

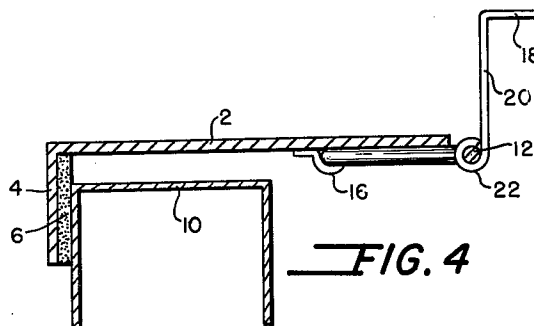
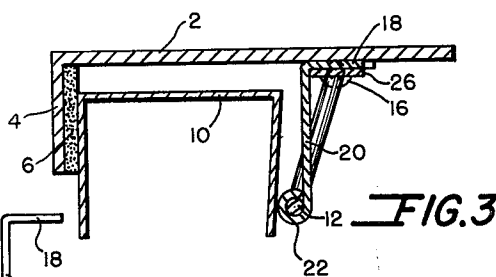
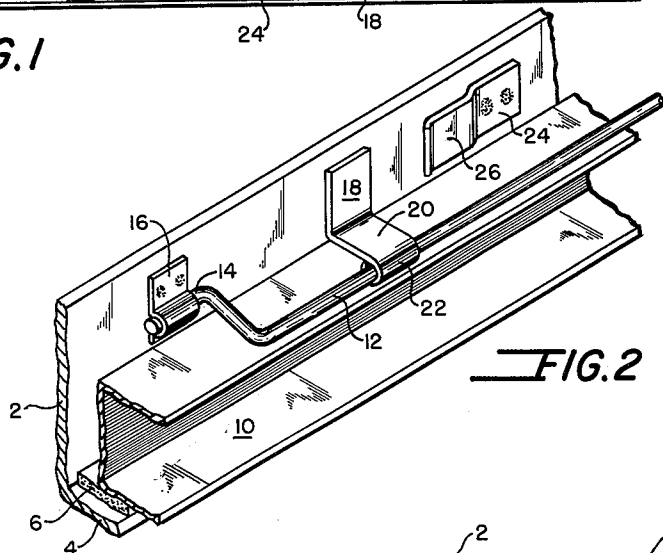
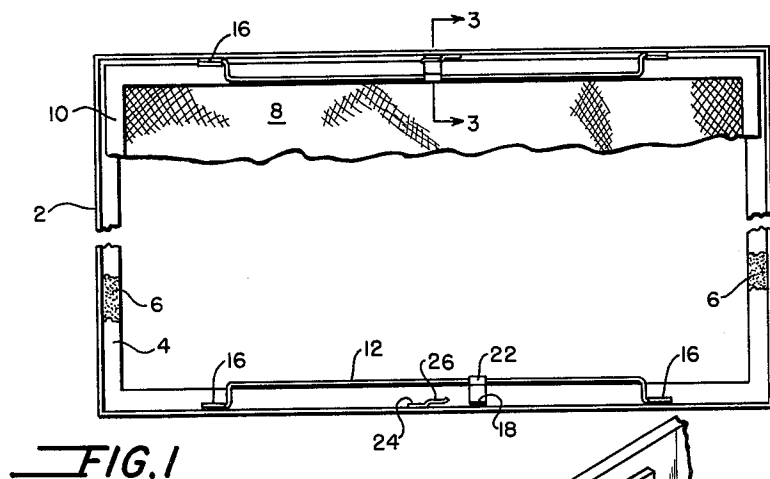
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UNIT AIR FILTER LATCH

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1

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UNIT AIR FILTER LATCH

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This invention relates to unit air filter latches.

Unit air filter cells or panels are normally mounted within an auxiliary frame which is permanently installed to extend across an air stream. The auxiliary frame has an unobstructed front opening and a marginally flanged rear opening, and latch means mounted on the frame are used to releasably hold the filter cell within the frame. The latch means in a cell-latching-position normally engages the front margin of the cell at two or more points and presses the cell rearwardly to effect an air sealing engagement of the rear margin of the cell against the rear flange of the frame.

