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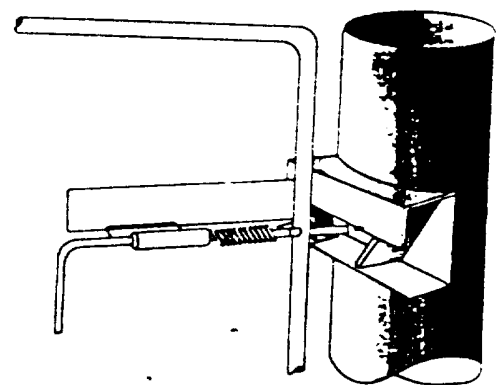
<p>(21) Application Number: AP/P/92/00406</p> <p>(22) Filing Date: 26.06.92</p> <p>(24) Date of Grant & Publication: 28.07.95</p> <hr/> <p>(30) Priority Data:</p> <p>(33) Country:</p> <p>(31) Number:</p> <p>(32) Date:</p> <hr/> <p>(84) Designated States:</p> <p style="text-align: center;">BW KE MW ZM ZW</p>	<p>(73) Applicant (s):</p> <p>JACK M. THIBE P. O. Box 20168 GABORONE Botswana</p> <p>(72) Inventor (s):</p> <p style="text-align: center;">Same as above</p> <p>(74) Representative:</p> <p>JACK M. THIBE P. O. Box 20168 GABORONE Botswana</p>
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(51) International Patent Classification Int. C1.⁵ F16L 37/46

(54) Title: THE AUTOMATIC SAFETY GATE UNITS

(57) Abstract

This invention relates to an automatic safety gate closer for closing a gate a predetermined time interval after a vehicle or individual has passed therethrough. The gate is biased to close when opened by a counterweight. A timer is connected to a catch which holds the gate open and releases the gate after a predetermined time period allowing it to close. The timer is pneumatic and has a piston reciprocable within a cylinder, a connecting rod connected to the cylinder and to the catch, a compression spring urging the piston from a bottom position to a top position and a valve which allows air to bleed from the top of the cylinder.



CLOSING CATCH DEVICE

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AUTOMATIC SAFETY GATE COMPONENTINTRODUCTION

THIS INVENTION relates to an automatic safety gate closer and to a timer for activating a closing mechanism for a gate after a horse drawn vehicle or motor vehicle has passed through the gate.

BACKGROUND TO THE INVENTION

Gates to farms and other gates in rural and underdeveloped areas are often left open by persons

/driving or

driving or passing therethrough. The reason for this is that it is usually inconvenient and time consuming to stop a vehicle and close a gate to resume a journey.

Where farm gates and other gates are left open stock particularly large animals such as cattle and the like can wander through the gate often straying considerable distances. These unattended animals present a considerable hazard to road users specially to drivers and passengers in motor vehicles and particularly at night.

Timing devices for operating spring loaded gate closing mechanisms are known. Such timing devices tend however to be intricate and are consequently expensive to manufacture and to maintain. Because of this they frequently break and the gate needs to be closed manually. This in itself presents a problem for travellers seeing such a timer will automatically assume that the gate will close behind them thus exacerbating the problem of straying livestock and other animals.

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OBJECT OF THE INVENTION

It is an object of this invention to provide an automatic safety gate closer and to a timer for regulating the closing of a gate after the passage of a vehicle therethrough, which at least partly alleviates the abovementioned difficulty.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided an automatic safety gate closer comprising a gate having a biasing mechanism which urges the gate from an open position into a closed position and a timer which is operable to release a catch holding the gate in its open position thereby enabling the gate to close; said biasing mechanism comprising a first arm which projects operatively rearwardly from the gate, a second arm which projects operatively rearwardly from a gate post to which the gate is hingedly hung and parallel to the first arm, a flexible connector element having a first end secured to the first arm and a second end passing through an aperture in the second arm, and

