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⑦① Applicant: **VICKERS PUBLIC LIMITED COMPANY**
P.O. Box 177 Vickers House
Millbank Tower Millbank London SW1P 4RA(GB)

⑦② Inventor: **Hodgson, Alan**
24 Brackenridge
Burnopfield Newcastle upon Tyne NE16 6LH(GB)

⑦④ Representative: **Gura, Henry Alan et al,**
MEWBURN ELLIS & CO. 2/3 Cursitor Street
London EC4A 1BQ(GB)

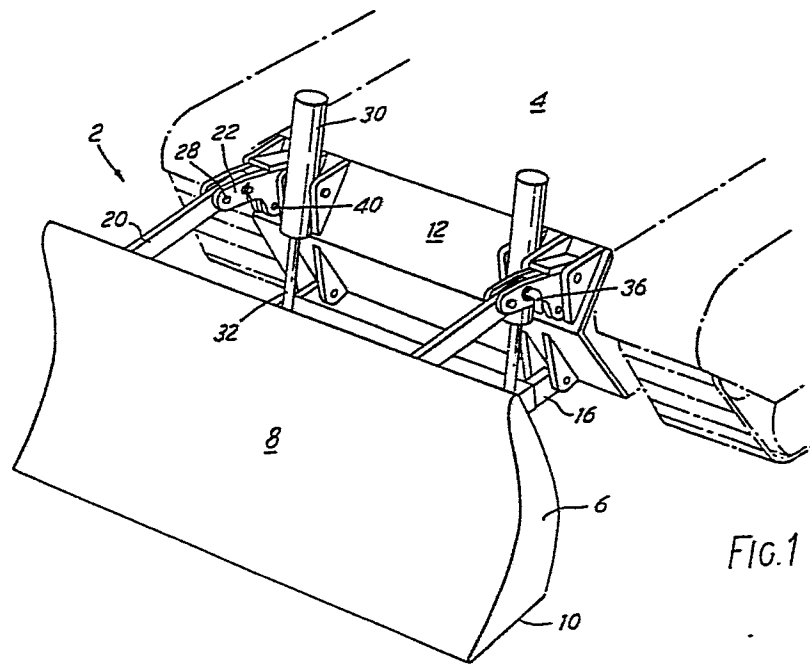
⑤④ **Blade-like attachment for armoured vehicles.**

⑤⑦ An attachment for an armoured vehicle comprises a dozer-like blade (6) with an earth-moving front surface (8) and a flat, substantially rearwardly extending lower stabiliser surface (10). The blade (6) is attached to the vehicle by an adjustable linkage (14) capable of locating the blade (6) in any one of the following positions:

a first, earth-moving position with the lower edge of the front surface (8) of the blade (6) just below ground level;

a second, anchorage position with a more substantial proportion of the lower regions of the blade (6) below ground level;

a third, stabilising position with the stabiliser surface (10) of the blade (6) contacting the ground.



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BLADE-LIKE ATTACHMENT FOR ARMoured VEHICLES

This invention relates to blade-like attachments for armoured vehicles, and more particularly to dozer-like blades for attachment to armoured recovery vehicles, engineer/repair vehicles and the like.

5 It is well-established practice to provide armoured recovery or repair vehicles which incorporate both a crane and a winch for effecting the recovery and/or repair of bogged-in, disabled or broken down vehicles requiring rescue, while the provision of dozer blades on armoured
10 vehicles for earth-moving purposes is also conventional practice.

When winching disabled vehicles, it is desirable for such recovery or repair vehicles to be firmly anchored relative to the ground to prevent loss of
15 positive contact with said ground, while it is further desirable for the recovery vehicles to be provided with stabilising means such that lifting of a heavy load by the crane does not lead to instability of the vehicle itself.

