

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 81101409.1

51 Int. Cl.<sup>3</sup>: **E 02 B 3/16**

22 Date of filing: 26.02.81

30 Priority: 29.02.80 IT 2025080

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

43 Date of publication of application: 09.09.81  
Bulletin 81/36

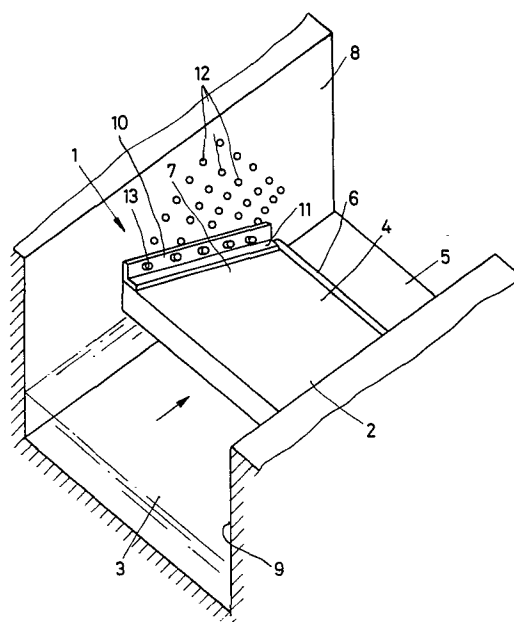
72 Inventor: **Colamussi, Arturo, Via Borso n. 8, Ferrara (IT)**  
Inventor: **Merli, Vittorio, Via Voltapaletto n. 15, Ferrara (IT)**

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

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

54 **Lateral seal for collapsible dams.**

57 The subject matter of the present invention is a lateral seal for collapsible dams (1 or 15) of the type which comprises at least one metallic tank (2 or 16) hinged to the bottom of a waterway and which oscillates around the bottom hinge (6 or 17), where said lateral sealing comprises ledge means in the area of the lateral walls of the waterway.



1 LATERAL SEAL FOR COLLAPSIBLE DAMS

The present invention refers to a lateral seal for collapsible dams, and in particular to a lateral seal for collapsible dams of the type comprising at least one  
5 rigid element hinged at one of their ends to the bottom of the waterway inside of which the dam is arranged.

There exist known collapsible dams of the previously defined type which have as a lateral sealing element sealing  
10 ing strips for example of rubber which when the rigid element rotates around the axis on which it is arranged, slide on the surface on the side of the waterway.

However, this type of lateral seal for collapsible dams  
15 presents the drawback of wearing-out the sealing strips as well as of acting as a brake for the movement of the rigid lateral element or elements hinged to the bottom of the waterway, particularly for dams having limited overall dimensions.

20

The aim of the present invention is to provide a lateral seal for collapsible dams of the previously defined type which is durable, which increases its sealing capacity when the pressures exercised by the water on the  
25 collapsible dam itself increase, and which can be controlled so as to provide the sealing in any raised position assumed by the dam itself.

One object of the present invention is a lateral seal  
30 for collapsible dams of the type comprising at least one rigid element hinged at one of their ends to the bottom of a respective waterway, characterized by the fact of comprising ledge sealing means on the lateral walls of the waterway.

35

The present invention will be better understood from the following detailed description, made by way of a

- 1 non limiting example, with reference to the attached  
sheets of drawings, wherein:
- 5 - Figure 1 shows a perspective view of a collapsible  
dam provided with lateral sealing means  
according to the present invention:
  - Figure 2 shows a perspective view of a large size  
collapsible dam provided with lateral seal-  
ing means according to the present invention;
  - 10 - Figures 3 and 4 show in cross-section two types of  
sealing strips that can be associated to  
the lateral sealing means according to the  
present invention.

15 In the more general idea of solution of a lateral seal  
for collapsible dams of the type comprising one or  
several rigid elements hinged at one of their ends to  
the bottom of a waterway, said lateral seam is provid-  
ed by means of a ledge sealing means.

20 In Figure 1 there is shown a perspective view of a  
collapsible dam 1, provided with lateral sealing means  
according to the present invention.

25 Said collapsible dam 1 comprises a rigid element 2,  
formed for example by a metallic tank into which air  
can be introduced for causing it to float and to raise  
it with respect to the upstream water basin 3 formed  
by the dam 1 itself.

30 Said rigid element 2 is connected along its end 4 by  
a hinge 6 to the bottom 5 of the waterway.

The seal between the side edges 7 of the rigid element  
2 (only one can be seen in Figure 1) and the lateral  
35 walls 8 and 9 of the waterway, is provided by means  
of a ledge sealing means.