/a weight



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a weight attached to the second end of the connector; said timer comprising a cylinder having a first end and a second end; a piston reciprocatable within the cylinder; a compression spring within the cylinder urging the piston towards the first end of the cylinder; a connecting rod having a first end connected to the piston and a second end protruding from the second end of the cylinder; a catch means towards the second end of the connecting rod, said catch means operable to engage an end of a gate when the piston is located towards the second end of the cylinder and release the gate when the piston is towards the first end of the cylinder; and an air valve located towards the first end of the cylinder, the valve is operable to allow air to enter the cylinder when the piston is moved towards the second end of the cylinder and to allow air to bleed slowly from the cylinder as the piston returns towards the first end of the cylinder under action from the compression spring thereby releasing the gate and enabling it to close.

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There is also provided for the piston to be in the form of a plunger having a diaphragm located towards the first end of the connecting rod, for the second end of the connecting rod to have a foot plate which is depressed, in use, by a foot of a person opening the gate to draw the piston towards the second end of the cylinder against the force of the compression spring, for the air valve to be adjustable to selectively increase and decrease the rate at which air escapes from the cylinder thereby altering the time period within which the gate is held open and for the valve to be operable to release air from the cylinder by means of a linkage connected to a clock timing means.

There is further provided for the flexible connector element of the biasing mechanism to be a length of chain, alternatively a length of cable.

A further feature of the invention provides for the gate to be retained in its closed position by a catch which is secured to a gate post, said catch comprising a horizontal channel in the operatively inner face of the post and a pair of spaced apart

/downwardly depending



downwardly depending wings hingedly connected to the operatively upper flange of the channel, the length of the wings being greater than the width of the channel and the operative free ends of each wing being orientated towards each other, in use when a bar projecting from the gate enters the channel, the wing on the side of the channel entered pivots about its hinge allowing the bar to enter further into the channel and when the bar passes beyond the operatively lower free end of the wing, the wing returns to its original position and the bar and consequently the gate is secured in its closed position.

The invention also extends to a timer, and to a biasing mechanism, and to a catch means as defined above.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will be described below by way of example only, and with reference to the accompanying drawings, in which:

/Figure 1 is

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Figure 1 is a side elevational view of a first embodiment of a timer operable to release a catch holding open a gate against a biasing force;

Figure 2 is a sectional side view of the timer of Figure 1;

Figure 3 is an isometric view of the embodiment of a timer of Figures 1 and 2 mounted to a mounting post adjacent a gate; and

Figure 4 is an isometric view of a second embodiment of a timer according to the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to Figures 1 and 2, a timer (1) operable to release a catch (2) holding open a gate (not shown) against a biasing force thereby enabling the gate to close comprises a cylinder (3) having a first end (4) and a second end (5). A piston (6) is reciprocatable within the cylinder (3). A

/compression spring



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compression spring (7) within the cylinder (3) urges the piston (6) towards the first end (4) of the cylinder (3).

A connecting rod (8) has a first end (9) connected to the piston (6) and a second end (10) which protrudes from the second end (5) of the cylinder (3). The catch (2) is located towards the second end (10) of the connecting rod (8). The catch means (2) is operable to engage and end (not shown) of a gate (not shown) when the piston (6) is located towards the second end (5) of the cylinder (3) and releases the gate (not shown) when the piston (6) is towards the first end (4) of the cylinder (3). An air valve (11) is located towards the first end (4) of the cylinder (3). The valve (11) is operable to allow air to enter the cylinder (3) when the piston (6) is moved towards the second end (5) of the cylinder (3). The valve (4) is also operable to allow air to bleed slowly from the cylinder (3) as the piston (6) returns towards the first end (4) of the cylinder (3) under action from the compression spring (7) thereby releasing the gate (not shown) and enabling it to close.

/The piston

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The piston (6) is in the form of a plunger having a diaphragm located towards the first end of the connecting rod (8). The second end of the connection rod (10) has a foot plate (12) pending laterally therefrom. The foot plate (12) is depressed in use by the foot of a person opening the gate to draw the piston (6) towards the second end of the cylinder (3) against the force of a compression spring (7).

