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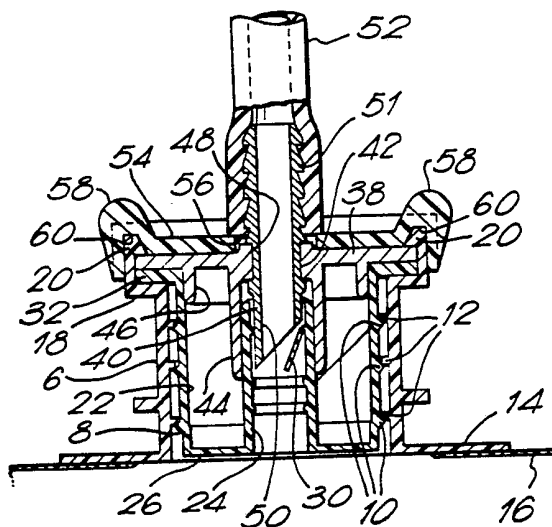
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GB 1562797	GB 1447183	GB 1446130
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(58) Field of search
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(54) Releasable couplings

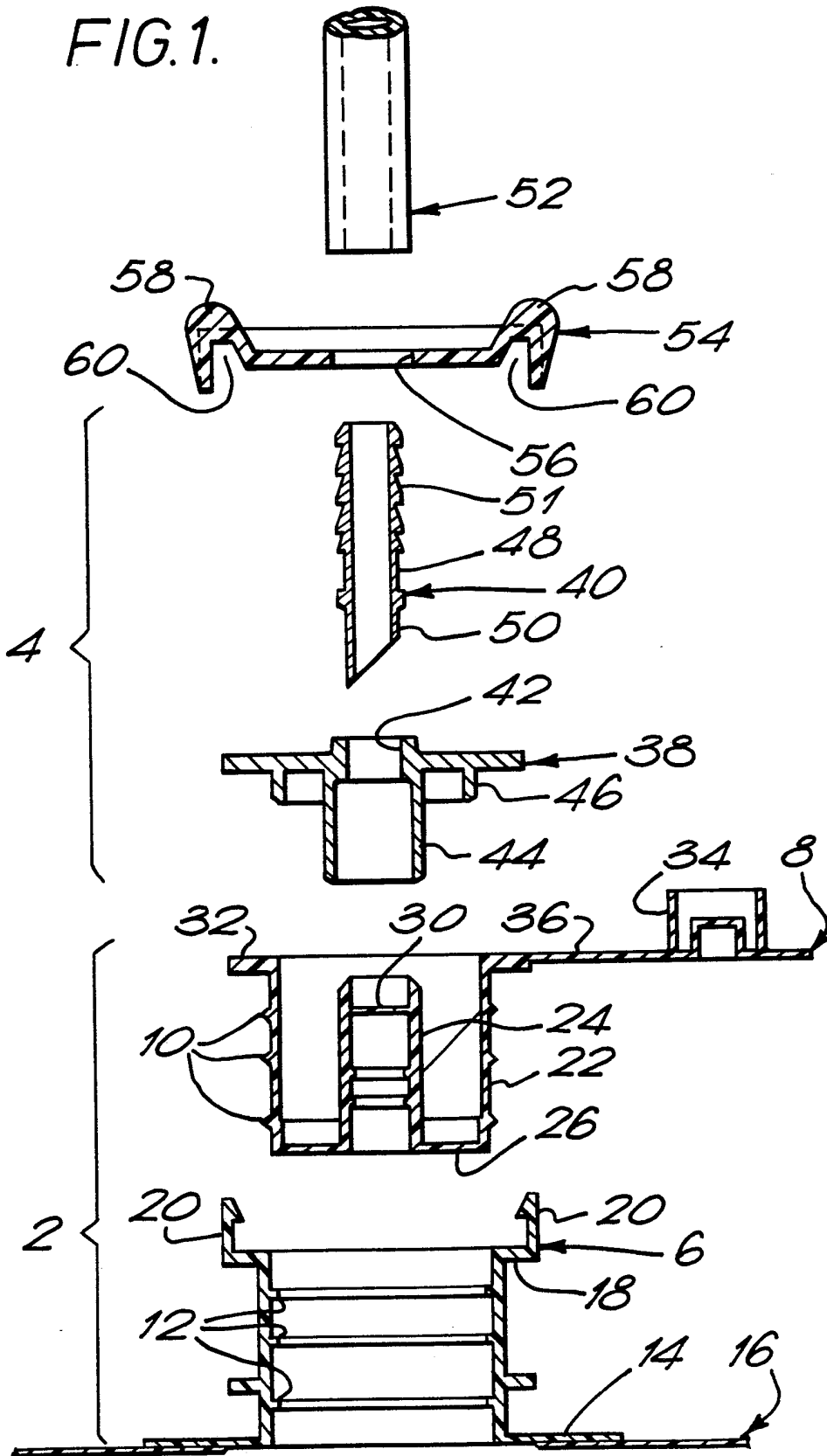
(57) A releasable coupling comprises a first component, assembled from an outer sleeve (6) and a bung (8), and a second component including a plug (38). The two components are held together, when engaged, by latching elements (20). The latching elements (20) are prevented from releasing the plug (38) by a locking element (54) which can be turned about a spigot (51), fitted to the plug (38) to engage or release the latching elements (20). The locking element (54) prevents accidental release of the coupling should abnormal forces be applied in the separating direction.