Said ledge sealing means in the particular embodiment

1 represented in Figure 1 and applicable in particular  
to collapsible dams having limited overall dimensions,  
can oscillate around an axis parallel to the axis of  
the hinge 6 which connects the rigid element 2 to the  
5 bottom 5 of the waterway.

Said ledge sealing means comprises in the embodiment  
represented in said Figure 1, a rigid and preferably  
metallic L-shaped bar 10, hinged at its end 11 to an  
10 axis parallel to the axis of the hinge 6. In partic-  
ular, as shown in the Figure, the said two axes can  
coincide.

As an alternative, said bar 10 can be hinged to the  
15 bottom 5 of the waterway by means of a ball joint  
(not shown in the Figures).

Said ledge sealing means comprises moreover blind  
threaded holes 12 present in the lateral sides 8 and  
20 9 of the waterway, so that bolts 13, associated to  
said bar 10, can be engaged through the holes present  
on the side of said bar 10 facing the lateral sides 8  
and 9 of the waterway.

25 As an alternative to blind threaded holes 12 and bolts  
13 a hydraulic-jack (not shown) can be connected to  
the bar 10 for varying the position of said bar 10 on  
the lateral sides 8 and 9 of the waterway.

30 Said ledge sealing means 10 can also be seen in detail  
in Figure 3, where is shown a type of gasket that can  
be applied to said ledge sealing means.

In the particular embodiment shown in said Figure 3,  
35 said gasket is a labyrinth seal 14 comprising a series  
of staggered grooves and projections present on the  
facing surfaces of the rigid bar 10 and of the side

1 edge 7 of the rigid element 2.

As an alternative to the solution shown in Figure 3,  
said gasket can be formed by one or several continuous  
5 elements of elastomeric material or by one or several  
inflatable seals, always of elastomeric material.

In Figure 2 there is shown a large size collapsible  
dam 15 for great depths, comprising one or more rigid  
10 elements 16, connected at one of their ends 17, by a  
hinge 18, to the bottom 19 of the waterway.

Said rigid elements 16 comprise air tanks 20, into  
which can be introduced air for causing them to be lift-  
15 ed from their seat 21 found in the bottom 19 of the  
waterway, which seat 21 is suitable to receive said  
rigid elements 16 when the collapsible dam 15 is in  
its collapsed position.

20 A sheet 22, for example of a rubberized fabric, closes  
the opening that exists between the upper lip 21' of  
the seat 21 and the upper edge 23 of the rigid elements  
16, for preventing any eventual sediment from settling  
in said seat 21, when the collapsible dam 15 is raised.

25

Said rigid elements 16 are connected to each other in  
a water-tight manner by sealing elements 24 formed for  
example by appropriate gaskets or rubberized fabrics.

30 The lateral seal between said rigid elements 16 and the  
banks 25 of the waterway comprises ledge sealing means.

Said means comprise in the particular embodiment  
represented in Figure 2 a shoulder 26, projecting from  
35 the lateral bank 25 of the waterway itself, which is  
contacted by the lateral edge 27 of the rigid element  
16 adjacent to the said lateral bank 25 of the waterway.

1 Said ledge sealing means can comprise gaskets (see  
Figure 4) such as for example one or more continuous  
sealing strips 28 of elastomeric material, present  
either on the surface of shoulder 26 facing the rigid  
5 element 16, or on the surface of the lateral edge 27  
of rigid element 16 facing the said shoulder 26, or  
on both of the said facing surfaces.

As an alternative to said continuous sealing strips  
10 28 there can be either a labyrinth-type seal, such as  
the one shown in Figure 3, or an inflatable gasket of  
elastomeric material.

For collapsible dams having large dimensions and for  
15 great depths such as those represented in Figures 2,  
said rigid elements 16 can be connected to the bottom of  
the waterway by tie rods, so as to limit the amplitude  
of the raising oscillations, in order not to stress  
sheet 22.

20 Said tie rods comprise in the particular embodiment  
shown in said Figure 2, chains 29 for example in two  
rows connected at one end to the bottom of the seat  
21 and at the other end to said rigid elements 16.

25 As can easily be understood from the previous descrip-  
tion, the lateral sealing means for collapsible dams  
according to the present invention achieves the above  
mentioned aims.

30 In fact, the solution represented in Figures 1 and 3,  
allows small sized collapsible dams provided with the  
lateral sealing means according to the present inven-  
tion, to effect the sealing for any position assumed  
35 by the dam itself, since said ledge sealing means can  
also be raised or lowered, as desired.

