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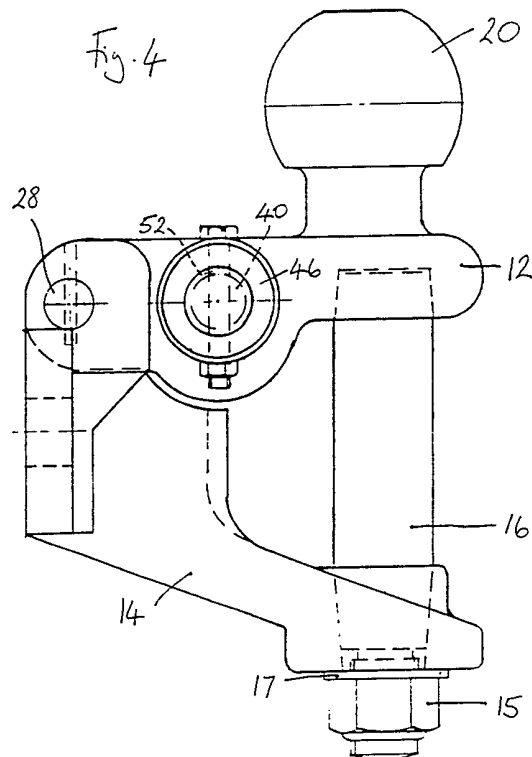
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(54) Towing coupling

(57) To simplify attachment of an eye coupling (not shown) to a pin (16), and minimise risk of inadvertent unfastening, one of the coupling jaw members (12, 14) between which the pin (16) extends is swingably connected relative to the other. The free end of the pin (16) may locate in a recess or aperture of the swingable jaw (12), when closed, and to provide a dual purpose coupling, a ball (20) may be mounted on one of the jaws, conveniently the upper swingable jaw (12). The swingable jaw (12) is lockable in its closed position by means, for example, of a retractable locking bolt (40) or of a rotatable locking bolt or nut.



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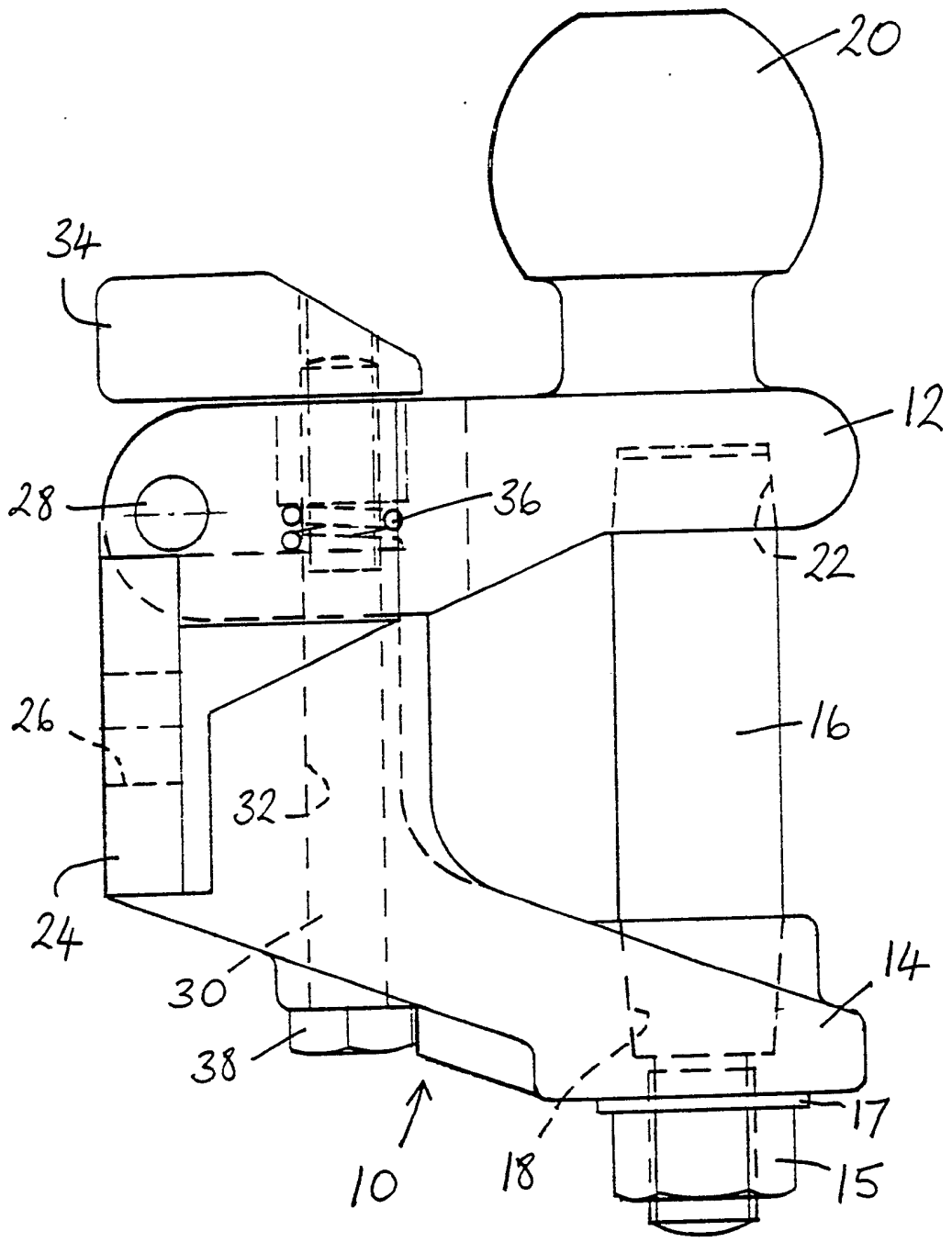


