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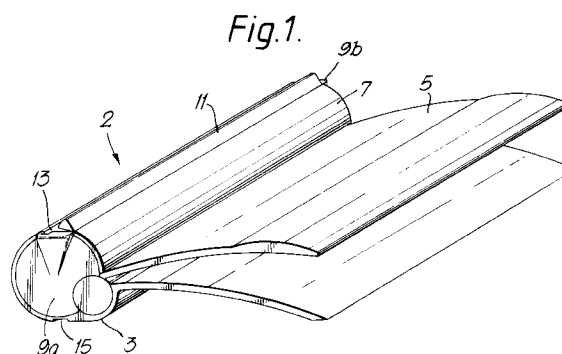
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(54) **Improvements in and relating to binding perforated sheets.**

(57) Apparatus for binding a number of perforated sheets (2) to book form by the use of a wire binding element (55) comprising two jaws, one on a base member and a corresponding one on a clamping member (3) adapted to pivot with respect to the base so that the jaw thereon may move through an arcuate path towards the jaw on the base so as to close the open wire binding element positioned therebetween, so that the closed ends of the prongs pass through the perforations of a pad positioned between the jaws, thereby binding the pad to book form.



This invention relates to apparatus for binding a number of perforated sheets to book form by the use of a wire binding element.

One type of wire binding element is formed from a length of metal wire bent to form a series of curved hairpin shaped prongs on which the sheets are impaled and which are brought to ring shape by bringing their closed ends into the vicinity of their open ends. When it is in the condition in which the impaling of the sheets on its prongs is effected, the wire binding element is in the form of a tube having a slot in its wall extending over its whole length. Such a wire binding element in such condition will be referred to herein as a wire binding element of the "type described".

Known devices for closing wire binding elements of the "type described" through holes in pads of paper comprise a pair of jaws which are adapted to close and which are manually actuated through a mechanical linkage. Such devices are normally biased so that the jaws are held in an open position to define a space into which the perforated edge of the pad and the wire binding element will fit. A user then moves a handle with sufficient force to overcome the bias and cause the jaws to close the wire binding element thus binding the sheets together. The mechanical linkage is normally configured so as to provide a mechanical advantage, so that the force applied by the user to the handle is less than that applied by the jaws to the binding element.

Such devices consist of a number of parts. Accordingly, they are relatively expensive to manufacture and assemble and they often require lubrication or other maintenance. With such devices it is often necessary to align manually the prongs of the wire binding element of the type described with the perforations in the sheets and this alignment maybe difficult and/or time consuming.

Apparatus for closing a wire binding element of the type described to bind a pad of perforated sheets to book forms in accordance with the invention comprises two jaws, one on a base member and a corresponding one on a clamping member adapted to pivot with respect to the base member so that the jaw thereon may move through an arcuate path towards the jaw on the base so as to close a wire binding element position between the jaws, the closed ends of the prongs of the binding element passing through the perforations of a pad positioned between the jaws, thereby binding the pad to book form.

The surface of the base jaw may be a segment of a cylinder.

The radius of the cylinder may conveniently correspond to the radius of the closed side of a particular diameter of wire binding element in a closed condition, so that the base jaw may accommodate the closed side of that particular size of wire binding element, and contact that side over its full cylindrical surface. The provision of such a curved base jaw helps

to prevent distortion of the wire binding element during the closing operation.

The clamping member may have a part cylindrical outwardly facing aperture arranged to engage a corresponding part tubular inwardly projecting portion of the base member so that the clamping member may pivot around the projecting part of the base during its arcuate movement.

The clamping member may also have an outwardly projecting lug arranged to mate with a slot in the end of the handle. The handle is arranged to pivot around a second projection extending from the base member and has a slot in its opposite face which is engaged by the lug extending outwardly from the clamping member, the arrangement being such that on pivotal movement of the handle relative to the base member the clamping member is caused to rotate to bring the jaws together.

There are only three parts, a base and clamping member and a handle, all of which may be formed from longitudinal extrusions, which are inexpensive and simple to manufacture and to assemble. The parts may be made from aluminium, which may be surface treated to improve wear resistance and/or to give an attractive surface colour, or from some other suitable alloy or plastic material. There are only two moving parts which require minimal maintenance, and the configuration of the parts may be such that the apparatus possesses a mechanical advantage in use.

