April 5, 1927. 1,623,789

W. A. HUBENER

TOGGLE AND METHOD

Filed Feb. 10, 1925 2 Sheets-Sheet 1

Fig 1

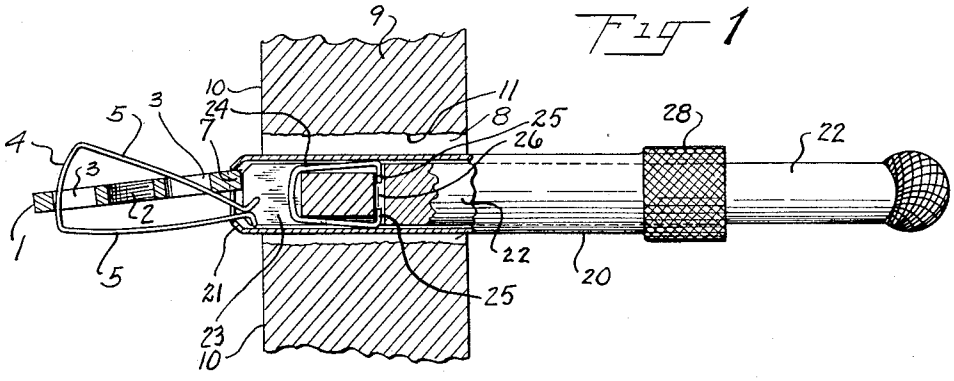


Fig 2

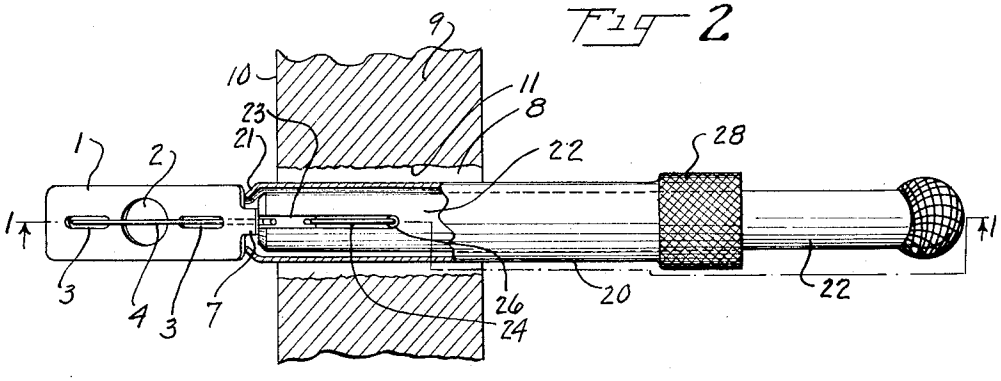
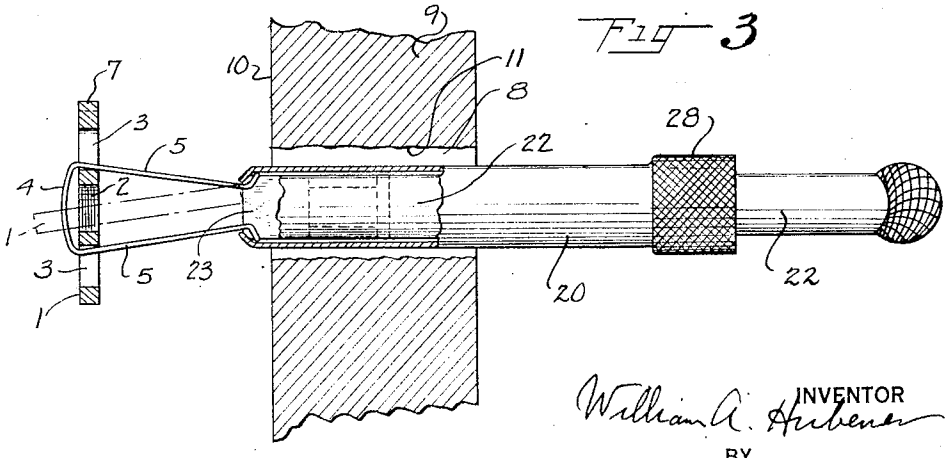


