May 28, 1963 J. L. VANDER SANDE ETAL 3,091,488

ROTARY LATCH

Filed Jan. 18. 1960 2 Sheets-Sheet 1

FIG. 1

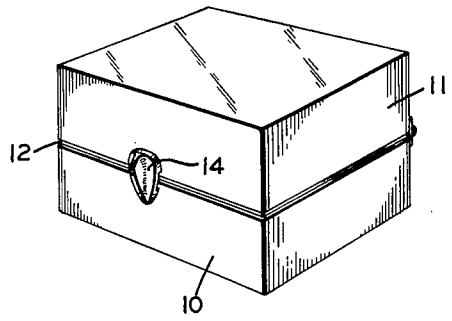


FIG. 2

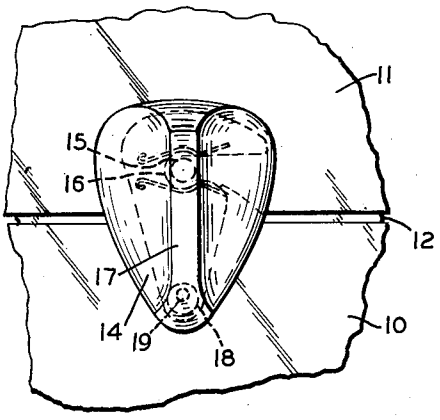


FIG. 4

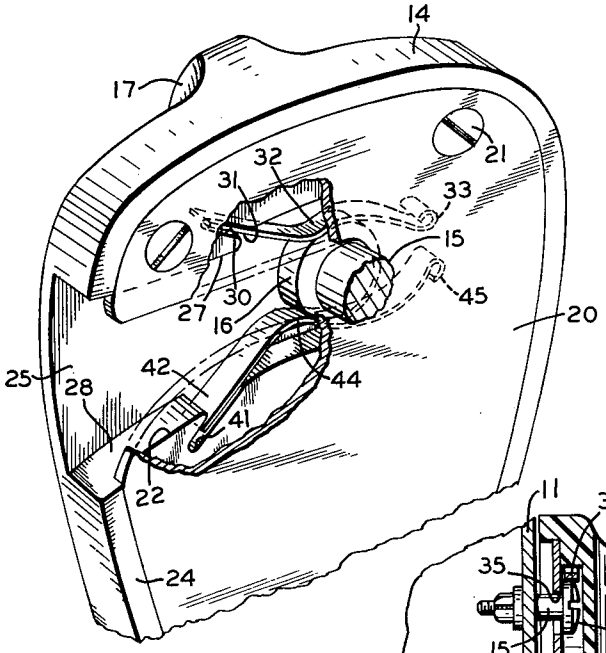


FIG. 3

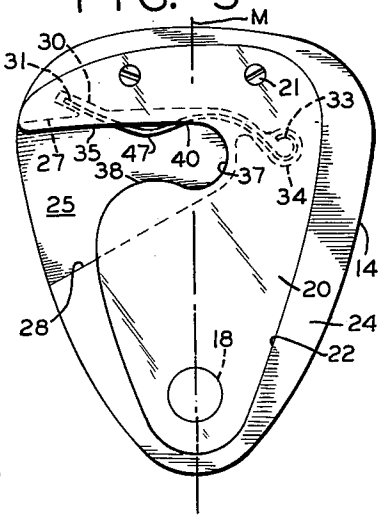
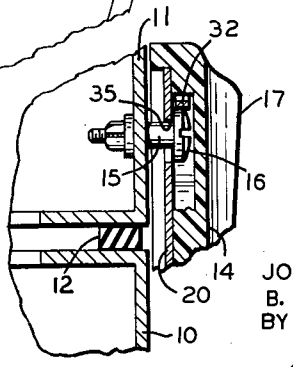


FIG. 5



INVENTORS
JOHN L. VANDER SANDE
B. CARL BEEHNER
BY John P. Chandler
THEIR ATTORNEY.