Conveniently the member may be biased towards an open position of the jaws. Such an arrangement ensures that when the binding operation is complete, and the user removes the pressure from the handle, the apparatus returns to the initial position ready for the binding process to be repeated.

The provision of end caps to close off each end of the apparatus improves the appearance of the apparatus, and they may act to align the wire binding element of the kind set forth and the perforated sheets perpendicularly to the plane of movement of the clamping member.

Embodiments of the invention will now be further described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an example of apparatus in accordance with the invention, and Figure 2 is a cross-sectional view of the apparatus of Figure 1.

Figure 3 is an exploded view of an alternative embodiment of the apparatus similar to Figure 1 but with the paper guide replaced by a retainer.

Figure 4a is a cross-sectional view of the apparatus of Figure 3 in an initial stage of operation.

Figure 4b is a view similar to Figure 4a in a final stage of operation.

Referring to Figure 1, apparatus for binding perforated sheets 2 comprises a base member 3, a han-

dle 5 and a clamping member 7, all of which are formed of longitudinal extensions. The ends of the apparatus are closed by end caps 9a,9b. The clamping member 7 is provided with a longitudinal paper guide 11 which seats in a recess 37 (see Figure 2) formed in clamping member 7. Alternatively, the paper guide may be seated in a recess formed in the base member 3 (not shown).

The upper part of the base member 3, the end caps 9a,9b and the paper guide 11 define the outline of the binding recess 13 into which a wire binding element of the type described (not shown) and the perforated sheets (not shown) are inserted to be bound. The lower surface of the base 3 is provided with a groove 15 suitable for the insertion of a strip of one or more studs 35 (see Figure 2) made of a non-slip rubber or plastic material so that the apparatus does not slip when in use on a flat surface. A strip 39 of similar material may be attached to the extension 4 of the base member for the same purpose (see Figure 4a).

Referring now to Figure 2, the base member 3 has a main body portion which encloses a recess 6 and an extension 4 which provides stability when the apparatus is in use. Contained within the recess 6 is a downwardly directed first projection 19 and an upwardly directed second projection 21. At the upper edge of the base member 3 is a fixed jaw 17 having a cylindrical surface of equal radius to the open side of a wire binding element of the type described (not shown) when the latter is closed.

The handle 5 has a bearing aperture 23 adapted to engage pivotally on the projection 21, and a slot 25 which, when the handle is in position on the base member 3, is directed towards the projection 19.

Clamping member 7 has a bearing aperture 27 adapted to engage pivotally on the projection 19 as shown. A lug 29 formed on the clamping member 7 is adapted to engage pivotally in the slot 25 of handle 5 when base member 3, handle 5 and clamping member 7 are assembled.

The apparatus may be assembled by sliding clamping member 7 onto base member 3 so that bearing aperture 27 engages with projection 19, and sliding handle 5 onto base member 3 so that bearing aperture 23 engages with projection 21 and lug 29 engages in slot 25. Paper guide 11 is slid into recess 37 and may be fixed using an adhesive. End caps 9a,9b are provided with means to engage with the ends of the apparatus (not shown) or may be mounted using a suitable adhesive.

The upper end of clamping member 7 is provided with a jaw 31 which faces jaw 17. Pivotal motion of handle 5 towards base extension 4 causes clamping member 7 to pivot about projection 19 and jaw 31 to move through an arcuate path towards jaw 17.

Biasing means 33 between base member 3 and clamping member 7 acts to hold the jaws 17,31 apart, or to move jaw 31 away from jaw 17 when pressure

is removed from the handle 5.

The operation of binding perforated sheets is carried out by inserting a wire binding element of the kind set forth into the binding recess 13 with its open side towards the jaw 17 and inserting the perforated sheets into the binding recess 13, the perforated sheets being brought into alignment with the prongs of the wire binding element by the paper guide 11 and the end caps 9a,9b. The user pushes the handle 5 towards the base extension 4 thus binding the sheets and then releases the handle 5 whereupon the biasing means opens the jaws 17,31 enabling the bound sheets to be removed. It will be apparent that the maximum length of perforated sheets which may be bound is equivalent to the overall length of the apparatus or the distance between the end caps 9a,9b. Perforated sheets shorter than this length may be bound in the apparatus using a wire binding element of appropriate length, by aligning both one end of the wire binding element of the type described and one end of the perforated sheets against one of the end caps 9a or 9b within the binding recess 13.

