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(54) **Closure means for front panel of heat exchanger for condensation tumble dryer**

Verschlussvorrichtung einer Frontplatte für einen Wärmetauscher eines Wäschetrommeltrockners mit Kondensateinrichtung

Dispositif de fermeture pour une plaque frontale d'un échangeur de chaleur d'un séchoir à tambour avec condenseur

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Description

[0001] The invention concerns a condensation tumble dryer with a clothes cylinder and a heat exchanger, wherein fitted into the front panel is a filling opening for the clothes cylinder, below which is an access opening to the heat exchanger and wherein the access opening can be locked and released by means of a fold-down cover, wherein to lock and release the cover, a vertical finitely adjustable control rod is used, which is held between filling opening and access opening on the rear side of the front panel, wherein the control rod can be accessed in the filling opening with an operating end and, in the area of the upper edge of the access opening, the locking and release of the cover is controlled by an actuation end.

[0002] This embodiment of condensation tumble dryer is known from EP 0 538 655 B1. This known connection and control of the cover by means of a control. rod is adequate, providing that the cover is small and has a flat unit on the front panel, i.e. the access opening. If this is not the case, several control rods are required which must be used at the same time in order to disengage the lock. This hinders access to the heat exchanger. Thus, various embodiments of control rods may become necessary, if the cover and the access opening have a horizontal and/or vertical curvature. A further difficulty can occur if the access opening is offset to the side of the filling opening and for this reason, the control rods cannot be distributed over the horizontal dimension such that they can be operated in the area of the filling opening.

[0003] The task of the invention is, on a condensation tumble dryer of the type mentioned above, to control the cover at the access opening to the heat exchanger with one single control rod, even if this is offset to the side of the filling opening and due to a horizontal and/or vertical curve geometry, several locking positions are required on the closing side.

[0004] This task is solved in accordance with the invention, in that in the area of the upper edge of the access opening, a horizontal, finitely adjustable closing rod is held by tension in a closing position, in which with at least 2 separate closing hooks, it can be made to establish a connection with the corresponding closing elements of the cover and that the closing rod, with an actuation end of the control rod formed as a sliding catch, can be pushed from the closing position against the effect of the spring, into an opening position.

[0005] To control the cover, only one single control rod is provided, which is to be coupled at any point in the longitudinal direction of the closing rod. This is always possible, since only parts of the access opening and the filling opening have to overlap. The closing rod and the cover can be designed to have any number of locking points and adapted in line with the curvature of the cover. This ensures that once the control rod has been disengaged, the cover is opened so far that it folds down into the open position, as will be illustrated later.

[0006] The adjustable position of the closing rod is achieved in accordance with one embodiment, in that the closing rod extends over the horizontal dimension of the access opening and is guided on the rear side of the front panel in mounted guide elements, wherein the tensioned support is achieved most simply by the spring being mounted in one piece on the closing rod and supported on a sliding catch on the front panel to maintain the closed position.

[0007] The coupling between the control rod and closing rod can be achieved at any pojnt along the longitudinal direction of the closing rod, since the closing rod is fitted with a mount, into which the sliding catch of the control rod is inserted and since the sliding catch and the bevel of the control rod interacts with a sliding bevel of the closing rod, angled in the opposite direction. Thus, when the closing rod returns from the pushed open position into the closed position, an opening movement is automatically exerted on the cover, provided that the closing hooks of the closing rod are formed as detent springs with catches, which are mounted in one piece on the closing rod and interact with closing elements with bevels angled in opposite directions and mounted on the cover in one piece, which are formed as detent catches. The bevels of the closing hooks and closing elements slide towards each other and open the cover so wide, such that its intrinsic weight causes it to fold down into the open position.

[0008] If in accordance with one embodiment, fitted to both ends of the control rod are catches, which limit the vertical adjustment of the control rod, wherein at least the catches on one end of the control rod, to insert into the mount located on the front panel, can be moved from a held engaged position, then the control rod can easily be inserted into mounts of parallel bridges of the front panel, wherein the movable catch has to be moved out so far that it can pass the fitted mount and resume its engaged position on the bridge.

[0009] In accordance with a preferential embodiment, the control rod can be made to establish a connection with one end of the closing rod and the closing rod on the front panel is supported by the spring mounted onto the other end.

[0010] The.cover is preferably composed of a lockable grid insert and a cover frame, which is coupled to the front panel in the area of its lower edge.