Fig. 1



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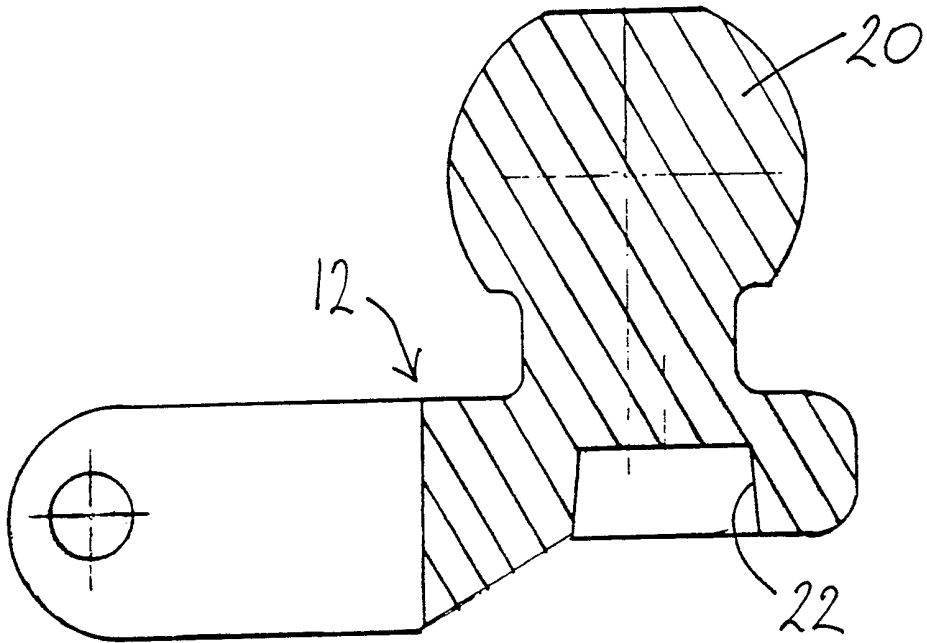
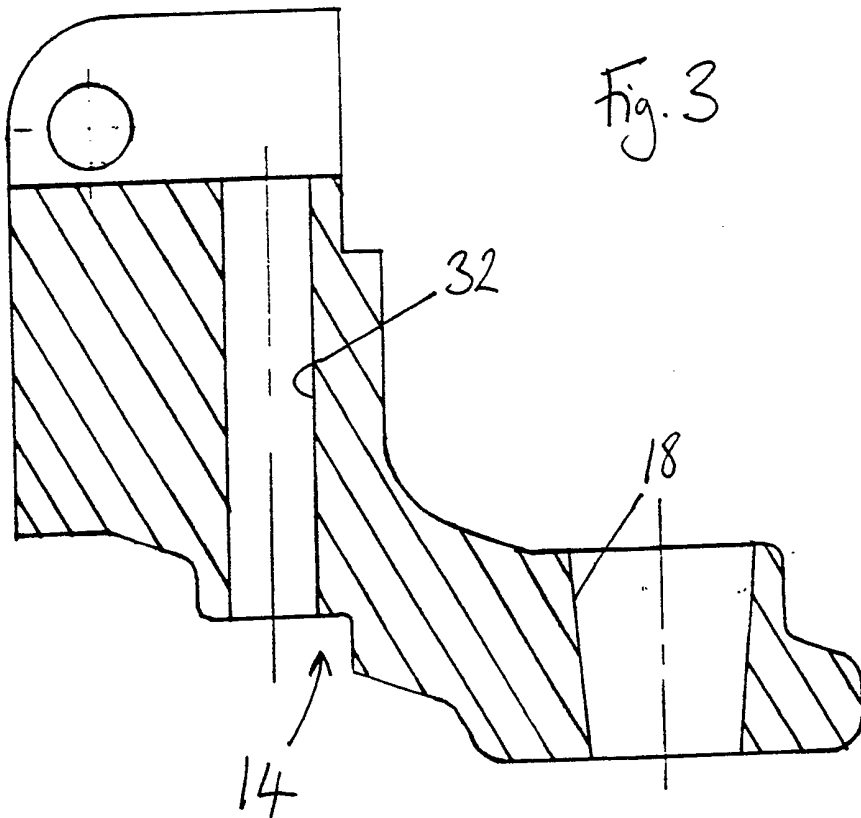
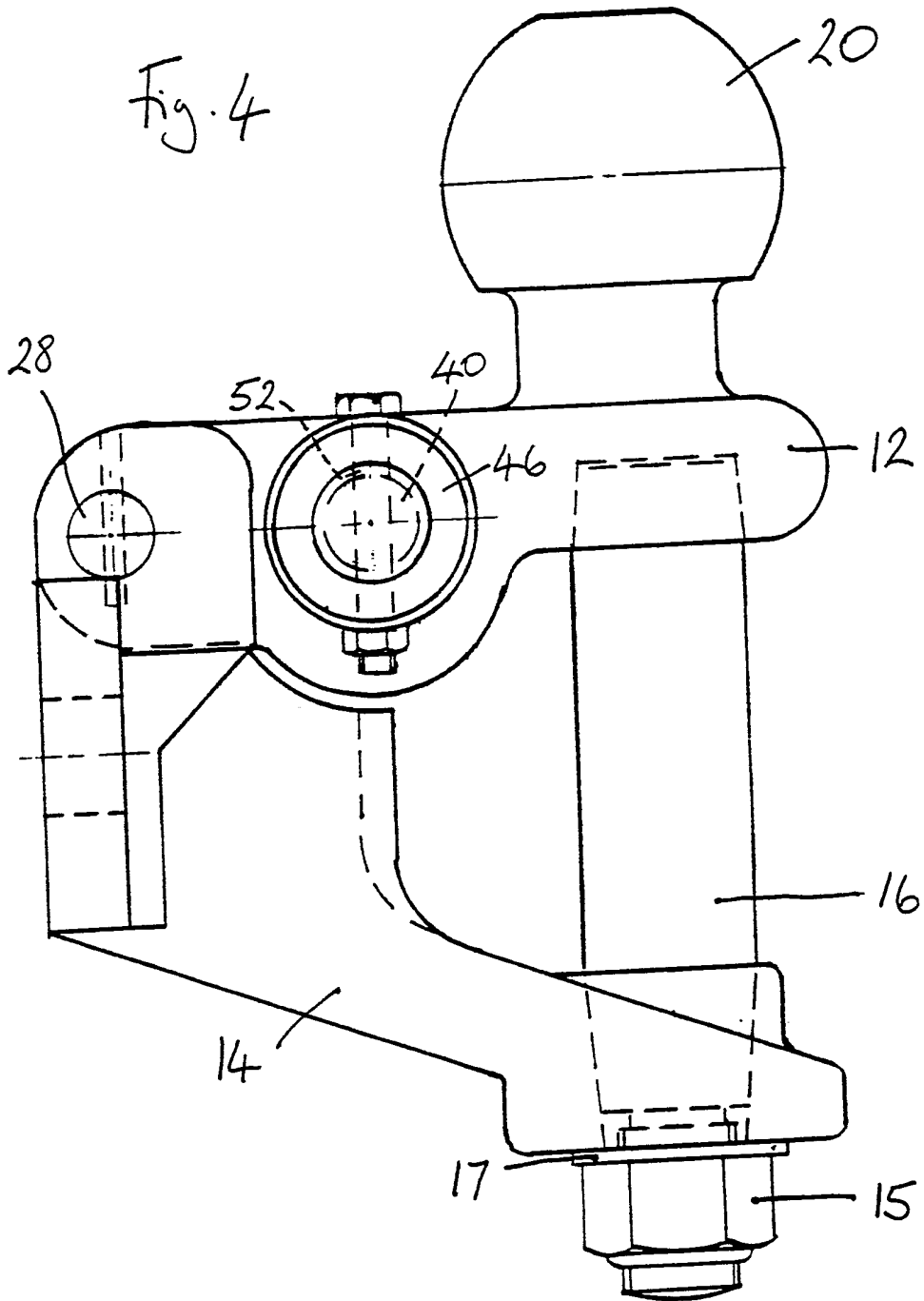