Referring now to Figure 3, an alternative embodiment is shown wherein the paper guide 11 is replaced by a retainer 41, which acts both to guide paper into the binding recess 13 and to retain a wire binding element 55 within the binding recess 13 during the binding operation (see Figures 4a and 4b).

The retainer 41 is formed of a longitudinal extrusion and has a lug 43 adapted to mount pivotally in a recess 49 formed in the clamping member 7. The clamping member 7 is also formed with a recess 51 in which a retainer spring 53 is mounted (see Figure 4a).

The base member 3 is formed with three end cap retainer recesses 57, into the ends of which, appropriate connecting means 61 (see Figure 4a) may be fitted. The end cap 9b is shown (Figure 3) provided with three connecting extensions 59 which are adapted to provide a snap connection with the connecting means 61 so as to attach the end caps 9a, 9b to the base member 3.

The binding operation illustrated in Figures 4a and 4b is similar to that described above. Initially, a wire binding element 55 is placed within the recess 13 and held in position by the retainer 41 which is biased toward the position shown in Figure 4a by the action of the retainer spring 53. A pad of perforated sheets (not shown) is then inserted into the binding recess and is guided by the edge 63 of the retainer 41. As the handle 5 is pushed towards the base extension 4 and the perforated sheets are bound, the edge 63 of retainer 41 bears against the sheets and retainer 41 pivots about lug 43 so as to hold both the closed binding element 55a and the bound sheets within the binding recess 13.

When pressure is removed from the handle 5, handle 5, clamping member 7 and retainer 41 move

to the position shown in Figure 4a under the action of bias means 33 and retainer spring 53. The bound sheets may then be removed from the binding recess 13, closed binding element 55a either clearing edge 63 of retainer 41, or partially engaging it requiring slight pressure to be applied so as to partially raise retainer 41 against the action of retainer spring 53.

ings.

Claims

1. Apparatus for closing a wire binding element of the type described to bind a pad of perforated sheets to book form, comprising two jaws, one on a base member and a corresponding one on a 'clamping member' adapted to pivot with respect to the base so that the jaw thereon moves through an arcuate path towards the jaw on the base so as to close an open wire binding element positioned between the jaws, the closed ends of the prongs of the binding element passing through the perforations of a pad positioned between the jaws, thereby binding the pad to book form. 10 15 20
2. Apparatus as claimed in Claim 1 wherein the base jaw is a segment of a cylinder. 25
3. Apparatus as claimed in Claim 1 or 2 wherein the surface of the jaw on the clamping member is planar. 30
4. Apparatus as claimed in any preceding Claim wherein the base member and clamping members are both formed from longitudinal extrusions. 35
5. Apparatus as claimed in any preceding Claim wherein the members are biased toward an open position of the jaws. 40
6. Apparatus as claimed in any preceding Claim wherein end caps are provided to close off each end of the apparatus. 45
7. Apparatus as claimed in any preceding Claim wherein the clamping member and/or the base member is provided with a paper guide adjacent the jaw surface. 50
8. Apparatus as claimed in any preceding Claim wherein the base is provided with feet to prevent the apparatus from slipping on a surface when the apparatus is in use. 55
9. Apparatus for closing a tubular form wire binding element substantially as hereinbefore described and with reference to the accompanying draw-

Fig.1.

