

# PATENT SPECIFICATION

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## (54) CAM-LOCK SLIDER

(71) We, YOSHIDA KOGYO KABUSHIKI KAISHA, a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to slide fasteners and has particular reference to a slider fastener which has a cam-lock slider means to lock the same against movement on the fastener.

Heretofore, a number of sliders of the so-called cam-lock type have been proposed in the art, and such known sliders are typically constructed with a cam or cams formed integrally with the pull tab and adapted to press the fastener elements into locking engagement with an internal recess in the bottom wing of the slider. The recess extends to a full transverse width of the bottom wing or element-guide channel between the opposite side flanges of the slider, and hence accommodates the fastener elements that are positioned thereat within the guide channel in the slider. As the fastener elements are thus pressed by the cam into locking engagement with the recess substantially parallel therewith, the tape edges carrying the rows of elements are likewise pressed together with those elements and squeezed forcibly along the contour of the recess, with the resulting resistance of the thus forced tape edges rendering the slider locking operation extremely heavy and sluggish. This would further invite undue frictional wear of the cam part of the pull tab and the surfaces of the fastener elements. Furthermore, because of the necessity of providing an element-guide surface wall of the prescribed thickness at the front and

back of the recess in the bottom wing, the overall length of the slider is increased thereby making its appearance less attractive. To produce sliders having such a recess has been also rendered quite difficult by die-casting or injection moulding.

Whereas, it is an object of the invention to provide improvements in such cam-lock sliders whereby the slider locking and unlocking operation is performed with a maximum of reliability and smoothness and with a minimum of resistance produced in the element-carrying tape edges.

It is another object of the invention to provide an improved cam-lock slider which is relatively small in its overall length and which can be manufactured with ease by die-casting or injection moulding.

To achieve these objects, there is provided according to the invention a slide fastener having a cam-lock slider which comprises a top wing having an opening arranged therein and a bottom wing connected together at one end by a neck portion, each of said wings having inwardly directed side flanges which together with said neck portion define a Y-shaped guide channel for the passage of two rows of fastener elements which form part of said slide fastener and each of which has a coupling head portion, a pull tab pivotally connected to said top wing, said a downwardly projecting locking cam integral with said pull tab and received in said opening in said top wing in the locking position of said cam, said bottom wing having a recess closed at one end adjacent said neck portion and open at the opposite end registering with an extremity of an exit end of the slider, said bottom wing further having surface bifurcations extending on opposite sides of said recess adapted to guide the fastener elements slidably thereon, and said locking cam having an operative posi-

tion in which it is adapted to press one of the fastener elements in either row into locking engagement with said recess while said one of the fastener elements is held in partly or half coupled relation to a mating element in the opposite row.

The invention will now be fully described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a cam-lock slider according to the invention with parts broken away to expose the interior thereof;

FIG. 2 is a longitudinal cross-sectional view of the slider of FIG. 1 of which top wing has been removed to better show how the fastener elements are locked in a recess in the bottom wing;

FIG. 3 is a transverse cross-sectional view taken along the line III-III of FIG. 2; and

FIG. 4 is a perspective view of the bottom wing of the slider having a modified recess according to the invention.

Referring now to the drawings and FIG. 1 in particular, there is shown a slider 10 embodying the present invention which is generally of the common construction designed for taking two rows of discrete fastener elements into and out of engagement on the respective stringers to close and open the slide fastener. Each row of fastener elements E (FIGS. 2 and 3) is secured to a beaded inner edge or element-carrying edge  $t$  of one stringer tape T and disposed for coupling engagement as at coupling heads  $e_1$  with the corresponding row of elements on the other stringer tape T.

The slider 10 comprises a top wing 11 and a bottom wing 12 which are connected together at one end by a neck portion 13. Each wing has inwardly directed side flanges 14 which together with the neck 13 define a Y-shaped guide channel 15 for the passage of the rows of fastener elements E during opening or closing of the fastener. A pull tab 16 generally rectangular in shape is pivotally connected at one end by a pintle 17 to a pair of laterally spaced lugs or bails 18 projecting upwardly from the top wing 11. Intermediate the lugs 18 there is formed an opening 19 in the top wing 11 through which a downwardly projecting cam 20 integral with the pull tab 16 is admitted when the latter is swung into locking position as better shown in FIG. 1. The cam 20 is provided with a rounded corner so as to engage smoothly upon the fastener elements E.

