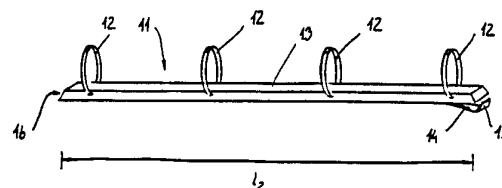
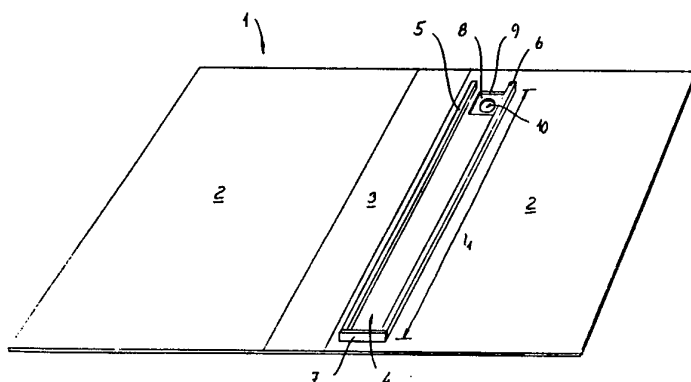


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/DK93/00191 <b>(22) International Filing Date:</b> 3 June 1993 (03.06.93)  <b>(30) Priority data:</b> 750/92                      4 June 1992 (04.06.92)                      DK  <b>(71) Applicant (for all designated States except US):</b> DUE PLAST A/S [DK/DK]; Bornholmsvej 2, DK-9670 Løgstør (DK).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only) :</b> DUE, Jørn [DK/DK]; Rugmarken 63, DK-9670 Løgstør (DK).  <b>(74) Agent:</b> LEHMANN & REE A/S; Grundtvigsvej 37, DK-1864 Frederiksberg C (DK).		<b>(81) Designated States:</b> AU, JP, PL, RU, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Danish).</i>

**(54) Title:** FLEXIBLE RING BINDER**(57) Abstract**

Ring binder comprising a cover (1) with pages (2) of the binder and a ring member (11). The ring member (11) and the cover (1) constitute two separate parts, which are joined by the profiles (5, 6, 7) in the cover cooperating with a track (13), which constitutes a part of the ring member. The cover or the ring member are provided with resilient locking means (14), which ensure that the two separate parts do not disengage when they first are joined. By releasing the resilient locking means it is possible to separate the two parts. The advantage with such a ring binder is that the ring member and the cover may be used together and separately. Accordingly, the period of use for the two parts is increased in that said parts may be re-used independently at the same time as the two parts may be recirculated when they are worn out, and accordingly, the consumption of resources is reduced.

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## FLEXIBLE RING BINDER

BACKGROUND OF THE INVENTION.

The present invention relates to a ring binder comprising a ring member and a cover, and consisting of pages of the binder and a spine, and comprising a member of engagement in the form of profiles, which constitute an integral part of the cover, preferably by being made of plastic, and casted simultaneously with the cover or by being hot welded, or in another way fastened to the cover, which preferably is made of plastic, and in which the ring member constitutes a separate part of the ring binder and is provided with a member of engagement in the form of a band, which is made to be in a releasable engagement with the profiles.

SE Publication No. 345,826 describes such a ring binder, in which the ring member is mounted on a plate, of which ends are inserted into pockets at each end of the spine of the ring binder. The ring member is secured in directions parallel to the plane of the cover by means of pins, which are secured to the plate of the ring binder, and which engage with corresponding pin holes in the cover. The cover is traditionally made by wrapping cardboard with plastic foil. The disadvantage with the ring binder described in said publication is that the pockets, in which the ends of the plate are inserted, are made of plastic foils, and that they are welded together to the plastic foil of the cover along a thin welded seam. Both the plastic foil constituting the pockets and the welded seam have very limited strength as regards loads of a ring member, which is filled with letters etc. Furthermore, the traditional production of the cover with cardboard and plastic causes the difficulty in recirculating the part of the ring binder, which constitutes the cover.

DK Patent Application No. 4215/69 describes a ring binder having a ring member, which is provided with a band having a T-profile. The ring member is secured to the cover by the band being guided down into a corresponding plastic profile, which is welded to the spine of the cover, and which has a groove corresponding to the T-profile of the band. The disadvantage with said ring binder is that the profile, which is welded to the spine of the cover, is not provided with stops. The band having the T-profile, which the ring member is provided with, will therefore be able to slide out of the profile when said profile

is held in a vertical position, which will be the normal position when e.g. the ring binder is kept and taken out of a bookcase. If the ring binder has to be recirculated, it is moreover required that the cover and the profile are to be made of identical plastic materials.

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The ring binders described in the above-mentioned patents, do not mention whether they may be used for the type of ring binders which are characterized as letter files, in which the content of paper, letters, etc. may be larger than the content for usual ring binders. Therefore, 10 the ring member in a letter file is constructed substantially different from the ring members, which are mentioned and described in the above-mentioned patents.

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When mentioning the present invention the reference ring binder is used. This will, however, also include the type of ring binders characterized as letter files, as the invention may be used both for normal ring binders and letter files unlike the prior art, which is referred to above.

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It is the object of the present invention to remedy the above-mentioned drawbacks, and thereby showing a ring binder, which through choices of materials and by its construction partly may secure the ring member in the cover in a safe way, irrespective of the position of the ring binder or the amount of letters or the like in the ring binder, and which at the same time makes it possible to carry out a simple joining, and subsequently a separation of cover and ring member thereby making it possible to re-use or recirculate both the cover and the ring member, and to increase the period of use of the ring binder.

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This object is obtained with a ring binder, characterized in that an optional member of engagement of the ring binder comprises a resilient member having a retention edge, which in a releasing way may abut a stop, which is provided on the other member of engagement, preferably in the form of an edge area on the bands of the ring binder or in the form of a stop formed in the cover.

Thus, the ring binder according to the invention is formed with profiles which constitute a part of the cover, and which make it possible for a ring member of an arbitrary material, though preferably metal or

plastic, to be secured to the cover in a releasing way. According to the invention said securing takes place in a safe way. As the profiles in the cover support the band, and as a further device is provided, which is formed as a resilient member with a retention edge, the ring member will be secured in all directions. This means that it is of minor importance in which orientation the ring binder is kept or used. The content of letters and the like placed into the ring member, will not fall out as the ring member is secured to the cover through the engagement of the retention edge with an edge area or a stop.

