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(54) **Detachable semi-trailer goosenecks**

(57) A gooseneck 1 having a generally horizontally extending tongue 2 for insertion into a socket 18 of a semi-trailer, the tongue being provided with a protrusion 7 for co-operation with a recess 20 provided in the socket of the semi-trailer, characterised in that the protrusion is retractable relative to said tongue to facilitate insertion and withdrawal of the tongue of the gooseneck into and from a said socket and is extensible relative to said tongue to ensure safe coupling of the gooseneck and semi-trailer. The extension and retraction of the protrusion is preferably effected pneumatically. The invention also embraces the combinations of such a gooseneck with a semi-trailer, and with a semi-trailer and tractor. The pneumatic supply is preferably drawn from a pneumatic system of the tractor.

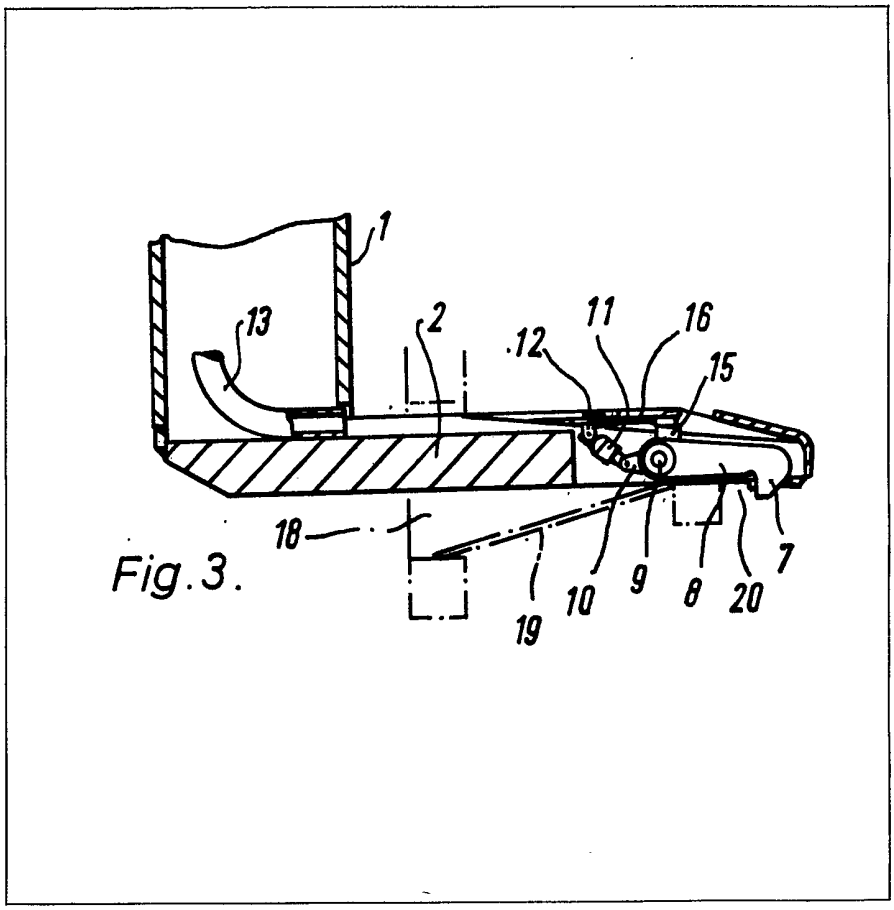

Fig.3.