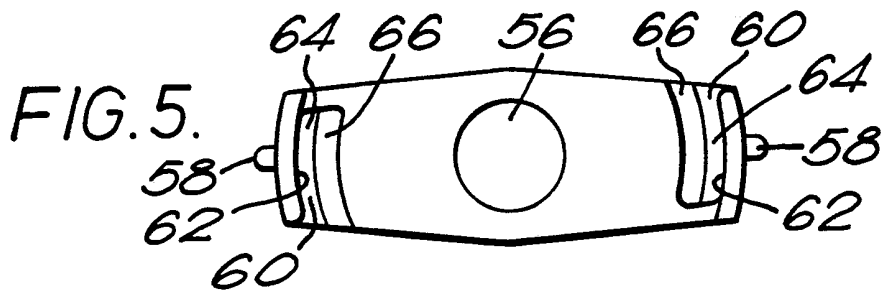
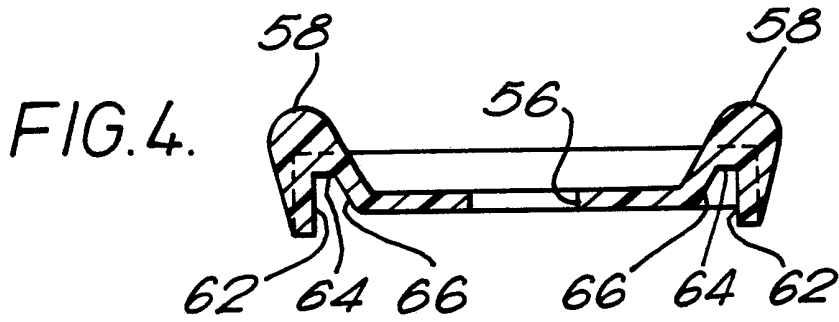
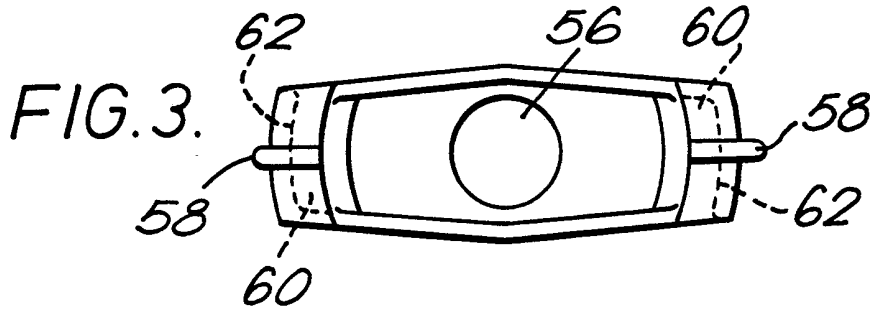
FIG. 2.



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FIG. 1.





