July 16, 1935. H. A. RHINEVAULT 2,008,367

DETENT

Filed Oct. 26, 1934

Fig. 1.

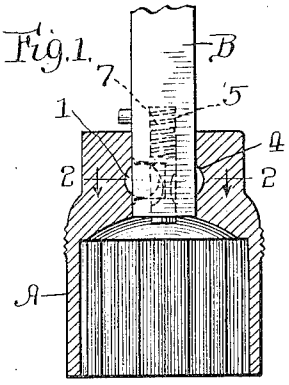


Fig. 7.

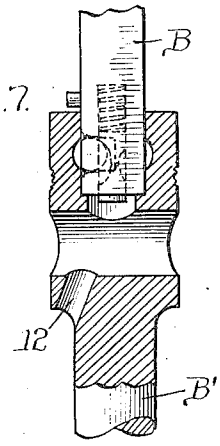


Fig. 2.

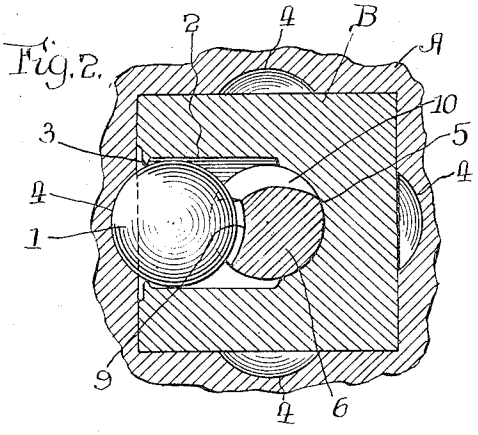


Fig. 3.

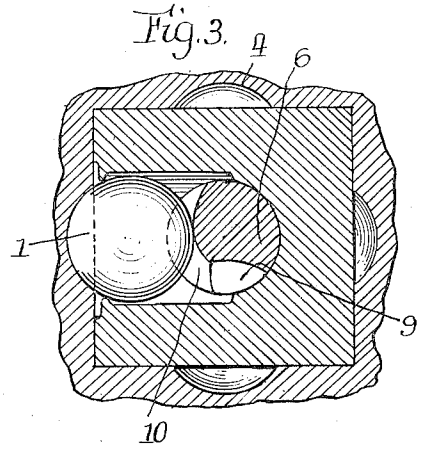


Fig. 4.

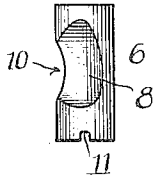


Fig. 5.

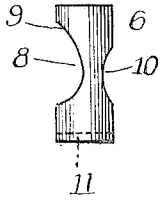
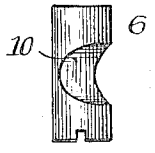


Fig. 6.



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UNITED STATES PATENT OFFICE

2,008,367

DETENT

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Application October 26, 1934, Serial No. 750,121

6 Claims. (Cl. 287—119)

This invention relates to detents, such, for example, as those commonly used in connection with socket wrenches. For the purpose of connecting the socket head to the handle it is common to provide a spring-pressed ball detent carried by the handle and adapted to spring into an internal recess in the socket head. The ball detent yields to allow the handle to be slipped into engagement with the socket head and yields to allow the handle and socket head to be separated.

The present invention relates particularly to means for locking the detent after the handle and socket head have been engaged with each other so as to prevent them from becoming separated until the detent shall have been unlocked, the object of the invention being to provide improved means for effecting such locking and unlocking action.

In the accompanying drawing,

Figure 1 is a longitudinal sectional view of a socket wrench embodying the features of my invention.

Fig. 2 is a section on line 2—2 of Fig. 1, showing the ball unlocked or free to yield.

Fig. 3 is a view on the same plane, but showing the ball locked against yielding.

Figs. 4, 5 and 6 are views of the locking element taken from different viewpoints.