[0011] The invention is explained in more detail by way of one of the embodiments illustrated in the drawings. The following are shown:

Fig. 1: a partial view on the rear side of the front panel with the attached control rod and the horizontal sliding closing rod,

Fig. 2: an exploded view of the control rod,

Fig. 3: a partial view on the front side of the front panel with the cover coupled for free access opening,

Fig. 4: an exploded view of the closing rod,

Figs. 5a to 5c: the control rod assembly in three schematic positions, and

Figs. 6a to 6c the cover positions and closing point when the cover is being opened in three schematic positions.

[0012] As the partial view in Fig. 1 shows, the filling opening 11 for the clothes cylinder in the front panel 10 can be arranged offset against the access opening 14 to the heat exchanger. In the area of the upper edge of the access opening 14, a horizontal bridge 12 is attached to the rear side of the front panel 10, so that in the edge between the filling opening 11 and the bridge 12, a vertical finitely adjustable control rod 20 can be inserted as shown in Fig. 2, as shown in Figs. 5a to 5c.

[0013] The control rod 20 is firstly inserted with an actuation end 25 into a mount 12a of the bridge 12, as shown by Fig. 5a. Thus, the mounted springs 22 are supported on the bridge 12 and are tensioned as indicated in Fig. 5b with the reference figure 22'. Thus, the catch 23, which is distanced as a detent spring, can be pushed back so far, that it can pass the mount 12a, as indicated by the reference figure 23'. The control rod 20 can then be pivoted so far towards the front panel 10, that the control end 21 can be inserted into the mount 11a of the filling opening 11 side catches 24 on the control rod 20 limit the idle position shown in Fig. 5c, which is held by the springs 22. The catch 23 assumes the locking position and, by means of.the catch on bridge 12, limits the downward adjustment movement of the control rod 20.

[0014] As also shown by Fig. 1, in the area of the bridge 12 in sliding catches 13 and 15, a closing rod 30 in accordance with Fig. 4 can be adjusted in a horizontal direction. Thus, closing hooks 34 and 35 with locking bevels 36 formed as locking springs are mounted onto both ends of the closing rod 30. These closing hooks 34 and 35 with locking bevels 36 project onto the front side of the front panel 10, as shown in Fig. 3. The cover 40 comprising the cover frame 44 and engaged grid insert 42 is coupled to the front panel 10 with the lower edge in the area of the lower edge of the access opening 14 on the front panel 10, as shown by the link elements 45. Mounted onto the closing rod 30 is also a spring element 33, which is supported on the front panel 10 and which holds the closing rod 30 in a starting position, which corresponds to the closing position, in which the closing element 43 of the cover 40, formed as locking catches, can engage with the locking catches 36 of the closing hooks 34 and 35. The grid insert 42 can be engaged into the cover frame 44.

[0015] In the locking position, the closing rod 30 is positioned in relation to the control rod 20, such that its actuation end 25 can be inserted into a mount 31 of the closing rod 30. This takes place when the control rod 20 is actuated downwards, wherein the door of the filling opening 11 is opened, providing access to the control end 21. The actuation end 25 of the control rod 20 is formed as a sliding catch and fitted with a sliding bevel 26, which during downward adjustments, slides along a sliding bevel 32 of the closing rod 30 angled in the opposite direction and pushes the closing rod 30 against the effect of the spring 33 so far in a horizontal direction, that the locking catches 36 of the closing hooks 34 and 35 on the closing rod 30 disengage the closing elements 43 of the cover 40 which are formed as locking catches. Thus, the closing hooks 34, which are supported on bridges 41 of the cover 40, are placed under spring tension, as indicated by the reference figure 34 in Fig. 6b. The closing position shown in Fig. 6a is released. If the control rod 20 is disengaged, the springs 22 return the control rod 20 to the starting position as shown in Fig. 5c.

[0016] When the control rod 20 is released, the closing rod 30 is returned to its starting position through the tensioned spring element 33, as shown in Fig. 6c.

[0017] The bevels 36 of the closing hooks 34 and 35 slide onto the bevels angled in an opposite direction of the closing elements 43 of the cover 40, which are formed as locking catches, and opens this so wide, that its intrinsic weight causes it to fold down into the open position, as shown by Fig. 6c.

[0018] If the cover 40 is closed, the locking position shown in Fig. 6a is resumed.

[0019] The closing hooks 34 and 35 are mounted in one piece onto the closing rod 30 and dstributed over the horizontal dimension of the cover 40 with the fitted closing elements 43.