20 According to the present invention there is provided an attachment for an armoured vehicle, the attachment comprising a dozer-like blade having an operative, earth-moving front surface and, at or adjacent the lower regions thereof, a flat, substantially rearwardly extend-
25 ing stabiliser surface, and a linkage adapted to react

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between the blade and the armoured vehicle and selectively adjustable to move the blade into:

- a) a first, earth-moving position with the lower edge of the front surface of the blade just below
5 ground level;
- b) a second, anchorage position with at least the lower regions of the blade, and preferably a substantial proportion of the blade, below ground level, and
- 10 c) a third, stabilising position in which said stabiliser surface of the blade contacts the ground.

It will be appreciated that, with such an attachment in said first position, the blade can be used for conventional earth-moving operations. In its second
15 position, the blade serves as an anchor during winching operations, thus preventing undesirable movement of the tracked hull of the vehicle on the application of substantial forces thereto during winching, while the blade can be located in its third position to act as a
20 stabiliser for the vehicle during actuation of the crane and while heavy loads are being lifted thereby.

Preferably the linkage is further adjustable to move the blade into a fourth, storage position in which the operative surface thereof, which is conveniently of
25 curved, generally concave configuration in transverse section, lies in a substantially horizontal plane. In

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this position, the blade can be used for stowage purposes, as a transport bucket or as a workbench.

A preferred linkage includes a lower, fixed length link pivotally attached to, to extend between, the blade
5 and the armoured vehicle, and an upper, adjustable length link pivotally attached to, to extend between the blade and the armoured vehicle, a hydraulic cylinder reacting between the vehicle and the lower link to alter the orientation of the blade relative to the vehicle.

10 Conveniently there are two such linkages spaced transversely of the blade, one at or adjacent each end of said blade.

The upper link may be adjustable between two lengths, a first, longer length associated with the first and
15 second positions of the blade, and a second, shorter length associated with the third and fourth positions of the blade.

A preferred upper link comprises a pair of hinged arms, one pivotally attached to each of the blade and
20 the armoured vehicle, said arms being lockable relative to one another in any of two or more positions to define a link of differing lengths.

An alternative upper link is of telescopic construction, the slidable components of which can be
25 locked in any one of two or more different positions relative to one another to define a link of differing lengths.

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By way of examples only, embodiments of the invention will now be described in greater detail with reference to the accompanying drawings, of which:

Fig. 1 shows an attachment according to the invention on an armoured vehicle;

Figs. 2 and 3 are a side view and a plan view from above respectively of the attachment of Fig. 1;

Figs. 4 to 7 show the blade of the attachment of Figs. 1 to 3 in each of four different positions;

Fig. 8 shows an alternative attachment according to the invention, and

Figs. 9 and 10 are a side view and a plan view from above respectively of the attachment of Fig. 8.

Referring to Figs. 1 to 3, there is shown an attachment indicated generally at 2 mounted on an armoured vehicle 4.

More particularly, the attachment 2 comprises a dozer blade 6 having a concave front surface 8, rearwardly from the lower edge of which extends a flat, stabiliser surface 10 for reasons to be detailed below.

The blade 6 is mounted on a bracket or mounting plate 12 adapted to be secured to the armoured vehicle 4, said mounting of the blade 6 being effected by means of two transversely-spaced linkages each indicated generally at 14. Each linkage 14 comprises a fixed length lower link 16 one end of which is pivotally connected to the rear surface of the blade 6 at a point intermediate the

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height of the blade and the other end of which is pivotally connected to the bracket 12.

Each linkage 14 further comprises an adjustable length upper link 18, said link 18 including hinged arms 20,22, one end of the arm 20 being pivotally connected at 24 to the upper regions of the rear of the blade 6 and one end of the arm 22 being pivotally connected at 26 to the bracket 12, the other ends of said arms 20,22 being hinged to one another at 28.

Hydraulic cylinders 30 mounted on the bracket 12 include pistons 32 the free ends of which are attached one to each of the fixed length lower links 16.

The upper link 18 shown in Fig. 2 is at its longer length, in that holes 34 in each arm 20,22 are aligned, the link 18 being locked in this longer position by means of a pin 36 extending through the aligned holes 34 best seen in Fig. 1.