Fig 3



William A. Hubener INVENTOR

BY

Alanson Johnson ATTORNEY

April 5, 1927. 1,623,789

W. A. HUBENER

TOGGLE AND METHOD

Filed Feb. 10, 1925 2 Sheets-Sheet 2

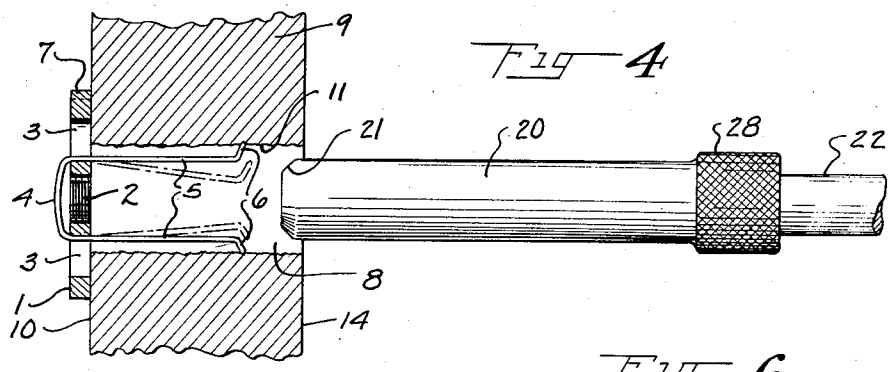


Fig 4

Fig 6

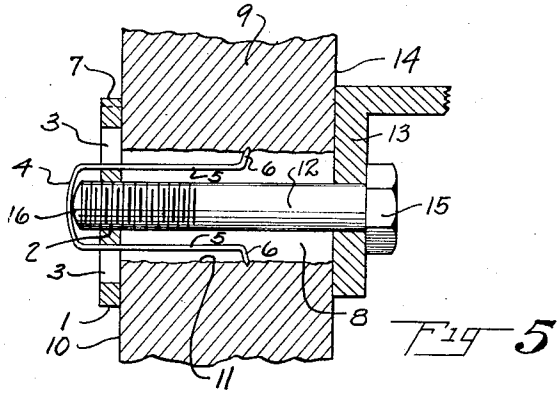
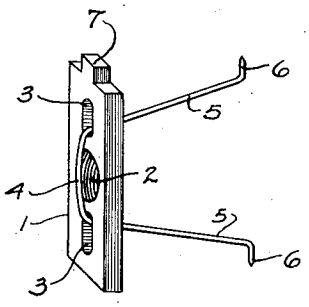


Fig 5



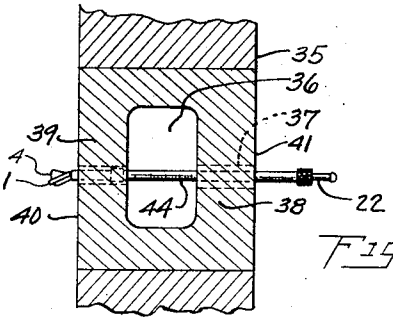


Fig 8

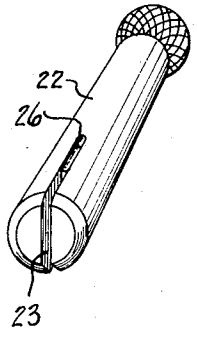


Fig 7

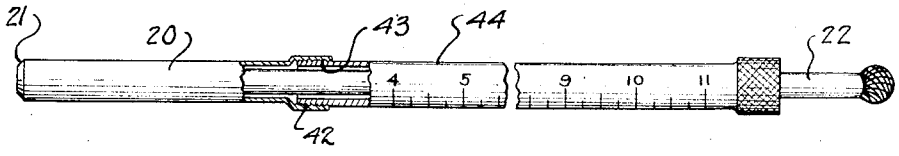


Fig 9

William A Hubener INVENTOR

BY

Alan W Johnson ATTORNEY

Patented Apr. 5, 1927. 1,623,789

UNITED STATES PATENT OFFICE.

