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(54) **A step stool**

Trittleiter

Escabeau

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US-B2- 6 550 579 US-B2- 6 902 035

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Description

[0001] The present invention relates to a step stool having a folding frame and multiple steps that will move simultaneous upon movement of the folding frame between its opened use position and its collapsed storage position.

[0002] For safety reasons, in many countries on a mandatory basis, step stools are provided with a latch mechanism that retains the step stool in its opened use position. Only deliberate manual operation of the latch mechanism can release the latch member, so that a sudden and undesired collapse of the step stool is impossible.

[0003] In US 6 902 035 a step stool is disclosed wherein the upper step has a step body with a notch in the rear portion of the step body. With this notch the latch member is arranged in pivotal manner so that a user can grip the member with a hand, pull it upward and so effect release of the latch member from the crossbar.

[0004] A drawback of the US 6 902 035 is the complexity of the step body to create the notch and arrange the latch member in said notch. A further drawback is that the latch member has a major upper face which extends as a continuation of the upper surface of the step. Thereby a user standing on the step stool is likely to place a foot on the latch member, causing it to be overloaded, worn, or malfunction.

[0005] The same drawbacks are present in the US 6 427 805 and US 6 550 579 step stools.

[0006] In US 6 026 933 a step stool is disclosed wherein the latch mechanism is only accessible via openings in the upper face of the upper step. This is awkward for the user of the step stool.

[0007] In US 6 390 237 a step stool is disclosed, wherein the latch member is fitted through an opening in a downward depending skirt of the upper step body. In order to disengage the latch member from the crossbar, the user has to press down the actuation portion of the latch member. As collapsing of the ladder is usually done by the user through pulling the rear of the upper step towards him, the user is effectively required to make two motions in opposite directions at the same time, which is awkward.

[0008] The present invention aims to provide an improved step stool with manually releasable latch mechanism.

[0009] In particular the invention aims to provide design of the upper step and associated latch mechanism that can be efficiently manufactured at low costs, which is important as step stools are mass produced items. Also the invention aims to provide a latch mechanism that is easy to operate by the user upon collapse of the step stool and will remain reliable over the lifetime of the step stool.

[0010] The present invention provides a step stool according to claim 1, the preamble thereof based on US 6 427 805, wherein the upper step comprises a metal step body having a platform and peripheral skirt extending

below and around said platform, and wherein the pivotal latch member is hinged to the lower side of the step at a position inside the contour of the peripheral skirt, wherein the latch member has a bridge portion extending from said latch face rearward, underneath the peripheral skirt, to an actuation portion of said latch member, said actuation portion extending adjacent the outer side of the peripheral skirt so as to be manually engaged by a users hand.

[0011] As the skilled person will readily appreciate this design of the latch mechanism allows for intuitive actuation by the user and at the same time allows for an attractive design of the latch mechanism and upper step from a manufacturing point of view. Also it allows to create a latch mechanism that will be reliable throughout the life time of the step stool.

[0012] Further preferred details of the step ladder according to the invention are mentioned in the subclaims and will be explained in the description of a preferred embodiment.

[0013] In the drawings:

Fig. 1 shows a preferred embodiment of the step stool according to the invention,

Fig. 2 the upper step of the step stool of figure 1 in horizontal use position, wherein the latch mechanism engages the crossbar,

Fig. 3 the upper step as the latch mechanism is manually operated and has been released from the crossbar, the upper platform having been tilted forward in order to collapse the step stool,

Fig. 4 the upper step from above during the collapse of the step stool, and

Fig. 5 the latch member of the step stool of figures 1-4.

[0014] A preferred embodiment of the step stool 1 according to the invention will now be explained referring to the figures 1-5.

[0015] The step stool 1 has a folding frame with a pair of front legs 2a, 2b and a pair of rear legs 3a, 3b. The rear are coupled to the front legs at their upper ends in this example, via hinges 4a, b, so that the front and rear legs are relatively pivotable between an opened use position, wherein the front and rear legs in general define an A in side view of the step stool, and a collapsed storage position, wherein the front and rear legs are essentially parallel.

[0016] This step stool includes an upper step 10 and two lower steps 11, 12, each step 10,11,12 being arranged between and coupled to the front legs 2a,b for pivotable movement between a horizontal use position and a storage position, each step being adapted to support a person thereon.

[0017] In this example the front legs are interconnected at spaced positions by pivot shafts 2c (visible in figures 2, 3) which each rotatably support the front portion of a step. Also the legs 2a, b are here connected by a hoop

portion at their upper ends.

