April 11, 1967 J. R. PULTZ 3,313,564

FASTENING APPARATUS

Filed Nov. 18, 1964

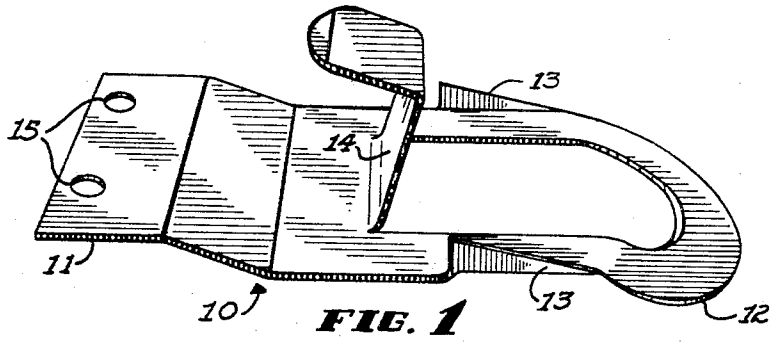



FIG. 1

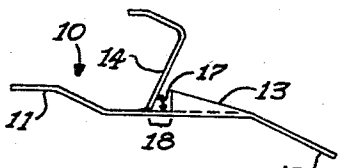



FIG. 2

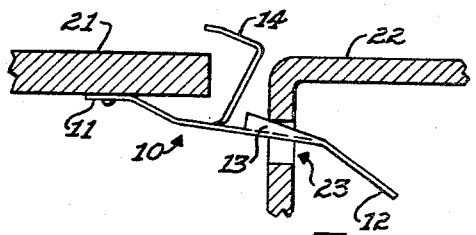



FIG. 3

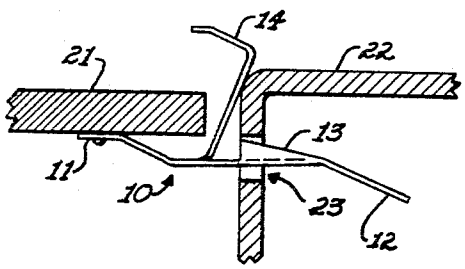



FIG. 4

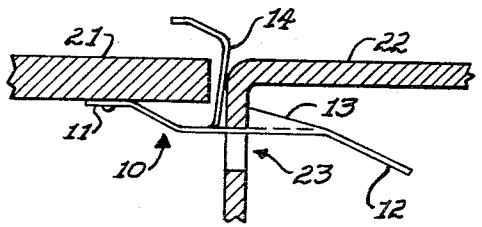



FIG. 5

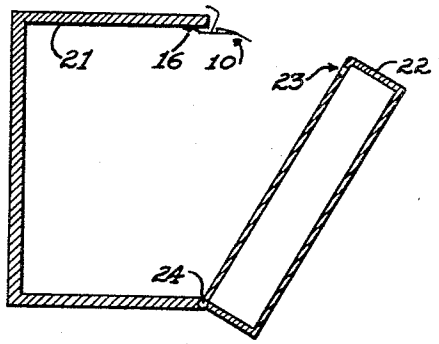



FIG. 6

INVENTOR.
JACK R. PULTZ

BY Francis A. Sirr

ATTORNEY

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# FASTENING APPARATUS

Jack R. Pultz, Shorewood, Minn., assignor to Honeywell Inc., a corporation of Delaware

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This invention is concerned with fastening means and more particularly with a spring clip device capable of fastening a lid to a box by projecting through an aperture in the lid.

Numerous fastening devices, comprising spring clips, are known in the art. There are clips that give a positive holding force, clips that provide a rattle free assembly and clips that will align a lid with a box. Many of the clips perform only one of these functions, and perhaps may perform two of these functions. It is the purpose of this invention to provide a unitary spring clip that will perform all three functions. It will provide a firm, positive holding force, not prone to accidental opening. It will provide through its firm holding a rattle free assembly. It will align a lid with a box, and will do so with a comparatively loose tolerance between mating parts.

