July 30, 1968 M. E. LARKIN 3,394,838

CLOSURE LATCH AND CONTAINER

Filed Nov. 18, 1966 2 Sheets-Sheet 1

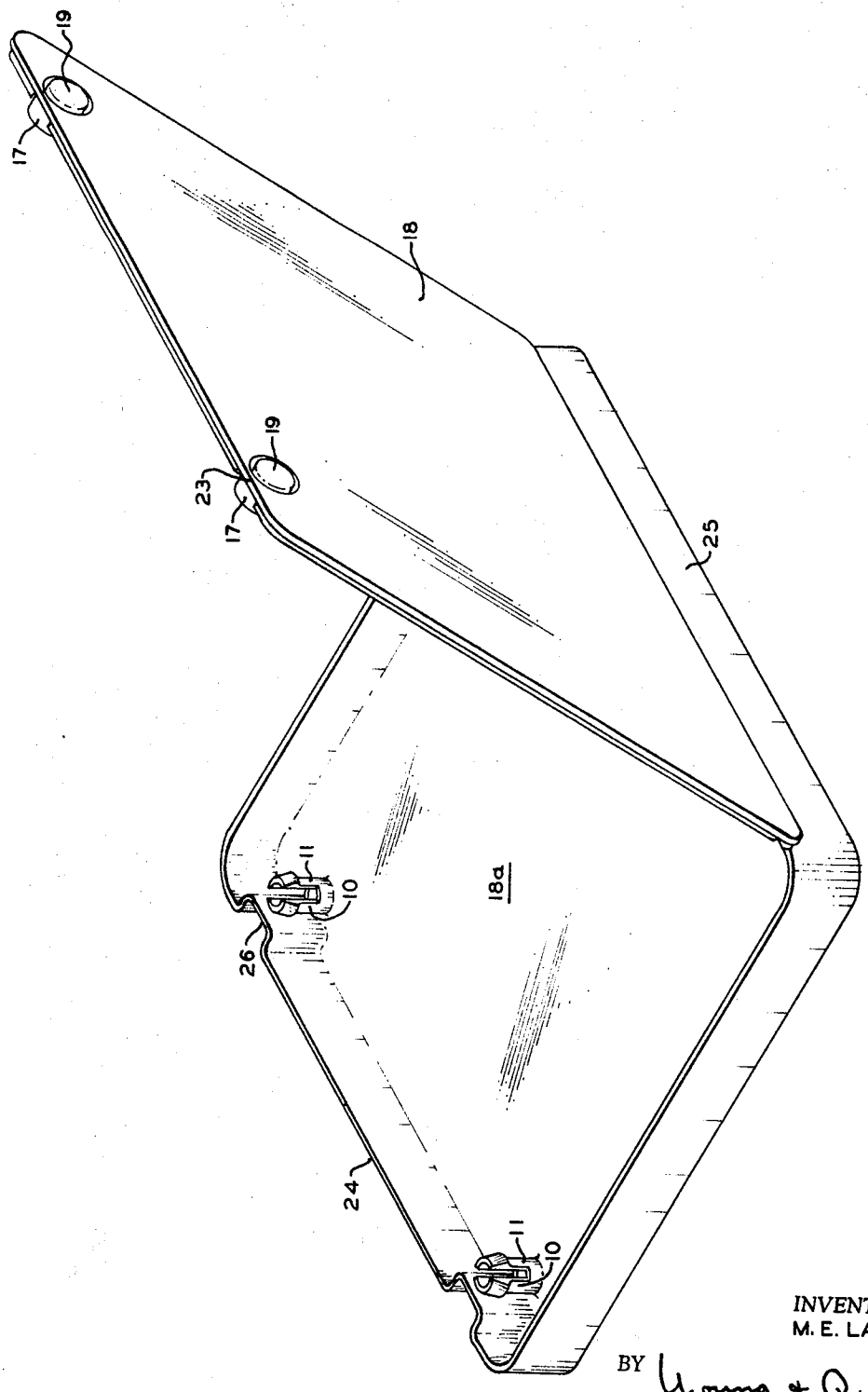

FIG. 1

INVENTOR.
M. E. LARKIN

BY Young & Quigg

ATTORNEYS

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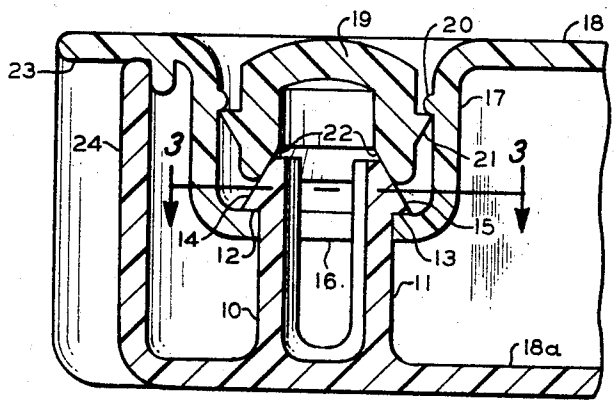

