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(54) **Animal feeder**

(57) An animal feeding apparatus comprising a hopper for containing particulate fodder, said hopper having a lower opening, a feed device disposed below said lower opening of the hopper to receive fodder discharged from said hopper through said lower opening under gravity, and a feed trough arranged to receive feed from said feed device, a vibration generating means for imparting vibration to said hopper to deliver fodder from the hopper onto said feed device, and a controller for controlling operation of said vibration generating means and said feed device to deliver fodder from the hopper into the feed trough, said controller including a timer whereby said controller can be programmed to operate said vibration generating means and feed device for predetermined periods at predetermined times or time intervals to deliver predetermined amounts of fodder from the hopper into the feed trough at said predetermined times or time intervals, the feed device comprising a rotatable disc rotatably driven by a drive means to broadcast fodder delivered onto the upper surface of the disc from the hopper into the feed trough, wherein the feed trough extends around the feed device whereby rotation of the rotatable disc broadcasts fodder delivered onto the upper surface of the disc from the hopper into the feed trough. <Figure 6>

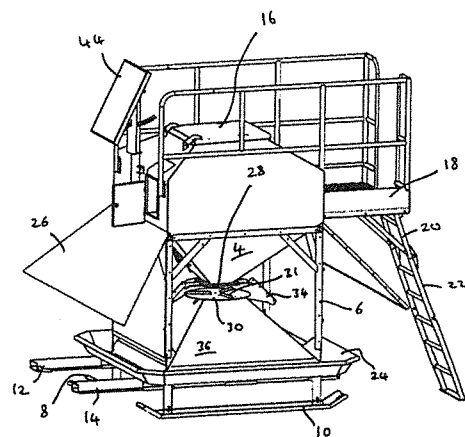


Figure 6

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Animal Feeding Apparatus

FIELD OF THE INVENTION

5 This invention relates to an animal feeding apparatus for feeding livestock and in particular to a programmable animal feeder that can automatically deliver substantially metered quantities of particulate fodder to animals at predetermined times or time intervals.

10 BACKGROUND OF THE INVENTION

It is common to feed livestock, in particular high value breeding stock, with high energy and high protein fodder in the form of particulate material. It is also known to tailor such fodder to the particular developmental needs of the animals to be fed.

15

Such fodder is typically delivered to the animal in feeding troughs. Animal feeding devices are known which can be used for feeding animals in an open field without replenishment of the fodder contained therein over relatively long periods of time, wherein a supply of fodder is stored in a hopper and delivered into a feeding trough
20 whenever the animal feeds. However, such devices tend to allow the animals to take as much fodder as they want, leading to gorging and overeating. Feeding excessively on such high energy and high protein fodder can often result in ill health and is wasteful. Attempts to control the amounts of fodder provided and the timing of feeding are typically extremely labour intensive to ensure that adherence to
25 meticulously planned feeding programmes is maintained.

It is an object of the present invention to provide an animal feeding apparatus which enables the amount and timing of particulate fodder discharged from a hopper to a feed trough to be controlled without requiring manual intervention.

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SUMMARY OF THE INVENTION

According to the present invention there is provided an animal feeding apparatus as claimed in claim 1.

Preferably said rotatable disc is rotatable about a substantially vertical axis. The rotatable disc may be mounted directly below said lower opening of the hopper for receiving fodder therefrom under the action of gravity.

5

The rotatable disc may be provided with radially extending vanes on the upper surface thereof.

In one embodiment the rotatable disc is mounted on top of a pyramidal or conical housing having downwardly and outwardly inclined side walls, said feed trough
10 being provided at a lower end of said housing whereby fodder broadcast from the rotatable disc falls down an outer surface of the side walls of said housing to be delivered into said feed trough.

15 The feed trough preferably extends around the periphery of a lower portion of the apparatus.

A canopy may be provided over the feed trough for preventing animals from climbing onto or into the feed trough.

20

The apparatus may be mounted on skids

Tine receiving slots may be provided in a base of the apparatus enabling the apparatus to be carried by a tele-handler.

25

Preferably the vibration generating means is mounted on the hopper, for example on an outer surface of a side wall of the hopper.

The vibration generating means and the feed device are driven by one or more
30 motors. Preferably said motors comprise electric motors. The apparatus may include one or more batteries for powering said motors and said controller, allowing the apparatus to operate in a remote location. The apparatus may include one or more photovoltaic panels, preferably mounted on an upper region of the apparatus, for charging the one or more batteries. Alternatively, or additionally, the apparatus

may include a transformer connectable to a mains electricity supply for powering said electric motors.

In one embodiment at least a lower portion of the hopper may have an inverted
5 pyramidal or frustoconical shape.

Preferably the hopper includes a filling opening provided with a lid for providing access to the hopper for loading fodder therein. A platform may be mounted on the apparatus adjacent said lid to facilitate filling of the hopper with fodder. A ladder
10 may be mounted on the apparatus to provide access to said platform.

BRIEF DESCRIPTION OF THE DRAWINGS

An animal feeding apparatus in accordance with an embodiment of the present
15 invention will now be described, by way of example only, with reference to the accompanying drawings, in which :-

Figure 1 is a perspective view of an animal feeding apparatus in accordance with an
embodiment of the present invention;

20

Figure 2 is a further perspective view of the apparatus of Figure 1;

Figure 3 is a rear view of the apparatus of Figure 1 with the ladder in an operative
position;

25

Figure 4 is a side view of the apparatus of Figure 1 with the ladder in a raised or
folded position;

Figure 5 is a longitudinal sectional view through the apparatus of Figure 1;

30

Figure 6 is a perspective view of the apparatus of Figure 1 with parts removed for
clarity;

Figure 7 is a detailed sectional view of the apparatus of Figure 1; and

Figure 8 is a perspective view of the apparatus of Figure 1 with parts removed to show the vibration generating means and battery.