Claims

1. Condensation tumble dryer with a clothes cylinder and a heat exchanger, wherein fitted into the front panel (10) is a filling opening (11) for the clothes cylinder, below which is an access opening (14) to the heat exchanger and wherein the access opening (14) can be locked and released by means of a fold-down cover (40), wherein to lock and release the cover (40), a vertical finitely adjustable control rod (20) is used, which is held between filling opening (11) and access opening (14) on the rear side of the front panel (10), wherein the control rod (20) can be accessed in the filling opening (11) with a control end (21) and, in the area of the upper edge of the access opening, the locking and release of the cover is controlled by an actuation end
characterised in that
in the area of the upper edge (12) of the access opening (14), a horizontal, finitely adjustable clos-

ing rod (30) is tensioned by a spring (33) in a closing position, in which with at least 2 separate closing hooks (34, 35), it can be made to establish a connection with the corresponding closing elements (41) of the cover (40) and
that the closing rod (30), with an actuation end of the control rod (20) formed as a sliding catch (25), can be pushed from the closing position against the effect of the spring (33) into an opening position.

2. Condensation tumble dryer in accordance with Claim 1,
characterised in that
the closing rod (30) extends over the horizontal dimension of the access opening (14) and can be guided into the guide elements (13,15) mounted onto the rear side of the front panel (10).

3. Condensation tumble dryer in accordance with Claim 1 or 2,
characterised in that
the spring (34) is mounted onto the closing rod (30) in one piece and supported on the guide catch (15) of the front panel (10), which maintains the closing position.

4. Condensation tumble dryer in accordance with one of the Claims 1 to 3,
characterised in that
the closing rod (30) is fitted with a mount (31), into which the sliding catch (25) of the control rod (20) is inserted and that the sliding catch (25) with bevels (26) of the control rod (20) interacts with a sliding bevel (32) of the closing rod (30) angled in the opposite direction.

5. Condensation tumble dryer in accordance with one of the Claims 1 to 4,
characterised in that
the closing hooks (34, 35) of the closing rod (30) are formed as locking springs with locking catches (36), which are mounted onto the closing rod (30) in one piece and interact with closing elements (43) moulded as one single component onto the cover (40) with bevels angled in an opposing direction, which are formed as locking catches.

6. Condensation tumble dryer in accordance with one of the Claims 1 to 5,
characterised in that
fitted to both ends of the control rod (20) are catches (23, 24), which limit the vertical adjustment movement of the control rod (20), wherein at least the catches (23) at one end of the control rod (20) are released from their held locking position for insertion into the corresponding mount (11a, 12a) of the front panel (10).

7. Condensation tumble dryer in accordance with one of the Claims 1 to 6,
characterised in that
the control rod (20) is made to establish a connection with one end of the, closing rod (30), and
that the closing rod (30) on the front panel (10) is supported by the spring (33) mounted to the other end.

8. Condensation tumble dryer in accordance with one of the Claims 1 to 7,
characterised in that
the cover (40) comprises a grid insert (42), which is inserted and in particular engaged into a cover frame (44).

Patentansprüche

1. Kondensattrommeltrockner mit einer Wäschetrommel und einem Wärmetauscher, wobei in der Frontplatte (10) eine Füllöffnung (11) für die Wäschetrommel angeordnet ist, unter der sich eine Zugangsöffnung (14) zum Wärmetauscher befindet, die Zugangsöffnung (14) mittels eines nach unten klappbaren Deckels (40) verschlossen und geöffnet werden kann, zum Verschließen und Öffnen des Deckels ein vertikaler, begrenzt einstellbarer Steuerstab (20) verwendet wird, der zwischen der Füllöffnung (11) und Zugangsöffnung (14) auf der Rückseite der Frontplatte (10) gehalten wird, auf ein Betätigungsende (21) des Steuerstabs (20) in der Füllöffnung (11) zugegriffen werden kann und das Verschließen und Öffnen des Deckels (40) im Bereich der oberen Kante der Zugangsöffnung (14) mittels eines Betätigungsendes (25) gesteuert wird,
dadurch gekennzeichnet,
dass ein horizontaler, begrenzt einstellbarer Schließstab (30) im Bereich der oberen Kante (12) der Zugangsöffnung (14) mittels einer Feder (33) in eine Schließposition vorgespannt ist, in der mit mindestens zwei getrennten Schließhaken (34, 35) eine Verbindung mit entsprechenden Schließelementen (41) des Deckels (40) hergestellt werden kann, und dass der Schließstab (30) mit einem als Rastvorrichtung ausgebildeten Betätigungsende (25) aus der Schließposition gegen die Wirkung der Feder (33) in die offene Position gestoßen werden kann.

