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D. J. DETRICH

2,295,893

INTERLOCK

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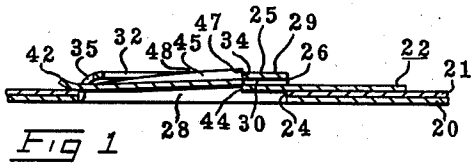


Fig 1

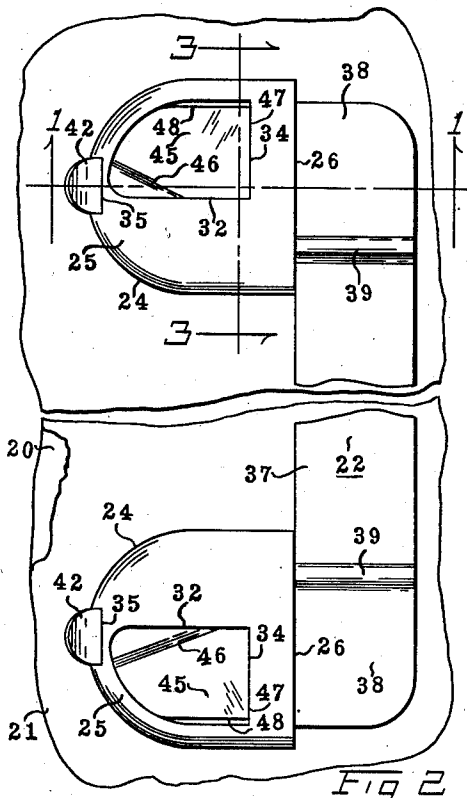


Fig 2

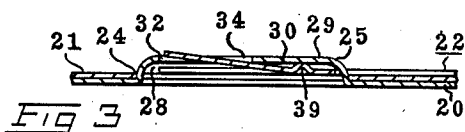


Fig 3

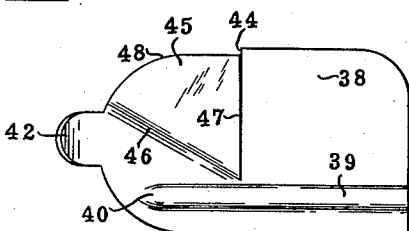


Fig 4

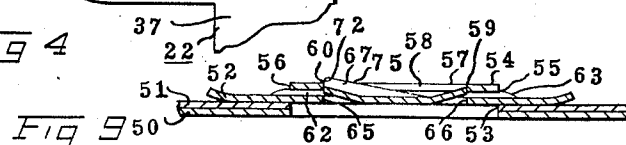


Fig 5

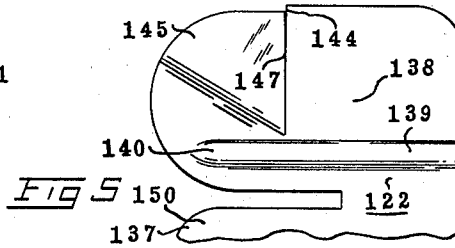


Fig 6

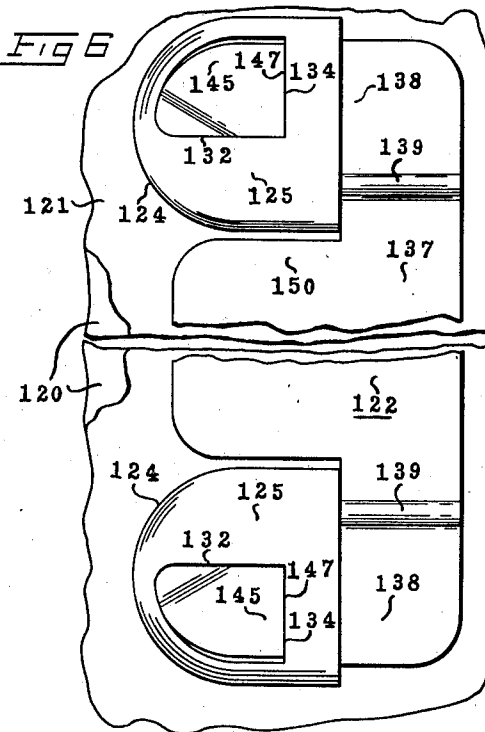


Fig 7

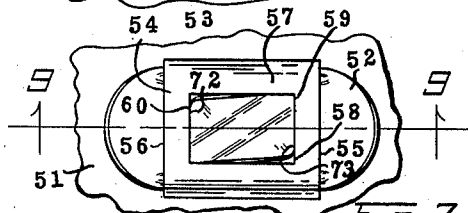


Fig 8

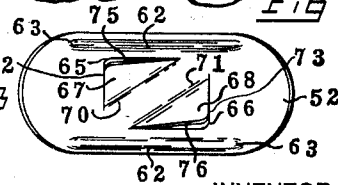


Fig 9

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INTERLOCK

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1 Claim. (Cl. 189—36)

The present invention relates to interlocking mechanisms, and more particularly to interlocking mechanisms for securing two sheet-like elements together.