Fig. 3

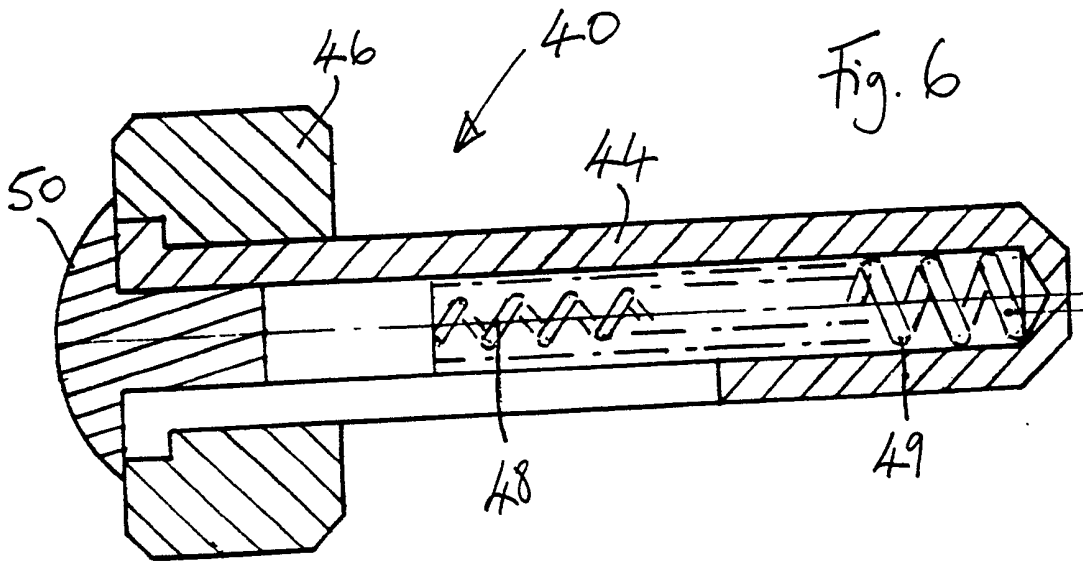
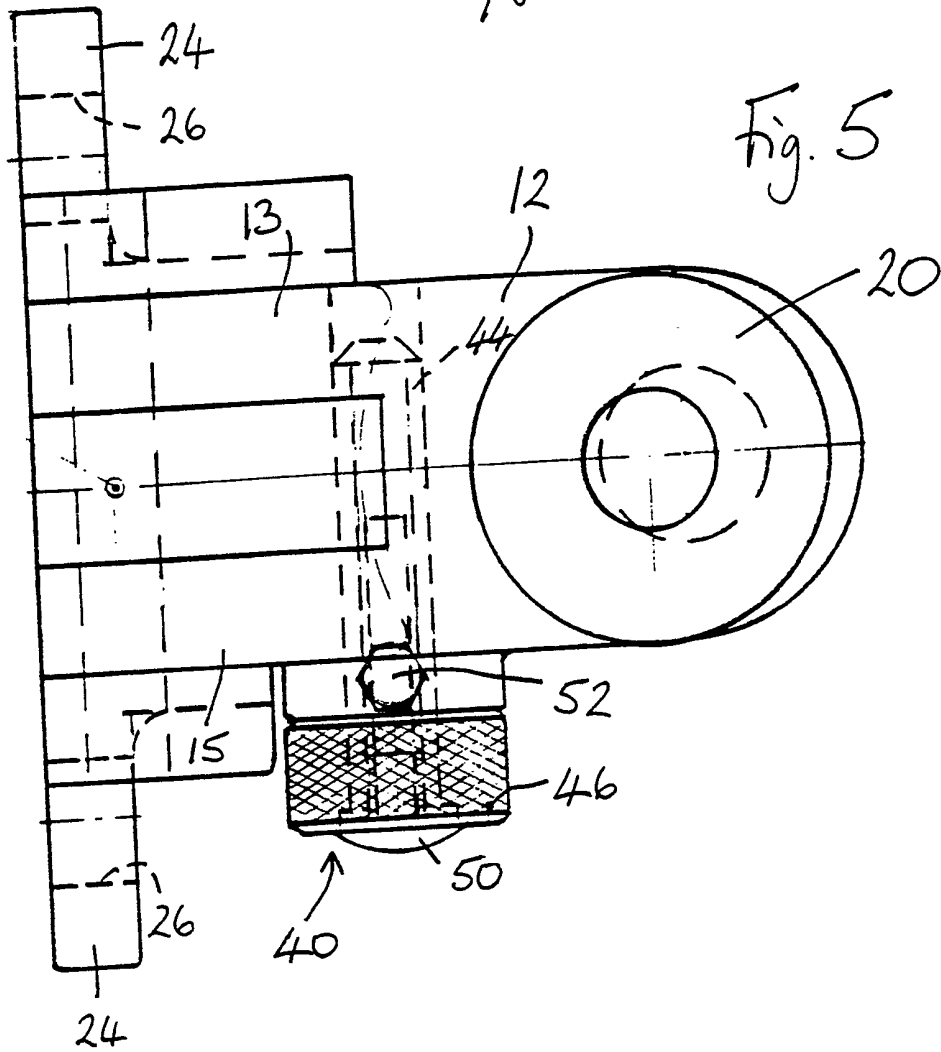


