(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 045 053**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **81105791.8**

(22) Date of filing: **22.07.81**

(51) Int. Cl.³: **E 02 B 7/42**, E 02 B 7/54

(30) Priority: **29.07.80 IT 2376180**

(43) Date of publication of application: **03.02.82 Bulletin 82/5**

(84) Designated Contracting States: **BE DE FR GB LU NL**

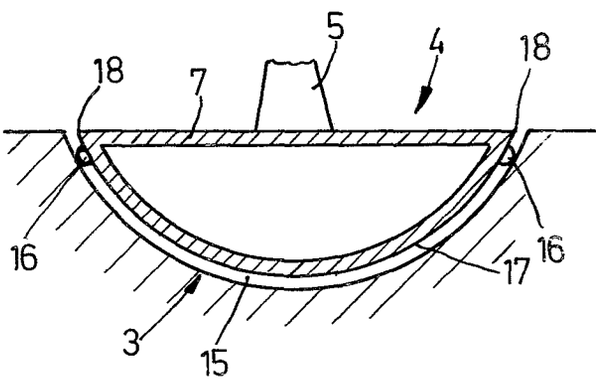
(71) Applicant: **PIRELLI/FURLANIS APPLICAZIONI IDRAULICHE-AGRICOLE GOMMA S.p.A., Piazzale Cadorna, 5, I-20123 Milan (IT)**

(72) Inventor: **Colamussi, Arturo, Via Borso, 8, Ferrara (IT)**
Inventor: **Merli, Vittorio, Via Voltapaletto, 15, Ferrara (IT)**

(74) Representative: **Dr. E. Wiegand Dipl.-Ing. W. Niemann Dr. M. Kohler, Dipl.-Ing. C. Gernhardt Dipl.-Ing. J. Glaeser Patentanwälte Herzog-Wilhelm-Strasse 16, D-8000 München 2 (DE)**

(54) Swinging dam.

(57) The present invention concerns a swinging dam provided with collapsible sealing means (16) arranged on the outer surface of the body (4) of the swinging dam so as to realize a tight seal with the wall of the cavity (3) where said swinging dam is lodged.



EP 0 045 053 A1

0045053

SWINGING DAM

The present invention concerns a swinging dam and more particularly means for sealing the swinging body of the dam against the walls of the cavity in which the swinging body is lodged and which, as it is known, is obtained in the bottom of the waterway where the dam is positioned.

Swinging dams are already known.

The known swinging dams have a very dangerous drawback which is that of running the risk of becoming and remaining blocked, when the dam is lowered, by the sediments which deposit in the gap existing between the swinging body and the walls of the cavity lodging the swinging body.

In order to avoid the above said risk which is very dangerous since it prevents the dam from working when it is necessary and which, if it occurs involves laborious washing actions to free the gap, at present the dam is set in action even when this is not necessary and with a pre-established rhythm according to the nature of the waterway where said dam is positioned.

It is evident that frequent actuation of the dam involves waste of energy and the use of manual labour for controlling the dam itself. All this leads to high maintenance costs, to wear and tear of the movable devices of the dam and to high stresses also in the moving devices of the dam since the swinging body of this latter encounters high resistance to movement owing to the friction due to the presence of sediments.

The present invention aims at avoiding the drawbacks of the known swinging dams firstly by eliminating the risk

of blocking the dam when it is lowered and secondly by avoiding continuous actuations of the dam itself when they are not necessary.

A further aim of the present invention is that of reducing to the minimum the strains necessary for the actuation of the dam and the energy necessary for said actuation.

An object of the present invention is a swinging dam comprising a box-shaped body which is pivoted to the side walls of the waterway, a cavity in the bottom of the waterway suitable to lodge the box-shaped body and means for rotating the box-shaped body around its pivot points, characterized by the fact of comprising collapsible sealing means arranged at least along those edges of the box-shaped body which are transversal to the waterway and acting against the walls of the cavity lodging the box-shaped body.

The present invention will be better understood by the following detailed description made by way of non-limiting example with reference to the figures of the accompanying sheet of drawing in which

figure 1 shows in perspective view a swinging dam according to the invention,
figure 2 shows a sectional view of a swinging dam along line II-II of figure 1,
figure 3 shows in perspective view a portion of the swinging body of the dam, and
figure 4 shows in enlarged view a particular detail of the dam according to the invention.

In its more general aspect for a swinging dam according to the invention which comprises a box-shaped body

provided with a shaft pivoted on the sides of a waterway and a cavity on the bottom of the waterway where the box-shaped body is lodged when the dam is not working, it is foreseen the presence of sealing means between the outer surface of the box-shaped body and the outer surface of the walls of the cavity obtained on the bottom of the waterway so as to avoid that debris, sands or the like can fill the gap which necessarily must exist between the box-shaped body and the surface of the cavity lodging the said body present on the bottom of the waterway.