An object of the invention is to provide an interlock for interlocking two elements together by a locking member that is inserted in a passage formed by the elements, the locking member being latched in the passage by a shoulder formed thereon, which shoulder is resiliently urged into alignment with an abutment extending transversely of the locking member, and the locking member being released from the passage by flexing the shoulder to one side of the abutment.

Another object of the invention is to form the shoulder on the locking member, mentioned above, by sloping an edge of the locking member outwardly from the section and substantially parallel with the abutment that extends transversely of the locking member, so that a portion of the sloping edge will engage the abutment. This permits the abutment to be formed of relatively thin sheet material.

Other and further objects and advantages will be apparent from the following description, reference being had to the accompanying drawing wherein preferred forms of embodiments of the present invention are clearly shown.

In the drawing:

Fig. 1 is a view in section of two elements interlocked by my improved interlocking mechanism, the section being taken on line 1—1 of Fig. 2;

Fig. 2 is a top view in elevation of the two elements interlocked by my improved interlocking mechanism;

Fig. 3 is a view in section taken on line 3—3 of Fig. 2;

Fig. 4 is a top view in elevation of a portion of a locking member;

Fig. 5 is a top view in elevation of a portion of another form of locking member;

Fig. 6 is a top view in elevation showing two elements interlocked by the form of locking member shown in Fig. 5;

Fig. 7 is a top view in elevation showing two elements interlocked by still another form of interlocking mechanism;

Fig. 8 is a top view in elevation of a locking member shown in Fig. 7; and,

Fig. 9 is a view in section taken on line 9—9 of Fig. 7.

Referring to the drawing, for the purpose of illustrating a preferred form of the invention,

two sheet-like elements 20 and 21 are shown interlocked by a locking member 22. The elements 20 and 21 are formed of sheet metal, but it is to be understood that they might be formed of any other suitable material. Thus, the elements 20 and 21 may be adjoining walls of file casings which are interlocked to form a file cabinet.

The element 21 is provided with a pair of spaced openings 24, and the element 20 is provided with a pair of bulged portions 25, which portions 25 are arranged to extend through the openings 24 when the elements 20 and 21 are placed in side to side relation. Preferably, the edges of the bulged portions 25 about the edges of the openings 24 for preventing sliding of one element relative to the other when the portions 25 are in the openings. The bulged portions 25 may be formed by slitting the element 20 at 26 and then drawing the material of the element 20 adjacent the slits 26 by a suitable die. The bulged portions 25 form recesses 28 and the slits 26 form mouths to the recesses 28. The outer walls 29 of the bulged portions 25 form inwardly facing abutments 30.

Each of the bulged portions 25 is formed with an opening 32 in the wall 29 thereof, and an edge of each of these openings forms an abutment 34. The areas of the openings 32 are preferably considerably less than the areas of the walls 29, so that the abutments 30 formed by the walls 29 will be relatively substantial.

Slit-like openings 35 are formed in the end walls of the bulged portions 25 opposite the mouths formed by the slits 26. These openings 35 are disposed above the surface of the element 21 when the bulged portions 25 are extended through the openings 24 in the element 21.

The locking member 22 is preferably formed of resilient sheet material, such as sheet metal, and is formed having a yoke 37 and two sections 38 each extending from opposite ends of the yoke. A ridge 39 is formed on each of the sections 38. The ends of the ridges 39 terminating on the sections 38 are sloped for forming camming surfaces 40. The ridges 39 are formed on the locking member 22 in positions which will align them with the abutments 30 formed by the walls 29 of the bulged portions 25 when the locking member 22 is in locking position. These ridges stiffen the sections 38 and also form cams for engaging the abutments 30 of the bulged portions 25.

A nose portion 42 is formed on each of the sections 38 and these noses are turned slightly

as is clearly illustrated in Fig. 1. The nose portions 42 are in alignment with the openings 35 when the sections 38 are inserted into the mouths of the portions 25. The slight curvature on the ends of the noses 42 facilitates the insertion of the noses through the openings 35, as will be apparent from the description hereinafter, and also provides a camming surface for moving the ends of the sections 38 toward the walls 29 of the bulged portions 25 when the noses are inserted in the openings 35.

