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(54) **SKI EDGE AND SIDEWALL CROSS SECTION PROFILE**

(57) The line construction (15) of the edge (6) and sidewall of the ski (10) solves the issue of effective grip of the edges (6) and optimum smooth handling of various types of skis though all the stages of the turn at various velocities and various types of snow surface (18). Skis (1) are composed of basic structural elements such as: the gliding base (5), the edge (6), dampening layers (8), reinforcing layers (9), ski sidewall (10) and top layers (11), namely in such a structural proportion and composition that the edge (6) and its edge side (7) pass into the ski sidewall (10) in a characteristic composite concave

curve (15) which ends with the top layers of the ski's top (11). Here, the composite functional concave curve (15) of the edge's (6) structural elements and the ski's sidewall (10) is always under a greater angle α as the angle E of the edge side (7) which creates a functional space for ejecting the carved snow mass (16) and a space for a larger incline of the ski throughout all the stages of the turn without the danger that the top edge of the ski (11) or the ski sidewall (10) would hit the snow mass (18) and thus impair the ski or reduce the force of pressure onto the edge (6).

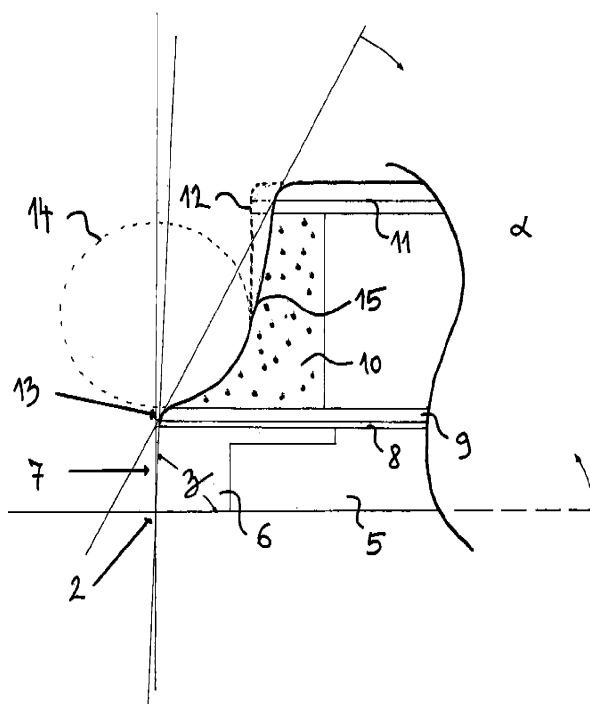


Fig. 8

Description

SUBJECT-MATTER OF THE INVENTION

[0001] The technical solution according to this patent, besides the basic assumptions that the ski moves through the mass of air, on the snow surface, and through the mass of snow, also arises from the fact that the effectiveness and grip of the ski is greater and better if its tilt during the stage of guiding the turn is larger.

STATE OF THE ART

[0002] This invention represents an upgrade of the existing solutions in the field of alpine skis which is to a great extent adjusted to the new conditions of modern skiing.

[0003] Throughout history, skiing changed depending on the requirements and the state of the art, especially in the manufacturing of skis. During the recent period, the technology of preparing the snow surface and its structure with snowmaking had a drastic impact on the improvement of the snow surface.

[0004] Besides this, the skiing technique is improving constantly, in recreational as well as competitive skiing. Even though the modern design of skis with its carving technique provided greater enjoyment on the snow and achievement of better results in the field of competitive skiing, there have arisen some shortcomings and dangers of modern skiing.

[0005] One of the basic dangers is surely the excessive speed of recreational skiers compared to their general knowledge, capabilities, and experience. Thus, every technological (product) and methodological (technique) solution is very welcome and reasonable.

[0006] Competitive skiing constantly strives for faster and effective skiing while increasing the degree of safety, thus development in this field will never stop.

[0007] As mentioned, with the introduction of the production of harder snow surfaces with a mixture of natural and artificial snow or only artificial snow and of various methods of snow production for the requirements of competition, new conditions on snow surfaces were implemented into alpine skiing.