FIG. 2

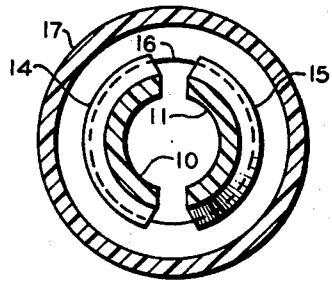

FIG. 3

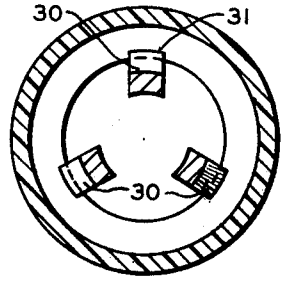

FIG. 3a

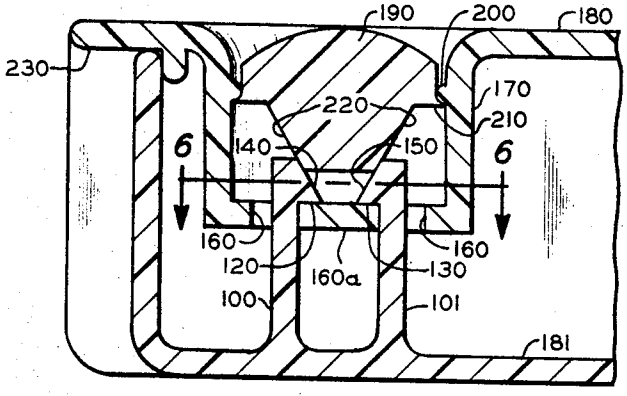

FIG. 5

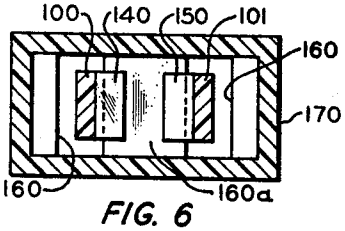

FIG. 6

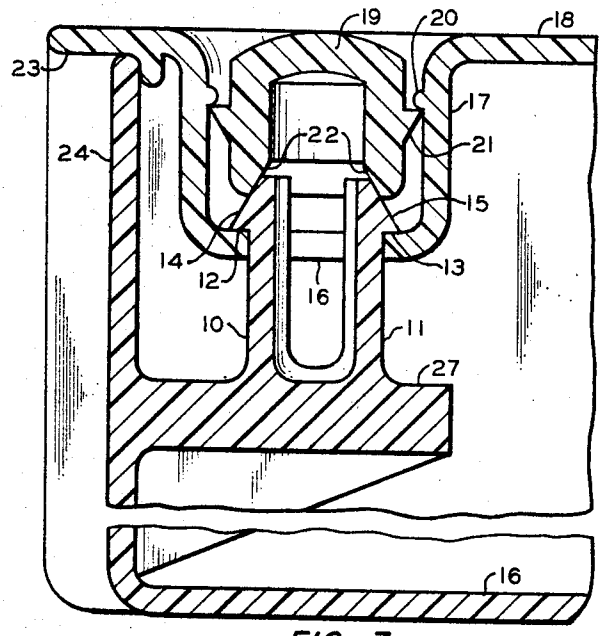

FIG. 7

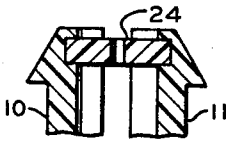

FIG. 4

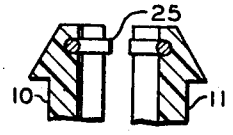

FIG. 4a

INVENTOR.
M.E. LARKIN

BY Young & Quigg

ATTORNEYS

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CLOSURE LATCH AND CONTAINER

Mark E. Larkin, Bartlesville, Okla., assignor to Phillips Petroleum Company, a corporation of Delaware

Filed Nov. 18, 1966, Ser. No. 595,394
9 Claims. (Cl. 220—60)

This invention relates to latching or fastening devices. In another aspect, this invention relates to fastening devices for containers. In another aspect, this invention relates to an improved container having an integral latching device.