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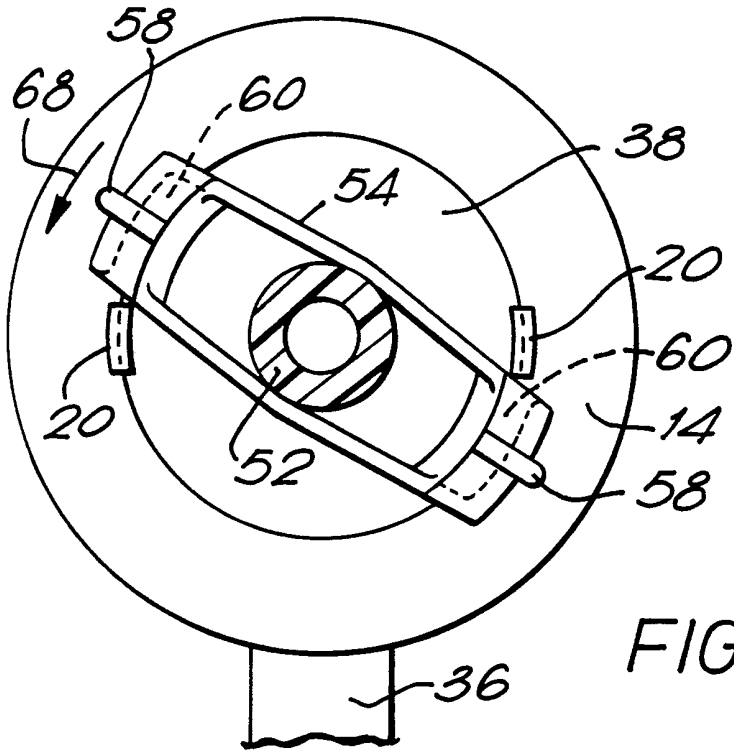


FIG. 6.

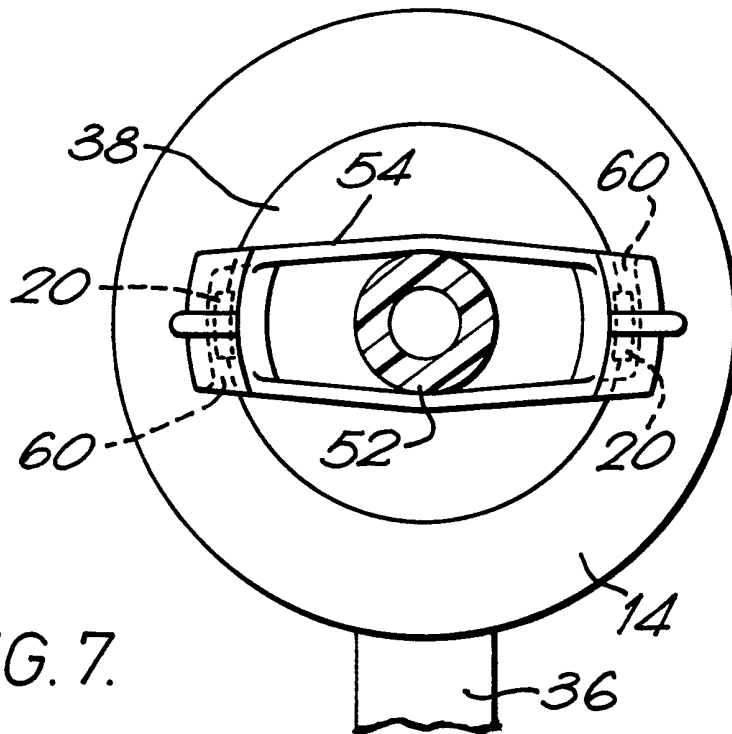


FIG. 7.

RELEASABLE COUPLINGS

This invention relates to releasable couplings, and is particularly, although not exclusively, concerned with a coupling suitable for connecting a fluid delivery device, such as a herbicide applicator, to a container of the fluid to be delivered.

GB2178815 discloses a releasable coupling which comprises two components which fit one within the other and are retained in position by oppositely disposed latching elements in the form of barbs. Although these barbs will keep the components together in normal use, it is possible for the two components to be pulled apart if sufficient force is exerted, since the barbs will be resiliently deflected away from each other and out of latching engagement. If this happens by accident, while the coupling is being used to connect a container of herbicide to a delivery device, large quantities of the herbicide may be permitted to flow freely from the container. Apart from the resulting waste of possibly expensive herbicide, and the potential unintended destruction of plants, such unintentional leakage can pose dangers to operating personnel.

According to the present invention there is provided a coupling comprising first and second components which are engageable with one another by relative movement in an engaging direction, the first component having a latch element which, when the components are engaged, cooperates with a portion of the second component to resist disengagement of the components, the latch element being releasable from the second component by movement in a release direction which is transverse to the engaging direction, a locking element being provided which is engageable with the latch element to prevent movement of the latch element in the release direction.

