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Inventor: **Merlo, Amilcare**
Via S. Maurizio, 26
I-12100 Cuneo, Frazione San Rocco(IT)
Inventor: **Galfre', Renato**
Via Tesoriere, 90
I-12011 Borgo San Dalmazzo(IT)

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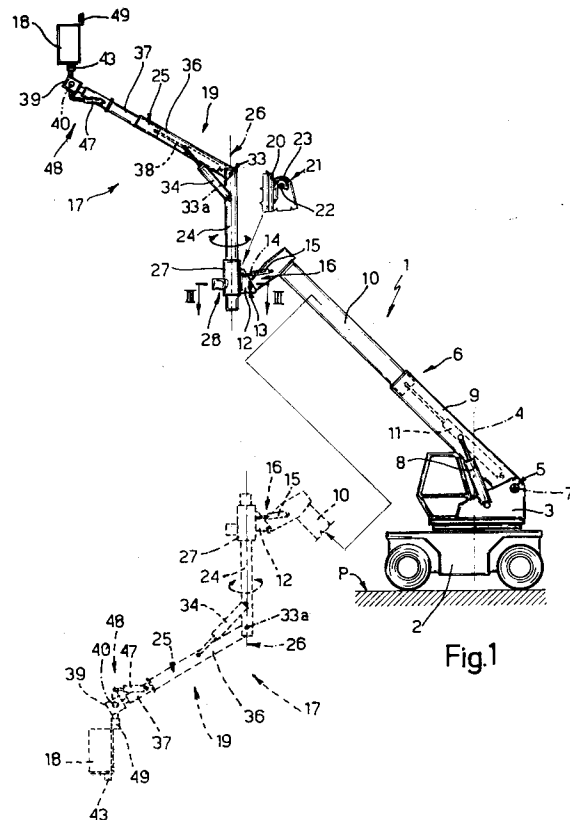
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Representative: **Jorio, Paolo et al**
STUDIO TORTA Società Semplice
Via Viotti 9
I-10121 Torino (IT)

Applicant: **MERLO S.P.A. INDUSTRIA**
METALMECCANICA
Via Nazionale, 9
I-12020 Defendente di Cervasca(IT)

Fixture for overhead control of platform lifts, and all-purpose machine fitted with such a fixture.

A fixture (17) for overhead control of platform lifts, having an articulated arm (19), one end of which supports a platform lift (18), and the opposite end of which is releasably connectable to a movable connecting member (12) of an all-purpose machine (1); the articulated arm (19) being defined by a first (24) and second (25) portion, of which the first portion (24) presents a first axis (26) maintained constantly in a substantially vertical position, and rotates about the first axis (26), and the second portion (25) is hinged to the first portion (24) so as to rotate about a second axis (33a) perpendicular to the first axis (26), and supports the platform lift (18), the angular position of which in relation to the first axis (26) is maintained unchanged, by a compensating device (48), during rotation of the second portion (25) about the second axis (33a).



EP 0 596 498 A1

The present invention relates to a fixture for overhead control of platform lifts or overhead platforms, and particularly suitable for fitment to an all-purpose machine.

All-purpose machines are currently known comprising a power-driven, preferably self-propelled, vehicle; a movable connecting member connected to the vehicle and operated by actuating means so as to move, in relation to the vehicle, along at least one predetermined path; and an accessory fixture connected releasably to the connecting member and selectable from a number of accessory fixtures such as forks, overhead platforms, power shovels and telescopic arms for lifting and handling objects of various types.

Special-purpose machines are also known which, unlike the all-purpose types described above, are designed to perform one and only one specific function which therefore determines the design and operating characteristics of the machine. Among the machines in this category are those for the overhead control of platform lifts, wherein the movable connecting member - in this case, connectable positively to various types of platform lifts - is connected to the free end of an articulated arm, the opposite end of which is connected to a turret in turn connected to the power-driven vehicle so as to rotate, in relation to the vehicle, about a substantially vertical axis.

Though widely used, a common drawback of both the above types of machine is that they fail to provide for universal positioning to meet the demands of widely differing working conditions.

It is an object of the present invention to provide a straightforward, low-cost fixture for the overhead control of platform lifts, and which is suitable for fitment to an all-purpose machine.