[0008] In general, it could be said that technological solutions of the construction designs of alpine skis are in a way behind the requirements of modern skiing on such snow surfaces, in recreational as well as competitive skiing.

[0009] Thus, from the technological aspect of construction design in modern skiing, designers are seeking solutions that contribute towards greater speed, better grip performance, smoothness and accuracy on the one hand and energy efficiency of the skier on the other.

[0010] Thus, it is not surprising that new ideas and solutions are being introduced in this field.

[0011] Here, it is sensible to highlight the patent by inventor Scott Carlson under patent No. US

2003/0006584 A1 titled Snow Skis Having Asymmetrical Edges which discusses greater effectiveness of such ski geometry and consequently the edges that would contribute towards greater efficiency from the aspect of the ergonomics of motion of the human and the ski itself over the surface of a mass of snow; therefore this solution is only a partial improvement of the construction design of the ski.

[0012] The solution under patent protection No. EP 1050324 A2 of 26 April, 2000 by inventors Fagot and Deborde titled Ski Alpin solves the technical issue of more effective handling and directing the ski throughout all the stages of the turn. With the system of different grooves on the gliding base, the authors try to create a greater degree of handling of skis, especially during movement on the mass of snow. This still, leaves the issue of more effective handling of the ski along the entire edge and through the mass of snow.

[0013] Inventor Gerhard in his patent No. US 6,241,272 B1 of 5 June, 2001 titled Pair of Skis for Alpine Skiing discussed and demonstrated a solution for the geometrical design of various radiuses of skis depending on whether it deals with the internal or external edge and as the result of the skier skiing spread-legged, but there is not detailed discussion about and solution to what happens with the skis during the turning stage.

[0014] The second solution, under patent application No. EP 1830932 B1 by inventor Wilson of 21 November, 2005 and titled Ski with Suspension clearly resolves the issue of effective functioning of the ski geometry where both the gliding base and the ski sidewall are designed so that they are divided into sections to ensure better grip and gliding performance. It is evident from the patent solution that the aspect of the tilt and the movement of the ski during turning is being neglected. Under patent No. EP 2105171 A1 of 26 March, 2009 by the inventor Podesev titled Alpinski mit Heckfinnen für die Richtungssteuerung shows a technological solution for better handling of the ski with designed tail fins on the bottom side of the gliding base, which once again shows that in most cases skiing is seen as movement on a snowy surface.

[0015] Inventor Strucl in patent No. 2012171667 A1 of 16 June, 2011 also defines the movement of the ski according to the laws of aerodynamics and invents a solution with which the gliding base is stabilised on the back tail section of the ski with a specially shaped gliding surface which ensures better handling of the ski on soft snow surface, but the solution remains unsuitable for harder snow surfaces and for turns where the ski is more tilted into the turn and where the skiing is also carried out along the side of the edge or the ski sidewall.

[0016] Inventor Mantegazza in patent application under No. EP 2409741 A1 of 14 July, 2011 demonstrates the solution to a better grip with a technological solution where the ski is shaped in negative tension and thus creates pre-conditions for quick reaction of the ski and better distribution of grip forces along the entire length of the

ski edges. The problem within this solution is still the treatment of the ski's movement as movement on the mass of snow and the fact that many additional vibrations appear because the ski cannot take up the absorption on bumpy terrain.

[0017] The patent solution under No. US 2013/027096 A1 by inventors Grilc, Kozjek, et al of 17 October, 2013 titled Ski having asymmetric characteristics also proposes a solution to better handling of the ski and its grip with an asymmetric design of the ski geometry and the design of the so called rockers on individual parts of the ski. Due to such design, the ski is very responsive and has good handling performance at relatively small tilts. But when the tilt of the ski during turning is larger, the ski sidewall and the top edge of the top surface hit the mass of snow and reduce its handling performance and grip, with additional vibrations.

