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(56) Documents Cited
GB 1054860 A GB 0882812 A GB 0839227 A
GB 0794691 A GB 0749521 A GB 0660410 A
US 5507400 A US 5312007 A

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(54) Abstract Title

An automatic coupling device for railway vehicles

(57) A coupling device (2), principally for railway vehicles includes means for pivoting the head of the coupler about a horizontal axis between use and stored positions via bores (10, 8). This is achieved by the placement of a pivot pin (not shown) in bore (8) which allows the coupler to hang down in a stored position, and the placement of a second pin (not shown) in bore (10) which effectively locks the coupler in a horizontal use position. The device (2) also provides means for limiting relative vertical movement of the couplers when coupled, the means comprising inter-engaging fingers (20, 24 and 22, 26) located on respective sides of the coupler.

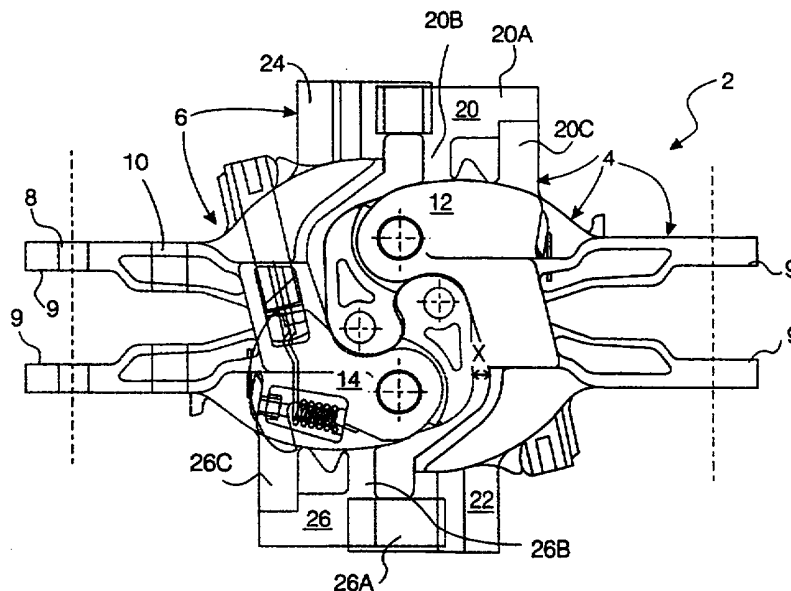


Fig. 3

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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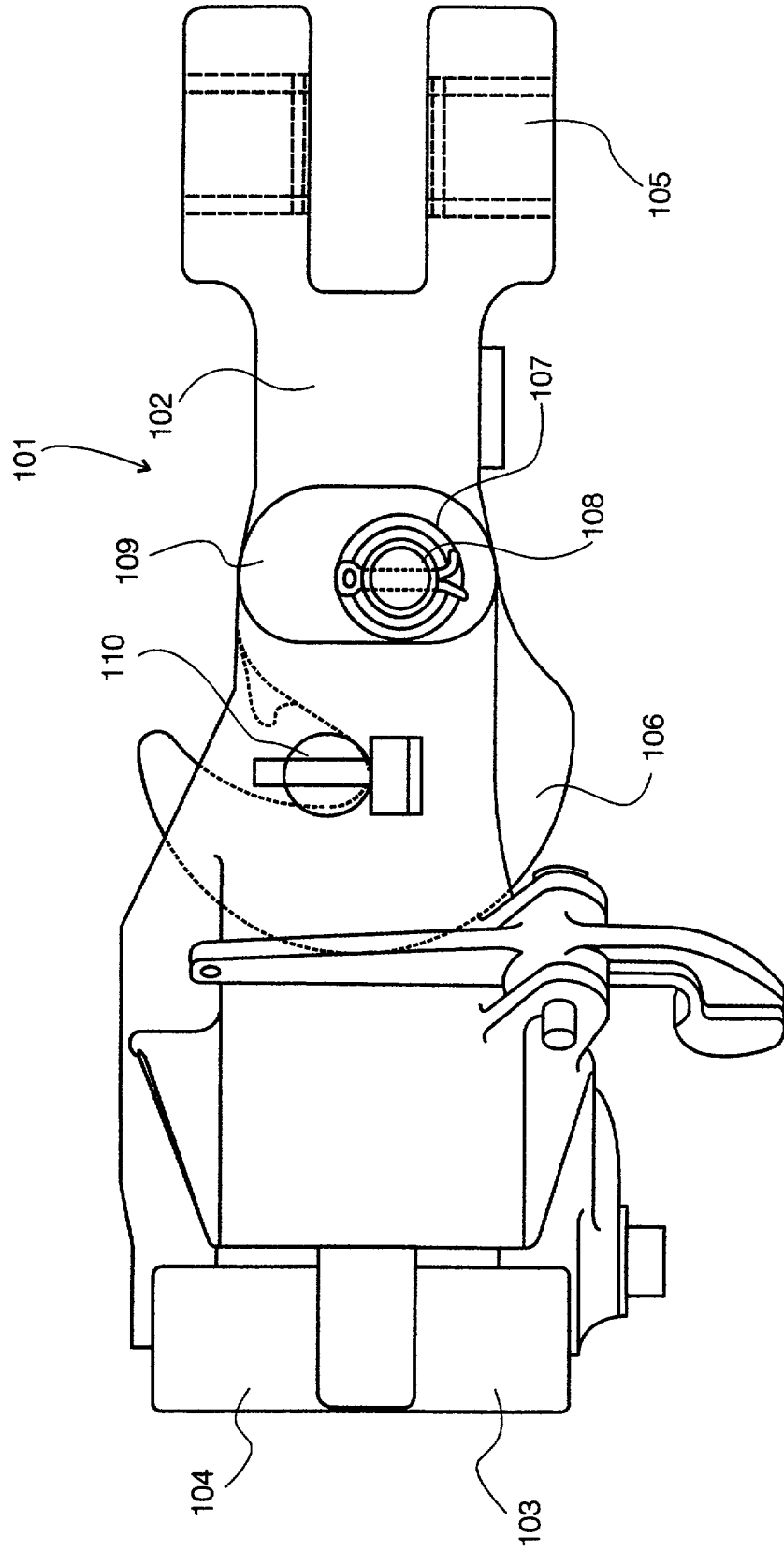


