

April 2, 1957

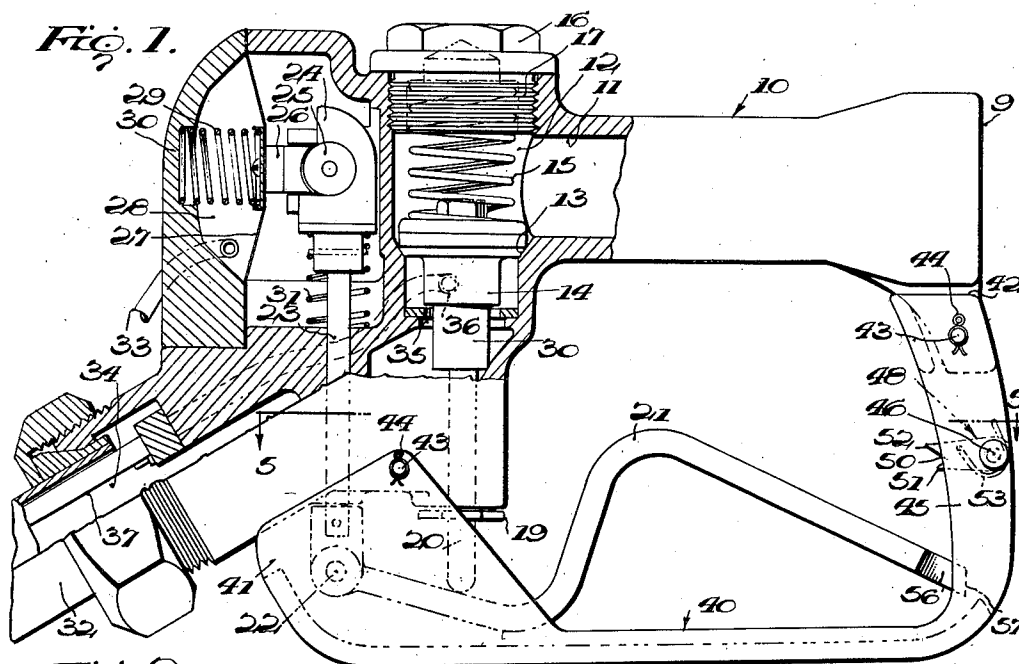
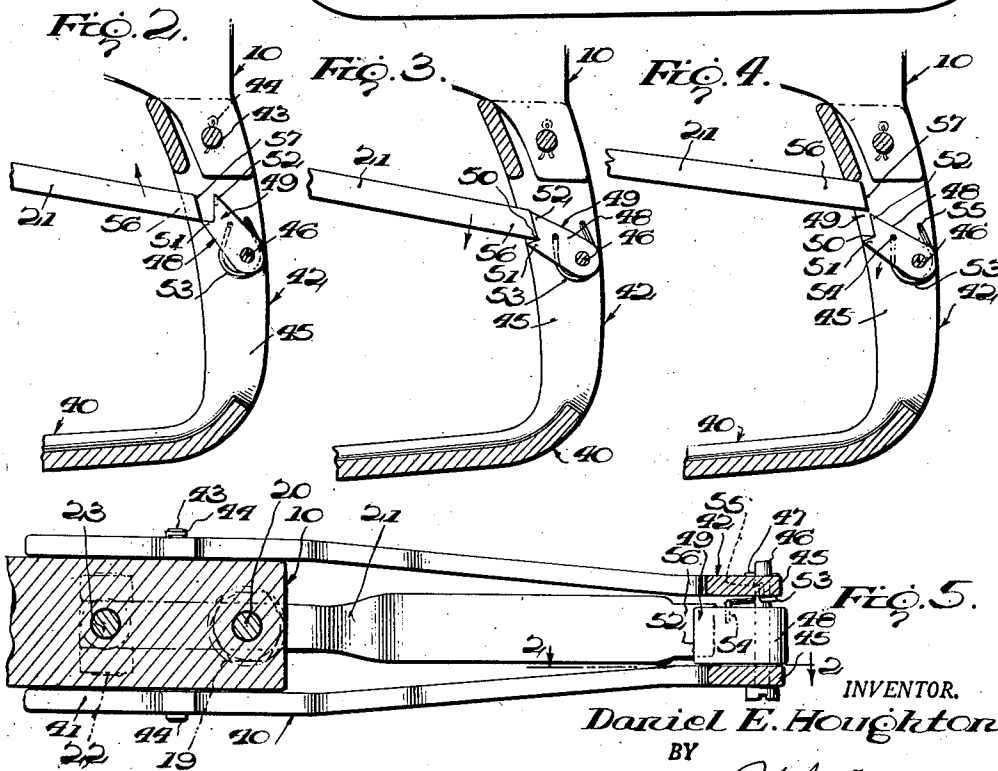