Fig. 7 is a longitudinal sectional view showing the use of my invention for locking an extension handle in place.

In Fig. 1, A denotes a socket head commonly termed a "socket", and B is a handle for use in turning the socket A. The handle B is herein shown as having a shank of square cross-section adapted to enter a correspondingly formed axial opening in the socket A.

The means for releasably locking the socket A to the handle B comprises a ball 1 mounted in a transverse cylindrical opening 2 in the shank of the handle B. The ball 1 may be prevented in any preferred manner from escaping from the opening 2, the method commonly employed being to peen the metal of the shank, as indicated at 3 so as to allow the ball to project partly out of the opening 2. Each wall of the axial opening in the socket A has a recess 4 adapted to receive the ball 1 for the purpose of latching the socket on the handle.

The transverse opening 2 extends to an axial cylindrical bore or opening 5 in the shank of the handle. In the present instance, the bore 5 is of slightly smaller diameter than the opening 2. The opening 5 extends inwardly from the end of the shank and is of sufficient length to contain a locking member 6 and a spring 7. The member 6 is of generally cylindrical form to fit slidably and rotatably within the outer end of the bore 5 and it is urged outwardly by the spring 7. In one side of the member 6 is a recess 8, the inner end wall 9 of which is inclined at such an angle that when it is forced into engagement with the ball 1 by the spring 7 it tends to cam the ball 1 outwardly in the opening 2, to the extent permitted by the peened-over metal 3, into engagement with a recess 4 in the socket A. When the member 6 occupies the angular position shown in Figs. 1 and 2, the spring 7, acting through the cam surface 9 of the member 6, yieldingly holds the ball 1 in latching position, but the ball will yield to permit the handle to be pulled off the socket. In such yielding movement the member 6 is forced inwardly against the compression of the spring 7.

Approximately ninety degrees distant from the recess 8 there is a peripheral recess or groove 10 in the member 6, said recess communicating with the recess 8. The recess 10 is of such depth that when the member 6 is turned approximately ninety degrees to carry the recess 8 out of register with the ball 1 and to place the recess 10 in register with the ball, the ball cannot yield and thus the socket is locked against separation from the handle.

In order that the member 6 may be turned to place the recesses 8 and 10 alternately in registration with the ball 1, the outer end of the member 6 is provided with a screw-driver kerf 11 so that the member 6 may be turned by means of a screw driver inserted into the socket A. When the member 6 is turned counterclockwise from the position shown in Fig. 2 to that shown in Fig. 3, the reaction of the cam surface 9 against the ball causes the member 6 to be forced inwardly against the influence of the spring 7. As soon as the recess 10 is in register with the ball, the member 6 is held in such inward position through the interengagement between the ball and the recess 10. When the member 6 is turned clockwise out of the position shown in Fig. 3 to place the recess 8 in register with the ball, the spring 7 advances the member 6 to press the cam surface 9 against the ball and thus again holds the ball yieldingly in its latching position.

It will be noted that the peened-over metal 3, acting through the ball 1, at all times serves to prevent the spring 7 from forcing the member 6 out of the axial bore 5.

It is sometimes desired to employ the present

invention in situations where it is impracticable to insert a screw driver in an axial direction for the purpose of operating the member 6. In such instances an opening more or less inclined to the member 6 may be provided, an example of which is illustrated in Fig. 7. In that figure, B represents a handle, the shank of which is adapted to be connected to an extension B^1. The parts B and B^1 are latched or locked together precisely as illustrated in Fig. 1, access to the member 6 being obtained through an opening or bore 12 formed in the extension B^1, said bore extending at an angle from the surface of the extension to a point within reach of the outer end of the member 6.

While I have herein described in considerable detail one embodiment of the present invention, it should be understood that the invention is not limited to such details, but includes various modifications within the scope of the appended claims.