5 DETAILED DESCRIPTION OF THE DRAWINGS

As illustrated in the drawings, an animal feeding apparatus 2 in accordance with an embodiment of the present invention comprises an inverted pyramidal feed hopper 4 for receiving a supply of particulate fodder, mounted on a frame 6. The frame 6 is supported on a pair of skids 8,10 and a pair of horizontally extending tine receiving channels 12,14 are mounted on a lower region of the frame 6 for receiving the tines of a tele-handler to allow the apparatus to be carried and placed where required, for example in a field where livestock to be fed is held.

15 A filling opening provided with a hinged lid 16 is provided at an upper end of the hopper 4 for loading the hopper with particulate animal fodder. A platform 18 is provided adjacent the upper end of the hopper 4 for providing access to the filling opening and lid 16 thereof. A foldable ladder 20 is mounted adjacent the platform 18 for providing access to the platform 18. As shown in Figures 2 and 5, a lower portion 22 of the ladder 20 is foldable between an operative position, shown in Figure 5, and raised or folded position, shown in Figure 2.

A feed trough 24 is mounted around the periphery of a lower region of the frame 6 of the apparatus at a height suitable for allowing animals to feed from the feed trough 24. The height of the feed trough 24 may be adapted to suit the size of animals to be fed, for example sheep or cattle. The height of the feed trough 24 on the frame 6 and/or the height of the frame 6 may be adjustable to adjust the height of the feed trough 24.

30 A canopy 26 is mounted above the feed trough 24, the canopy 26 preventing animals from climbing into the feed trough 24 while protecting the feed trough 24 and its contents from the weather. Creeper bars (not shown) may be provided around the feed trough 24 to prevent animals from climbing into the trough and/or to

prevent larger animals from feeding while permitting access to smaller animals, such as lambs.

The hopper 4 is provided with a lower opening 28 directly below which is mounted a rotating disc 30 defining a feed delivery device for delivering fodder from the hopper 4 into the feed trough 24, as will be described below in more detail. The rotating disc 30 is rotatably driven by an electric motor 32, mounted beneath the disc 30, for rotating the disc 30 about a vertical axis substantially coaxial with the vertical axis of the hopper 4. Radially extending vanes or paddles 31 are mounted on the disc 30 to facilitate broadcasting of fodder from the disc 30 when the disc is rotated by the motor 32. A shield 34 is mounted around the disc 30, surrounding the disc 30 for diverting fodder downwardly towards the feed trough 24.

The rotating disc 30 is mounted on top of a pyramidal housing 36 having downwardly and outwardly diverging side walls terminating at a lower end thereof at the feed trough 24 whereby fodder dispersed from the disc 30 may be guided down the outer surface of the housing 36 to fall into the feed trough 24 under the action of gravity.

As best shown in Figure 8, a vibration generating means 38, such as an eccentrically mounted weight provided on the output shaft of an electric motor, is mounted on an outer side of the hopper 4 for imparting vibration to the hopper 4 to agitate fodder within the hopper 4 and to cause the particulate fodder to fall out of the lower opening 28 of the hopper 4 onto the rotating disc 30, in use, as will be described below.

In the embodiment shown, the profile of the apparatus 2 and the feed trough 24 is substantially square in plan view. However, it is envisaged that the profile of the apparatus and the feed trough may be circular or rectangular or any other shape. Where the apparatus is required to feed larger numbers of animals two or more hoppers and associated rotating discs may be mounted side by side, such that the apparatus presents a substantially rectangular or elongated profile in plan view, a single elongate feed trough extending around the entire periphery of the apparatus and being fed by each hopper.

A control panel 40 housing a controller is mounted on an upper region of the hopper 4 or on the frame 6, said control panel 40 being provided with an access door 42 for facilitating programming of the controller. The controller incorporates a timer, 5 whereby the controller can be programmed to operate the motors driving the vibration generating means 38 and the rotating disc 30 for predetermined periods at predetermined times or time intervals.

One or more batteries may be provided for powering the controller and the motors. 10 Additionally, or alternatively, a transformer may be provided connectable to a mains electricity supply for powering the controller and the motors. As illustrated in Figure 8, the one or more batteries may be mounted on the frame 6 of the apparatus alongside the hopper 4.

15 As shown in the drawings, a solar panel 44 incorporating photo-voltaic cells, may be mounted on an upper side of the apparatus 2 for charging the one or more batteries.

In use, the controller is programmed to switch on both the motor driving the rotating 20 disc 30 and the motor driving the vibration generating means 38 at predetermined times or time intervals for a predetermined period of time. When the motors are switched on by the controller, the vibrations imparted to the hopper 4 by the vibration generating means 38 cause particulate fodder to fall from the lower opening 28 of the hopper 4 onto the rotating disc 30 while rotation of the disc 30 25 broadcasts the fodder down the sides of the housing 36 and into the feed trough 24 at a substantially constant rate so that a metered quantity of fodder is delivered into the feed trough 24 over said predetermined period of time. The vibration imparted to the hopper 4 also serves to break up clumps of material in the hopper 4 and facilitates the flow of material through the lower opening 28 of the hopper 4 and 30 rotating disc 30. The vibration imparted to the hopper 4 also generates a noise which the animals to be fed quickly come to associate with fodder being available, attracting animals to the apparatus 2.