On attachment of the bracket 12 to the front of an armoured vehicle 4, and with the link 18 at this longer length, the hydraulic piston-cylinder arrangements 30,32 can be actuated to locate the blade 6 in either of the two positions shown in Figs. 4 and 5.

In Fig. 4, the piston 32 is partly extended such that the blade 6 is in an earth-moving position with the lower edge thereof just below ground level.

In Fig. 5, the piston 32 is fully extended such that a substantial part of the blade 6 is below ground

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level whereby said blade acts as an anchor for the vehicle 4 during winching operations.

The upper link 18 can be altered to a shorter length by removing the pin 36 and pivoting the arms 20,22 towards one another about the hinge point 28 until holes 38,40, one adjacent the one end of each arm 20,22 respectively, are aligned, a pin such as 36 then being located through the aligned holes 38,40 to retain the link 18 at said shorter length.

With the link 18 at this shorter length, the piston 32 can be actuated to locate the blade 6 in either of the two positions shown in Figs. 6 and 7.

In Fig. 6, the piston 32 is partly extended such that the surface 10 on the blade 6 abuts the ground and whereby the blade 6 acts as a stabiliser during lifting operations by a crane mounted on the vehicle 4.

In Fig. 7, the piston 32 is fully retracted whereby the blade 6 is in an uppermost, substantially horizontal storage position in which it can be retained during travel of the vehicle 4.

When the blade is in its substantially horizontal position, it can be used for other purposes, such as a transport bucket for carrying earth and the like, or for extra storage space for carrying auxiliary equipment, or the surface 8 could be used as a workbench.

The attachment of Figs. 8 to 10 is similar to that of Figs. 1 to 3 and components equivalent to those of the

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attachment of Figs. 1 to 3 are similarly referenced.

However, instead of hinged upper links 18, this embodiment includes telescopic links 18' comprising an outer box section 42 one end of which is pivotally mounted to the bracket 12 and in the other end of which is slidably mounted an inner section 44, the end of said section 44 remote from the section 42 being pivotally attached to, adjacent the upper regions of, the blade 6.

The section 44 is provided with a pair of axially-spaced holes, one of which is referenced 46, either of which can be aligned with a corresponding hole 48 through the section 42. Fig. 9 shows the upper link 18' at its longer length, enabling the blade 6 to be pivoted by means of the piston 32 into the positions shown in Figs. 4 and 5.

In order to achieve a shorter length link 18', the box section 44 is pushed further into the section 42 to align the other hole in said section 44 with the hole 48 in the section 42. This then enables the blade 6 to be located in positions equivalent to those of Figs. 6 and 7 by appropriate actuation of the piston 32 in the cylinder 30.

Thus there is provided a blade-like attachedment for an armoured vehicle, which serves a three-fold purpose in that it comprises a dozer-blade capable of an earth-moving function, capable of acting as an anchor when winching

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by means of a winch mounted on the vehicle, and capable of acting as a stabiliser when lifting loads by means of a crane mounted on the vehicle.

Clearly the precise construction of the attachment
5 can vary from that illustrated and in particular the linkages 14 can be other than shown and could be such as to be locatable in an infinite number of positions by means other than hydraulic, for example pneumatic, mechanical, electronic and the like, while the means for
10 locking the blade in a given position could comprise pins, stops, clamps or other mechanisms.

The attachment can be fitted to armoured recovery vehicles, repair/engineer vehicles, battle tanks and the like, while the attachment could be of modular construct-
15 ion to fit various vehicles or specially tailored to suit a particular vehicle.

The driving mechanisms for pivoting the blade could be self-contained within the attachment or located remote therefrom.