2. Kondensattrommeltrockner nach Anspruch 1,
dadurch gekennzeichnet,
dass der Schließstab (30) längs der horizontalen Dimension der Zugangsöffnung (14) verläuft und in Führungselementen (13, 15) geführt werden kann, die auf der Rückseite der Frontplatte (10) befestigt sind.

3. Kondensattrommeltrockner nach Anspruch 1 oder 2,
dadurch gekennzeichnet,
dass die Feder (34) mit dem Schließstab (30) einstückig verbunden ist, sich in der Führungsaufnahme (15) der Frontplatte (10) abstützt und die Schließposition aufrechterhält.

4. Kondensattrommeltrockner nach einem der Ansprüche 1 bis 3,
dadurch gekennzeichnet,
dass der Schließstab (30) mit einer Aufnahme (31) versehen ist, in der die Gleitrastvorrichtung (25) des Steuerstabs (20) aufgenommen ist, und dass die Gleitrastvorrichtung (25) Abschrägungen (26) des Steuerstabs (20) und mit diesen Abschrägungen zusammenarbeitende Gleitabschrägungen (32) des Schließstabs (30) aufweist, wobei die Abschrägungen (26, 32) in entgegengesetzten Richtungen verlaufen.

5. Kondensattrommeltrockner nach einem der Ansprüche 1 bis 4,
dadurch gekennzeichnet,
dass die Schließhaken (34, 35) des Schließstabs (30) als Rastfedern mit Rastvorsprüngen (36) ausgebildet sind, wobei die Rastfedem mit dem Schließstab (30) einstückig verbunden sind und mit den Schließelementen (43) zusammenarbeiten, die als eine einzelne Komponente an den Deckel (40) mit Abschrägungen angespritzt sind, die in entgegengesetzter Richtung abgeschrägt sind, wobei die Schließelemente (43) als Rastvorrichtungen ausgebildet sind.

6. Kondensattrommeltrockner nach einem der Ansprüche 1 bis 5,
dadurch gekennzeichnet,
dass an beiden Enden des Steuerstabs (20) Rastvorrichtungen (23, 24) vorgesehen sind, die die vertikale Einstellbewegung des Steuerstabs (20) begrenzen, wobei mindestens die Rastvorrichtungen (23) an einem Ende des Steuerstabs (20) aus ihrer gehaltenen Schließposition zum Einfügen in die entsprechende Aufnahme (11a, 12a) der Frontplatte (10) freigegeben werden.

7. Kondensattrommeltrockner nach einem der Ansprüche 1 bis 6,
dadurch gekennzeichnet,
dass der Steuerstab (20) derart ausgebildet ist, dass er eine Verbindung mit einem Ende des Schließstabs (30) herstellt, und dass sich der Schließstab (30) mittels der Feder (33) an der Frontplatte (10) abstützt.

8. Kondensattrommeltrockner nach einem der Ansprüche 1 bis 7,
dadurch gekennzeichnet,
dass der Deckel (40) einen Gittereinsatz (42) aufweist, der in einen Deckelrahmen (44) eingefügt ist, insbesondere in diesen eingreift.

Revendications

1. Séchoir à tambour avec condenseur avec un tambour à vêtements et un échangeur de chaleur, dans lequel est monté dans le panneau avant (10) une ouverture de remplissage (11) pour le tambour à vêtements, sous laquelle se trouve une ouverture d'accès (14) à l'échangeur de chaleur et dans laquelle l'ouverture d'accès (14) peut être verrouillée et déverrouillée au moyen d'un couvercle rabattable (40), dans lequel pour verrouiller et déverrouiller le couvercle (40), une tige de commande verticale réglable de manière finie (20) est utilisée, qui est maintenue entre l'ouverture de remplissage (11) et l'ouverture d'accès (14) sur le côté arrière du panneau avant (10), dans lequel on peut accéder à la tige de commande (20) dans l'ouverture de remplissage (11) avec une extrémité de commande (21) et, dans la zone du côté supérieur de l'ouverture d'accès, le verrouillage et le déverrouillage du couvercle sont commandés par une extrémité d'actionnement
caractérisé en ce que
dans la zone du bord supérieur (12) de l'ouverture d'accès (14), une tige de commande horizontale réglable de manière finie (30) est mise sous tension par un ressort (33) dans une position fermée, dans lequel avec au moins deux crochets de fermeture séparés (34, 35), on peut établir une connexion avec les éléments de fermetures correspondants (41) du couvercle (40) et
en ce que la tige de fermeture (30), avec une extrémité d'actionnement de la tige de commande (20) formée comme un loquet coulissant (25), peut être poussée hors de la position fermée contre l'action du ressort (33) dans une position ouverte.