May 28, 1963 J. L. VANDER SANDE ETAL 3,091,488

ROTARY LATCH

Filed Jan. 18. 1960 2 Sheets-Sheet 2

FIG. 6

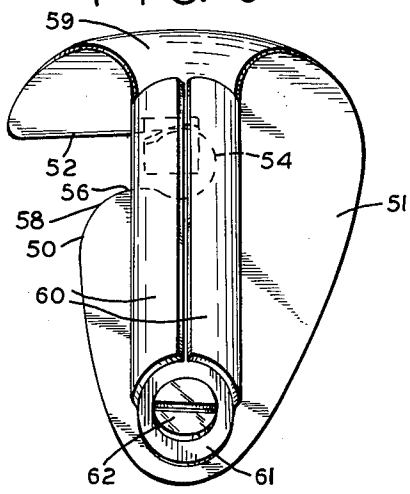
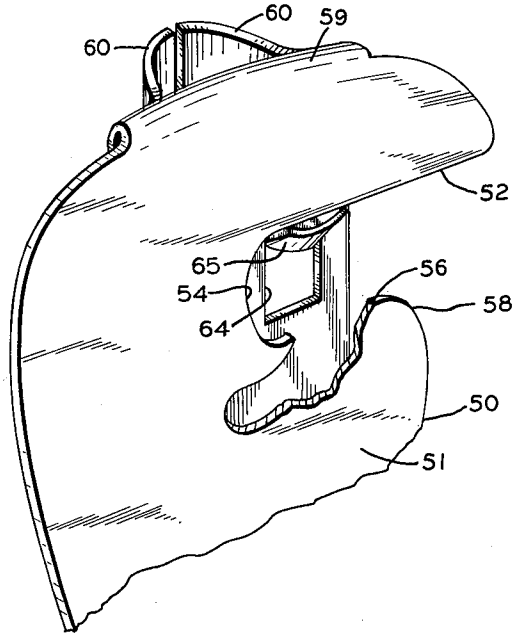


FIG. 7



INVENTOR.
JOHN L. VANDER SANDE
B. CARL BEEHNER
BY John P. Chandler
THEIR ATTORNEY.

United States Patent Office 3,091,488 Patented May 28, 1963

3,091,488

ROTARY LATCH

John L. Vander Sande, North Hollywood, and Benjamin Carl Beehner, Los Angeles, Calif., assignors to Camloc Fastener Corporation, Paramus, N.J., a corporation of New York

Filed Jan. 18, 1960, Ser. No. 2,880
2 Claims. (Cl. 292—241)

This invention relates to latch fasteners for containers or the like and relates more particularly to a novel latch which is especially suitable for securing a hinged cover or lid in closed position on a box.

An important object of the invention is to provide an improved rotary latch fastener having a knob which can be moved from unfastened to fastened condition in about one-quarter of a turn and which has a novel spring urged detent not only securing the latch in locked position but also providing an audible click when it has reached this position to indicate to the operator that the latch is locked. This spring detent can be positioned in the rotary knob either above or below the keeper and if desired two of those detents may be employed, one in each of said positions.

A further object of the invention is to provide a quick acting latch with a rotary knob which has no external parts which might tend to catch on the clothing or other articles and wherein the keeper may be an ordinary flat headed pin projecting from the second member, such as the hinged cover, a very minimum distance.

Yet another object of the invention is to provide a rotary latch fastener with a novel camming element incorporated into the rotary knob and which draws the cover tightly against the main body or housing and which does not require periodic adjustment to retain this tightly fastened condition. The knob itself may be of ornamental shape or contour and it may also have the user's trademark applied thereto. The entire mechanism except for the knob may thus be standard and only the knob need be changed to suit customer's requirements.

In the drawing:

FIG. 1 is a perspective view of a box equipped with the latch fastener of the present invention.

FIG. 2 is a broken front elevation thereof and showing an enlarged view of the knob.

FIG. 3 is a rear elevation of the knob.

FIG. 4 is an enlarged perspective view of the knob taken from the rear with portions of the cam plate broken away to show the internal arrangement of the knob which in this instance is fitted with two spring detents.

FIG. 5 is a fragmentary section taken through the fastening parts of the latch.

FIG. 6 shows a modification of the invention.

FIG. 7 is a rear view thereof.

The rotary latch of the present invention is shown as fitted on a box **10** and a hinged cover or lid **11**, the box having a resilient gasket **12** on its upper rim to afford a dust-proof seal when the cover is tightly closed against this upper rim.

The latch comprises a knob **14** and a keeper, the latter comprising a pin **15** having an enlarged head or flange **16** and which is secured to one of the members, in this case the cover. For simplicity in the construction of this latch pin an ordinary machine screw may be used and a short bushing acts as a spacer element separating the head from the wall of the cover with a washer between the inner end of the bushing and the wall. The knob may be molded from plastic or be made from other suitable material. It has a vertical ridge **17** on its front face which is received between the thumb and forefinger for the purpose of turning it.

The knob is pivoted on the second member, in this case the box, at its lower end by pivot means **18**. As shown in FIG. 2, this pivot may be eccentrically mounted in a support **19** which is rotatable within a suitable opening in housing **10** to an adjusted fixed position. The knob further has a cam plate **20** secured by screws **21** to its rear face, said plate being positioned in a recess **22** defined by a rim **24** which is continuous except for an entrant portion **25** for the keeper leading to a cavity defined by an upper wall **27** and a lower wall **28**.

The upper wall of the cavity has a recess **30** extending diagonally upwardly therefrom which receives one end **31** of a spring detent **32** made from flat spring stock and whose opposite end is shown as formed in a ring **33** and received in a recess **34** in said upper wall provided for that purpose. This detent which forms the central section of the spring has a bending moment since it is moved from the adjacent upper wall **27**, as shown in FIG. 3.

The cam plate **20** has a substantially straight cam edge **35** which extends from its outer edge inwardly to a point beyond the central vertical median line M of the knob and then merges into a downwardly curved section **37** and thence outwardly in a convexly curved section **38**. This inner terminal **40** of the straight cam edge is important, as will be pointed out later.