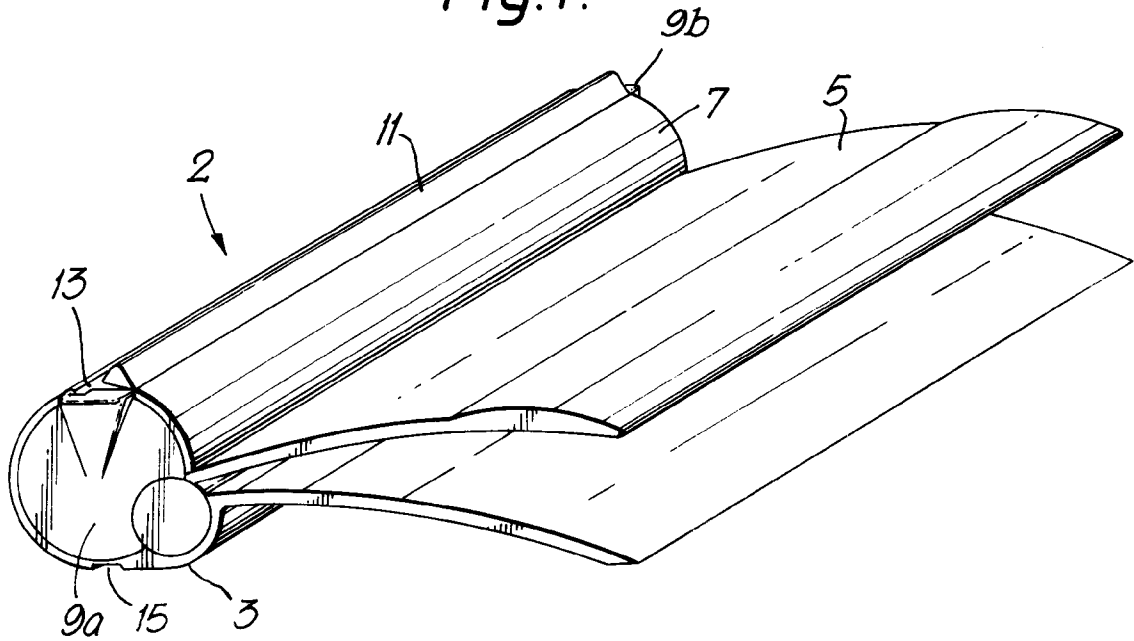


Fig.2.

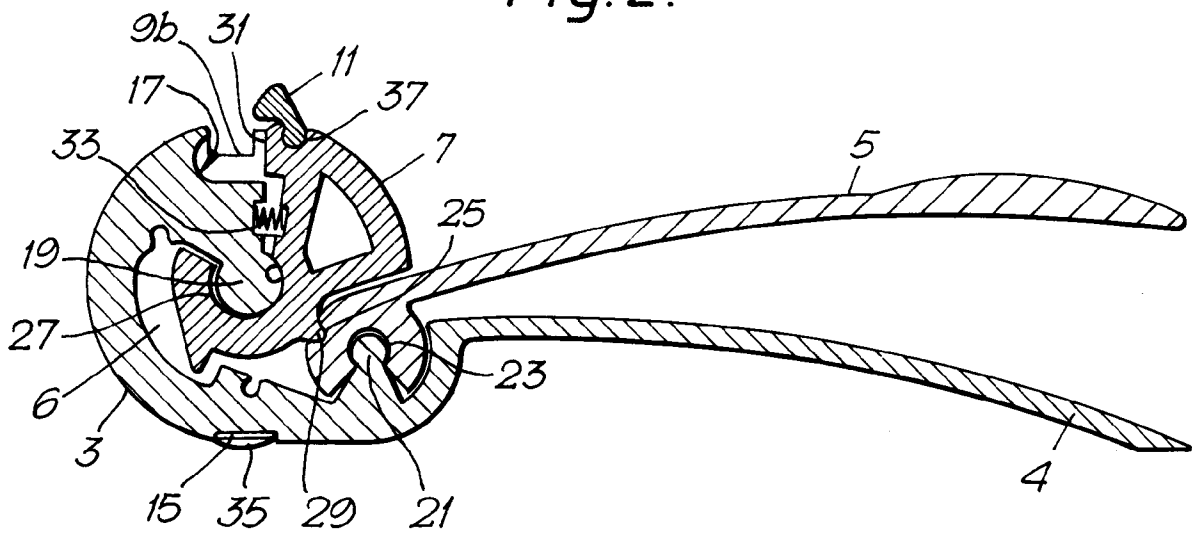


Fig. 3.