A particular embodiment of a swinging dam according to the invention is shown in the enclosed figures.

As shown in figure 1, a cavity 3 is obtained in the bottom 1 of a waterway, e.g. a canal 2. The dimensions of said cavity 3 are such as to occupy entirely the bottom of the canal 2 for the whole width.

A box-shaped body 4 is lodged in the cavity 3. The shape of the box-shaped body 4 is similar to that of the cavity 3 so that the bottom 1 of the canal 2 is plane when the box-shaped body 4 is entirely lodged in the cavity 3.

At the lateral ends of the box-shaped body 4 there are arms 5 and 6 which are perpendicular to the surface of the box-shaped body 4, and said arms 5 and 6 are provided with pivots 8 through which said arms 5, 6 are pivoted to the side walls 9 of the canal 2.

More particularly, whilst the arm 5 does not extend beyond the upper edge of the respective side wall 9 of the canal 2 to which it is pivoted, the arm 6 is provided with an extension of such a length as to have its end 10

not bound to the box-shaped body 4 extend over the respective side wall 9 of the canal 2 to which said arm 6 is pivoted (figure 1).

The end of a rope 11 is connected to the end 10 of the arm 6. The other end of the rope 11 is connected to the drum of a winch 12 secured on the side wall 9 of the canal 2, and said winch 12 is provided with drive means which can be of any type and have been illustrated in figure 1 by a simple crank 13 provided with blocking means in the form of a ⌐- shaped rotatable rod 14.

More particularly the box-shaped body 4 (see figure 2) is a hollow body and between it and the cavity 3 lodging said hollow box-shaped body 4 there is a gap 15.

An essential element according to the present invention is the presence of seals between the box-shaped body 4 and the wall of the cavity 3 in order to prevent, when said box-shaped body 4 is lodged in the cavity 3, debris, sand and the like from filling even partially the gap 15 existing between said box-shaped body 4 and said cavity 3.

Figures 2 and 4 represent the sealing means between box-shaped body 4 and cavity 3.

As shown in figure 2, the sealing means are inflatable and collapsible seals 16 which belong to the box-shaped body 4 and which are arranged on the revolving surface 17 of the latter in proximity of the corners where the revolving surface 17 meets with the plane surface 7 of the box-shaped body 4 and more particularly in proximity of the edges 18 which are perpendicular to the side walls 9 of the canal 2.

According to an alternative embodiment, shown in fig. 3, the inflatable and collapsible seals 16 extend also on the faces 19 of the box-shaped body 4 in proximity of the edge 20 where the faces 19 meet with the plane surface 7 of the box-shaped body 4.

Figure 4 represents in detail the inflatable and collapsible seal 16.

As shown in figure 4, in the outer surface 17 of the box-shaped body 4 a continuous cavity 21 is obtained which along a line parallel to a generatrix of the revolving surface 17 is provided with a groove or continuous slot 22 which places into communication the cavity 21 with a tube or tubular cavity 23 which in its turn is in communication with a not shown pump for admitting and withdrawing a fluid under pressure.

On both edges of the continuous cavity 21, which face towards the surface of the cavity 3, grooves 24 are provided. Shaped articles 25 are lodged within said grooves 24 and the longitudinal edges 26 of a strip 27 of flexible and inextensible material as, for example, a strip of rubberized fabric are laid around the shaped articles 25.

The edges 26 of the strip 27 are secured to the shaped articles 25 and these latter are connected in a tight manner to the surface of the respective groove 24 by a second shaped article 28, which leans against the shaped article 25 being interposed between them the edge 26 of the strip 27, and by screws which fasten the shaped articles 28 and 25 to the surface of the groove 24.

More particularly the grooves 24 have such dimensions as to receive completely the shaped articles 25 and 28

and the portions of flexible strip 27 present in said grooves 24 when the seal 16 is collapsed, i.e. when the strip 27 has assumed the position represented with dashed line 29 in figure 4.

The operation of a swinging dam according to the present invention is the following.

In figure 1 the swinging dam is represented in non-operating condition. In fact, the box-shaped body 4 is completely lodged in the cavity 3 obtained in the bottom of the canal 2 so as not to present any obstacle for the water flow in said canal 2. In this condition the seals 16 are inflated and the flexible strip 27 is pressed against the surface of the cavity 3, and the seals 16 are in the condition represented in figures 2 and 4 so that the entrance of debris, sand and the like into the gap 15 is prevented.

In order to manoeuvre the dam, at first it is created a depression in the cavities 21 and in this way it is obtained a collapsing of the seal 16 so that the strip 27 of flexible material separates from the surface of the cavity 3 and assumes the position represented with dashed line and marked with reference numeral 29 in figure 4.

