

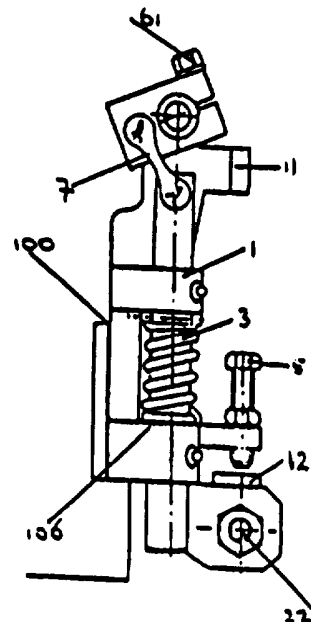
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(54) Title: MOWER DEVICE AND QUICK HEIGHT ADJUSTMENT FOR THIS DEVICE**(57) Abstract**

A mower device comprises at least one mower unit (100) which is supported with a transport roller (101) on a ground surface. Said transport roller (101) is coupled to the mower unit (100) so as to be adjustable in height and is provided with means (102) for manually adjusting the height of said roller between a predetermined high and a predetermined low position.



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Mower device and quick height adjustment for this device

The invention relates to a mower device comprising at least one mower unit which is supported with a transport roller on a ground surface, said transport roller being coupled to
5 the mower unit so as to be adjustable in height.

Such a device is widely used for mowing lawns. The optimum mowing height of grass depends on, for example, the age of the grass plants, the soil condition, and the weather conditions. The mowing height of the device should accordingly be adjustable in order to prevent that the device is to be uncoupled and a different device with a different mowing
10 height is to be connected, which would not only be time-consuming, but would also necessitate the investment in one or several additional mower devices.

The height adjustment of a present art mower device is based on threaded spindles or slots on either side of each mower unit, whereby the height thereof can be steplessly varied. The height readjustment in such a mower device is particularly time-consuming, especially
15 because a mower device is often fitted with a number of mower units; for example, fivefold or sevenfold mower devices are quite usual, and this readjustment in addition requires a certain accuracy because of the possibility of maladjustment.

The present invention accordingly has for its object to provide a device of the kind mentioned in the opening paragraph with which the mowing height can be realized in a
20 simple manner and within a comparatively short period.

To achieve this object, according to the invention, a mower device of the kind mentioned in the opening paragraph is characterized in that the transport roller is provided with means for manually adjusting the height of said roller between a predetermined high and a predetermined low position. The invention is based on the recognition that it suffices for
25 mowing of laws in actual practice to adjust the mowing height between two discrete levels:

high and low. Stepless intermediate positions are found to be often, if not indeed always, superfluous in practice.

A special embodiment of the device according to the invention is characterized in that said means on either side of the transport roller comprise a quick height adjustment assembly
5 comprising a first and a second sliding rod, each of which is accommodated in a holder with sliding possibility in a direction substantially transverse to the transport roller, the latter being fastened on either side to a first end of the relevant sliding rod while the two sliding rods are eccentrically fastened at their opposite ends to a connecting rod via a pivot arm which pivots at both ends, which connecting rod is fastened to a fixed part of the
10 mower unit with pivoting possibility about its centreline and can be manually operated. A high and a low mowing height can be interchanged in a single simple operation by placing the transport roller in the predetermined and once accurately set high and low positions by means of the quick height adjustment assembly.

The invention also relates to a quick height adjustment designed for such a mower device
15 and will now be explained in more detail with reference to an embodiment and an accompanying drawing, in which:

Fig. 1 is a side elevation of the quick height adjustment assembly of an embodiment of the mower device according to the invention;

Fig. 2 is an elevation of the device of Fig. 1 seen in a direction transverse thereto; and

20 Fig. 3 is an exploded view of the quick height adjustment assembly of the device of Figs. 1 and 2.

The drawing is purely diagrammatic and not (fully) true to scale. Dimensions are sometimes exaggerated for greater clarity. Corresponding parts have been given the same reference numerals as much as possible in the Figures.