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Fig. 4



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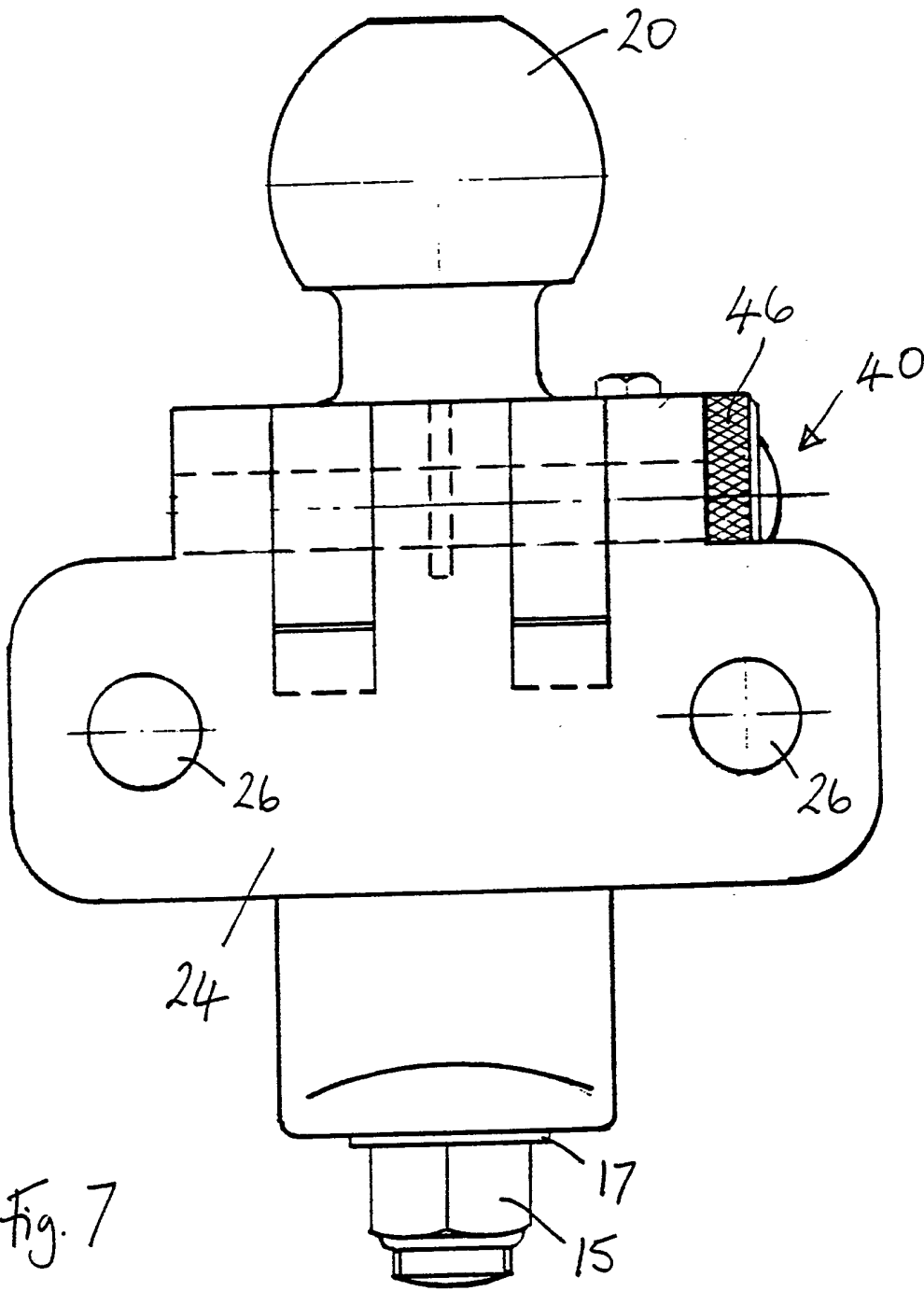