WILLIAM A. HUBENER, OF NEW YORK, N. Y., ASSIGNOR TO DIAMOND EXPANSION BOLT COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TOGGLE AND METHOD.

Application filed February 10, 1925. Serial No. 8,181.

My invention relates to a new toggle and the method of using it; and also to a setting tool, which is preferably employed to set the toggle. This setting tool would ordinarily be sold with the toggles, though the toggles and the setting tool may be sold as separate articles of manufacture.

While my toggle is preferably set with the aid of my setting tool, it is possible to set the toggle by hand if the hole in the wall is large enough to permit the ready grasping of the ends of the resilient member.

My invention also relates to setting or positioning a toggle behind a wall having air pockets, or similar voids, the setting tool being preferably calibrated to indicate the exact length of stove bolt, machine bolt, cap screw, or other securing member, which would have to be used to reach the toggle and give sufficient pull to engage and tighten the work.

My invention further relates to certain methods, combinations, sub-combinations, and articles of manufacture as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings I have shown illustrative embodiments of my invention, simply by way of example, though it is to be distinctly understood that my invention is not to be confined to these particular forms. In these drawings the same reference numerals refer to similar parts in the several figures.

Fig. 1 is a vertical section through a wall or other suitable support, and through my toggle and a portion of the setting tool, the remaining portion of the setting tool being shown in side elevation;

Fig. 2 is a horizontal section through the wall of other suitable support, showing the toggle head in plan; a portion of the setting tool is broken away for purpose of better illustration;

Fig. 3 is a vertical section, similar to Fig. 1, but showing the parts in different positions;

Fig. 4 is a vertical section, similar to Fig. 1, showing the toggle set and the setting tool being withdrawn from the hole in the wall;

Fig. 5 is a vertical section, similar to Fig. 4, showing a bolt cooperating with the toggle head and holding the work on the exposed surface of the wall or other suitable support;

Fig. 6 is a perspective view of the toggle head with its resilient member;

Fig. 7 is a perspective view of the inner plunger or ejector of the setting tool, the spring friction member being omitted;

Fig. 8 is a vertical section through a wall or other suitable support having a large air pocket, the setting tool being calibrated to show the operator at a glance the length of stove bolt, machine bolt, cap screw, or other securing member that will have to be employed to cooperate with the toggle head;

Fig. 9 is a side elevation, partly broken away, showing a modification in which the sleeve of the setting tool is extended and calibrated.

In the illustrative embodiments of my invention shown in the drawings, 1 (Fig. 6) is a toggle head provided with a bolt hole 2 having interior screw-threads, and on either side of this tapped or screw-threaded hole, are holes 3, 3 through which a resilient member 4, preferably in the form of spring wire, is threaded to form arms 5, 5, the end of each arm being preferably bent to form prongs 6, 6 for a purpose to be hereinafter described. The toggle is also preferably, though not necessarily, provided with a trigger 7.

To position the toggle a hole 8 is drilled, or otherwise made, within the wall or other support 9 usually formed of terra-cotta, brick, concrete, stone or similar material. After the hole has been formed the arms 5, 5 are compressed after first tilting the toggle head so that it can be passed through the hole in the wall. This compression may be done by the fingers of the operator, who while the parts are in this position, may if the hole is large enough, manually place the toggle head, with its resilient member 4, within the hole and manipulate the toggle head until it passes the interior surface 10 of the wall 9. By then withdrawing his fingers the resilient members 5, 5 will instantly spring out and engage with the interior surface 11 of the hole 8, as shown for example in Fig. 4. The operator, before releasing the arms 5, 5, will preferably draw the arms 5, 5 forward so as to make the toggle head 1 bridge or straddle the hole 8. In this positioning of the parts the bolt 12 can be

screwed within the hole 2 to secure the work 13 to the exposed face 14 of the wall or other suitable support 9. When screwing up the head 15 of the bolt the end 16 of the bolt will engage with the resilient member 4, and move the resilient member slightly to the rear causing the prongs 6, 6 of the arms 5, 5 to scrape along the interior of the wall 11. In doing this, however, the toggle bolt will not be misplaced because the bolt will hold the toggle in proper position and will cause it to firmly bear against the interior or concealed surface 10 of the wall or other suitable support 9.