The sections 38 are slit at 44 and portions 45 adjacent the slit are bent upwardly along a fold indicated at 43. Preferably, the slits 44 are formed so that when the locking member 22 is in locking position, the edges 47 of the portions 45 formed by the slits extend in planes substantially parallel with planes in which the abutments 34 of the bulged portions extend. Thus, the edges 47 form shoulders which are substantially parallel with the abutments 34. The portions 45 of the sections 38 extend outwardly through the openings 32 in the bulged portions 25 and slightly beyond the outer surface of the walls 29 of the bulged portions 25 when the sections 38 are in the recesses 23 formed by the bulged portions 25. It is to be noted that the edges, or shoulders 47 slope outwardly from the sections 38, so that portions of the shoulders 47 will always be in alignment with the abutments 34 whether or not the portion of the walls 29 of the bulged portions 25 are uniformly spaced from the element 21 when the elements are in the interlocked position. Since the key 22 is formed of resilient material, the shoulders 47 are normally biased in this sloping position at all times, but they can be flexed toward the sections 38. It is also apparent that the edge 43 of each of the portions 45 form camming surfaces sloping from the ends of the sections 38 to the shoulders 47.

When the elements 20 and 21 are arranged in side to side relation with the bulged portions 25 extending through the openings 24, the locking member 22 is inserted in its locking position by inserting the noses 42 of the sections 38 into the recesses 23 through the mouths formed by the slits 26 and as the locking member is moved rearwardly in the recesses 23, the camming edges 43 of the sloping portions 45 of the sections 38 engage the outer edges of the mouths of the recesses 23 and cause the portions 45 to be depressed so that the sections 38 can enter the mouths. When the portions 45 move into alignment with the openings 32, they are released and the shoulders 47 spring upwardly into alignment with the abutments 34 formed by the edges of the openings 32. Also, as the sections 38 are inserted in the mouths of the recesses 23, the sloping ends 40 of the ridges 39 engage the abutments 30 of the bulged portions 25 and tend to draw the element 20 tightly against the element 21 by the camming action of the sloping ends of the ridges 39 on the abutments 30. As the noses 42 are inserted into the openings 35, the turned portions of the noses 42 engage the element 21 and cam the sections 38 upwardly. This causes the element 20 to be more firmly drawn against the element 21. When the locking member 22 is in its locking position, the noses 42 extend through the openings 35 and rest on the element 21 for supporting the sections 38 in planes substantially parallel with the element 21. By curving the noses 42 slightly, they are more readily aligned with the openings 35 since the cam-

ming action of the ends of the ridges 39 causes the ends of the sections 38 to sag. It is apparent that when the locking member 22 is in locking position, the shoulders 47 on the sections 38 will abut the abutments 34 for preventing accidental removal of the locking member 22 from its locking position. Although the shoulders 47 are flexible, in a direction toward the sections 38, they are inflexible in the directions in which the locking member is inserted or removed from the bulged portions 25. Therefore, the locking member 22 is firmly latched in its locking position when the shoulders 47 engage the abutments 34.

When the locking member 22 is to be removed, the portions 45, which are accessible through the openings 32, are pressed inwardly until the shoulders 47 are moved below the abutments 34 and the member 22 may then be withdrawn from the bulged portions 25.

Although the elements 20 and 21 are shown interlocked at two spaced points by the locking member 22, it is to be understood that these elements could be interlocked in a similar manner by one or more locking members comprising a single section formed similarly to one of the sections 38.

In the embodiment of the invention shown in Figs. 5 and 6, a locking member 122 is shown for locking two sheet-like elements 120 and 121 together.

The elements 120 and 121 are similar to the elements 20 and 21. The element 121 is provided with two spaced openings 124 and the element 120 is provided with bulged portions 125 which extend through the openings 124 when the elements 120 and 121 are placed in side to side relation. The bulged portions 125 are formed similarly to the bulged portions 25. The bulged portions 125 have openings 132 therein, the edges of which openings form abutments 134.

The locking member 122 is similar to the locking member 22, having a yoke 137 and two sections 138 extending from either end of the yoke, however, no projections similar to the noses 42 of the sections 38 are formed on the sections 138 of the member 122. Ridges 139 having camming surfaces 140 are formed on the locking member similar to the ridges 39 of locking member 22. The sections 138 are also slit at 144 and portions 145 of the member 122 are bent outwardly for forming shoulders 147 that are similar to the shoulders 47 on the locking member 22. A section 150 extends from the yoke 137 intermediate and parallel to the sections 138, so that when the sections 138 of this locking member 122 are inserted in the recesses formed by the bulged portions 125, the section 150 will engage the element 121 for supporting the member 122 by minimizing sagging of the sections 138. Thus, the section 150 performs a function similar to the function of the noses 42 of the locking member 22.

The locking member 122 is latched in locking position similarly to the locking member 22, the shoulders 147 of the locking member 122 cooperating with the abutments 134. The locking member 122 is also released from its locking position similarly to the locking member 22, i. e., by depressing the portions 145. It is to be noted that the shoulders 147 are inflexible in the directions in which the locking member 122 is moved to its locking and unlocking positions so that a firm latch is effected.