20 Other modifications and variations from the described arrangements will be apparent to those skilled in the art.

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CLAIMS

1. An attachment for an armoured vehicle, the attachment being characterised by a dozer-like blade (6) having an operative, earth-moving front surface (8) and, at or adjacent the lower regions thereof, a flat, substantially rearwardly extending stabiliser surface (10), and a linkage (14) adapted to react between the blade (6) and the armoured vehicle (4) and selectively adjustable to move the blade (6) into:
- a) a first, earth-moving position with the lower edge of the front surface (8) of the blade (6) just below ground level;
 - b) a second, anchorage position with the lower edge of the front surface (8) of the blade (6) further below ground level whereby a substantial proportion of the lower regions of the blade (6) is below ground level, and
 - c) a third, stabilising position in which said stabiliser surface (10) of the blade (6) contacts the ground.
2. An attachment as claimed in claim 1 in which the linkage (14) is further adjustable to move the blade (6) into a fourth, storage position in which the operative surface (8) thereof lies in a substantially horizontal plane.
3. An attachment as claimed in claim 2 in which the

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linkage (14) includes a lower, fixed length link (16) pivotally attached to, to extend between, the blade (6) and the armoured vehicle (4), and an upper, adjustable length link (18) pivotally attached to, to extend
5 between, the blade (6) and the armoured vehicle (4), a hydraulic cylinder (30) reacting between the vehicle (4) and the lower link (16) to alter the orientation of the blade (6) relative to the vehicle (4).

4. An attachment as claimed in claim 3 and comprising
10 ing a pair of linkages (14) spaced transversely of the blade (6), one at or adjacent each end of said blade (6).

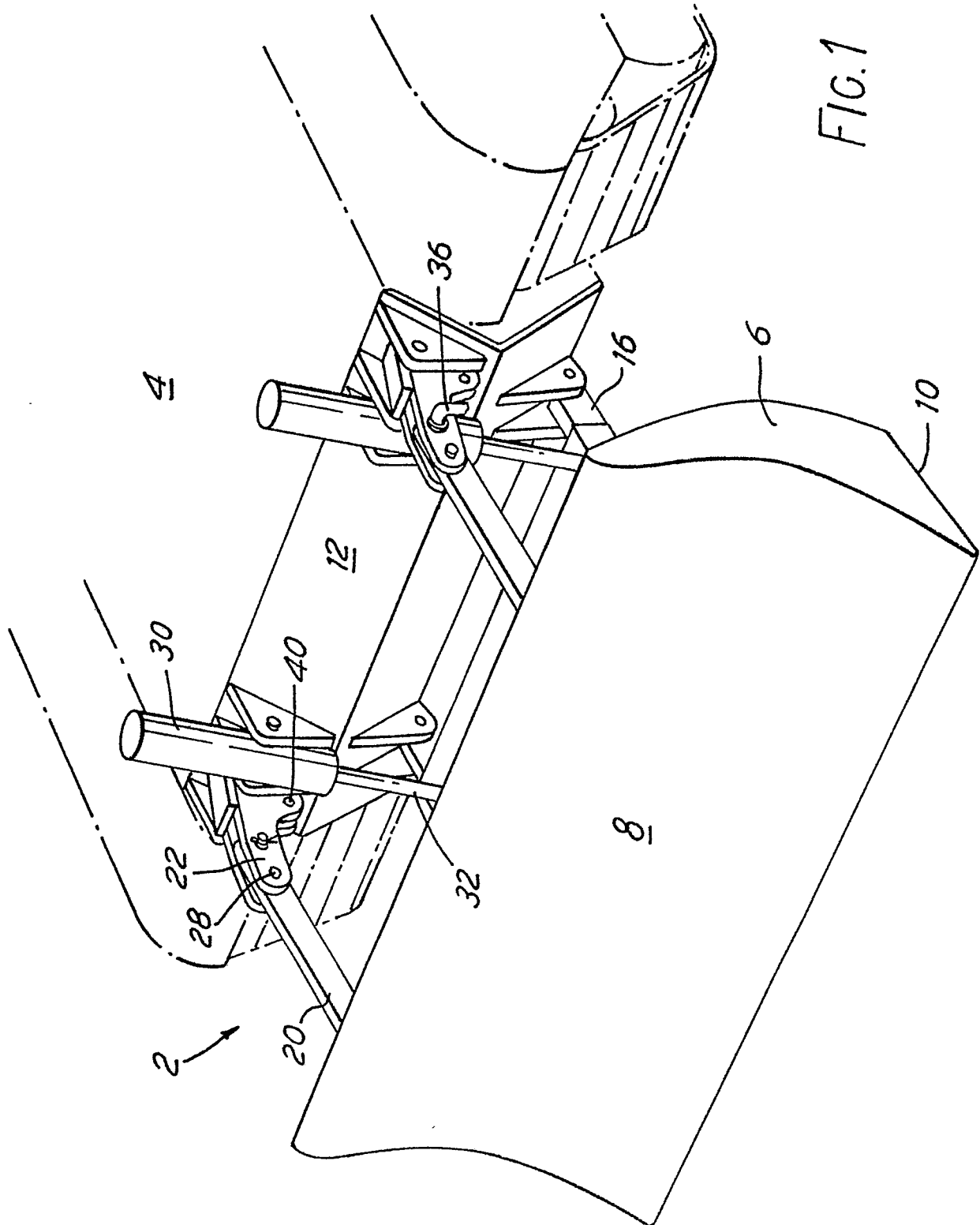
5. An attachment as claimed in claim 3 or claim 4 in which the upper link (18) is adjustable between two lengths, a first, longer length associated with the first
15 and second positions of the blade (6), and a second, shorter length associated with the third and fourth positions of the blade (6).