Fig. 7

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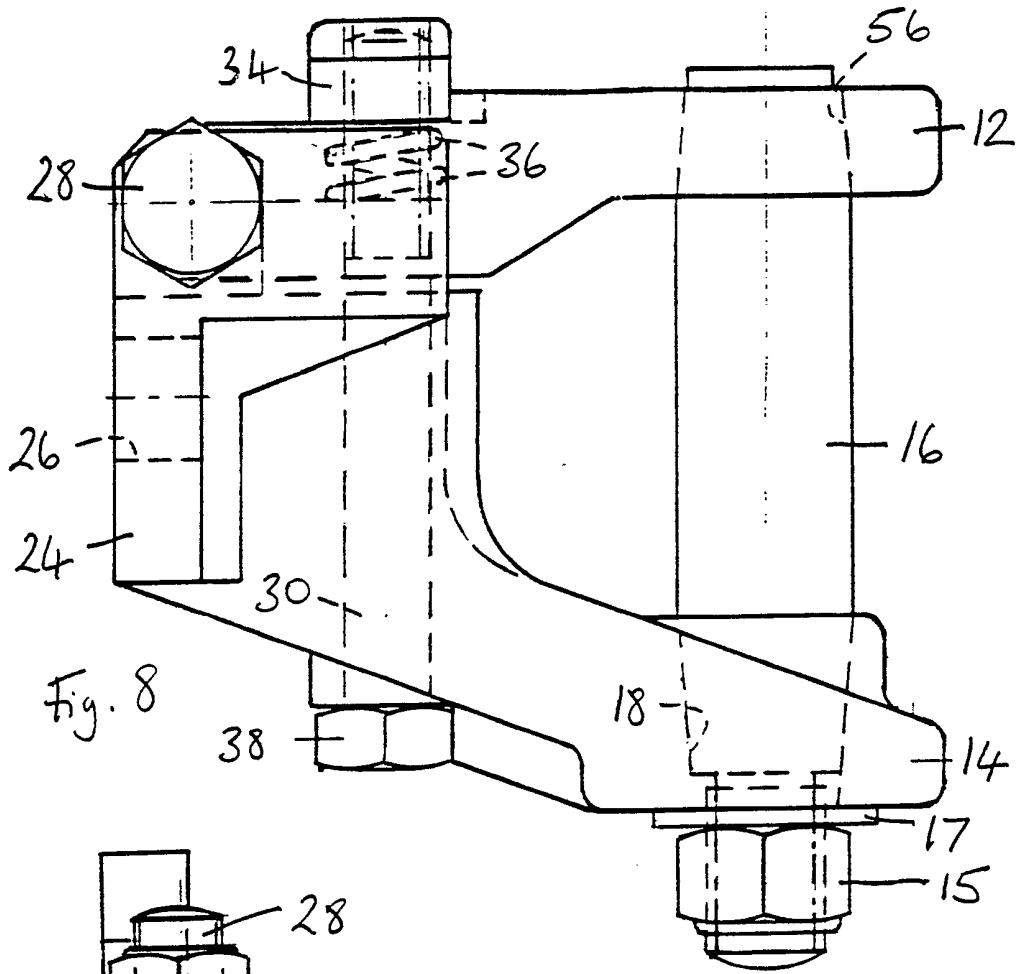


