June 4, 1957 M. H. KRUGER 2,794,664

LATCHES

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Fig. 1.

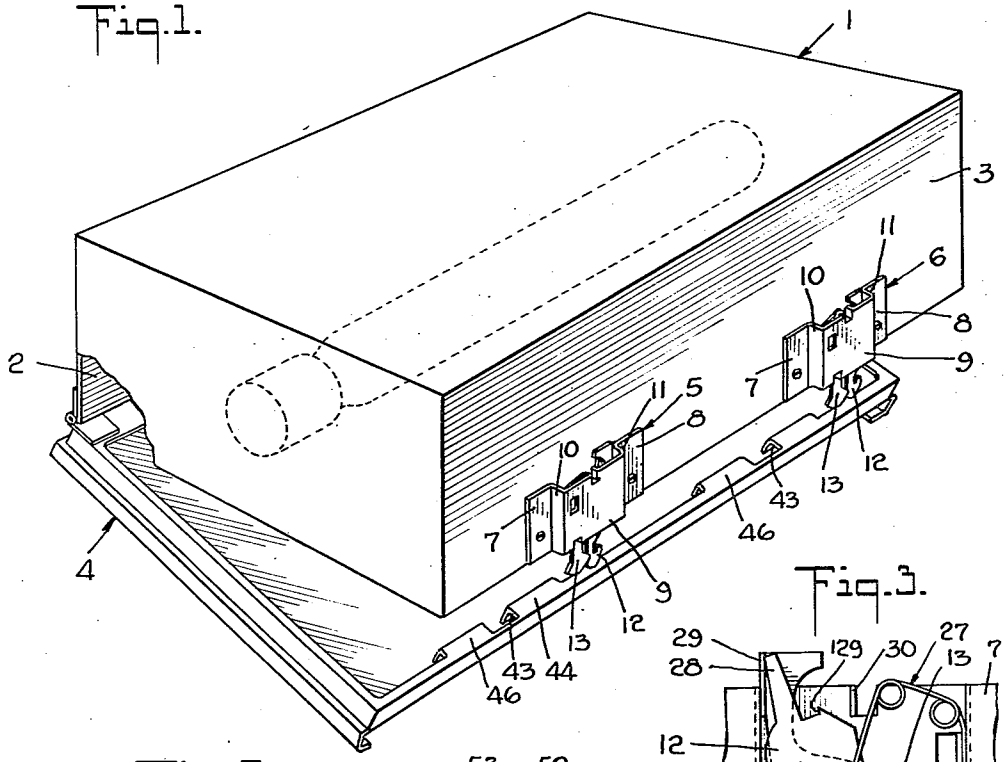


Fig. 3.

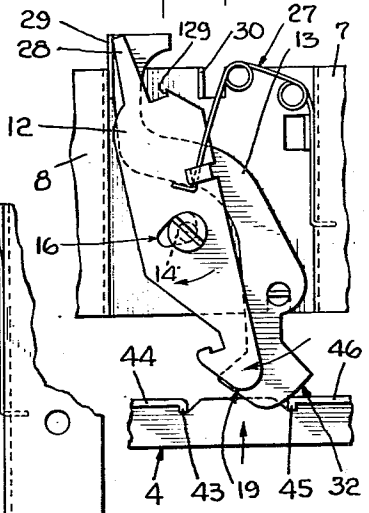
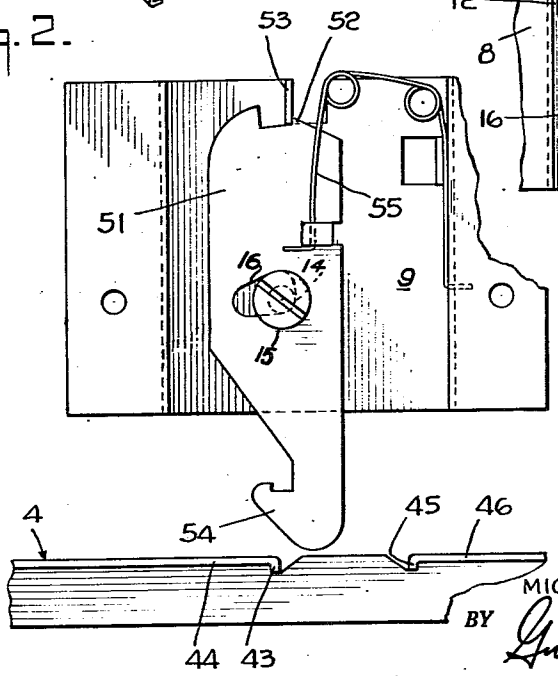


Fig. 2.