1 Moreover the collapsible dams provided with sealing  
means according to the present invention increase their  
own sealing capacity, just as the head of water in the  
basin 3 upstream is increased, since the thrust that  
5 the water exercises upon the dam (see arrow in Figure  
1) is unloaded on the ledge sealing means, increasing,  
as a consequence, the pressure exercised between the  
side edges of the rigid element and the ledge sealing  
means themselves.

10

Moreover, since during the raising and lowering of  
the rigid elements constituting the dam itself, there  
occurs no sliding of the sealing means and the gasket  
against the surfaces, there is eliminated any wearing-  
15 out of the said sealing means and the gaskets.

The solution represented in Figures 2 and 4 also guarant-  
ees for large dimension collapsible dams 15 provided  
with sealing means according to the present invention,  
20 an efficient seal even if the pressure that the water  
exercises on the dam itself, increases (see arrow of  
Figure 2).

In fact, the increase in the thrust of the water also  
25 increases the pressure that the lateral rigid elements  
16 exercise against the shoulder 26 present on the  
banks 25 of the waterway.

Moreover the tie rods which connect the rigid elements  
30 16 to the bottom of the seat 21 and which are received  
by the seat 21 if the rigid elements 16 lie on the  
bottom, prevent in particular overturning of the rigid  
elements 16 not adjacent to the banks 25 of the water-  
way in case of very high water thrusts besides main-  
35 taining the sheet 22 which protects said seat 21 free  
from any stress.

1 What is more, both the solutions represented permit  
the collapsible dam to support differences in depths,  
even from the side where there is the hinge that  
connects the rigid element of the collapsible dam to  
5 the bottom of the waterway (i.e. from the direction  
opposite to that indicated by the arrows in Figures  
1 and 2).

In fact, the upward thrust resulting from the air  
10 present in the air tanks of the rigid elements, can  
compensate the pressure exercised on the dam by the  
higher water level present on the side of the collapsible  
dam where said dam is hinged.

15 Moreover for the dam represented in Figures 1 and 3  
the resistance also to great differences in depth,  
opposed to those indicated by the arrows of Figure 1,  
can be obtained by rendering the bar 10 fast with the  
rigid element 2, and effecting the seal between the  
20 bar 10 and lateral side 8 or 9 of the waterway with  
the eventual interpositioning of gaskets.

Although several particular embodiments of a lateral  
seal for collapsible dams according to this invention  
25 have been illustrated and described, it is understood  
that also included in its scope are any other alter-  
native embodiments accessible to a technician of this  
field.

30

35

1 WHAT IS CLAIMED IS:

1. Lateral seal for collapsible dams of the type comprising rigid elements hinged at one of their ends to the bottom of a waterway into which the dam itself has been placed, characterized by the fact of comprising ledge sealing means (10 or 26) in the area of the lateral walls (8, 9 or 25) of the waterway.
2. Lateral seal for collapsible dams according to claim 1, characterized by the fact that said ledge sealing means (10) can oscillate around the axis (6) at which the rigid elements (2) of the dam itself are hinged.
3. Lateral seal for collapsible dams according to claims 1 and 2, characterized by the fact that said sealing means comprise an L-shaped bar (10) hinged at one end blind threaded holes (12) in the lateral walls (8, 9) of the waterway, and bolts (13) associated to said bar engageable in said holes.
4. Lateral seal for collapsible dams according to claim 1, characterized by the fact that said lateral ledge sealing means (26) are fixed.
5. Lateral seal for collapsible dams according to claim 4, characterized by the fact that said ledge sealing means comprise a shoulder (26) projecting from each lateral wall (25) of the waterway.
6. Lateral seal for collapsible dams according to claims 1, 4 or 5, characterized by the fact that the said rigid elements hinged at one of their ends are associated tie rods (29) for limiting their oscillating movement.

1 7. Lateral seal for collapsible dams according to  
any of the preceding claims, characterized by the  
fact that said ledge sealing means comprise gaskets  
(14 or 28).

