The present invention relates to a device (1) for preventing entry of a rodent through a pipe comprising a jacket (2), a first gate plate (3) and a locking device (4), where the jacket (2) is adapted for mounting in the discharge pipe, where the first gate plate (3) is pivotally arranged inside the jacket (2), and where the locking device (4) is arranged in connection to the first gate plate (3), wherein a second gate plate (6) is pivotally arranged at a distance (X) from the first gate plate (3) inside the jacket (2) and connected to the first gate plate (3) by means of a connection assembly (8).
FIELD OF THE INVENTION

[0001] The present invention relates to a device for preventing entry of a rodent through a pipe comprising a jacket, a first gate plate and a locking device, where the jacket is adapted for mounting in the discharge pipe, where the first gate plate is pivotally arranged inside the jacket, and where the locking device is arranged in connection to the first gate plate.

BACKGROUND OF THE INVENTION

[0002] Through time rodents have tried and succeeded in invading the human habitation, as the survival instinct of the rodents makes them e.g. seek for food or better living conditions during cold seasons or famines.

[0003] In developed areas e.g. cities with sewage systems, rodents and especially rats are a major problem, because they breed fast, spread hazardous human diseases, and destroy building constructions as they nest or invade a building.

[0004] It is a fact that every major city has a growing population of rats, which typically live and breed in the cities' sewage systems. Due to occasional flooding of the sewage pipes, cold periods or famines, the rats try to invade buildings in order to find better living conditions.

[0005] If a building is invaded by rodents e.g. rats, several means are provided for killing the rats, e.g. different kinds of poison and different kinds of mechanical and/or lethal traps. The disadvantages of the aforementioned means are that when using e.g. poisons the rats sometimes die in unknown places of a building causing severe odour nuisances. Furthermore, rats killed by poison can represent a health risk for a carnivore eating the rats, meaning that pet animals, like dogs and cats, are exposed, thus trapped or killed rats have to be disposed of.

[0006] To avoid these disadvantages and the costs of procurement of the aforementioned means, it is obvious to prevent the rodents e.g. rats from entering the buildings through pipe installations.

[0007] Different kinds of rodent entry prevention devices have been provided and adapted for arrangement in the pipe installations, e.g. grates, tilting gate, water traps, one-way-valves and others.

[0008] Everyone of these rodent entry prevention devices prevent a number of rodents from invading a building, however studies of rats have shown that the animals are very persistent and inventive and try to circumvent the device. As the rats are quick learners, they often succeed in doing so hence the usefulness of the device is significantly reduced.

[0009] Furthermore, another disadvantage of such devices is that they do not allow unimpeded flow through the pipe installation. Thus the risk of clogging the pipe installation increases, and since the rats can swim, a water trap does not provide an efficient barrier to rats.

OBJECT OF THE INVENTION

[0010] Thus an object of the present invention is to provide a rodent entry prevention device, which significantly reduces the risk of rodents, especially rats, invading a building through any pipe installation and which at the same time allows unimpeded flow of water through the pipe installation.

[0011] This is achieved with a device according to claim 1, wherein a second gate plate is pivotally arranged at a distance from the first gate plate inside the jacket and which is connected to the first gate plate by means of a connection assembly.

DESCRIPTION OF THE INVENTION

[0012] To obtain a device which is sure to prevent a rodent from entering a building through a pipe, the device according to the present invention comprises a jacket, wherein a first gate plate and a second gate plate is pivotally arranged at a distance and functionally connected by means of a connection assembly, and where a locking device is arranged in connection to the first gate plate.

[0013] The two-gate-plate design of the device makes it superior to the design of any other device, as other devices are provided with only one gate. Due to the distance between the two gate plates and the locking device being connected to the first gate plate and the functional connection, which is ensured by the connection assembly, the rat cannot open both gate plates at the same time meaning that the rat cannot circumvent the device in any other ways than by destroying the device or the pipe.

[0014] It is universally known that rats can and will eat/bite their way through e.g. cement, plastic material, wood or the like, if they are sure to find food, soil, heat or arid conditions on the other side of the material. Thus in order to prevent or reduce the risk of rats biting/chewing and subsequently destroying the gate plates, the device is made of a very hard material, e.g. stainless steel or reinforced plastic material, which provides another advantage, as these materials withstand the aggressive environment, which is typical of sewage/drain systems.