Fig. 2

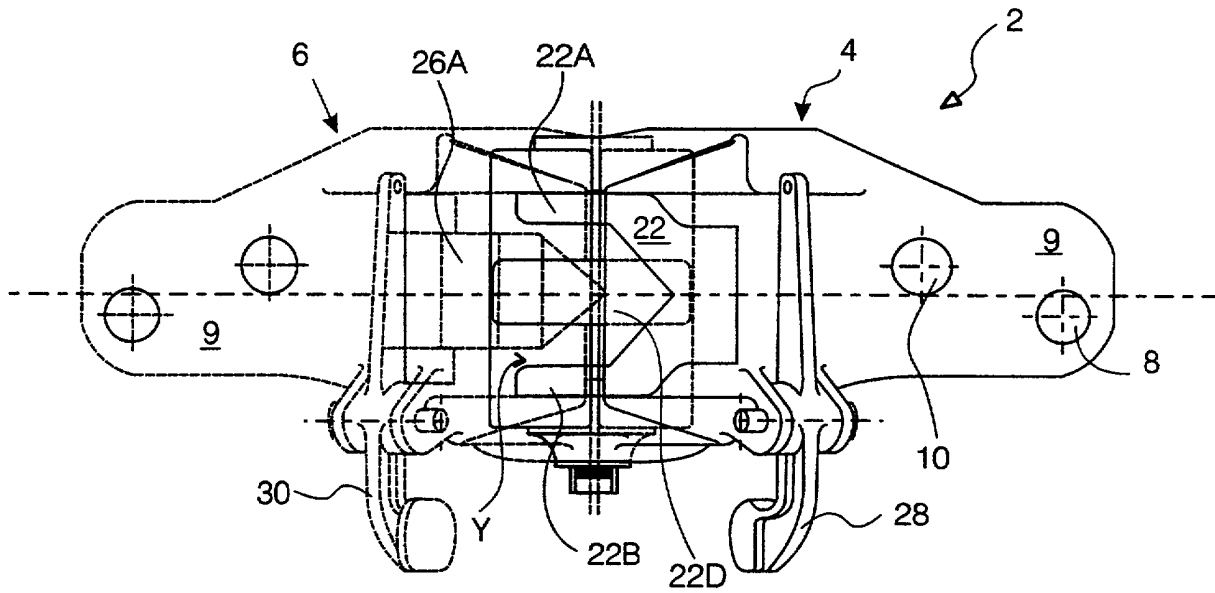


Fig. 4

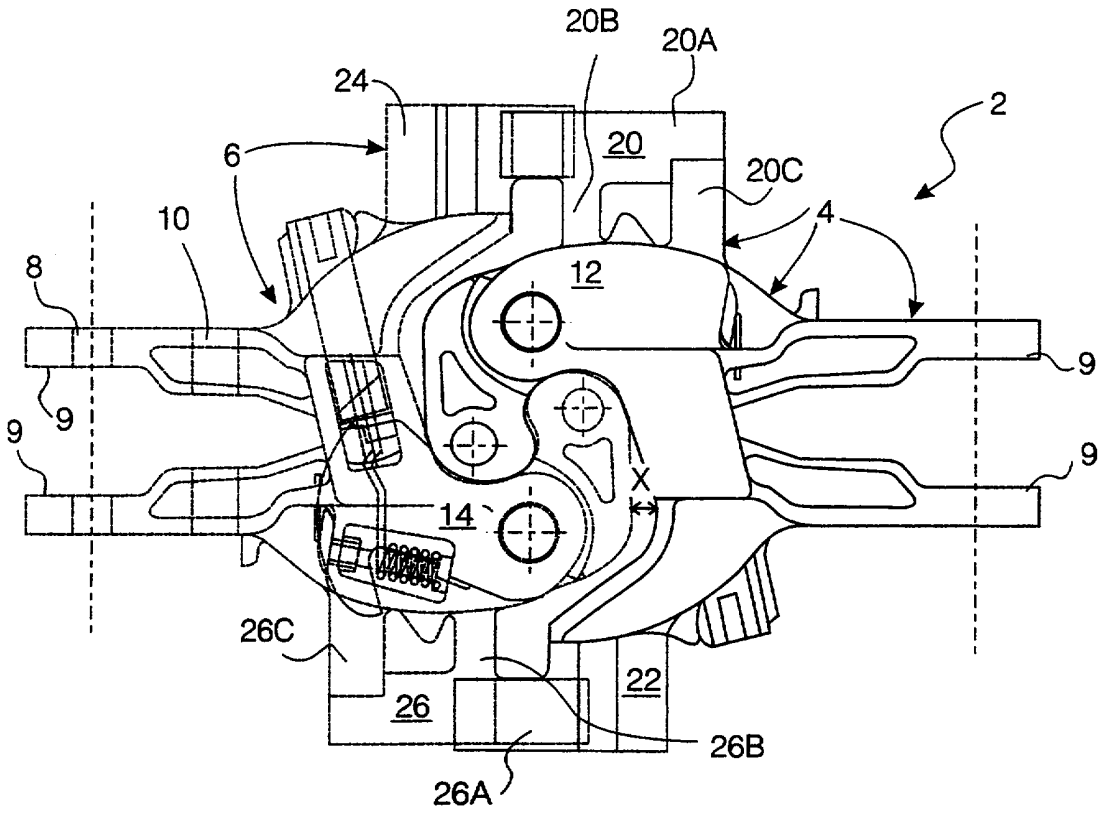


Fig. 3

COUPLERS

The present invention relates to coupling devices and couplers, and in particular to coupling devices and couplers for vehicles such as railway vehicles, and especially to
5 automatic coupling devices and couplers.

Various types of automatic coupling devices for railway vehicles are known, which are used to join together adjacent vehicles of a train, of which the buckeye-type is one of the most well known. Often, automatic couplers are the sole means of joining one
10 vehicle to the next, but it is also known to provide automatic couplers which also include a conventional draw hook. The hook is used where the adjacent vehicle also has a hook rather than an automatic coupler and the hooks of the two vehicles are then joined by means of a connecting shackle. The hook may also find use in the event that the automatic coupler fails. A conventional design of automatic coupler
15 including a draw hook is illustrated in Figures 1 and 2. Figure 1 is a plan view of a known automatic coupler and Figure 2 is a side elevation of the coupler of Figure 1.

Referring to Figures 1 and 2, the conventional automatic coupler 101 includes a draw bar 102 and an automatic coupler portion 103. In the illustrated automatic coupler,
20 the coupler portion is a buckeye type coupler. This type of coupler is well known in the art and will not be described in detail. The buckeye coupler includes knuckles 104 which engage corresponding knuckles of a second coupler when the two couplers are urged together.

