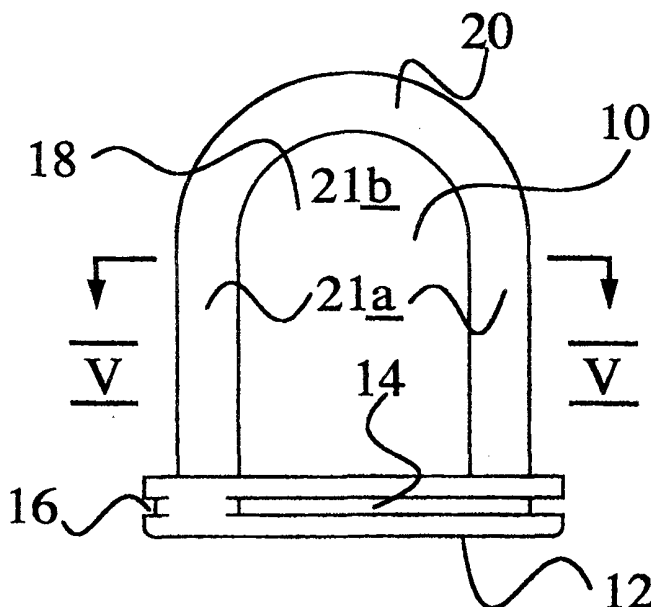




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(21) International Application Number: PCT/GB99/02476 (22) International Filing Date: 29 July 1999 (29.07.99) (30) Priority Data: 9817162.2 6 August 1998 (06.08.98) GB (71) Applicant (for all designated States except US): FOLDERS GALORE LIMITED [GB/GB]; The Windsor Centre, Windsor Grove, Crystal Palace, London SE27 9LT (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): PAINE, Leslie [GB/GB]; 12 Mandela Street, London SW9 6EL (GB). WEBB, Hugh [GB/GB]; The Windsor Centre, Windsor Grove, Crystal Palace, London SE27 9LT (GB). (74) Agents: CROUCH, David, John et al.; Bromhead & Co., 19 Buckingham Street, London WC2N 6EF (GB).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: FILING DEVICE (57) Abstract Leaf retaining means (10) for loosely retaining a multiplicity of leaves of material, such as sheets of paper. The leaf retaining means (10) comprise a base portion (12), which is provided with at least one formation (14) to enable it to be secured to a folder cover (32), and loop means (20), the latter has at least two points on its surface which two points are closest to an imaginary plane which does not pass through that position and which is perpendicular to the loop means (20), and which two points are spaced apart. The loop means (20) are such as to enable a leaf (60) of material, such as a sheet of paper, with a generally T-shaped aperture in it that is open at an edge of the leaf, to be releasably held by the loop means (20) by pushing the aperture (44) onto the loop means (20).		



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FILING DEVICE

The present invention relates to leaf retaining means, for use for example in a loose-leaf folder.

One well-known construction for this kind of product
5 comprises a plurality of openable rings secured to the spine or rear flap of a folder. The rings may be snapped open and leaves of paper having appropriate holes punched therein can be attached to the rings which can then be snapped shut to retain those leaves in the folder.

10 A problem encountered with such a construction is the cost of manufacture of the openable and closable rings. The mechanisms concerned occupy a relatively large volume and the folders cannot be packed flat. The mechanisms are made of a different material from the folders thus
15 creating a recycling problem. Furthermore, the ring mechanism requires riveting, either through itself or through a holding plate.

In another previously proposed construction, a multiplicity of discs are provided, each with a flange all
20 the way round its periphery. Leaves which are to be bound together and which may comprise a multiplicity of sheets of paper with hard sheets acting as covers and between which the sheets of paper are sandwiched, have a multiplicity of T-shaped apertures cut through the leaves
25 along the intended spine of the folder. Each T-shaped aperture has the upright of the 'T' perpendicular to the intended spine and opens at that edge of each sheet. This enables one such disc to be inserted into each such

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aperture so that its flange engages the part of the aperture in each sheet corresponding to the horizontal part of the 'T'. Each of the discs engages all the sheets in this way, so that the discs are spaced apart along the spine.

The problem with this construction is that the leaves are still free to slide relative to one another such that the binding becomes strained and even fails.

The present invention seeks to provide a remedy.

Accordingly, a first aspect of the present invention is directed to leaf retaining means for loosely retaining a multiplicity of leaves of material, such as sheets of paper, the leaf retaining means comprising a base portion, which is provided with at least one formation to enable it to be secured directly or indirectly to a folder cover, and loop means, in which the loop means, in section at a given position around the loop means, has at least two points on its surface which two points are closest to an imaginary plane which does not pass through that position and which is perpendicular to the loop means and the base portion and which two points are spaced apart, the loop means being such as to enable a leaf of material, such as a sheet of paper, with a generally T-shaped aperture in it that is open at an edge of the leaf, to be releasably held by the loop means by pushing the aperture onto the loop means.

Whilst the loop means could conceivably comprise two adjacent parallel loops of wire, it is preferable that the

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loop means comprises a flange around a tongue of the leaf retaining means that extends from the base portion thereof.

The said imaginary plane may be the median bisector
5 of the loop. The said two points may be spaced apart laterally of the general plane in which the loop lies.

Preferably, the flange extends on both sides of the tongue.

Preferably, the said formations comprise at least one
10 groove adapted to be engaged by a corresponding internal edge of a folder.

In one advantageous form of the invention, the loop means are narrower at a top of the loop means to facilitate the addition or removal of leaves to the
15 folder.

The first aspect of the present invention extends to a combination of at least two such retaining means and a folder being provided with at least two apertures at or adjacent to a spine of the folder at the respective ends
20 thereof, the shape of each hole in the folder corresponding to that of the base portion of each such retaining means, the latter having been slid into the apertures in the folders.

This aspect of the present invention also extends to
25 a folder having such retaining means and leaves of material, such as sheets of paper, formed with generally T-shaped apertures at the two ends of one side thereof for engaging the said retaining means, the T-shaped apertures

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opening at one of the edges of the leaf.

Each leaf may comprise a folded sheet with the T-shaped apertures being formed at the fold. As a result, if there are only two retaining means at a top and bottom
5 of this sheet, the latter may be opened whilst still being retained in the retaining means and in the opened state there is substantially no obscuring of the central regions of the opened leaf.

Preferably, the folder has two parallel slots
10 extending away from each aperture formed therein, so that the material of the folder between the slots yields to facilitate insertion of the base portion of the retaining means into the aperture of the folder and then the part of the material between the slots may be snapped against one
15 end of the base portion of the retaining means to firmly secure the latter in the folder. At least one groove in the base portion of the retaining means can be provided to receive an edge of this folder material between the slots.