According to the present invention, there is provided a fixture for the overhead control of platform lifts, characterized by the fact that it comprises a platform lift; an articulated arm supporting the platform lift and in turn comprising a first and second portion, said first portion presenting a first axis maintained, in use, in a substantially vertical position, and said second portion supporting said platform lift in projecting manner; first hinge means interposed between said two portions, for enabling rotation of said second portion in relation to said first portion and about a second axis perpendicular to said first axis; first actuating means for rotating said second portion in relation to said first portion and about said second axis; releasable connecting means fitted to said first portion and enabling connection of said articulated arm to a movable member of an all-purpose machine; second hinge means interposed between said connecting means and said first portion, for securing the first portion in rotary and axially fixed manner about said first

axis and in relation to the connecting means; and second actuating means for rotating the first portion in both directions about said first axis.

The present invention also relates to an all-purpose machine.

According to the present invention, there is provided an all-purpose machine comprising a power-driven vehicle; a movable member connected to said power-driven vehicle; control means for moving said movable member in relation to the power-driven vehicle; an accessory fixture selectable from a number of accessory fixtures and connectable to said movable member; and first connecting means fitted to said movable member, for releasably connecting said accessory fixture to the movable member; characterized by the fact that said accessory fixture comprises a platform lift; an articulated arm supporting the platform lift and in turn comprising a first and second portion, said first portion presenting a first substantially vertical axis, and said second portion supporting said platform lift in projecting manner; first hinge means interposed between said two portions, for enabling rotation of said second portion in relation to said first portion and about a second axis perpendicular to said first axis; first actuating means for rotating said second portion in relation to said first portion and about said second axis; second releasable connecting means fitted to said first portion and connectable positively and releasably to said first connecting means; second hinge means interposed between said second connecting means and said first portion, for securing the first portion in rotary manner about said first axis and in axially fixed manner in relation to the second connecting means; and second actuating means for rotating the first portion in both directions about said first axis.

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a preferred embodiment of an all-purpose machine featuring a fixture for the overhead control of a platform lift in accordance with the teachings of the present invention;

Figure 2 shows an exploded view in perspective of a detail of the fixture on the Figure 1 machine;

Figure 3 shows a larger-scale section along line III-III in Figure 1.

Number 1 in Figure 1 indicates an all-purpose machine comprising a power-driven, preferably self-propelled, vehicle consisting, in the example shown, of an ordinary tired tractor 2; and a turret 3 supported on and connected to tractor 2, and rotated about its own fixed vertical axis 4 by a known drive (not shown). By means of a hinge 5, a tele-

scopic arm 6 is hinged at one end to turret 3 and is swung about the horizontal axis 7 of hinge 5 by a hydraulic jack 8. Arm 6 comprises a first and second element 9 and 10 connected telescopically to each other, and of which element 9 is hinged to turret 3 by hinge 5, and element 10 is moved axially in relation to element 9 by a further hydraulic jack 11.

The free end portion of arm 6 is fitted with a known connecting member 12 hinged to the end portion of element 10 by a hinge pin 13 and rotated about an axis 14 parallel to axis 7 by a hydraulic actuator 15. Actuator 15 is connected in known manner (not shown) to both jack 8 and a known hydraulic control system (not shown) so as to define a compensating device 16 which, when desired, provides for maintaining the angular position of member 12 in relation to the fixed axis 4 of turret 3 unchanged alongside a variation in the angular position of arm 6 in relation to tractor 2.

Again with reference to Figure 1, member 12 is designed to enable connection of an interchangeable fixture - in this case, a fixture 17 for overhead control of a platform lift 18. In particular, the fixture connectable to member 12 is normally selectable from a number of fixtures (not shown), each designed to meet specific operating requirements.

Fixture 17 comprises an articulated arm 19, one end of which is fitted with platform lift 18, and the opposite end of which is fitted to a connecting plate 20 in turn connected to member 12 by means of a known connecting device 21 comprising a cylindrical horizontal cross member 22 connected integral with member 12, and two C-shaped brackets 23 positively connected to cross member 22 and integral with plate 20. Constant connection of brackets 23 to cross member 22 is assured by a movable lock pin (not shown) extending through respective portions of and releasably connecting plate 20 and member 12.