[0018] As is common in step stools a linkage member arrangement is provided, which effects simultaneous movement of the steps 10-12 as the frame is folded to move between the use position and the collapsed position. Here the linkage member arrangement includes one or more linkage members 7 extending between the rear legs on the one hand and a step (here step 11) on the other hand, each linkage member 7 being hinged at its ends. Furthermore one or more linkage members 8 extend between the steps 11, 12, 13, each connection being pivotal. Upon collapse of the step stool the steps 10-12 are tilted to their vertical or storage position, here essentially parallel to the plane of the front legs.

[0019] The frame includes a crossbar 9 extending between the rear legs 2a,b and arranged so that a rear portion of the upper step 10 rests on said crossbar 9 when said upper step 10 is in its use position (see figure 2). A further crossbar 9b is fitted in this example at a lower level between the rear legs.

[0020] The upper step 10 is provided with a manually releasable latch mechanism including a pivotal latch member 20 having a latch face 20e that is arranged to catch under the crossbar 9 when the frame is folded to its use position so as to retain the step stool 1 in the use position (see figure 2).

[0021] The pivotal latch member 20 is operable manually by a user to disengage the latch member 20 from the crossbar 9 and to fold the frame to the storage position. This can already be appreciated from figures 2-4.

[0022] The upper step 10 has a metal step body with a platform 10a and peripheral skirt 10b extending below and around said platform 10a. As is preferred the upper step metal body is made from sheet metal by deep drawing. For reinforcement a reinforcement strip 10c is welded transversely under the platform.

[0023] The pivotal latch member 20 is hinged to the lower side of the upper step 10 at a position inside the contour of the peripheral skirt 10b as can be seen in the figures 2,3.

[0024] The latch member 20 has a bridge portion 20b extending from said latch face 20e rearward, underneath the peripheral skirt 10b, to an actuation portion 20c of said latch member 20. The actuation portion 20c extends adjacent the outer side of the peripheral skirt 10b so as to be manually engagable by a user's hand, which grips from above over the actuation portion 20c.

[0025] As can be seen, in this practical embodiment, the latch member 20 includes a bore 20d for a pivot pin 23, the pivot pin 23 extending below the platform 10a. As is preferred two tabs 10e have been folded downwards from the sheet metal of the platform 10a, the tabs 10e supporting the pivot pin 23 at opposed ends.

[0026] The latch mechanism includes a spring (not shown here, in this example the spring will be arranged around the pivot pin 23 as a torsion spring engaging the underside of the upper step and the latch member) urging the latch member 20 to catch under the crossbar 9.

[0027] When a user desires to collapse the step stool 1 all that is needed for the user is to grip the actuation portion 20c and pull it upwards towards him. This simple action causes the latch member 20 to disengage from the crossbar 9 as the member 20 pivots about the pivot pin 23. Then the latch member 20 comes to bear against the upper step body so that continued pulling by the user causes the step 10 to tilt to its storage position, away from the crossbar 9. Due to the linkage member arrangement this motion of the upper step 10 simultaneously causes the frame to fold and all other steps to move towards their storage position.

[0028] It will be appreciated that the peripheral skirt 10b here is continuous all around, at least has a continuous rear portion, which enhances production of the step and gives good stability of the step at low costs. Also, which has the same effects, the rear portion of the skirt 10b has a uniform height over its length. As is preferred the rear portion, at least in the vicinity of the latch member 20 is free of any notches or openings as in prior art designs.

[0029] To avoid contact between the shoes of a person standing on the upper step 10 and the latch member 20, it is preferred that the actuation portion 20c - with the step stool in use position - has an upper end below the upper face to the upper step, as can be seen in figure 2.

[0030] As is preferred, and as shown in figures 2-4, the actuation portion 20c includes depressions to accommodate one or more fingers of the user's hand.

[0031] As is preferred, and as shown in the figures 2-5, the latch member 20 is a monolithic member, preferably of plastic.