The folder may be made of a metal or metal alloy. In
20 that case, at least some of the internal edges which define the apertures may be serrated to improve the securing of the retaining means in the folder.

According to a second aspect of the present invention, there is provided retaining means for retaining
25 a multiplicity of leaves of material, such as sheets of paper, in a folder comprising a retainer extending upwardly from a base portion of the retaining means, the base portion being provided with a groove to engage inner

edges of a folder.

According to a third aspect of the present invention, there is provided a folder cover, at least one leaf retainer extending from the inside of a cover, and at least one removable leaf of material, such as a sheet of paper, having a T-shaped aperture cut at an edge thereof so that what constitutes the upright of the 'T' is open at an edge of the leaf.

The present invention extends to a stamp device for stamping two such T-shaped apertures at the ends of an edge of a leaf of material, such as a sheet of paper.

Examples of retaining means made in accordance with the present invention will now be described with reference to the accompanying drawings, in which:

- 15 Figure 1 shows a side view of such retaining means;
 Figure 1a shows part of a side view of a modified
 form of the retaining means shown in
 Figure 1;
 Figure 2 shows an end view of such retaining means;
20 Figure 3 shows an underneath view of such retaining
 means;
 Figure 4 shows a view from above of such retaining
 means;
 Figure 5 shows a sectional view of retaining means
25 shown in Figure 1 taken along the line V-V
 thereof;
 Figure 6 shows a view from above of modified
 retaining means;

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Figure 7 shows a perspective view of a folder provided with apertures for receiving two retaining means such as the one shown in Figures 1 to 5;

5 Figures 7a to 7c show perspective views of part of the folder and retaining means shown in Figure 7, at successive stages during the insertion of the retaining means in the folder;

10 Figure 8 shows a perspective view of a folder shown in Figure 7 with such retaining means inserted therein;

Figure 9 shows a large leaf of material, such as a sheet of paper, folded and provided with
15 apertures such that, in the folded state, there appear to be two generally T-shaped apertures open to the folded edge close to the ends thereof;

Figure 10 shows a folder as shown in Figure 8 with a
20 leaf as shown in Figure 9 held therein;

Figures 11 and 12 show modified constructions of the retaining means shown in Figures 1 to 5;

Figure 14 shows further modification of the retaining means;

25 Figure 15 shows a plan view of a further folder in open condition with a device having apertures for receiving a plurality of retaining means each as shown in Figures 1

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to 5;

Figure 16 shows an end view of a tool for stamping
such T-shaped holes;

Figure 17 shows a plan view of a section of one part
5 of the tool shown in Figure 16;

Figure 18 shows a cross-section through a part of the
tool shown in Figure 16; and

Figure 19 shows a plan view of the tool shown in
Figure 16 with further parts thereof, not
10 normally visible, shown in ghosted form
therein.

The retaining means shown in Figures 1 to 5 comprises
a clip 10 having a base or foot 12 around a front edge of
which, and along the sides thereof extends a groove 14 and
15 in the rear of which is formed a second groove 16. A
tongue 18 projects upwardly from the foot 12, and around
the periphery of the tongue 18 is formed a flange 20. The
flange 20 has two generally straight portions 21a
extending from the foot 12 to respective ends of an
20 arcuate portion 21b of the flange that extends around the
tip of the tongue 18. The whole clip is made integrally
as a single injection moulded polypropylene component.

As can be seen more clearly from Figure 5, the flange
20 comprises a rounded outer surface 22, and two flats 24
25 and 26 on opposite sides of the tongue 18.

As is evident from Figure 1a, the groove 14 may be
stepped, to provide a groove 15 which is deeper but
narrower than the groove 14, to accommodate folders of a

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thickness selected from more than one thickness.

In the modification shown in Figure 6, the flange 22 is scalloped or otherwise thinned in the region 30 at the tip of the tongue.

5 A series of pairs of clips may be provided, each pair comprising two identical clips, and the feet of all the clips, both of the same pair and of different pairs, being identical in shape and size, but the straight portions 21a of different pairs being of respective different lengths,
10 to accommodate different numbers of leaves.

Figure 7 shows a folder 32 made of cardboard or polypropylene. It has two fold lines 34 and 36 between which extends the spine 38. The latter itself may be folded as shown in ghosted form to accommodate different
15 amounts of paper. Extending from each line 34 and 36 is a front and rear flap 40 and 42 respectively of the folder 32.

In the rear flap 42 adjacent to the spine 38 and at the upper and lower ends thereof, there are provided two
20 apertures 44. Each of these apertures 44 has an elongate rectangular portion 46 which is only slightly wider than the foot 12 of a clip 10, as shown in Figures 1 to 5, and a further elongate portion 48 extending from the rectangular portion 46, the portion 48 having a rounded
25 end and generally following the contour of the inside of the groove 14 of the clip, as shown in Figures 1 to 5. Two slots 50 at the upper and lower ends of the rectangular portion 46 of the aperture 44 extending

inwardly therefrom towards the spine 38.

Respective clips, each as shown in Figures 1 to 5, are then inserted into the apertures. The front end or nose of the base 12 of each clip 10 is inserted into the rectangular portion 46, as shown in Figures 7a and 7b, and the portion of the folder between the slots 50 can yield a little to facilitate this. With the edges of the folder 32 which define the portion 44 of the aperture 48 engaging the groove 14, the nose of the base portion 12 is pushed towards the rounded end of the portion 48 of the aperture 44, as shown in Figure 7b, until the portion of the folder between the slots 50 snaps back behind the base 12 to engage the groove 16 therein, as shown in Figure 7c. This secures the clip 10 firmly in the folder 32. The same procedure is followed for each of the clips 10 shown in Figure 8.

If the clip 10 has the form as shown in Figure 1a, the thickness of the material of the folder 32 would be thinner, and the aperture 44 would be slightly smaller, than as shown in Figures 7 to 7c.

A double sheet of paper such as that labelled 60 in Figure 9 has a fold 62 along the centre thereof. With the sheet 60 folded double, a generally key-hole shaped or T-shaped aperture 64 is punched therein with what constitutes the upright of the 'T' opening at the fold 62.