The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

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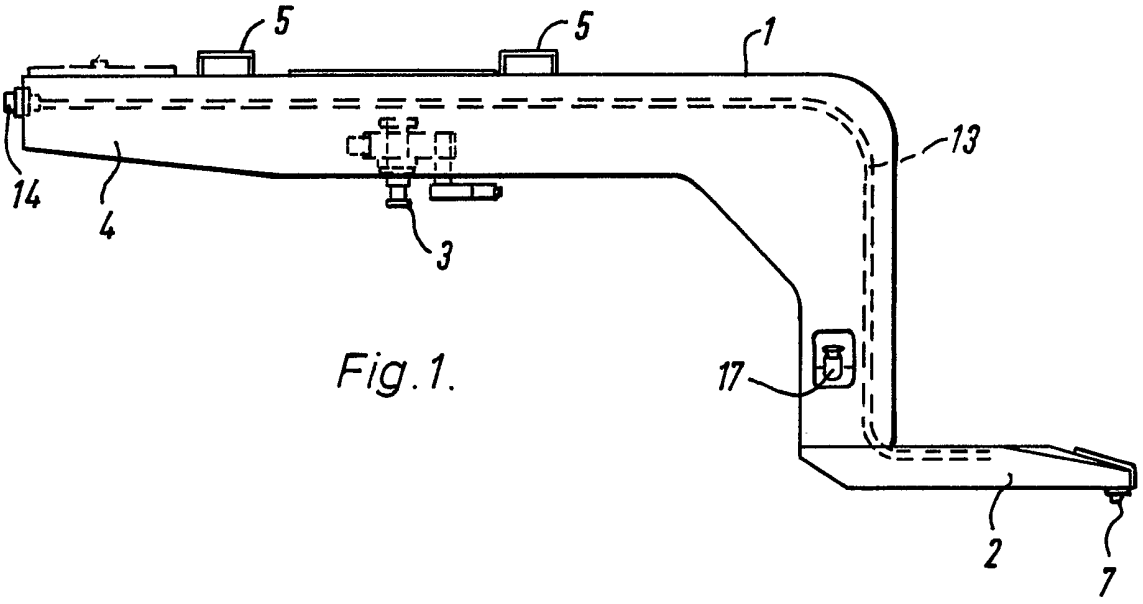

Fig. 1.

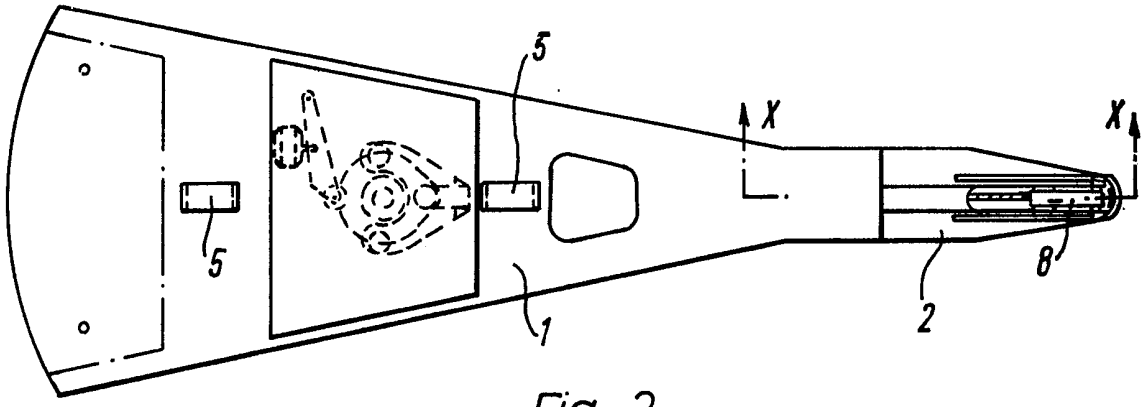

Fig. 2.

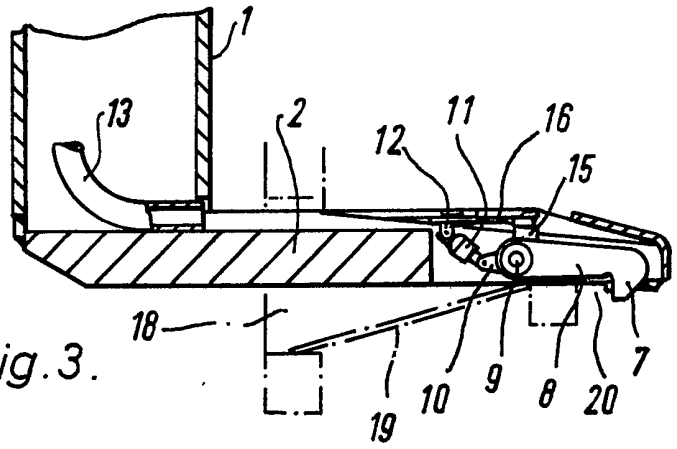

Fig. 3.

SPECIFICATION

Coupling for gooseneck/trailer combination

This invention relates to a gooseneck such as is employed to engage a tractor and a semi-trailer in ro-ro operations, which is provided with an improved coupling.