Claims

1. A step stool comprising:

- a folding frame having a pair of front legs (2a, b) and a pair of rear legs (3a,b), said rear legs being coupled to the front legs for pivotable movement between an opened use position and a collapsed storage position,
- an upper step (10) and one or more lower steps (11,12), each step (10,11,12) being arranged between and coupled to the front legs (2a,b) for pivotable movement between a horizontal use position and a storage position, each step (10,11,12) being adapted to support a person thereon,
- a linkage member arrangement (7, 8) effecting simultaneous movement of the steps (10-12) as the frame is folded to move between the use position and storage position,

wherein the frame comprises a crossbar (9) extending between the rear legs (3a,b) and arranged so that a rear portion of the upper step (10) rests on

said crossbar (9) when said upper step is in its use position,
 the upper step (10) being provided with a manually releasable latch mechanism including a pivotal latch member (20) having a latch face (20a) that is arranged to catch under said crossbar (9) when the frame is folded to its use position so as to retain the step stool in said use position,
 the pivotal latch member (20) being operable manually by a user to disengage the latch member (20) from the crossbar (9) and fold the frame to the storage position,
 wherein the upper step (10) comprises a step body having a platform (10a) and peripheral skirt (10b) extending below and around said platform,
 the latch member (20) having a bridge portion (20b) extending from said latch face (20a) rearward to an actuation portion (20c) of said latch member (20), said actuation portion (20c) being manually engagable by a users hand,
 so that - with the step stool (1) in its use position - when the user pulls the actuation portion (20c) upwards the latch member (20) is released from the crossbar (9), the latch member (20) then engaging the step body, and further upward pulling causes the step stool (1) to move to its storage position

characterized in that

the step body of the upper step (10) is made of metal, the pivotal latch member (20) is hinged to the lower side of the step body at a position inside the contour of the peripheral skirt (10b),
 the bridge portion (20b) of the latch member (20) extends from the latch face (20a) rearward, underneath the peripheral skirt (10b), to the actuation portion (20c) of said latch member (20),
 and said actuation portion (20c) extends adjacent the outer side of the peripheral skirt (10b) so as to be manually engagable by a users hand.

2. A step stool according to claim 1, wherein the peripheral skirt (10b) has a continuous rear portion.
3. A step stool according to claim 1 or 2, wherein the step body is deep drawn from plate metal.
4. A step stool according to claim 2, wherein the rear portion has a uniform height over its length.
5. A step stool according to one or more of the preceding claims, wherein the latch member includes a bore for a pivot pin (23), the pivot pin extending below the platform.
6. A step stool according to claim 5, wherein two tabs (10e) are folded downwards from the platform, the tabs supporting the pivot pin (23) at opposed ends.
7. A step stool according to one or more of the preced-

ing claims, wherein the actuation portion (20c) - with the step stool in use position - has an upper end below the upper face of the upper step (10).

8. A step stool according to one or more of the preceding claims, wherein the actuation portion (20c) includes depressions to accommodate fingers of the user's hand.
9. A step stool according to one or more of the preceding claims, wherein the latch member (20) is a monolithic member, preferably of plastic.
10. A step stool according to one or more of the preceding claims, wherein the latch mechanism includes a spring urging the latch member (20) to catch under the crossbar.

Patentansprüche

1. Trittleiter, enthaltend:

- einen Klapprahmen, der zwei vordere Beine (2a, b) und zwei hintere Beine (3a, b) hat, wobei die hinteren Beine mit den vorderen Beinen gekoppelt sind, um eine Schwenkbewegung zwischen einer geöffneten Gebrauchsstellung und einer zusammengeklappten Aufbewahrungsstellung auszuführen,
- eine obere Stufe (10) und wenigstens eine untere Stufe (11, 12), wobei jede Stufe (10, 11, 12) zwischen den vorderen Beinen (2a, b) angeordnet und mit diesen gekoppelt ist, um eine Schwenkbewegung zwischen einer horizontalen Gebrauchsstellung und einer Aufbewahrungsstellung auszuführen, und jede Stufe (10, 11, 12) dazu eingerichtet ist, eine Person zu tragen,
- eine Verbindungselementanordnung (7, 8), die eine gleichzeitige Bewegung der Stufen (10 bis 12) bewirkt, wenn der Rahmen geklappt wird, um sich zwischen der Gebrauchsstellung und der Aufbewahrungsstellung zu bewegen,

wobei der Rahmen eine Querstange (9) enthält, die sich zwischen den hinteren Beinen (3a, b) erstreckt und derart angeordnet ist, dass ein hinterer Abschnitt der oberen Stufe (10) auf der Querstange (9) ruht, wenn sich die obere Stufe in der Gebrauchsstellung befindet,

die obere Stufe (10) mit einem manuell lösbaren Arretiermechanismus versehen ist, der ein Schwenkarretierelement (20) enthält, das über eine Arretierfläche (20a) verfügt, die derart angeordnet ist, dass sie unter die Querstange (9) greift, wenn der Rahmen in seine Gebrauchsstellung geklappt ist, so dass die Trittleiter in der Gebrauchsstellung gehalten