Fig. 8

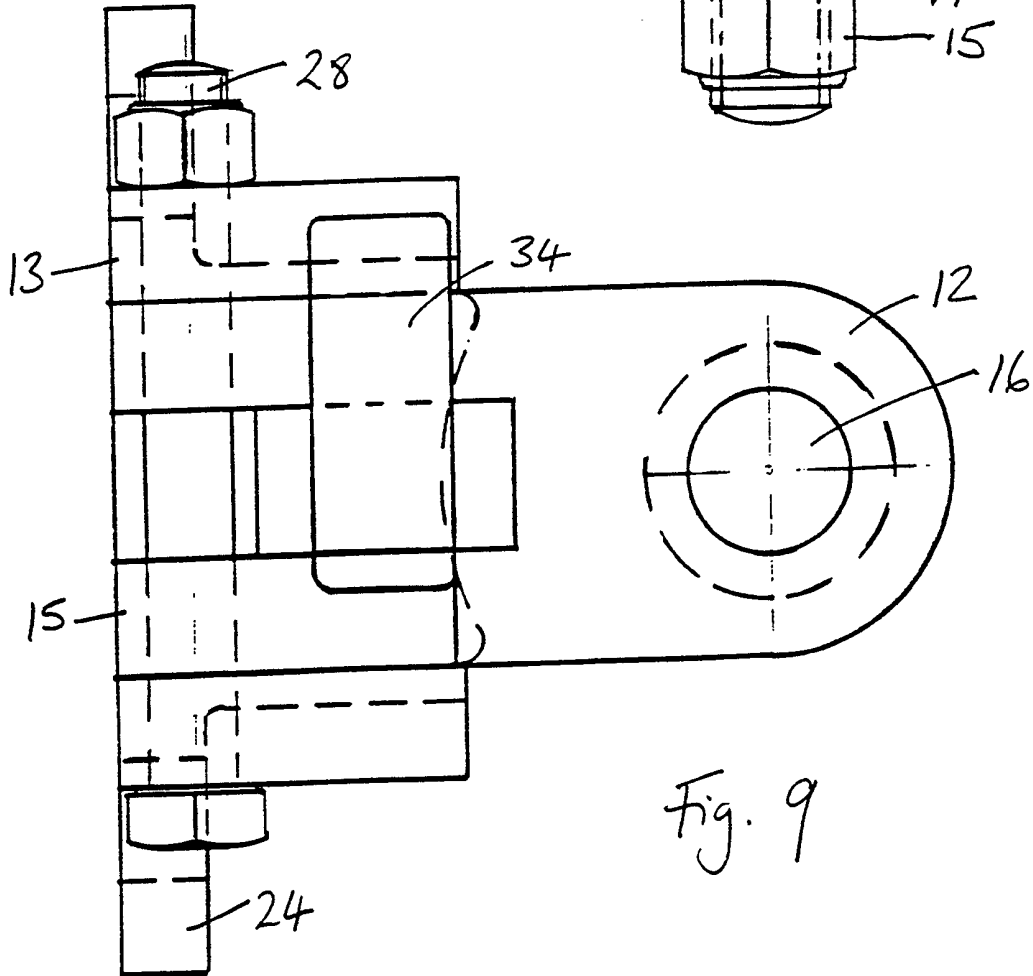


Fig. 9



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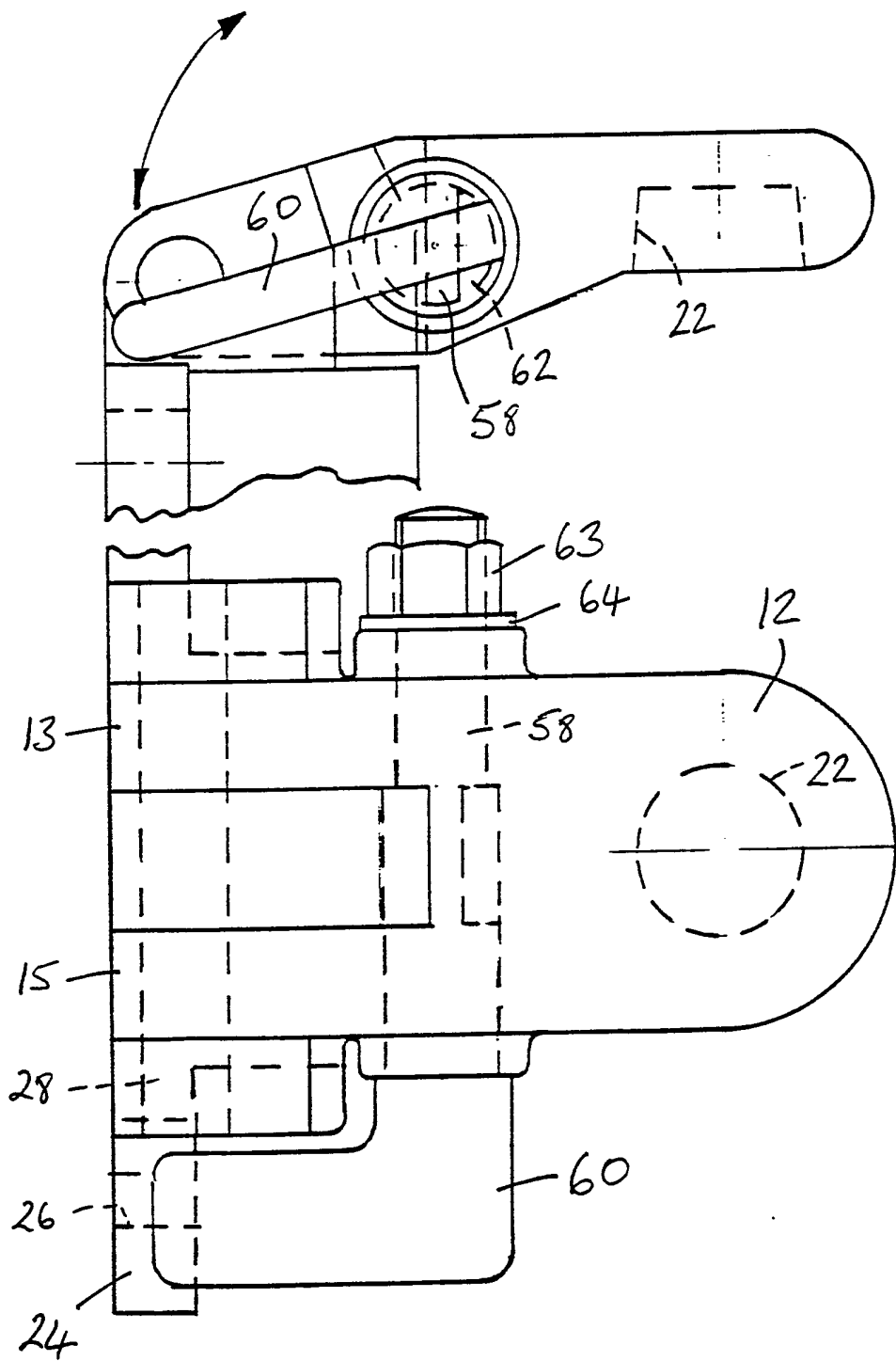


Fig. 10

TOWING COUPLING

This invention relates to a towing coupling for attachment to a towing vehicle.

Dual purpose couplings, which include both a ball and a pin for selective engagement, respectively with a socket type coupling, or with an eye type coupling of a trailer vehicle are known, for example from prior UK patent specifications Nos: 1436673, 1548991, 2063803, 2076765 and 2167365. Such couplings all comprise a forked bracket, having a pair of spaced arms or jaws between which the pin is fitted. The ball is generally integral with the upper arm or jaw, but in the applicant's earlier patent GB 1548991 it is fitted to the upper end of the pin, which extends through the upper arm or jaw.

In all the aforesaid devices, the pin is a separate component which has to be released and detached or withdrawn, and subsequently resecured whenever an eye type coupling is to be connected or disconnected. Such operations may require certain manual dexterity by the user, and may leave open the risk that the pin is not securely re-attached by the user, or is prone to be released by vibration or shock, which would lead to the danger of the trailer uncoupling during motion.

It is an object of the present invention to provide an improved construction of towing coupling, preferably, built not necessarily of dual purpose type, whereby attachment of an eye type coupling is simpler to accomplish than hitherto, and whereby any risk of its detachment can be minimised.