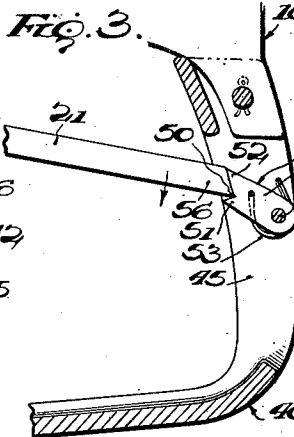
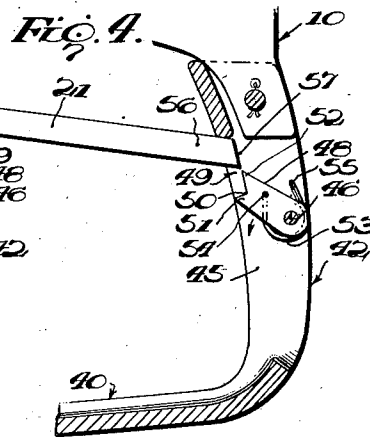
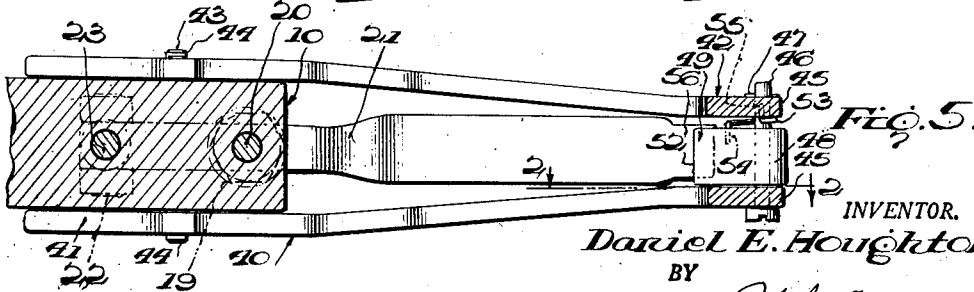
D. E. HOUGHTON