According to an important aspect of the invention, there is provided a recess 21 in the bottom wing 12, which recess is defined by side shoulders 22 extending parallel with a longitudinal axis of the slider 10

and a transverse front shoulder 23 connecting the side shoulders 22 at one end adjacent to a point corresponding to the position of the cam 20 on the pull tab 16, the recess 21 being thus closed at one end by the front shoulder 23 but open at the opposite end registering with an extremity of an exit end 10' of the slider 10. The side shoulders 22 are equidistant from the respective side flanges 14 as indicated by the reference character D which refers to element-guide surface bifurcations 24 extending coplanar with the inner surface 25 of the bottom wing 12. The bifurcations 24 are each wide enough to permit the sliding movement of the fastening elements E thereon during opening, or closing of the fastener without causing the fastener elements E to fall into the recess 21 except when the slider 10 is brought positively into locked position as later described.

It is to be noted that the locking cam 20 has an operative position such that it engages upon one element  $Ea$  in either row which is half or partly coupled with the mating element  $Eb$  in the opposite row and which is therefore inclined relative to a line at right angles to the longitudinal axis of the fastener or fastener element rows. To lock the element  $Ea$  more effectively, the front shoulder 23 is slightly tapered towards the neck 13 so as to permit the inclined element  $Ea$  to bear smoothly against and to be arrested at the shoulder 23 when the slider 10 is held in locked position.

With this construction, the slider 10 can be locked effectively against movement on the fastener, when desired, by swinging the pull tab 16 counter-clockwise as viewed in FIG. 1 about a pintle 17 into the locking position wherein the pull tab 16 lies flat against the slider top wing 11, with the locking cam 20 pressing the element  $Ea$  partly coupled with the corresponding element  $Eb$  into locking engagement with the recess 21. More specifically, the element  $Ea$  has its coupling head portion  $e_1$  pressed against the bottom of the recess 21 with the leg portions  $e_2$  positioned at one of the bifurcations 24, so that the tape T is slightly bent inwardly along the element-carrying edge  $t$  as shown in FIG. 3. Advantageously, since the element  $Ea$  is thus disposed to engage only at its coupling head portion  $e_1$  with the recess 21 while the element  $Eb$  is held in partly or half coupled relation to the corresponding element  $Eb$ , and the tape portions that lie between the side flanges 14, 14 are held substantially free from any stresses with the tape edge  $t$  alone directed slightly downwardly with respect to the plane of the fastener, the slider 10 can be locked and unlocked by a light finger touch with

a minimum of resistance, and hence frictional wear of either the cam 20 or the element Ea can be held to an absolute minimum. Also advantageously by virtue of the configuration of the recess 21 that has been described, the absence of the element-guide surface of the bottom wing 12 at the back of the recess 21 makes it possible to so much reduce the overall length of the slider 10 and render the same relatively compact. Further advantageously, the provision of bifurcations 24,24 ensures that the rows of fastener elements E be guided in horizontal alignment therealong without being caught in the recess 21, thereby facilitating the movement of the slider 10.

It will be further appreciated that the slider 10 having such characteristic recess 21 can be made with ease by die-casting or injection moulding.

Reference to FIG. 4 shows a modified recess 26 according to the invention which has a bottom surface bisected longitudinally into identical halves 27,27' which are inclined downwardly and inwardly towards each other and merged at a longitudinal center 28.

The recess 26 in this embodiment is closed at one end adjacent the neck 13 by a transverse front shoulder or abutment 29, similar to the front shoulder 23 previously described, but open at the other or opposite end registering with the extremity of the exit end 10' of the slider 10. The advantage of the modified recess 26 is that the fastener elements E when pressed by the locking cam 20 are tilted easily along the inclined bisected bottom surface 27(27') thereby facilitating the locking

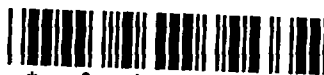
operation with increased smoothness.

#### WHAT WE CLAIM IS:—

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2. A slide fastener substantially as herein described with reference to and as illustrated in the accompanying drawings.

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