The slightly modified arrangement of FIG. 4 is the same as shown in FIG. 3 except that lower wall **28** of the cavity also has a diagonal recess **41** which receives one end **42** of a second detent spring **44**, the opposite ring-like end **45** being received in a recess like recess **34** in FIG. 3.

It will be noted from an examination of FIG. 3 that a small portion **47** of the spring detent projects below cam edge **35** and this latter edge extends below upper edge **27** of the cavity. When the knob is rotated towards locked position the flange on head **16** of the keeper pin **15** is engaged by the cam plate above cam edge **35** and the edge itself engages the shank **15** of the pin. In the starting position this cam edge slopes downwardly and continued rotation pulls the lid tighter against the box. If the spring detent were missing, any relaxation of the turning movement would cause the knob to rotate in the opposite direction until, of course, the keeper pin passes the central median line M and when portion **40** of the edge to the right of this line engages the keeper pin a locking action has been achieved, even without the spring detent.

Before this occurs, however, the projecting portion **47** of the spring detent has engaged the head **16**, causing the spring to retract and further rotation causes the head to move into the substantially U-shaped recess which forms the detent. This relationship is shown in the fragmentary view in FIG. 5.

The reason for the upwardly projecting portion of the cam plate defined by edge **38** is to prevent opening of the latch in the event of a rather improbable upward movement of the box while the cover remains stationary. If desired, a lower detent spring only may be used but in certain installations both may be employed.

In the modified arrangement shown in FIGS. 6 and 7, the entire fastener may be stamped from sheet metal in a single blank. It includes interconnected front and rear sections, the latter of which is a cam plate **51** which is shaped generally similar to cam plate **20** in the first form of the invention. It has the same slot leading inwardly from one side edge **50**, in this case from the side opposite that shown in FIG. 3. The slot has the same upper edge **52** which is substantially straight and perpendicular to the major axis of the plate and which extends beyond the vertical median line and merges into a downwardly curved section **54** and thence back toward edge **50**, curv-

ing upwardly as shown at 56 and thence downwardly at 58.

At its upper end the cam plate has a forwardly curved section 59 of progressively narrower width and this merges into a tubular section wherein the opposed front edges 60 are curved forwardly to form a tubular handle for the latch. The curved sections 60 terminate just short of the lower edge and a flat section 61 is provided. A pivot screw 62 passes through this section and the rear cam plate to mount the latch.

The detent in this case may be a spring element similar to spring detent 32 and suitably secured to the handle. Preferably, however, the rear section of the handle has a square struck-out section leaving an opening 64 wherein the metal so struck out is nevertheless not removed but is bent rearwardly and then bent to a curved contour and forms the detent 65 for the headed keeper similar to keeper 15. This struck-out portion can be formed equally well along the lower edge of opening 64.

It will be noted that in both forms of the invention the distance between the detent spring and the opposite (i.e., upper or lower) edge of the cam slot is less than the diameter of the keeper so that it is always necessary to deflect the spring in order to rotate the latch free of the keeper.

While there have been described herein what are at present considered preferred embodiments of the invention, it will be obvious to those skilled in the art that many modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiments are illustrative and not restrictive of the invention, the scope of which is defined in the appended claims, and that all modifications that come within the meaning and range of equivalency of the claims are intended to be included therein.

What we claim is:

1. A rotary latch fastener for securing two members together and comprising a knob provided with a finger engaging portion and pivotally mounted on one of the members, a cam plate secured on the back face of the knob and having a cam slot extending inwardly from one edge thereof and formed with a lower edge and a substantially straight upper cam edge extending to a point beyond the center of the plate, the back of the knob having a recess underlying said slot, the upper and lower edges of the slot extending beyond and overhanging the walls of the recess to allow said edges to engage the head of a keeper pin carried by the second member, one of said walls having slots therein and a spring whose terminals are mounted in the slots and which extend into the path of said headed pin as it moves towards the inner end of the slot, said spring restraining movement of the head out of the slot.

2. A rotary latch fastener for securing two members together and comprising a knob pivotally mounted on one of the members, a cam plate secured on the back of the knob and having a cam slot extending inwardly from one edge thereof and formed with a lower edge and a substantially straight upper cam edge, the back of the knob having a recess underlying said slot, the upper and lower edges of the slot extending beyond and overhanging the walls of the recess to allow said edges to engage the head of a keeper pin having a shank carried by the second member, said edge extending inwardly beyond the central median line and being substantially perpendicular to said median line when the axis of the pin passes beyond said line so that a self-locking action is effected when the shank of the headed pin reaches the inner end of the slot.

References Cited in the file of this patent

UNITED STATES PATENTS

217,146	Quackenbush	July 1, 1879
708,903	McClay	Sept. 9, 1902
1,420,899	Williams	June 27, 1922

FOREIGN PATENTS

559,948	France	June 27, 1923
716,555	France	Oct. 12, 1931
733,565	France	July 11, 1932
106,690	Great Britain	June 10, 1916