2,787,295

TRIPPABLE LATCH (FOR DISPENSING VALVE)

Filed Nov. 3, 1955

2 Sheets-Sheet 1



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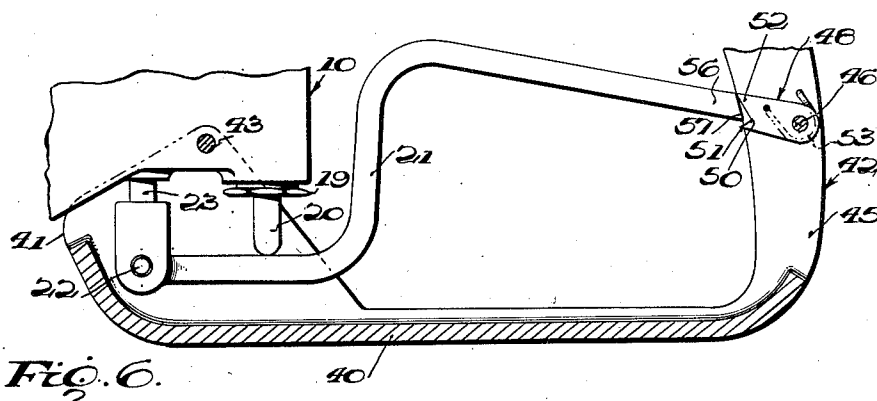
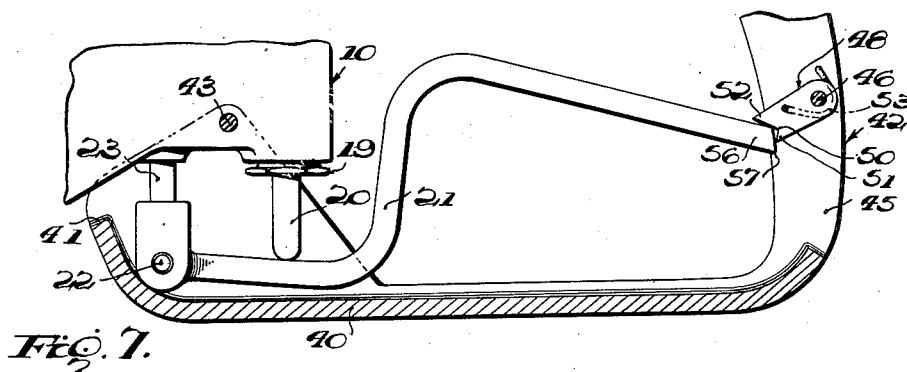
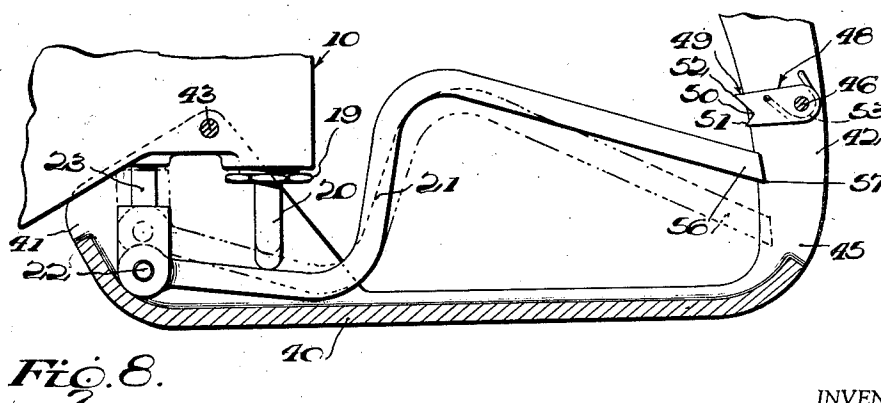
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2 Sheets-Sheet 2



INVENTOR

Daniel E. Houghton

BY

W. J. Earlestone

ATTORNEY

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2,787,295

TRIPPABLE LATCH (FOR DISPENSING VALVE)

Daniel E. Houghton, Arlington, Va., assignor to the United States of America as represented by the Secretary of the Army

Application November 3, 1955, Serial No. 544,846

10 Claims. (Cl. 141—209)

The invention relates to trip latches of the type which are automatically engaged by latch trip means held thereby and thereafter tripped and disengaged by further movement of such latch trip means in a predetermined direction. The invention is particularly applicable to the valve actuating levers or handles of fluid fuel dispensing nozzles of the type which automatically close when the fuel rises in the filler neck of a container and covers the free end of the spout. Devices for accomplishing the desired result are known but are objectionable for various reasons.

In the main, most prior are devices are too complicated and costly to manufacture, are readily broken in use, difficult to repair and replace, and inconsistent in operation.

With the foregoing in view, it is an object of the invention to provide an improved trip latch.

A further object is to provide an improved trip latch which automatically engages a moving latch trip to prevent return movement thereof but which is tripped and releases the latch trip for return movement upon a predetermined amount of continued movement of the trip in the original direction.

A further object is to provide an improved trip latch for the actuating lever for the valve of a liquid dispenser of the type which cuts off when liquid rises in a container sufficiently to cover the nozzle of the dispenser.

A further object is to provide an improved trip latch such as that last described which is manually operated to release and which also automatically releases the actuating lever upon the closing of the dispensing valve.

Other objects and advantages reside in the particular structure of the invention, the structure of the several elements thereof, combinations and sub-combinations of such elements, all of which will be readily apparent to those skilled in the art upon reference to the attached drawing in connection with the following specification wherein the invention is shown, described and claimed.

