

AUSTRALIA

Patents Act 1990

REQUEST FOR A STANDARD PATENT

AND NOTICE OF ENTITLEMENT

647828

The Applicant identified below requests the grant of a patent to the nominated person identified below for an invention described in the accompanying standard complete patent specification.

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[54] Invention Title:

APPARATUS FOR TREATMENT OF VEGETATION

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[31,33,32]

Details of basic application(s):-
90 12057 FRANCE

FR 1 October 1990

Applicant states the following:

1. The nominated person is the assignee of the actual inventor (e)
2. The nominated person is
- the applicant
~~- the assignee of the applicant~~
~~- authorised to make this application by the applicant~~
of the basic application.
3. The basic application was/were the first made in a convention country in respect of the invention.

The nominated person is not an opponent or eligible person described in Section 33-36 of the Act.

30 September 1991

By Berthoud S.A. Societe anonyme
By PHILLIPS ORMONDE & FITZPATRICK
Patent Attorneys
By

Our Ref : 230183

5999q

David B Fitzpatrick



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(56) Prior Art Documents
US 4609145

(57) Claim

1. An apparatus for the treatment of vegetation, comprising a blower which is capable of producing a current of air, means for atomising a treatment product in said current of air, drive means for said blower, at least one sensor which is capable of measuring continuously a speed of rotation of said blower or a flow of a current of air which it produces, means for controlling independently of the drive means variations in the speed of rotation of said blower and/or characteristics of the blower as a function of signals from the sensor and of a set value.

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COMPLETE SPECIFICATION
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Invention Title:

APPARATUS FOR TREATMENT OF VEGETATION

Our Ref : 230183
POF Code: 1149/152584

••••• The following statement is a full description of this invention, including
••••• the best method of performing it known to applicant(s):
•••••

~~State of the art~~

The present invention relates to an apparatus for treatment of vegetation, comprising a blower which is capable of producing a current of air, and means for atomising a treatment product in said current of air.

At present, apparatuses of this type which are found on the market are equipped with an axial or centrifugal blower, driven by the power take-off of a tractor by means of a mechanical transmission, or even by means of a hydraulic transmission comprising a pump, usually driven by said power take-off, and feeding a hydraulic engine by means of pipes under pressure.

It is even possible to find, although more rarely, blowers driven by an electric generator. Means, such as a gearbox, make it possible, in certain cases, to change when stationary the ratio between the speed of the power take-off of the tractor and the speed of rotation of the blower. Also found are blowers, the pitch of which can be changed when stationary.

When it is desired to treat plants, such as fruit trees, of a certain height, it is important that the output of the blower does not vary with the speed of the engine of the tractor. In the opposite case, there is a danger that the top of the trees will not be reached during slowing down and, on the contrary, that the air current will go too far during acceleration.

US patent no. 4.609.145 in the name of Allen L. Miller describes a device which makes it possible to vary the speed of rotation of the blower of an apparatus for spreading pesticides, by virtue of a control located in the driver's cab, this control operating the feed valve of a hydraulic engine which operates the blower. Usually, the pressure of the feed fluid of a hydraulic engine mounted on a tractor is provided by a pump operated by the power take-off of said tractor. This means that, if the tractor has a reduction in speed, the output of the blower will reduce also. It will thus be precisely at the moment when the driver of the tractor has to make a turn, for example, or face a difficulty, that the output of the



blower will deviate from the value envisaged, and that it will be necessary, moreover, to monitor the speed of the latter. This arrangement, as can be seen, is not satisfactory.

5 According to the invention there is provided an apparatus for the treatment of vegetation, comprising a blower which is capable of producing a current of air, means for atomising a treatment product in said current of air, drive means for said blower, at least one sensor which
10 is capable of measuring continuously a speed of rotation of said blower or a flow of a current of air which it produces, means for controlling independently of the drive means variations in the speed of rotation of said blower and/or characteristics of the blower as a function of
15 signals from the sensor and of a set value.

The sensor can be sensitive to the drive speed of the blower. It will then be an apparatus of tachometer type, either connected to the drive of the blower, or operated by the blower itself.

20 According to another embodiment, the sensor is located in the current of air and is sensitive to the speed or to the pressure of the latter. In this case, the sensor can comprise a Pitot tube, or a "wind meter" comprising a small inductive turbine; these two types of
25 sensor are available on the market.

30 According to an embodiment which is particularly simple and advantageous from the financial point of view, the means for varying the speed of rotation and/or the characteristics of the blower comprise blades, or vanes, of variable orientation located on the suction of the
35 blower. A simple mechanical means will be capable of controlling the orientation of the vanes, and thus acting effectively on the air flow produced, as a function of data collected by the sensor.

It is possible to arrange, in place of the vane



device, flaps which are approximately perpendicular to the flow of suction air, mounted on pivots parallel to this flow and formed so as to create a suction passage of variable cross-section, in the manner of the adjustable diaphragms of certain cameras. This solution is of approximately comparable price to the previous one, and the adoption of one or the other may be the result of aerodynamic considerations.

According to an embodiment which is slightly more expensive, but perfected at present, the blower comprises a propeller, and use is made of means for varying in operation the pitch of said propeller.

It is even possible to make use of means acting directly on the speed of rotation of the blower, for example a mechanical transmission with variable gear reduction, or a hydraulic transmission with variable output, or even, in a case in which the blower is driven by an electric motor, to equip the latter with a variable speed drive.

