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(54) Apparatus for smoothing and/or planing difficult-to-access surfaces

(57) The apparatus comprises a wheel-mounted self-propelled vehicle (1), fitted with an arm (2) having hydraulically controlled elements or the like that can be orientated in any position, carrying at its terminal end a carriage element designed to travel in a controlled manner across the difficult-to-access surface to be smoothed and/or planed.

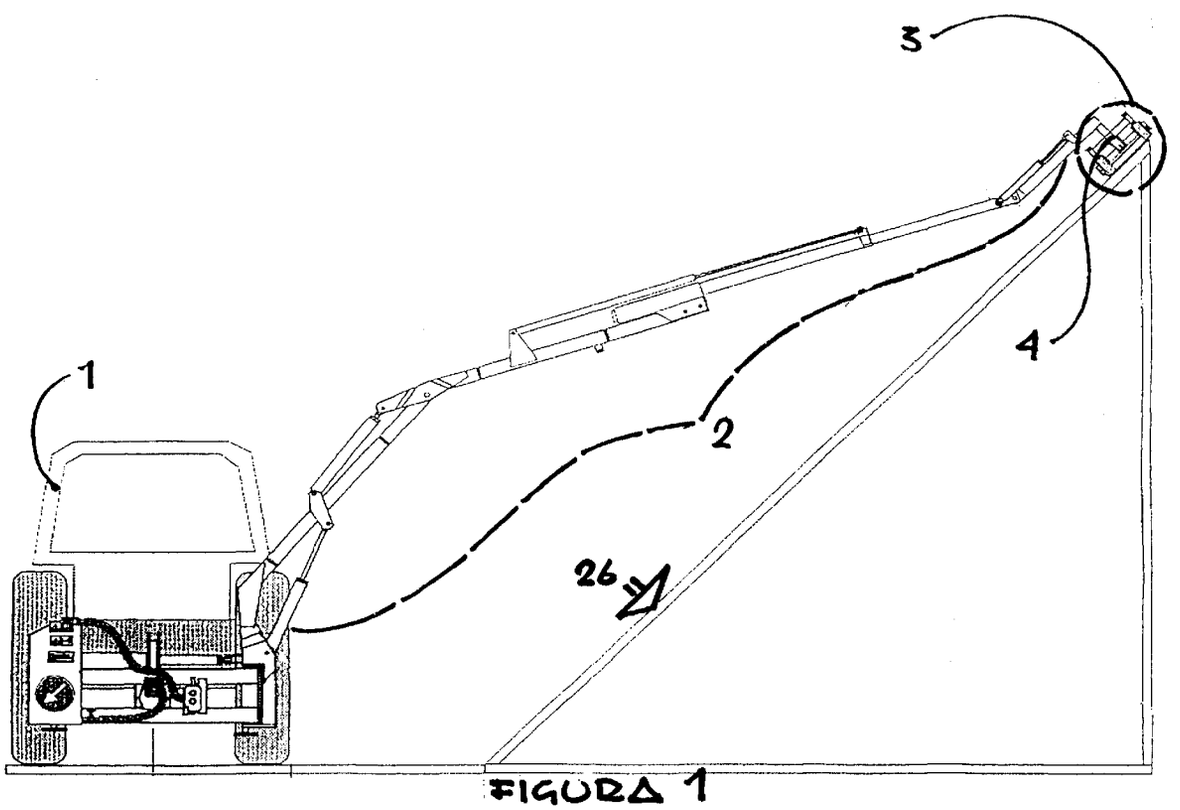

FIGURA 1

EP 0 867 564 A2

Description

The present invention relates to an apparatus for smoothing and/or planing difficult-to-access surfaces which may be horizontal or sloping, flat or with numerous radii of curvature.

The present invention proves to be particularly suitable for smoothing and/or planing or refacing large wood-clad surfaces such as those found, for example, in sports stadia of the type including cycle stadia, velodromes, wooden roller-skating tracks or the like, or large wooden structures with sloping surfaces.

Until now such track surfaces were smoothed and/or planed using small apparatuses which cannot be used on sloping wooden surfaces such as those needed in large sports stadia of the velodrome, track or similar type, since they tend to slide downwards under the effect of gravity and cannot be secured to the surfaces in question because, in order to function properly, they must be able to move around freely and continuously.

The object of the present invention is to provide an apparatus which overcomes the disadvantages encountered with the conventional techniques of the prior art.

