(54) Title: APPARATUS FOR FEEDING ANIMALS

(57) Abstract

An animal feeding pen (3) for one animal comprises a pair of side walls (1) and (2) which define an entrance (4). A closure frame (7) pivotally connected to the side walls (1, 2) is pivotal by a hoist (9, 11, 14, 15) from a downward closed position closing the pen (3), to an upward open position. A lever (16) extending from the closure frame (7) engages a pivotal latch (18) for releasably retaining the closure frame (7) in the open position. A trip frame (22) is pivotally suspended in the pen (3) for engagement by an animal. A lug (23) on the trip frame (22) engages the latch (18) for pivoting the latch (18) for disengaging the lever (16) as the animal enters the pen, thereby closing the closure frame (7).
FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>Austria</td>
<td>CA</td>
<td>Canada</td>
<td>FR</td>
<td>France</td>
</tr>
<tr>
<td>AU</td>
<td>Australia</td>
<td>CG</td>
<td>Congo</td>
<td>GB</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>BB</td>
<td>Barbados</td>
<td>CH</td>
<td>Switzerland</td>
<td>GN</td>
<td>Guinea</td>
</tr>
<tr>
<td>BE</td>
<td>Belgium</td>
<td>CI</td>
<td>Côte d'Ivoire</td>
<td>GR</td>
<td>Greece</td>
</tr>
<tr>
<td>BF</td>
<td>Burkina Faso</td>
<td>CM</td>
<td>Cameroon</td>
<td>HU</td>
<td>Hungary</td>
</tr>
<tr>
<td>BG</td>
<td>Bulgaria</td>
<td>CN</td>
<td>China</td>
<td>IE</td>
<td>Ireland</td>
</tr>
<tr>
<td>BJ</td>
<td>Benin</td>
<td>CS</td>
<td>Czechoslovakia</td>
<td>IT</td>
<td>Italy</td>
</tr>
<tr>
<td>BR</td>
<td>Brazil</td>
<td>CZ</td>
<td>Czech Republic</td>
<td>JP</td>
<td>Japan</td>
</tr>
<tr>
<td>BY</td>
<td>Belarus</td>
<td>CF</td>
<td>Central African Republic</td>
<td>KP</td>
<td>Democratic People's Republic of Korea</td>
</tr>
<tr>
<td>CA</td>
<td>Canada</td>
<td>CG</td>
<td>Congo</td>
<td>KR</td>
<td>Republic of Korea</td>
</tr>
<tr>
<td>CL</td>
<td>Chile</td>
<td>CM</td>
<td>Cameroon</td>
<td>KZ</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>CM</td>
<td>Cameroon</td>
<td>CN</td>
<td>China</td>
<td>LI</td>
<td>Liechtenstein</td>
</tr>
<tr>
<td>CS</td>
<td>Czech Republic</td>
<td>CZ</td>
<td>Czech Republic</td>
<td>LK</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>DE</td>
<td>Germany</td>
<td>DK</td>
<td>Denmark</td>
<td>LU</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>ES</td>
<td>Spain</td>
<td>FI</td>
<td>Finland</td>
<td>LV</td>
<td>Latvia</td>
</tr>
<tr>
<td>MR</td>
<td>Mauritania</td>
<td>MW</td>
<td>Malawi</td>
<td>NE</td>
<td>Niger</td>
</tr>
<tr>
<td>NL</td>
<td>Netherlands</td>
<td>NO</td>
<td>Norway</td>
<td>NZ</td>
<td>New Zealand</td>
</tr>
<tr>
<td>PL</td>
<td>Poland</td>
<td>PT</td>
<td>Portugal</td>
<td>RO</td>
<td>Romania</td>
</tr>
<tr>
<td>RU</td>
<td>Russian Federation</td>
<td>SD</td>
<td>Sudan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>Sweden</td>
<td>SI</td>
<td>Slovenia</td>
<td>SK</td>
<td>Slovak Republic</td>
</tr>
<tr>
<td>SN</td>
<td>Senegal</td>
<td>TD</td>
<td>Chad</td>
<td>TG</td>
<td>Togo</td>
</tr>
<tr>
<td>UA</td>
<td>Ukraine</td>
<td>US</td>
<td>United States of America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UZ</td>
<td>Uzbekistan</td>
<td>VN</td>
<td>Viet Nam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
"Apparatus for feeding animals"

The present invention relates to apparatus for feeding a plurality of animals, and to an animal feeding pen, and relates in particular to, though is not limited to, an animal feeding pen for feeding a pregnant sow.