[0015] According to an embodiment of the present invention the connection assembly comprises a push rod and a guidance pipe, where the push rod is pivotally connected to the second gate plate and where the guidance pipe is arranged on a part of the push rod, and where the first gate plate is provided with an aperture which is adapted to interact with the push rod.

[0016] The push rod is longer than the distance between the two gate plates and is at one end hinged to the second gate plate and the other end is arranged through the aperture in the first gate plate, thus it is possible to swing the two pivotally hinged gate plates.

[0017] In order to guide the push rod and to make the two gate plates co-operate, the push rod is arranged coaxially inside the guidance pipe, which is slidably mounted along a part of the push rod.

[0018] The guidance pipe is either slightly shorter or equal to the distance between the two gate plates, whereby any allowable movement of one gate plate results in a subsequent quick movement of the other gate plate.

[0019] To prevent rats from manipulating the first gate plate and from opening the gate plate in the direction of the water flow, the locking device comprises a locking clamp and a pivotal detent, the locking clamp being connected to the first gate plate and the detent being pivotally connected to the jacket.

[0020] The locking device does not allow any opening of the gate plates even if the rat succeeds in manipulating the first gate plate in either direction, as the pivotal detent is engaged with the locking clamp. Only in case of full water flow, the push rod disengages the pivotal detent from the locking clamp making it possible to open both gate plates. Likewise when the water flow falls, the pressure on the second gate plate
decreases and the push rod pulls back making the pivotal detent swing back and engage with the locking clamp.

[0021] According to another embodiment of the present invention the connection assembly comprises a first tension rod, and the locking device comprises a hook member and a locking pin, where the first tension rod is pivotally connected to the second gate plate, and where the hook member is pivotally arranged inside the jacket and pivotally connected to the first tension rod, and where the locking pin is connected to the first gate plate.

[0022] The first tension rod is at one end pivotally hinged to the second gate plate at a point higher than the shaft, whereupon the second gate plate and at the other end is pivotally hinged to the hook member below the point where it is pivotally hinged to the jacket. In the light of the above any movement of the second gate plate due to the water flow rising or falling results in the hook member disengaging from the locking pin on the first gate plate, whereby the water flow opens the first gate member and subsequently allows full flow through the device.

[0023] A rat trying to open the first gate plate in the direction of the water flow will not succeed, because the hook does not allow the locking pin to rotate clockwise around the shaft whereupon the first gate plate is pivotally hinged.

[0024] A rat trying to push the first gate plate open in the opposite direction of the water flow probably does not succeed, as the hook member engages the locking pin and hence prevents the opening of the first gate plate, which is pivotally hinged. If the rat contrary to expectations opens the first gate plate, it is detained when it reaches the second gate plate as there is no room for the second gate plate to open in the direction of the water flow.

[0025] According to another embodiment of the present invention the connection assembly comprises a second tension rod, a guidance tube and a guidance strap. The locking device comprises a locking pin, where the second tension rod is pivotally connected to the second gate plate and connected to the guidance strap, which is arranged inside the jacket between the first and the second gate plates, and where the locking pin is connected to the first gate plate.

[0026] The second tension rod is at one end pivotally hinged to the second gate plate at a point higher than the shaft whereupon the second gate plate is supported by the guidance strap, which is connected to the jacket. This means that any movement of the second gate plate due to the water flow rising or falling causes the second tension rod to disengage from the locking pin on the first gate plate, whereby the water flow may open the first gate member and allow full flow through the device. A rat trying to open the first gate plate in the direction of the water flow will not succeed, because the second tension rod does not allow the locking pin to rotate clockwise around the shaft whereupon the first gate plate is pivotally hinged.

[0027] A rat trying to push the first gate plate open in the opposite direction of the water flow is detained when it reaches the second gate plate, because the second gate plate cannot open in the opposite direction of the water flow, because of the guidance tube being arranged on the second tension rod between the guidance strap and the second gate plate, whereby any pushing on the second gate plate results in the guidance tube being pushed against the guidance strap, which prevents the second gate plate from opening.

[0028] The rat will not succeed in opening the second gate plate in the opposite direction of the water flow, because there is no room for the second gate plate to open in the direction of the water flow, when the first gate plate is open in the opposite direction of the water flow.

