at the bottom for the introduction of feed mechanism which comprises a plate capable of exactly closing the magazine, and carrying three parallel rods of which the two outer ones are spaced apart in such a manner as to receive exactly the inner limb of the clips, these rods passing freely through a second plate identical with the first and acted upon by a spring threaded on one of the rods between the two plates, so as to press the clips threaded on the rods outwardly, the first plate being provided with means for ensuring its securing in the magazine and wherein the middle rod passes through the two

plates and is terminated on the outside by an operating knob, the outer part of this rod carrying a projection which, in one position of the knob, engages with an angular opening provided in a wall of the magazine and when the knob is rotated through 180° engages with a branch of this opening and under the action of the spring slides in the other branch of the opening so as to lock the feed mechanism in the magazine.

7. Pliers according to claim 1, wherein the magazine is a flat box of which the inner section has the same outline as the clips, this box being open at the bottom for the introduction of feed mechanism which comprises a plate capable of exactly closing the magazine, and carrying three parallel rods of which the two outer ones are spaced apart in such a manner as to receive exactly the inner limb of the clips, these rods passing freely through a second plate identical with the first and acted upon by a spring threaded on one of the rods between the two plates, so as to press the clips threaded on the rods outwardly, the first plate being provided with means for ensuring its securing in the magazine and wherein the middle rod is provided at its free end with a rectangular plate which when the knob is in the position corresponding with the locking of the feed mechanism in the magazine, allows the clips to pass, whilst when the knob is moved through 180° this plate extends transversely to the clips and holds these in spite of the feed action of the spring.

8. Pliers according to claim 1, characterised by a support formed by a base and means on this base by which the pliers are supported vertically during the periods when they are not to be used.

9. Pliers according to claim 1, characterized by a support comprising a base carrying two vertical resilient lugs between which the ends of the arms of the pliers can be engaged and retained resiliently.

10. Pliers according to claim 1, characterized by a support comprising a base carrying two spring blades over which the ends of the arms of the pliers are fitted and held resiliently.

11. Pliers according to claim 1, characterized by a support comprising a base provided at its centre with a vertical tube into the upper end of which there is fitted the knob of the magazine of the pliers.

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