The clip of this invention comprises a flat plate made of a yieldable material. A rear portion of the plate is raised above the plane of the plate and contains holes for mounting to a box. A front portion of the plate is rounded and bent down with respect to the plane of the plate, to provide a means of alignment. Directly behind the front portion of the plate are a pair of vertical projections, or barbs, having a substantially triangular shape. The barbs extend substantially perpendicular to the plane of the plate and have a flat edge facing the rear portion of the plate. An arm is struck upwardly from the plate and is integral with the plate at a point between the rear portion and the back edges of the barb. The arm performs three functions: it will perform a firm holding function by grasping the lid between itself and the back edges of the barbs, it will provide a guide for leading the lid to the proper position between the arm and the back edges, and it will perform as an actuating device for releasing the lid when a downward pressure is placed on the arm.

It is therefore an object of this invention to provide a unitary fastening means capable of collectively and individually performing the functions of a positive holding force, a rattle free assembly, and alignment of a lid to a box.

It is a further object of this invention to provide a spring clip for fastening a lid having an aperture to a box by passing through the aperture and firmly holding the lid between a pair of barbs on the clip and yieldably mounted arm on the clip.

It is another object of this invention to provide a spring clip for fastening a lid having an aperture to a box, which spring clip has a pair of barbs and a yieldably mounted arm, which is capable of firmly holding the lid between itself and back edges on the barb, of guiding the lid to the proper position between itself and the back edges of the barb, and of releasing the lid by depressing the spring clip when a downward pressure appears on the arm.

These and other objects of this invention will become apparent upon consideration of the accompanying claims, specification and drawings of which:

FIGURE 1 is a perspective drawing of an embodiment of the spring clip of this invention,

FIGURE 2 is a side view of the clip of FIGURE 1,

FIGURE 3 is a drawing intended to show the use of this embodiment of the clip under normal conditions,

FIGURE 4 is a drawing showing how the clip of this



embodiment may be used to overcome abnormal conditions,

FIGURE 5 is a drawing showing the clip of this embodiment in a normal actuated or locked condition, and

FIGURE 6 is a drawing representing the clip in position with a box, and a hinged lid having an aperture at the unhinged end, which represents a preferred use of the clip.

In FIGURE 1 there is disclosed a fastening means for spring clip **10**. A rear portion **11** of the clip is offset from the main plane of the clip to facilitate fastening to an inner wall in a box, such as the box **21** of FIGURE 6. A pair of holes **15** are placed in the rear portion **11** also to facilitate fastening to the box **21**. A front portion **12** of the clip is shown as having a rounded nose and being downwardly bent with respect to the normal plane of the clip **10**. A pair of lateral projections or barbs **13** are upwardly bent from the normal plane of clip **10**, and are in the shape of a triangle having a substantially perpendicular rear edge. An arm **14** has been upwardly struck from the clip **10** and is integral with the clip **10** at a point between the rear edges of the barbs **13** and rear portion **11**.

FIGURE 2 is a side view of the clip **10** showing an angle **17** which is the angle formed between clip **10** and arm **14**. There is also shown in FIGURE 2 a distance **18** which is the distance between the rear edges of barbs **13** and the point at which arm **14** is integral with clip **10**.

FIGURE 6 shows the clip **10** fastened to the inner hole of the box **21** by a pair of fastening devices here shown as rivets **16**. A lid or cover **22** is connected at one end to box **21** by a hinge **24**. At the other end of lid **22** there is an aperture **23**, through which a portion of clip **10** is intended to pass.