25 Fig. 1 shows an embodiment of the mower device according to the invention with a fixed part of a mower unit 100 to which a transport roller 101 is coupled by means of a two-sided quick height adjustment assembly 102. The remaining parts of the mower device are deemed sufficiently familiar to those skilled in the art and are accordingly omitted to keep the Figures clear. It should be noted, however, that the invention can be applied to all types of

mower, so for example not only to cage-type mowers but also to rotary mowers and other types, whether designed for cutting of grass or otherwise.

The quick height adjustment assembly 102 in this example comprises a holder 1 with sliding rod 2 and compression spring 3, a setscrew 5, a clamping block 6 with a pivot arm 7 which is connected with pivots at both ends. The two holders are one another's mirrored images for reasons of symmetry. The sliding rods 2 in the two holders 1 are interconnected by a common connecting rod 8 and securely connected thereto by means of the clamping block 6 with detachable clamping means in the form of a bolt and thread 61. The pivot arm 7 is here connected eccentrically relative to the connecting rod 8.

- 10 In principle, the quick height adjustment assemblies 102 could also be fitted each with its own connecting rod 8, but in that case the switch-over between a high and a low mowing position would necessitate two operations, whereas one operation suffices in the case of a single connecting rod.

The connecting rod 8 is fastened to a fixed part of the mower unit with pivoting possibility about its centreline. This is realized in the present example in that the connecting rod 8 is received between the two clamping blocks 6 in through holes 104 provided for this purpose at the ends of the holders 1. For setting the high mowing position, the connecting rod 8 is rotated by means of actuation rod 10, which is provided with a jig for this purpose. The sliding rods 2 are pushed outward by this because they are connected to the connecting rod via the pivot arm 7 and the clamping block 6. The sliding rods 2 are coupled to the front and/or rear transport roller 101 of the mower unit by means of a mounting eyelet 22. Such a transport roller defines the mowing height because the mower unit with its mowing tools is supported on the ground surface by this roller.

Conversely, a rotation of the connecting rod 8 in the opposite direction will lead to a lower mowing height. The high mowing height can be steplessly set beforehand because the two holders are adjustably fastened in a slot 105 of the mower unit 100 by means of a levelling pin 4. The clamping block 6 is held against a fixed abutment stop 11 provided adjacent the clamping block in the high mowing position. The low mowing position can be exactly set

with an adjustable stop arranged between the transport roller 101 and at least one of the holders 1. In the present example this stop is present in twofold for operation of the device at both sides, comprising a setscrew 5 and an abutment 12.

To retain the sliding rod in these two positions, it is provided with spring means in the form of a pretensioned compression spring 3 accommodated in the holder 1 coaxially with the sliding rod 2. The compression spring 3 bears on a portion of the holder 1 at a first side and at the opposite side on a projection 106 provided for this purpose on the sliding rod 2.

Since the clamping block 6 with the connecting rod 8 is pivotable about a centreline 81 of the connecting rod 8, an accurate, synchronous action of the two height adjustment assemblies 102 is safeguarded, so that the mowing height can be switched between a high and a low position in a single movement. Presetting of the exact high and low mowing heights may be achieved once and for all beforehand, for example in the storage shed, after which in the field a single, simple manual operation requiring little accuracy suffices for bringing the mowing height from a high to a low position or vice versa. This occupies hardly any time, also if it is to be performed several times in the case of a multiple mower arrangement. The invention thus provides a mower device which can be utilized in a much more practical and flexible way than an existing mower device.