In the drawing:

Fig. 1 is a fragmentary elevational view of a dispensing nozzle embodying one form of the invention, parts being broken away;

Fig. 2 is a fragmentary vertical sectional view taken substantially on the plane of the line 2—2 of Fig. 5 and showing the parts before the latching occurs;

Fig. 3 is a view like Fig. 2 but showing the parts in the latched position;

Fig. 4 is a view like Fig. 2 but showing the parts in one of the tripped positions;

Fig. 5 is a fragmentary horizontal sectional view taken substantially on the plane of the line 5—5 of Fig. 1; and

Figs. 6, 7, and 8 are views like Figs. 2, 3, and 4 but show the action of the actuating lever as the valve closes and the latch is tripped thereby.

Referring specifically to the drawing wherein like reference characters designate like parts in all views, 10 designates generally a fluid dispensing nozzle of the automatic cut-off type to which the device of the invention

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has been applied. Such nozzle 10 corresponds to and operates in the same manner as that of the patent to Shaffer and Houghton, No. 2,675,952 of April 20, 1954. Obviously, the invention is applicable to other nozzles and structures.

In brief, the device 10 includes an inlet end 9 for connection to a suitable flexible hose, not shown, for communication through a passage 11 with a valve chamber 12 containing a seat 13 for the reception of a valve body 14. The valve is biased toward its seat by means of a spring 15 which is interposed between the head of the valve and a plug 16 threaded into an opening in the nozzle body. Axially aligned with the threaded opening in the valve body is another opening for a threaded bushing 19 through which a valve stem 20 slidably projects for engagement with a valve actuating lever 21. The valve actuating lever 21 is articulated by means of a pivot 22 to a bolt 23 which is slidably mounted in the valve body and whose opposite end is provided with a hook portion 24 for engagement with a roller 25 carried by a reciprocating detent arm 26 whose fixed end is secured to a diaphragm 27 constituting a flexible wall of an expandable chamber 28.

The diaphragm 27 and the detent arm 26 to which it is fixedly secured in any suitable manner are biased toward the right as shown in Fig. 1 by means of a spring 29 interposed between the diaphragm 27 and a rigid wall 30 of the chamber 28. The bolt 23 is biased upwardly by means of a spring 31 interposed between the enlarged hooked end 24 and a portion of the nozzle body. As long as the detent 26 remains the position shown in Fig. 1, its roller 25 will be engaged with the hook portion 24 and the pivot or fulcrum 22 of the lever 21 will remain fixed with respect to the valve body. Under these circumstances, when the lever 21 is grasped manually and moved upwardly away from its guard 40, the valve stem 20 will be moved upwardly to unseat the valve 14 against the force of the spring 15 sufficiently to permit passage of liquid from the valve chamber 12 forwardly beyond the valve body 14. The major portion of the liquid passing the valve 14 will enter the main channel 34 through a port 35 and pass through the spout 32 to the container for which it is intended. Another portion of the liquid however, will pass outwardly of the valve chamber 12 through the smaller auxiliary port 36 and into a tube 37 which is connected with an eduction device, not shown, which corresponds to that of the Shaffer and Houghton patent aforesaid. In like manner, such eduction device is connected to the vacuum chamber 28 by means of a conduit 33 whereby to create automatically a partial vacuum in such chamber, retract the diaphragm 27, release the bolt 23, and permit the valve 14 to be closed as in the patent aforesaid when the free end of the spout is submerged in liquid.

The nozzle body 10 has a guard 40 detachably secured thereto in any suitable manner. The guard 40 may be generally U-shaped in elevation and of channel-shaped cross section. Thus, the front leg 41 and rear leg 42 have upper ends which straddle adjacent portions of the body 10 and may be detachably secured thereto in any suitable manner as by the pins 43 and cotter keys 44.

The side walls 45 of the rear leg 42 are formed with aligned holes in which is journaled a headed cross-pin 46 which is located in downwardly spaced relation to the body 10. The pin 46 is detachably secured in position by any suitable means such as the cotter key 47, Fig. 5. A latch 48 is mounted on the pin 47 between the guard walls 45. The latch 48 has a free front end providing a latch dog generally designated by 49 and comprising a notch 50 defined by a relatively short bottom tooth 51 and a longer top tooth 52.