Pursuant hereto the invention provides a towing coupling adapted for fitment to the rear of a towing vehicle and comprising a bracket having spaced jaw members between which a pin extends, one of the jaw members being swingably connected relative to the other jaw member and being lockable in its closed position.

It will be appreciated that with such a coupling it is a simple matter to unlock the one jaw member and swing it back to allow an eye coupling to be fitted onto the pin, after which said one jaw member can be swung back and resecured.

Two types of such a coupling are possible. Those which only comprise a pin, and are termed "standard" couplings, and those which comprise a ball as well as a pin, and are termed "dual purpose" or "universal" couplings.

In this respect, in dual purpose couplings the ball is mounted on one of the jaw members, conveniently the

swingable jaw member. Indeed, in preferred embodiments, with the jaw members disposed one above the other, in use, the ball is integrally connected to the upper jaw member and the latter is pivotally connected to the lower jaw member of the bracket.

Thus, the invention also provides a combined ball and pin towing coupling adapted for fitment to the rear of a towing vehicle and comprising a bracket having spaced jaw members between which the pin extends, the ball being mounted on one of the jaw members, said one jaw member being swingably connected relative to the other jaw member and being lockable in its closed position.

Advantageously the swingable jaw member, upon which the ball is generally mounted in a dual purpose coupling, is provided with a recess, into which one end of the pin locates in the closed/locked position of said jaw member. In this way, the pin is particularly reliably secured when the swingable jaw member is locked in its closed position.

In a standard coupling, in particular, an aperture in the swingable jaw is equally good for location and securement of the end of the pin in the closed condition of the device.

The other end of the pin may conveniently be fixedly

attached to the other, stationary, jaw member, so that no other securement means requires manipulation and there is no risk of detachment of the pin.

The swingable jaw may conveniently be lockable in its closed position by means of a rotatable locking nut or locking bolt, which may be spring biased into its locking position, or retainable in its locking position by auxiliary locking means. In this respect, the swingable jaw member may advantageously be of forked configuration, such that a locking nut, or a head of a locking bolt, is accommodated, in its released position, in a gap between forked limbs, and is rotatable to a locking position in which it engages over the forked limbs so as to prevent swinging of the jaw member.

The invention will be described further, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a side view of a first practical embodiment of the coupling of the invention;

Fig. 2 is a plan view of the coupling of Fig. 1;

Fig. 3 is a cross-section of the two separated jaw members of the coupling of Fig. 1, along the line A-A in Fig. 2;

Fig. 4 is a side view of a second practical embodiment of the coupling of the invention;

Fig. 5 is a plan view of the coupling of Fig. 4;

Fig. 6 is an enlarged cross-section of a retractable locking pin of the second embodiment;

Fig. 7 is a rear view of the coupling of Fig. 4, in the direction of arrow B in Fig. 4;

Fig. 8 is a side view of a third practical embodiment of the coupling of the invention;

Fig. 9 is a plan view of the coupling of Fig. 8; and

Fig. 10 is a reduced scale, fragmentary plan and side view of a fourth practical embodiment of the coupling of the invention.

As illustrated, in Figs. 1 to 3, a first embodiment of the coupling of the invention comprises a bracket, indicated generally by reference numeral 10, constituted by upper and lower jaw members 12, 14, between which a towing pin 16 is mounted.

The respective jaw members 12, 14, as shown in Fig. 3, consist of separate metal castings or forgings. The

lower jaw member 14 has integral lateral flanges 24 (best seen in Fig. 2) at the rear, each with a bolt hole 26 for securing the coupling to the rear of a towing vehicle. The lower jaw member 14 is also provided, towards its front end, with a through bore 18 in which the lower end of the pin 16 is accommodated. The pin 16 has a screw threaded extension which is secured at the other side of the bore 18 by a nut 15 and a washer 17.

The upper jaw member 12 has a ball 20 integrally formed thereon towards its front end substantially in alignment with a recess 22, which fits over the top of the pin 16, as shown in Fig. 1. Towards its rear, the upper jaw member 12 is forked so as to have side by side limbs 13, 15 (as best seen in Fig. 2), with a gap therebetween. The limbs 13, 15 are pivotally connected to the top of the rear portion of the lower jaw member 14 by means of transverse pivot pin 28.

A bolt with a threaded shaft 30 extends through and is threadedly engaged in a bore 32 in the rear portion of the lower jaw member 14 and projects through the gap between the upper jaw member limbs 13, 15. The head 38 of the bolt 30 is retained beneath the lower jaw member 14.

A winged nut 34 is threadedly engaged on the upper portion of the shaft 30 projecting beyond the upper jaw

member 12 and is biased by a torsion spring 36 to a position where its wings are substantially parallel to the flanges 24, thus overlying the limbs 13, 15 and locking the upper jaw 12 in the portion shown in Fig. 1. When the wing nut 34 is turned through 90° so that its wing is aligned with the gap between the limbs 13, 15 (see Fig. 2) the upper jaw 12 is released and can be swung upwards away from the top of the pin 16. An eye coupling can then be located on the pin and retained by replacing and re-locking the upper jaw 12.

Alternatively, when the upper jaw 12 is locked onto the pin 16, a socket coupling can readily engage the ball 20 of the upper jaw 12.

Many minor variations of detail are, of course possible in respect of this embodiment. For example, the wing nut does not need to be spring-biassed, and a further grub screw or transverse bolt or similar could be provided to retain it in its locking position. The shaft on which the wing nut engages could be replaced by an integral stud, or a shaft which is welded in place, or which is engaged in a blind bore.

Figs 4 to 7 illustrate a second embodiment of coupling which is very similar in design to the first embodiment, and like the first embodiment is a dual purpose coupling, with a ball as well as a pin. To avoid



repetition corresponding parts are designated by the same reference numerals as used in Figs. 1 to 3.