The controller can be of simple design, merely comprising a timer and switching means to control the supply of power to the two motors driving the vibration generating means and the rotatable disc. Also the absence of moveable parts, other than the rotatable disc, provides an extremely robust and reliable means for
5 controlling the dispensing of fodder.

Therefore the present invention provides a relatively low cost and highly reliable means for automatically dispensing metered quantities of fodder to animals at predetermined times or time intervals, enabling a carefully controlled feeding
10 programme to be implemented without substantial manual intervention.

The invention is not limited to the embodiments described herein but can be amended or modified without departing from the scope of the present invention.

Claims

1. An animal feeding apparatus comprising a hopper for containing particulate fodder, said hopper having a lower opening, a feed device disposed below said lower opening of the hopper to receive fodder discharged from said hopper through said lower opening under gravity, and a feed trough arranged to receive feed from said feed device, a vibration generating means for imparting vibration to said hopper to deliver fodder from the hopper onto said feed device, and a controller for controlling operation of said vibration generating means and said feed device to deliver fodder from the hopper into the feed trough, said controller including a timer whereby said controller can be programmed to operate said vibration generating means and feed device for predetermined periods at predetermined times or time intervals to deliver predetermined amounts of fodder from the hopper into the feed trough at said predetermined times or time intervals, the feed device comprising a rotatable disc rotatably driven by a drive means to broadcast fodder delivered onto the upper surface of the disc from the hopper into the feed trough, wherein the feed trough extends around the feed device whereby rotation of the rotatable disc broadcasts fodder delivered onto the upper surface of the disc from the hopper into the feed trough.
2. An apparatus as claimed in claim 1, wherein said rotatable disc is rotatable about a substantially vertical axis.
3. An apparatus as claimed in claim 1 or claim 2, wherein the rotatable disc is mounted directly below said lower opening of the hopper for receiving fodder therefrom under the action of gravity.
4. An apparatus as claimed in any preceding claim, wherein the rotatable disc is provided with radially extending vanes on the upper surface thereof.
5. An apparatus as claimed in any preceding claim, wherein the rotatable disc is mounted on top of a pyramidal or conical housing having downwardly and outwardly inclined side walls, said feed trough being provided at a lower end of said housing

whereby fodder broadcast from the rotatable disc falls down an outer surface of the side walls of said housing to be delivered into said feed trough.

6. An apparatus as claimed in any preceding claim, wherein the feed trough
5 extends around the periphery of a lower portion of the apparatus.

7. An apparatus as claimed in claim 6, wherein a canopy is provided over the feed trough.

10 8. An apparatus as claimed in any preceding claim, wherein the apparatus is mounted on skids

9. An apparatus as claimed in any preceding claim, wherein fine receiving slots are provided in a base of the apparatus enabling the apparatus to be carried by a tele-
15 handler.

10. An apparatus as claimed in any preceding claim wherein the vibration generating means is mounted on the hopper.

20 11. An apparatus as claimed in any preceding claim, wherein the vibration generating means and the feed device are driven by one or more motors.

12. An apparatus as claimed in claim 11, wherein said motors comprise electric motors.

25

13. An apparatus as claimed in claim 12, wherein the apparatus includes one or more batteries for powering said motors and said controller.

14. An apparatus as claimed in claim 13, wherein the apparatus includes one or
30 more photovoltaic panels for charging said one or more batteries.

15. An apparatus as claimed in any of claims 12 to 14, wherein the apparatus includes a transformer connectable to a mains electricity supply for powering said electric motors.

16. An apparatus as claimed in any preceding claim, wherein at least a lower portion of the hopper has an inverted pyramidal or frustoconical shape.

5 17. An apparatus as claimed in any preceding claim, wherein the hopper includes a lid for providing access to the hopper for loading fodder therein.

18. An apparatus as claimed in claim 17, wherein a platform is mounted on the apparatus adjacent said lid to facilitate filling of the hopper with fodder.

10

19. An apparatus as claimed in claim 18, wherein a ladder is mounted on the apparatus to provide access to said platform.