ten ist,

das Schwenkarretierelement (20) von einem Benutzer manuell betätigt werden kann, um das Arretierelement (20) von der Querstange (9) zu lösen und den Rahmen in die Aufbewahrungsstellung zu klappen,

wobei die obere Stufe (10) einen Stufenkörper mit einer Plattform (10a) und einer Randleiste (10b) enthält, die sich unter der Plattform, diese umgebend, erstreckt und

das Arretierelement (20) einen Brückenabschnitt (20b) aufweist, der sich von der Arretierfläche (20a) nach hinten zu einem Betätigungsabschnitt (20c) des Arretierelementes (20) erstreckt, wobei der Betätigungsabschnitt (20c) durch die Hand eines Benutzers manuell derart in Eingriff gebracht werden kann, dass, wenn sich die Trittleiter (1) in ihrer Gebrauchsstellung befindet und der Benutzer den Betätigungsabschnitt (20c) nach oben zieht, das Arretierelement (20) von der Querstange (9) gelöst wird und das Arretierelement (20) anschließend mit dem Stufenkörper in Eingriff gelangt, und ein weiteres Ziehen nach oben bewirkt, dass sich die Trittleiter (1) in ihre Aufbewahrungsstellung bewegt,

dadurch gekennzeichnet, dass

der Stufenkörper der oberen Stufe (10) aus Metall besteht,

das Schwenkarretierelement (20) gelenkig mit der Unterseite des Stufenkörpers an einer Position innerhalb des Umfangs der Randleiste (10b) verbunden ist,

sich der Brückenabschnitt (20b) des Arretierelementes (20) von der Arretierfläche (20a) nach hinten, unter der Randleiste (10b) zu dem Betätigungsabschnitt (20c) des Arretierelementes (20) erstreckt und sich der Betätigungsabschnitt (20c) derart benachbart der Außenseite der Randleiste (10b) erstreckt, dass er durch die Hand eines Benutzers manuell in Eingriff gebracht werden kann.

2. Trittleiter nach Anspruch 1, bei der die Randleiste (10b) einen ununterbrochenen hinteren Abschnitt hat.
3. Trittleiter nach Anspruch 1 oder 2, bei der der Stufenkörper aus einer Metallplatte tiefgezogen ist.
4. Trittleiter nach Anspruch 2, bei der der hintere Abschnitt eine einheitliche Höhe über seine Länge hat.
5. Trittleiter nach wenigstens einem der vorhergehenden Ansprüche, bei der das Arretierelement eine Bohrung für einen Schwenkzapfen (23) enthält, wobei sich der Zapfen unter der Plattform erstreckt.
6. Trittleiter nach Anspruch 5, bei der zwei Fahnen (10e) von der Plattform nach unten gebogen sind, wobei diese Fahnen den Schwenkzapfen (23) an ge-

genüberliegenden Enden halten.

7. Trittleiter nach wenigstens einem der vorhergehenden Ansprüche, bei der der Betätigungsabschnitt (20c), sofern sich die Trittleiter in ihrer Gebrauchsstellung befindet, ein oberes Ende unter der Oberseite der oberen Stufe (10) hat.
8. Trittleiter nach wenigstens einem der vorhergehenden Ansprüche, bei der der Betätigungsabschnitt (20c) Vertiefungen enthält, die die Finger der Hand eines Benutzers aufnehmen.
9. Trittleiter nach wenigstens einem der vorhergehenden Ansprüche, bei der das Arretierelement (20) ein monolithisches Element vorzugsweise aus Kunststoff ist.
10. Trittleiter nach wenigstens einem der vorhergehenden Ansprüche, bei der der Arretiermechanismus eine Feder enthält, die das Arretierelement (20) derart drückt, dass es unter der Querstange einrastet.