The latch is loaded to an inwardly or forwardly pro-

jecting idle position by any suitable means. In the embodiment shown, such means comprises a coil spring 53 which encircles the pin 46. One end 54 of the spring 53 is seated in a recess in the latch 48 and the other end 55 is seated in a recess in the adjacent side wall 45 of the guard 40. Thus, although the latch 48 is free to pivot in either direction, the spring 53 resiliently maintains it in the idle position shown in Fig. 1 wherein the latch dog portion 49 projects laterally inwardly of the guard walls 45 for engagement with a latch trip now to be described.

In the embodiment illustrated, the rear end 56 of the actuating handle 21 is formed as the latch trip. In the form illustrated, the trip is slightly narrower than the space between the channel walls 45 so as to move freely therebetween longitudinally thereof. The tip of the latch trip 56 is formed as a beveled pawl 57 which is adapted to seat in the notch 50 in one position of the parts as best seen in Fig. 3.

To operate the device the valve operating lever 21 is grasped and elevated whereby to elevate the valve stem 20 and unseat valve 14. Continued elevation of the lever 21 brings its latch trip providing free end 56 into engagement with the lower tooth 51 of the latch dog so that the latch 48 is raised to the Fig. 2 position. Immediately thereafter, and as best seen in Fig. 3, the latch trip tooth 57 clears the shorter lower latch dog tooth 51 which permits the latch spring 53 to snap the latch 48 downwardly until the inner surface of the longer upper latch dog tooth 52 flatly engages the beveled upper surface of the latch trip pawl 57. If the upward movement of lever 21 is stopped at this point and the lever released, it forms an upwardly disposed toggle with the latch 48 so that return movement of lever and latch under the loads of springs 15 and 33 is prevented. This releases the operator for other duties until fluid covers the free end (not shown) of the dispensing nozzle spout 32, creates a partial vacuum in the conduit 33 whereby to partially evacuate vacuum chamber 28 and cause the seating of valve 14 in the manner of the Shaffer and Houghton patent supra.

As the valve stem 20 moves downwardly under the drive of the valve spring 15, it carries with it the released hook bolt 23 and the left end of the valve actuating lever 21 which is pivoted as at 22 to such bolt. However, the latch trip 56 at the other end of the actuating lever 21 is still engaged with the latch 48 so cannot move straight downwardly. Instead, the lever 21 is given a compound movement. At first, it is tilted slightly and then moved longitudinally and downwardly and to the left so that its toggle connection with the latch is straightened out as best seen in Fig. 6. Thereafter, of course, lever 21 is free to complete its descent and the latch 48 is free to return to the idle position, see Figs. 7 and 8. Thus, when the parts reach the Fig. 6 position the latch trip pawl 57 is released from the toggle-forming position in the notch 50 and drives against the lower latch tooth 51 so as to move the latch 48 out of its path, Fig. 7. It then passes clear of the latch 48 which returns to the idle position and the lever 21 then assumes the solid line position of Fig. 8. Lever 21 is now free to resume the Fig. 1 position shown in broken lines in Fig. 8. As soon as the spout 32 is removed from the liquid, the expansible chamber 28 is again open to the atmosphere so that the spring 29 reseats the roller 25 in the hook 24 of bolt 23 which was forced back to the Figure 1 position by its spring 31 as the actuating lever 21 returned to the Fig. 1 position as aforesaid.

When the device is to be actuated manually through-out, the operator elevates the actuating lever 21 beyond the position of Fig. 3 to the Fig. 4 position wherein the latch trip pawl 57 has cleared the latch 48 and the latter is free to return to the idle position. Of course, the operator must manually hold the actuator 21 in this position until the desired amount of liquid has been dispensed. Thereupon, the valve is closed and the parts re-

turn to the Fig. 1 position by merely releasing the lever 21. The latch trip 56 merely flips the latch 48 out of the way in passing.

The device may operate semi-automatically by locking the valve open as in Fig. 3 and releasing the lever 21. Thereafter, when the desired amount of liquid has been dispensed, the operator re-grasps the lever or actuator 21, moves it to the Fig. 3 position and releases it to close the valve. This manner of operation frees the operator for a limited time when some quantity less than a full tank of liquid is desired.