Conventionally a tongue of the gooseneck is provided with a downwardly projecting toe at its distal end, so that when the tongue is fully inserted into a socket of a semi-trailer and the gooseneck is rotated about a transverse horizontal axis into an engaging position the toe lodges in a recess provided at the rear of the socket. Because of the requirement that the tongue and toe be freely insertable into and removable from the socket when desired, the toe can project from the tongue only to such an extent as permits this insertion and removal to occur. In practice the maximum depth of this toe is only 15 millimetres and this is frequently insufficient to prevent accidental uncoupling of the gooseneck and semi-trailer if a change in incline or if rough ground is being traversed. The risks consequent upon the running away of a semi-trailer loaded perhaps with containers weighing 40 tons are self-evident.

Attempts have been made to provide safety couplings of the sort in which a bolt means on the gooseneck is automatically driven through a corresponding eye when the tongue of the gooseneck is fully inserted into the socket of the semi-trailer but such systems have not provided completely satisfactory solutions.

According to the present invention there is provided a gooseneck having a tongue for insertion into a socket of a semi-trailer, the tongue being provided with a protrusion for cooperation with a recess provided in a socket of a semi-trailer, which protrusion is retractable to facilitate insertion and withdrawal of the tongue of the gooseneck into and from a said socket and is extensible to ensure safe coupling of the gooseneck and a semi-trailer.

The protrusion preferably replaces the fixed toe of a conventional gooseneck since thereby no modifications are required to be made to any semi-trailers, but, if desired, the retractable and extensible protrusion of the present invention may be provided in addition to the conventional fixed toe.

Any means may be employed for retracting and extending the protrusion of the present invention, e.g. manual, hydraulic, pneumatic, electrical or mechanical means. Preferably the arrangement is such that latching (extension) of the protrusion in a recess of a socket of a said semi-trailer occurs under the influence of gravity and unlatching (retraction) is effected pneumatically and, as a standby system, manually by mechanical means.

Preferably the protrusion is located adjacent the distal end of the tongue and protrudes in a downward direction but, particularly when the protrusion constitutes an auxiliary safety coupling, the protrusion may be located upon any suitable part of the tongue and may protrude upwards or sideways as required. The protrusion may even be located on the tongue so as to be outside the socket of a said semi-trailer when the tongue is fully inserted within the socket, for engagement with an eye or the like provided on the semi-trailer externally of the socket.

By virtue of the extensibility and retractability of the protrusion an increased degree of coupling can be obtained than was the case with the conventional gooseneck, whereby the dangers of accidental uncoupling are alleviated to a considerable extent.

An embodiment of a gooseneck according to the present invention will now be described, by way of example only, by reference to the accompanying drawings in which:

Figure 1 is a side elevation of an embodiment of a gooseneck according to the present invention;

Figure 2 is a plan of the gooseneck of Figure 1; and

Figure 3 is a detail longitudinal section of the tongue of the gooseneck of Figure 1.

Referring to the drawings, a gooseneck 1 is shown having a tongue 2 projecting rearwardly from the base thereof. In conventional manner the gooseneck is provided with a fifth wheel pin 3 for engagement with an elevatable fifth wheel of a tractor vehicle, a counterweight 4 at the forward end of the gooseneck 1 and apertures 5 for receiving forks of a fork lift truck for gooseneck handling purposes.

At the distal end of the tongue 2 there is provided a coupling toe 7 forming one end of a lever arm 8 mounted for pivoted movement about a transversely extending pivot 9 fixed in the tongue 2. Pivotably affixed to the proximal end 10 of the lever arm 8 is an end of a pneumatic cylinder 11 which is pivotably affixed at its other end to a fixed support 12 within the tongue 2.

An airline 13 for supplying the pneumatic cylinder 11 with working air under pressure extends from the pneumatic cylinder 11 within the gooseneck 1 to the front thereof where there is arranged a coupling 14 for coupling with a flexible air supply hose of a tractor vehicle (not shown).

As a standby system a lug 15 is affixed to the top of the lever arm 8 and to this lug is attached a cable 16 extending forwardly within the gooseneck 1 and connected to a manual operation lever 17 mounted on an upright part of the gooseneck 1.