1/8

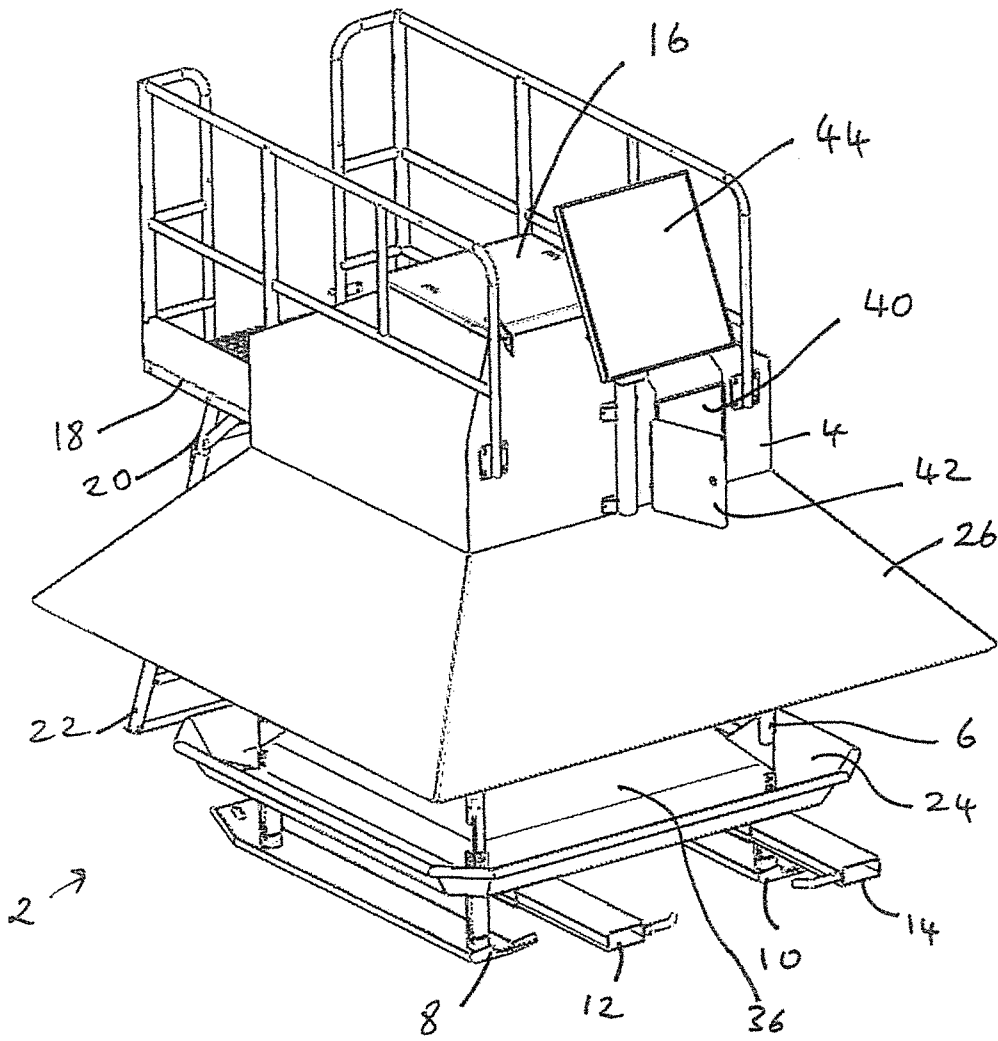


Figure 1

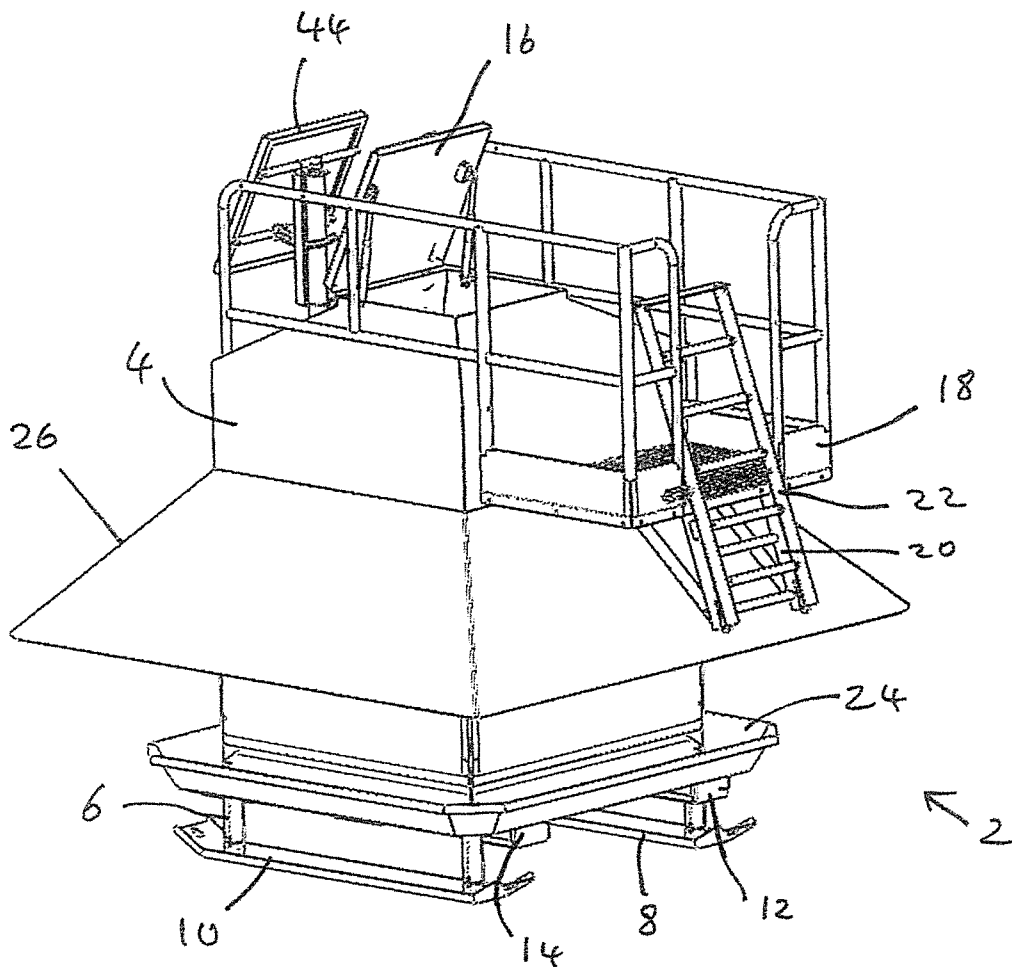