Where animals are reared intensively, and in particular, where sows are reared intensively, it is important that each sow should get a balanced ration, and of equal importance is the fact that the sows should each receive the same quantity of the ration. In the intensive rearing of sows, in general, it is the practice to feed sows from a relatively large feeding trough. The troughs are generally sized so that up to ten sows, and in some cases more than ten sows, feed from the same trough. A particular disadvantage of this method of feeding is that the stronger sows by virtue of their physical strength tend to deprive the less strong sows of access to the feeding trough until their desire for feed has been satisfied. In many cases by the time the weaker sows reach the feeding trough most of the feed has been consumed by the stronger sows. Thus, this leads to a situation where the stronger sows by eating more tend to get stronger, while the weaker sows tend to deteriorate.

There is therefore a need for an apparatus for overcoming this problem.

It is an object of the invention to provide apparatus which overcomes the problems of known apparatus, and it is also an object of the invention to provide a pen for use in the apparatus. In particular, it is an object of the invention to provide apparatus and a pen which facilitates the feeding of rations of substantially similar size to a plurality of animals, for example, pigs and sows. A secondary object of the invention is to provide such apparatus which facilitates easy inspection
and removal of a pig or sow.

According to the invention, there is provided an animal feeding pen having an entrance wherein the pen comprises a first closure means which is moveable between an open and a closed position for closing the entrance, a first releasable retaining means for retaining the first closure means in the open position, and a trip means responsive to an animal entering the pen for releasing the retaining means for permitting the first closure means to move from the open to the closed position.

Preferably, an opening means for moving the first closure means into the open position is provided.

Preferably, a second releasable retaining means for retaining the first closure means in the closed position is provided. Advantageously, the second retaining means is releasable by the opening means.

Preferably, the trip means is operable by an animal, and advantageously, the trip means comprises a trip member movably mounted in the pen and operable by engagement with an animal.

The first closure means may be pivotal about a horizontal pivot axis from an upward open position to a downward closed position.

In one embodiment of the invention, means for urging the closure means into the closed position is provided.

In another embodiment of the invention, a counterweight means is provided for countering part of the weight of the first closure means acting in the direction of movement of the closure means from the open to the closed position.

Preferably, the weight of the counterweight means is less than the weight of the closure means acting in the direction of
movement of the closure weight means from the open to the closed position so that the weight difference between the closure means and the counterweight means acts as the means for urging the closure means into the closed position.

In one embodiment of the invention, cushioning means is provided for cushioning the first closure means as it moves from the open position to the lower closed position.

Preferably, the first releasable retaining means comprises a latch pivotally connected to the pen and engagable with a lever extending from the first closure means.

Advantageously, the first closure means comprises a closure frame.

Preferably, an exit is provided from the pen, and advantageously, the exit is provided opposite the entrance.

Preferably, a second closure means is provided for closing the exit. In accordance with a further feature of the invention, the second closure means comprises a door hingedly connected to the pen.

Preferably, each animal feeding pen is of a size to accommodate only one animal.

Preferably, the opening means for opening the first closure means comprises a hoist mechanism, the hoist mechanism being connected to the first closure means, and drive means being provided for driving the hoist mechanism for moving the closure means from the closed to the open position.

Additionally, the invention provides apparatus for feeding a plurality of animals, the apparatus comprising a plurality of animal feeding pens according to the invention, which are
preferably arranged side by side with their respective entrances facing in a similar direction.

The advantages of the invention are many. A particularly important advantage of the invention is achieved where the animal feeding pen is of size to accommodate only one animal. A ration of feed can be provided in the pen for the animal, and the animal can consume the ration undisturbed. Where a plurality of pens are provided in the apparatus, animals can feed in the respective pens without being disturbed by other animals. In this way, each animal receives a similar ration to each of the other animals. Indeed, it is envisaged in certain cases that pens may be dedicated to individual animals, in which case rations appropriate for the respective animals may be provided in the respective pens. By providing the trip means responsive to an animal entering the pen, the closure means of the respective pens are closed individually by the respective animals entering the pens. Thus, once an animal has entered a pen, the closure means of that pen closes behind the animal, thereby preventing the entry of other animals, and thus avoiding any disturbance of the animal in the pen while eating the ration. The provision of the trip means being operable by the animal provides a relatively simple and robust construction of pen which requires minimal maintenance. The provision of opening means for moving the first closure means into the open position provides for easy operation of the apparatus, and of each pen.