Many prior latches have not been completely acceptable for one reason or another. A deficiency of certain latches has been that they project forwardly from the frame so that increased shipping and storage space is required. Also the projecting latches are subjected to the possibility of damage during handling and storage. Another deficiency of certain latch arrangements is that the latches have relatively small contact areas which concentrate the rearward pressure on the filter cell at a few points only instead of distributing the force over a substantial part of the filter cell margin. With certain filter cells, such as those employing pasteboard channel margins, the concentrated pressure causes the margin to so deform and bow that the air seal between frame and cell is lost.

An object of this invention is to provide a relatively inexpensive, simple, easily operated latch which: does not have rigidly mounted forwardly projecting parts; may be released to a position permitting unobstructed removal of a filter cell; does not deform the margins of a filter cell to an extent that the air seal between frame and cell is lost; and which satisfies other known requirements for filter latches.

The invention will be described in connection with the accompanying drawing illustrating the principles of the invention incorporated in one embodiment by way of example, and wherein:

FIGURE 1 is a partly broken front face view of a unit filter cell mounted in an auxiliary frame provided with a latch constructed in accordance with the present invention;

FIGURE 2 is a fragmentary isometric view of an auxiliary frame wall fitted with the latch, this view showing a filter cell margin in the frame and the latch in a cell-latching-position but not locked in that position;

FIGURE 3 is a sectional view taken along the line 3-3 of FIGURE 1 with the latch in a cell-latching-position; and,

FIGURE 4 is a sectional view similar to FIGURE 3 but illustrating the latch fully retracted to a cell-releasing-position.

The metal auxiliary frame has perimetric side walls 2 defining a front unobstructed opening, and an inwardly directed rear flange 4 defining the rear opening. On the front face of flange 4, felt 6 or other suitable material is adhesively secured so that when an air filter panel or cell 8 is fitted within the frame the rear face of a channel-shaped margin 10 lies against the felt 6. The filter cell is pressed rearwardly and held within the frame by the latching means engaging the front face of the margin 10 along at least two sides of the cell.

The latching means of the invention are probably best understood in a general way in connection with FIGURE 2. At least two of the side walls of the auxiliary frame are

2

provided with identical latches in the form of somewhat bail-shaped wire arms having an elongate straight portion or bight 12 adapted to press against the front face of the filter cell margin when the latch is in cell-engaging-position, and having ends 14 which are axially offset relative to the bight and each of which is pivotally secured by a hinge strap 16 welded to the auxiliary frame wall.

The bight 12 of each latch carries an L-shaped clip having a leg portion 18 and a base portion 20. The toe of the base portion 20 is rolled to form a sleeve 22 encircling the bight 12 in such fashion that the clip may be both slid axially along, and rotated about, the bight. Near the front edge of the auxiliary frame wall 2, a tongue-like keeper element or detent is secured. The detent includes a base portion 24 welded to the inner face of the wall, and an offset portion 26 spaced away from and extending along the wall so that a passage having one open end is formed along the wall. When the clip is moved into engagement with the detent so that the leg 18 is received between the offset portion 26 and the wall, the bail latch is locked in a cell-engaging-position. When the leg 18 is moved out of the passage, the bail latch is free to be moved out of a cell-engaging-position. The bail is preferably made of rod or wire material which does not appreciably yield in normal service. Consequently, when the bail is locked in position, the filter cell is pressed rearwardly by substantially the entire length of the bight 12 with the bight being held in position at both ends and by the clip.

FIGURE 3 illustrates the position of the latching means relative to the frame wall and cell margin in a cell-engaging-position. In this case the latch bail projects inwardly and somewhat rearwardly from the frame wall with the bight 12 pressing along the front face of the cell margin. It will be appreciated from this view that, in accordance with the invention, the clip is so dimensioned, relative to the swinging radius of the bail, that the leg 18 of the clip can be received behind the detent only when the bail is in the proper cell-engaging-position. That is, if the bail is swung past a correct position the clip will be tilted with its leg 18 out of the plane in which it must lie to be received by the detent. Conversely, if the bail is not swung far enough toward a cell-engaging-position the base portion 20 will not be long enough so that the leg 18 can be received by the detent. Thus, the latch assembly is so made that the front marginal face of the cell is firmly engaged and possibly flexed by the bail when it is in the correct cell-engaging-position. This arrangement not only insures a tight air seal between the flange 4 and the rear face of the cell margin, but also avoids any guesswork as to when the bail is in a proper latching position.