Figure 2

3/8

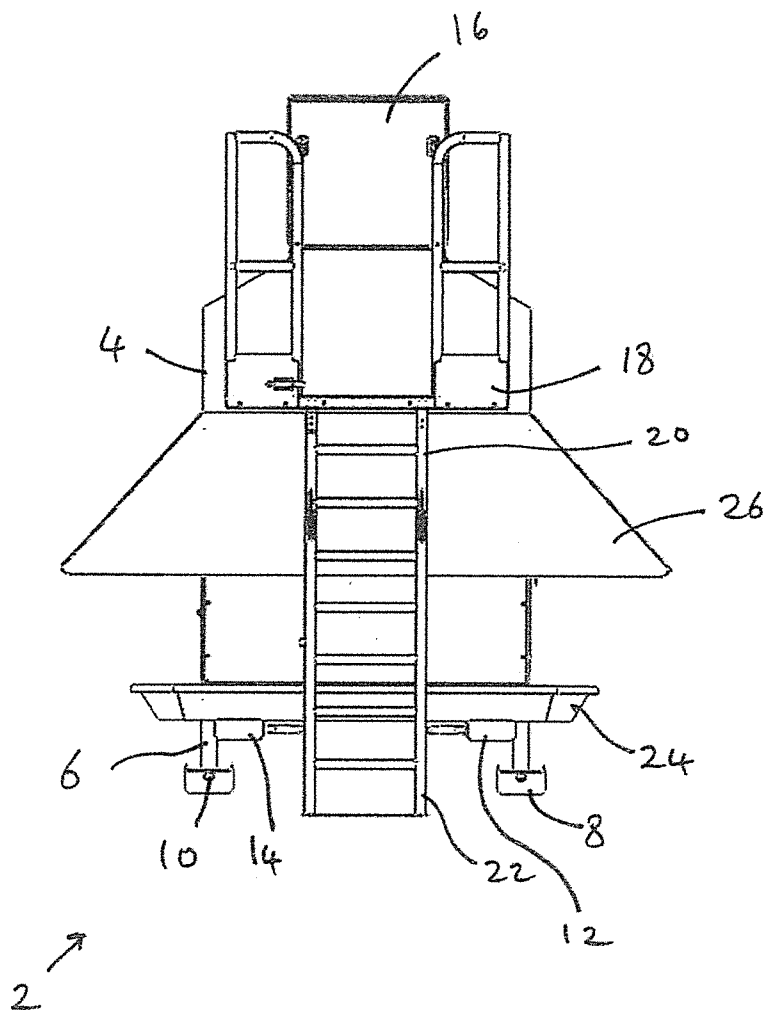


Figure 3

4/8