Although the invention was explained in detail with reference to only a single embodiment, it will be obvious that the invention should by no means be regarded as limited to the embodiment presented. On the contrary, many variations and embodiments are possible to those skilled in the art without departing from the scope of the invention. Thus the various adjustable abutment stops may be left out, albeit to the detriment of the adjustability of the device, because in that case only a single high and a single low mowing position can be selected, defined by the construction. Given a shared connecting rod, it suffices to design the height adjustment assembly between the transport roller and the holder to be single, now that only the highest setting of the two is the determining factor. The fundamental idea of the invention can be used not only for height adjustment but also for a quick switching between two predetermined depth, width, or length positions of any device whatsoever.

CLAIMS

1. A mower device comprising at least one mower unit which is supported with a transport roller on a ground surface, said transport roller being coupled to the mower unit so as to be adjustable in height, characterized in that the transport roller is provided with
5 means for manually adjusting the height of said roller between a predetermined high and a predetermined low position.
2. A mower device as claimed in Claim 1, characterized in that said means on either side of the transport roller comprise a quick height adjustment assembly comprising a first and a second sliding rod, each of which is accommodated in a holder with sliding
10 possibility in a direction substantially transverse to the transport roller, the latter being fastened on either side to a first end of the relevant sliding rod while the two sliding rods are eccentrically fastened at their opposite ends to a connecting rod via a pivot arm which pivots at both ends, which connecting rod is fastened to a fixed part of the mower unit with pivoting possibility about its centreline and can be manually operated.
- 15 3. A mower device as claimed in Claim 2, characterized in that the connecting rod is common to the two sliding rods.
4. A mower device as claimed in Claim 2 or 3, characterized in that each of the pivot arms is fastened to the connecting rod through the interposition of a clamping block which grips around the connecting rod and is securely connected thereto by detachable clamping
20 means.
5. A mower device as claimed in Claim 2, 3 or 4, characterized in that at least one of the sliding rods is provided with spring means for retaining its position in the holder.
6. A mower device as claimed in Claim 5, characterized in that said spring means comprise a compression spring which is accommodated in the holder coaxially with the
25 sliding rod and which bears on a portion of the holder at a first side and on a projection on the sliding rod at an opposite side.
7. A mower device as claimed in any one of the Claims 2 to 6, characterized in that an adjustable abutment stop is arranged between the transport roller and at least one of the holders.
- 30 8. A mower device as claimed in any one of the Claims 2 to 7, characterized in that

the holder is fastened to the mower unit so as to be adjustable in height.

9. A mower device as claimed in any one of the Claims 2 to 8, characterized in that the two holders at their sides facing away from the transport roller each have a through hole for accommodating the common connecting rod.

5 10. A mower device as claimed in any one of the Claims 4 to 9, characterized in that the mower unit near at least one of the clamping blocks comprises an abutment stop, which may or may not be adjustable, for receiving against it the clamping block in one of the height adjustment positions thereof.

11. A quick height adjustment assembly for use in the mower device as claimed in any
10 one of the Claims 2 to 9.

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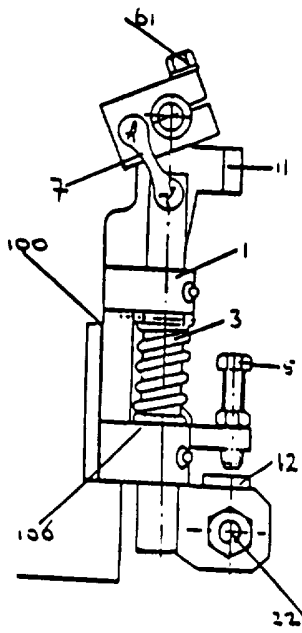