While my toggle may be set by hand in a hole sufficiently large to permit this operation, in practice I preferably set the toggle head by means of a setting tool, which permits me to employ a much smaller hole 8 in the wall 9, thereby reducing the cost of installation and in addition positively and quickly setting the toggle head for engagement with the stove, machine, or other bolt, or cap screw.

The method of setting the toggle by means of the setting tool 28 is clearly shown in Figs. 1 to 4 inclusive. This setting tool which I preferably employ comprises a sleeve 20 having its inner end provided with locking surfaces 21, preferably formed by spinning the end of the sleeve. Within this sleeve 20 I mount a plunger or ejector 22 so as to have frictional engagement with the interior of the sleeve. This frictional engagement, to prevent the plunger or ejector dropping out of the sleeve 20, may be accomplished in various ways. I have shown by way of example a cut or kerf 23 in the end of the plunger or ejector 22 and mounting therein a friction member 24 formed of resilient wire having its ends 25, 25 (Fig. 1) bent towards each other and engaging in the hole 26. When the plunger or ejector is pushed into the sleeve 20, these ends 25, 25 are caused to approach each other, the friction member 24 being compressed and yieldingly engaging with the inner surface of the sleeve 20. This friction, however, does not interfere with the ready operation of the plunger or ejector 22, being merely sufficient to hold the plunger or ejector in any position within the sleeve 20.

To insert the toggle 1 with the aid of the setting tool 28, the toggle head is swung from the position shown in Fig. 6 to bring the trigger 7 adjacent to the upper arm 5 of the resilient member 4 when both arms 5, 5 are compressed, for example by the fingers of the left hand of the operator, and the prongs 6, 6 and the trigger 7 are inserted in the end of the setting tool 28 so that the trigger 7, as well as the prongs 6, 6 engage with the locking surfaces 21 formed on the sleeve 20 (see Fig. 1). The setting tool with the attached toggle head and resilient member is then threaded through the hole 8 in the wall or other suitable support, until the inner end of the toggle head clears the inner surface 10 of the wall or other suitable support. Then by grasping the sleeve 20 with the fingers of one hand, and pushing in the plunger or ejector 22 with the other hand, the end of the plunger or ejector 22 will trip the trigger 7, and cause it to disengage the locking surface 21 of the sleeve 20. The parts will then be in the position shown in Fig. 3, the toggle snapping from the dotted position in that figure to the position shown in full lines. By then pulling out on the sleeve 20, which will carry the plunger or ejector 22 with it, the toggle head is moved to the right of Fig. 3 and caused to straddle or bridge the hole 4. Further pressure to the right of Fig. 3 will withdraw the tool as shown in Fig. 4. The prongs 6, 6 will be pulled out from engagement with the locking surfaces 21 on the sleeve 20 and will immediately engage the inner surface 11 of the wall, or other suitable support 8, and automatically hold the toggle head in correct position bridging or straddling the hole 8, as shown in Fig. 4.

The work 13, whatever it may be, can then be secured to the exposed surface 14 of the wall or other suitable support 9.

In screwing up the head of the bolt, the end 16 of the bolt 12 will engage with the resilient member 4, and as the toggle head is tightened and secured against the inner surface 10 of the wall or other support, the prongs 6, 6 of the resilient member will be caused to scrape along the inner surface 11, but this action is not objectionable for it does not occur until the male threads on the bolt cooperate with the female threads in the hole 2 of the toggle 1.

In some walls large air pockets, or other voids, are encountered and to get the proper strength or support for the work 13 it is necessary to go beyond these pockets. This often entails the use of a very long stove, machine or other bolt. The exact length of bolt needed is hard to determine and requires manipulation of several lengths of bolts before the correct length is found.