I claim as my invention:

1. The combination of two parts to be locked together, one of said parts having a shank to enter an opening in the other part, said shank having an axial opening and a transverse opening communicating therewith, a detent ball located in the transverse opening, a member of generally cylindrical form slidably and rotatably mounted in the axial opening, said member having a recess, one end wall of which constitutes a cam surface, a spring in the axial opening tending to move said member outwardly to force the cam surface against the ball and thus move the ball outwardly in said transverse opening, said member also having a recess located approximately ninety degrees away from and communicating with the first recess, the second recess being shallower than the first recess whereby when said member is turned to place the second recess in register with the ball the latter is prevented from moving inwardly in said transverse opening, the outer end of said member having a screw-driver kerf.

2. The combination of two parts to be locked together, one of said parts having a shank to enter an opening in the other part, said shank having a longitudinal opening and a transverse opening communicating therewith, a detent ball located in the transverse opening, a member of generally cylindrical form slidably and rotatably mounted in the longitudinal opening, said member having a recess, one end wall of which constitutes a cam surface, a spring in the longitudinal opening tending to move said member outwardly to force the cam surface against the ball and thus move the ball outwardly in said transverse opening, said member also having a peripheral recess communicating with the first recess, the second recess being shallower than the first recess whereby when said member is turned to place the second recess in register with the ball the latter is prevented from moving inwardly in said transverse opening, the outer end of said member having a screw driver kerf.

3. The combination of a part having a longitudinal opening and a transverse opening communicating therewith, a detent ball located in the transverse opening, a member of generally cylindrical form slidably and rotatably mounted in the longitudinal opening, said member having a recess, one end wall of which constitutes a cam surface, a spring in the axial opening tending to move said member outwardly to force the cam surface against the ball and thus move the ball outwardly in said transverse opening, said member also having a recess located approximately ninety degrees away from and communicating with the first recess, the second recess being shallower than the first recess whereby when said member is turned to place the second recess in register with the ball the latter is prevented from moving inwardly in said transverse opening, the outer end of said member having a screw driver kerf.

4. The combination of two parts to be locked together, one of said parts having a shank to enter an opening in the other part, said shank having a longitudinal opening extending inwardly from the end of the shank, and a transverse opening communicating with the longitudinal opening, a detent ball located in the transverse opening, a member of generally cylindrical form slidably mounted in the longitudinal opening, said member having a recess, one end wall of which constitutes a cam surface, a spring in the axial opening tending to move said member outwardly to force the cam surface against the ball and thus move the ball outwardly in said transverse opening, said member being rotatable in said longitudinal opening, whereby when said member is turned to withdraw the recess from register with the ball the latter is prevented from moving inwardly in said transverse opening, the outer end of said member having a screw driver kerf accessible from within said other part.

5. The combination of two parts to be locked together, one of said parts having a shank to enter an opening in the other part, said shank having a longitudinal opening and a transverse opening communicating therewith, a detent ball located in the transverse opening, a member rotatably mounted in the longitudinal opening, said member having a recess, one end wall of which constitutes a cam surface, a spring tending to move said member to force the cam surface against the ball and thus move the ball outwardly in said transverse opening, said member also having a recess located approximately ninety degrees away from and communicating with the first recess, the second recess being shallower than the first recess whereby when said member is turned to place the second recess in register with the ball the latter is prevented from moving inwardly in said transverse opening.

6. The combination of two parts to be locked together, one of said parts having a shank to enter an opening in the other part, said shank having a longitudinal opening and a transverse opening communicating therewith, a detent ball located in the transverse opening, a member of generally cylindrical form slidably mounted in the longitudinal opening, said member having a recess, one end wall of which constitutes a cam surface, a spring tending to move said member outwardly to force the cam surface against the ball and thus move the ball outwardly in said transverse opening, said member being rotatable in said longitudinal opening, whereby when said member is turned to withdraw the recess from register with the ball the latter is prevented from moving inwardly in said transverse opening far enough to permit disengagement of the parts from each other.

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