Revendications

1. Tabouret escabeau comprenant :

un châssis de pliage ayant une paire de pieds avant (2a, b) et une paire de pieds arrière (3a, b), lesdits pieds arrière étant couplés aux pieds avant pour le mouvement de pivotement entre une position d'utilisation ouverte et une position de rangement repliée,

un échelon supérieur (10) et un ou plusieurs échelons inférieurs (11, 12), chaque échelon (10, 11, 12) étant agencé entre et couplé aux pieds avant (2a, b) pour le mouvement de pivotement entre une position d'utilisation horizontale et une position de rangement, chaque échelon (10, 11, 12) étant adapté pour supporter une personne sur ce dernier,

un agencement d'élément de liaison (7, 8) effectuant le mouvement simultané des échelons (10 - 12) lorsque le châssis est plié pour se déplacer entre la position d'utilisation et la position de rangement,

dans lequel le châssis comprend une traverse (9) s'étendant entre les pieds arrière (3a, b) et agencée de sorte qu'une partie arrière de l'échelon supérieur (10) repose sur ladite traverse (9) lorsque ledit échelon supérieur est dans sa position d'utilisation,

l'échelon supérieur (10) étant prévu avec un mécanisme de verrou manuellement déblocable comprenant un élément de verrou pivotant (20) ayant une face de verrou (20a) qui est agencée pour s'accrocher sous ladite traverse (9) lorsque

le châssis est plié dans sa position d'utilisation afin de retenir le tabouret escabeau dans ladite position d'utilisation, l'élément de verrou pivotant (20) pouvant être actionné manuellement par un utilisateur pour dégager l'élément de verrou (20) de la traverse (9) et plier le châssis dans la position de rangement, dans lequel l'échelon supérieur (10) comprend un corps d'échelon ayant une plateforme (10a) et une jupe périphérique (10b) s'étendant au-dessous et autour de ladite plateforme, l'élément de verrou (20) ayant une partie de pont (20b) s'étendant à partir de ladite face de verrou (20a) vers l'arrière dans une partie d'actionnement (20c) dudit élément de verrou (20), ladite partie d'actionnement (20c) pouvant être mise en prise manuellement par la main d'un utilisateur, de sorte que - avec le tabouret escabeau (1) dans sa position d'utilisation - lorsque l'utilisateur tire la partie d'actionnement (20c) vers le haut, l'élément de verrou (20) est débloqué de la traverse (9), l'élément de verrou (20) mettant ensuite en prise le corps d'échelon, et la traction supplémentaire vers le haut amène le tabouret escabeau (1) à se déplacer dans sa position de rangement,

caractérisé en ce que :

le corps d'échelon de l'échelon supérieur (10) est réalisé à partir de métal, l'élément de verrou pivotant (20) est articulé par rapport au côté inférieur du corps d'échelon dans une position située à l'intérieur du contour de la jupe périphérique (10b), la partie de pont (20b) de l'élément de verrou (20) s'étend à partir de la face de verrou (20a) vers l'arrière, au-dessous de la jupe périphérique (10b), vers la partie d'actionnement (20c) dudit élément de verrou (20), et ladite partie d'actionnement (20c) s'étend de manière adjacente au côté externe de la jupe périphérique (10b) afin de pouvoir être mis en prise manuellement par la main d'un utilisateur.

2. Tabouret escabeau selon la revendication 1, dans lequel la jupe périphérique (10b) a une partie arrière continue.
3. Tabouret escabeau selon la revendication 1 ou 2, dans lequel le corps d'échelon est embouti à partir d'un métal en plaque.
4. Tabouret escabeau selon la revendication 2, dans lequel la partie arrière a une hauteur uniforme sur sa longueur.

5. Tabouret escabeau selon une ou plusieurs des revendications précédentes, dans lequel l'élément de verrou comprend un alésage pour une broche de pivot (23), la broche de pivot s'étendant au-dessous de la plateforme.
6. Tabouret escabeau selon la revendication 5, dans lequel deux languettes (10e) sont pliées vers le bas à partir de la plateforme, les languettes supportant la broche de pivot (23) au niveau des extrémités opposées.
7. Tabouret escabeau selon une ou plusieurs des revendications précédentes, dans lequel la partie d'actionnement (20c) - avec le tabouret escabeau dans la position d'utilisation - a une extrémité supérieure au-dessous de la face supérieure de l'échelon supérieur (10).
8. Tabouret escabeau selon une ou plusieurs des revendications précédentes, dans lequel la partie d'actionnement (20c) comprend des dépressions pour loger les doigts de la main d'un utilisateur.
9. Tabouret escabeau selon une ou plusieurs des revendications précédentes, dans lequel l'élément de verrou (20) est un élément monolithique, de préférence en plastique.
10. Tabouret escabeau selon une ou plusieurs des revendications précédentes, dans lequel le mécanisme de verrou comprend un ressort poussant l'élément de verrou (20) pour s'accrocher sous la traverse.

