July 1, 1930. S. O. TAYLOR 1,768,720

RETAINING DEVICE

Filed May 25, 1928

Fig.1

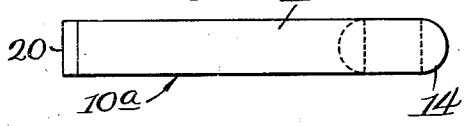


Fig.4

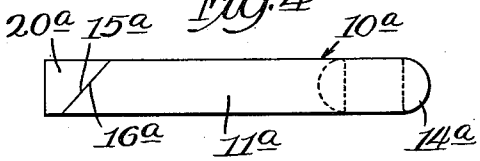


Fig.2

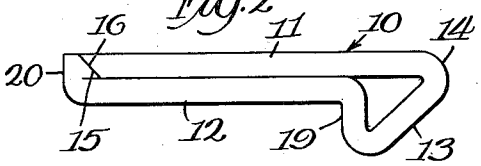


Fig.5

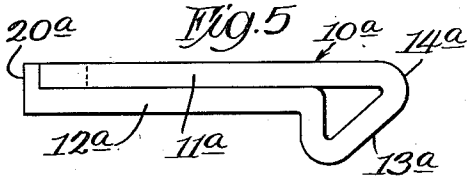


Fig.3

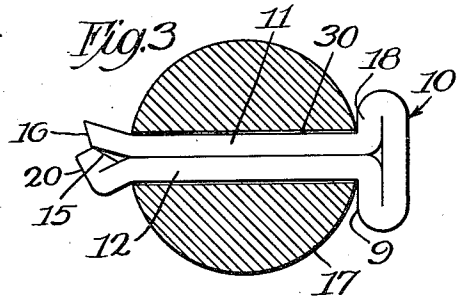


Fig.6

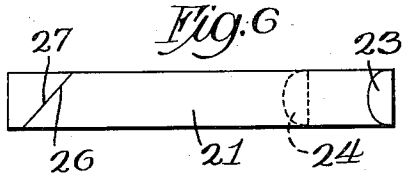


Fig.8

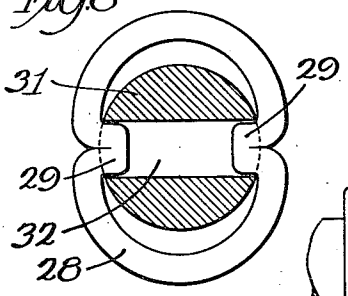


Fig.7

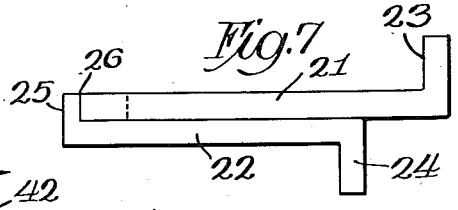


Fig.11

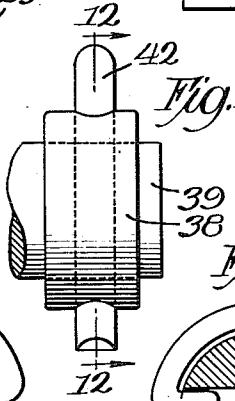


Fig.12

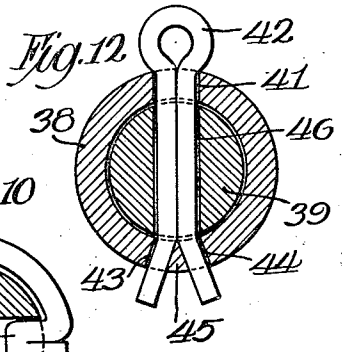


Fig.10

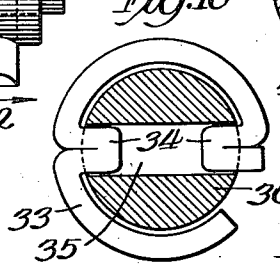
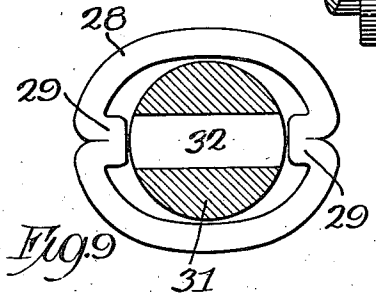


Fig.9



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By Gilson, Mann & Coy Attys.

Patented July 1, 1930 1,768,720

UNITED STATES PATENT OFFICE

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RETAINING DEVICE

Application filed May 25, 1928. Serial No. 280,547.

This invention relates to cotter and other retaining keys or pins.

The principal object of the invention is the provision of new and improved means for retaining bolts and the like in position.

Another object of the invention is the provision of a retaining pin with new and improved means for automatically distorting the end or ends of a cotter or other pin when the same is inserted in position for use.

A further object of the invention is the provision of new and improved means for retaining cotter and other pins or bolts in position during use, that is cheap to manufacture, simple in construction, composed of a minimum number of parts, and that is efficient and reliable in use.

Other objects and advantages will appear from the following description, or will be apparent from the disclosure.

On the drawings,

Fig. 1 is a side elevation of one of the devices;

Fig. 2 is a plan view thereof;

Fig. 3 is a cross-section of a bolt showing the invention in position therein;

Fig. 4 is a view similar to Fig. 1, but showing a modified form of construction;

Fig. 5 is a plan view thereof;

Fig. 6 is an elevation of a further modified form of construction;

Fig. 7 is a plan view thereof;

Fig. 8 is a cross-section of a bolt showing a further modified form of retaining device in position therein;

Fig. 9 is a view similar to Fig. 8, but showing the retaining device distorted and in process of being attached;

Fig. 10 is a cross-section of a modified form of bolt showing a modified form of retaining device in position therein;

Fig. 11 is a side elevation of the outer end of the pin showing a modified form of retaining means thereon; and

Fig. 12 is a section on line 12—12 of Fig. 11.