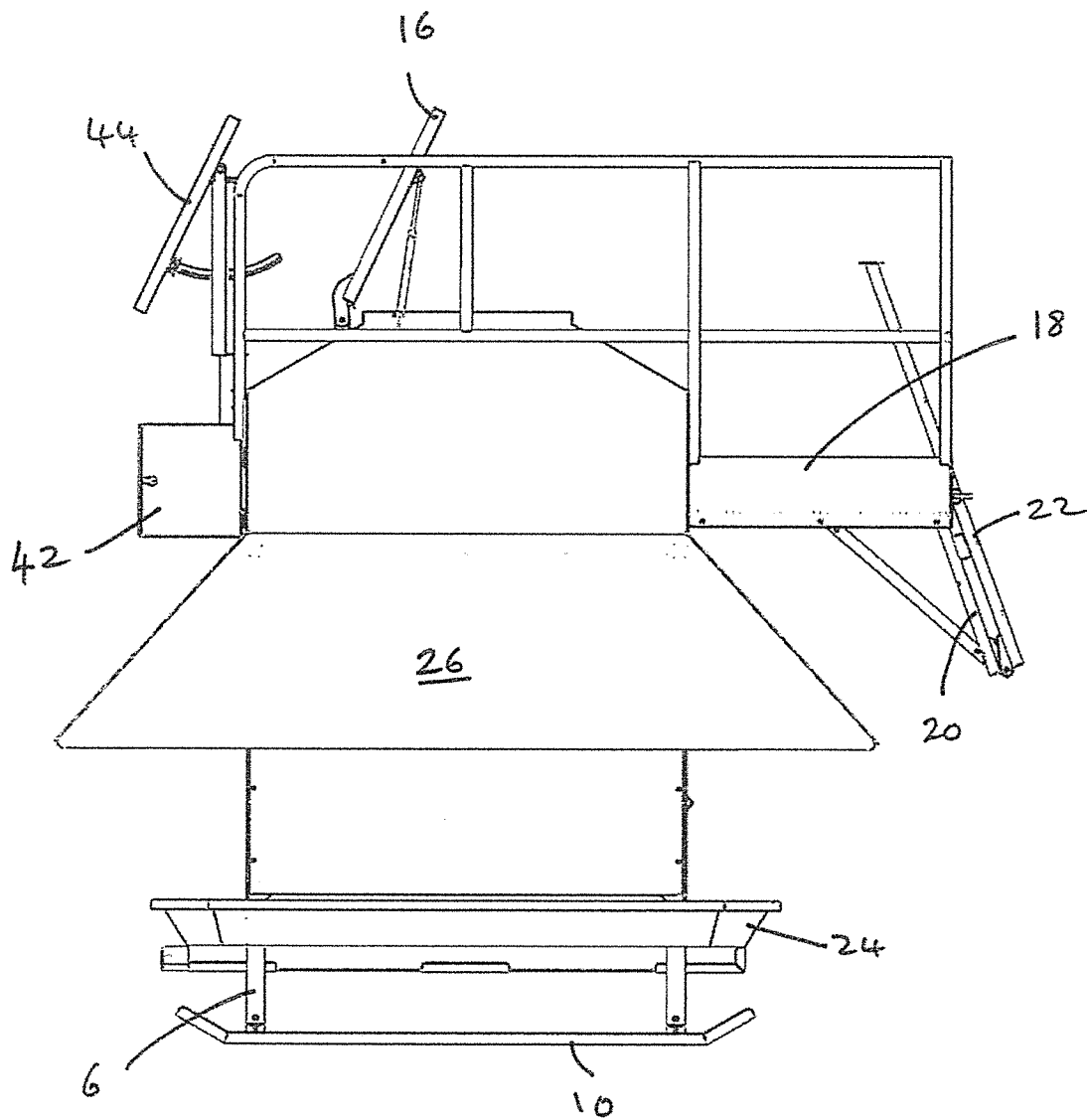


Figure 4

5/8

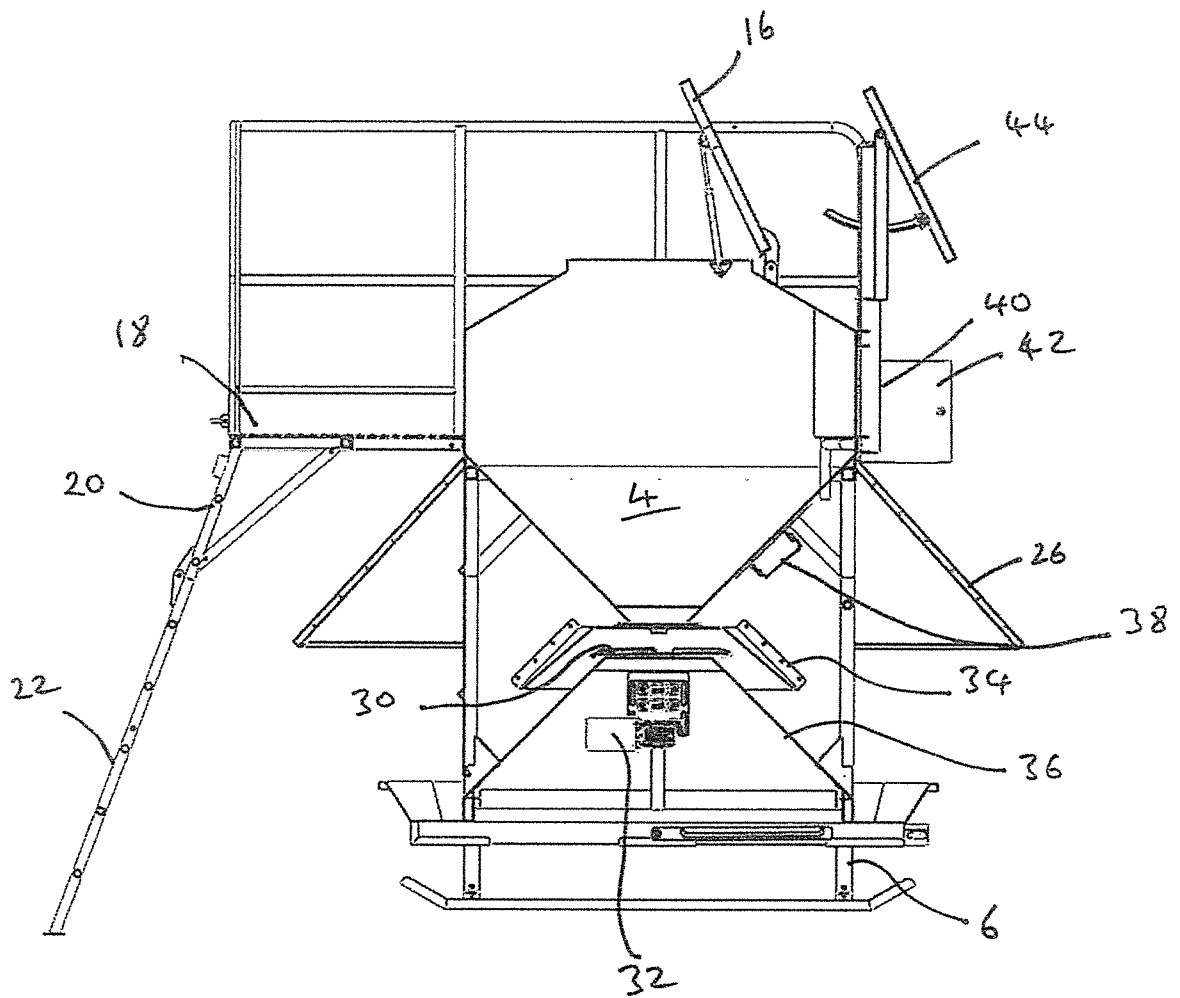