Arm 19 comprises a first and second portion 24 and 25. Portion 24 presents a substantially vertical axis 26, and engages in rotary and axially fixed manner a hollow body 27 connected integral with plate 20, coaxial with axis 26, and forming part of a known hinge connecting device 28. In use, portion 24 extends upwards in relation to plate 20 and member 12, and is rotated in relation to plate 20 by a drive 29 comprising, as shown more clearly in Figure 3, a pinion 30 fitted to an intermediate portion of portion 24, and teeth 31 meshing with pinion 30 and moved in opposite directions, transversely in relation to axis 26, by a known hydraulic unit 32 not described in detail.

Again with reference to Figure 1, portion 25 is hinged to portion 24 by a hinge pin 33 perpendicular to axis 26, and is rotated in relation to portion 24 and about the axis 33a of pin 33 by a hydraulic

jack 34, the body of which is hinged to an intermediate point of portion 24, and the output rod of which is hinged to an intermediate point of portion 25. More specifically, portion 25 is defined by two telescopically connected elements 36 and 37, of which element 36 is hinged to portion 24, and element 37 is moved axially in relation to element 36 by its own hydraulic jack 38, and terminates in a supporting fork 39 to which platform lift 18 is connected so as to rotate about a horizontal axis 40 parallel to axis 33a of pin 33.

More specifically, and as shown in more clearly in Figure 2, platform lift 18 is preferably connected to element 37 by a cross element 41 comprising a vertical hollow central body 42 engaged positively by a corresponding appendix 43 on platform lift 18; and two pins 44 extending radially from body 42 and engaging in rotary manner respective holes 45 formed through respective arms 46 of fork 39 and coaxial with axis 40.

Again with reference to Figure 2, the angular position of platform lift 18 in relation to element 37 and about axis 40 is adjustable continuously by means of a hydraulic jack 47 interposed between element 37 and platform lift 18 and connected in known manner (not shown) to both jack 34 and said known hydraulic control system (not shown) so as to define a compensating device 48 similar to device 16, and which provides for maintaining the floor of platform lift 18 substantially horizontal regardless of the angular position of portion 25 in relation to portion 24.

According to a variation shown by the dotted-line diagram in Figure 1, fixture 17 may alternatively be connected to member 12 in a position wherein it is rotated substantially 180° in relation to the position described above, and wherein portion 24 is again connected to body 27 in axially fixed and in rotary manner about axis 26, but extends downwards in relation to plate 20 and member 12. In this case, body 42 of cross element 41 is engaged positively by an appendix 49 formed on platform lift 18 by way of an alternative to appendix 43 and shown by the dotted line in Figure 2.

In actual use, therefore, by establishing the length of portion 25 and appropriately combining rotation of portion 25 about axis 33a of pin 33 and rotation of portion 24 about axis 26, it is possible, for each position of connecting member 12, to move platform lift 18 into a number of work points all lying on a respective outer surface of a spherical bowl having its axis coincident with axis 26, and a radius corresponding with the predetermined length of portion 25.

As such, when fitted to an all-purpose machine, e.g. of the type described above, capable of moving connecting member 12 into a number of points

within a work envelope surrounding the rotation axis 4 of turret 3, fixture 17 enables the machine to cater to any requirement as regards positioning of platform lift 18, even under the most diverse working conditions.

In particular, fixture 17 not only provides for overcoming fixed obstacles, such as the walls of partially demolished buildings, and for positioning platform lift 18 on the opposite side of such obstacles with respect to tractor 2, but also, when portion 24 of arm 19 is connected so as to extend downwards in relation to connecting member 12, for even positioning platform lift 18 beneath the supporting surface P of tractor 2.

Finally, fixture 17 fitted to machine 1 provides for easily working around obstacles of any kind while at the same time maintaining a fixed position of tractor 2 in relation to the obstacle. In particular, in the case of an obstacle consisting of a pillar, after setting up tractor 2 in a given fixed position, fixture 17 provides for moving platform lift 18, and hence also a worker (not shown), around the pillar for performing any work at any point about the pillar.