The provision of second releasable retaining means for retaining the closure means in the closed position provides the additional advantage that there is no danger of an animal opening the closure means to enter a pen already occupied by an animal. Where the second releasable retaining means is releasable by the opening means, a particularly easily operable apparatus and pen is provided.

The provision of the trip means being operable on engagement with
an animal provides a particularly advantageous arrangement of pen.

The provision of means for urging the closure means into the closed position further facilitates operation of the closure means by the action of an animal entering the pen. The provision of a counterweight means avoids any danger of the closure means injuring the animal. Indeed, where the weight of the counterweight means is less than the weight of the closure weight means in the direction of movement of the closure means from the closed to the open position, a particularly advantageous construction of pen is provided, in that the difference in weight between the closure means and the counterweight acts as the means for urging the closure means into the closed position.

The provision of a cushioning means further avoids any danger of the animal being injured by the closure means as the closure means is moving into the closed position.

A particularly advantageous construction of apparatus and pen is achieved when the closure means is pivotal, and in particular when the closure means is pivotally connected to the side walls of the pen.

The invention will be more clearly understood from the following description of a preferred embodiment thereof given by way of example only with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a sow feeding pen according to the invention open so as to allow a sow to enter or leave,

Fig. 2 is a partly cut away view similar to Fig. 1, but with the pen shown closed,
Fig. 3 is a plan view of apparatus according to the invention comprising a number of the pens of Fig. 1 arranged in side-by-side relationship,

Fig. 4 is a perspective view on a larger scale of a detail of the pen of Fig. 1,

Figs. 5A, 5B and 5C illustrate another detail of the pen of Fig. 1, in particular the trip mechanism for releasing the closure means to allow the pen to close, Fig. 5A being a side elevation before tripping, Fig. 5B being a perspective view at the instant the mechanism is being tripped and Fig. 5C being a side elevation immediately after tripping,

Figs. 6A, 6B and 6C illustrate another detail of the pen of Fig. 1, in particular a linkage for releasably retaining the closure means in the closed position, Fig. 6A being a side elevation with the pen closed, Fig. 6B being a side elevation with the pen open and Fig. 6C being an enlarged perspective view of a detail of the linkage, and

Fig. 7 is a view similar to Fig. 2, but showing a modified construction of a pen.

Referring to the drawings, the apparatus according to the invention comprises a plurality of pens 3 also according to the invention arranged side by side as illustrated in Fig. 3, and as will be described below. Each pen 3 defines a rectangular area 50, and each pen 3 accommodates one sow in the area 50.

Referring to Figs. 1 and 2, each pen 3 comprises two parallel spaced apart side walls 1 and 2 which together define an entrance 4 at one end through which the sow may enter the pen 3, and an exit 5 at the other end. A feeding trough 6 (see Fig. 3) is located in each pen 3 towards the exit 5. Ground engaging legs 49 extend downwardly from the side wall 1 and 2. A first closure means in the form of a closure frame 7 is pivotally carried on a
pivot shaft 51 which is in turn carried on brackets 52 extending from the respective side walls 1 and 2. The pivot shaft 51 defines a horizontal axis about which the closure frame 7 is pivotal from an open position above the pen 3 as shown in Fig. 1 to a closed position as shown in Fig. 2, to close the entrance 4. A tubular member 57 extending transversely of the closure frame 7 between opposite side members 58 of the closure frame 7 pivotally engages the pivot shaft 51. The tubular member 57 is rigidly secured to the side members 58. A second closure means comprises a hinged door 8 hinged at 53 to the side wall 1 for closing the exit 5.

To prepare a pen 3 for feeding, the closure frame 7 is hoisted from the closed to the open position by an opening means, namely, a hoist mechanism 9 which will be described in more detail below. Once it has been raised by the hoist mechanism 9, the closure frame 7 is retained in the open position by a first releasable retaining means, namely, a retaining mechanism, indicated generally by the reference numeral 10 (see Figs. 5A, 5B and 5C) which will be described in more detail below. Thus, the closure frame 7 is held in the open position by the retaining mechanism 10 only.