Various types of fastening devices for containers, cabinets, fabrics, etc. are known in the art. The most common type of fastening device for containers and the like comprises a metal or plastic pawl mounted on a lid and adapted to engage a resilient spring member on the container wall in locked engagement. Another common type of fastening device comprises a resilient spring-like pawl mounted on the container lid and adapted to engage a fixed member mounted on a container wall. These fastening devices can be disengaged by merely applying force to the lid or door to thereby pull the pawl from locked engagement with the spring or fixed member mounted on the container wall.

The advantage of these fastening devices is that the fastening device becomes engaged merely by closing the receptacle lid. However, the disadvantage of these push-pull type fastening devices is that they can be easily disengaged when the container lid is subjected to unintended shock, such as accidental bumping or dropping.

Several fastening devices are known in the art that will accomplish the above-stated advantage without creating the above-stated disadvantage. However, these fastening devices normally have a latch or slide release that is externally mounted on the container lid or sidewall which is easily triggered by accidental forces.

Therefore, it is desirable to have a fastening device for containers that will engage or lock when the container lid is closed, but will not become unlocked merely by lifting force being applied to the container lid, and that has no releasing mechanism externally mounted on the container sidewall or lid.

Therefore, one object of this invention is to provide an improved closure latch for containers and the like. Another object of this invention is to provide an improved latching device for containers and the like that will come into locking engagement if two surfaces are brought together, but will not unlock by merely forcing the said surfaces apart. Still another object of this invention is to provide an improved latching device for containers and the like which has no externally protruding releasing devices or mechanisms mounted on the container. A further object of this invention is to provide a novel container having an integral latching device with the releasing mechanism of said integral latching device mounted in the lid thereof.

According to one embodiment of this invention, a fastening device for fastening two surfaces together is provided wherein one surface carries at least two resilient studs, each said stud having a flange inclined toward the leading end thereof and extending therefrom; the other surface carries a catch which will contact the inclined flanges and cause the resilient studs to bend in a direction from the inclined flanges and extend through the catch as the first and second surfaces are brought together. When the flanges are fully extended into the catch, the resilient studs will straighten and the flanges will lock with said catch. A release button is movably positioned adjacent the catch and has inclined surfaces which match with the inclined flanges on the studs. Thus, as the release button is forced against the inclined flanges, the studs

will bend in a direction from the inclined flanges and cause the inclined flanges to unlock from the catch.

According to another embodiment of this invention, a container is provided having the above fastening device wherein the resilient studs extend from the bottom of the container and the catch and movable push buttons are contained within depressions in the container lid adjacent the resilient studs. The sidewalls of the container adjacent the resilient studs are indented so that a portion of the top will overhang and be used to lift the container lid after the latch is unlocked.

This invention can be more easily understood by reference to the drawing in which FIGURE 1 is a perspective view of a container of this invention having integral latching devices. FIGURE 2 is a cross section of the preferred latching device of this invention. FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 2. FIGURE 3*a* is a variation of FIGURE 3. FIGURES 4 and 4*a* are sectional views of another embodiment of this invention. FIGURE 5 is a cross section illustrating a modification of the embodiment illustrated by FIGURE 2. FIGURE 6 is a sectional view taken along line 6—6 of FIGURE 5. FIGURE 7 is a cross sectional view illustrating the latching device of FIGURE 2 on a different mounting.

Now referring to the drawing, FIGURE 1 is a perspective view of a container of this invention. The container of FIGURE 1 is a shallow, rectangular-shaped container suitable for holding reels of movie film, tools, and the like, and is preferably molded from a thermoplastic material such as polyethylene. If desired, this container can have a circular or semi-circular shape. Lid **18** is shown pivotably mounted on a sidewall **25**. This mounting can be either an integral self-hinge or separate individual plastic or metal hinges connecting the said lid to the said sidewall. The container bottom **18***a* has two circular protrusions, each comprising resilient stud members **10** and **11**, respectively. Thus, as lid **18** closes, depressions **17** containing captive push buttons **19** will fit over the two said rounded protrusions from container bottom **18***a* and become in locked engagement therewith to hold the lid **18** firmly in the closed position. Indentions **26** in front wall **24** are provided so that portions **23** of lid **18** will overlap front wall **24** when lid **18** is in the closed position. This will provide a means for lifting lid **18** after the latching devices have become disengaged by applying a downward force on captive push buttons **19**.