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Fig. 4.

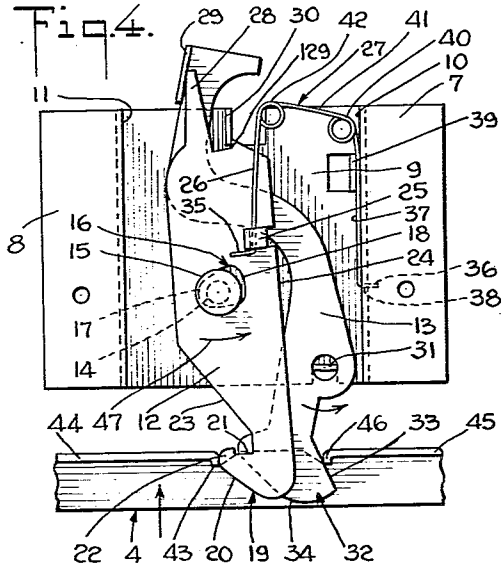


Fig. 5

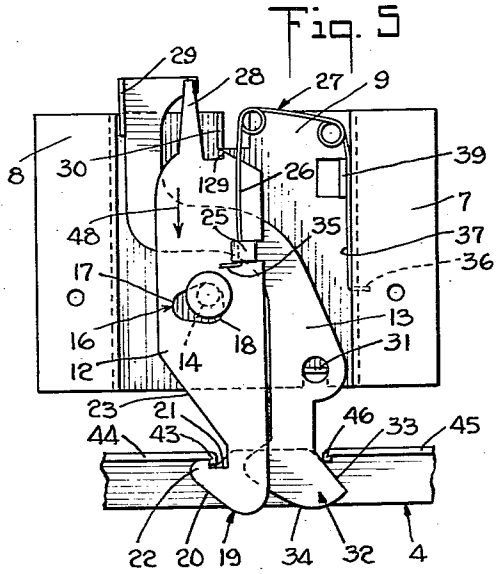


Fig. 6.

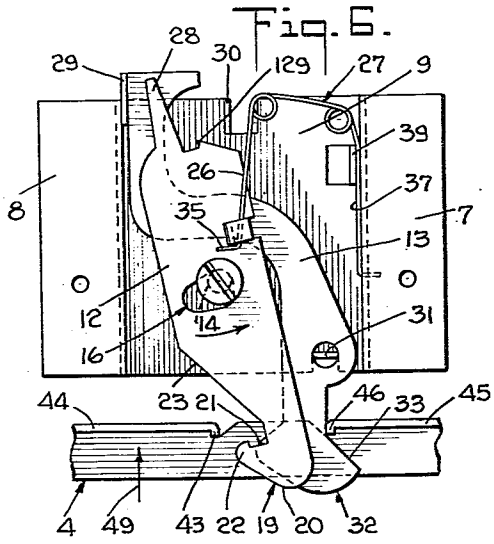


Fig. 7.

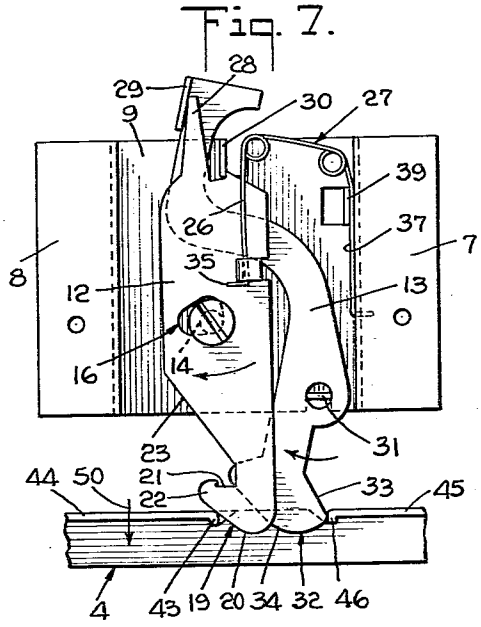
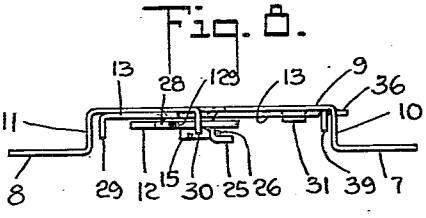


Fig. 8.