A sow enters the pen 3 through the entrance 4 to feed from the trough 6. The movement of the sow into the pen 3 releases the retaining mechanism 10 as will be described in more detail below; and the closure frame 7 then descends under its own weight from the open position to the closed position, preventing the sow from leaving the pen 3, and preventing any other sow from entering the pen 3.

After feeding, the closure frame 7 is again hoisted from the closed to the open position by means of the hoist mechanism 9, allowing the sow to leave through the entrance 4.

The preceding paragraphs described the operation of a single pen
3. Typically, the apparatus according to the invention comprises a large number of pens 3 arranged side by side as shown in Fig. 3, with the entrances 4 facing a sty 100 and with the exits 5 facing a walkway 101 where the operator stands. A single overhead hoist mechanism 9 is provided for simultaneously raising all the closure frames 7 into the open position. Adjacent pens 3 share common side walls, so that the side wall 1 of one pen 3 forms the side wall 2 of the next adjacent pen 3. When the operator puts pig feed in the troughs 6, sows enter the respective pens 3, and as each sow enters a pen 3, the corresponding closure frame 7 descends, closing the pen 3 and thereby ensuring that the sow can feed undisturbed. After all the sows have finished feeding, the hoist mechanism 9 is operated to raise all the closure frames 7 simultaneously and release all the sows back into the sty 100.

During feeding the operator may walk along the walkway 101 inspecting the condition of each sow, and if any sow requires more detailed inspection the operator can open the door 8 and bring the sow out through the exit 5 onto the walkway 101, and can subsequently return the sow through the exit 5. It will be appreciated that inspection and treatment is an important aspect of the handling of sows when pregnant.

The pens 3 are located in a covered housing. It will therefore be appreciated that raising the closure frame 7, which represents half of the area 50 of a pen 3, when the pen 3 is not in use, represents a considerable advantage in space saved in a confined area.

Referring to Fig. 4, the hoist mechanism 9 comprises an overhead shaft 11 rotatable in bearings 54 which are carried on stanchions 55 which in turn extend upwardly from the side walls 1 and 2. In general, stanchions 55 will not be provided extending from every side wall 1 and 2, but will be located at intervals sufficient for supporting the shaft 11 over a plurality of pens 3. An
electric motor 12 rotates the shaft 11 for winding a belt 14 onto the shaft 11 for raising the closure frame 7 into the open position. A chain 15 connects the belt 14 to the closure frame 7 as will be described below. The shaft 11 is freely rotatable for unwinding the belt 14 when the motor 12 is deactivated to permit the closure frame 7 to be returned to the closed position.

A lever 16 extending rigidly from the closure frame 7 is of sufficient weight to act as a counterweight for preventing the closure frame 7 descending too rapidly into the closed position, and thereby avoids injury to the sow. Additionally, the lever 16 is of weight just less than the weight of the closure frame 7, and the difference in weight between the closure frame 7 and the lever 16 is such as to provide an urging force, namely, an urging means for urging the closure frame 7 downwardly into the closed position. Cushioning means comprising a shock absorber 17 further slows and cushions the descent of the closure frame 7 into the closed position. One end of the shock absorber 17 is connected to a transverse arm 41 extending from the side wall 1, while the other end is connected to a link 42 extending from the tubular member 57 of the closure frame 7.

The retaining mechanism 10 for retaining the closure frame 7 in the open position is best seen in Figs. 5A, 5B and 5C and comprises an L-shaped latch 18 pivotally mounted on a bracket 19, which in turn is mounted on the inside of the side wall 2. An end face 18c of an arm 18a of the latch 18 engages an end face 21 of the lever 16 when the closure frame 7 has been raised into the open position for retaining the closure frame 7 in the open position. A stop member 20 extending from the side wall 2 engages an arm 18b of the latch 18 to limit pivotal movement of the latch 18 in the direction of the arrow B.

Trip means for pivoting the latch 18 in the direction of the arrow A for releasing the lever 16 and in turn the closure frame 7 comprises a trip member, in this case a trip frame 22 which
extends across the pen 3, and is pivotally suspended into the pen 3 from a pivot bracket 59 carried on the arm 41. The trip frame 22 comprises a pair of spaced apart side members 61 joined by a top cross member 62 which pivotally engages the pivot bracket 59. Only one of the side members 61 is illustrated in the drawings. The pivot bracket 59 comprises a pair of spaced apart eye members 63, one of which is illustrated in Figs. 2, 5A and 5C, which pivotally engage the top cross member 62. A pig engaging cross member 64 extends between the side members 61 for engaging the neck and shoulders of the pig for pivoting the trip frame 22 as it enters into the pen 3. A lug 23 extends sidewardly from one of the side members 61 for engaging an arm 18b of the latch 18 for pivoting the latch 18 in the direction of the arrow A for disengaging the faces 18c and 21 of the latch 18 and lever 21, respectively, as the pig pivots the trip frame 22 in the direction of the arrow B, thereby releasing the lever 21 and in turn permitting the closure frame 7 to pivot downwardly into the closed position.