The air valve (11) is adjustable in use to selectively increase and decrease the rate at which air escapes from the cylinder (3) thereby altering the time period within which the gate is held open by the catch (2). The valve (11) may also be openable to release air from the cylinder (3) by means of a linkage connected to a clock timing means.

Referring to Figure 3, the timer (1) is mounted to a vertical post (13). The cylinder (3) is covered by a protective screen (14) and the second end (10) of the connecting rod (8) projects from the operatively lower end (15) of the screen. The end

/(10) of

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(10) of the connecting rod (8) has a laterally extending guide (16) which is cooperable with a set of rails (17) also mounted operatively vertically to the post (13). When the foot plate (12) is depressed and the piston (not shown) and connecting rod (8) are moved operatively downwardly the guide (16) ensures that the connecting rod moves in a vertical direction only.

Referring to Figure 4, an alternate embodiment of a timer (20) according to the invention is shown. In this embodiment the piston (21) has an operatively upper end (22), an operatively lower end (23) and an air release valve (24) located at its upper end (22). A connecting rod (25) which has a foot plate (26) and catch (27) projects from the operatively lower ends (23) of the cylinder (21). In this embodiment a clock timing means (28) is used to allow air to be released through the valve (24) from the cylinder (21). The timing means (28) has an operatively vertically orientated arm (29) which is rotatable. One end (30) of the arm (29) has a pin (31) secured thereto. As the arm (29) rotates so does the pin (31) until the pin (31) depresses a

/release mechanism

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release mechanism (32) on the valve (24) thereby allowing air to escape rapidly from the cylinder. The timer (28) is linked to the foot plate (26) by a flexible cable (33). In use, then the foot plate (26) is depressed, the downward movement of the foot plate is transferred to an opposite end (34) of the arm (29) through the cable (33). This causes the arm (29) to rotate in a clockwise direction. Once wound the timer regulates the rate at which the arm (29) rotates in a counter clockwise direction until the pin (31) depresses the valve means (32) and allows the piston to move towards the first end (22) of the cylinder (21).

Referring specifically to Figures 3 and 4, when a gate (not shown) is opened against the biasing of a spring or similar mechanism arranged to close the gate. The person opening the gate depresses the foot plate. As the foot plate is depressed this draws the piston operatively downwardly away from the first end of the cylinder towards the second end of the cylinder and simultaneously compresses a compression spring.

/When the

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When the foot plate is depressed with the gate held open the catch engages the operatively lower end of the gate thereby holding it open. As air bleeds from the valve the piston moves towards the first end of the cylinder and, after a period of time, the catch is lifted operatively upwardly to release the gate which can close under spring biasing. The rate at which air is released from the valve can be adjusted thereby lengthening or reducing the length of time which the gate is held open. It is envisaged that a timer according to the invention will be easy to maintain and install and will go a long way to alleviating the disadvantages mentioned above.

/CLAIMS

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CLAIMS

1. An automatic safety gate closer comprising a gate having a biasing mechanism which urges the gate from an open position into a closed position and a timer which is operable to release a catch holding the gate in its open position thereby enabling the gate to close; said biasing mechanism comprising a first arm which projects operatively rearwardly from the gate, a second arm which projects operatively rearwardly from a gate post to which the gate is hingedly hung and parallel to the first arm, a flexible connector element having a first end secured to the first arm and a second end passing through an aperture in the second arm, and a weight attached to the second end of the connector; said timer comprising a cylinder having a first end and a second end; a piston reciprocatable within the cylinder; a compression spring within the cylinder urging the piston towards the first end of the cylinder; a connecting rod having a first end connected to the piston and a

/second end

second end protruding from the second end of the cylinder; a catch means towards the second end of the connecting rod, said catch means operable to engage an end of a gate when the piston is located towards the second end of the cylinder and release the gate when the piston is towards the first end of the cylinder; and an air valve located towards the first end of the cylinder, the valve is operable to allow air to enter the cylinder when the piston is moved towards the second end of the cylinder and to allow air to bleed slowly from the cylinder as the piston returns towards the first end of the cylinder under action from the compression spring thereby releasing the gate and enabling it to close.