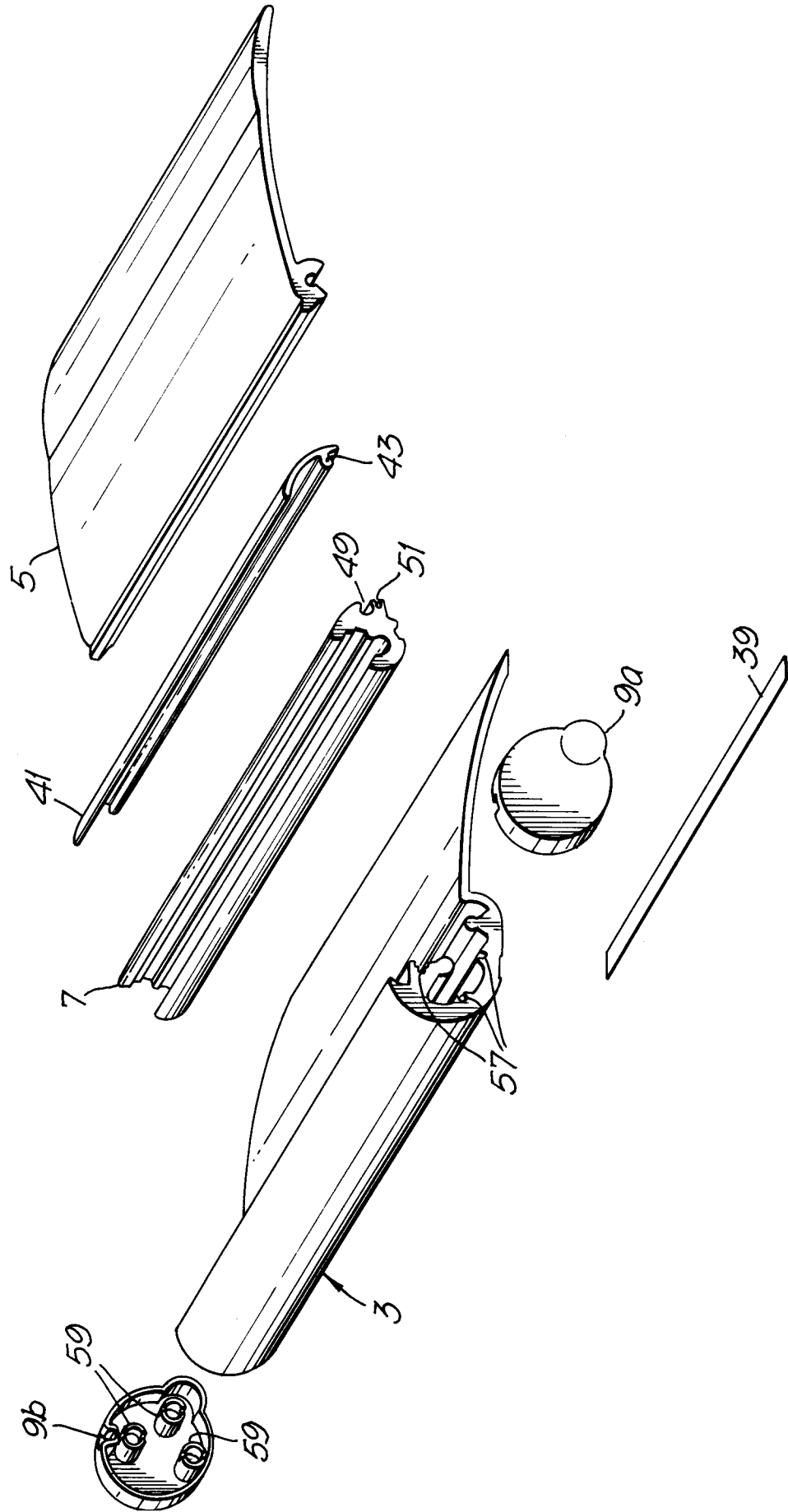


Fig. 4a.