The operation of the clip **10**, in holding the lid **22** to the box **21**, may be best described by reference to FIGURES 3, 4 and 5. FIGURE 3 represents the operation of the clip **10** under normal conditions, that is, when the aperture **23** is properly aligned. Under normal conditions as the lid **22** swings closed on hinge **24** the upper portion of the aperture **23** will first strike along the front portion **12** of clip **10**. This front portion will therefore serve to laterally align the cover **22** and cause the barbs **13** to be guided into the aperture **23**. As the upper edge of the aperture **23** rides along first the front portion **12** and then the ramp of the barbs **13**, it will cause the clip **10** to be deflected downward as shown in FIGURE 3. When the barbs **13** have progressed a predetermined distance into the aperture **23**, the lid **22** will strike the arm **14** and deflect it in a backward direction. After another small motion the barbs **13** will pass through the aperture **23**, and the resiliency of the clip **10** will cause the clip to attempt to return to its original position. This will result in the rear edges of the barbs **13** rising along the inside wall of the lid **22** until the clip **10** strikes the upper edges of aperture **23**, as may be seen by reference to FIGURE 5. Further reference to FIGURE 5 reveals that the lid and box are now in a closed position, that the arm **14** has been deflected by the lid **22**, and due to its resilience is firmly grasping the lid **22** between the arm **14** and the rear edges of the barbs **13**.

FIGURE 4 shows the operation of the clip of this invention in a situation where the lid **22**, box **21**, or hinge **24** have been mistreated or otherwise effected such that when lid **22** swings closed on hinge **24** the aperture **23** will strike neither front portion **12** nor the ramp portion of barbs **13**. In this situation the first contact made is by an outer wall of lid **22** against the inclined arm **14**. As the lid **22** is forced closed against the arm **14**, it will cause the inclined arm **14** to ride upward and pull the deflectable clip **10** upward. When the clip **10** has been deflected upward sufficiently to cause barbs **13** to engage

the upper portion of aperture **23**, arm **14**, will also begin to deflect backwards. When the barbs **13** have passed through the aperture **23** the deflected arm **14** and the sliding action of the lid **22** along the incline of arm **14** will cause the rear edges of barbs **13** to be pulled up along the inner wall of lid **22** until the clip **10** again strikes the upper edge of aperture **23**. It will be noted that this brings us exactly to the same closed and locked configuration shown in FIGURE 5.

It will be apparent from the discusion of FIGURES 3 and 4, that for proper operation of this clip the incline of arm **14**, that is, the angle **17** as shown in FIGURE 2, and the distance between the rear edges of the barbs **13** and the arm **14**, also shown in FIGURE 2 as distance **18**, are both critical. That is, there is a particular angle **17** combined with a particular distance **18** which will cause the best operation of this invention when used with a lid **22** of a known dimension.

It has been found that for a lid approximately 0.05 inches thick and having a rounded leading edge, the best combination of angle **17** and distance **18** are, respectively, 65° and 0.79 inch.

The invention of this application has been built with the preceding dimensions and applied to the closure of an actual lid on an oil burner primary box. The spring clip of this invention proved to work substantially as described in this specification in performing the triple function of a positive holding force, provision of a rattle free assembly, and alignment of the lid with the box.

It will be ovious that the general principles herein disclosed may be embodied in many forms other than that specifically illustrated without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

**1.** A fastener comprising:

a member having a front portion, a rear portion, and a resilient intermediate portion interconnecting said front and rear portions,



barb means on said intermediate portion extending in a direction away from said intermediate portion, said barb means having a fastening edge which faces the rear portion of said member,

and actuating means comprising a resilient elongated tab having an end fixed to said intermediate portion at a point between the fastening edge of said barb means and the rear portion of said member, having a fastening portion extending in said direction away from said intermediate portion and inclined toward the fastening edge of said barb means, and having a free end extending in said direction away from said intermediate portion and inclined away from the fastening edge of said barb means.

**2.** A fastener as defined in claim **1** wherein said barb means is a substantially triangular projection with said fastening edge formed as a surface which is substantially normal to said intermediate portion.

**3.** A fastener as defined in claim **1** wherein said member is a resilient plate, the intermediate portion of which includes side edges; and wherein said barb means is a pair of triangular projections, one on each of said side edges, the fastening edge of each projection being formed on a surface which is substantially normal to said intermediate portion.


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MARVIN A. CHAMPION, *Primary Examiner.*

EDWARD C. ALLEN, *Examiner.*

J. R. MOSES, *Assistant Examiner.*