Because of the spring ability, the device formed as a resilient member, will releasably secure the ring member in the direction(s), in which the profiles do not secure the ring member. The device is typically formed as a resilient "click"-device. This means that when the separate ring member is placed into the cover, the device will engage with the corresponding devices in the ring member or in the cover, and thereby secure the ring member. Though this engagement will be releasable by counteracting the resilient force of the device, and at the same time displace the ring member in the direction(s), in which the device previously secured the ring member.

By choice of materials and by ensuring an easy joining, and subsequently separation of the cover and ring member, there is a possibility that both the cover and the ring member may be re-used or recirculated. It is possible to re-use the cover when the ring member is filled with letters or the like. Usually, the ring binder with content is placed in archives for secondary use. With the ring binder according to the invention the ring member is removed from the cover, and the ring member with content may subsequently be filed in a thereto organized file system. Thus, a new ring member may be inserted into the cover and used once again as a ring binder. When the content in the filed ring member later on is thrown away, the ring member may be re-used. As long as the cover and the ring member are not defective, these parts may form part of said re-use procedure. When the parts become defective, they may subsequently be recirculated.

Preferably the cover will be made of plastic only without the use of cardboard or the like to make the cover more stiff. The stiffness of the cover is ensured through the choice of plastic type and by the

constructive forming of the cover in the form of reinforcing ribs, embedding of fibres, or in another way. By solely making the cover of plastic it is possible to recirculate the cover, i.e. remelt the cover in such a way that the plastic may be re-used. Furthermore, it will  
5 also be possible to make the ring member from materials, which may be re-used.

The above-mentioned features of the present invention provide a ring binder, which makes it possible to use a ring member and cover separately and together, respectively, and accordingly, reducing the environmental damages in that the two single parts may be used several  
10 times. When the parts are worn out they can be recirculated in such a way that the consumption of resource is reduced.

Furthermore, the division of the ring binder into two separate parts will make it possible to pack these parts separately during freight and distribution. This will reduce the space requirements substantially, and thereby reduce the freight and distribution expenses compared to the ready-to-use ring binder, in which the "excess space" is very  
15 large compared to the space, which actually is taken up by material.  
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#### BRIEF DESCRIPTION OF THE DRAWING

The invention will now be further explained with reference to the accompanying drawing, wherein

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Figs. 1A and 1B show a cover and a ring member, respectively, of a ring binder according to the invention,

Fig. 1C shows a partial section through the cover,

Fig. 1D shows a section through the ring member transverse to its  
30 longitudinal axis,

Figs. 2A and 2B show an embodiment of a cover and a ring member, respectively, for a letter file according to the invention,

Figs. 3A and 3B show an alternative embodiment of a cover and a ring member, respectively, for a letter file according to the  
35 invention, and

Figs. 4A, 4B, and 4C show a further embodiment of a cover and a ring member, respectively, for a ring binder according to the invention.

Figure 1A illustrates the inside of a cover 1 consisting of two pages 2 of the binder and a spine 3. The cover 1 is solely made of plastic, it will, however, also be possible to make the cover of other materials. On one of the pages 2 of the binder a groove 4 is formed by means of two profiles 5 and 6, which are placed in the vicinity of the spine 3, and which extend substantially along the cover 1 in the direction parallel to the longitudinal direction of the spine. A third profile 7 is placed at the one end of the two other profiles 5,6, and is placed at a substantial right angle proportional to said profiles. At the other end at which the third profile 7 is placed, a recess 8 having a stop 9 is formed in the cover 1. However, said stop 9 may possibly be provided in the form of a bead. At the bottom of the recess 8 a through hole 10 is provided, which extends to the outside of the cover 1.

The profiles 5,6,7 are either made as an integrated, moulded part of the cover 1 or are made separately, and subsequently hot welded or in another way fastened to the cover. Preferably the profiles 5,6 have a simple triangular or rectangular cross section (see Figure 1C), and are placed in such a way that the groove 4 is formed, which is wider at the bottom than at the top. Consequently, it is possible to secure a band member, which is thinner than the width  $b_1$  of the groove 4 at the bottom, but though wider than the width  $b_2$  of the groove at the top, and which is displaced into the groove. As an alternative to the profiles 5,6 with the rectangular cross section as shown in Figure 1C, the profiles may have other forms such as an inverted L(I). It is only required that the width of the groove is larger at the bottom than at the top. The form of and the placing of the cross section of the third profile 7, and the placing of said profile may be chosen more arbitrarily, as it is not a requirement that the third profile has to secure an inserted band member, but it has only to ensure that the member is not displaced out of the groove 4. The placing of the third profile 7 delimits the length  $l_1$  of the groove 4.

Figure 1B illustrates a ring member 11 which is intended for cooperating with the profiles 5,6,7 in the cover illustrated in Figure 1A. The ring member 11 consists of a number of rings 12 which are placed onto a band 13. The rings 12 are of the two-piece type which are separated in the middle, and where known spring members are inserted into

the band to keep the rings closed, but which allow opening of these rings for insertion of paper, etc.

5 The band 13 has a length  $l_2$  and is constructed in such a way that the band 13 may cooperate with the groove 4 which is described in Figure 1A. As mentioned previously, this means that the part of the band 13 engaging the groove 4 has a width  $b_3$  which is less than the width  $b_1$  of the groove at the bottom, but which though is greater than the width  $b_2$  of the groove at the top (see Figure 1C). The cross section  
10 of the band 13 is substantially equal to the cross section of the groove 4, possibly a little larger in order to provide a tight fit between the band and the groove so that play between these parts is avoided.

15 On the underside of the band 13 a spring strap 14 is placed at the one end, said spring strap extends down below the bottom plane of the band. The spring strap 14 has a linear form extending obliquely downwards proportional to the band 13, and is provided with a bending 15 for forming a retention edge as shown in the Figure. Said spring strap  
20 14 is intended for engaging the stop 9 in the recess 8, which is formed in the cover 1 (see Figure 1A). When the ring member 11 is placed in the cover 1, the band 13 is displaced into the groove 4. The band 13 is led into the groove with a first end 16 in front, said end being the opposite of the end, where the spring strap 14 is placed. When the  
25 first end 16 of the band 13 abuts the third profile 7, which is placed across the two other profiles 5,6 which form the groove, the band has reached bottom, and simultaneously the spring strap 14 slides down into the recess 8. The bending 15 of the spring strap 14 abuts the stop 9 of the recess 8 and prevents the ring member 11 from being dis-  
30 placed back out of the groove 4. When the ring member 11 has to be removed from the cover 1, the abutment of the spring strap 14 against the stop 9 of the recess 8 is released in that the spring strap is influenced by an opposite directed force through the hole 10 extending to the outer side of the cover 1 (see Figure 1A), simultaneously with  
35 the ring member 11 being displaced out of the groove 4.