The arm 18b of the latch 18 is sufficiently weighted relative to the arm 18a for returning the latch 18 in the direction of the arrow C to abut the stop member 20 on being disengaged by the lug 23. In this way, as the closure frame 7 is pivoted into the open position, the lever 16 pivots the latch 18 slightly in the direction of the arrow A, and on the lever 16 having pivoted past the arm 18a, the latch 18 returns so that the arm 18b abuts the stop member 20 and the face 18c of the arm 18a engages the face 21 of the lever 16.

Referring now to Figs. 6A, 6B and 6C, there is illustrated a second releasable retaining means comprising a mechanical linkage indicated generally by the reference numeral 65 for retaining the closure frame 7 in the closed position. The mechanical linkage 65 comprises a fixed link 31 rigidly attached to the side wall 1 and a fixed link 34 rigidly attached to one of the side members 58 of the closure frame 7. A pair of floating links 32 and 33
are pivotally connected together by a pivot pin 36 and are respectively pivotally connected to the fixed links 31 and 34 by pivot pins 67 and 68, respectively. The mechanical linkage 65 pivots from the position illustrated in Fig. 6B to the position illustrated in Fig. 6A as the closure frame 7 pivots from the open position illustrated in Fig. 6B to the closed position illustrated in Fig. 6A. A portion 66 of the floating link 33 extends beyond the pivot pin 36 and carries a lip 35 which engages the floating member 32 as the floating links 32 and 33 pivot downwardly in the direction of the arrow D into their aligned position illustrated in Fig. 6A, or pivot just beyond their aligned position. In this way, further pivotal movement of the floating links 32 and 33 in the downward direction of the arrow D is prevented. Thus, while the floating links 32 and 33 are in the aligned position illustrated in Fig. 6A, the closure frame 7 is retained in the closed position since the weight of the floating links 32 and 33 prevents upward pivotal movement of the floating links 32 and 33 in the direction of the arrow E. An extension 33a extends from the floating link 33 beyond the pivot 68. The chain 15 slidably extends through a pair of tubular members 37 secured to one of the side members 58 of the closure frame 7 and is attached to the extension 33a for pivoting the floating links 32 and 33 out of the aligned position in the direction of the arrow E as the belt 14 commences to wind onto the shaft 11, thereby permitting pivoting of the closure frame 7 from the closed to the open position. Thus, further winding of the belt 14 onto the shaft 11 raises the closure frame 7 to the open position.

In use, the closure frames 7 of the pens 3 are generally retained in the open position by the action of the latch 18 on the lever 16. The motor 12 is deactivated, and permits free rotation of the shaft 11. When it is desired to feed the pigs, animal feed is placed in the troughs 6 of the respective pens 3. The pigs then enter the respective pens 3, one pig to a pen 3. Each pig, on entering a pen 3, engages the pig engaging cross member 64 of
the trip frame 22, thereby moving the trip frame 22 in the direction of the arrow C, so that the lug 23 engages the latch 18 and pivots the latch 18 in the direction of the arrow A, thereby releasing the lever 16. The closure frame 7 pivots under the action of the difference in the weight of the closure frame 7 and the lever 16 from the open to the closed position. Downward movement of the closure frame 7 is cushioned by the shock absorber 17. On the closure frame 7 pivoting into the closed position, the floating links 32 and 33 pivot downwardly in the direction of the arrow D into the aligned position as illustrated in Fig. 6A, thereby retaining the closure frame in the closed position. When all the pigs are finished eating, the closure frames 7 of the pens 3 are simultaneously raised by activating the motor 12 to rotate the shaft 11, thereby winding the belts 14 onto the shaft 11. The initial winding of the belts 14 onto the shaft 11 pivots the floating links 32 and 33 upwardly in the direction of the arrow E out of the aligned position, thereby permitting upward pivoting of the closure frames 7 from the opened to the closed position. Further winding of the belts 14 onto the shaft 11 pivots the closure frames 7 to the open position. On the closure frames 7 being pivoted fully into the open position, the latches 18 engages the levers 16, thereby retaining the closure frames 7 in the open position. During feeding, if desired, the door 8 of any of the pens 3 may be opened for removal of a pig for inspection or other treatment.