At this time the crank 13 is released by rotating the ⌐-shaped rotatable rod 14 in clockwise direction for an observer who looks at the figure 1 and the winch 12 is set in action through said crank 13 so as to increase the winding on it of the rope 11. Thus operating it is caused rotation of the arms 5 and 6 around the respective pivots 8 which define a pivot point for the box-shaped body 4 and this latter is moved out of the cavity 3 creating in the canal 2 a weir the height of which can

be varied at will and corresponds to the degree of rotation given to the arms 5 and 6 by rotating the winch 12.

The winch 12 is then blocked by rotating the ⌐-shaped rotatable rod 14 in counterclockwise direction for an observer who looks at the figure 1, so as to block with the winch 12 also the crank 13.

To lower the dam the operations are carried out in opposite sense to those described before. In other words, at first, acting on the winch 12 the box-shaped body 4 is placed into the cavity 3 and subsequently the seals 16 are expanded sending into the cavities 21 of said seals 16 a fluid under pressure through the tube 23 so as to advance the strip 27 into contact with the surface of the cavity 3 as represented in figure 4.

From the previously indicated description, is is understood how with the solution according to the present invention the aimed purposes are achieved.

In fact, by means of the presence of the seals 16 it is absolutely prevented that solid bodies enter into the gap 15 between the swinging box-shaped body 4 and the cavity 3 when the dam is not raised.

The safety of having the above cited gap 15 always free makes periodical actuations of the dam unnecessary, because the presence of the seals 16 prevents any possible blocking of the dam itself due to the presence of solid bodies in the gap 15 between swinging box-shaped body 4 and the cavity 3.

Moreover, the perfect cleaning of the above cited gap 15 makes the actuation of the weir easy since any possible friction between the swinging box-shaped

body 4 and the cavity 3 is avoided.

Although some particular embodiments of the present invention have been illustrated and described, it is understood that the invention includes in its scope any other alternative embodiment accessible to a technician of the field.

CLAIMS:

1. Swinging dam comprising a box-shaped body (4) which is pivoted to the side walls (9) of a waterway (2), a cavity (3) in the bottom of the waterway (2) suitable to lodge the box-shaped body, and means for rotating the box-shaped body around its pivot points (8), characterized by the fact of comprising collapsible sealing means (16) arranged at least along those edges of the box-shaped body (4) which are transversal to the waterway (2) and acting against the wall of the cavity (3) which lodges the box-shaped body.

2. Swinging dam according to claim 1, characterized by the fact that each collapsible sealing means (16) comprises a cavity (21) in the outer surface of the box-shaped body (4), a strip (27) of rubberized fabric secured along the longitudinal edges of the cavity (21) and means (23) for admitting and withdrawing a fluid under pressure into the space delimited by the assembly of the cavity (21) and the strip (27) of rubberized fabric.

3. Swinging dam according to claim 2, characterized by the fact that the means for admitting and withdrawing a fluid under pressure into the space delimited by the cavity (21), present in the surface of the box-shaped body (4) and by the strip (27) of rubberized fabric, comprise a tube (23) arranged with its own axis parallel to the cavity (21) and in communication with this latter through a slot (22) arranged according to the generatrices of the tube.