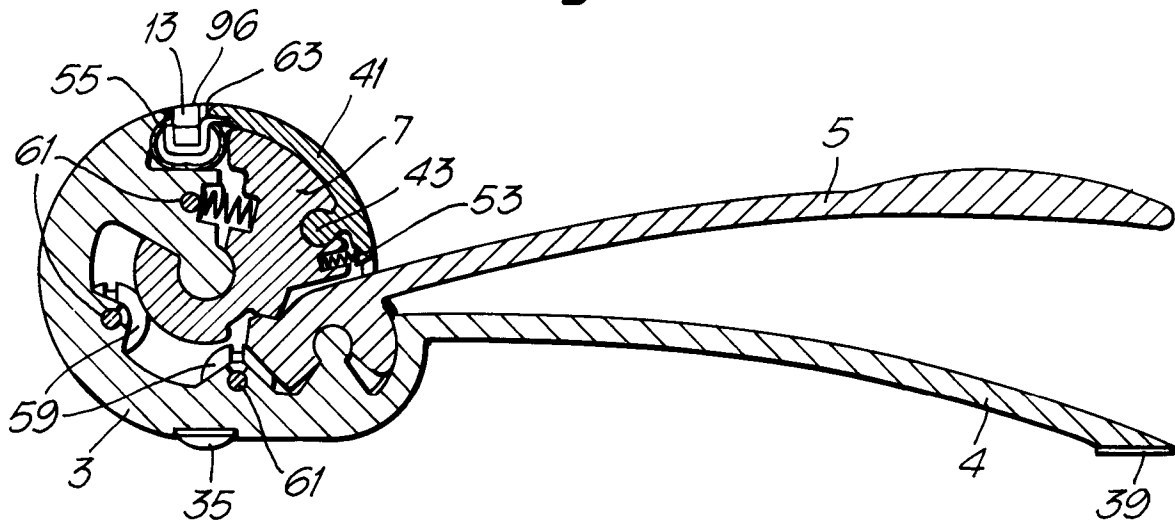
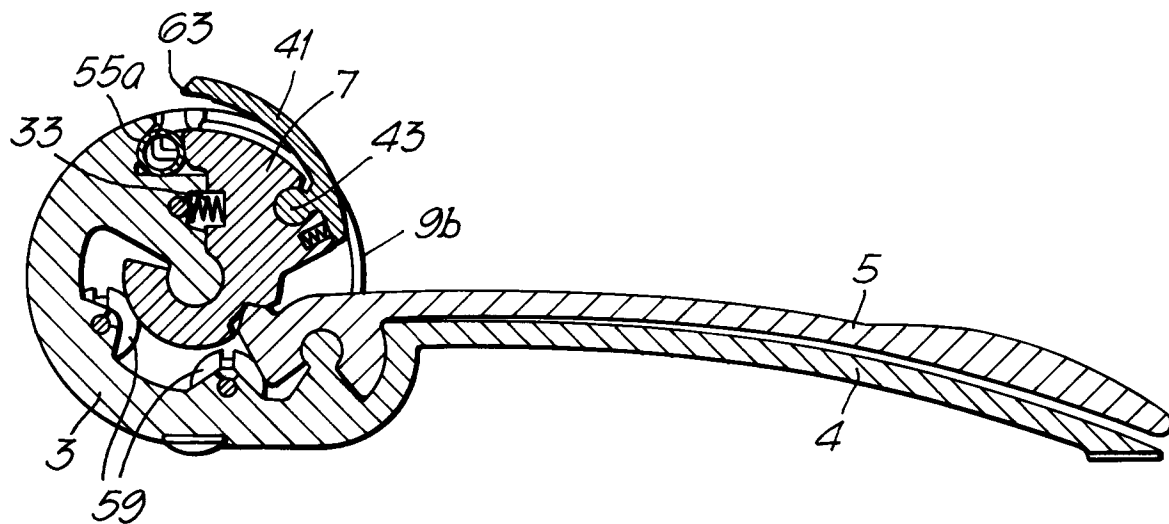


Fig. 4b.





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EUROPEAN SEARCH REPORT

Application Number

EP 92 30 7467

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|--|---|--|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| A | US-A-2 945 246 (DUNCAN; JONES) --- | | B42B5/10 |
| A | US-A-3 761 983 (STAATS) --- | | |
| A | US-A-3 699 596 (LYON) ----- | | |
| | | | TECHNICAL FIELDS SEARCHED (Int. Cl.5) |
| | | | B42B |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 24 NOVEMBER 1992 | Examiner MADSEN P. |
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