5

10

15

20

25

30

35

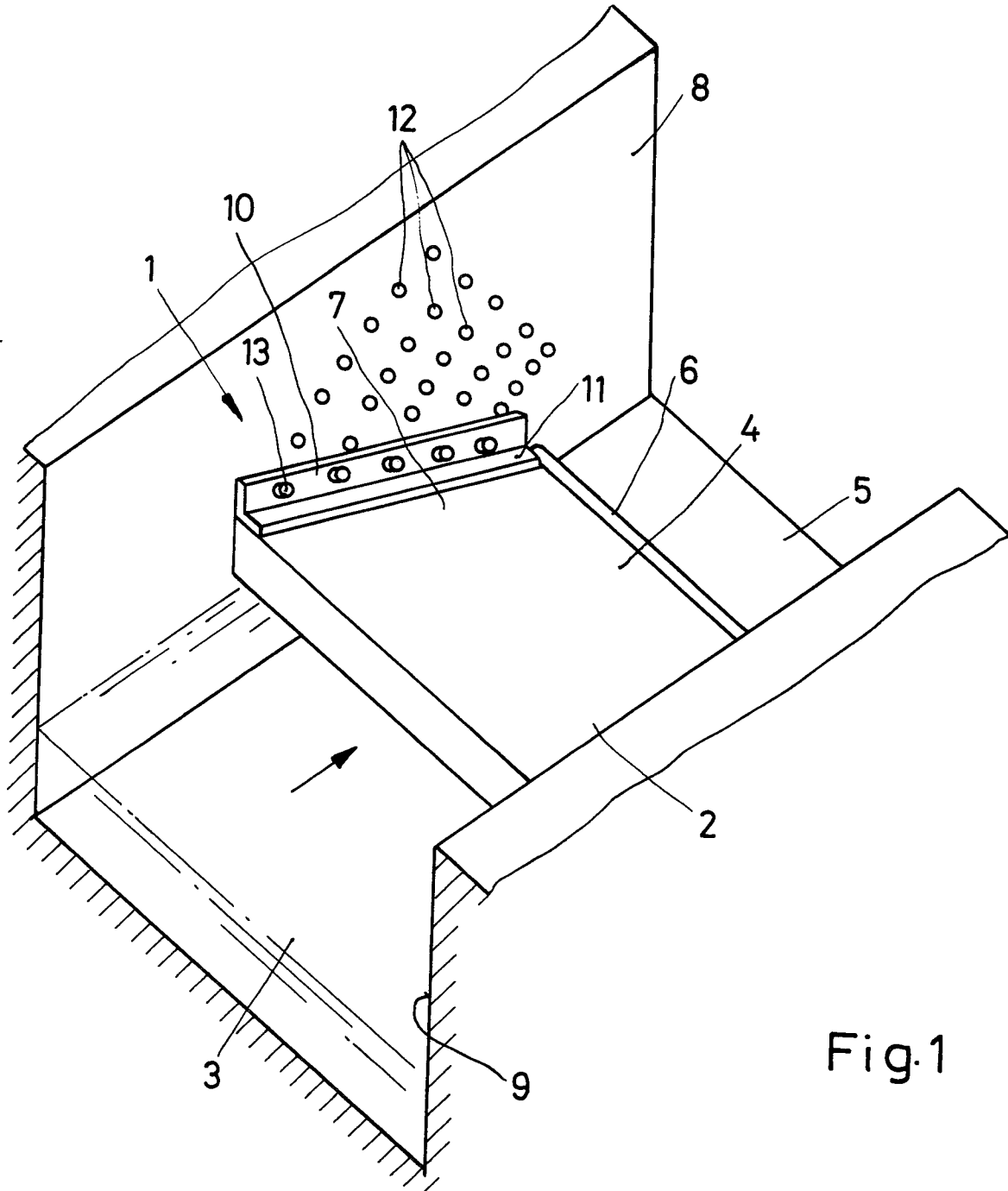


Fig.1

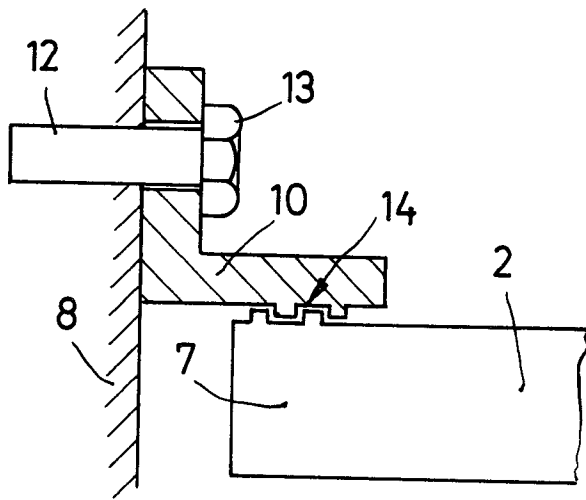