Although the elements 120 and 121 are shown

interlocked at two spaced points by a locking member including a yoke, it is apparent that the elements may be interlocked at one point by a locking member having a single section similar to the sections 138 and a leg section corresponding to the section 150.

Referring to Figs. 7, 8 and 9, another form of interlock is shown. In this embodiment, two sheet-like elements 50 and 51 are interlocked in side to side relation by a locking member 52. The element 51 is provided with a substantially rectangular opening 53, and the element 50 is provided with a rectangular yoke member 54 which is adapted to extend through the opening 53 when the elements are placed in side by side relation. The yoke member 54 is formed by slitting the element 50, and then bulging the material intermediate the slits outwardly by a suitable die. After the material is bulged outwardly, the slits form openings 55 and 56 which are similar to the openings 26 shown in Figs. 1 and 2. The wall 57 of the yoke 54 is provided with a rectangular opening 58, and the end edges of the opening 58 form abutments 59 and 60.

The locking member 52 is preferably formed of resilient, flat sheet metal and has two ridges 62 formed lengthwise along opposite edges thereof. The ridges 62 are sufficiently high to engage the inside of the wall 57 of the yoke member 54 when the locking member 52 is inserted intermediate the wall 57 and the element 51. The ends of the ridges 62 are sloped as shown at 63 for forming cams which tend to move the yoke 54 outwardly when the locking member 52 is inserted between the yoke member 54 and the element 51. This causes the element 50 to be drawn tightly against the element 51. The ridges 62 also stiffen the locking member. The ends of the locking member 52 are preferably turned upwardly as is indicated in Fig. 9 for performing a function similar to that of the noses 42 of the member 22.

Two right angular slits 65 and 66 are formed in the locking member 52 and portions 67 and 68 of the locking member 52 are bent along folds 70 and 71 so that the portions 67 and 68 extend outwardly from the member 52. The portions 67 and 68 form shoulders 72 and 73, respectively, which shoulders slope outwardly from the locking member 52. The slits 65 and 66 are disposed so that the shoulders 72 and 73 will lie intermediate the abutments 59 and 60, formed by the opening 58, in the yoke member 54, when the locking member 52 is inserted intermediate the yoke 54 and element 51. The edges of the portions 67 and 68 which are at right angles to the shoulders 72 and 73 form camming surfaces 75 and 76, respectively.

When the elements 50 and 51 are to be interlocked, the yoke member 54 of the element 50 is extended through the opening 53 formed in the element 51, and the locking member 52 is inserted through one or the other of the openings 55 or 56 in the element 51 and the end edges of the yoke member 54, and the ridge members 62 abut the wall 57 of the yoke 54 and cause the

yoke member to be cammed outwardly for drawing the element 50 tightly against the element 51. Since the shoulders 72 and 73 extend above the edge of the yoke 54, the shoulders must be depressed when the key 52 is inserted in the yoke 54. For example, when the key 52 is inserted in the right hand opening 55 of the yoke member, as viewed in Fig. 7, the shoulder 72 is moved below the edge of the yoke 54 by pressing the portion 67 of the locking member downwardly by one's finger or a tool. As the locking member is moved further to the left, the cam 76 of the member 68 will abut the underside of the wall 57 of the yoke 54 and depress the shoulder 73 out of alignment with the edge of the yoke 54. When the locking member 52 is moved to a position in which the shoulders 72 and 73 are in alignment with the opening 58 in the yoke 54, the shoulder 73 will be released from the wall 57 of the yoke and will spring upwardly into alignment with the abutment 59 formed by the edge of the opening 58. It is apparent that since the shoulder 72 is in alignment with the abutment 60, the locking member 52 cannot be removed from its locking position until one or the other of the shoulders 72 or 73 is depressed, depending on the direction in which the locking member is to be removed. It is apparent that the shoulders 72 and 73 are relatively unyielding in the directions in which the locking member 52 is moved when it is withdrawn from its locking position, therefore, the member will be firmly and securely latched in locking position.

By my invention I have provided an interlocking mechanism that is particularly suitable for interlocking two sheet-like elements together, and which is relatively flat and requires but a minimum of space. The locking members of the mechanisms are positively maintained in their locking positions until released manually.

While the forms of embodiments of the present invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted, all coming within the scope of the claim which follows.

I claim:

In combination, two elements, one of said elements including a wall portion having an opening, the other of said elements having a bulged portion formed of sheet-like material, said bulged portion extending through said opening, said bulged portion having an opening in one end thereof and an opening in a wall thereof in alignment with the opening in the first mentioned element; and a locking member for locking said elements together, said member including a substantially flat sheet-like section extending along said wall portion of said one element and in the second mentioned opening, said section having an edge of a portion thereof sloping outwardly into the third mentioned opening and in alignment with a portion of an edge of the third mentioned opening, said edge of the section being flexible with respect to the section.

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