2. An automatic safety gate closer as claimed in claim 1 in which the piston is in the form of a plunger having a diaphragm located towards the first end of the connecting rod.
3. An automatic safety gate closer as claimed in claim 1 or in claim 2 in which the second end

/of the

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of the connecting rod has a foot plate which is depressed, in use, by a foot of a person opening the gate to draw the piston towards the second end of the cylinder against the force of the compression spring.

4. An automatic safety gate closer as claimed in any one of claims 1 to 3 in which the air valve is adjustable to selectively increase and decrease the rate at which air escapes from the cylinder thereby altering the time period within which the gate is held open.
5. An automatic safety gate closer as claimed in any one of claims 1 to 3 in which the valve is operable to release air from the cylinder by means of a linkage connected to a clock timing means.
6. An automatic safety gate closer as claimed in any one of the preceding claims in which the flexible connector element of the biasing mechanism is a length of chain.

/7. An automatic

7. An automatic safety gate closer as claimed in any one of claims 1 to 5 in which the flexible connector element of the biasing mechanism is a length of cable.

8. An automatic safety gate closer as claimed in any one of the preceding claims in which the gate is retained in its closed position by a catch which is secured to a gate post, said catch comprising a horizontal channel in the operatively inner face of the post and a pair of spaced apart downwardly depending wings hingedly connected to the operatively upper flange of the channel, the length of the wings being greater than the width of the channel and the operative free ends of each wing being orientated towards each other, in use when a bar projecting from the gate enters the channel, the wing on the side of the channel entered pivots about its hinge allowing the bar to enter further into the channel and when the bar passes beyond the operatively lower free end of the wing, the wing returns to its

/original position



original position and the bar and consequently the gate is secured in its closed position.

9. A biasing mechanism for an automatic safety gate closer as claimed in any one of the preceding claims comprising a first arm which projects operatively rearwardly from the gate, a second arm which projects operatively rearwardly from a gate post to which the gate is hingedly hung and parallel to the first arm, a flexible connector element having a first end secured to the first arm and a second end passing through an aperture in the second arm, and a weight attached to the second end of the connector.

10. A timer for an automatic safety gate closer as claimed in any one of claims 1 to 8 comprising a cylinder having a first end and a second end; a piston reciprocatable within the cylinder; a compression spring within the cylinder urging the piston towards the first end of the cylinder; a connecting rod having a first end connected to the piston and a

/second end

second end protruding from the second end of the cylinder; a catch means towards the second end of the connecting rod, said catch means operable to engage an end of a gate when the piston is located towards the second end of the cylinder and release the gate when the piston is towards the first end of the cylinder; and an air valve located towards the first end of the cylinder, the valve is operable to allow air to enter the cylinder when the piston is moved towards the second end of the cylinder and to allow air to bleed slowly from the cylinder as the piston returns towards the first end of the cylinder under action from the compression spring thereby releasing the gate and enabling it to close.

11. A catch for an automatic safety gate closer as claimed in any one of claims 1 to 8 comprising a horizontal channel in the operatively inner face of the post and a pair of spaced apart downwardly depending wings hingedly connected to the operatively upper flange of the channel, the length of the wings being greater

/than the

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than the width of the channel and the operative free ends of each wing being orientated towards each other, in use when a bar projecting from the gate enters the channel, the wing on the side of the channel entered pivots about its hinge allowing the bar to enter further into the channel and when the bar passes beyond the operatively lower free end of the wing, the wing returns to its original position and the bar and consequently the gate is secured in its closed position.

