

PATENT SPECIFICATION

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31D



(54) SNAP HEADED HOLLOW WALL FIXING DEVICE

(71) I, ANTHONY CHARLES WORRALLO, of 15 Sprott Road, Auckland 5, New Zealand, British Subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates generally to means for securing two elements together.

According to one aspect of the present invention there is provided a pin comprising a shank and a head at one end of the shank, the head being of greater diameter than the shank and the face of the head remote from the shank having a recess therein thereby to provide a weakened, circular break-off region between the outer surface of the pin and the surface of the said recess, the head of the shank being joined by means of the said region.

The recess can be of circular form and its diameter can be greater than, less than, or the same as that of the shank where the shank joins the head. Where the diameter of the recess is equal to or greater than that of the shank, the depth of the recess is less than the thickness of the central region of the head whereby said weakened region is of annular form. Where the diameter of the recess is less than the diameter of the shank where the shank joins the head, the depth of the recess can be less than or greater than the thickness of the central region of the head. Where the depth of the recess is greater than the thickness of the central region of the head, the recess penetrates the shank and said weakened region is in the form of a cylindrical wall.

The end of the shank remote from the pin can be tapered and preferably has a frusto-conical form.

According to a further aspect of the present invention, there is provided the combination of a pin as defined above, and a plug having a head, a shank which is longitudinally split to provide at least two

elongated shank portions and a bore passing through the head and shank of the plug, the bore being of a size to receive the shank but not the head of the pin, and the pin shank serving to splay out said shank portions.

Preferably, said shank portions are formed with circumferentially extending serrations.

According to a still further aspect of the present invention, there is provided a method of removing the combination defined in either of the preceding paragraphs from a bore in which its composite shank is located, the method comprising striking the central region of the head of the pin so that the pin fractures along said weakened region to separate the pin head from the pin shank, driving the shank of the pin through and out of the bore of the plug so that said splayed-out portions can move towards one another to reduce the diameter of the plug shank, and thereafter removing the plug from said bore in the direction opposite to that in which the shank was driven from the plug bore.

For a better understanding of the present invention, reference will now be made, by way of example, to the accompanying drawing in which:

Figure 1 is an axial section through a headed pin;

Figure 2 is an end view of the head of the pin of Figure 1;

Figure 3 is a side elevation of a headed plug of flexibly resilient synthetic plastics material;

Figure 4 is an end view of the head of the plug of Figure 3; and

Figure 5 illustrates a headed pin and plug in their condition of use.

The pin of Figures 1 and 2 comprises a head 10 and solid shank 12, the head and shank being integral with one another and preferably being of metal, such as steel or aluminium. The shank 12 is cylindrical throughout most of its length but tapers slightly adjacent the end thereof remote

from the head 10 to form a cone 14 of frusto-conical form.

The head 10 is indented by means of a circular recess 16 having a flat base. The diameter of the recess 16 is greater than the diameter of the shank 12 and its depth is less than the thickness of the head 10 measured between its two major faces. The provision of the recess 16 results in the head 10 being connected to the shank 12 by means of a weakened, circular break-off region which, in this form, is constituted by a thin, annular web 18.

The plug of Figures 3 and 4 comprises a shank 20 and a head 22. The shank 20 comprises a collar 24 which is adjacent the head 22. Beyond the collar 24 the shank 20 is split longitudinally to form two shank portions 26. A bore 28 extends through the head 22 and the collar 24 and, by virtue of the fact that the remainder of the shank is split the bore 28 can be considered to pass right through the plug.

The approximately semi-cylindrical outer face of each portion 26 is serrated, the serrations extending circumferentially.

Turning now to Figure 5, this shows a pin and plug in their condition of use. In the illustrated form, the combination is shown as securing an element 30 to a wall 32. The wall 32 is preferably one of the bounding layers of a cavity wall, the other layer being to the left of that shown and not itself being illustrated.

To secure the element 30 to the wall 32, the plug is pushed through the aligned bores 34 and 36 in the element 30 and wall 32 with the portions 26 pressed towards one another so that the longitudinal split is closed and the outside diameter of the shank is minimum. Leftward movement of the plug, as illustrated in Figure 5, ceases when the head 22 encounters the outer face of the element 30. At this stage the plug is in the condition shown in Figure 3.

The pin is then hammered through the bore 28. As the shank 12 encounters the part-cylindrical extensions of the bore 28 which exist on the inner faces of the portions 26, these portions are forced outwardly to the position illustrated. Of course, it will be understood that if the element 30 and wall 32 were thicker, the portions 26 would be restrained from splaying out to the degree illustrated. It will be noted that the serrations of the portions 26 are such as to resist withdrawal of the plug to the right while, however, not significantly interfering with movement of the plug to the left.