A latching mechanism retains the couplers in the engaged position. At a first end of
25 the draw bar 102 is a vertical through bore 105 and the automatic coupler is attached to the vehicle by means of a pin, shaft or the like which passes through the bore 105. This arrangement allows the automatic coupler 101 at least some movement in a horizontal plane about the axis of the bore 105, for example, to accommodate relative
30 movement of the coupled vehicles.

At the second end of the draw bar 102, a hook 106 is provided, which may also be used for coupling vehicles by means of a conventional coupling shackle. In the normal use position of the automatic coupler, the automatic coupler portion 103 at least partially surrounds the hook 106 so that the hook cannot be used.

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Although automatic couplers of the type described are effective in coupling railway vehicles, they have some disadvantages. In particular, in the event of a crash or other situation in which unusual forces are placed on the vehicle, the couplers may separate. Since many railway vehicles and especially older vehicles have a relatively strong undercarriage and relatively weak superstructure, difficulties can arise if the couplers do separate. For example, a rearwardly positioned carriage could, if the carriage in front of it were to stop suddenly, continue its forward movement by riding up and ploughing over the front one, destroying the relatively weak superstructure by means of its relatively strong undercarriage. There is therefore a need to ensure that couplers, once coupled, cannot easily be unintentionally separated by relative vertical movement of the couplers. In addition, it is of particular advantage to be able to move the head of the coupler to a stored position when not in use, or to reveal a draw hook for connection to a coupling shackle, for example for emergency use.

20 Accordingly, a first aspect of the present invention provides an automatic coupler for a vehicle comprising:

a draw bar portion engageable with the vehicle and operatively moveable about a substantially vertical axis;

25 an automatic coupler portion, attached to the draw bar portion and operative to engage the automatic coupler portion of the corresponding coupler of an adjacent vehicle, thereby to allow motion to be transferred between the vehicles, the automatic coupler portion being moveable about a substantially horizontal or vertical axis between a use position and a stored position,

30 means for retaining the automatic coupler portion in the respective use and stored positions, and

means for limiting relative vertical movement of the automatic coupler in use with respect to an engaged corresponding coupler of an adjacent vehicle, said means comprising

5 at least two spaced first projecting fingers depending from a first lateral side of the automatic coupler portion and defining at least one space therebetween, and

at least one second projecting finger depending from an opposite lateral side of the automatic coupler portion,

10 said fingers being so sized and located that when, in use, the automatic coupler engages a corresponding automatic coupler of an adjacent vehicle said space can receive a corresponding second finger of said corresponding automatic coupler and said second finger may be received in a corresponding space of the corresponding automatic coupler, whereby said first fingers stand in the path of vertical movement of said second finger thereby to limit said relative vertical movement.

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A second aspect of the present invention provides a coupling device for coupling adjacent vehicles comprising:

20 first and second automatic coupler portions attached to respective vehicles and engageable to couple said vehicles, each coupler portion being pivotally attached to its respective vehicle whereby each coupler portion, when not coupled, is moveable about a vertical axis between a use position and a stored position, and including means for retaining the coupler portion in said respective use and stored positions, the first coupler portion further comprising at least two spaced first fingers depending from a first lateral side thereof and defining at least one space
25 therebetween and the second coupler portion further comprising at least one second finger depending from an opposite side thereof, said first and second finger being so sized and located that, when said coupler portions are engaged, the second finger of the second coupler portion may be received in the space defined by the first fingers of the first finger portion whereby said first fingers stand in the path of vertical
30 movement of said second finger, thereby to limit vertical movement of said second finger.

In a preferred embodiment each coupler portion includes first and second fingers at respective sides thereof.

5 In preferred arrangements according to the aspects of the invention said fingers are substantially rectangular in lateral cross section. It is particularly preferred that the leading end of the second finger is tapered and the shape of the space defined by the first fingers conforms to the shape of said second finger.

10 A preferred construction according to the invention provides that the first and second fingers are so spaced (when the couplers are coupled) as to provide vertical play between the couplers to accommodate normal in use relative vertical movement of the respective couplers.

15 Preferably said fingers are spaced apart from the adjacent side of the coupler head portion and depend at one end from a member attached to the side of the coupler head portion.

For a better understanding of the invention and to show how the same may be carried
20 into effect, reference will now be made by way of example only, to the following drawings, in which:

Figure 1 is a plan view of a conventional automatic coupler;

Figure 2 is a side elevation of the automatic coupler of Figure 1;

Figure 3 is a plan view of a coupling device comprising two couplers coupled
25 together, according to the invention; and

Figure 4 is a side elevation of the coupling device of Figure 3.