Figures 2A and 2B illustrate a cover 20 and a ring member 21, respectively having rings 22 and a band 23, which parts constitute a ring binder of the type which is characterized as a letter file. The diffe-



rence between this type of a ring binder and a ring binder of the type described in Figures 1A and 1B is that the separation of the rings 22, when letters, etc., have to be placed into or taken out of the ring member 21, takes place by means of a mechanism (not shown), which is known, and which comprises a power transmitting arm which releases a spring which subsequently separates the rings. The keeping together of the ring member 21 and the cover 20 is carried out in the same way as illustrated and described in connection with Figures 1A-1D, however, the cover is provided with a groove 24 of which length  $l_3$  is less than the length  $l_1$  of the groove 4, as the ring member 21 in a letter file usually consists only of two rings 22. Consequently, the band 23 can be made shorter, and, accordingly, it is not necessary to have a long groove 24. The profiles 25,26,27 in the cover 20 will be placed in such a way that the ring member 21 is situated approximately at the centre of a first page 28 of the binder of the cover and in the vicinity of the spine 29. The description of the individual parts, profiles, recesses, bands, and spring straps, respectively, and their mutual co-operation will not be further described in connection with said Figure as reference is made to the description in connection with Figures 1A-1D.

Besides the parts which secure the ring member to the cover, the cover in Figure 2A is, however, provided with further devices.

Two openings 30 are formed in another page 31 of the binder opposite the page 28 of the binder together with which the ring member is joined. These openings 30 are made for grasping the rings 22 of the ring member 21 and to secure the pages 28,31 of the binder in a closed position, after the letter file is closed. It is noted that according to the object of the invention the cover is made of one material solely, in order to make it possible to recirculate the cover without having to destroy the cover first, which will be necessary if the cover was made of several different materials. Thus, the openings 30 are not provided with metal edges as can be seen on known letter files. For the same reason the openings 30 must be formed in consideration of the securing ability and strength.

In the Figure no specific embodiment is shown as such an embodiment is not within the scope of the invention, the forming of the openings 30

may, however, be carried out individually when only the claims required for the securing ability and strength are fulfilled.

Moreover, the cover is provided with a through hole 32 in the spine 29, which may be used as a grip when the ring binder is to be taken out of e.g. a bookcase. Like the openings 30 the grip 32 is not provided with metal edges, thus retaining the possibility of recirculating the cover 20. Along the one edge area 33 of the cover 20 and extending past the two pages 28,31 of the binder and beyond the spine 29, the cover is, as illustrated in the Figure, provided with bended flaps 34,35, and 36, which are bended at an angel of 90° in proportion to the plane of the cover. These flaps 34,35,36 are made for increasing the stability of the ring binder when it is closed and is standing upright in e.g. a bookcase.

Figures 3A and 3B illustrate a cover 40 and a ring member, respectively, for an alternative embodiment of a letter file. One of the pages 41 of the binder of the cover 40 is provided with profiles 42,43, and 44, which comprise a first profile 42 which forms a key slot 45, and which is adjacent the spine 46 of the letter file, two other profiles 43 which are formed as rectangular protrusions, and two third profiles 44 which are formed as resilient tongues. The profiles are either made as an integral part of the cover or are made as separate members, and subsequently hot welded or in another way secured to the cover.

The first profile 42 has a cross section which has a shape like an inverted L (I), but other cross sections e.g. as profile 5 illustrated in Figure 1C, may also be used. The requirement of the profile 42 is that it has to secure the one edge of a band member when said edge is inserted into the key slot. The two other profiles 43 (protrusion-profiles) are displaced proportional to the first profile 42. In the immediate vicinity of the two protrusion profiles 43 two third profiles 44 (the tongue profiles) are placed. In the embodiment shown the protrusion profiles 43 have a rectangular cross section, however, any cross sections may be used, as the protrusion profiles cooperate with corresponding holes substantially having the same shape formed in the band of the ring member 51 (see Figure 3B). The object of the protrusion profiles 43 is to secure the ring member 51 in directions parallel to the plane of the cover 40. The tongue profiles 44 are dimen-

sioned in such a way that they may be resilient, and consist of a tongue 47 and a nose 48 having an oblique top side 49 and a retention edge 50 on the bottom side.

- 5 In the embodiment shown, the ring member 51 (see Figure 3B) is of the type which is used in a letter file. The ring member 51 is provided with two rings 52 and a band 53, one edge 54 of said band is intended for engaging the key slot 45, which is formed by the first profile 42. At a distance from said edge 54, preferably at an opposite facing edge
- 10 55, the ring member 51 is provided with holes 56. The holes 56 have a shape and a size which allows said edges to engage with the protrusion and tongue profiles 43,44. The inner contour 57 of the holes 56 has exactly the same shape as the outer contour which is delimited by the base of the protrusion and tongue profiles, i.e. where said profiles
- 15 are fastened to the page 41 of the binder of the cover 40. Hereby, a safe securing of the ring member 51 is obtained in directions parallel to the plane of the cover. In the direction away from the cover the ring member 51 is secured by the first profile 42 and by the retention edge 50 on the bottom side of the nose 48 on the tongue profiles 44.
- 20 When the ring member 51 is placed into the cover 40 the one edge 54 on the band 53 is guided into the key slot, after which the holes 56 are guided over the protrusion and tongue profiles 43,44. In order to making it possible for the holes 56 to be guided past the nose on the tongue profiles 44, these profiles are resilient backwards towards the
- 25 protrusion profiles 43 until the holes have passed the nose 48. The tongue profiles 44 subsequently spring back and the retention edge 50 abuts the top side of the band 53 of the ring member 51 at the edge area of the holes 56.
- 30 Figures 4A, 4B, and 4C illustrate a further embodiment of a cover 60 and a ring member 71. Here, the spine 61 of the cover 60 is provided with profiles 62 forming oblong, T-shaped protrusion profiles. The profiles 62 are placed along the spine 61 of the cover so that two protrusion profiles are provided in each end of the spine. Furthermore,
- 35 a bead 63 having an edge 64 is formed in the spine, and in the immediate vicinity of this bead 63 a through hole 65 is formed.