What constitutes the horizontal part of the 'T' is actually rounded on its upper edge so that when the sheet of paper 60 is unfolded, the aperture 64 straddles the

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fold 62 and overall appears to be a dumb-bell shape. This leaf 60 can be placed on to the folder 32 so that the clips 10 project through the apertures 64 as shown in Figure 10. It can be seen from this Figure that there is
5 nothing that obstructs the centre region of the leaf 60. This is particularly valuable if the latter provides a graphical image which is not to be marred by the retaining means. At the same time, the sheet 60 can be folded back double without removing it from the retaining means since
10 one end of the aperture 64 can follow the flange 20 as one side of the leaf 60 is folded over on to the other side.

The folder may be provided with a third flap 70 with further apertures 72 for receiving further clips, each as shown in Figures 1 to 5. End flaps 74 may be provided at
15 the upper and lower edges of the further flap 70, with further apertures 76 to receive the clips that are secured at the aperture 72.

In the modification of a clip shown in Figure 11, the flange 22 extends to one side only of the tongue 18, the
20 latter being shifted to one side of the foot 12 to facilitate this.

In the modification shown in Figure 12, there is no tongue 18, and the flange 22 is replaced by two loops 80 and 82. These may be made of wire instead of plastics.

25 In the modification shown in Figure 13, the loops 80 and 82 are replaced by one single loop 84 which has a width corresponding to the spacing of the loops 80 and 82.

In the modification shown in Figure 14, there is

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provided a diecut polypropylene strip mounting 90 with two rivet holes 92 as provided in many conventional loose-leaf ring binders, from which extends a tongue and flange portion 20, like the tongue and flange portion that extends from the base 12 of the clip shown in Figures 1 to 5, one such tongue and flange portion being provided at each end of the mounting 90.

The flange portions 20 may alternatively be provided as end parts 94 of the mounting 90, the latter being foldable upwardly and being held in their upwardly extending positions by a snap fit.

Alternatively, the flange portions may be parts of clips each as shown in Figures 1 to 5 with or without the modification as shown in Figure 6, and each received in apertures in the strip mounting 90 each like the apertures 44 shown in Figure 7.

In the modification shown in Figure 15, each feature which corresponds to that shown in the previous Figures has been given the same reference numeral as used in those previous Figures. A hollow metal strip 95 is riveted onto the inside of the rear flap 42, adjacent and parallel to the spine 38, by two rivets 96 which extend through respective holes in the centre of respective circular troughs 97 in respective ends of a raised longitudinal central part of the strip 95, between longitudinally extending steps 98 in the metal plate of the strip 95. Five holes 48 are formed in the strip 95 uniformly spaced along its length, and each having generally the same

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shape, dimensions, and orientation when viewed from above as each hole 48 shown in the previous Figures.

Figures 16 to 19 show a tool for punching holes such as those labelled 64 in Figure 9. It comprises a flat bed 100 upwardly from which extend two trunnions 102 through which extends a pivot axle 104. This axle 104 also extends through a lever 106.

T-shaped die-castings 108, each having a cross-section as shown in Figure 18 extend downwardly from the lever 106, with what constitutes the upright of the 'T' in each case extending towards the axle 104. A strip 110 is mounted on the bed 100, underneath the die-castings 108. The strip 110 is provided with apertures 112 each of which generally conforms to the cross-section of each die-casting 108 and each being located so as to receive such a die-casting.

In addition, the bed 100 is provided with recesses 114 of the same shape and corresponding in location to the apertures 112 in the strip 110.

The strip 110 is mounted on the bed 100 by way of an elongate support 116 which is provided along its side further from the axle 104 with respective recesses 118 which are in registration with the what constitutes the bottom end of the upright of the 'T'.

The edge of the support 116 which is further from the axle 104 acts as an abutment surface 120 for any sheets of paper which are inserted into the tool.

With such a sheet thus inserted, the lever 106 is

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depressed so that the T-shaped holes are cut into the edge of the paper by the die-castings 108.

The illustrated clip may be made of any suitable metal, metal alloy, rubber, or synthetic plastics material
5 or other castable material. The illustrated folder may also be made of any suitable metal, metal alloy, rubber, synthetic plastics material, or rigid or semi-rigid material, not necessarily the same material as the clip.

The assembly of the illustrated folder and clips does
10 not need rivets nor any special or skilled tasks to be performed.

The tongue 18 and flange 20 of the clip 10 shown in Figure 1 may be replaced by a ring made integrally with the base 12. The ring may be a complete closed "O" shape,
15 or a closed "D" shape with a straight portion perpendicular to the base 12 at the end thereof further from the groove 16.

Instead of or in addition to the double sheet of paper 60, there may be one or more single sheets, or a
20 stitched document such as a previously bound brochure. In each case, T-shaped apertures like those labelled 64 in the accompanying drawings may be formed in each sheet or document, or in tabs secured to each sheet or document.

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Claims:

1. Leaf retaining means (10) for loosely retaining a multiplicity of leaves of material, such as sheets of paper, the leaf retaining means comprising a base portion
5 (12), which is provided with at least one formation (14) to enable it to be secured directly or indirectly to a folder cover (32), and loop means (20), **characterised in that** the loop means (20), in section at a given position around the loop means (20), has at least two points on its
10 surface which two points are closest to an imaginary plane which does not pass through that position and which is perpendicular to the loop means (20) and the base portion (12) and which two points are spaced apart, the loop means (20) being such as to enable a leaf of material (60), such
15 as a sheet of paper, with a generally T-shaped aperture (64) in it that is open at an edge of the leaf, to be releasably held by the loop means (20) by pushing the aperture onto the loop means (20).
2. Leaf retaining means according to claim 1,
20 **characterised in that** the loop means (20) comprises a flange (20) around a tongue (18) of the leaf retaining means (10) that extends from the base portion (12) thereof.
3. Leaf retaining means according to claim 2,
25 **characterised in that** the flange (20) extends on both sides of the tongue (18).
4. Leaf retaining means according to claim 1 or claim 2, **characterised in that** the said imaginary plane is the

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median bisector of the loop.

5. Leaf retaining means according to any preceding claim, **characterised in that** the said two points are spaced apart laterally of the general plane in which the
5 loop lies.

6. Leaf retaining means according to any preceding claim, **characterised in that** the said at least one formation (14) comprises at least one groove (14) adapted to be engaged by a corresponding internal edge of a folder
10 (32).

7. Leaf retaining means according to any preceding claim, **characterised in that** the loop means (20) are narrower at a top of the loop means (20) to facilitate the addition or removal of leaves to the leaf retaining means
15 (10).

8. A binder comprising at least two leaf retaining means (10) as claimed in any preceding claim and a folder (32) being provided with at least two apertures (44) at or adjacent to a spine (38) of the folder at the respective
20 ends thereof, the shape of each hole in the folder corresponding to that of the base portion of each such retaining means, the latter having been slid into the apertures in the folder.