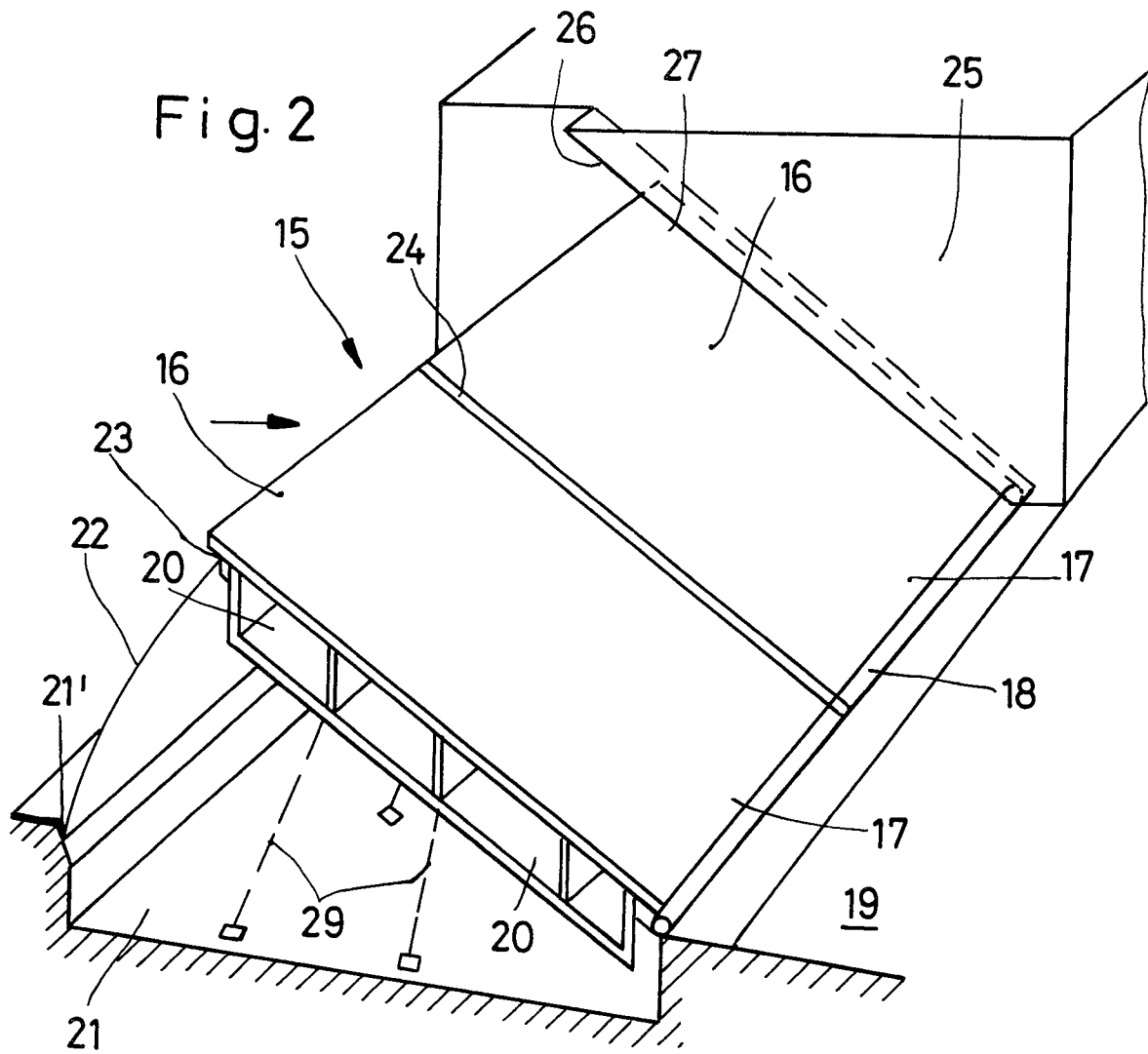


Fig. 3

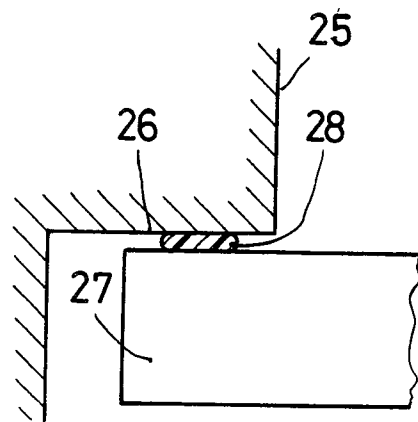


Fig. 4