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LATCHES

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Application March 31, 1955, Serial No. 498,190

8 Claims. (Cl. 292—129)

This invention relates to latches in general, and more particularly to latches for anchoring frames, such as light diffusing frames, to troffers.

Among the objects of the present invention it is aimed to provide an improved latch for a frame, such as a light diffusing frame, which frame is conventionally pivotally connected to one of the lower edges of a troffer to enable the frame to be swung up into supporting engagement with another lower edge of the troffer, and in turn allow the frame to be released from supporting engagement by tilting the frame slightly upward to liberate the latch from the frame.

It is still another object of the present invention to provide an improved latch secured to a lower edge of a troffer for cooperation with a frame, such as a light diffusing frame, which latch will grippingly engage the frame when the frame is raised into operative association with such latch, and which latch in turn will become conditioned for releasing the frame from gripping engagement with the latch upon lowering the frame into supporting position, and which latch in turn may then be released from gripping engagement with the frame and enable it to clear the frame upon a subsequent raising of the frame relative to the latch.

It is still another object of the present invention to provide an improved latch secured to an abutment for cooperation with a frame in which the abutment may either be a door or a housing and the frame may be either a housing or door, which latch will grippingly engage the frame when the frame is moved toward said abutment and which latch in turn will become conditioned for releasing the frame from gripping engagement with the latch upon moving the frame outwardly into anchoring position, and which latch in turn may then be released from gripping engagement with the frame and enable it to clear the frame upon a subsequent inward movement of the frame relative to the latch.

These and other features, capabilities and advantages of the invention will appear from the subjoined detailed description of specific embodiments thereof illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective showing a troffer equipped with the improved latch made according to one embodiment.

Fig. 2 is a side elevation enlarged of a second embodiment of the latch.

Figs. 3 to 7, inclusive, are side elevations of five possible successive positions of the latch illustrated in Fig. 1, to wit: Fig. 3 shows the latch collapsed; Fig. 4 shows the latch conditioned preparatory to gripping a frame; Fig. 5 shows the latch in gripping engagement but conditioned for releasing the frame; Fig. 6 shows the latch approaching the collapsed position of Fig. 3 after releasing the frame; and Fig. 7 shows the latch reset while being removed from the frame ready for again receiving the frame.

Fig. 8 is a top plan view of the embodiment illustrated in Figs. 3 to 7, inclusive, with the upper portion of the spring 27 broken off and with the latch shown in a position similar to that shown in Fig. 6.

In Fig. 1 the casing 1 illustrates a troffer for a tubular fluorescent lamp comprising a rear wall 2 and a front wall 3.

To the lower edge of the rear wall 2 in the present instance, there is hingedly connected the frame 4 for supporting an egg crate louver or suitable light diffusing sheet composed of translucent glass, translucent plastic material, or the like.

On the outer face of the front wall 3 adjacent the lower edge thereof, there are shown two supporting plates 5 and 6, each having two vertically extending lateral flanges 7 and 8 with an intermediate U-shaped portion including the main plate or abutment 9, and two short side walls 10 and 11 intermediate the main plate 9 and the flanges 7 and 8. The flanges 7 and 8 engage the outer face of the front wall 3 and are secured thereto. In the chamber formed by the front wall 3, the main plate 9 and the side walls 10 and 11, there is operatively mounted the latch now to be described.

The latch, see particularly Figs. 3 to 7, inclusive, consists essentially of a supporting lever 12 and a control lever 13. The lever 12 is floatingly mounted on the pin 14 mounted on the plate 9 and having a head 15 on the inner end thereof to capture or anchor the lever 12 to the plate 9, the pin 14 extending through the aperture or slot 16 formed in the lever 12. This slot 16 has a narrow or diminished portion 17 adjacent the flange 8, and a wide or enlarged portion 18 remote from the flange 8, the slot 16 at its greatest width being less than the diameter or width of the head 15 to enable the head 15 effectively to capture or anchor the lever 12 to the plate 9.