The only significant difference compared to the first embodiment lies in the means for locking the upper jaw 12 in its closed position and releasing it for swinging back. In this embodiment, this is achieved by a retractable locking bolt 40, which extends through a transverse bore 42 in the upper jaw 12 at the junction from where the limbs 13, 15 thereof extend (see Fig. 5). Indeed, when located in the bore 42, the bolt 40 projects partially into the gap between the limbs 13, 15. The lower jaw 14 is formed so as to extend around and almost complete the passageway for the bolt 40 in this gap. Because a portion of the lower jaw 14 overlies the bolt in this region, the upper jaw 12 is only capable of swinging back relative to the lower jaw 14 when the bolt 40 is pulled back beyond said gap.

The form of the bolt 40 is shown in Fig. 6. It comprises a hollow shaft 44 and a knurled head 46, adapted to be manually grasped. Two helical compression springs 48, 49 are provided within the cavity of the shaft, and at the head end this is closed off by a plug 50. Upon production of the coupling, after this bolt 40 is inserted into its bore 42, a pin 52 is inserted through a lateral boss 54 of the upper jaw 12, against which the head 46 abuts, and through a corresponding

transverse bore in the shaft 44, adjacent the head 46. This pin 52 retains the bolt 40, so that it cannot be fully removed or detached from the coupling, but allows it to be retracted at least to the extent that the end of the shaft 44 clears the gap between the limbs 13, 15 and thereby releases the upper jaw 12 for swinging back. The springs 48, 49 acts against this pin 52 to bias the bolt to its inserted locking position. Thus, the bolt returns automatically to its locking position when the head 44 is released from manual force pulling it outwards of the coupling.

The use of such a retractable locking bolt as locking means has been found to be particularly reliable and the constructional simplicity of the arrangement makes it easy to incorporate in manufacture of the coupling.

Figs. 8 and 9 illustrate a third embodiment of coupling, which lacks the ball 20 of the previous two embodiments. In most other respects, including locking means, it is very similar to the first embodiment so corresponding reference numerals have been used for corresponding parts and the description thereof will not be repeated. One slight difference of note is the provision of an aperture 56 in the upper jaw 12 to receive and secure the upper end of the pin 16 instead of the recess 22 in the earlier embodiment. Obviously, the lack of a ball 20 in the present case makes this feasible.

Finally, Fig. 10 illustrates another embodiment of standard coupling, i.e. without a ball, the same reference numerals again being used for the basic components corresponding to those already described in relation to previous embodiments.

Here, a recess 22 is again provided in the upper jaw 12 for reception of the upper end of the pin 16.

More importantly, however, another manner of locking the upper jaw 12 relative to the lower jaw 14 is shown. This is accomplished in this embodiment by a rotatable locking bolt 58 which has a flattened handle portion 60 extending laterally at one end for turning manually, as indicated by arrows in the fragmentary side view. The bolt 58 extends through a bore 42 in the upper jaw member 12 which is situated as in the second embodiment (Figs. 4 to 7). The lower jaw member 14 is also formed as in that embodiment, with a portion completing the passageway for the bolt 58 in the gap between the upper jaw limbs 13, 15. In this case, however, the bolt shaft has a part circumferential or segmental cut away section 62 substantially in line with the gap so that when the bolt 58 is rotated through almost 180° to bring that section 62 into the gap, there is nothing to retain the upper jaw 12 and it can be swung back to allow connection of an eyelet to the pin 16. The position of

the handle 60 clearly indicates to the user whether the bolt 58 is in its locking position (handle down as shown) or release position (handle projecting obliquely upwards and forwards). The other end of the bolt 58 is simply retained by a nut 63 and washer 64.

It is to be understood that the invention is not limited to the specific constructional details of the foregoing embodiments. Many variations are possible and features of the respective embodiments could readily be interchanged so that, for example, the respective locking means could be employed with either standard or dual purpose couplings.

Moreover, in all the aforesaid embodiments, the pin could be secured at its lower end by welding or by other fastening means, and its upper end need not locate in a recess or aperture in the upper jaw member, but could merely be abutted by said member.

Furthermore, in certain other embodiments the pin could be secured to the swingable upper jaw member (opposite to the ball, if present) and releasably abut the lower jaw, or releasably locate in a recess or aperture in the lower jaw member, only when the upper jaw member is in its closed position.

In all cases, the shape of the towing pin may conform to

any known standard or desired configuration, i.e. it may have a circular cross-section at least over its working portion, or it may have opposing parallel surfaces. In any event it should be suitably adapted for its purpose for location of either a parallel bore or circular mating eye.

CLAIMS

1. A towing coupling adapted for fitment to the rear of a towing vehicle and comprising a bracket having spaced jaw members between which a pin extends, one of the jaw members being swingably connected relative to the other jaw member and being lockable in its closed position.
2. A coupling as claimed in claim 1 wherein the swingable jaw is provided with an aperture or recess into which one end of the pin locates in the closed/locked position of said jaw.
3. A coupling as claimed in claim 1 or 2 wherein a ball is mounted on one of the jaws.
4. A coupling as claimed in claim 3 wherein the ball is mounted on the swingable jaw.
5. A coupling as claimed in any preceding claim wherein the swingable jaw is disposed above and pivotally connected to the other, stationary jaw.
6. A coupling as claimed in any preceding claim wherein the swingable jaw is lockable in its closed position by means of a rotatable or retractable locking element, which is spring biased into its locking

position.

7. A combined ball and pin towing coupling adapted for fitment to the rear of a towing vehicle and comprising a bracket having spaced jaw members between which the pin extends, the ball being mounted on one of the jaw members, said one jaw member being swingably connected relative to the other jaw member and being lockable in its closed position.

8. A towing coupling substantially as hereinbefore described with reference to and as illustrated in any of the accompanying drawings.