2. Séchoir à tambour avec condenseur selon la revendication 1,
caractérisé en ce que
la tige de fermeture (30) s'étend au-dessus de la dimension horizontale de l'ouverture d'accès (14) et peut être guidée dans les éléments de guidage (13, 15) montés sur le côté arrière du panneau avant (10).

3. Séchoir à tambour avec condenseur selon la revendication 1 ou 2,
caractérisé en ce que
le ressort (34) est monté sur la tige de fermeture (30) dans une pièce et supportée sur le loquet de guidage (15) du panneau avant (10), qui maintient la position fermée.

4. Séchoir à tambour avec condenseur selon l'une des revendications 1 à 3,

caractérisé en ce que

la tige de fermeture (30) est montée avec un trou de montage (31), dans lequel le loquet coulissant (25) de la tige de commande (20) est insérée et **en ce que** le loquet coulissant (25) avec des biseaux (26) de la tige de commande (20) interagit avec un biseau coulissant (32) de la tige de fermeture (30) incliné dans la direction opposée.

5. Séchoir à tambour avec condenseur selon l'une des revendications 1 à 4,

caractérisé en ce que

les crochets de fermeture (34, 35) de la tige de fermeture (30) sont formés comme des ressorts de fermeture avec des loquets de fermeture (36), qui sont montés sur la tige de fermeture (30) en une pièce et interagissent avec des éléments de fermeture (43) moulés comme un seul composant sur le couvercle (40) avec des biseaux inclinés dans une direction opposée, qui sont formés comme des loquets de fermeture.

6. Séchoir à tambour avec condenseur selon l'une des revendications 1 à 5,

caractérisé en ce que

aux deux extrémités de la tige de commande (20), sont montées des loquets (23, 24), qui limitent le mouvement de réglage vertical de la tige de commande (20), dans lequel au moins les loquets (23) à une extrémité de la tige de commande (20) sont déverrouillés de leur position de verrouillage maintenue pour l'insertion dans le trou de montage correspondant (11a, 12a) du panneau avant (10).

7. Séchoir à tambour avec condenseur selon l'une des revendications 1 à 6,

caractérisé en ce que

la tige de commande (20) est faite pour établir une connexion avec une extrémité de la tige de fermeture (30), et

en ce que la tige de fermeture (30) sur le panneau avant (10) est supportée par le ressort (33) monté sur l'autre extrémité.

8. Séchoir à tambour avec condenseur selon la revendication 1,

caractérisé en ce que

le couvercle (40) comprend une grille insérée (42), qui est insérée et en particulier en prise dans un cadre de couvercle (44).