9. A binder according to claim 8, **characterised by**
25 leaves (60) of material, such as sheets of paper, formed with generally T-shaped apertures (64) at the two ends of one side thereof for engaging the said retaining means (10), the T-shaped apertures (64) opening at one of the

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edges of the leaf (60).

10. A binder according to claim 9, **characterised in that** each leaf (60) comprises a folded sheet with the T-shaped apertures (64) being formed at the fold (62).

5 11. A binder according to any one of claims 8 to 10, **characterised in that** the folder (32) has two parallel slots (50) extending away from each aperture (44) formed therein, so that the material of the folder (32) between the slots (50) yields to facilitate insertion of the base
10 portion (12) of the retaining means (10) into the aperture (44) in the folder (32) and then the material between the slots (50) is snapped against one end of the base portion (12) of the retaining means (10) to firmly secure the latter in the folder (32).

15 12. A binder according to claim 11, **characterised in that** at least one groove (16) is provided in the base portion (12) of the retaining means (10) to receive an edge of the folder material between the slots (50).

13. A binder according to any one of claims 8 to 12,
20 **characterised in that** the folder (32) comprises a sheet of polypropylene.

14. A binder according to any one of claims 8 to 12, **characterised in that** the folder (32) comprises a sheet of metal or metal alloy.

25 15. A binder according to any one of claims 8 to 14, **characterised in that** at least some of the internal edges which define the apertures (44) are serrated to improve

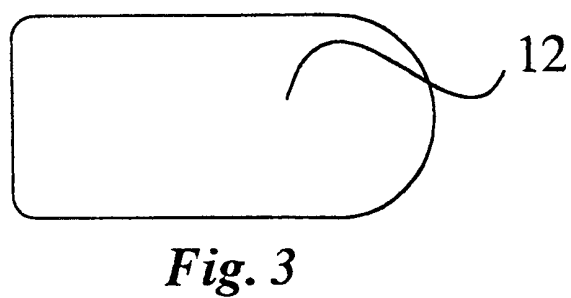
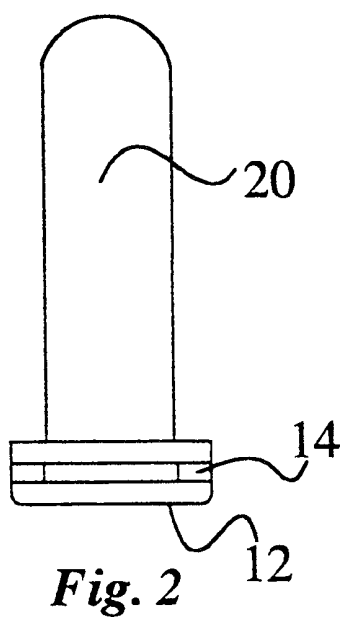
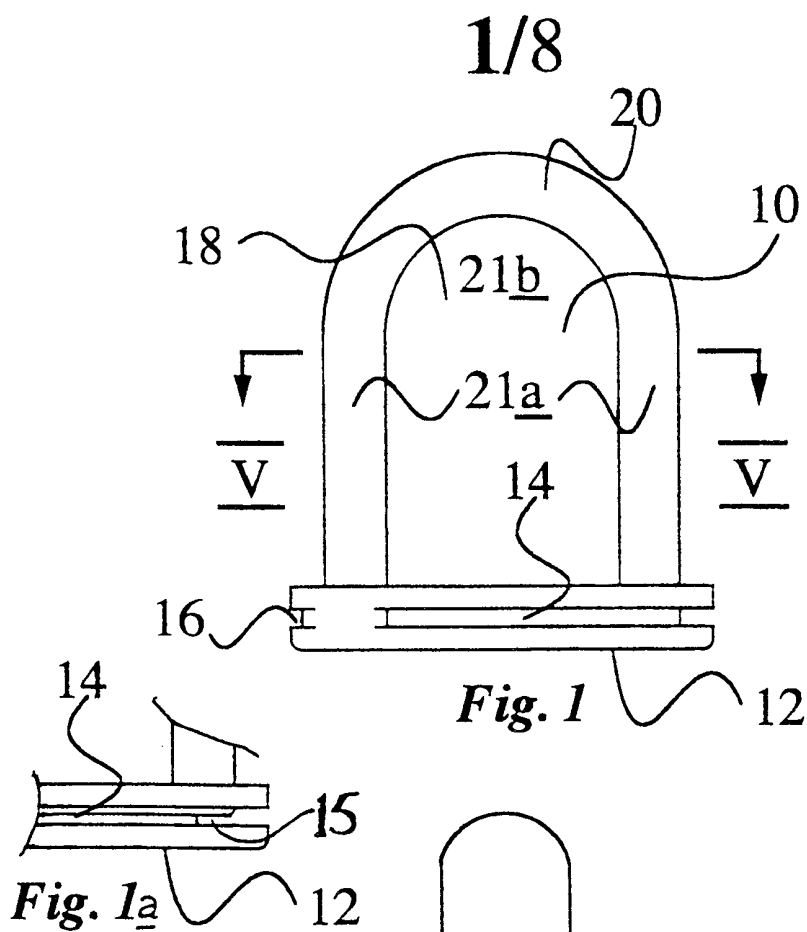
-17-

the securing of the retaining means (10) in the folder (32).

16. Leaf retaining means (10) for retaining a multiplicity of leaves of material, such as sheets of paper, in a folder (32) comprising a retainer (18, 20) extending upwardly from a base portion (12) of the retaining means (10), **characterised in that** the base portion (12) is provided with a groove (14) to engage inner edges of the folder (32).

10 17. A folder cover (32), at least one leaf retainer (10) extending from the inside of a cover (32), and at least one removable leaf (60) of material, such as a sheet of paper, **characterised in that** the leaf (60) of material has a T-shaped aperture (44) cut at an edge thereof so that
15 what constitutes the upright of the 'T' is open at an edge of the leaf (60).

18. A stamp device for stamping two T-shaped apertures at the ends of an edge of a leaf of material, such as a sheet of paper, in such a manner that what constitutes the
20 upright of the "T" is open at an edge of the leaf.