In Figure 4B the ring member 71 is shown in perspective from the bottom side and in Figure 4C it is shown plane from the bottom side. The

ring member 71 is provided with rings 72 and a thin band 73. The band 73 is provided with holes 74 which are intended for engaging the profiles 62, which are placed on the spine 61 of the cover 60. The holes 74 in the thin band 73 consist of two areas 75 and 76. The first area 75 has a contour 77 delimiting a cross section, which is larger than the cross section of each of the profiles 62 seen in a direction perpendicular to the plane of the cover 60. The second area 76 has a contour 78 delimiting a cross section, which is smaller than the cross section of each of the profiles 62, but which, however, has a width  $b_4$ , which is larger than the width  $b_5$  of the base 66 of the profiles where the profiles are fastened to the cover 60. This forming of the holes 74 in the thin band 73 of the ring member 71 ensures that the ring member may be secured to the cover. This is made by guiding the ring member 71 down the profiles 62 having the first area 75 placed opposite the profiles. When the ring member is led down the profiles 62 the ring member is displaced parallel to the spine, thereby displacing the base 66 of the profiles into the second area 76. As the second area 76 has a cross section which is smaller than the cross section of the profiles 62, seen perpendicular to the plane of the cover, the ring member 71 cannot be removed from the cover.

Furthermore, the ring member 71 is provided with a spring strap 79 having a bending 80 for forming a retention edge. When the ring member 71 is displaced parallel to the longitudinal axis of the spine 61, after being led down the profiles, the retention edge 80 of the spring strap 79 engages with the edge 64 of the bead 63. In the same way as the spring strap 14 in Figure 1B the spring strap 79 ensures that the ring member 71 is not displaced backwards and disengages the profiles 62. When the ring member has to be separated from the cover the engagement of the spring strap 79 with the edge 64 of the bead 63 is released by affecting the strap with a force directed oppositely through the through hole 65 in the spine 61. Subsequently, the ring member 71 may be displaced backwards in such a way that the first area 75 of the holes 74 are opposite the profiles 62, after which the ring member may be removed from the cover.

The embodiments illustrated in the above-mentioned Figures cover a part of the embodiments a ring binder may have according to the invention. However, the illustrated embodiments are not to be considered as

a limitation of the invention as other embodiments also will be considered to be within the scope of the invention in question.

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C L A I M S.

1. Ring binder comprising a ring member (11,21,51,71) and a cover (1,20,40,60), and consisting of pages (2,28,31,41) of the binder and a spine (3,29,46,61), and comprising a member of engagement in the form of profiles (5,6,7,25,26,27,42,43,44,62), which constitute an integral part of the cover, preferably by being made of plastic, and casted simultaneously with the cover or by being hot welded, or in another way fastened to the cover, which preferably is made of plastic, and in which the ring member constitutes a separate part of the ring binder and is provided with a member of engagement in the form of a band (13,23,53,73), which is made to be in a releasable engagement with the profiles, characterized in that an optional member of engagement of the ring binder comprises a resilient member (14,44,79) having a retention edge (15,50,80), which in a releasing way may abut a stop, which is provided on the other member of engagement, preferably in the form of an edge area (55) on the bands of the ring binder or in the form of a stop (9,50) formed in the cover.

2. Ring binder (1,20) according to claim 1, characterized in that the profiles are constituted of two longitudinal profiles (5,6,25,26), which extend parallel to the longitudinal axis of the spine (3,29) and a transverse profile (7,27), which extends perpendicular to the longitudinal axis of the spine between the two longitudinal profiles, that the longitudinal profiles form a dovetail-shaped or T-shaped groove (4,24) having a greater width ( $b_1$ ) at the bottom of the groove, which faces the cover, than at the top of the groove, and that the band (13,23) of the ring member (11,21) has a width ( $b_3$ ), which is greater than the smallest width ( $b_2$ ) of the groove, and which is smaller than the greatest width ( $b_1$ ) of the groove, which band is intended to be guided down into the groove parallel to the longitudinal profiles.

3. Ring binder according to claim 1, characterized in that the profiles of the cover are constituted of a first profile (42) forming a key slot (45), and one or several other profiles (43) forming protrusions, and being provided at a distance from the first profile at an angle in proportion to the longitudinal axis of said first profile, and that the band (53) of the ring member (51) comprises an

edge area (54), which engages with the key slot (45) and openings (56), which engage with the protrusions (43).

5 4. Ring binder according to claim 1, c h a r a c t e r i z e d in that the profiles are constituted of one or several profiles (62) extending parallel to the longitudinal axis of the spine (61), and which form at least one key slot, and that the band (73) of the ring member (71) is provided with openings substantially shaped like a keyhole consisting of two areas (75,76) being connected with each other, in which the one  
10 area (75) has a cross section, which is greater than the cross section of a profile (62) seen perpendicular to the plane of the cover (60), and in which the other area (76) has a width ( $b_4$ ), which is smaller than the width of the greatest width of a profile, but which is greater than the width ( $b_5$ ) of a base (66) of a profile.

15 5. Ring binder according to claims 1,2, and 4, c h a r a c t e r i z e d in that the ring member (11,21,71) is provided with a resilient strap (14,79), which is fastened onto the underside of the band (13,23,73) of the ring member, and which is provided with a retention  
20 edge (15,80).

6. Ring binder according to claims 1 and 3, c h a r a c t e r i z e d in that one or several of the profiles of the cover constitute resilient tongues (44) extending substantially perpendicular from the plane  
25 of the cover (40), and which are provided with retention edges (50).

7. Ring binder according to any one of the preceding claims, c h a r a c t e r i z e d in that the cover and the profiles solely are made from plastic materials.  
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8. Ring binder according to any one of the preceding claims, c h a r a c t e r i z e d in that the cover is provided with a stop, which is constituted of a bead.

35 9. Ring binder according to any one of the preceding claims, c h a r a c t e r i z e d in that the band (53) of the ring member (51) is provided with openings (56), each having an inner contour, which delimits a cross section having the same shape as an outer contour, which is delimited by a base of one of the profiles (43,44) of the cover,

which form a protrusion.

10. Ring binder according to any one of the preceding claims,  
c h a r a c t e r i z e d in that the cover along an edge is provided  
5 with flaps (34,35,36).