FIGURE 4 illustrates the latching means in a retracted position permitting the removal of the cell. In this case the bail has been swung forwardly and outwardly until it lies closely against the auxiliary frame wall 2. During this cell-release-operation, the clip has been so rotated that it projects laterally out of the front face of the frame to permit the unobstructed removal of the cell. To the end that this lateral projection of the clip out of the frame is possible, the bail is dimensioned and hinged, relative to the front edge of the auxiliary frame, so that its swinging radius is sufficient to carry the bight 12 of the bail to a position relative to the front edge of the frame that the clip can be rotated to a position where it does not obstruct the front opening of the frame.

It is also noted that the detent is positioned with its forward edge spaced rearwardly from the forward edge of the auxiliary frame. This is done so that as the bail is swung to its cell-releasing-position, the bail will clear the detent and thereby permit the bail to lie closely against the frame wall.

It will be appreciated that the hinge strap 16 and the detent tongue 26 need not be separate parts secured to

3

the wall 2, but instead may be integral with but struck out from the frame wall.

For modifying auxiliary frames in service but having unsatisfactory latch means, the latch assembly including the hinges, bail, clip, and detent may all be mounted on an integral base member (not shown) which may in turn be secured to a frame in service.

The auxiliary frame may be shipped with the latch locked in a cell-engaging-position even though the cell itself is shipped separately. Or if the latch is not locked in a cell-engaging-position, the latch may be swung downwardly with the clip toward the rear of the frame so that no part of the latch means projects out of the frame.

While the invention has been described in connection with a filter cell having a frame around the edges, it will be appreciated that the latch may be used with a filter pad not enclosed by a frame if a suitable open-work grid is provided for the front and rear faces of the pad.

The invention claimed is:

1. An improvement in latches for releasably retaining an air filter cell within a forwardly open auxiliary frame having a marginal sealing flange along its rear, comprising: a bail-shaped latch having an elongate bight and axially offset ends pivotally secured to a wall of said frame to permit swinging movement of said latch from a cell-releasing-position in which the bight of said latch lies closely adjacent said wall permitting removal and insertion of a cell, to a cell-latching-position in which said bight is swung inwardly to lie in spaced relation from said wall for engagement along a forward margin of said cell; a tongue projecting inwardly from, and extending along, said wall in spaced relation thereto to define a clip retaining slot between said wall and tongue; and latch locking means in the form of an angular clip slidably mounted on said bight for movement therealong to a latch locking position wherein a portion of said clip is received within said slot to retain said latch in a cell-latching-position.

2. An improvement in latches for releasably retaining an air filter cell within a forwardly open auxiliary frame having a marginal sealing flange along its rear, comprising: a bail-shaped latch pivotally secured at its ends for swinging movement of the bight thereof between a cell-engaging-position in which said latch projects obliquely

4

and rearwardly away from a wall of said frame to engage a margin of said cell and a cell-releasing-position in which said latch projects forwardly to lie closely along said wall; an angular clip having one extremity slidably connected to said bight for movement axially therealong and rotation thereabout, and an opposite leg in face-to-face contact with said wall when said latch is in cell-engaging-position; and detent means on said wall forming a clip retaining slot therewith to receive and retain said opposite leg for holding said latch in cell-latching-position.

3. The improvement in latches of claim 2 wherein: said latch is pivotally secured along an axis, relative to the swinging radius of said latch and the forward edge of said frame, that said bight in a cell-releasing-position lies sufficiently forward relative to said forward edge of said frame to permit rotation of said clip to project laterally out of the open face of said frame.

4. The improvement in latches of claim 3 wherein: said detent means is so disposed relative to the arc through which said bight is displaceable, that said bight may be moved between opposite positions without obstruction by said detent means.

5. An improvement in latches for releasably retaining an air filter cell within a forwardly open auxiliary frame having a marginal sealing flange along its rear, comprising: a wire latching arm of generally U-shape having an elongate, straight bight portion extending along a major part of the length of a wall of said frame and having its ends pivotally secured to the inner face of said frame wall so that said bight portion moves through an arc between a cell-engaging-position and a cell-releasing-position; a clip of angular cross-section having one extremity slidably and rotatably secured to said bight portion; and detent means on the inner face of said wall and substantially centered relative to said bight portion for receiving said clip in interlocking relation when said bight portion is in said cell-engaging-position.

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