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54 **Apparatus for clearing snow from road edges and the like.**

57 The apparatus for clearing snow from road edges and the like comprises a beam (9) which is intended to be mounted on a tractor (2) and has one end (9a) which protrudes from the tractor itself; the beam can be raised in a vertical plane which is transverse to the direction of advancement of the tractor. A snow-clearing tool (16) is mounted at the protruding end of the beam and is constituted by a milling roller (17) which is mounted on a frame (18) which is angularly rotatable about a vertical axis (24) between a roller working position which is parallel to the direction of advancement and a perpendicular working position. Means (25) are furthermore provided to control the inclination of the milling roller in the vertical plane.

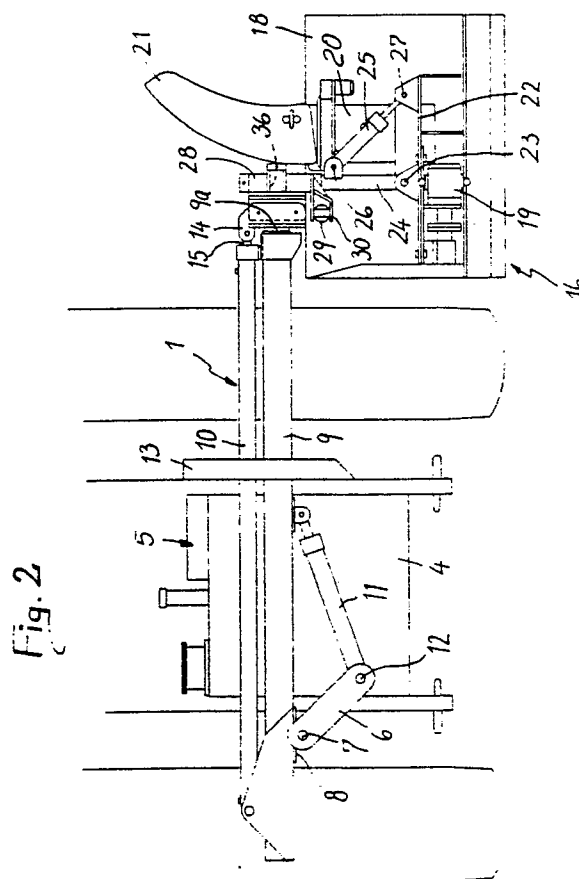


Fig. 2

**EP 0 361 345 A2**

## APPARATUS FOR CLEARING SNOW FROM ROAD EDGES AND THE LIKE

The present invention relates to an apparatus for clearing snow from road edges and the like.

As is known, snowplows are generally used to clear snow from the roads of urban areas; said snowplows are provided, at the front, with a wedge-shaped device which pushes the snow to the sides of the road. Rotary snowplows are furthermore known which are provided with a milling roller which removes the snow from the road and conveys it to a launch tube.

Such known snowplows are however rather rigid in their use. The snow removed from the road is in fact accumulated along the road edges, forming a barrier which can obstruct access to pedestrian walkways, gates, garages and the like. The fact is furthermore particularly complained that the snow can laterally and upwardly cover the bins used for collecting refuse, the use whereof must instead be ensured due to obvious hygiene problems.

In this case it is necessary to manually clear the snow with an obvious use of labor and loss of time.

The aim of the present invention is to solve the above problem by providing an apparatus which allows to clear snow from road edges or sides at refuse bins, pedestrian passages and the like.

Within this aim, an object of the present invention is to provide a snow-clearing apparatus which is simple in concept, safely reliable in operation and versatile in use.

This aim and this object are both achieved, according to the invention, by the present apparatus for clearing snow from road edges and the like, as defined in claim 1.

The invention will become apparent from the detailed description of a preferred embodiment of the apparatus for clearing snow from road edges and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a side view of the apparatus according to the invention, in the roller working position which is perpendicular to the direction of advancement;

figure 2 is the same view of figure 1 in the roller working position which is parallel to said direction of advancement;

figure 3 is a top view of the apparatus;

figure 4 is a detail plan view of the coupling region between tool and beam.

With reference to the above figures, the snow-clearing apparatus is generally indicated at 1 and is applied behind a vehicle 2 (figure 3) which is adapted to act as tractor and has a mechanical power take-off. The use of a vehicle with a hydrau-

lic three-point lifter, indicated at 3 in the drawing, is conveniently provided.

The apparatus 1 is provided with an oil tank 4 which is rigidly associated with the three arms of the lifter 3 of the tractor. The tank 4 has a particularly strong structure and is upwardly provided with a hydraulic unit 5 which has a pair of tandem pumps supported by the power take-off and actuated thereby through an adapted multiplier. Said unit is commercially available and is therefore not described in detail.

An arm 6 is rigidly fixed to the rear face of the tank 4 and is inclined on a vertical plane. A supporting plate 8 for a telescoping beam 9 is articulated on a pivot 7 at the top of the arm 6. The telescoping of the beam 9 is actuated by a jack 10 which is fixed longitudinally to said beam.