[0029] In order to prevent a rat from pushing the first gate plate and then manage to open both gate plates in the opposite direction of the water flow thereby allowing free passage, a covering plate is arranged inside the jacket. This covering plate is positioned in the direction of the water flow just behind the second gate plate. The dimension of the covering plate allows the plate to protrude into the jacket. It is important that a bent portion of the covering plate has a possible contact point on the second gate plate, which is lower than the shaft whereupon the second gate plate is pivotally hinged. The covering plate can also be closely arranged with the second gate plate when in closed position.

[0030] In this case the covering plate prevents the second gate plate from being pivoted in the opposite direction of the water flow, and because the first gate plate is connected to the second gate plate either directly or through the locking device, the covering plate furthermore prevents the first gate plate from pivoting in the opposite direction of the water flow.

[0031] One reason why the device according to the present invention is very efficient against prying rats is that the distance between the first gate plate and the second gate plate is minimum 30 mm, preferably more than 50 mm. The distance between the two gate plates ensures that rats cannot circumvent the first gate plate and then activate the second gate plate, as the rats cannot reach the second gate from the first gate in any way.

[0032] Furthermore, if a small rat succeeds in opening the first gate plate it will be trapped between the two gate plates, however, because of the device construction the rat can escape the same way as it entered the device.

[0033] The device is typically installed in e.g. a sewage/drain pipe of a building and the device must be able to allow unimpeded flow through the pipe when the gate plates are in open position. Likewise the device must allow a certain flow through the pipe when the gate plates are in closed position, which reduces the risk of clogging the pipe. If effluent is flowing through the device when the gate plates are in closed position, the risk of clogging the device is significantly reduced when the first gate plate preferably is smaller than the second gate plate.

[0034] This reason for this is that effluent passing through the second gate plate easily passes through the smaller first gate plate, whereby the risk of effluent being detained between the gate plate is reduced along with the risk of the device being prevented from functioning properly e.g. by preventing opening of the gate plates in case of full flow through the pipe.

[0035] The gate plates have either a circular or polygonal dimension, however, they are always of a dimension smaller than the pipe in which they are supposed to be installed thus they secure free passage between the jacket/pipe and the gate plates and never block the pipe.

[0036] The device according to the present invention is intended for both new and old pipe installations. In new installation the device can be positioned anywhere, whereas in old installations the device is typically positioned in pipe discharges e.g. in a central drain shaft. In order to maintain or exchange a device it is important that the device is correctly arranged in the pipe, e.g. it must not be pushed too far up the pipe. To avoid this, the jacket is provided with a number of projections, which are arranged on an outer surface of the
These projections engage with the rim of the pipe end section preventing the device from being pushed too far up the pipe. The projections can be a number of protrusions spaced around the outer surface of the jacket or an encircling collar, which is integrated with the outer surface of the jacket.

In a further advantageous embodiment of the invention, a different mechanism foresees the interlocking of the two gate plates in relation to each other such that entrance in one direction is impossible. In this embodiment, the connection assembly comprises a first notch arranged on the second gate plate and a pivotal pendulum member adjacent the first gate plate on the opposite side of said first gate plate to the second gate plate, and that an aperture is provided in the first gate plate through which aperture the pendulum member may engage the first notch. The pendulum assures that the first gate plate in its rest position, i.e. in its position where the plane of the gate is perpendicular to the longitudinal axis of the pipe in which it is mounted, is engaged in the aperture provided in the first gate member such that the first gate member cannot pivot in any direction. Therefore, if a rodent attempts to enter in the direction indicated by the arrow “B”, it will not be able to move the first gate member in any direction. When waste water, however, is led towards the device, the second gate member will pivot due to the water pressure whereby the first notch attached to the second gate member will engage the pendulum member, and release the engagement between the pendulum member and the first gate member such that also the first gate member may pivot and thereby allow the waste water to pass through the pipe.

These and other aspects are illustrated in the further dependent claims to this particular embodiment.

To easily mount or dismount the device from a pipe, the jacket is provided with a number of mounting holes, which are adapted to engage with protrusions of a tool. When the tool protrusions are engaged in the mounting holes, it is possible to reduce the diameter of the jacket slightly, making it possible to slide the device into a pipe or pull the device out of a pipe.

The device can be used at the entrance of each building pipe installation, thus securing a building against rat invasion. Alternatively, one device can be used in a central drain shaft isolating an entire section of a sewage system, which section covers all entrances to a building, all entrances to a number of buildings or the pipe string for the entire street.

The device can be used in pipes having an inclination up to 45 degree from horizontal, as the gate plates are pivotally hinged. In most piping installation this is sufficient.