According to the present invention, an apparatus is provided which comprises a wheel-mounted self-propelled vehicle, designed to travel preferably on a surface which does not form part of the structure to be smoothed and/or planed, fitted with an arm having hydraulically controlled elements or the like that can be orientated in any position, the terminal end of the arm carrying a carriage element designed to travel in a controlled manner across the surface to be smoothed and/or planed.

The carriage is fitted with a plurality of wheels designed to provide stable yet flexible support for the said carriage on the surface to be treated.

Furthermore, the carriage is attached at approximately the centre of gravity of a frame fitted with a linkage system which is elastically connected to the said frame under the control of elastic or hydraulic means, the object being to support an inter-mediate element designed to carry motor means connected to a smoothing element.

The intermediate element mentioned above is fitted with a device having a hydraulic pump and an actuating hydraulic cylinder, the arrangement of these components being such that the smoothing and/or planing element can be brought into operational contact with the surface to be smoothed and/or planed.

The present invention will now be described with reference to a currently preferred embodiment thereof which is described by way of non-limiting example on the basis of the figures in the appended drawings, in which:

Figure 1 shows the overall position of the smoothing and/or planing apparatus relative to a surface to be treated; and

Figure 2 shows a diagrammatic view of the smoothing and/or planing device attached to the end of an arm which can be extended in a controlled manner.

With reference to Figure 1, this shows a self-propelled vehicle 1 fitted with an extending arm which has been given the general reference 2 and which will not be described in any further detail since it is known from the prior art in connection with machines for mowing motorway verges and the like.

Attached to the end of the extending arm 2 is a structure denoted by the general reference 3, which will be described in detail with reference to Figure 2.

It should be noted that the end of the extending arm 2 terminates in a terminal shaft 4 which can be orientated at will by the operator via manoeuvring means located on board the vehicle 1 and on the extending arm 2.

With reference to Figure 2, the structure of the smoothing and/or planing device will now be described in detail.

The shaft 4 which forms the terminal part of the extending arm 2 is attached to a unit 5 comprising a hydraulic pump together with its associated actuating hydraulic piston, the function of which will be described below.

The unit 5 is fixed to a frame 6, the ends 7, 8 of which carry supports 9, 10 for a plurality (at least three) of wheels 11, 12 of the castor type, only two of which are illustrated for the sake of simplicity.

The unit 5 is arranged so that it can move a platform 13 parallel to itself, as indicated by the arrows F1 and F2. This platform 13 is designed to support motor means (not shown) which are positioned so that, via a shaft 14, they drive a working element 15 provided with smoothing and/or planing means.

A parallel linkage comprising arms 16, 17 which are hinged at the points 18, 19, 20, 21 between the platform 13 and the frame 6, ensures that the platform 13 is moved parallel to itself relative to the frame 6.

Mounted on the frame 6 is a structure in the shape of an upturned U which has the general reference 22 and in which, between the point 23 on this structure and the point 24 on the frame 6, there is a spring 25 designed to alter the pressure exerted by the working element 15, as indicated by the arrows F3, by means of a combined action of the hydraulic pressure generated by the unit 5 and the mechanical action of the said spring 25, so as to adapt the apparatus to the particular operating conditions, such as rough-shaping, finishing, etc.

Clearly, the specific tools fitted on the working element 15 will vary depending on the type and condition of the surface to be treated, indicated diagrammatically as 26 in Figure 1, without the particular slope of the said surface 26 being seen as a limiting factor in the applicability of the apparatus according to the present invention.

The present invention has been described with reference to a preferred embodiment thereof, but it should

be understood that variations and modifications could, in practice, be made by a person skilled in the art without thereby departing from the scope of protection of the present industrial patent.

Claims

1. Apparatus for smoothing and/or planing difficult-to-access surfaces, which comprises a wheel-mounted self-propelled vehicle, designed to travel preferably on a surface which does not form part of the structure to be smoothed and/or planed, fitted with an arm having hydraulically controlled elements or the like that can be orientated in any position, characterized in that the terminal end of the arm carries a carriage element designed to travel in a controlled manner across the surface to be smoothed and/or planed; the carriage being fitted with a plurality of wheels designed to provide stable yet flexible support for the said carriage on the surface to be treated; the carriage being furthermore attached at approximately the centre of gravity of a frame fitted with a linkage system which is elastically connected to the said frame under the control of elastic or hydraulic means, the object being to support an intermediate element designed to carry motor means connected to a smoothing and/or planing element; the intermediate element mentioned above being fitted with a device having a hydraulic pump and an actuating hydraulic cylinder, the arrangement of these components being such that the smoothing and/or planing element can be brought into operational contact with the surface to be smoothed and/or planed.