FIGURE 2 shows a cross section of a latching device of the container of FIGURE 1. As illustrated, resilient stud members **10** and **11**, having flanges **12** and **13**, respectively, formed by the termination of inclined surfaces **14** and **15**, respectively, rest upright on container bottom **18***a*. Studs **10** and **11** are shown as plastic material integral with base **18***a* that was formed during the molding of the container. In the locked position as shown, resilient stud members **10** and **11** protrude into opening **16** of depression **17** in container lid **18**. Flanges **12** and **13** are held in locked engagement on the periphery of opening **16** by resilient stud members **10** and **11** in the upright position. Captive push button **19** is held within depression **17** by stops **20** in depression **17** and stops **21** on the periphery of captive push button **19**. The top portion of captive push button **19** rests flush or slightly below the level of top **18**, and captive push button **19** is vertically movable in recess **17** below stops **20** therein. Inclined surfaces **22** match with inclined surfaces **14** and **15** and slide thereon as captive push button **19** is depressed to thereby cause resilient studs **10** and **11** to come together and flanges **12** and **13** to be pulled from their locking position on the periphery of opening **16**. Overlap **23** is provided whereby lid **18** can be lifted when flanges **12** and **13** are pulled from their locking position on the periphery of opening **16**

as resilient studs **10** and **11** are forced together by the downward action of captive push button **19**.

FIGURE 3 is a sectional view taken along line **3**—**3** of FIGURE 2 to illustrate the locked engagement of flanges **12** and **13** on the periphery of opening **16**. It must be noted that the flanges contact almost the entire periphery of opening **16** when in locked engagement to provide a very strong container latch that is not easily rupturable or broken as force is applied upward on lid **18**. If desired, however, a series of studs **30** can be provided with smaller flanges that lock on the periphery of opening **16**, as illustrated in FIGURE 3*a*. This configuration is desired whenever the resilient studs are made of a metallic material and are separately mounted in bottom **16**. However, as stated, it is desired that resilient stud members **10** and **11** be made of the same plastic material as the container base so that they can be molded in a one-step operation when the said container base is molded. The arrangement of the metallic stud members as shown in FIGURE 3*a* can be used in many heavy-duty type operations that would result in a great amount of wear on inclined surfaces **31**. In this later instance, depression **17** can also be made of a metallic material or the entire container can be made of a metallic material.

FIGURES 4 and 4*a* illustrate the use of a resilient plastic or rubber insert and a metal split ring insert, respectively, between resilient stud members **10** and **11** to thereby add rigidity to said stud members needed for heavy-duty use of the molded plastic container. In FIGURE 4 insert **24** can be a disk of resilient material such as neoprene, polybutadiene, butadiene/styrene rubber, ethylene/propylene rubber, or the like, and in FIGURE 4*a* split ring **25** can be a stainless steel split ring. Thus, when using the integral molded plastic container under heavy-duty conditions, resilient stud members **10** and **11** might tend to warp or permanently deform in the inward direction, but the use of the embodiments of FIGURES 4 and 4*a* combines the economy of integral molding plus the memory and strength of the rubber disk or steel ring to thereby provide the necessary resilience to stud members **10** and **11** in the said heavy-duty operation.

FIGURE 5 is another embodiment of this invention illustrating a different configuration of the latch of FIGURE 2. Resilient stud members **100** and **101**, having flanges **120** and **130**, respectively, which are formed by the termination of inclined surfaces **140** and **150**, respectively, rest upright on the container bottom **181**. Flanges **120** and **130** lock on cross member **160***a* when container lid **180** is in closed position. As shown, resilient stud members **100** and **101** protrude through openings **160** in depression **170** on the container lid **180** in a similar fashion as the studs in FIGURE 2. Captive push button **190** is held within depression **170** by stops **200** in depression **170** and stops **210** on the periphery of captive push button **190**. Inclined surfaces **220** match with inclined surfaces **140** and **150** and slide thereon as captive push button **190** is depressed to thereby cause resilient studs **100** and **101** to spread apart. In this arrangement, captive push button **190** will force resilient stud members **100** and **101** apart and out of locking engagement with cross member **160***a* as opposed to the opposite effect of push button **19** on studs **10** and **11** of FIGURE 2. For heavy-duty operations, a resilient spring means can be positioned around resilient stud members **100** and **101** to thereby increase their rigidity.

FIGURE 6 is a sectional view of FIGURE 5 taken along line **6**—**6** and illustrates the locking engagement of flanges **120** and **130** on cross member **160***a*. When inclined surfaces **220** of captive push button **190** are forced against inclined surfaces **140** and **150**, resilient stud members **100** and **101** will spread until flanges **120** and **130** lose contact with cross member **160***a*. Then, as lid **180** is uplifted, resilient stud members **100** and **101** will slide through rectangular openings **160** in depression **170**.