Figure 5

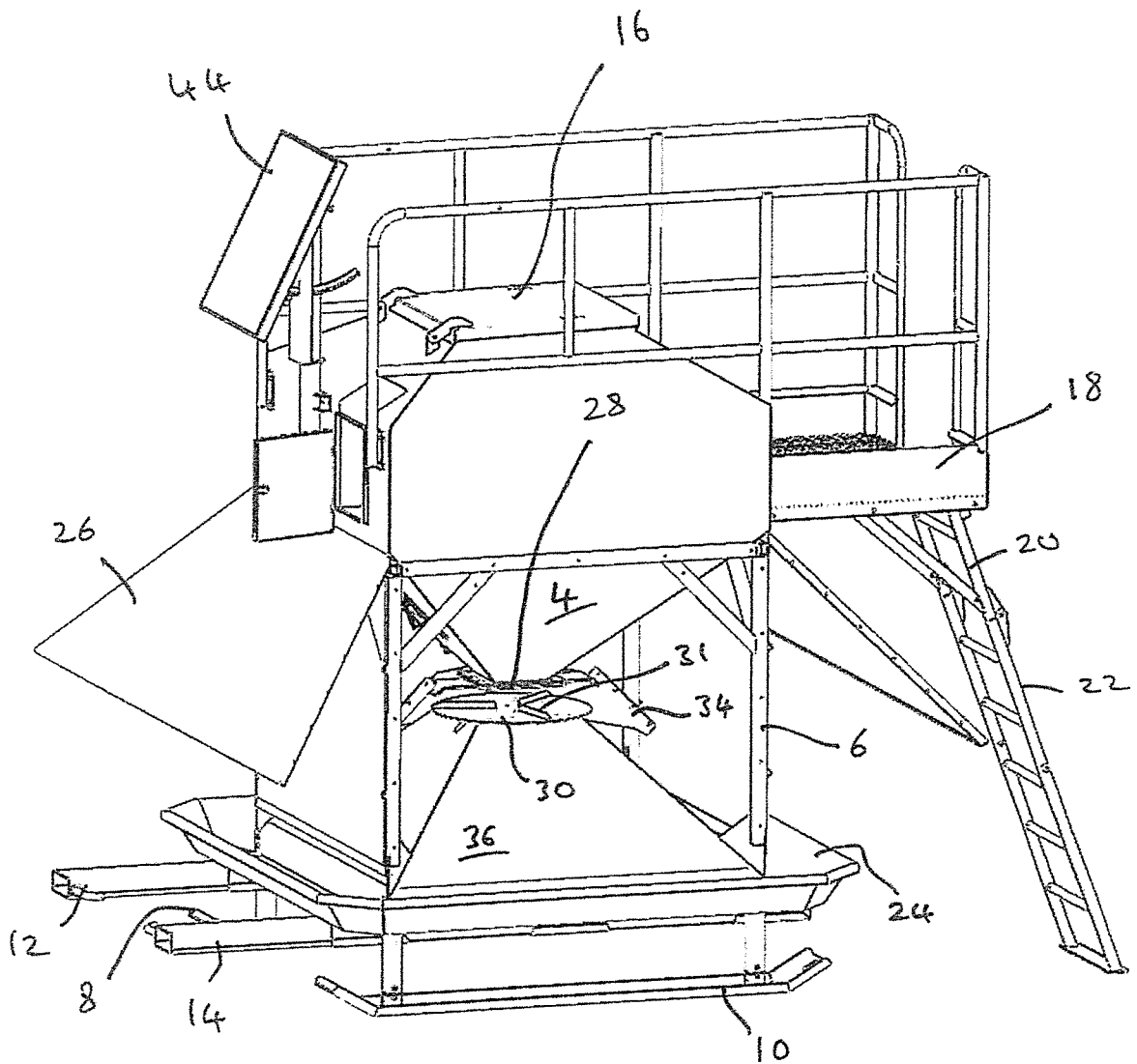


Figure 6

7/8