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ABSTRACT

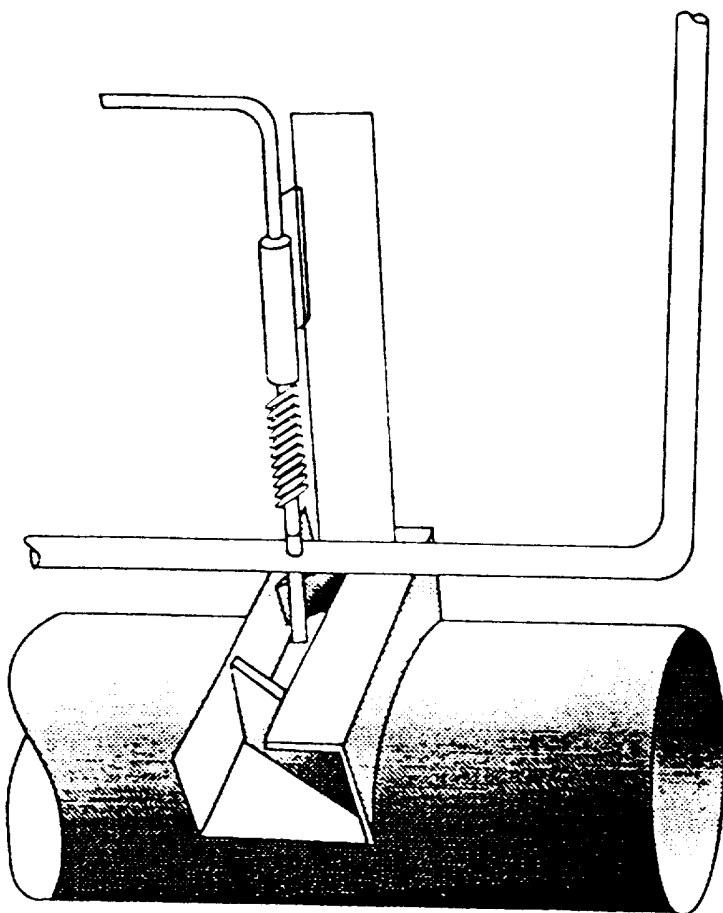
This invention relates to an automatic safety gate closer for closing a gate a predetermined time interval after a vehicle or individual has passed therethrough. The gate is biased to close when opened by a counterweight. A timer is connected to a catch which holds the gate open and releases the gate after a predetermined time period allowing it to close. The timer is pneumatic and has a piston reciprocable within a cylinder, a connecting rod connected to the cylinder and to the catch, a compression spring urging the piston from a bottom position to a top position and a valve which allows air to bleed from the top of the cylinder.