By positively engaging the latch elements, the locking element prevents unintentional disengagement of the first and second components, even under considerable forces in the separating direction.

5 Preferably, the locking element is mounted rotatably on the second component, for example about an axis parallel to the engaging direction. It is convenient for the locking element to be rotatable about a spigot which is provided on the second
10 component to receive a tube for conveying liquid to or from the coupling.

 Preferably, the first component is provided with more than one latch element, for example two oppositely disposed latch elements. Where this is the case, the
15 same locking element may be adapted to engage all of the latch elements simultaneously.

 The first component of the coupling may comprise an outer sleeve and a bung which is a push fit in the outer sleeve. The latch element or elements may be
20 provided on the bung, but this creates the risk that, if sufficient axial force is applied in the separation direction of the two components, the bung may be pulled, with the second component, from the outer sleeve. Fluid may then flow freely through the open
25 outer sleeve. Preferably, therefore, the latching element or elements are provided on the outer sleeve so as to retain all parts of the coupling in firm engagement with each other.

 For a better understanding of the present
30 invention, and to show how it may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

 Figure 1 is an exploded view of a releasable coupling;

35 Figure 2 is a sectional view showing the coupling in its assembled and engaged configuration;

Figures 3 to 5 show a locking element of the coupling;

Figures 6 and 7 show two positions of the locking element with respect to the rest of the coupling; and

5 Figure 8 corresponds to Figure 2 but illustrates an alternative embodiment.

Referring to Figures 1 and 2, the coupling comprises first and second components 2 and 4. The first component 2 comprises an outer sleeve 6 and a
10 bung 8 which is a push fit in the outer sleeve 6, where it is retained by cooperating ribs 10 and 12 on the bung 8 and the outer sleeve 6 respectively. The outer sleeve 6 has a flange 14 at one end which, in use, is welded to the wall of a bag 16 formed of flexible
15 plastics material.

At the end opposite the flange 14, the outer sleeve 6 is provided with a flange 18 which carries two oppositely disposed latching elements in the form of
20 barbs 20. The outer sleeve 6 is made from a material, such as a suitable plastics material, which is somewhat flexible, so that the barbs 20 can be resiliently deflected away from each other to permit engagement of the coupling, as will be described later in this description.

25 The bung 8 has an outer wall 22, which carries the ribs 10, and an inner projection 24. The outer wall 22 and the projection 24 are interconnected by a continuous annular end wall 26. The projection 24 is hollow and is provided with a breakable partition 30.
30 At the end away from the annular wall 26, the outer wall 22 is provided with a flange 32, to which a cap 34 is connected by a flexible strap 36. The cap 34 is adapted to fit over the end of the projection 24 in order to shut off the flow of fluid from the bag 16
35 when not in use.

The second component 4 comprises a plug 38 and a

spigot 40 which is received in a hole 42 in the plug 38. The plug 38 comprises a central skirt 44 which is a close fit around the projection 24, and an outer skirt 46 which is a close fit within the outer wall 22.

5 The spigot 40 has a peripheral recess 48 which cooperates with the wall of the hole 42 to retain the spigot 40 and the plug 38 together. On one side of the recess 48, the spigot 40 has an obliquely cut end portion 50 which, when the second component 4 is
10 assembled, is shrouded by the central skirt 44. On the other side of the recess 48, the spigot 40 has a serrated portion 51 for receiving a tube 52.

 The coupling also comprises a locking element 54 which is shown in detail in Figures 3 to 5. The
15 locking element has an opening 56, through which projects the serrated portion 51 of the spigot 40. The locking element is retained on the spigot 40 by the tube 52, but is rotatable about the spigot 40. The locking element 54 has two arms which extend to
20 opposite sides of the opening 56, and each arm is provided with an upstanding lug 56 to enable the locking element 54 to be rotated by an operator's fingers. Each arm of the locking element 54 is provided with an arcuate groove 60, which is centered
25 on the axis of the opening 56. Each groove 60 is open at one side of the respective arm of the locking element 54, but closed at the other side. Each groove, as shown in the sectional view of Figure 4, has an outer wall 62 which extends parallel to the central
30 axis of the opening 56, a bottom wall 64, and an oblique inner wall 66. The configuration of each groove, as seen in cross-section, corresponds to that of each barb 20.