0045053

1/1

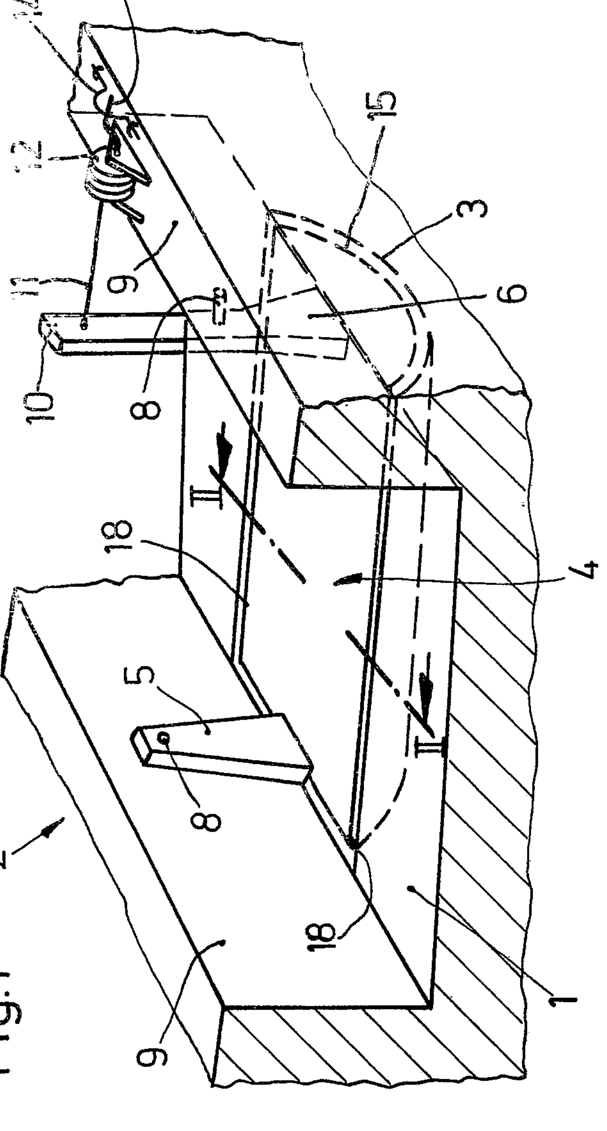


Fig.1

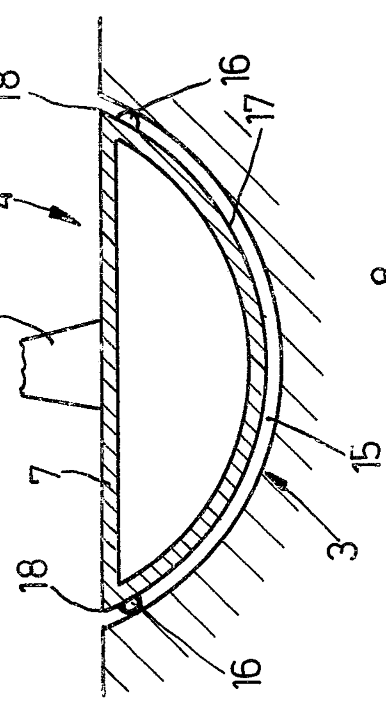


Fig.2

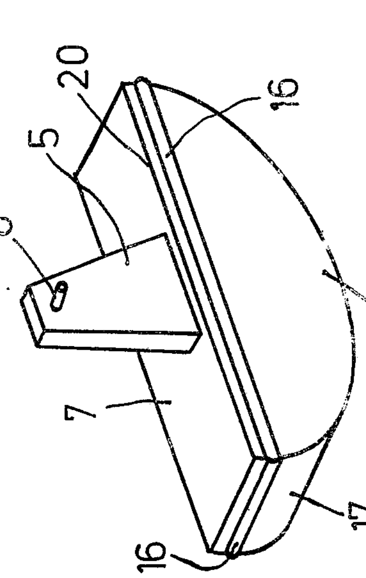


Fig.3

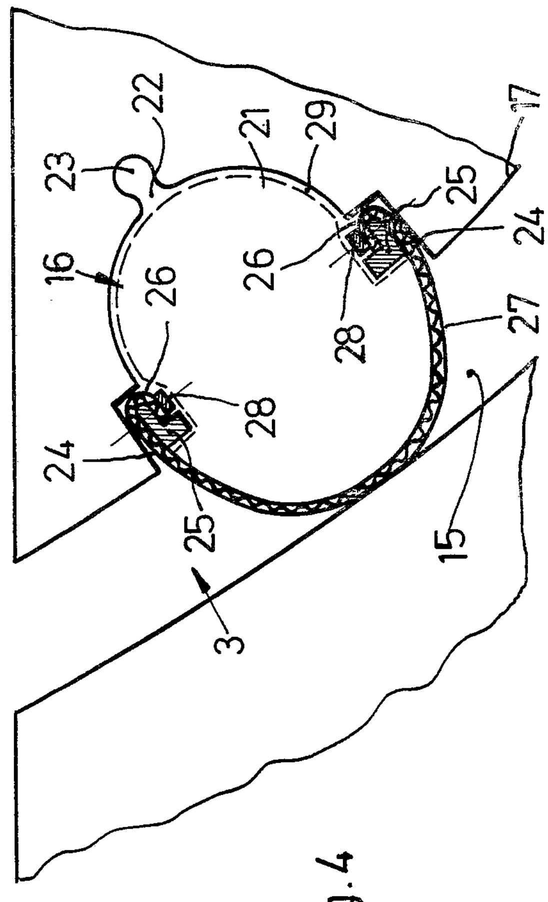


Fig.4

European Patent Office

EUROPEAN SEARCH REPORT

0045053

Application number

EP 81 10 5791

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	GB - A - 1 340 865 (WHITE) * Page 2, lines 71-101; figures 1-7 *	1
	FR - A - 1 175 799 (CHRISTIANI) * Page 2, column 1, lines 35-48; figure 1 *	2,3
A	DE - B - 2 838 431 (RODATZ) * Column 6, lines 10-15; figures 1,2 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

E 02 B 7/42
7/54

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

E 02 B

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

☒ The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	04-11-1981	HANNAART

EPO Form 1503.1 06.78