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DRAWING NO. 1

FLOODING CATCH DEVICE



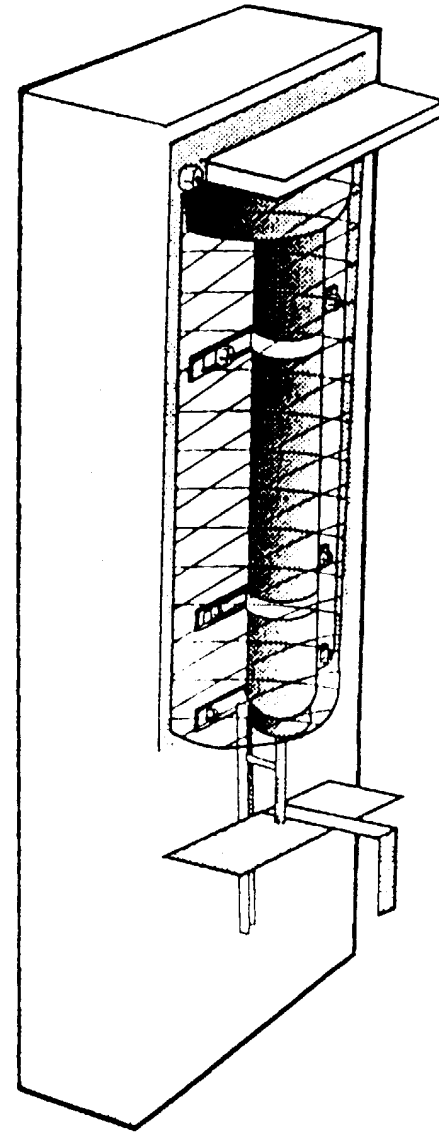
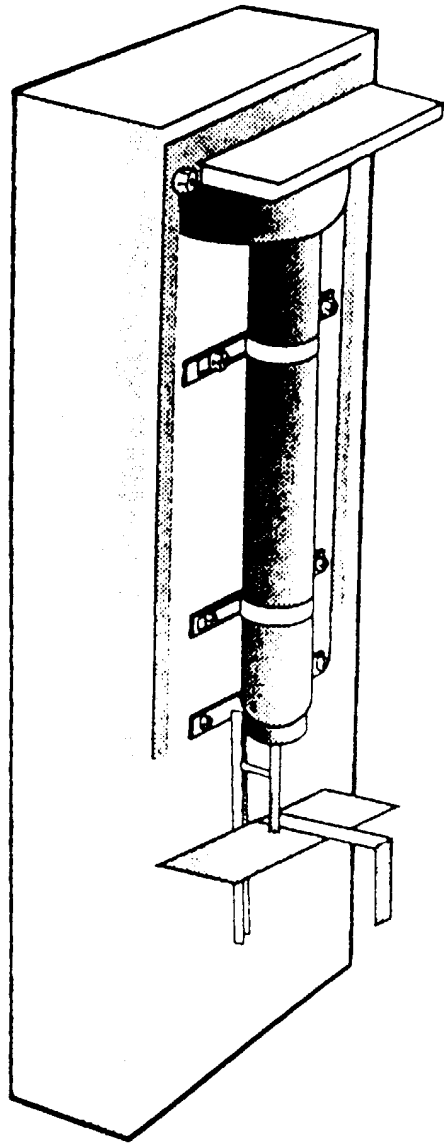
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DRAWING NO. 3