Referring now to Fig. 7, there is illustrated a pen according to another embodiment of the invention indicated generally by the reference numeral 110. The pen 110 is substantially similar to the pen 3 and similar components are identified by the same reference numerals. The main difference between the pen 110 and the pen 3 is in the mechanical linkage for retaining the closure frame 7 in the closed position and in the lever which forms part of the first retaining means for retaining the closure frame 7 in the open position.
The mechanical linkage 165 in this case comprises a fixed link 131 which extends upwardly from the arm 41, and a fixed link 134 secured to a cross member 107 of the closure frame 7. Floating links 132 and 133 are pivotally connected together and to the fixed links 131 and 134 in similar fashion as the floating links 32 and 33 are pivotally connected together and to the links 31 and 34 of the pen 3. A lip 135 which is similar to the lip 35 is carried on the floating link 133 for engaging the link 132 to prevent the floating links 132 and 133 pivoting downwardly in the direction of the arrow D beyond or just beyond their aligned position. However, in this embodiment of the invention, the chain 15 has been omitted and the belt 14 is connected to the floating link 132 by a bracket 132a at a position intermediate the pivot pins 136 and 167. Accordingly, when the closure frame 7 is in the closed position, and the belt 14 is being wound onto the shaft 11, initial winding of the belt 14 onto the shaft 11 causes the two floating links 132 and 133 to pivot upwardly in the direction of the arrow E, thereby permitting pivotal movement of the closure frame 7 from the closed to the open position. Further winding of the belt 14 onto the shaft 11 pivots the floating link 132 in the direction of the arrow F about the pivot pin 167, which in turn, thereby pivots the closure frame 7 from the closed into the open position.

The lever of the first retaining means is indicated by the reference numeral 116, and instead of being weighted to form a counterweight, carries a counterweight 118. The lever terminates in a portion 20 which defines a face (not shown) similar to the face 21 for engaging the latch 18. Otherwise, the lever 116 and its operation and co-operation with the latch 18 is identical to the lever 16 of the pen 3.

While a particular construction of second retaining means has been provided, other suitable second retaining means for retaining the closure frame 7 in the closed position may be provided. Additionally, other suitable first retaining means may
be provided for retaining the closure frame in the open position. Other trip means may also be provided, and the trip means may be activated by any other part of the animal as the animal enters into the pen, or towards the trough in the pen.

It will of course be appreciated that other suitable opening means may be provided besides the hoist which has been described, and in certain cases manual opening means may be provided.

While the pens have been described as being suitable for a sow or a pig, the pens may be provided for any other animal, and needless to say, where pens are provided for other animals, they would be sized and shaped to suit the particular animals for which they are provided.
CLAIMS

1. An animal feeding pen (3) having an entrance (4), characterized in that the pen (3) comprises a first closure means (7) which is movable between an open and a closed position for closing the entrance (4), a first releasable retaining means (16,18) for retaining the first closure means (7) in the open position, and a trip means (22,23) responsive to an animal entering the pen (3) for releasing the retaining means for permitting the first closure means (7) to move from the open to the closed position.

2. An animal feeding pen according to claim 1 characterized in that an opening means (9) for moving the first closure means (7) into the open position is provided.

3. An animal feeding pen according to claim 1 or 2 characterized in that a second releasable retaining means (65) for retaining the first closure means (7) in the closed position is provided.

4. An animal feeding pen according to claim 3 characterized in that the second retaining means (65) is releasable by the opening means (9).

5. An animal feeding pen according to any preceding claim characterized in that the trip means (22,23) is operable by an animal.

6. An animal feeding pen according to any preceding claim characterized in that the trip means (22,23) comprises a trip member (22,23) movably mounted in the pen (3) and operable by engagement with an animal.

7. An animal feeding pen according to any preceding claim characterized in that the first closure means (7) is pivotal about a horizontal pivot axis (51) from an upper open position to a lower closed position.
8. An animal feeding pen according to any preceding claim characterized in that means for urging the closure means (7) into the closed position is provided.