FIG. 1

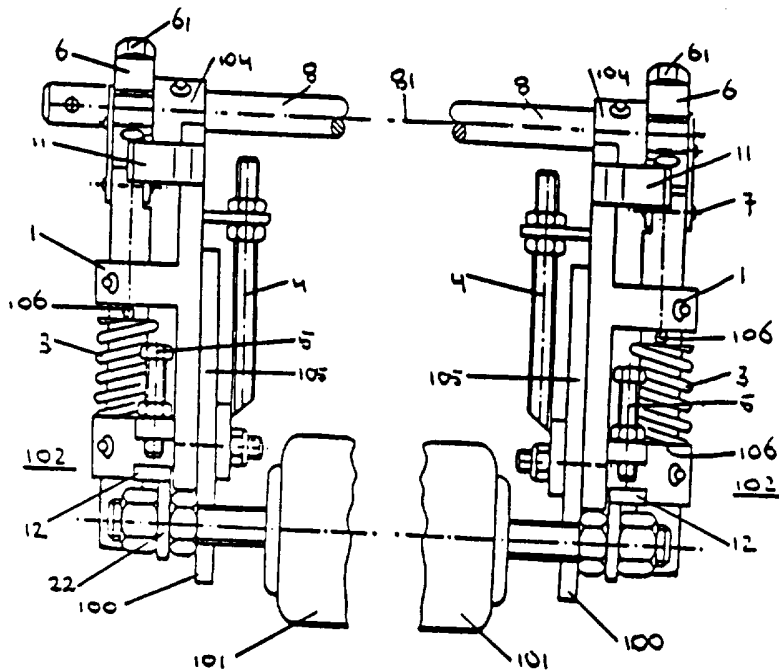


FIG. 2

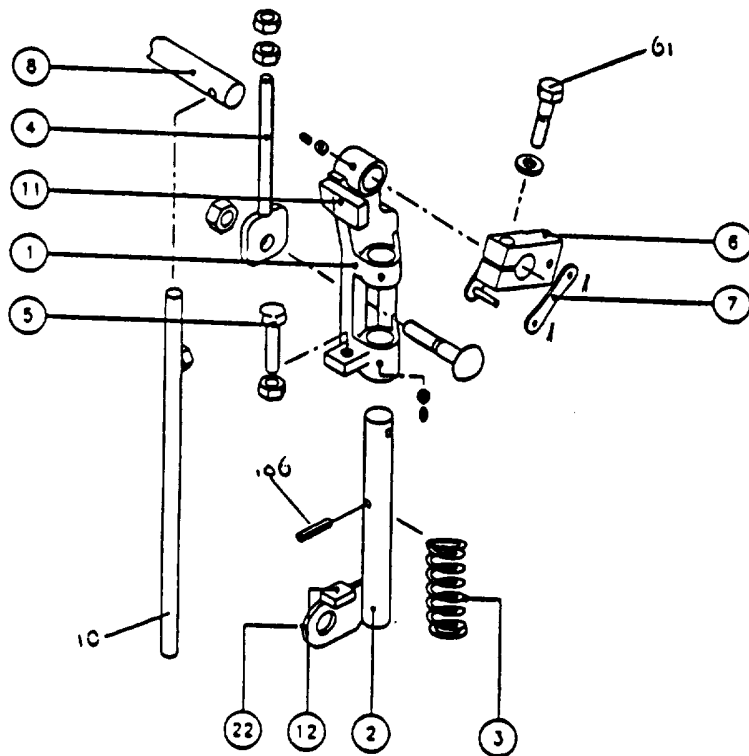


FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 95/00322

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A01D34/54

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US,A,3 524 309 (BARTLETT) 18 August 1970 see the whole document ---	1-3 7,8,10, 11
A	GB,A,1 164 603 (BARRINGTON SIDNEY HAYNES) 17 September 1969 see the whole document ---	1,2,5-8, 11
A	AU,B,464 129 (ROVER MOWERS) 14 August 1975 see the whole document ---	1-3,5,6, 11
A	WO,A,91 03927 (RANSOMES SIMS & JEFFERIES) 4 April 1991 ---	
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-3524309	18-08-70	NONE	
GB-A-1164603	17-09-69	NONE	
AU-B-464129	14-08-75	AU-B- 464129	14-08-75
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WO-A-9103927	04-04-91	EP-A- 0538254	28-04-93
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EP-A-382527	16-08-90	US-A- 5197267	30-03-93