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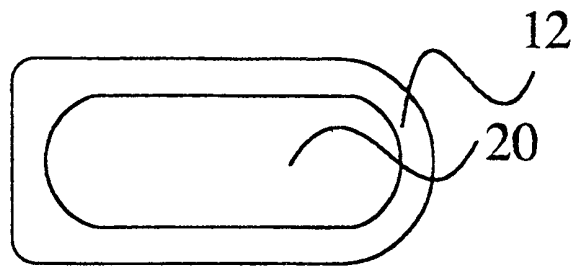


Fig. 4

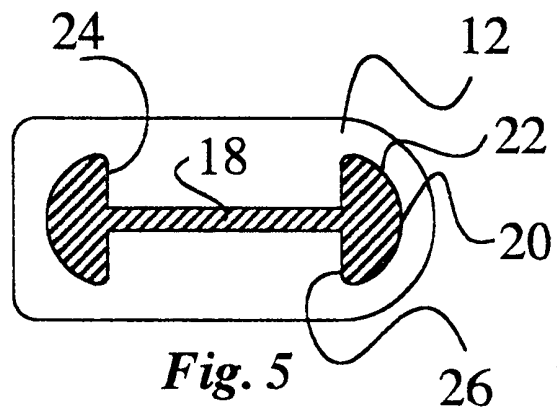


Fig. 5

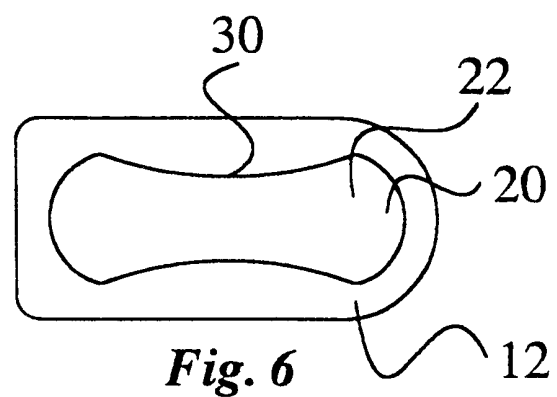


Fig. 6

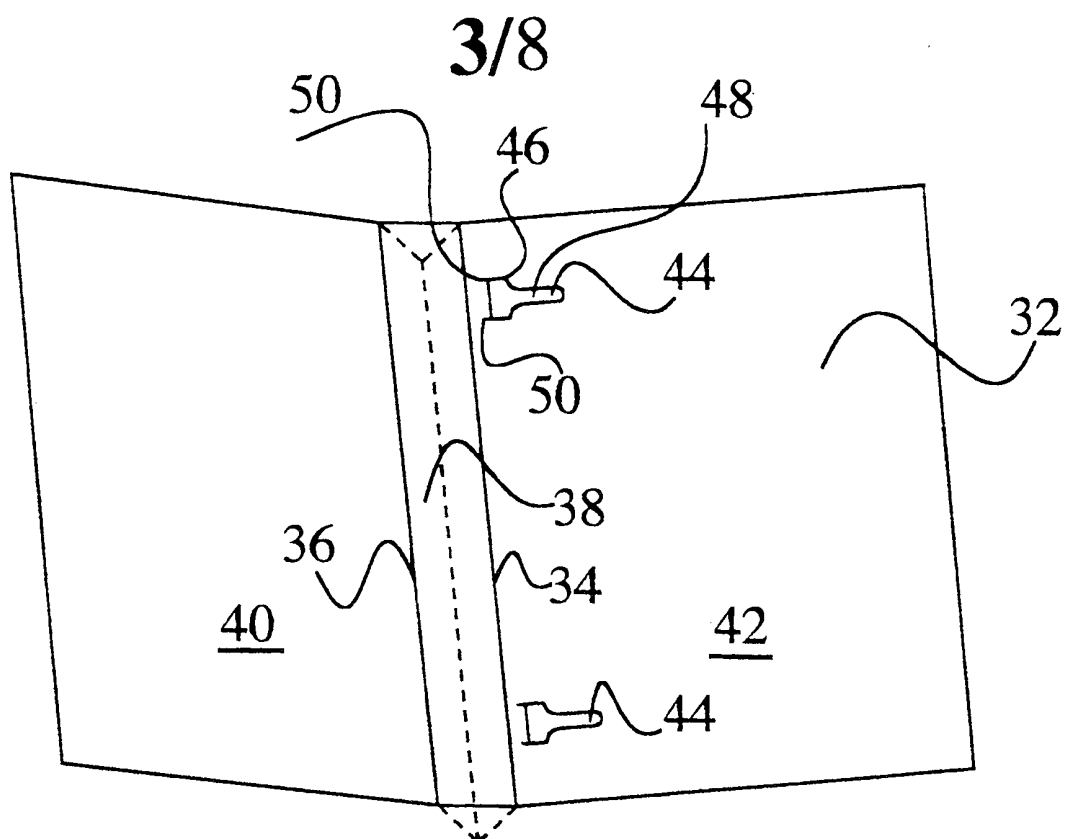


Fig. 7

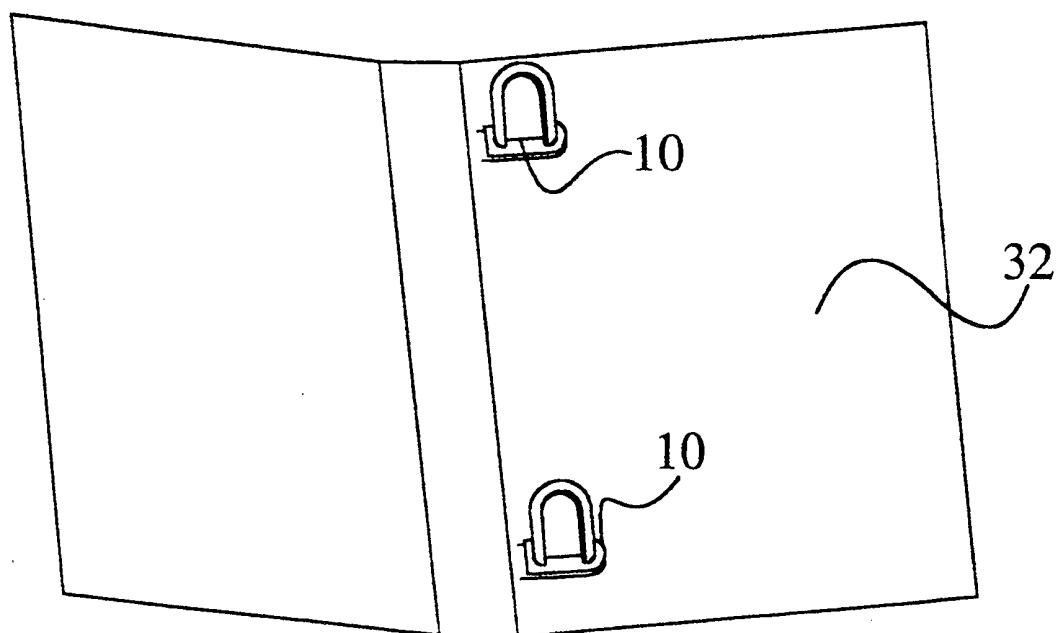