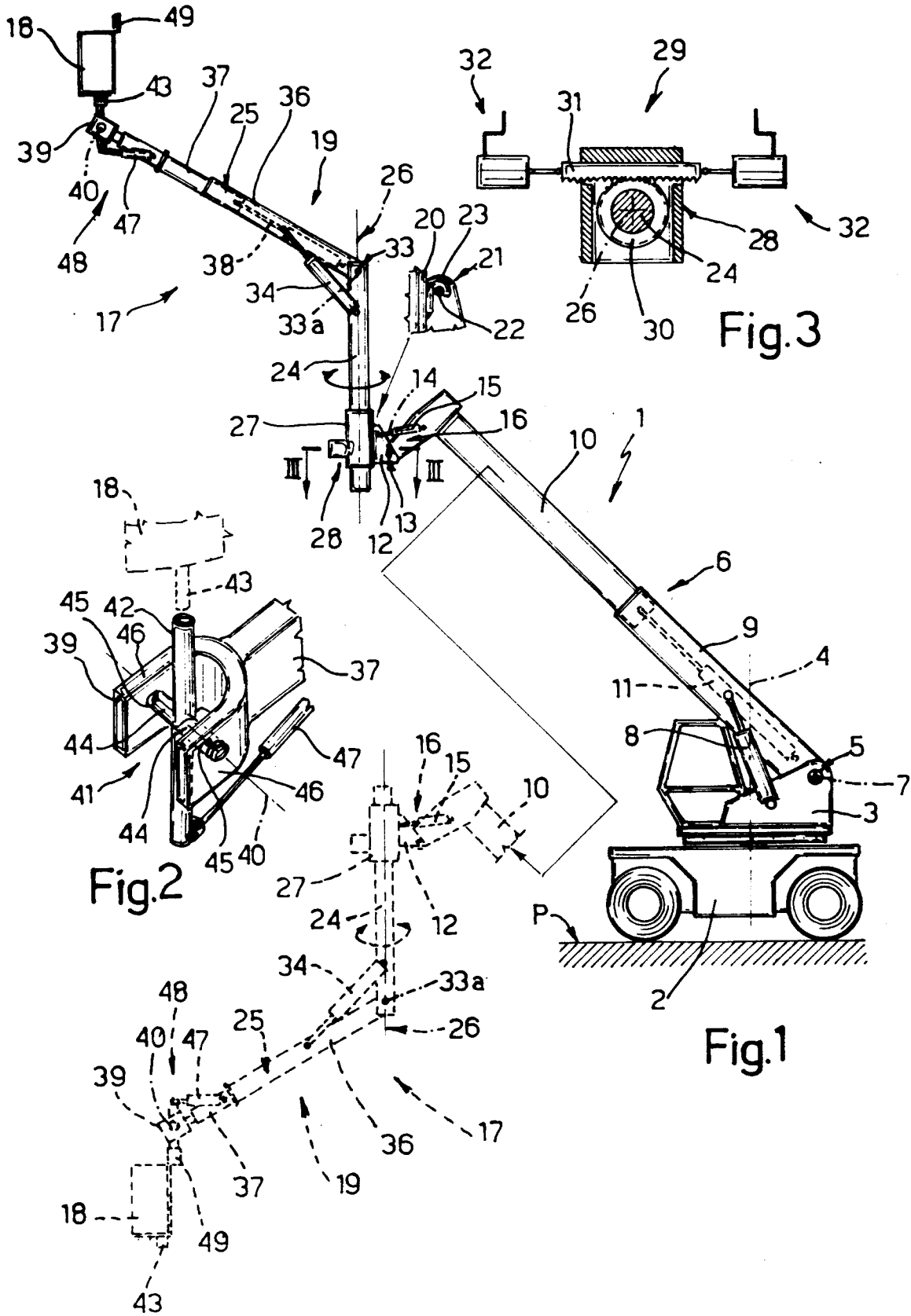
To those skilled in the art it will be clear that changes may be made to machine 1 or relative fixture 17 as described and illustrated herein without, however, departing from the scope of the present invention. In particular, different devices may be provided for connecting platform lift 18 to arm 19, portion 24 to plate 20, and plate 20 to connecting member 12.