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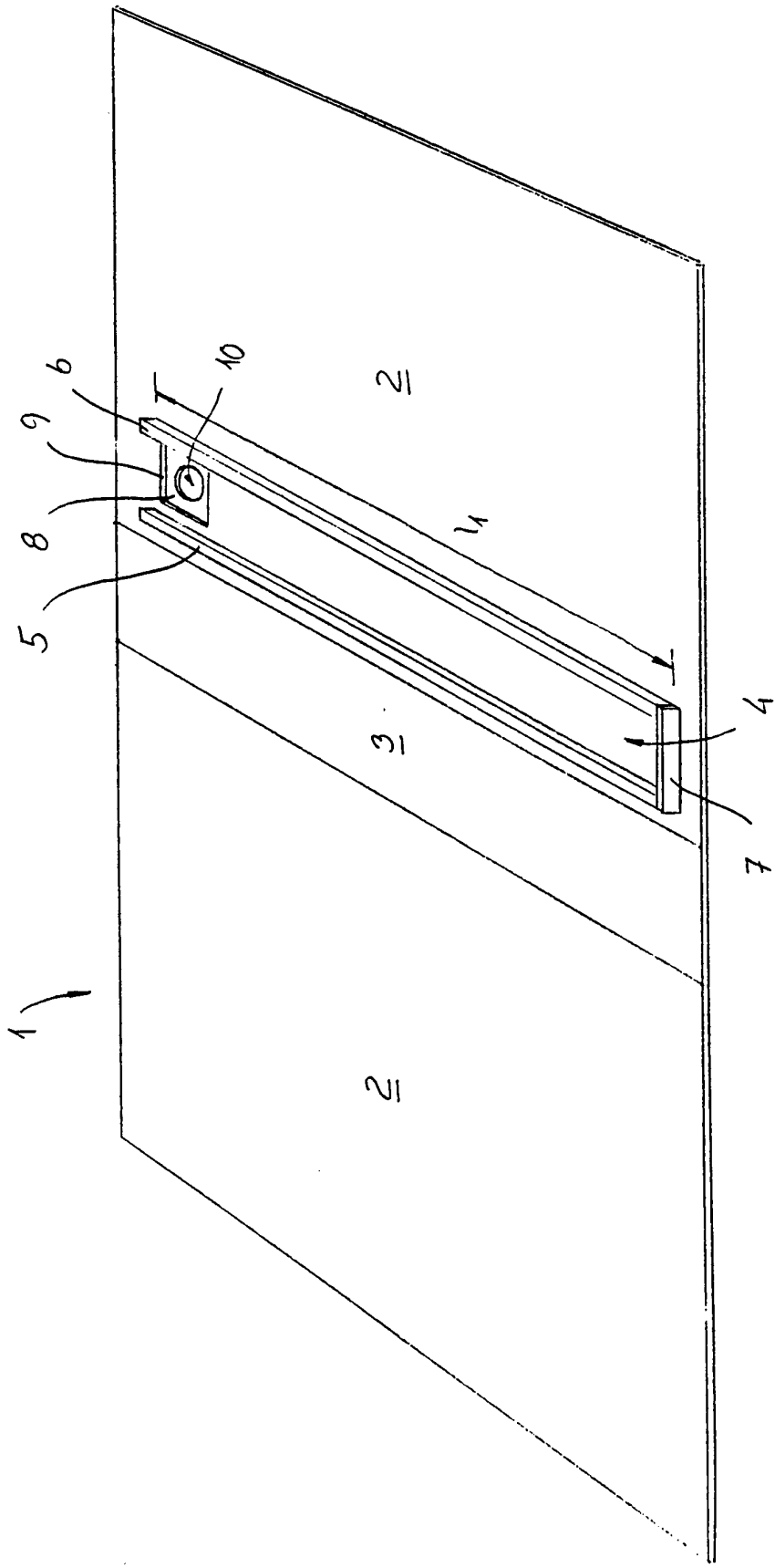