9. An animal feeding pen according to any preceding claim characterized in that a counterweight means (16) is provided for countering part of the weight of the first closure means (7) acting in the direction of movement of the closure means (7) from the open to the closed position.

10. An animal feeding pen according to Claim 8 or 9 characterized in that the weight of the counterweight means (16) is less than the weight of the closure means (7) acting in the direction of movement of the closure means (7) from the open to the closed position so that the weight difference between the closure means (7) and the counterweight means (16) acts as the means for urging the closure means (7) into the closed position.

11. An animal feeding pen according to any preceding claim characterized in that cushioning means (17) is provided for cushioning the first closure means (7) as it moves from the open position to the lower closed position.

12. An animal feeding pen according to any preceding claim characterized in that the pen (3) comprises a pair of spaced apart side walls (1,2), one end of the side walls defining the entrance (4).

13. An animal feeding pen according to claim 12, characterized in that the first closure means (7) is pivotally connected to the side walls (1,2).

14. An animal feeding pen according to any preceding claim characterized in that the first releasable retaining means (16,18) comprises a latch (18) pivotally connected to the pen (3) and engagable with a lever (16) extending from the first closure
means (7).

15. An animal feeding pen according to any preceding claim characterized in that the first closure means (7) comprises a closure frame (7).

16. An animal feeding pen according to any preceding claim characterized in that an exit (5) is provided from the pen (3).

17. An animal feeding pen according to claim 16, characterized in that the exit (5) is provided opposite the entrance (4).

18. An animal feeding pen according to claim 16 or 17, characterized in that a second closure means (8) is provided for closing the exit (5).

19. An animal feeding pen according to claim 18 characterized in that the second closure means (8) comprises a door (8) hingedly connected to the pen.

20. An animal feeding pen according to any preceding claim, characterized in that the animal feeding pen (3) is of a size to accommodate only one animal.

21. An animal feeding pen according to any of claims 2 to 20 characterized in that the opening means (9) for opening the first closure means comprises a hoist mechanism (9,11,14,15), the hoist mechanism being connected to the first closure means (7), and drive means (12) being provided for driving the hoist mechanism (9,11,14,15) for moving the closure means (7) from the closed to the open position.

22. Apparatus for feeding a plurality of animals, characterized in that the apparatus comprises a plurality of animal feeding pens (3) according to any one of the preceding claims.
23. Apparatus according to claim 22 characterized in that the plurality of animal feeding pens (3) are arranged side by side with their respective entrances (4) facing in a similar direction.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/IE 93/00041

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: A01K 1/02
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)

IPC5: A01K

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>DE, B2, 1916966 (EGGERKING, WILFRIED), 10 November 1977 (10.11.77), column 5, line 4 - line 30, figures 1-5</td>
<td>1, 2, 5-9, 12-16,20</td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td>22,23</td>
</tr>
<tr>
<td>X</td>
<td>US, A, 2814271 (D.S. BLACK), 26 November 1957 (26.11.57), column 2, line 64 - line 71, figures 1, 2, claim 1</td>
<td>1-6, 8,12,13, 15-20</td>
</tr>
<tr>
<td>Y</td>
<td>US, A, 4129096 (L.L. NICKEL), 12 December 1978 (12.12.78), column 1, line 1 - line 19, figures 2, 6</td>
<td>22,23</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search | Date of mailing of the international search report
30 Sept. 1993 | 08. 11. 93

Name and mailing address of the International Searching Authority
European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel.: (+31-70) 340-2040, Tx.: 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer
Catarina Forssén

Form PCT/ISA/210 (second sheet) (July 1992)
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>AT, B, 383722 (AGRARTECHNIK GRIESKIRCHEN GESELLSCHAFT M.B.H.), 10 August 1987 (10.08.87), figures 1,2, claim 1</td>
<td>1</td>
</tr>
<tr>
<td>Patent document cited in search report</td>
<td>Publication date</td>
<td>Patent family member(s)</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>DE-B2- 1916966</td>
<td>10/11/77</td>
<td>NONE</td>
</tr>
<tr>
<td>US-A- 4129096</td>
<td>12/12/78</td>
<td>NONE</td>
</tr>
<tr>
<td>AT-B- 383722</td>
<td>10/06/87</td>
<td>NONE</td>
</tr>
</tbody>
</table>

Form PCT/ISA/210 (patent family annex) (July 1992)