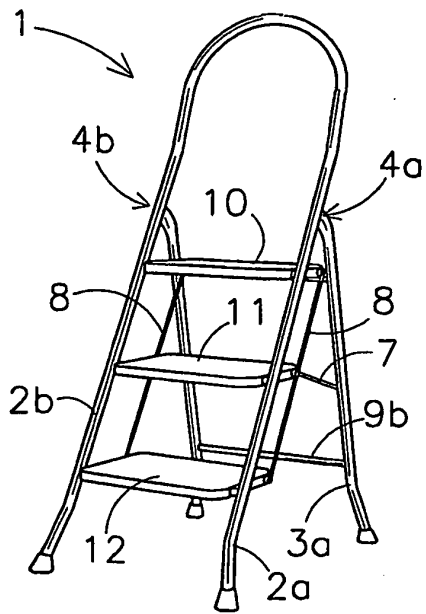


Fig 1

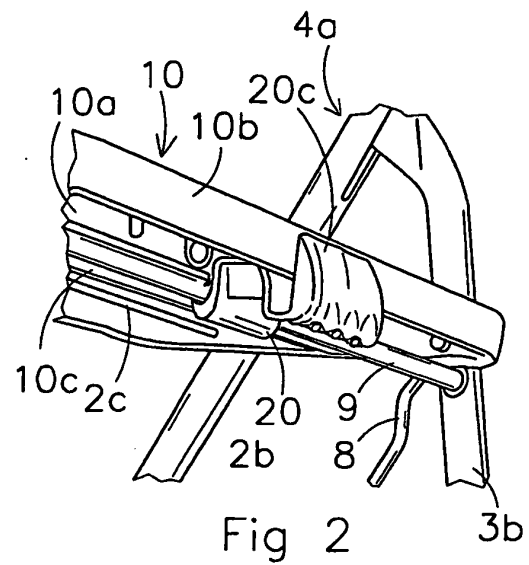


Fig 2

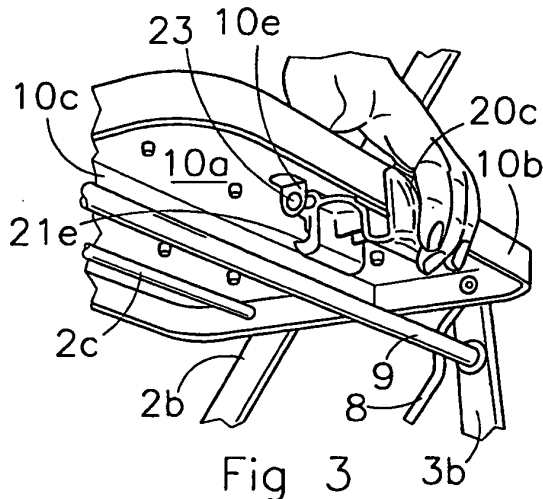


Fig 3

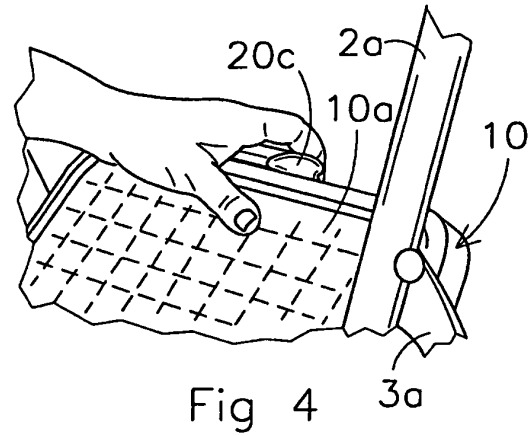


Fig 4

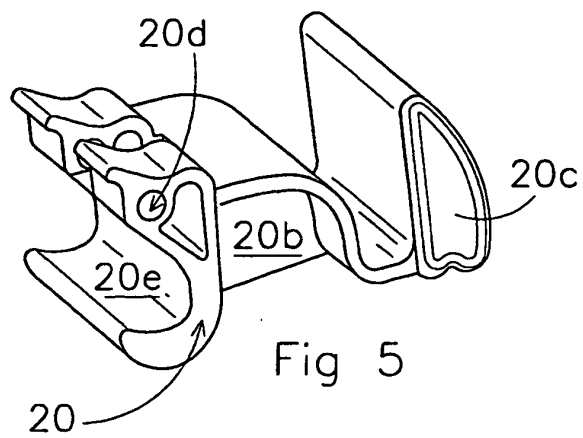


Fig 5

REFERENCES CITED IN THE DESCRIPTION

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