The device according to the present invention is described for preventing rats from invading a building through a pipe. However, the device may be used to prevent other kinds of rodents from entering building constructions, bridges, towers, ships, vehicles or planes.

SHORT DESCRIPTION OF THE DRAWINGS

The invention is described in more detail below with reference to the accompanying drawing in which:

FIG. 1 shows a side view of a first embodiment of a device according to the present invention,
FIG. 2 shows a side view of an open device according to the present invention,
FIG. 3 shows a perspective view of the device in FIG. 1,
FIG. 4 shows a side view of another embodiment of a device according to the present invention, and
FIG. 5 shows a side view of a further embodiment of a device according to the present invention.
FIG. 6 shows a side view of a further embodiment.
FIG. 7 shows a plane view of the first gate plate 3.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows a device 1 for preventing entry of a rodent (not shown) through a pipe 37 comprising a jacket 2, a first gate plate 3 and a locking device 4, where the jacket 2 is adapted for mounting in the pipe 37, where both the first gate plate 3, which is pivotally hinged around shaft 5, and the second gate plate 6, which is pivotally hinged around the shaft 7, is arranged inside the jacket 2 with a mutual distance X.

FIG. 4 shows a side view of another embodiment of a device according to the present invention, and
FIG. 5 shows a side view of a further embodiment of a device according to the present invention.
FIG. 6 shows a side view of a further embodiment.
FIG. 7 shows a plane view of the first gate plate 3.

The two gate plates 3, 6 are functionally connected by means of a connection assembly 8 comprising a push rod 9 and a guidance pipe 10, where the push rod 9 at one end is pivotally hinged to the second gate plate 6, and where the guidance pipe 10 is arranged around the part of the push rod 9, which is positioned between the two gate plates 3, 6.

The length of the push rod 9 exceeds the distance X, causing one end to interact with an aperture (not shown) in the first gate plate 3. The length of the guidance pipe 10 is slightly shorter than the distance X, whereby any movement of either gate plates 3, 6 causes movement of the other gate plate 3, 6.

The guidance pipe 10 may be hinged to the first gate plate 3, such that the different parts of the device all are fastened in one way or the other into one unit, meaning that there are not any loose parts.

The locking device 4 comprises a locking clamp 11 and a pivotal detent 12, where the locking clamp 11 is connected to the first gate plate 3 and the detent 12 is pivotally hinged around shaft 13 to the jacket 2, and when the two gate plates 3, 6 are in locked position, the detent 12 engages with the locking clamp 11, which prevents the two gate plates 3, 6 from being opened in the direction A.

The shaft 5 is positioned higher than the shaft 7 and in addition to the second gate plate, which is larger than the first gate plate 3. This results in that the second gate plate 6, in a open position, is positioned lower than the first gate plate 3, in open position, and the gate plates overlap each other, thus protecting the aperture (not shown) in the first gate plate 3 and prevents the connection assembly 8 from being filled with effluent.

Furthermore, it is possible to see that the distances between B and C to the bottom of the pipe 37 are different, thus clogging is prevented as the distance between B and the pipe is smaller than the distance between C and the pipe, hence effluent (not shown) which passes below the second gate plate 6 can surely pass below the first gate plate 3 too.

The covering plate 14 is arranged inside the jacket 2 just behind the second gate plate 6 and is shown with a bended portion 15, which has a possible contact point 16 below the shaft 7, wherein the second gate plate 6 is pivotally hinged. This prevents the second gate plate 6 from being openable in the opposite direction A. Furthermore, the first gate plate 3 is prevented from being opened in the opposite direction A due to the guidance pipe 10.

As illustrated the jacket 2 extends outside the pipe 37, for example into a manhole opening. The jacket 2 insertion into the pipe is limited by the projections 17 which leave a bit of the jacket 2 accessible. This is important in that it makes it relatively easy to remove the device 1 when necessary.
It should further be noted that the jacket 2 has a shape substantially corresponding to the inner shape of the pipe 37. The jacket 2 has an extend, which is slightly larger than the inner periphery of the pipe 37, such that the device 1 due to the inherent stresses in the jacket 2 will be held by the friction between the pipe 37 and the jacket. Due to the jacket covering more than half of the inner circumference of the pipe 37 it will be firmly held in place.

FIG. 2 shows the device 1 having both the first gate plate 3 and the second gate plate 6 in open position in the direction A. Due to the pressure of full flow on the second gate plate 6, the push rod 9 has disengaged the detent 12 from the locking clamp 11 and the guidance pipe 10 ensures a nearly simultaneous opening of the first gate plate 3.