Fig. 1A

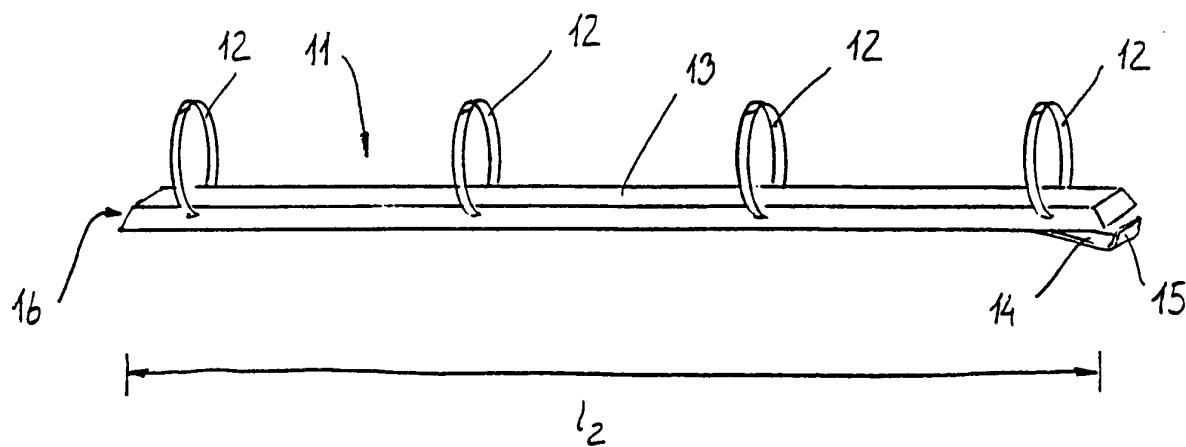


Fig. 1B

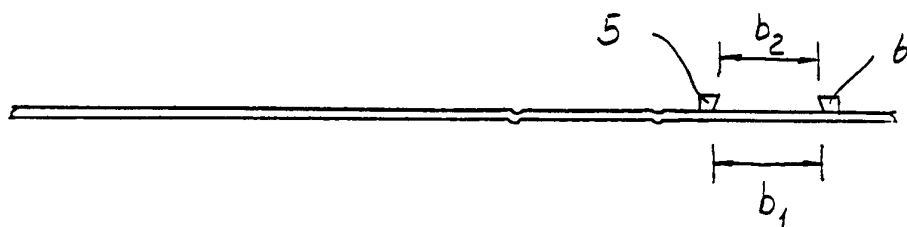


Fig. 1C

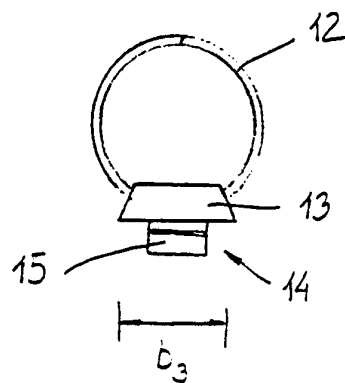
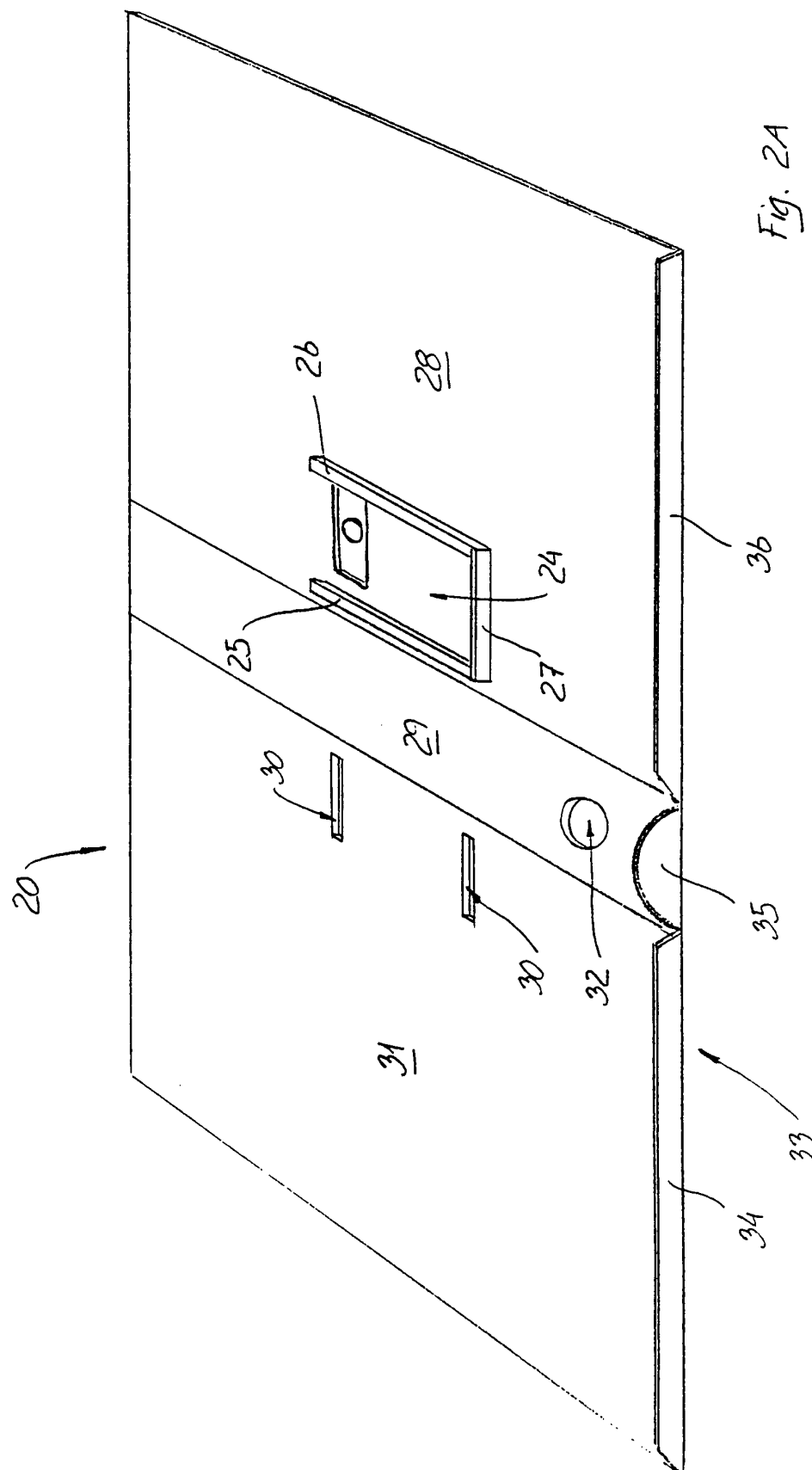