For supporting the frame 4, the lever 12 is provided with a hooked end portion 19 having an outer inclined cam face 20 and a notch 21 between the projection 22 and the edge 23 of the lever 12. Intermediate its length on the edge 24 opposite to the edge 23 and receding therefrom is formed the lip 25 to form an abutment for the end of the portion 26 of the spring 27. Extending from the upper end of the lever 12 there is formed the finger 28 to serve as an abutment to be engaged by the second stop or lip 29 on the left hand edge of the control lever 13. Intermediate the finger 28 and the lip 25, there is formed the shoulder 129 to engage the first stop or ledge 30 fixed relative to, and extending at right angles to the abutment or plate portion 9. When the supporting lever 12 is in the raised position shown in Fig. 4, the pin 14 approaches the southwest or lower left hand corner of the slot 16, the shoulder 129 engages the ledge 30, and the control lever 13 is free to assume either the position shown in Fig. 4 or that shown in Fig. 5.

The control lever 13 is pivotally mounted on the stud or projection 31 and below the projection 31 it has a two-faced cam end 32 having the straight cam face 33 on the right hand side and the convex curved cam face 34 on the lower end thereof.

The spring 27 is secured in place by having the bent end 35 at the free end of the leg portion 26 extend under the lip 25, and the bent end 36 at the free end of the leg portion 37 extends into the opening 38 formed in the wall 10. The leg portion 37 furthermore is positioned between the ledge 39 and the wall 10. Above the ledge 39 and spring 27 is provided preferably with a loop 40 having at least one coil, with an intermediate extension 41, and between the extension 41 and the leg portion 26 with a loop 42 having at least one coil. The two loops 40 and 42 are formed inwardly relative to the leg portions 37 and 26 and intermediate extension 41 in order to exercise an outward and upward force on the lip 25. As a result of this arrangement of the loops, the supporting

lever 12 will assume the position illustrated in Fig. 4 as above described.

The hooked end portion 19 in supporting position, see Fig. 5, will have its recess or notch 21 receive the downwardly extending shoulder 43 extending downwardly from the flange portion 44 of the frame 4. Preferably as shown, a second flange portion 45 is formed on the frame 4 having a downwardly extending shoulder 46 spaced a predetermined distance from the shoulder 43 to cooperate with the cam end 32 in one instance to actuate the supporting lever 12 into anchoring engagement of its shoulder 129 with the ledge 30 of the plate.

From the foregoing, it will thus appear, when the frame 4 is raised and the supporting lever 12 and control lever 13 are in the positions shown in Fig. 3, that the initial engagement of the cam face 34 of the control lever 13 will cause its ledge 29 to engage the extension 28 and swing the supporting lever 12 into the position shown in Fig. 4 when the engagement of the cam face 29 with the shoulder 43 will cause the control lever 12 to move a little to the right in the direction of the arrow 47, see Fig. 4, when the pin 15 instead of engaging the southeast or lower right hand corner of the slot 16 will move toward the left hand area 17 of the slot 16. Upon continued upward pressure of the frame 4, see Fig. 5, the tension of the spring 27 will cause the hooked end portion 19 to snap under the flange portion 44 to receive the ledge 43 in the recess 21. Thereupon when the frame 4 is released, it will draw the supporting lever 12 downwardly in the direction of the arrow 48, see Fig. 5, and cause the shoulder 129 to clear the ledge 30. Thereupon should it now be desired to free the frame 4 from the supporting lever 12, it will only be necessary to raise the frame 4 in the direction of the arrow 49, see Fig. 6, and the supporting lever 12 under the urge of the spring 27 will snap into the position shown in Fig. 6.

Thereupon see Fig. 7, as a result of the then ensuing downward movement of the frame 4 in the direction of the arrow 50, see Fig. 7, the engagement of the shoulder 46 with the cam face 33 of the control lever 13 and the ensuing engagement of the shoulder 43 with the cam face 20 of the supporting lever 12, will cause the supporting lever 12 again to be anchored by the cooperation of the shoulder 129 with the ledge 30.

In the embodiment shown in Fig. 2, the control lever 13 is omitted. The supporting lever 51, on the other hand, is substantially identical to the supporting lever 12 except that the extension 28 of the supporting lever 12 is omitted. In this case, to set the supporting lever 51 into the anchored position where its shoulder 52 engages the stop or ledge 53 integral with, and fixed relative to, said abutment 9, it would be necessary to engage the hooked end portion 54 and move it to the left when the spring 55 would cooperate during such movement to move the supporting lever 51 upward and the upper portion of the lever 51 laterally outward in a left hand direction to cause the effective engagement of the stop or ledge 53 by the shoulder 52.

