This invention relates to boxes, cabinets, chests, or the like, particularly to tool chests.

Tool chests such as are shown, for instance, in my Patent No. 2,215,681, issued September 24, 1940, generally consist of a box-like structure, having a lower drawer section and an upper tray section. The upper section is adapted to be closed by a hinged cover, the usual type of releasable snap fasteners and/or lock being provided for maintaining the cover closed. All of the drawers are held closed by a single front panel which is movable into a position in front of the drawers. This panel is held in place by one or more spring controlled plunger pins, wherein the spring maintains the plunger out of position, permitting movement of the panel to its closed position, and then the plunger or plungers can be depressed to enter corresponding holes in the panel. Each plunger is depressed upon closure of the top cover.

It is one of the objects of the present invention to provide an improved plunger construction which is simple and reliable in its action and which can be easily installed or replaced, should replacement be necessary.

In the preferred embodiment of the present invention each plunger assembly is encased in a tube which includes a spring that maintains the plunger pin normally entirely within the tube. The tube is open at both ends so that the plunger pin may be pushed into the tube at one end to project the opposite end of the pin out of the tube thereby projecting it into a corresponding hole in the panel. When the chest is made of wood, the plunger pin assembly can be mounted in place by drilling a hole through the proper portion of the box or chest for receiving the plunger pin assembly. This hole is preferably made slightly undersized and the plunger pin assembly is then forced into position in much the same manner as a nail is driven into a piece of wood.

A part of the tubular casing of the plunger pin assembly is knurled or otherwise roughened so that the tube is gripped by the wood once the tube is driven into place.

It is a further object of the present invention to provide an improved means for holding the plunger pin and spring in the plunger tube. The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a perspective view of a box or chest embodying the present invention.

Figure 2 is a transverse sectional view through the chest of Figure 1.

Figure 3 is an enlarged fragmentary sectional view illustrating the plunger locking portion of the chest of Figure 1 and.

Figure 4 is an exploded, unassembled view of the locking plunger.

Referring more particularly to the drawing, the box or chest, indicated at 1, is preferably made of wood or the like, although it may be made of various known compositions, or of metal. The chest is a box-like structure provided with a hinged cover 2 adapted to close an open top tray section 3 of the box, and a slideable panel 4 adapted to close an open front section 5 of the cabinet. The open front section 5 comprises a drawer compartment and has a number of drawers 6 of different depths slidably mounted therein, in any desired manner as, for instance, as illustrated in my Patent No. 2,215,681, above referred to. The front panel 4 is removable from the chest and is slideable into a horizontal position where it is located between the bottom 7 of the cabinet and the lowest drawer. The panel may be positioned vertically with a bottom tongue 10 thereof extending into a corresponding groove in the bottom 7 of the chest to hold the lower edge of the panel against forward sliding. The tongue extends across the full width of the panel. When the panel is thus positioned the top of the panel comes immediately under the lower edge of a front strip or cross bar 12, of wood or the like, which is a part of the chest and constitutes the front wall of the tray section 3.

The panel is adapted to be locked in position by two plunger assemblies 15, each of a construction such as is illustrated more fully in Figures 3 and 4. Each plunger assembly comprises a circular plunger tube 16 of brass or the like, having an inwardly spun peripheral groove 17 adjacent the lower edge thereof. A spring 18 and a plunger pin 19 is lowered into the cylindrical bore of the tube 16 until the spring rests upon the indented ring portion 20 of the groove 17, thus retaining the spring against further downward movement. The top of the plunger 19 has a collar 21 pressed thereon, which collar may, if desired, also be spot welded in place, although this may be dispensed with, since a tight pressed or shrunk fit can be obtained between the collar 21 and the plunger so that the collar is irremovable and non-sidable on the pin. The
plunger 19 is inserted into the tube until the top edge thereof is flush with or slightly below the top edge 23 of the tube. At this time the bottom of the spring 18 rests on the ring 20, and the spring is under compression. Thereafter a peripherally extending groove 24, similar to the groove 17, is formed in the tube 16 above the collar 21, thus forming an inwardly extending ring 25 on the inside of the tube. This acts as a limiting stop against which the collar 21 bears under the action of the spring 18. When the collar 21 bears against the lower edge of the rail 15 under the action of the plunger 19, which is in compression, the top of the plunger is flush with the top 23 of the tube 16 and the tapered bottom of the plunger is substantially flush with the bottom edge of the tube 16. The tube 16 is preferably of a length exactly equal to the height of the cross strip 12 of the chest.

The cross strip 12 has a plurality of longitudinally extending holes therein each of a diameter slightly less than the external diameter of the tube 16. A plunger assembly is pressed or driven into each of these holes by driving the tube 16 into the holes in much the same manner as a nail is driven in place. To facilitate holding the tube in place against accidental removal, a portion of the tube is initially formed roughened. This roughened portion is formed, in the present instance, by knurling the outer upper edge 40 of the tube 16. When the tube is driven home into the strip 12 the knurled portion 26 serves to lock the tube in place, since the knurling of the brass tube produces narrow outwardly projecting longitudinally extending teeth of very little depth but extending outwardly sufficiently to embed the tube in the wood.

A ferrule 30 is mounted in the panel 4 opposite each tube 16 in the cross member 12. This ferrule consists of a short brass tube of the same diameter as the tube 16 which is driven into a slightly undersized hole drilled in the panel 4. Approximately half of the periphery of the tube 30 is knurled or otherwise roughened, as indicated at 31, to lock the ferrule 30 in place in the wooden panel 4.