6. An attachment as claimed in claim 5 in which the upper link (18) comprises a pair of hinged arms (20,22),
20 one pivotally attached to each of the blade (6) and the armoured vehicle (4), said arms (20,22) being lockable relative to one another in any one of two or more positions to define a link of differing lengths.

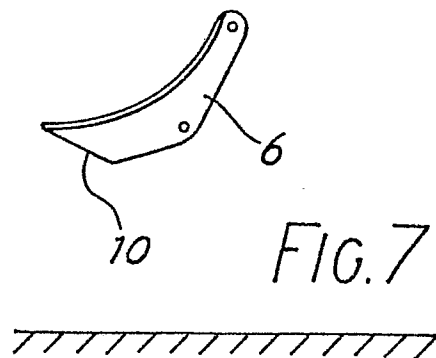
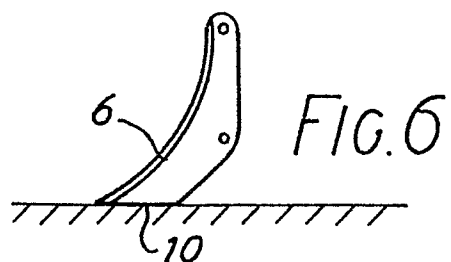
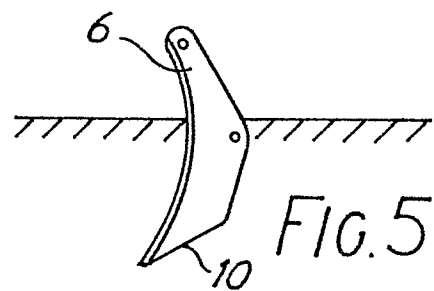
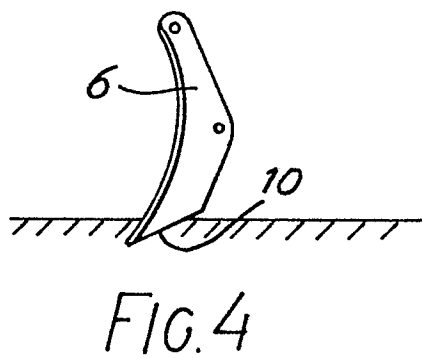
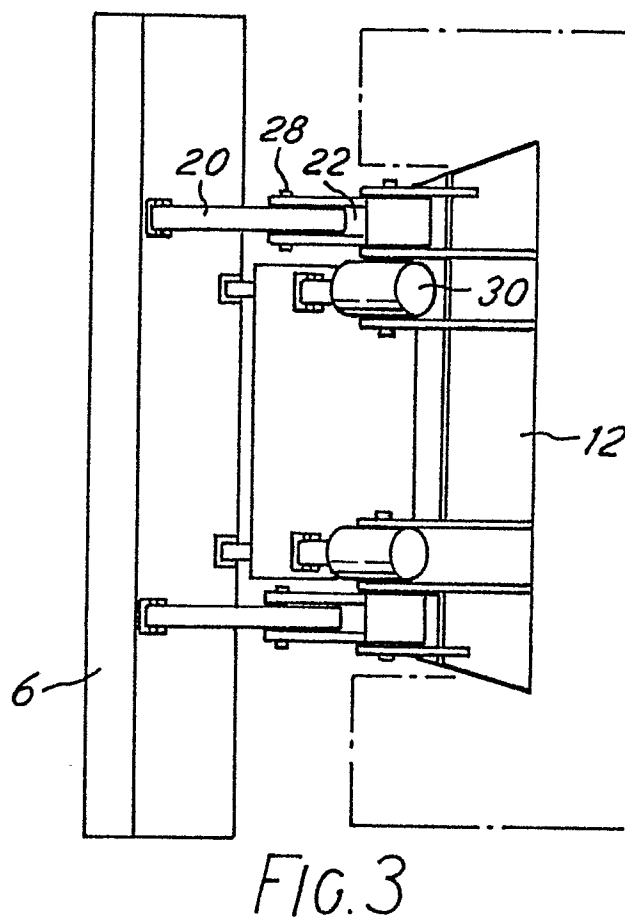
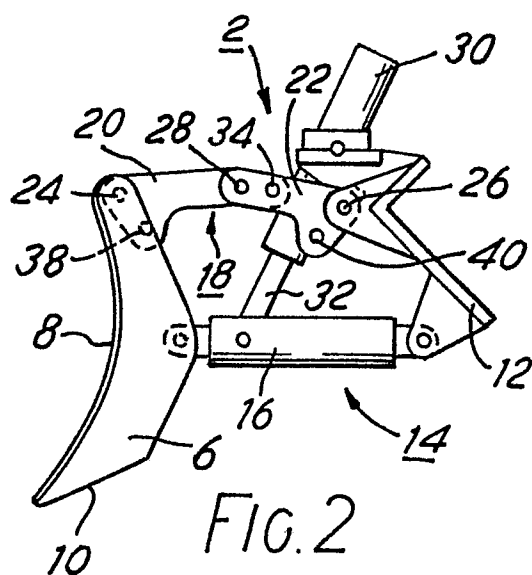
7. An attachment as claimed in claim 5 in which
25 the upper link (18) is of telescopic construction, the slidable components (42,44) of which can be locked in

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any one of two or more different positions relative to one another to define a link of differing lengths.