 As shown in Figure 2, when the first component 2
35 is assembled, the flange 32 on the bung 8 makes face-to-face contact with the flange 18 on the outer sleeve

6. Insertion of the second component 4 into the first component 2 brings the skirts 44 and 46 into sealing contact with the projection 24 and the outer wall 22, respectively. During the insertion movement, the outer periphery of the plug 38 engages the oblique faces of the barbs 20 and causes them to be deflected outwardly. When the plug 38 is fully inserted, the barbs 20 are able to spring back under their own resilience to trap the plug 38. To enable the second component 4 to be inserted into the first component 2, the locking element 54 must be in the position shown in Figure 6, in which it is away from the barbs 20. Once the plug 38 has been inserted into the first component 2, the locking element 54 is rotated in the direction indicated by the arrow 68 so as to trap the barbs 20 in the grooves 60, as shown in Figure 7. In this position, the barbs 20 are in contact with the outer walls 62 of the grooves 60, and so are prevented from moving outwardly to release the plug 38. Furthermore, since the barbs 20 are formed integrally on the outer sleeve 6 of the first component 2, there is no tendency for a pull on the tube 52 to draw the bung 8 from the outer sleeve 6.

Figure 8 shows an alternative embodiment in which this possibility remains. However, the alternative shown in Figure 8 utilises a standard outer sleeve 106, which may provide economic advantages in some circumstances. In the embodiment of Figure 8, the barbs 120 are formed integrally on the bung 108, instead of being formed on the outer sleeve 6 of Figure 1. Apart from this modification, the embodiment of Figure 8 is identical to that of Figures 1 to 7, and corresponding parts are indicated by the same reference numerals.

CLAIMS

1. A coupling comprising first and second components which are engageable with one another by relative movement in an engaging direction, the first
5 component having a latch element which, when the components are engaged, cooperates with a portion of the second component to resist disengagement of the components, the latch element being releasable from the second component by movement in a release direction
10 which is transverse to the engaging direction, a locking element being provided which is engageable with the latch element to prevent movement of the latch element in the release direction.

2. A coupling as claimed in claim 1, in which
15 the locking element is mounted for rotation on the second component.

3. A coupling as claimed in claim 2, in which the locking element is rotatable relatively to the second component about an axis parallel to the engaging
20 direction to bring the locking element into and out of engagement with the latch element.

4. A coupling as claimed in claim 2 or 3, in which the second component is provided with a spigot for receiving a tube, the locking element being mounted
25 for rotation about the spigot.

5. A coupling as claimed in claim 4, in which the locking element is adapted to be retained on the second component by a tube fitted to the spigot.

6. A coupling as claimed in any one of claims 2
30 to 5, in which the locking element comprises an arcuate groove which is centred on the axis of rotation of the locking element, the groove being movable, upon rotation of the locking element, into and out of a locking position in which the latch element is
35 accommodated in the groove.

7. A coupling as claimed in claim 6, in which,

in the locking position, a circumferentially extending wall of the groove abuts the latch element to prevent movement of the latch element in the release direction.

8. A coupling as claimed in claim 7, in which
5 the circumferentially extending wall is a radially outer wall of the groove.

9. A coupling as claimed in any one of claims 6 to 8, in which the groove is closed at one end and open at the other end.

10 10. A coupling as claimed in any one of the preceding claims, in which the first component comprises an outer sleeve and a bung which is received in the outer sleeve.

11. A coupling as claimed in claim 10, in which
15 the latch element is provided on the outer sleeve.

12. A coupling as claimed in claim 10, in which the latch element is provided on the bung.

13. A coupling as claimed in any one of the preceding claims, in which the latch element is one of
20 a plurality of latch elements.

14. A coupling as claimed in claim 13, in which there are two of the latch elements which are disposed opposite each other on the first component.

15. A coupling as claimed in any one of the
25 preceding claims, in which the portion of the second component with which the or each latch element cooperates is a flange.

16. A coupling as claimed in any one of the preceding claims, in which the first component is
30 fitted to a container for fluid and in which the second component is fitted to equipment to which the fluid is to be supplied.

17. A coupling as claimed in claim 16, in which the container is a flexible bag.

35 18. A coupling as claimed in claim 16 or 17, in which the container contains herbicide.

19. A coupling substantially as described herein with reference to, and as shown in, the accompanying drawings.

20. Spraying apparatus comprising a container of
5 herbicide and equipment for delivering the herbicide, the container and the equipment being interconnected by a coupling in accordance with any one of the preceding claims.