Fig. 8

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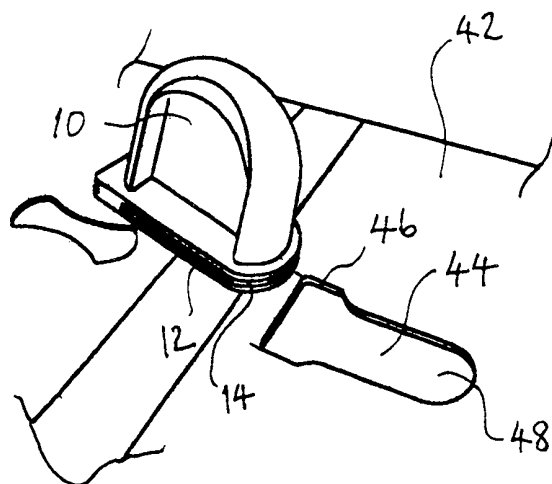


Fig. 7a

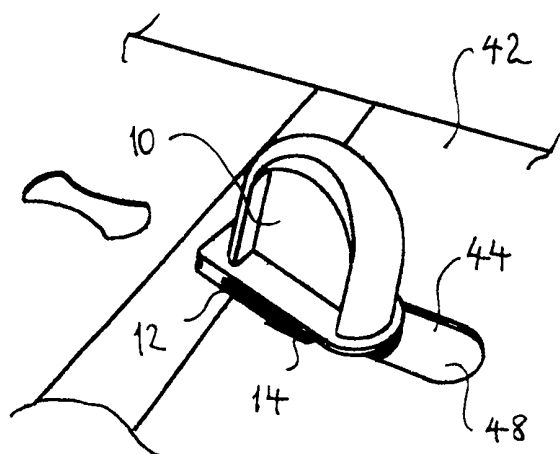


Fig. 7b

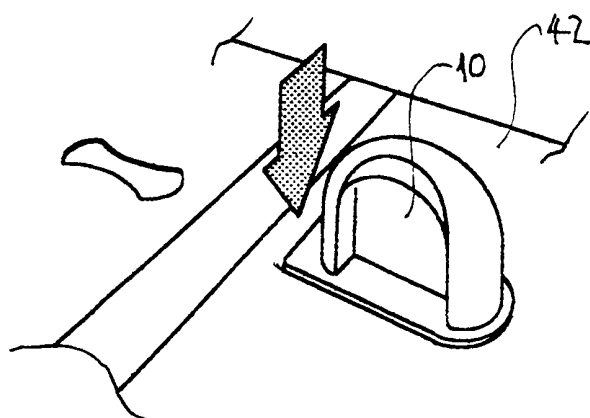
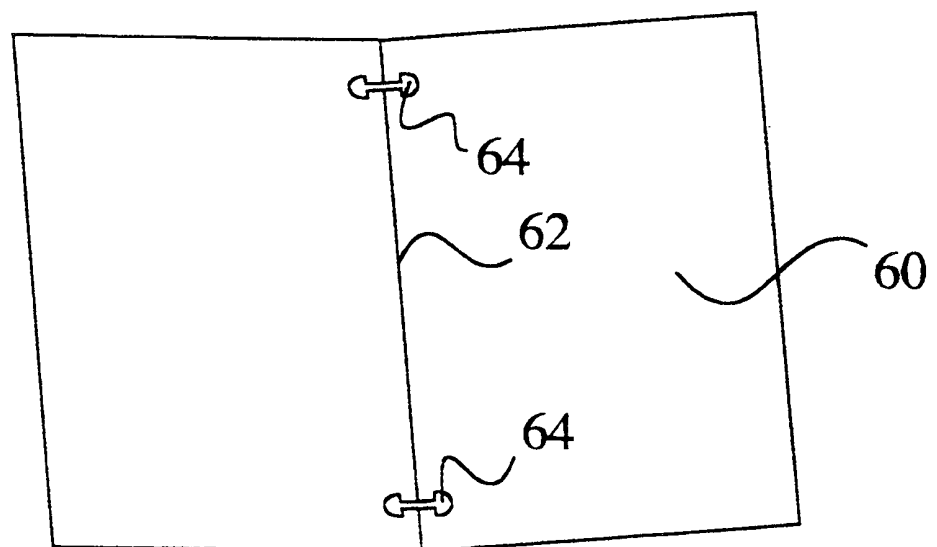
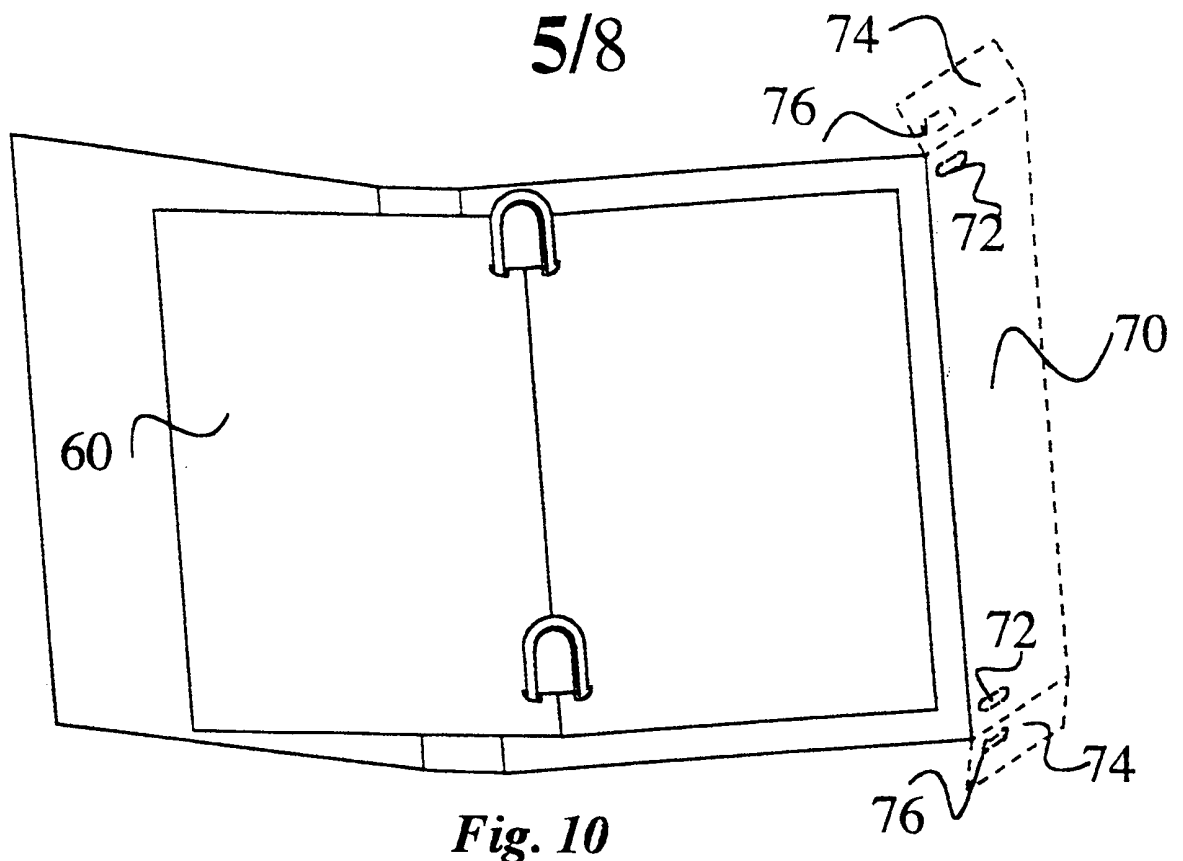