The cover 2 has a front strip 35 forming a part of the cover rim, which strip bears against the strip 12 when the cover is closed. The strip 35 has two pins 36 projecting from the lower surface thereof each in alignment with a plunger assembly 15. The pins 36 may be hammered into undersized holes in the cover in much the same manner as a nail is driven home.

When the cover 2 is open, the bottom portion of the plungers 19 of the plunger assemblies do not project below the bottom of the strip 12. The panel 4 may thus be positioned as illustrated in Figure 2 in front of the drawers. Thereafter, when the cover 2 is closed the dull tapering ends of the pins 36 force the lower ends of the plungers 19 into the ferrules 30, as illustrated in Figures 2 and 3, to lock the panel against opening. The pins 36 force the plungers 19 downwardly an amount sufficient to cause the lower ends of the pins to enter the ferrules 30, but an amount insufficient to bring the tops of the plungers 19 below the rings 25. The chest may be provided with the usual clasps 38 for clamping the cover in its closed position. A lock 39 may be provided for locking the cover in its closed position. A handle 40 on the cover facilitates carrying the portable chest. When the chest is thus carried the plungers 19 are maintained in their panel locking position by the pins 36.

From the above description it is apparent that I have provided an improved plunger assembly which can readily and quickly be mounted in position in a chest for locking the chest panel upon closing of the top 2. The plunger assembly may be manufactured under factory conditions and precision, such as is applicable to metal working. Thus the plunger assembly is adapted for receiving the plunger assemblies, all that is necessary being to drill the holes for receiving the plunger assemblies and receiving the ferrules. If desired, these holes may be drilled in a single operation. For instance, the panel 4 may be moved to its closed position and then a single drilling operation the strip 12 may be drilled to receive a plunger assembly 15 and the drilling may be continued until the same drill enters into and forms a hole in the panel 4 for receiving the ferrule 30.

In compliance with the requirements of the patent statutes I have here shown and described a preferred embodiment of my invention. It is, however, to be understood that the invention is not limited to the precise construction here shown but is merely illustrative of the principles of the invention. What I consider new and desire to secure by Letters Patent is:

1. In a chest or the like of the type including a narrow strip against opposite edges of which closure members are movable to their closed position, a tube making a press fit in an undersized hole in said strip and extending from one towards the other of said opposite edges, a locking plunger in said tube, a plunger receiving opening in one closure member and in alignment with the tube in the closed position of said one closure member, and a plunger pin on the other closure member adapted to enter the tube in the closed position of said other closure member and push the plunger into the opening in the one closure member.

2. In a chest or the like of the type including a narrow strip and closure members movable to their closed positions against opposite edges of the strip, a plunger lock assembly including a tubular member open at both ends and making a press fit in an undersized hole in said strip and having at least a portion of its outer surface roughened to inhibit withdrawal of the tubular member, a plunger slidably in said member and terminating flush with the exposed surface of the member, spring means within the tubular member for urging the plunger to its normal position within the tubular member, stop means for limiting the movement of the plunger under the action of the spring, and pin means on one of the closure members movable into one open end of the tubular member for projecting the plunger through the opposite end of the tubular member into the other closure member.

3. In a chest or the like of the type including a narrow strip and closure members movable to their closed positions against opposite edges of the strip, a plunger lock including a tubular member open at both ends and making a press fit in an undersized hole in said strip and having at least a portion of its outer surface roughened to inhibit withdrawal of the tubular member, a plunger slidably in said member, spring means entirely within the tubular member for urging the plunger to its retracted position within the tubular member, stop means in the tube for limiting the movement of the plunger under the action of the spring, and pin means on one open end of the tubular member for projecting the plunger through the opposite end of
the tubular member, said pin means being car
ried by one of said chest closure members, and
a ferrule embedded in the second chest closure
member and engaged by the projected end of
the plunger.
4. A portable chest having an upper section
opening upwardly, a cover for the section, a lower
section opening forwardly, a panel closing the
lower section, a front wall strip against the top
of which the cover bears in its closed position
and below the lower edge of which the top of the
panel terminates in its closing position, a straight
tube extending into the strip from the top edge
toward the lower edge thereof and making a
press fit therein, a plunger slideable in the tube
and movable below the lower edge of the front
wall strip to lock the panel, spring means enca
ced in the tube and urging the plunger upwardly,
and pin means carried by the cover and movable
into the tube for pushing the plunger down
wardly upon closure of the cover.
5. A portable tool chest comprising a box-like
structure having an open front and an open top,
a front panel movable into a position to close the
front of the chest, a metal tube in the chest
immediately above the panel when the panel is in
its closed position, a plunger in said tube, said
panel having a plunger receiving opening into
which the plunger is movable, spring means
within the tube for retaining the plunger in the
tube, a cover for the open top, pin means carried
by the cover and movable into one end of the
tube and bearing against the plunger for project
ing the opposite end of the plunger into the panel
against the action of the spring to secure the
panel in place.
6. In a portable tool chest having an open
front face, a movable closure for the front face,
said chest having a front cross bar immediately
above the closure, a ferrule at the top of the
closure and embedded in the closure, a tube em
bedded in the cross bar in alignment with the
ferrule, a plunger in the tube and movable to
project into the ferrule, the cross bar being of a
width at least equal to the length of the plunger,
spring means in the tube maintaining one end of
the plunger retracted in the tube, means for
holding the opposite end of the plunger against
projecting above the cross bar, and means for
moving the plunger against the action of the
spring to project said one end of the plunger into
the ferrule to hold the closure in its closed posi
tion.

HARRY L. LEVENSTEN.