FIGURE 7 is an illustration of the latching device of FIGURE 2 utilized on a container having a greater depth than the container illustrated in FIGURE 2. As illustrated, resilient studs **10** and **11** can merely be molded on a protrusion **27** extending from sidewall **24**. When done in this manner, or in any manner similar thereto, the latching device of this invention can be used with a container having any type configuration.

From an examination of the above disclosure, it is obvious that the latching device of this invention can take many configurations and forms, and the specific embodiments disclosed are in no way intended to limit the scope of this invention. For example, it can readily be seen that the fastening device of this invention can be used for fastening any two surfaces together, such as two fabric surfaces. The resilient studs can be bradded to one surface, and the depression, in the form of a cylinder having the captive push button therein, can be bradded to another surface to thereby form a locking snap-type fastener for fabrics and the like. Also, the container lid need not be pivotably mounted on a container sidewall but can be completely removable, and fastening devices can be positioned around the periphery thereof, such as in the corners of a rectangular top or the circumference of a circular top.

I claim:

1. A fastening device for fastening two surfaces together comprising:

(a) at least two adjacent resilient stud means extending from the first said surface, each said stud means having an inclined flange extending therefrom and inclined toward the leading end thereof;

(b) catch means carried by the second said surface and adjacent said resilient stud means so that said catch means will contact said inclined flanges and cause said resilient stud means to bend in a direction from said inclined flanges and extend through said catch means as said first and second surfaces are brought together, said catch means locking with said inclined flanges as said inclined flanges extend therethrough and as said resilient stud means straighten to thereby hold said first and second surfaces in closed relationship;

(c) a release means movably positioned adjacent said catch means, said release means having inclined surfaces positioned adjacent said inclined flanges to contact said inclined flanges and cause said reslient stud means to bend in a direction from said inclined flanges as said release means is forced against said inclined flanges and to thereby cause said inclined flange means and said catch means to unlock.

2. The fastening device of claim **1** further comprising lifting means for lifting said first surface from said second surface after said flange means and said catch means are unlocked.

3. The fastening device of claim **1** further comprising a resilient spring means positioned on said resilient stud means to thereby resist the bending motion of said stud means as said first and second surfaces are forced together.

4. The fastening device of claim **2** wherein said first surface is a container lid for a container and said second surface is the bottom of said container.

5. The fastening device of claim **4** whrein said catch means comprises a depression carried by said lid, said depression having at least one aperture through the lower portion thereof for receiving said resilient studs, the periphery of said apertures aligned so that a portion thereof will contact said inclined flanges on said resilient stud means, and will engage said flange means as said resilient studs straighten when said resilient stud means pass therethrough.

6. The fastening device of claim **5** wherein said release means comprises a push button held within said depression by locking ridges on said push button and said de-

pression, said push button being movable axially within said depression.

7. The fastening device of claim 6 wherein said lifting means comprises a portion of said container top overlapping a sidewall adjacent said depression.

8. A container comprising in combination a bottom, said bottom having at least one pair of adjacent resilient stud means integral therewith and extending from one side thereof, each said stud means having an inclined flange extending therefrom and inclined toward the leading end thereof; a sidewall extending vertically therefrom and positioned in enclosed relationship around the sides of said bottom; a top pivotably mounted on a portion of the sidewall extending from a side of said bottom opposite the side having said resilient stud means, said top having depressions therein adjacent each pair of resilient stud means, said depressions having apertures through the lower portions thereof, the periphery of said apertures aligned so that a portion thereof will contact said inclined flanges and cause said resilient stud means to bend in a direction from said inclined flanges and extend through said apertures as said lid is closed, the periphery of said apertures locking with said inclined flanges as said

inclined flanges extend through said apertures and said resilient stud means straighten; a release button held but movable axially within each said depression, said release button having inclined surfaces positioned adjacent said inclined flanges to contact said inclined flanges and cause said resilient stud means to bend in a direction from said inclined flanges as said release button is forced against said inclined flanges to thereby cause said inclined flanges to unlock with the periphery of said apertures; lifting means for opening said top after said inclined flange means are unlocked.

9. Container of claim 8 wherein said lifting means comprises portions of said top adjacent said depressions and the sidewalls adjacent said resilient stud means are indented to expose said portions.

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JAMES B. MARBERT, *Primary Examiner.*