Fig. 7c



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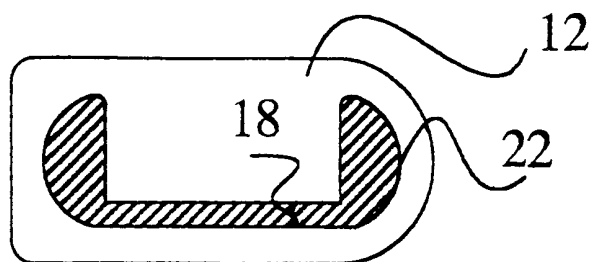


Fig. 11

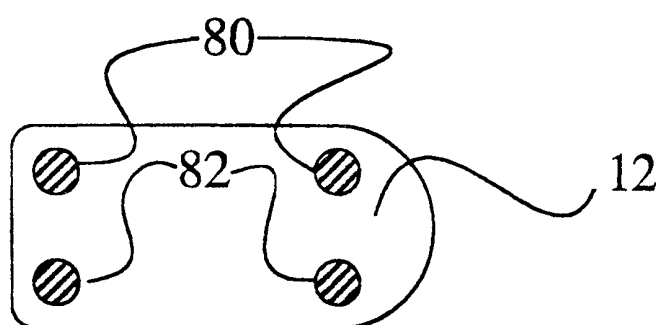


Fig. 12

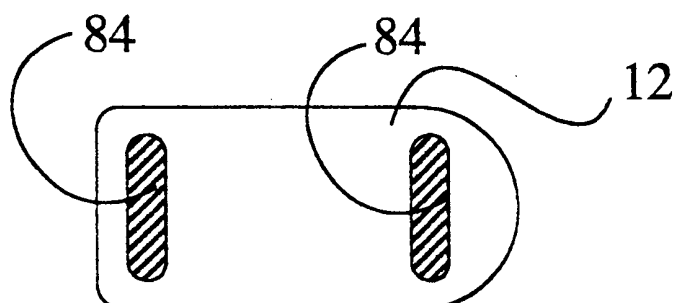


Fig. 13

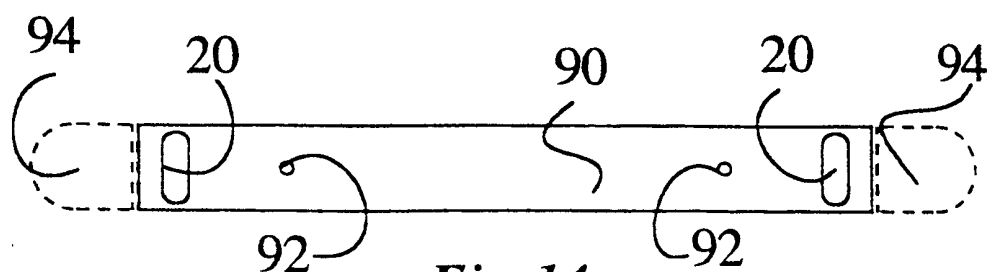


Fig. 14

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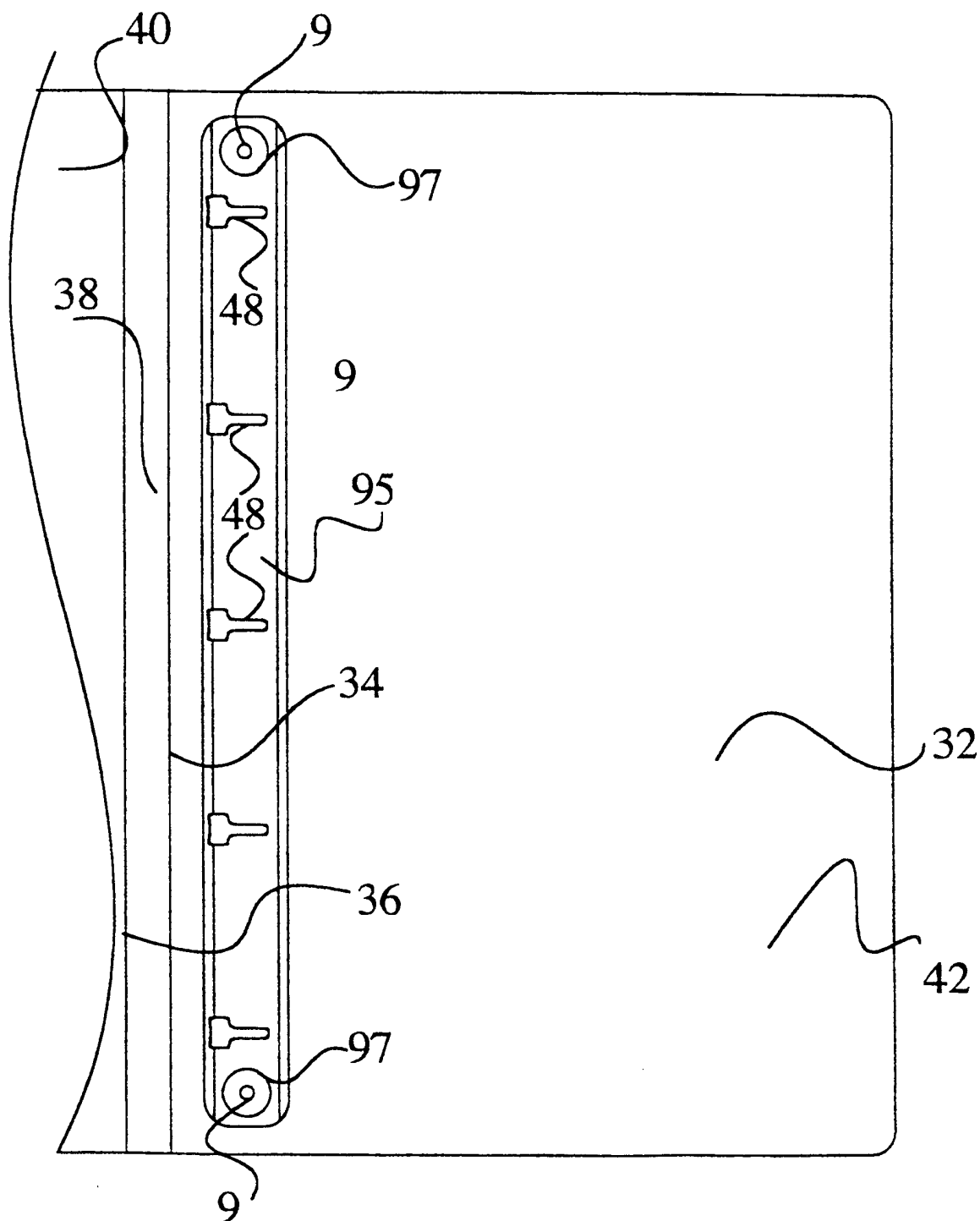


