Claims

What is claimed is:

1. A push button, comprising:

a retainer with top and bottom ends and an axial bore extending from the top end to the bottom end of the retainer, the retainer further comprising a collar at a distal portion of the top end;

wherein the axial bore includes a central cavity and a counterbore, the counterbore extending from a distal portion of the bottom end, the central cavity bounded by a roof portion and a top of the counterbore, said roof portion having a first set of cams;

a cam ring insert formed as a separate feature from the retainer, disposed against the top of the counterbore, and including a second set of cams;

a plunger received within the axial bore and axially slidable between extended and retracted positions, said plunger comprising:

a button portion at a distal top end of the plunger, a pin portion at a distal bottom end of the plunger, and a flanged midsection of lateral square cross-section located between the top and bottom ends of the plunger, and

wherein corners of the flanged midsection act upon the first and second sets of cams when the plunger is moved between the retracted and extended positions whereby the plunger is rotated.

2. The push button of claim 1 constructed such that during a first upward movement of the plunger, the plunger is stopped when the flanged midsection abuts the collar thereby defining a stable retracted position of the plunger within the retainer.

3. The push button of claim 2 constructed such that during a second upward movement of the plunger after the first upward movement the plunger, the plunger is stopped by the roof portion of the central cavity thereby defining a stable extended position of the plunger.

4. The push button of claim 1, further comprising an end cap affixed to the bottom end of the retainer.

5. The push button of claim 4 wherein the end cap is affixed to the retainer by broaching.

6. The push button of claim 1 wherein the extended and retracted positions of the plunger are each alternatively changed from one to the other by a first down stroke of the plunger then a second sequential up stroke of the plunger, said combined up and down strokes defining a plunger cycle.

7. The push button of claim 5 wherein the second set of cams engage the plunger midsection during the first down stroke of the plunger and the first set of cams engage the plunger midsection during the up stroke of the plunger.

8. The push button of claim 7 wherein the first and second sets of cams engage only the corners of the flanged midsection.

9. The push button of claim 6 wherein a change in plunger position to and from retracted and extended positions is performed by pressing and then releasing the button portion of the plunger.

10. The push button of claim 9 wherein each plunger cycle causes the plunger to rotate 45 angular degrees.

11. The push button of claim 6 wherein the first and second sets of cams are oriented to apply a turning force to the plunger in the same rotational direction in both axial up and down directions of each plunger cycle so that the rotary positional advancements of the plunger are additive.

12. The push button of claim 1 wherein the cams of the first set of cams have the same shape and are equally spaced about a 360-degree circular array, and the cams of the second set of cams have the same shape and are equally spaced about a 360-degree circular array.

13. The device of claim 12 wherein the first and second sets of cams are radially offset from each other 22.5 angular degrees.

14. The push button of claim 1, further comprising an end cap configured to attach the push button to an object.

15. The push button of claim 1, further comprising a spring.

16. The push button of claim 15, further comprising an end cap, the spring disposed between the plunger and end cap to urge the plunger upwardly toward the top end of the retainer.

17. The push button of claim 1, wherein the cam ring insert has a periphery including radially outwardly extending keys configured to match corresponding keyways formed into the counterbore.

18. The push button of claim 1, wherein the cams of the second set of cams are located on top and bottom faces of the cam ring insert so that the cam ring insert is symmetrical about a midplane.

19. The push button of claim 1, wherein the cam ring insert is disposed in the retainer between an end cap disposed at the bottom end of the retainer and the collar.

20. The push button of claim 1, wherein the first and second sets of cams are disposed opposite each other such that the first and second sets of cams face each other.