Fig. 1D



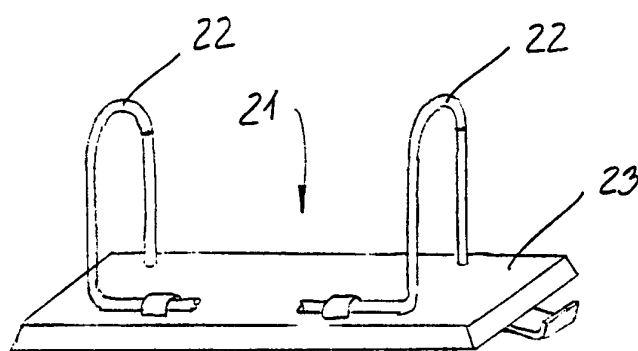


Fig. 2B

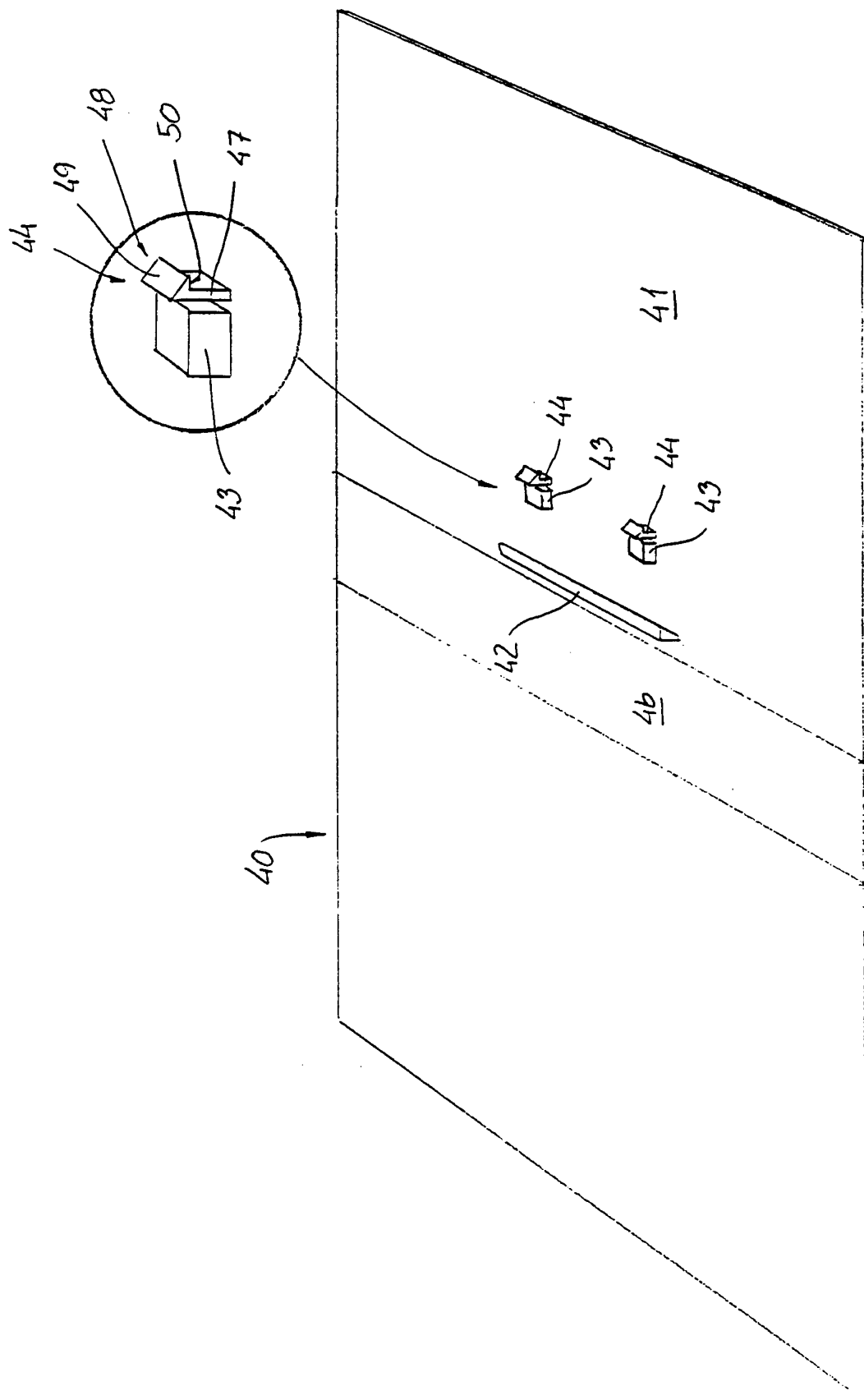
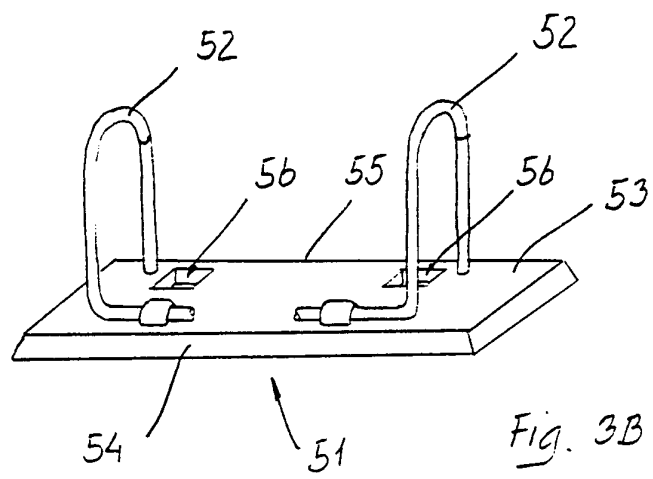