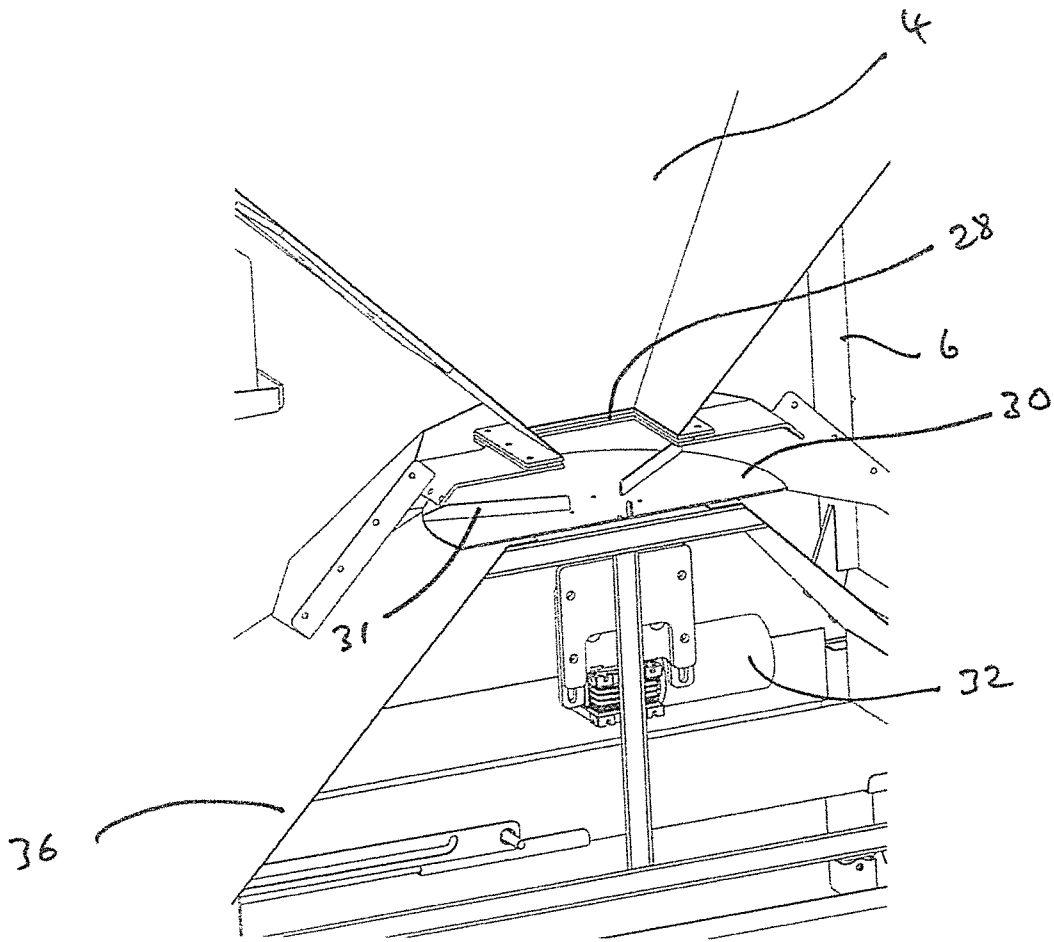


Figure 7

8/8

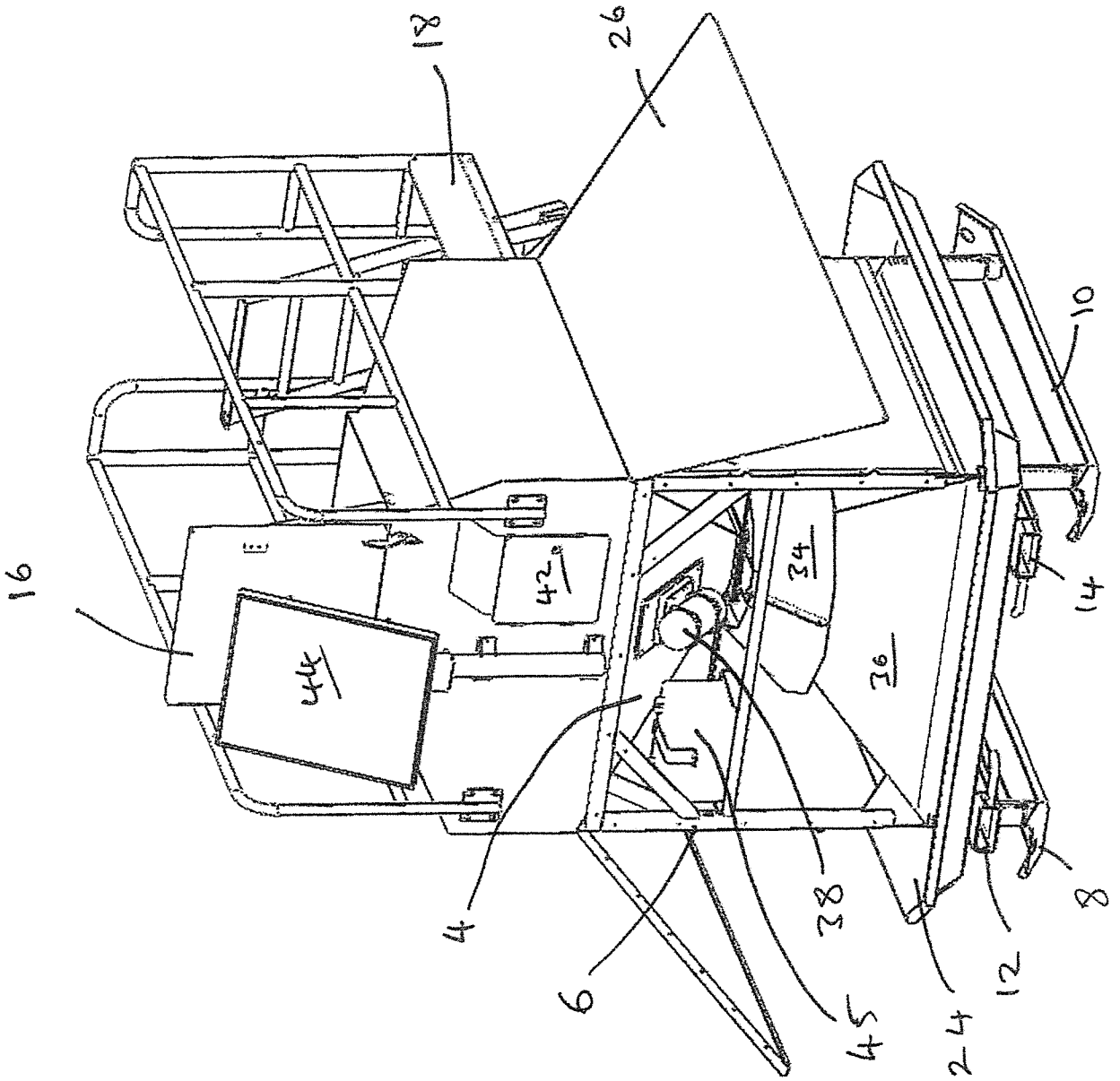


Figure 8