Fig.15

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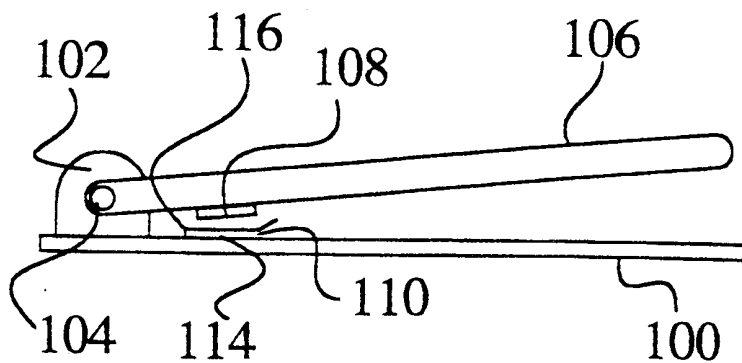


Fig. 16

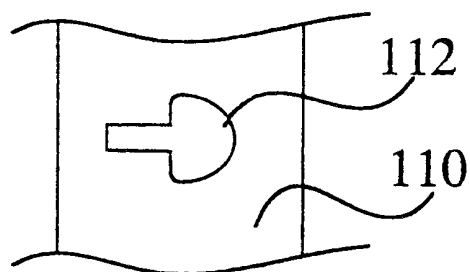


Fig. 17

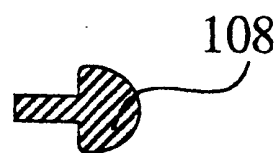


Fig. 18

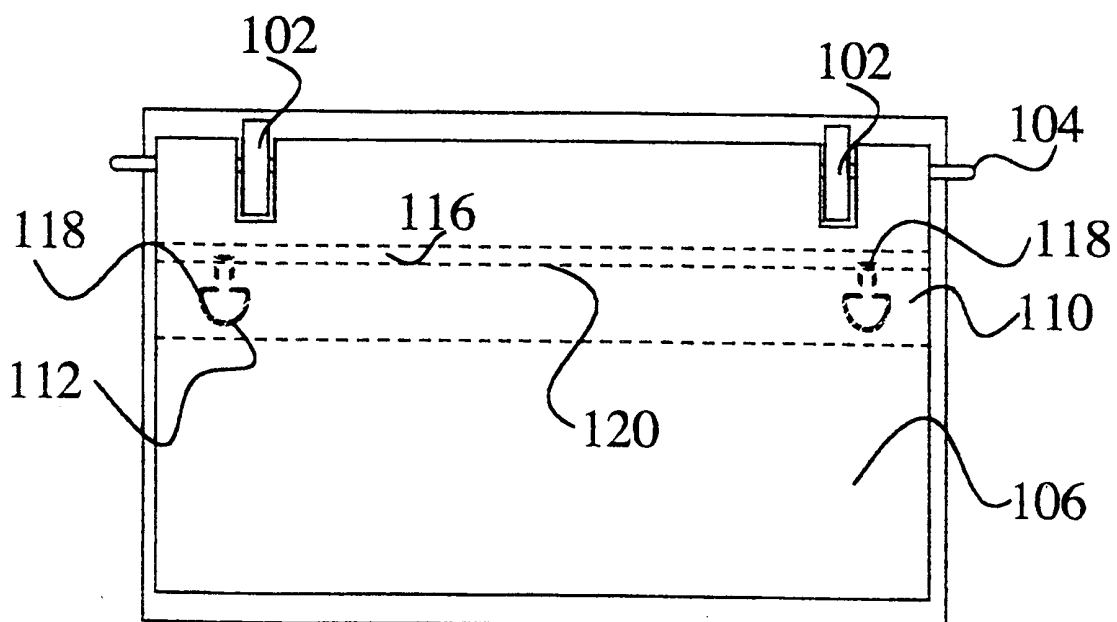


Fig. 19

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02476

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B42F13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B42F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 748 703 A (TECNO CART) 18 December 1996 (1996-12-18) column 2, line 39 -column 5, line 32; figures 1-13 ---	8
A	WO 91 11333 A (INNOVATIONS) 8 August 1991 (1991-08-08) page 4, line 11 -page 9, line 17; figures 1-12 ---	1,16-18
A	BE 903 643 A (ABEL CUEVAS) 3 March 1986 (1986-03-03) page 3, line 10 -page 5, line 13; figures 1-5 -----	2



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search

3 November 1999

Date of mailing of the international search report

10/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Evans, A

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02476

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 748703	A	18-12-1996	IT MI951275 A US 5683193 A	16-12-1996 04-11-1997
WO 9111333	A	08-08-1991	AU 7233291 A GB 2241676 A,B	21-08-1991 11-09-1991
BE 903643	A	03-03-1986	NONE	