FIG. 3 shows the device 1, from which it is possible to see that the jacket 2 is not a tube but a semicircle, and the jacket 2 is provided with projections 17 and mounting holes 18 at the end of the jacket 2, which is closest to the first gate plate 3. The projections 17 prevent the device 1 from being pushed too far up a pipe (see FIG. 1) and the mounting holes 18 are used for easy installation of the device 1 in a pipe (not shown) with a special tool (not shown).

The first gate plate 3 is provided with an aperture 19, which interacts with the push rod 9, whereby it is possible to pivot the gate plates 3, 6 to an almost horizontal position without disengaging the push rod 9 from the aperture 19.

In FIGS. 2, 4 and 5 only the mechanism relating to the functioning of the gates are illustrated. It should in this context be noted that all the embodiments described may be fitted inside a jacket as illustrated in FIG. 1 or FIG. 3. Alternatively, the gates and mechanisms may be installed directly into the walls of the pipe. Care should be taken with these embodiments in that flushing, cleaning and the like may only be carried out from one side indicated by the arrow A as it is not possible to remove the gates as these are integral parts of the pipe.

FIG. 4 shows a device 20 with gate plates 3, 6, where the connection assembly 21 comprises a first tension rod 22, and the locking device 23 comprises a hook member 24 and a locking pin 25.

The first tension rod 22 is pivotally hinged around the shaft 26 to the second gate plate 6, and the hook member 24 is pivotally arranged around the shaft 27 to the jacket 2 and pivotally hinged to the first tension rod 11, and the locking pin 25 is connected to the first gate plate 3.

An opening of the second gate plate 6 in the direction A causes the first tension rod 22 to be displaced and disengage hook member 24 from the locking pin 25 on the first gate plate 3, whereby the device 20 allows full flow of water through the pipe.

FIG. 5 shows a device 30 with gate plates 3, 6, where the connection assembly 31 comprises a second tension rod 32, a guidance tube 33, a guidance strap 34 and the locking device 35 comprises a locking pin 36.

The second tension rod 32 is pivotally hinged to the second gate plate 6 and connected to the guidance strap 34, which is positioned between the two gate plates 3, 6, and the locking pin 36 is connected to the first gate plate 3.

An opening of the second gate plate 6 in the direction A causes the second tension rod 32 to displace and disengage locking pin 36 on the first gate plate 3, whereby the device 30 allows full flow of water through the pipe.

The guidance tube 33 is mounted on the part of the second tension rod 32, which is positioned between the guidance strap 34 and the second gate plate 6. Due to the fact that the guidance strap 34 is attached to the jacket 2 in one position, the guidance tube 33 prevents any opening of the second gate plate 6 in the opposite direction A.

Turning to FIG. 6, a further embodiment according to the invention is illustrated. In a pipe 37 a device 1 is inserted, where the device comprises a jacket 2 which in line with the embodiments mentioned above is suitable to be installed inside the pipe 37.

Inside the jacket 2, first and second gate plates 3, 6 are arranged, which are pivotably mounted inside the jacket such that the gate plates 3, 6 may pivot about the axis 5.7. The gate plates 3, 6 extend above the pivot points 5.7, and are in this embodiment equipped with weights 40 which, due to the off-central location of the weights 40 in relation to the plane of the gate plates 3, 6, will urge the gate plates against the direction indicated by the arrow "B". The arrow "B" indicates the direction from which a rodent will attempt to gain access into the pipe 37, and thereby into the installations upstream from the device 1. Adjacent the first gate plate 3, a pendulum member 41 is arranged. In the first gate plate member 3, an aperture 42 is provided such that a section of the pendulum member 41 in its rest position as illustrated in FIG. 6 will penetrate the aperture in the first gate plate 3 such that part of the pendulum member 41 will be on the back side of the first gate plate member 3, and part of the pendulum member 41 will be on the front side. A lower edge 43 of the pendulum member will, in the rest position, engage the lower edge of the aperture 42 provided in a first gate plate member such that a mutual interlocking between the two members is accomplished. In the position as illustrated in FIG. 6, it is impossible to move the first gate plate member 3 backwards or forwards in relation to the flow direction of the waste water. In this manner, access is denied for rodents and the like trying to gain access in the direction indicated by the arrow "B".