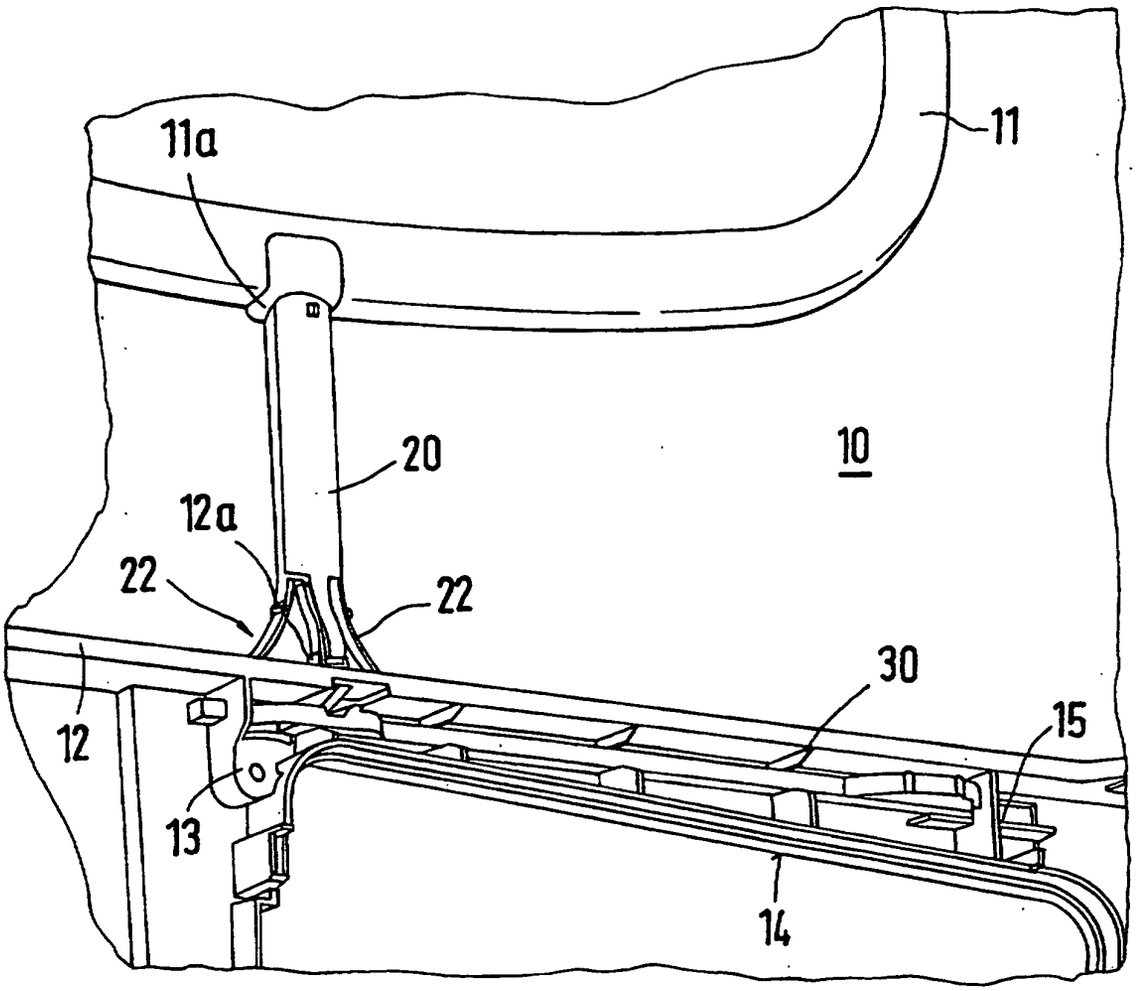


Fig.1

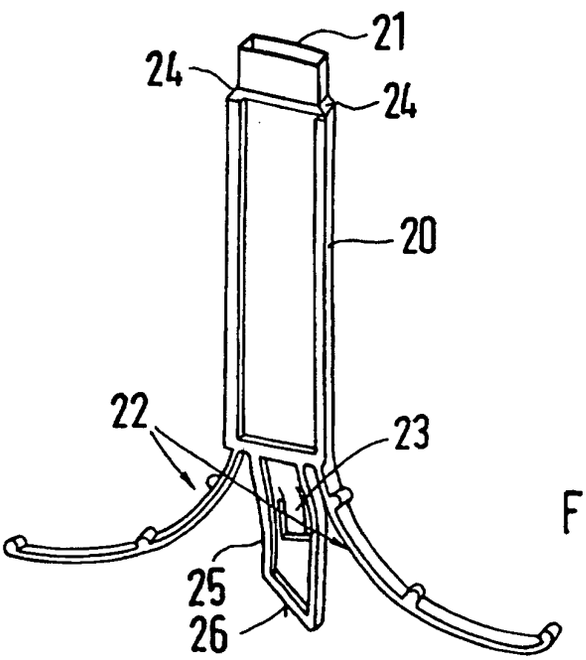


Fig.2

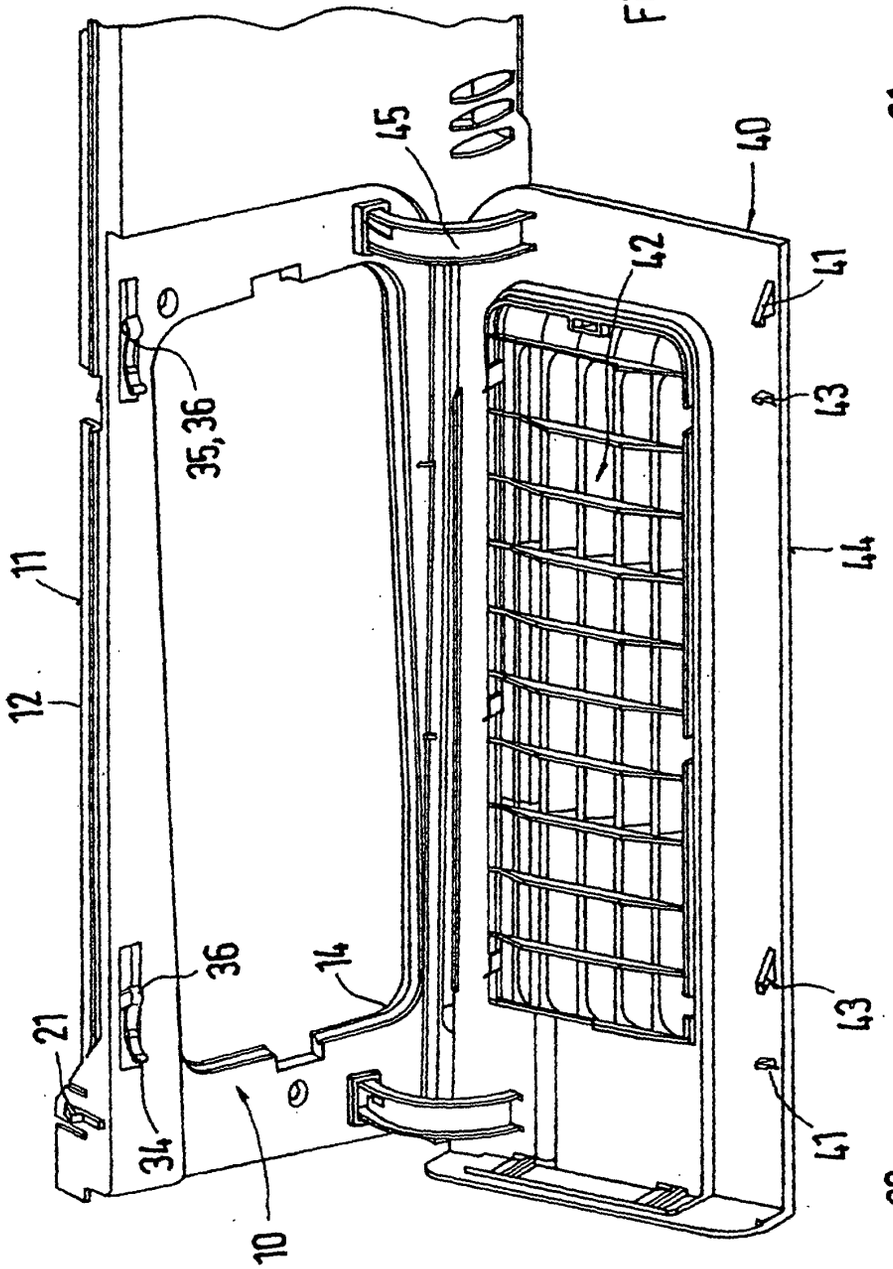

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