Referring now to Figures 3 and 4, a coupling device 2 comprises two coupler head
portions 4 and 6 which are shown in an engaged (coupled) condition. The couplers
30 are coupled together by engaging knuckles 12, 14 which are of generally known design and will not be described further.

The coupler head portions 4, 6 depend from forks 9. Each fork 9 includes bores 8 and 10. In use, the respective coupler head portions 4, 6 are connected to a draw bar (not shown) by means of the forks 9 and bore 8. A pin (not shown) is located in the bore 8 and passes through a corresponding bore in the draw bar. Thus the coupler head portions 4, 6 can pivot about the pin, that is, about the axis of bore 8 so that the coupler head portions can, by this pivoting, be moved between a use position and a stored position in which the coupler head portion 4, 6 hangs below the respective draw bar. The head portion 4, 6 is retained in its use position by means of a retaining pin which passes through bore 10 and through a corresponding bore in the draw bar (not illustrated). Movement about the axis of bore 8 is thereby prevented.

As noted above, an important feature of the present invention is also to provide a means of limiting relative vertical movement of engaged couplers. This is achieved by means of co-operating formations 20, 24 and 22, 26. The formations 20 and 26 are identical and the formations 22 and 24 are identical also. As can best be seen in Figure 4, formation 26 is in the shape of a projecting finger 26A, projecting towards the head portion of the adjacent coupled coupler 4. Similarly, formation 20 is a projecting finger 20A projecting towards the adjacent coupler 6. Formations 22 and 24 each comprise a pair of vertically aligned fingers 22A, 22B, 24A 24B which define a space 22D, 24D therebetween. The fingers 22A, 22B and 24A, 24B are so sized and located that the space 22D, 24D corresponds substantially in size and shape to the single finger (26A, 20A) of the adjacent coupler, so that said respective finger may be received in the space 22D, 24D when the couplers are coupled. In this way, when the couplers are coupled, the fingers 22A, 22B stand in the path of vertical movement by the finger 26A and so limit its vertical movement. Similarly, the fingers 24A, 24B stand in the path of vertical movement of the finger 20A and so limit its vertical movement. Thus the co-operation of the respective formations 20, 24 and 22, 26 limits the relative vertical movement of the two couplers.

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It will be understood that although the illustrated embodiment shows formations with respectively one and two fingers, the invention also includes formations including a greater number of fingers. For example, a coupler head portion may have a formation on one side with three fingers defining two spaces which thus co-operates
5 with a coupler having two fingers which are received in the said spaces. The middle finger of the three-fingered formation may be received in a space defined between the two fingers of the two-fingered formation.

As may be seen in Figure 4, the fingers of the respective formations are so sized that
10 not all relative vertical movement is prevented. Thus gap Y provides a degree of play between the two coupler portions which accommodates the normal relative vertical movements of the couplers in use arising from, for example, defects in the track or changes in gradient of the track. Similarly, a gap X is provided between the couplers to provide some longitudinal play. Formations 20, 22, 24, 26 are also so
15 relatively sized and shaped as to accommodate this longitudinal play.

As may best be discerned from Figure 3, the formations 20, 22, 24 or 26 are mounted at the side of, and spaced somewhat apart from, the coupler head portions. In particular, the formations depend at their ends distant from the adjacent (coupled)
20 coupler from a member 20C, 22C, 24C, 26C which depends from the side of the coupler head portion, extending laterally. This facilitates operation of the respective formations 20, 22, 24, 26 without interference from, or interfering with, other components of the coupler(s).

25 The fingers 20A, 26A, 22A, 22B, 24A, 24B are all substantially rectangular, in particular square, in lateral cross-section and this construction facilitates manufacture and is reliable in use. Other shapes of finger may, however, be used. Advantageously, the fingers 20A, 26A include a tapered leading (distal) end to facilitate insertion of the fingers into the respective spaces 26D, 22D. The
30 formations 22, 24 are also advantageously shaped so that the shape of the space 22D,

24D at the end nearest the member 22C, 24C corresponds to the tapered shape of the leading end of the finger 20A, 26A.

5 The terms "horizontal" and "vertical" as used in this specification relate to the normal orientation in use of the couplers, and of the vehicles to which they are attached. Thus, some variation from exactly vertical and exactly horizontal is within the scope of the invention.