A person skilled in the art will understand that a certain number of these various methods can be used simultaneously.

Brief description of the drawings

The invention will now be described in a more precise manner with the aid of a non-limiting example illustrated by the single figure which is a theoretical diagram of the installation.

Detailed description of a preferred embodiment

A propeller 1, mounted on a shaft 2 connected by means (not shown) to the power take-off of a tractor (likewise not shown), is mounted inside a tube 3 for guiding the current of air. A deflector 4 diverts the current of air created by the propeller in order to send it in a direction perpendicular to that of the shaft 2. On the intake side, a fixed dome 5, arranged axially in relation to the propeller 1, supports vanes 6 which are distributed equally around the axis and two of which are

shown in the figure. The dome further contains means for controlling of the orientation of the vanes. The latter are each mounted on a shaft 7 which is perpendicular to the shaft 2 of the propeller and which supports a ring gear 8 which engages on a drive pinion 9, the axis of which is parallel to the shaft 2 and which is mounted on a geared motor 10 which is capable of driving it at low speed: two revolutions per minute. A position sensor 11 makes it possible to know at any moment the exact position of the vanes. A ring gear 12, which engages on the gears 8, ensures the synchronisation of the movements of all the vanes.

A control box 13 is connected on the one hand to the position sensor 11 by means of a cable 14, and to the geared motor 10 by means of a feed cable 15.

Furthermore, the box is connected to an electromagnetic sensor 16 of the speed of the propeller by a cable 17. In an alternative, the sensor 16 is replaced by a tachometric dynamo 16A located at the end of the shaft 2. In another alternative, the sensor 16 is replaced by a fan 16B located on the delivery of the blower 1.

In the lower part of the figure, the display part of the control box 13 has been shown. Reference 20 designates a switch for application of voltage and reference 21 represents the control of the potentiometer which makes it possible to choose the desired air flow. 22 designates a panel for display of the speed of air conduction. 23 designates an alarm indicator which emits a luminous signal when the speed of the blower exceeds a limit chosen in advance, the vanes having reached the end of their travel.

Operation is as follows: the blower is made to rotate at its nominal speed, for example 2200 revolutions/minute, then the operator adjusts the air flow to the desired power by action on the potentiometer control 21, which acts by means of the control box 13. If use is made of a sensor 16, 16A which is sensitive to the speed of rotation of the blower, a programme preset in the factory makes the geared motor 10 rotate by an angle

linked to the separation between the actual speed and the nominal speed by a law, for example a proportional law.

5 If use is made of a sensor 16B, sensitive to the air flow, the control box 13 compares the air flow measured at each moment with said envisaged air flow, established with the aid of the control 21, and orders a displacement of the vanes 6, by rotation of the geared motor 10, until the separation falls below a value fixed in advance.

10 In both cases, preparation of the electrical diagram of the control box is sufficiently simple to be within the scope of any person skilled in the art.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An apparatus for the treatment of vegetation, comprising a blower which is capable of producing a current of air, means for atomising a treatment product in said current of air, drive means for said blower, at least one sensor which is capable of measuring continuously a speed of rotation of said blower or a flow of a current of air which it produces, means for controlling independently of the drive means variations in the speed of rotation of said blower and/or characteristics of the blower as a function of signals from the sensor and of a set value.

2. The apparatus as claimed in claim 1, wherein said sensor is sensitive to the drive speed of the blower.

3. The apparatus as claimed in claim 1, wherein said sensor is located in the current of air and is sensitive to the speed or to the pressure of the latter.

4. The apparatus as claimed in claim 1, wherein said means for varying the speed of rotation and/or the characteristics of the blower comprise blades or vanes of variable orientation located on the suction of the blower.

5. The apparatus as claimed in one of claims 1 to 3, wherein said means for varying the speed of rotation and/or the characteristics of the blower comprise flaps which are approximately perpendicular to the flow of suction air of the blower, mounted on pivots parallel to this flow and formed so as to create a suction passage of variable cross-section.

6. The apparatus as claimed in claim 1, wherein the blower comprises a propeller, and said means for varying the speed of rotation and/or the characteristics of the blower comprise means for varying in operation the pitch of said propeller.



7. The apparatus as claimed in claim 1, wherein said means for varying the speed of rotation and/or the characteristics of the blower comprise a mechanical transmission with variable gear reduction.

8. The apparatus as claimed in claim 1, wherein said means for varying the speed of rotation and/or the characteristics of the blower comprise a hydraulic transmission of variable output.

9. The apparatus as claimed in claim 1, wherein said means for varying the speed of rotation and/or the characteristics of the blower comprise an electric motor with a variable speed drive.

10. An apparatus for the treatment of vegetation substantially as herein described with reference to any one of the embodiments illustrated in the accompanying drawings.

DATED: 24 November 1993

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A B S T R A C T

An apparatus for treatment of vegetation, comprising a blower (1) which is capable of producing a current of air, means for atomising a treatment product in said current of air, drive means (2) for said blower, at least one sensor (16, 16A, 16B) which is capable of measuring continuously the speed of rotation of the blower or the flow of the current of air which it produces, means (6, 10, 13) for controlling variations in the speed of rotation of the blower and/or the characteristics of the blower as a function of the signals from the sensor and of a set value.

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