Fig.3

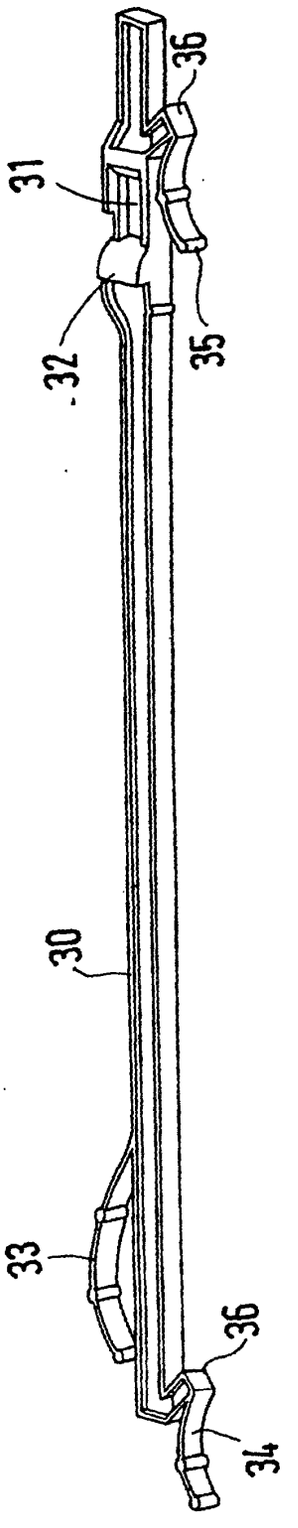

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Fig.4

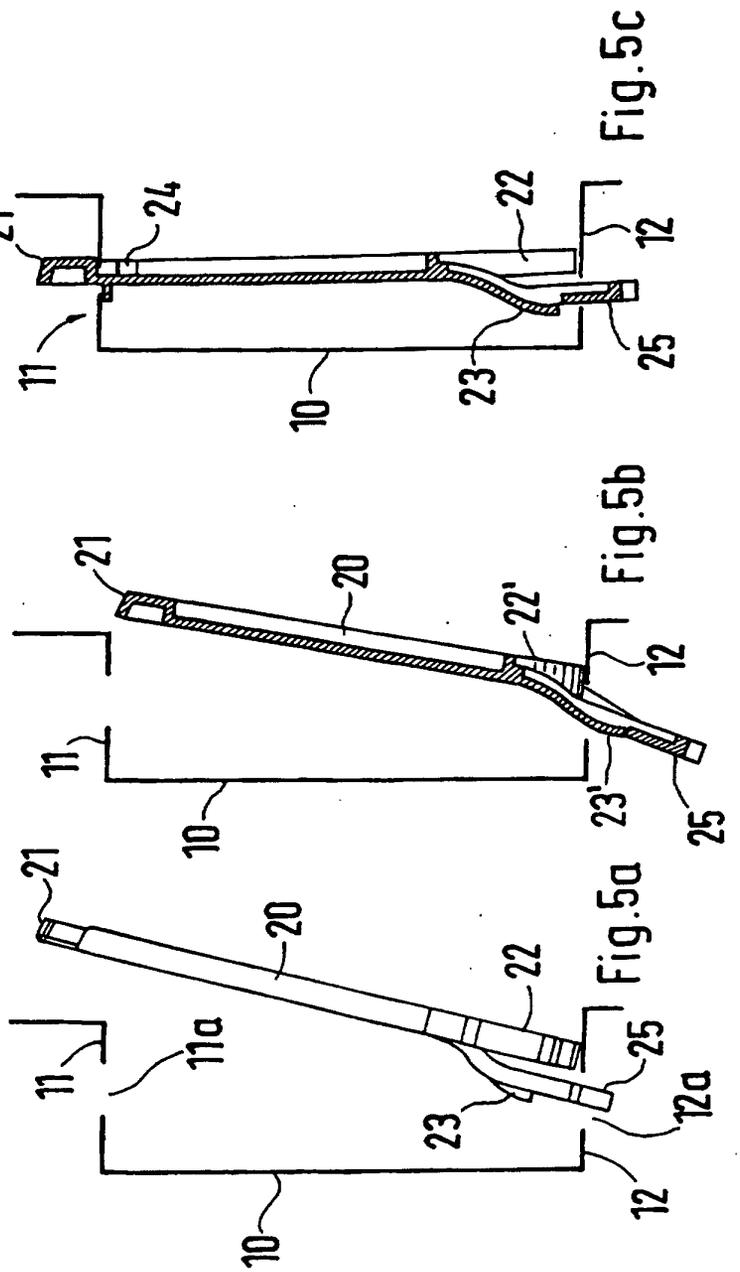