The second gate plate member 6 is provided with a first notch 44 such that as waste water flowing in a direction opposite the direction indicated by the arrow "B", the second gate plate member 6 will pivot about the axis 7 whereby the notch 44 will engage the pendulum member 41, and push the lower edge 43 of the pendulum member 41 out of engagement with the lower edge of the aperture 42 provided in the first gate plate member 3 whereby the locking engagement between the pendulum member 41 and the first gate plate member 3 is released such that both gate plate members 3, 6 may pivot in order to allow the flow of waste water to pass the device according to the invention.

As a security measure, in order to avoid that an overflow of waste water enters the mechanism and disturbs the proper functioning of the mechanism as described above, a shield plate 45 is provided upstream of the pivoting mechanisms such that waste water will be forced to leave the pipe member 37 by passing the gate plates 3, 6 below the extent of the shield plate 45.

In FIG. 7, a plane view of the first gate plate 3 is illustrated wherein the aperture 42 may easily be recognised. Obviously, the actual shape of the aperture may be different from the shape illustrated, the important aspect relating to the aperture being the fact that the pendulum member may engage an edge of the aperture, and thereby create the mutual interlock between the pendulum member 41 and the first gate plate 3.

1. Device (1) for preventing entry of a rodent into a building through a pipe comprising a jacket (2), a first gate plate (3)
and a locking device (4), where the jacket (2) is adapted for mounting in the discharge pipe, where the first gate plate (3) is pivotally arranged inside the jacket (2), and where the locking device (4) is arranged in connection to the first gate plate (3), wherein said jacket has a shape substantially corresponding to the inner shape of the pipe and an extend covering more than half of the circumference of said pipe, and that a second gate plate (6) is pivotally arranged at a distance (X) from the first gate plate (3), inside the jacket (2) and in communication with the first gate plate (3) by means of a connection assembly (8).

2. Device (1) according to claim 1, wherein the connection assembly (8) comprises a push rod (9) and a guidance pipe (10), where the push rod (9) is pivotally connected to the second gate plate (6), and where the guidance pipe (10) is arranged on part of the push rod (9), and where the first gate plate (3) is provided with an aperture (19) adapted to interact with the push rod (9).

3. Device (1) according to claim 1, wherein the locking device (4) comprises a locking clamp (11) and a pivotal detent (12), the locking clamp (11) being connected to the first gate plate (3) and the detent (12) being pivotally connected to the jacket (2).

4. Device (20) according to claim 1, wherein the connection assembly (21) comprises a first tension rod (22) and the locking device (23) comprises a hook member (24) and a locking pin (25), and where the first tension rod (22) is pivotally connected to the second gate plate (6), and where the hook member (24) is pivotally arranged inside the jacket (2) and pivotally connected to the first tension rod (22), and where the locking pin (25) is connected to the first gate plate (3).

5. Device (30) according to claim 1, wherein the connection assembly (31) comprises a second tension rod (32), a guidance tube (33), a guidance strap (34) and the locking device (35) comprises a locking pin (36), where the second tension rod (32) is pivotally connected to the second gate plate (6) and connected to the guidance strap (34), which is arranged inside the jacket (2) between the first and second gate plates (3, 6), and where the locking pin (36) is connected to the first gate plate (3).

6. Device (1) according to claim 1, wherein the distance (X) between the first gate plate (3) and the second gate plate (6) is minimum 50 mm, preferably more than 50 mm.

7. Device (1) according to claim 1, wherein the jacket (2) is provided with a number of projections (17) arranged on an outer surface of the jacket (2).

8. Device according to claim 1, wherein the connection assembly comprises a first notch (40) arranged on the second gate plate (6) and a pivotal pendulum member (41) adjacent the first gate plate (3) on the opposite side of said first gate plate (3) to the second gate plate (6), and that an aperture (42) is provided in the first gate plate (3) through which aperture (42) the pendulum member (41) may engage the first notch (40).

9. Device according to claim 8, wherein the first and second gate plates (3, 6) extend above the shafts (5, 7) about which they pivot, and that the sections of the gate plates (3, 6) extending above the shafts (5, 7) are angled against the flow direction in relation to the plane of the gate plates.

10. Device according to claim 8, wherein the pendulum member in its rest position partly projects through the aperture, and an engagement edge of the pendulum member engages an edge of the aperture in the first gate member, and when the first notch is brought into contact with the pendulum member, the pendulum member is released from its engagement with the first member such that the first gate may pivot.

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