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CLAIMS

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1. An automatic coupler for a vehicle comprising:

a draw bar portion engageable with the vehicle and operatively moveable about a substantially vertical axis;

10 an automatic coupler portion, attached to the draw bar portion and operative to engage the automatic coupler portion of the corresponding coupler of an adjacent vehicle, thereby to allow motion to be transferred between the vehicles, the automatic coupler portion being moveable about a substantially horizontal or vertical axis between a use position and a stored position,

15 means for retaining the automatic coupler portion in the respective use and stored positions, and

means for limited relative vertical movement of the automatic coupler in use with respect to an engaged corresponding coupler of an adjacent vehicle, said means comprising

20 at least two spaced first projecting fingers depending from a first lateral side of the automatic coupler portion and defining at least one space therebetween, and

at least one second projecting finger depending from an opposite lateral side of the automatic coupler portion,

25 said fingers being so sized and located that when, in use, the automatic coupler engages a corresponding automatic coupler of an adjacent vehicle said space can receive a corresponding second finger of said corresponding automatic coupler and said second finger may be received in a corresponding space of the corresponding automatic coupler, whereby said
30 first fingers stand in the path of vertical movement of said second finger thereby to limit said relative vertical movement.

2. A coupling device for coupling adjacent vehicles comprising:
first and second automatic coupler portions attached to respective vehicles and engageable to couple said vehicles, each coupler portion being pivotally attached to its respective vehicle whereby each coupler portion, when not coupled, is moveable about a horizontal or vertical axis between a use position and a stored position, and including means for retaining the coupler portion in said respective use and stored positions, the first coupler portion further comprising at least two spaced first fingers depending from a first lateral side thereof and defining at least one space therebetween and the second coupler portion further comprising at least one second finger depending from an opposite side thereof, said first and second fingers being so sized and located that, when said coupler portions are engaged, the second finger of the second coupler portion may be received in the space defined by the first fingers of the first finger portion whereby said first fingers stand in the path of vertical movement of said second finger, thereby to limit vertical movement of said second finger.
3. A coupling device as claimed in claim 2 wherein each coupler portion includes first and second fingers at respective sides thereof.
4. A coupler as claimed in claim 1 or 2 or a device as claimed in claim 3 wherein said fingers are substantially rectangular in lateral cross section.
5. A coupler as claimed in claims 1 to 4 or a device as claimed in claim 3 or 4 wherein the leading end of the second finger is tapered and the shape of the space defined by the first fingers conforms to the shape of said second finger.
6. A coupler as claimed in any of claims 1 to 5 or a device as claimed in any of claims 3 to 5 wherein the first and second fingers are so spaced (when the couplers are coupled) as to provide vertical play between the couplers to

accommodate normal in use relative vertical movement of the respective couplers.

5 7. A coupler as claimed in any of claims 1 to 6 or a device as claimed in any of claims 3 to 6 wherein said fingers are spaced apart from the adjacent side of the coupler head portion and depend at one end from a member attached to the side of the coupler head portion.

10 8. A coupler or a device substantially as herein before described with reference to Figure 3 and/or Figure 4.

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INVESTOR IN PEOPLE

Application No: GB 0020015.4
Claims searched: 1-8

Examiner: Kevin Hewitt
Date of search: 14 November 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): B7T (TM, TQK, TQP, TV)

Int Cl (Ed.7): B61G 3/04, 3/06, 3/10, 3/12, 5/04, 7/06, 7/08, 7/10, 7/14

Other:

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|--|--------------------|
| Y | GB 1054860 A (MIDLAND ROSS) See Figs 5, 6 and 7 | 1-4 |
| Y | GB 0882812 A (HILGER et al.) See all Figs. | 1,2 |
| Y | GB 0839227 A (NATIONAL MALLEABLE AND STEEL) See all Figs. | 1,2 |
| Y | GB 0794691 A (BUCKEYE) See Figs 1, 2, 4 and 5 | 1-4 |
| Y | GB 0749521 A (NATIONAL MALLEABLE AND STEEL) Whole document relevant. | 1-6 |
| Y | GB 0660410 A (NATIONAL MALLEABLE AND STEEL) Whole document relevant. | 1-6 |
| Y | US 5507400 A (LONG et al.) Whole document relevant. | 1-6 |
| Y | US 5312007 A (KAUFHOLD et al.) See Figs 1 and 2 | 1-4 |

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|---|---|---|--|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
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