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PNEUMATIC THERM

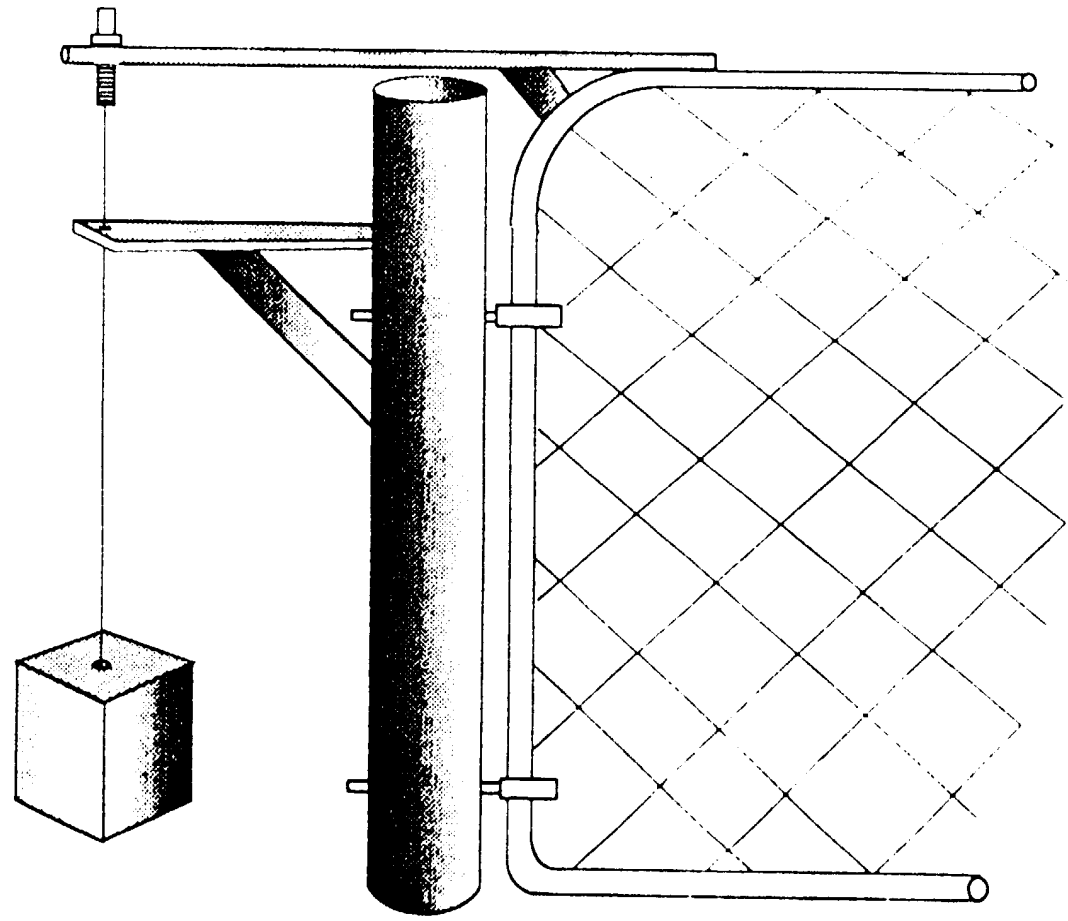


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DRAWING NO. 2

SUSPENSION UNIT

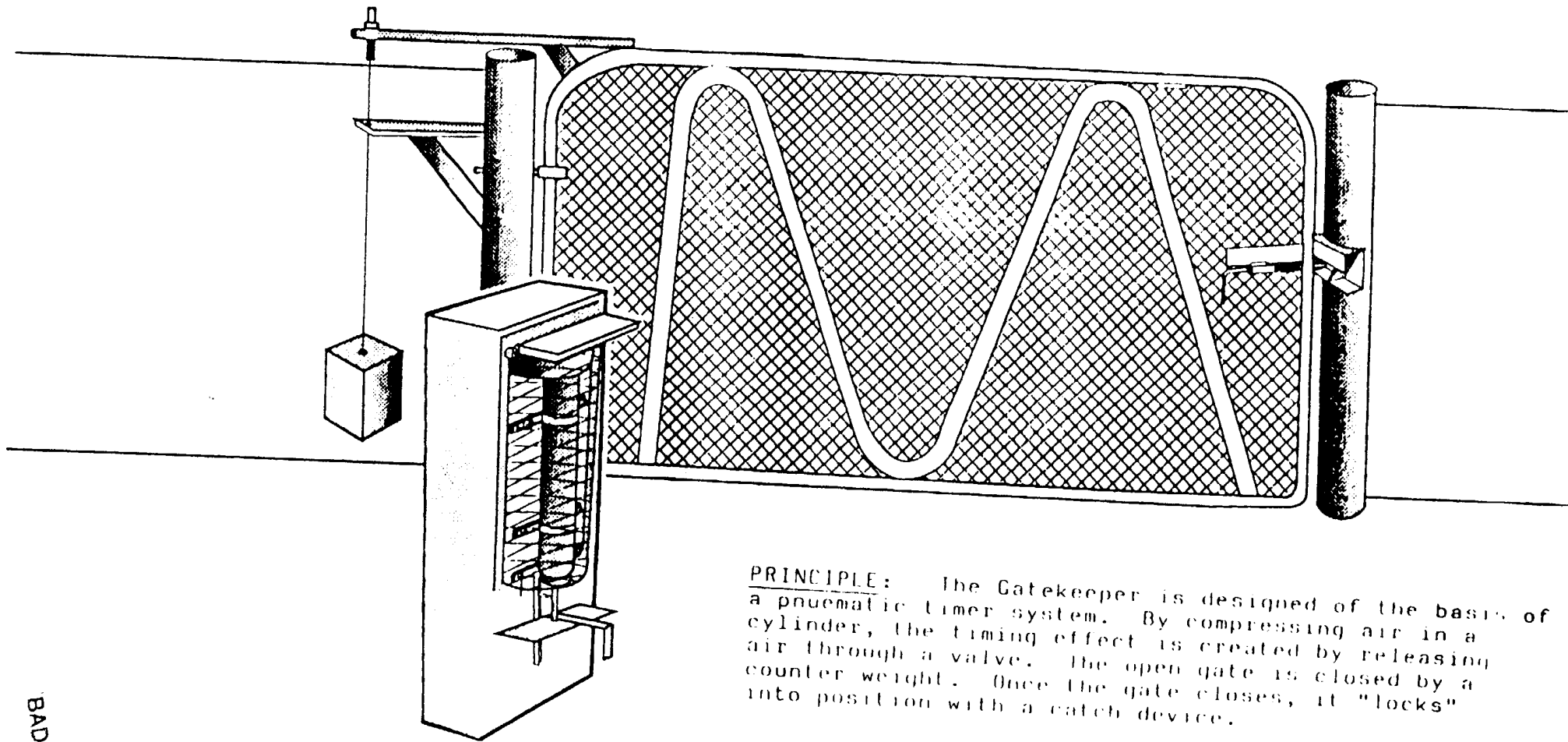


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DRAWING NO. 4

AUTOMATIC GATE UNIT



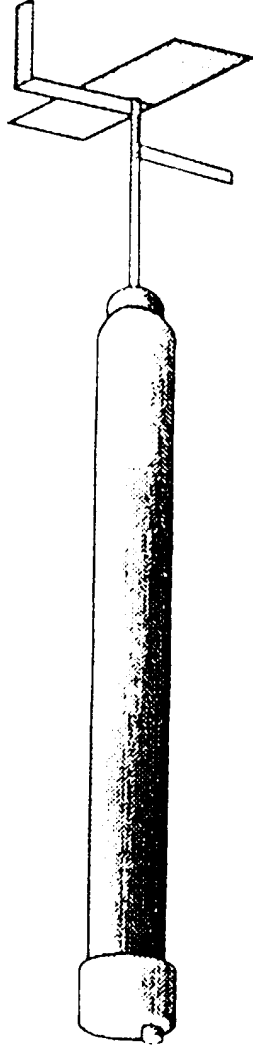
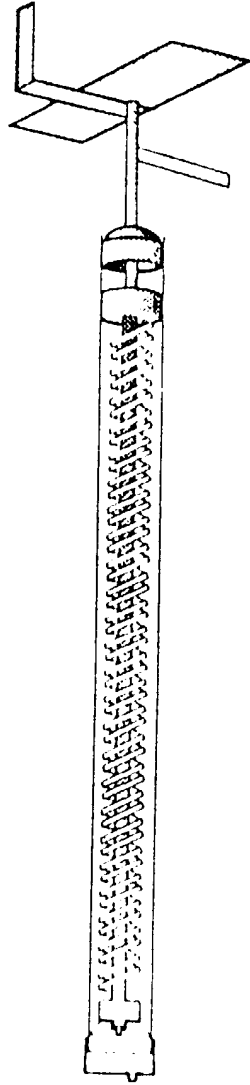
PRINCIPLE: The Gatekeeper is designed on the basis of a pneumatic timer system. By compressing air in a cylinder, the timing effect is created by releasing air through a valve. The open gate is closed by a counter weight. Once the gate closes, it "locks" into position with a catch device.

(See attached formulae for the pneumatic timer)

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THE PRINTED TIMER BY SECTION

DRAWING NO. 3

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ADOPTED PRESSURE FORMAT FOR THE BUILT IN
TIMER USED WITH THE AUTOMATIC SAFETY GATE UNIT.

THE FORMULAE WORKS AS FOLLOWS :

FULLY COMPRESSED, FORCE IN SPRING = 20 kg.

PISTON DIAMETER = 40 mm.

$$\begin{aligned} \text{MAX PRESSURE} &= \frac{20 \times 9.81 \times 4}{\pi \times .04^2 \times 10^3} = 1.56 \text{ kpa.} \\ &= 1.56 \text{ bar.} \end{aligned}$$