When the latch constituting the present improvement is used for the door of a cabinet as an instance, it is obvious, without departing from the spirit of the invention, that the latch will be moved inward instead of upward when brought into anchoring engagement with the ledge 30 of the embodiment illustrated in Fig. 3, or the ledge 53 of the embodiment illustrated in Fig. 2, and that the latch will move into outward position when anchoring the door relative to the cabinet. In turn, it is of course obvious that it may be necessary to rely upon gravity when the latch is used for supporting a light distributor such as illustrated in Fig. 1, but that a spring may be relied upon in such case with equal efficiency. In turn, when the latch is used for a door swinging about a vertical hinge, it may be desirable then to rely upon a spring means instead of gravity to anchor the door in anchoring position. Obviously, in turn, the casing 1 as well as the cabinet may be considered the abutment and the frame 4 of the embodiment illustrated in Fig. 1 as well as the door of a cabinet may be considered the frame and are so intended in the appended claims.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

I claim:

1. The combination with an abutment, of a single anchoring lever, a pivotal connection between said abutment and said lever, said pivotal connection including an aperture and pin connection between said abutment and said lever, the aperture of said pivotal connection being large enough relative to said pin not only to enable the lever to rotate relative to said abutment but also to enable said lever to have lateral as well as longitudinal movement relative to said abutment, a hooked end portion at the lower end of said lever to receive a frame to be anchored, a single spring connecting said abutment to said lever above its pivotal connection with said abutment normally urging said lever upwardly and laterally and positioning said lever in a predetermined upper position, a stop fixed on said abutment, and a shoulder on said lever engaging said stop in the predetermined upper and lateral position of said lever and clear of said stop in a lower frame anchoring position, said lever being lowered when a frame rests on and is anchored on said hooked end portion in turn to clear said stop from engagement by said shoulder.

2. The combination as set forth in claim 1 in which said shoulder engages said stop and serves as a fulcrum when said lever is rotated relative to said abutment in the upper position of said lever.

3. The combination as set forth in claim 1 in which said spring deflects said lever laterally clear of said shoulder when the frame previously anchored is moved out of anchoring engagement with said lever.

4. The combination as set forth in claim 1 in which said spring exercises a rotative force on said lever about said pin in turn to deflect said lever clear of said shoulder when the frame previously anchored is moved from anchoring engagement with said lever, said pin serving as the fulcrum when said lever so rotates relative to said abutment.

5. The combination as set forth in claim 1 characterized by a control lever pivotally connected to said abutment, said control lever having one arm extending downwardly from its pivotal connection and adjacent the right hand side of the lower end of said anchoring lever and another arm extending upwardly from its pivotal connection and adjacent to the left hand side of the upper end of said anchoring lever, and a second stop on the left hand side of said control lever engaging said anchoring lever and enabling said anchoring lever to be actuated into anchoring engagement of its shoulder with said first mentioned stop by actuation of the lower arm of said control lever.

6. The combination with a housing, of a single supporting lever, a pivotal connection between said housing and said lever, said pivotal connection including a pin in said housing and an opening in said lever larger than said pin to receive said pin and allow for rotative as well as lateral movement of said lever relative to said housing, a hooked end portion at the lower end of said lever to receive a frame to be supported, a single spring connecting said housing to said lever above its pivotal connection with said housing normally urging said lever upwardly and laterally and positioning said lever in a predetermined raised position, a stop fixed in said housing, and a shoulder on said lever engaging said stop in raised position of said lever and clearing said stop in a descended frame supporting position, said hooked end portion having a supporting nose to receive the frame to be supported and a cam face both on the left hand side

of the lower end of said lever, said cam face engaged and actuated by the frame when raising the frame into supporting position and in turn actuating the lower end of said lever to rotate relative to said stop as a fulcrum.

7. The combination as set forth in claim 6 in which said spring deflects said lever laterally clear of said shoulder when the frame previously supported is raised from supporting engagement with said lever.

8. The combination as set forth in claim 6 characterized by a control lever pivotally connected to said housing, said control lever having one arm extending downwardly below said housing and adjacent the right hand side of the lower end of said supporting lever and another arm extending upwardly from its pin and adjacent to the left hand side of the upper end of said supporting

lever, a cam face on the right hand side of the lower arm of said control lever, and a second stop on the left hand side of the upper arm of said control lever engaging the left hand edge of said supporting lever and enabling said supporting lever to be actuated into anchoring engagement of its shoulder with said first mentioned stop by engagement of said cam face by the frame to be supported and consequent actuation of the lower arm of said control lever.

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