Fig. 3A



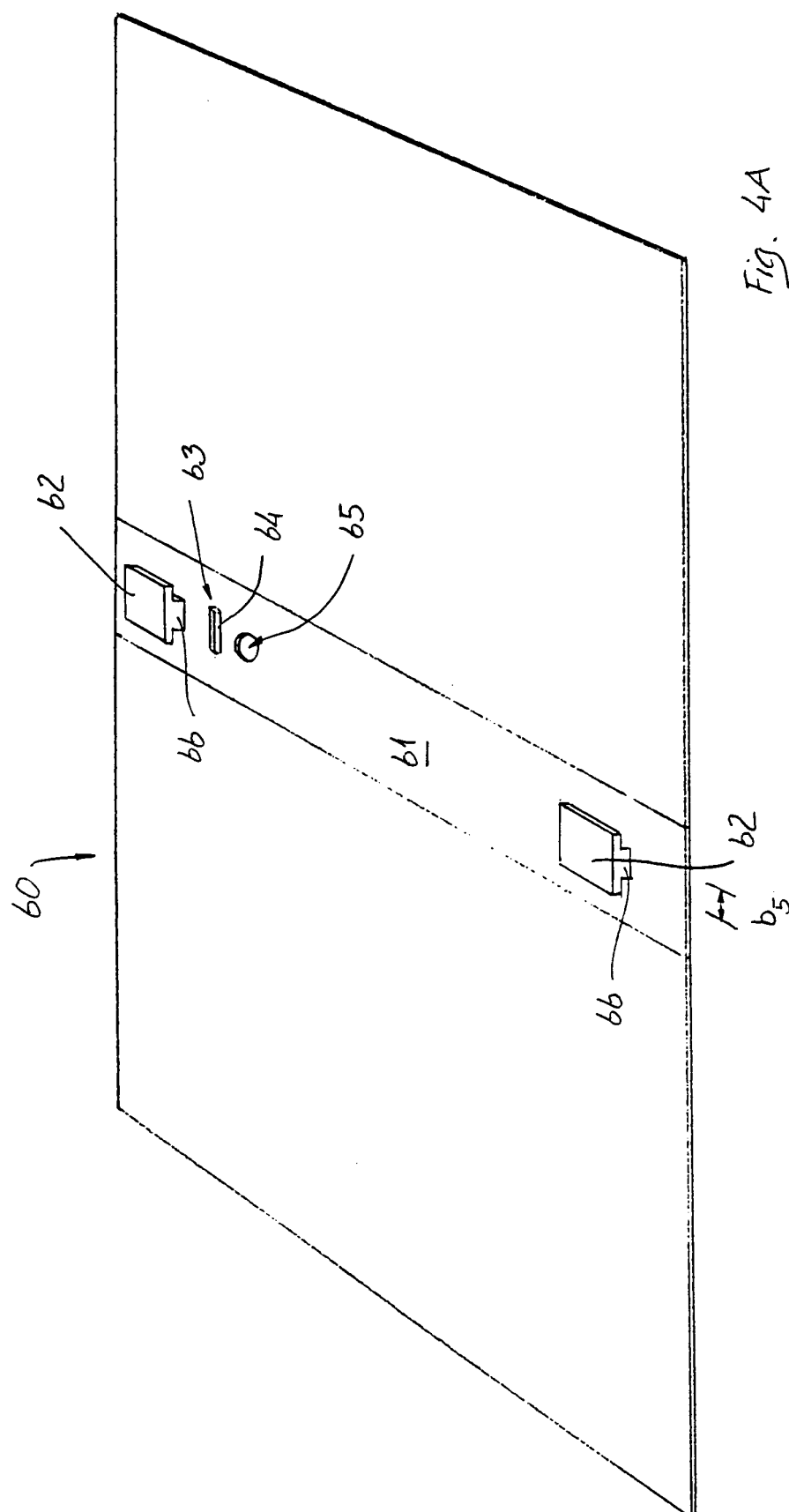


Fig. 4A

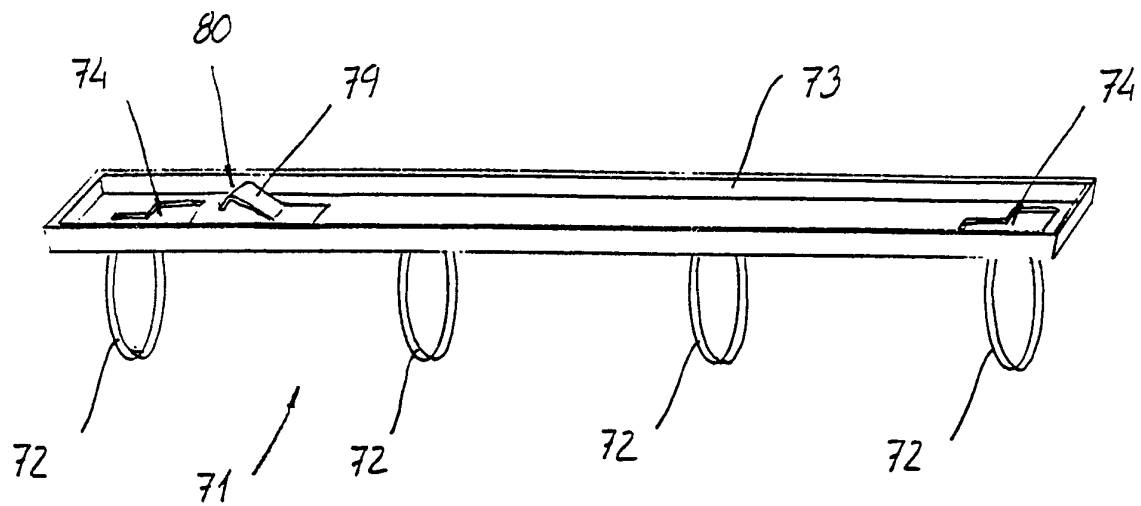


Fig. 4B

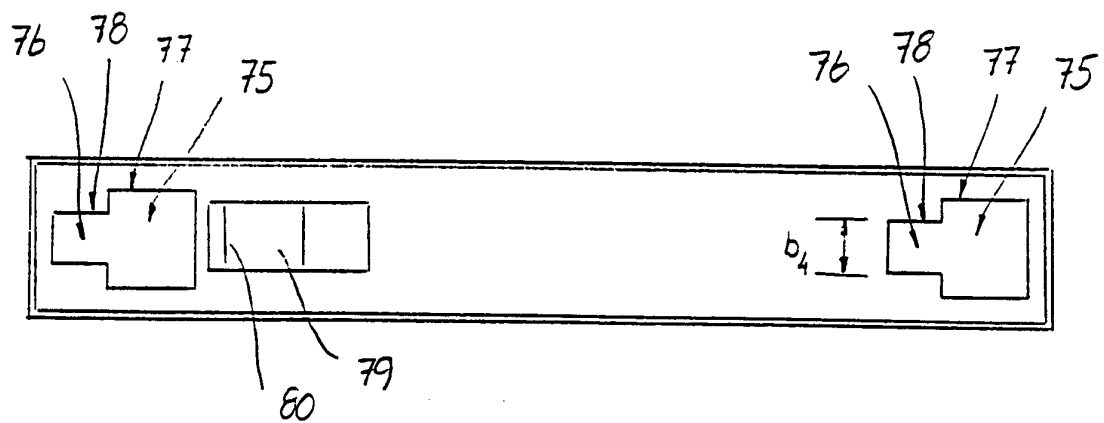


Fig. 4C



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00191

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B42F 13/16

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)

IPC5: B42F

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, 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	GB, A, 2207637 (RHODEN PARTNER LIMITED), 8 February 1989 (08.02.89), page 3, line 28 - page 4, line 6 --	1,4,5
X	EP, A1, 0482354 (KOLOMAN HANDLER GESELLSCHAFT M.B.H.), 29 April 1992 (29.04.92) --	1-10
X	US, A, 2425205 (R.M. RAYNOLDS), 5 August 1947 (05.08.47), column 2, line 31 - line 41 --	1,5,6,8
X	EP, A2, 0371860 (GERRIET JACQUES), 6 June 1990 (06.06.90), column 2, line 28 - column 3, line 20 --	1,2



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

9 Sept. 1993

Date of mailing of the international search report

10 -09- 1993

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 93/00191

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH, C, 497286 (BABCOCK & WILCOX LIMITED), 30 November 1970 (30.11.70), column 4, line 49 - line 67  --	1,2
X	DE, C2, 3013310 (FA. XAVER FELDER), 19 May 1983 (19.05.83), column 6, line 63 - column 8, line 10  -- -----	1,3

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

30/07/93

International application No.

PCT/DK 93/00191

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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US-A-	2425205	05/08/47	NONE		
EP-A2-	0371860	06/06/90	FR-A-	2639584	01/06/90
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			DE-A-	1939957	12/02/70
			FR-A-	2015146	24/04/70
			NL-A-	6911975	10/02/70
			GB-A-	1287732	06/09/72
DE-C2-	3013310	19/05/83	NONE		