Referring now to Figs. 1, 2 and 3 of the drawings, the reference character 10 designates a retaining pin comprising the two arms 11 and 12. For convenience of description the arm 11 will be termed the shorter arm, and the member 12 the longer arm. These arms are connected together by a loop 13 which, before the pin is in position for use, somewhat resembles a right angle triangle with the apex 14 in line with the arm 11 and with the base forming a stop shoulder 9, see Fig. 2.

The outer end of the arm 12 is provided with a lateral ctxcnsion 20 having an inclined surface 15. Preferably, though not necessarily, the outer end of the arm 12 is return bent and the end cut at an angle to form the inclined surface as clearly shown in Fig. 2. The outer end of the arm 11 is cut at an angle to provide an inclined surface 16 for engaging the inclined surface 15 of the arm 12.

In use, the pin 10 is inserted in the recess or hole 30 of an element such as the bolt or other member 17, and after the shoulder 9 engages the same the pin is hit one or more blows with a hammer on the apex 14, which will drive the arm 11 forwardly. The engagement of the inclined surfaces 15 and 16 will distort the ends of the pin and prevent its withdrawal and at the same time the loop 13 will also be distorted, forming the shoulder 18, thus making the head more nearly symmetrical, as shown in Fig. 3.

The distortion of the pin during its insertion in the opening through the bolt will cause the pin to fit snugly within the opening thereby adding materially to the holding capacity of the pin.

The form of the device shown in Figs. 4 and 5 differs from that just described in that the inclined surfaces 15^a of the lateral extension 20^a of the longer arm 12^a and the cooperating inclined surface 16^a of the shorter arm 11^a are arranged at right angles to the corresponding inclined faces on the form of the device shown in Figs. 1 to 3, whereby when the pin is inserted the outer ends thereof will be distorted in a plane at substantially right angles to that of said arms instead of in the plane of the arms as in the form previously described.

In this form of construction, as in the form shown in Figs. 1, 2 and 3, when the pin is inserted and is struck one or more blows with a hammer on the apex 14^a the outer ends of the arms will be distorted laterally and the loop 13^a will take a position substantially like

that shown in Fig. 3, whereby the pin will be locked in position.

The form of the device shown in Figs. 6 and 7 differs from the forms previously described in that the two arms are separate and independent. In this form of the device each of the arms 21 and 22 is provided at its inner end with lateral extensions or heads 23 and 24 respectively. The outer end of the arm 22 is provided with a lateral extension 25 having an inclined surface 26 thereon which is adapted to be engaged by a corresponding inclined surface 27 on the outer end of the arm 21. The pin in the position shown in Fig. 7 is inserted in a hole in a bolt until the extension or head 24 comes in contact with the bolt, after which the head or extension 23 is hit one or more blows with a hammer to bring the same down into alignment with the head 24. In the meantime, the outer ends of the arms 21 and 22 will be distorted in the manner described above.

In the form of the device shown in Figs. 8 and 9 the retaining device is in the form of a continuous elliptical ring 28 having projections such as the reentrant portions 29 on each side thereof. The reentrant portions 29 are of less distance apart than the diameter of the bolt 31 to which the device is adapted to be attached. The reentrant portions 29 are of such form as to engage the ends of the opening 32 extending through said bolt.

When the device is to be attached to the bolt the same is distorted by pressure along its major axis to cause the same to take the form shown in Fig. 9, and when the pressure is released the resiliency of the ring 28 will cause the reentrant portions 29 to engage in the ends of the opening 32 for locking said ring in position on said bolt.

In the form of the device shown in Fig. 10, the retaining device is in the form of a split ring 33 substantially circular. The ring 33 is provided at opposite sides thereof with projections such as the reentrant portions 34 which are adapted to engage an opening such as the hole 35 in a bolt or other member 36. In applying or disengaging the ring 33 the same is spread apart to separate the projections or reentrant portions 34 sufficiently to engage the opening 35 or be disengaged therefrom.

In Figs. 11 and 12 the retaining device is in the form of an annular member 38 through which the outer end of the bolt 39 is adapted to extend. The annular member 38 is provided with a radial opening 41 through which the cotter pin 42 is adapted to extend. The opposite portion of the annular member 38 is provided with diverging openings 43 and 44. The space between the openings 43 and 44 constitutes a wedge-shaped member 45 which is adapted to engage between the arms of the pin 42 when the same is inserted through the opening 41 and a corresponding opening 46 through the pin 39. Upon forcing the pin 42 through said openings the arms will be spread by the wedge shaped member 45 as clearly shown in Fig. 12 of the drawing.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that various changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claim.

I claim as my invention:

A self-locking pin comprising a single length of a metallic member return bent to form a pair of arms, the connecting portion of said arms forming a loop substantially in the form of a right angle triangle with the base extending at right angles to said arms and with one side in alignment with one of said arms, the outer end of one of said arms having a projection provided with a surface inclined at right angles to the plane of said arms for engaging a corresponding inclined surface on the outer end of the other arm, whereby when said pin is inserted in an opening and struck one or more blows both ends of said pin will be distorted laterally from the plane of said arms in opposite directions for locking said pin in said position in said opening.

In testimony whereof I affix my signature.

STEADMAN O. TAYLOR.