Said beam 9 can rotate angularly on its vertical plane which is transverse to the direction of advancement of the tractor 2 upon the actuation of a lifting jack 11 which is articulated to the lower end of the arm 6 at a pivot 12 and to the beam 9 at a pivot 12a.

The beam 9 is guided, during its rotation, within a vertical slot of a guide 13 which is rigidly associated with the tank 4.

The telescoping portion 9a of the beam 9 is connected by means of a bracket 14 to the stem 15 of the beam actuating jack 10, and a snow-clearing tool, generally indicated at 16, is articulated to said bracket.

Said tool 16 comprises a milling roller 17, of the kind known for use in snow-clearing. A frame 18 supports the milling roller 17 so as to allow rotation thereof around a horizontal axis, with the frame 18 defining a protective housing for said milling roller and rearwardly supporting a hydraulic motor element 19 for actuating said roller. The frame 18 is upwardly provided with a duct 20 for expelling the jet of snow, and a launch tube 21 is mounted thereon and is axially rotatable so as to allow the jet of snow to be launched in the desired direction.

Behind the housing, at a ledge 22, the frame 18 supports a pivot 23 (figure 1) for articulation to a column 24 supporting the beam 9; the pivot 23 has a horizontal axis and is perpendicular to the axis of the milling roller 17. The frame 18 is rotatable about the pivot 23 by actuating a jack 25 which is pivoted to the column 24 at one end 26 and on the ledge 22 at the opposite end 27.

The column 24 is angularly rotatable about its own vertical axis within a sleeve 28 which is supported at the free end of the telescoping portion 9a of the beam 9. The angular rotation of the column

24 is actuated by a jack 29 which is articulated, at one end, to a fork-like arm 30 which extends horizontally and is rigidly associable to the portion 9a of the beam 9, as will be explained hereinafter; the stem 29a of the jack 29 is instead articulated to a lever 31 which is radially rigidly associated with the column 24.

A safety device is conveniently interposed between the beam 9 and the coupling of the tool 16; said safety device comprises a pair of plates 32, 33 which are arranged facing one another and are rigidly associated through a plurality of shear pins 34. The plate 32 is provided, on its opposite faces, with a tang 35 and with a pivot 36 which are mutually coaxial. The tang 35 engages a seat 37 which is defined frontally to the portion 9a of the beam 9 and is locked by a transverse shear pin 38; the pivot 36 crosses the plate 33 and in turn engages a sleeve 39 which is rigidly associated with said plate 33.

The sleeve 28 of the column 24 and the supporting arm 30 of the jack 29 are rigidly associated with the plate 33.

The operation of the apparatus is easily understandable from the above description. The snow-clearing tool 16 can work in all directions and positions, both in the direction of advancement of the tractor 2 and transversely thereto, as can be seen respectively in figure 1 and in figure 2.

By means of the hydraulic unit 5, it is in fact possible to act on the hydraulic jacks 11, 25 and 29 so as to obtain the desired working position. In particular, the jack 29 allows, by acting on the lever 31 which is rigidly associated with the column 24, to angularly rotate the tool 16 between a working position of the roller 17 which is perpendicular to the direction of advancement of the tractor (figure 1 corresponding to the position of tube 21 and lever 31 shown with continuous line in figure 4) and a parallel working position, as illustrated in figures 2 and 3 with tube 21 and lever 31 in the position shown with broken lines in figure 4.

When the roller 17 is in a position which is perpendicular to the direction of advancement (figure 1), the advancement of the tool 16 is provided by the advancement of the tractor. When the roller 17 is instead in a position which is parallel to the advancement direction (figure 2), the advancement of the tool 16 is controlled by the actuation of the jack 10, which telescopes the beam 9 outward.

If it is necessary to clean the snow at a level higher than the road level, for example to clean a bin, the tool 16 is raised by inclining the beam 9 by means of the jack 11. By subsequently actuating the jack 25, which controls the rotation of the frame 18 with respect to the column 24, it is possible to restore the horizontal position of the axis of the roller 17.

To summarize, with the apparatus according to the invention it is possible to intervene in all the situations requiring the clearing of snow from the road sides of urban areas.

Since the tool is provided with an axially rotatable launch tube 21, the jet of snow can be directed exactly in the desired direction.

It should be furthermore noted that the presence of the shear pins 34, 38 allows the impacts suffered by the milling roller or by the frame of the tool to be dampened both in the direction of advancement and transversely thereto.

In the practical embodiment of the invention, the materials employed, as well as the shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

## Claims

1. An apparatus for clearing snow from road edges and the like, characterized in that it comprises a beam (9) to be mounted on a tractor (2) so as to protrude therefrom with one end thereof, wherein said beam can be raised on a plane which is transverse to the direction of advancement of said tractor, and a snow-clearing tool (16) of the kind composed of a milling roller (17) and of a snow-launching tube (21), said tool (16) being mounted on a frame (18) which is supported at the protruding end (9a) of said beam (9) and is angularly rotatable about a vertical axis between a working position in which said roller (17) is parallel to said advancement direction and a working position in which said roller (17) is perpendicular to said advancement direction.