When it is required that the element 30 be removed from the wall 32, the base of the circular recess 16 is struck sharply as indicated by the arrow (A). The head 10, being in face-to-face contact with the head

22, cannot move to the left and the blow struck thus has the effect of fracturing the pin along the web 18. Once the head 10 has been removed, the headless shank 12 can be driven through and out of the bore 28 so that it drops down inside the cavity wall. Once the forces exerted on the portions 26 by the shank 12 are removed, the portions 26 are free to move back towards the position shown in Figure 3 so that the plug can be removed from the aligned bores 34 and 36.

WHAT I CLAIM IS:—

1. A pin comprising a shank and a head at one end of the shank, the head being of greater diameter than the shank, and the face of the head remote from the shank having a recess therein thereby to provide a weakened, circular break-off region between the outer surface of the pin and the surface of said recess, the head and shank being joined by means of said region.

2. A pin as claimed in claim (1), wherein said recess is of circular form and its diameter is equal to or greater than that of the shank where the shank joins the head, and its depth is less than the thickness of the head whereby said weakened region is annular.

3. A pin as claimed in claim 1, wherein the recess of circular form and its diameter is less than that of the shank where the shank joins the head, the recess having a depth greater than the thickness of the head whereby the recess penetrates into the shank.

4. A pin as claimed in any preceding claim, wherein the end of the shank remote from the pin is tapered.

5. The combination of a pin as claimed in any preceding claim and a plug having a head, a shank which is longitudinally split to provide at least two elongated shank portions and a bore passing through the head and shank of the plug, the bore being of a size to receive the shank but not the head of the pin, and the pin shank serving to splay out said shank portions.

6. The combination of claim (5), wherein said shank portions are formed with circumferentially extending serrations.

7. A method of removing the combination of claim (5) or claim (6) from a bore in which its composite shank is located comprising striking the central region of the head of the pin so that the pin fractures along said weakened region to separate the pin head from the pin shank, driving the shank of the pin through and out of the bore of the plug so that said splayed-out portions can move towards one another to reduce the diameter of the plug shank, and thereafter removing the plug from said bore in the direction opposite to that in



from the head 10 to form a cone 14 of frusto-conical form.

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10 connected to the shank 12 by means of a weakened, circular break-off region which, in this form, is constituted by a thin, annular web 18.

15 The plug of Figures 3 and 4 comprises a shank 20 and a head 22. The shank 20 comprises a collar 24 which is adjacent the head 22. Beyond the collar 24 the shank 20 is split longitudinally to form two shank portions 26. A bore 28 extends through the
20 head 22 and the collar 24 and, by virtue of the fact that the remainder of the shank is split the bore 28 can be considered to pass right through the plug.

25 The approximately semi-cylindrical outer face of each portion 26 is serrated, the serrations extending circumferentially.

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40 minimum. Leftward movement of the plug, as illustrated in Figure 5, ceases when the head 22 encounters the outer face of the element 30. At this stage the plug is in the condition shown in Figure 3.

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55 plug to the right while, however, not significantly interfering with movement of the plug to the left.

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1. A pin comprising a shank and a head at one end of the shank, the head being of greater diameter than the shank, and the face of the head remote from the shank having a recess therein thereby to provide a weakened, circular break-off region between the outer surface of the pin and the surface of said recess, the head and shank being joined by means of said region.

2. A pin as claimed in claim (1), wherein said recess is of circular form and its diameter is equal to or greater than that of the shank where the shank joins the head, and its depth is less than the thickness of the head whereby said weakened region is annular.

3. A pin as claimed in claim 1, wherein the recess of circular form and its diameter is less than that of the shank where the shank joins the head, the recess having a depth greater than the thickness of the head whereby the recess penetrates into the shank.

4. A pin as claimed in any preceding claim, wherein the end of the shank remote from the pin is tapered.

5. The combination of a pin as claimed in any preceding claim and a plug having a head, a shank which is longitudinally split to provide at least two elongated shank portions and a bore passing through the head and shank of the plug, the bore being of a size to receive the shank but not the head of the pin, and the pin shank serving to splay out said shank portions.

6. The combination of claim (5), wherein said shank portions are formed with circumferentially extending serrations.

7. A method of removing the combination of claim (5) or claim (6) from a bore in which its composite shank is located comprising striking the central region of the head of the pin so that the pin fractures along said weakened region to separate the pin head from the pin shank, driving the shank of the pin through and out of the bore of the plug so that said splayed-out portions can move towards one another to reduce the diameter of the plug shank, and thereafter removing the plug from said bore in the direction opposite to that in



which the shank was driven from the plug bore.

8. A pin, substantially as hereinbefore described with reference to Figures 1 and 2 of the accompanying drawing.

9. The combination of a pin and plug, substantially as hereinbefore described with

reference to the accompanying drawing.

10. The method of removing the combination of claim (9) from a bore in which its composite shank is located, substantially as hereinbefore described.

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