Also, connecting plate 20 may be replaced by a frame shaped and sized to meet specific requirements in terms of overall size and rigidity

Claims

1. A fixture (17) for the overhead control of platform lifts, characterized by the fact that it comprises a platform lift (18); an articulated arm (19) supporting the platform lift (18) and in turn comprising a first (24) and second (25) portion, said first portion (24) presenting a first axis (26) maintained, in use, in a substantially vertical position, and said second portion (25) supporting said platform lift (18) in projecting manner; first hinge means (33) interposed between said two portions (24, 25), for enabling rotation of said second portion (25) in relation to said first portion (24) and about a second axis (33a) perpendicular to said first axis (26); first actuating means (34) for rotating said second portion (25) in relation to said first portion (24) and about said second axis (33a); releasable connecting means (23) fitted to said first portion (24) and enabling connection of said articulated arm (19) to a movable member (12) of an all-purpose machine (1); second hinge means (28) interposed between said connecting means (23) and said first portion (24), for securing the first portion (24) in rotary and axially fixed manner about said first axis (26) and in relation to the connecting means (23); and second actuating means (29, 32) for rotating the first portion (24) in both directions about said first axis (26).
2. A fixture as claimed in Claim 1, characterized by the fact that it comprises third hinge means (41) interposed between said second portion (25) and said platform lift (18), for enabling the platform lift (18) to rotate about a third axis (40) parallel to said second axis (33a); and compensating means (48) interposed between said platform lift (18) and said second portion (25) and connected to said first actuating means (34), for maintaining the floor of said platform lift (18) substantially horizontal regardless of the angular position of the second portion (25) in relation to the first portion (24).
3. A fixture as claimed in Claim 1 or 2, characterized by the fact that said second portion (25) consists of at least two telescopically connected elements (36)(37).
4. An all-purpose machine (1) comprising a power-driven vehicle (2); a movable member (12) connected to said power-driven vehicle (2); control means (3, 6) for moving said movable member (12) in relation to the power-driven vehicle (2); an accessory fixture (17) selectable from a number of accessory fixtures and connectable to said movable member (12); and first connecting means (22) fitted to said movable member (12), for releasably connecting said accessory fixture (17) to the movable member (12); characterized by the fact that said accessory fixture (17) comprises a platform lift (18); an articulated arm (19) supporting the platform lift (18) and in turn comprising a first (24) and second (25) portion, said first portion (24) presenting a first substantially vertical axis (26), and said second portion (25) supporting said platform lift (18) in projecting manner; first hinge means (33) interposed between said two portions (24, 25), for enabling rotation of said second portion (25) in relation to said first portion (24) and about a second axis (33a) perpendicular to said first axis (26); first actuating means (34) for rotating said second portion (25) in relation to said first portion (24) and about said second axis (33a); second releasable connecting means (23) fitted to said first portion (24) and connectable positively

- and releasably to said first connecting means (22); second hinge means (28) interposed between said second connecting means (23) and said first portion (24), for securing the first portion (24) in rotary manner about said first axis (26) and in axially fixed manner in relation to the second connecting means (23); and second actuating means (29, 32) for rotating the first portion (24) in both directions about said first axis (26).
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10. A machine as claimed in Claim 9, characterized by the fact that it comprises further hinge means (13) interposed between said telescopic arm (6) and said movable member (12), for enabling the movable member (12) to rotate about a further axis (14) parallel to said fourth axis (7); second compensating means (16) being interposed between said telescopic arm (6) and said movable member (12), and being connected to said activating means (8), for continuously regulating the angular position of the movable member (12) in such a manner that said angular position of the movable member (12) about said further axis (14) is maintained substantially unchanged in relation to said power-driven vehicle (2) alongside a variation in the angular position of said telescopic arm (6) in relation to said power-driven vehicle (2).
11. A machine as claimed in Claim 9 or 10, characterized by the fact that said control means (3, 6) comprise a turret (3) connected to said power-driven vehicle (2) so as to rotate about its own fixed vertical axis (4) and in relation to said power-driven vehicle (2); said telescopic arm (6) being hinged to said turret (3) so as to rotate about said fourth axis (7).





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.5)
Y	EP-A-0 407 359 (MANITOU COSTRUZIONI INDUSTRIALI) * the whole document * ----	1-11	B66F11/04
Y	WO-A-89 02410 (CELLA) * the whole document * ----	1-11	
A	US-A-4 744 718 (LOGAN) ----		
A	FR-A-2 626 865 (LES FILS DE MARCEL COUTURIER) ----		
A	EP-A-0 099 485 (FREY - WIGGER) ----		
A	EP-A-0 310 749 (JLG INDUSTRIES) ----		
A	US-A-4 646 875 (SHOLL) ----		
A	GB-A-2 242 887 (STRAMEX) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B66F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		21 January 1994	Van den Berghe, E
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