2. An apparatus according to claim 1, characterized in that said frame (18) is supported by a column (24) which is supported in a bush (28) so as to be rotatable about a vertical axis, wherein said bush is rigidly associated with the protruding end of said beam (9), a jack (29) being provided which acts between said beam (9) and said bush (28) to orientate said frame.

3. An apparatus according to claims 1 and 2, characterized in that said beam (9) is articulated to said tractor (2) to rotate in a vertical plane and can be raised by means of a lifting jack (11) and in that the frame (18) of said milling roller (17) is articulated to said column (24) so as to rotate in a

vertical plane, a jack (25) being provided which acts between said frame (18) and said column (24) to orientate said frame (18).

4. An apparatus according to any of claims 1-3, characterized in that said beam (9) is provided with a portion (9a) which can telescope outward by means of a jack (10) which is fixed longitudinally to said beam and supports said tool (16) at its end.

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Fig. 1

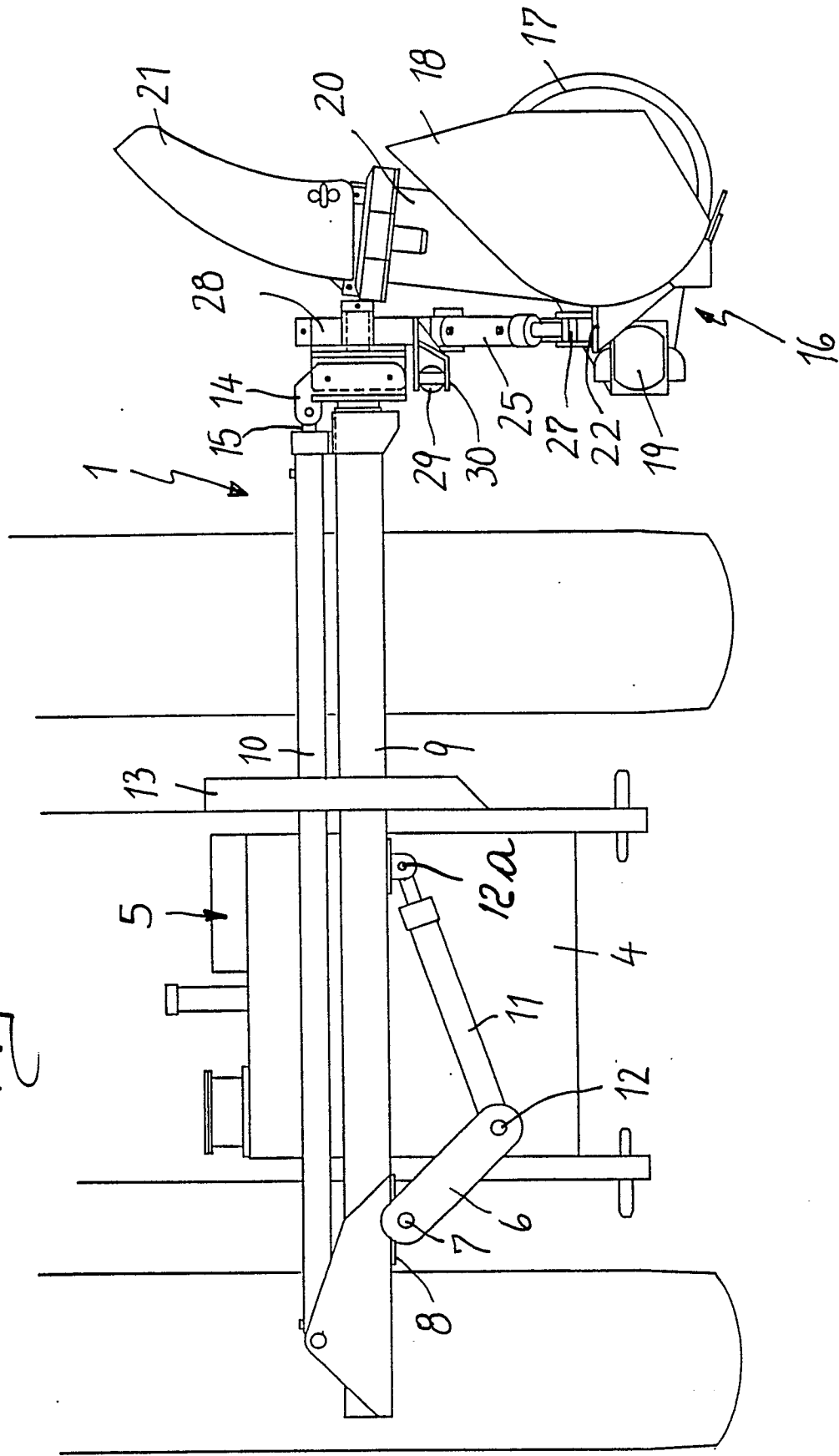


Fig. 2