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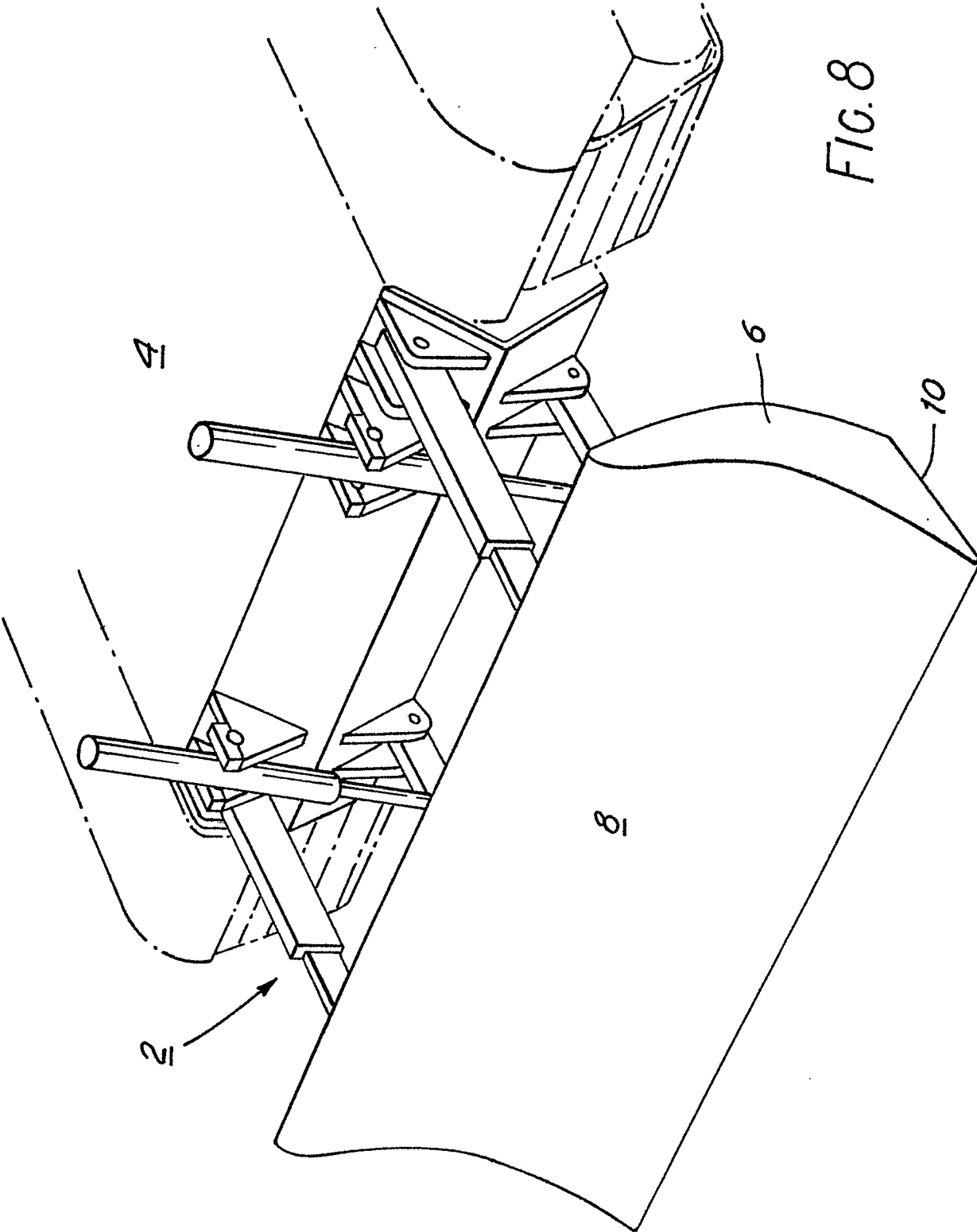
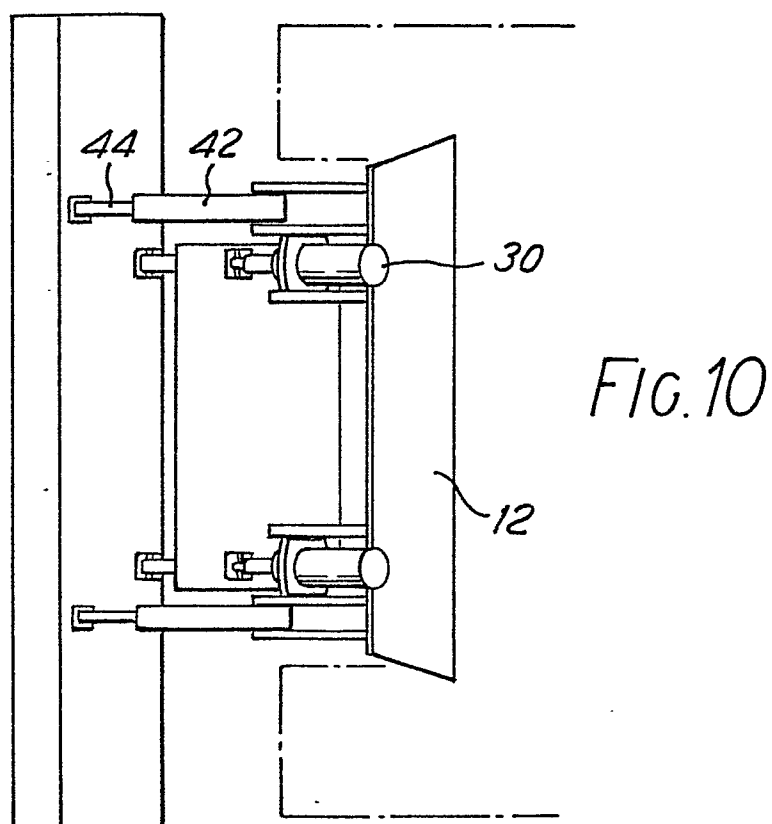
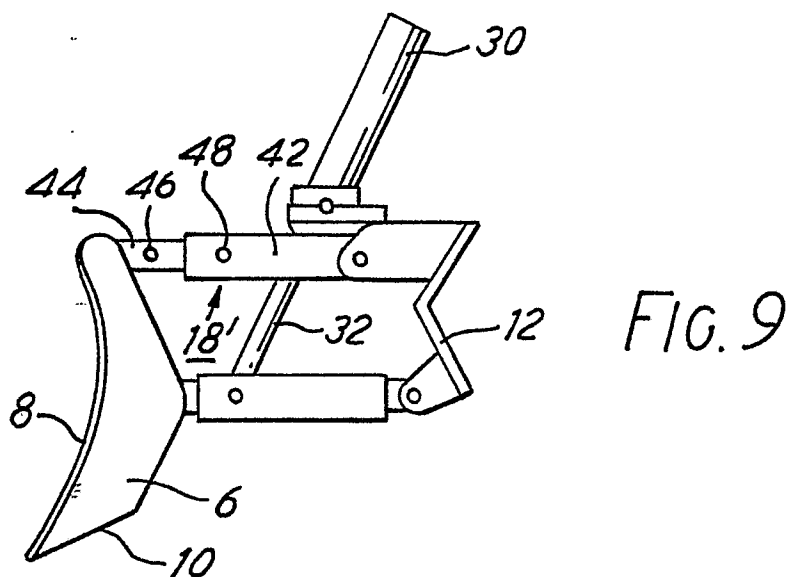


FIG. 8

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	FR-A-2 498 139 (U. MATZEN et al.) * Whole document *	1-4	E 02 F 3/76
Y	US-A-2 604 708 (H.H. WASHBOND) * Figure 1 *	1-4	
A	US-A-3 222 804 (B.A. KUHL) * Figures 1-3 *	1-3,6	
A	DE-A-2 501 461 (H. WEIGELE et al.) * Claims 1-7; figure 1 *	1,2	
A	DE-A-3 039 364 (A. MORLOK) * Claims 1,2 *	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	DE-A-2 758 461 (W. SEEWALD) * Figure 1 *	1,2	E 02 F
A	US-A-3 653 451 (M.D. FRYREAR et al.) * Figures 1-3 *	1,2	
A	US-A-2 216 572 (H.L. NICHOLS, Jr.) * Figures 1-6 *	1,2	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09-06-1987	Examiner ANGIUS P.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			



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EUROPEAN SEARCH REPORT

Application number

EP 87 30 3321

DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A-1 229 238 (CATERPILLAR TRACTOR CO.) * Figure 2 *	1,5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09-06-1987	Examiner ANGIUS P.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			