2. Apparatus according to Claim 1, characterized in that the intermediate element is positioned so that it can be moved parallel to itself relative to the frame by means of a parallel linkage.

3. Apparatus according to Claim 2, characterized in that the intermediate element is fitted with motor means for driving the working element.

4. Apparatus according to Claim 3, characterized in that the working element is fitted with treatment means which can be selected depending on the type of material to be treated and the type of treatment being carried out.

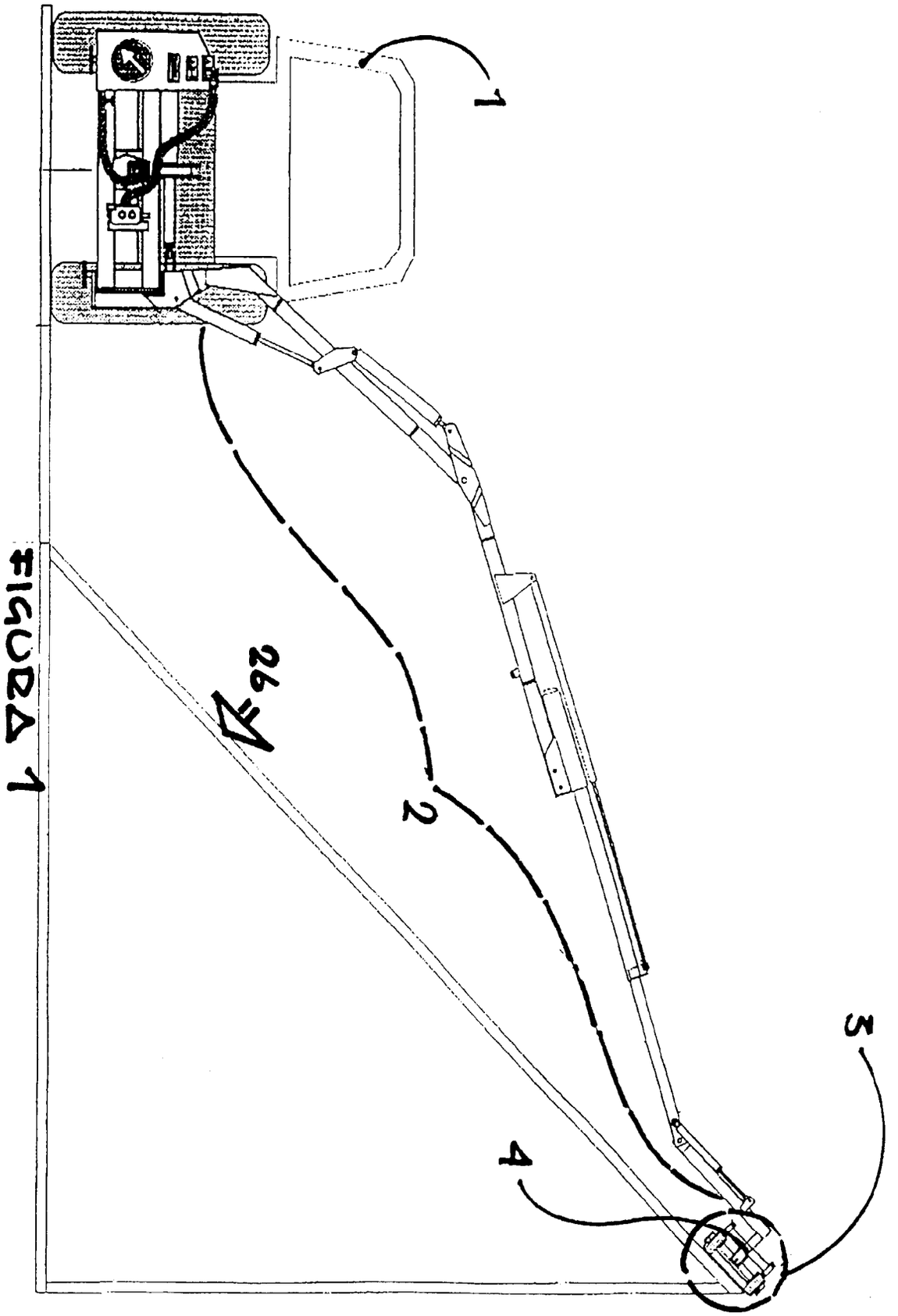

FIGURA 1

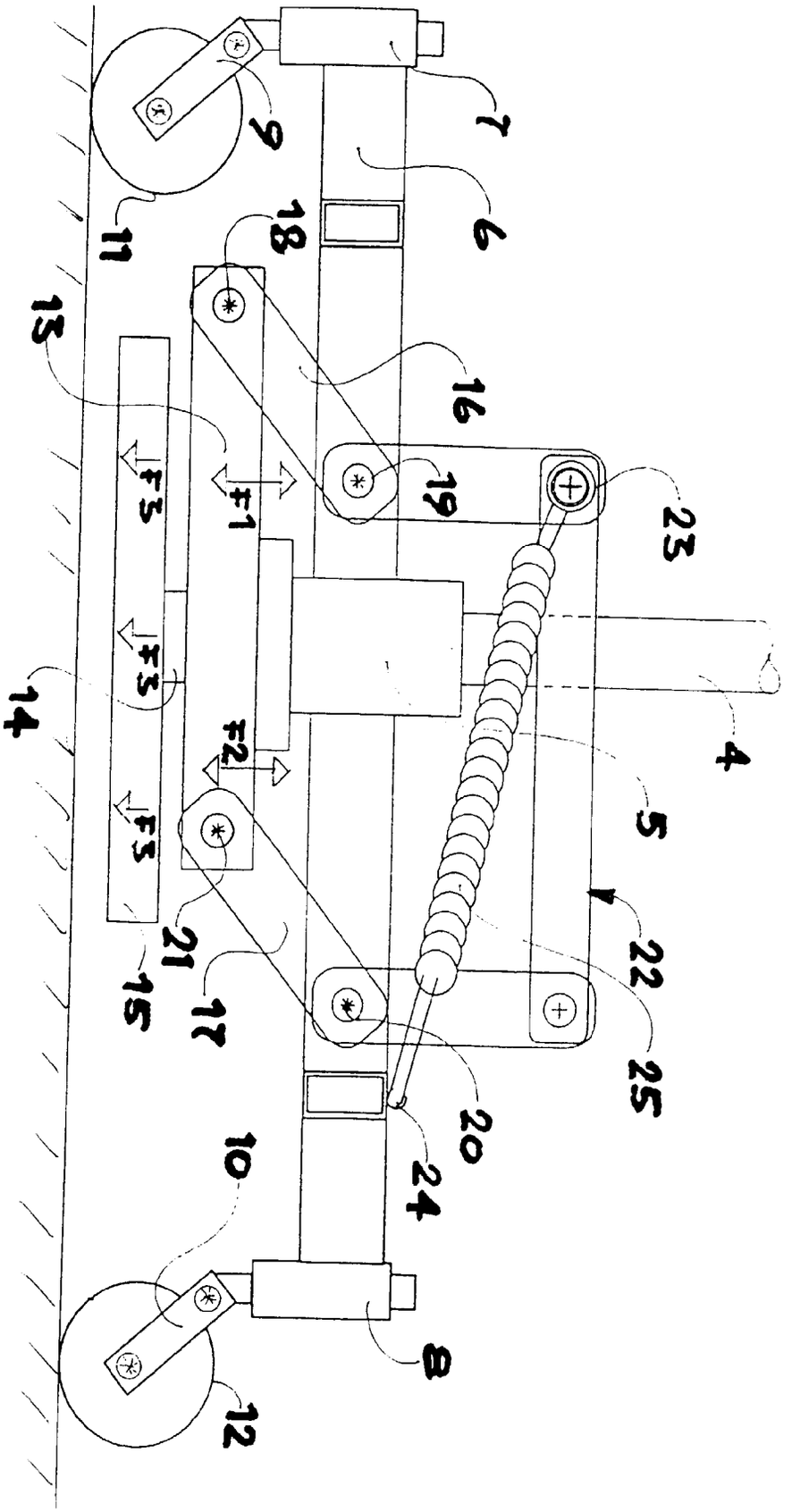

FIGURE 2