The toe 7 is chamfered at its rear surface and the mounting of the lever arm 8 in the tongue 2 is such that the lever arm is freely pivotable about the pivot 9. Thus when the tongue 2 is inserted into a socket 18 of a semi-trailer (shown schematically in Figure 3) the toe 7 rised up the inclined entry surface 19 of the socket 19 until it drops into the recess 20 conventionally provided at the rear end of the socket 18. The gooseneck is then raised to cause rotation thereof in a clockwise direction with reference to Figure 3 to lock the tongue 2 within the socket 18. Because of the increased depth which the toe of the gooseneck 1 of the present invention may have the tongue 2 will be securely engaged within the socket 18 and can withstand much greater upsetting forces then hitherto.

To disengage the tongue 2 from the socket 18 the gooseneck 1 is lowered to cause rotation thereof in an anti-clockwise direction with reference to Figure 3 whereupon the position is arrived at which is shown

in Figure 3, in which the tongue 2 is located generally axially of the socket 18 but the toe 7 is still located within the recess 20 thereof. By supplying air via air supply 13 to the pneumatic cylinder 11 the lever arm 8 is rotated about the pivot 9 in an anti-clockwise direction with reference to Figure 3 and the toe 7 is retracted from within the recess 20. The retracted state is maintained while the tongue 2 is withdrawn from the socket 19.

It will be appreciated that although one particular embodiment of this invention has been described, the invention embraces all other modes whereby the principle of this invention may be put into effect.

It is to be noted that the invention also embraces a combination of a gooseneck as defined herein and a semi-trailer and the combination of such a gooseneck with a semi-trailer and a tractor.

CLAIMS

1. A gooseneck having a generally horizontally extending tongue for insertion into a socket of a semi-trailer, the tongue being provided with a protrusion for co-operation with a recess provided in a socket of a semi-trailer, characterised in that the protrusion is retractable relative to said tongue to facilitate insertion and withdrawal of the tongue of the gooseneck into and from a said socket and is extensible relative to said tongue to ensure safe coupling of the gooseneck and semi-trailer.

2. A gooseneck according to claim 1, characterised in that the gooseneck includes pneumatic means for effecting the extension and retraction of the protrusion relative to said tongue.

3. A gooseneck according to claim 1, characterised in that the gooseneck includes hydraulic means for effecting the extension and retraction of the protrusion relative to said tongue.

4. A gooseneck according to claim 1, characterised in that the gooseneck includes manually operable means for effecting the extension and retraction of the protrusion relative to said tongue.

5. A gooseneck according to claim 4, characterised in that further means are provided for effecting said extension and retraction, said manually operable means being auxiliary thereto.

6. A gooseneck according to any preceding claim, characterised in that the protrusion is located adjacent a distal end of the tongue and protrudes in a downward direction.

7. A gooseneck according to any preceding claim, characterised in that the protrusion comprises one end of a lever arm located generally within the tongue and mounted for pivotal movement about a pivot extending transversely of the tongue, means being provided at the other end of the lever arm for pivoting the lever arm about the pivot and causing the protrusion to extend from an aperture provided in the tongue and to be retracted into said aperture.

8. A gooseneck according to claim 7, characterised in that said means comprises a piston-and-cylinder device arranged to be operated pneumatically or hydraulically.

9. A combination characterised in that it comprises a gooseneck as claimed in any preceding claim and a semi-trailer having a socket for receiving the tongue of the gooseneck, the socket being provided with means for co-operating with the protrusion of the tongue when it is extended relative to the tongue to ensure safe coupling of the gooseneck and the semi-trailer.

10. A combination according to claim 9, characterised in that it further includes a tractor upon which the gooseneck is mounted.

11. A combination according to claim 10, characterised in that the tractor is provided with an elevatable fifth wheel upon which the gooseneck is mounted.

12. A combination according to claim 10 or 11, characterised in that the gooseneck is provided with pneumatically operable means for effecting the extension and retraction of the protrusion relative to the tongue and the tractor is provided with means for supplying compressed air, to which latter means the said pneumatically operable means is connected.

13. A gooseneck, substantially as hereinbefore described with reference to the accompanying drawings.

14. A combination of gooseneck and semi-trailer, and optionally a tractor, substantially as hereinbefore described with reference to the accompanying drawings.

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