Fig.5c

Fig.5b

Fig.5a

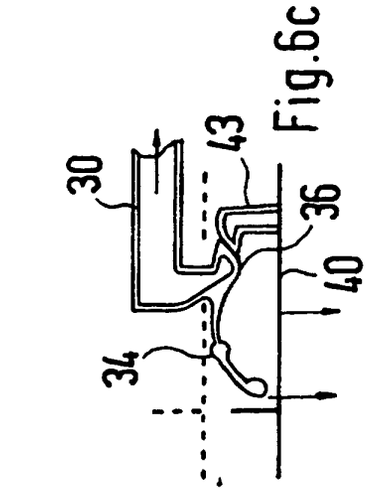


Fig.6c

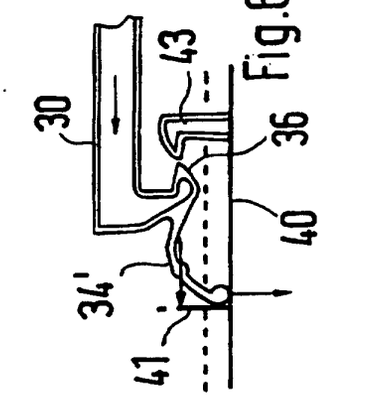


Fig.6b

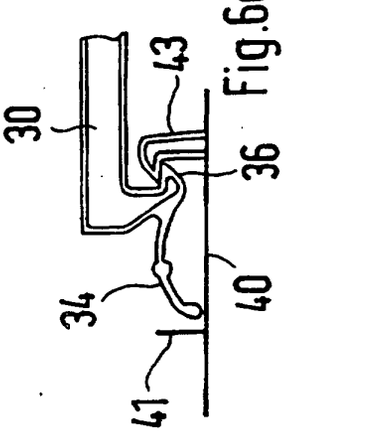


Fig.6a