By one feature of my invention I enable the operator to tell at a glance exactly the correct length of stove or other bolt to be employed. I accomplish this by calibrating the setting tool.

In Fig. 8 I have shown on a smaller scale, a wall 35 having an air pocket or void 36.

In drilling the hole 37, the operator may find that the portion of the wall 38 is not strong enough to support the work, and therefore he drills through the portion 39, on the other side of the air pocket 36, so that the toggle head will get a firm bearing on the inner surface 40 of the wall or other suitable support 35.

To enable the operator to determine at a glance the exact length of stove or other bolt that will have to be used to cooperate with the toggle head 1, I calibrate the setting tool so that the graduated portion of the tool, which is in line with the outer wall 41, will give the correct reading and show exactly the length of bolt that would have to be employed; thereby avoiding the delay of manipulating a series of bolts of different lengths to determine which one is the correct length to cooperate with the toggle.

For convenience of manufacture, I preferably provide the sleeve 20 with interior or female screw-threads 42, Fig. 9, to cooperate with the exterior screw-threads 43 on the extension sleeve 44 which sleeve is calibrated as shown in Fig. 9. While I preferably employ a sleeve and an extension sleeve connected together it is of course to be understood that if desired the outer sleeve may be a single member.

Having thus described this invention in connection with illustrative embodiments thereof, to the details of which I do not desire to be limited, what is claimed as new and what is desired to secure by Letters Patent is set forth in the appended claims.

What I claim is:—

1. A new article of manufacture comprising a toggle head adapted to pass through a hole and engage with the inaccessible surface of a support, and a resilient metal spring arranged to engage with the walls of the hole in the support and be held thereby to hold the toggle head in position to be engaged by a holding bolt.

2. A new article of manufacture comprising a flat toggle head adapted to engage with the inaccessible surface of a support, and a resilient metal spring arranged to engage with the walls of the hole in the support and be held thereby to hold the flat toggle head in position to be engaged by a holding bolt.

3. A new article of manufacture comprising a toggle head nut provided with spring arms substantially at right angles to the toggle head nut and arranged to hold the toggle head nut adjacent to an inaccessible surface of a support and in position to be engage by a bolt.

4. A new article of manufacture comprising a toggle head nut provided with a wire spring bent at an angle to the nut and arranged to pass through a hole in a support with the toggle head nut and support the toggle head nut adjacent to the inner inaccessible surface of the support and in position to be engaged by a bolt.

5. A new article of manufacture comprising a toggle head nut provided with a wire spring bent at an angle to the nut and arranged to pass through a hole in a support with the toggle head nut and support the toggle head nut adjacent to the inner inaccessible surface of the support and in position to be engaged by a bolt, said wire spring being provided with prongs constructed to engage with the walls of the hole.

6. A new article of manufacture comprising a toggle head nut having an extension forming a trigger, and provided with means to support it adjacent to an inaccessible surface of a wall or other support in position to be engaged by a bolt.

7. A new article of manufacture comprising a toggle head nut provided with holes, which lie in the same plane as the threaded hole and a bent wire spring threaded through said holes and bent at an angle to the toggle head thereby permitting the spring to hold the toggle head adjacent to an inaccessible surface and in position to be engaged by a bolt.

8. The combination of a toggle head nut, a resilient spring carried by the toggle head and constructed to frictionally engage with the walls of a hole to support the toggle head nut adjacent to an inaccessible surface, and a bolt to engage the toggle head and clamp it against the inaccessible surface, the spring being adapted to slip in the hole to permit this clamping action.

9. The combination of a toggle head nut provided with an extension forming a trigger, a resilient spring carried by the toggle head and constructed to engage with the walls of a hole to support the toggle head nut adjacent to an inaccessible surface, and a bolt to engage the toggle head and clamp it against the inaccessible surface, the spring being adapted to slip in the hole to permit this clamping action.

WILLIAM A. HUBENER.