It is apparent from the foregoing that the invention readily accomplishes the several objects by a simple structure and mode of operation which is, nevertheless strong and sturdy in use. Clearly, broken parts are readily replaceable and are simple and inexpensive. Moreover, while there has been shown and described what is now thought to be the preferred embodiment of the invention, it should be understood that the same is susceptible of other forms and expressions. Consequently, the invention is not limited to the precise structure shown and described hereinabove, except as hereinafter claimed.

I claim:

1. In a dispensing device, the combination with a shut-off valve loaded to a closed position and a valve lever engaging said valve and movable to and from a valve opening position, said lever including a free end; of a latch for readily releasably securing said lever in said valve opening position, said latch having a free end, means pivotally mounting said latch, means loading said latch to an idle position with said free end thereof in the path of said free end of said lever, said free ends of said latch and lever being formed with complementary inter-engaging means, said latch being engaged and moved pivotally by said free end of said lever as the same approaches said valve opening position to a toggle-providing position wherein said free ends of said latch and lever are engaged at an angle to form a toggle joint when said lever reaches said valve opening position to prevent return movement of said latch and lever, and said inter-engaged complementary means disengaging to release said latch and lever for return movement upon slight movement of said lever in directions to disengage said toggle joint.

2. In a dispensing device, the combination with a shut-off valve loaded to a closed position and a valve actuator for opening said valve upon movement to a valve opening position; of a latch for readily releasably securing said actuator in said valve opening position, said actuator including a latch trip, said latch having a free end, means pivotally mounting said latch, means loading said latch to an idle position wherein said free end lies in the path of said latch trip, said latch being engaged and pivotally moved by said latch trip as said actuator approaches said valve opening position, said latch trip and said free end of said latch including complementary means formed to interengage and form a toggle when said actuator reaches said valve opening position so as to prevent return movement of said latch and actuator when the latter is advanced to said valve opening position, and said complementary means being disengaged to release said latch and actuator for return movement by relatively slight movements of said actuator in toggle disengaging directions.

3. A device according to claim 2, wherein said complementary means comprises notch and pawl means on said latch and latch trip.

4. A device according to claim 2, wherein said complementary means comprises said free end of said latch being formed with a notch, and said latch trip having a free end formed to provide a pawl seatable in said notch.

5. In a device movable to at least two positions and having means loading the same to a first position, the combination with an actuator for moving said device to a second position; of a latch for readily releasably secur-

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ing said actuator in said second position, said actuator including a latch trip, said latch having a free end, means pivotally mounting said latch, means loading said latch to an idle position wherein said free end lies in the path of said latch trip, said latch being engaged and pivotally moved by said latch trip as said actuator approaches said second position, said latch trip and said free end of said latch including complementary means formed to interengage and form a toggle when said actuator reaches said second position so as to prevent return movement of said latch and actuator when the latter is advanced to said second position, and said complementary means being disengaged to release said latch and actuator for return movement of said actuator to said first position by relatively slight movements of said actuator in toggle disengaging directions.

6. A trip latch, comprising a latch member, a fixed support for said latch member, means pivotally mounting said member on said support for free pivotal movement in opposite directions from a central idle position, means loading said member to said idle position, a latch trip, means mounting said trip for movement in opposite directions along a normally fixed path, said latch member having a latch dog projecting into said fixed path with said latch member in said idle position so as to be engaged and moved by said trip upon movement of the same in one direction, said latch dog and latch trip having means interengaging to provide a toggle preventing return

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movement of the twain as long as they are in engagement, and said trip being disengaged from said dog upon continued movement of said trip in the original direction.

7. A trip latch according to claim 6, wherein said latch trip includes means connected thereto and at times operable to move the same substantially at right angles to its fixed path in a direction away from said latch member a sufficient distance to straighten said toggle and permit return movement of said trip substantially along its fixed paths.

8. A device according to claim 5, there being means operable automatically to move said actuator in one toggle disengaging direction.

9. A dispensing device according to claim 2, there being means for moving said actuator in at least two toggle disengaging directions.

10. A dispensing device according to claim 2, said actuator normally being movable along a fixed arcuate path, said actuator being at times movable in a direction substantially radially of said path, means for manually moving said actuator along said fixed path beyond said valve opening position to disengage said toggle, and automatic means at times moving said actuator radially inwardly of said path to disengage said toggle.

References Cited in the file of this patent

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