[0018] One of the first proposals for finding a technical solution to the grip performance of the edges is the patent application under No. 5,083,810 of 28 January, 1992 titled Double Edge Snow Ski in which the inventor James D. Minidis technologically defines the solution of the ski with two edges that only run in the middle part of the ski. Here, the second edge only functions at larger tilts. This can be problematic, because the force of pressure is at a certain moment distributed onto both edges and subsequently the carved mass has not space for ejection which significantly increases the difficulty and effectiveness of skiing. Multi-Edged Downhill Snow Skis is a patent by inventors Harper of 9 March, 1994 under No. 0622097 A1 and shows a two-level system of edges on the ski, the problem of which is that at the moment the grip is transferred onto the upper edge the skier must adopt a completely new balance position, because the edge or the point of the grip changes, which is extremely difficult during movement when turning. Besides the above, during turning, the carved snow was probably wedged at the upper side of the edge under the lower edge and impaired smooth movement of the ski throughout the turn.

[0019] Patent application of 16 May, 2000 by inventor Eugene, titled Ski Construction demonstrates technological solutions of edges that provide greater grip performance. But because the bottom gliding base is also changed so that it is convex, the handling of such a ski during skiing straight downhill and during transitions from one turn to another is made difficult and unstable, especially because the edges of edges are slightly raised from the snow surface. The solution is probably most suitable for hard icy snow surfaces. There is also the issue of the edges having such a shape that they effectively have two edges, which might hinder the ski in some way and prevent the turn to be performed cleanly.

[0020] The following selected patent which deals with edges and better grip of the ski is patent No. EP 1386643 A1 by inventor Park of 17 April, 2002 which demonstrates a solution with multiple edges on the ski's sidewall which are shaped in various ways. The problem of similar so-

lutions is that the transitions from one edge to another are not smooth and that the support surface is actually increased which reduces the force so that the effectiveness of such systems is very questionable. Besides the above - if the ski is on the top edge - the ejection of snow is practically prevented.

[0021] Ski with Improved Edging Characteristic by inventors Gerald, Eric et al under patent No. US 2006/0208459 of 21 September, 2006 demonstrates a technological solution with an installed edge in the inside of the ski, but because the nature of the problem is practically identical to similar mentioned patent, it presents similar weaknesses.

[0022] Patent No. EP 2 135644 A1 of 18 March, 2009 titled Three-in-one Alpine Ski by inventor Peezaris also demonstrates an original solution with a shaped gliding base which is shaped so that it utilises as much as possible the human laws of ergonomics and the laws of effective motion of the ski on the mass of snow. The issue once again remains in the case of a larger tilt of the ski when turning, because the sidewall moves through the mass of snow.

[0023] In relation to greater grip of edges, patent No. US 8,075,014 B2 of 13 December, 2011 should also be mentioned, since its inventor Phibbs discusses technological solutions for edges that increase the grip performance of mainly snowboards. These solutions also demonstrate systems with multiple edges that run along the entire sidewall of the snowboard. Edges suitable for a certain tilt of the snowboard are engaged. An interesting solution is depicted on figure 8 where, the edges are designed in the shape of semi-circles that link one to another. There still remains the problem of effective ejection of excess mass of snow and the support surface of the edges which increases with the larger number of edges.

[0024] The patented solutions that refer to the shape and construction solutions of the ski sidewall are very different and the majority of these solutions focus on resolving torsion forces of the ski while turning.

[0025] Thus, patent No. 0373 083 A1 of 6 December, 1989 by inventor Fagot presents a design of the ski sidewall which differs on the inside and outside of the ski, but the problem is that on the inside the sidewall runs too much in the vertical direction and thus when tilting the ski hits the mass of the snow which decelerates the ski.

[0026] The patent No. 0 628 327 A1 of 26 May, 1994 by inventors Stephan and Perenon with a design of the sidewall and the cross-section of the ski discusses the profile of the ski in the function of an arm of torsional resistance and easier ski handling, but some details once again have the issue of the sidewall hitting the ski into the mass of snow. But the above solution could be compatible with our patent solution.

[0027] Patent No. EP 2745 855 A1 by inventor Grenetier of 20 December, 2013 also depicts construction design of the sidewall which is also too vertical and represents an issue in the event of a greater tilt of the ski. It also clearly depicts the solution to the issue of absorbing

vibrations that also appear on the sidewall of the ski.

[0028] Even the profile solutions for the ski from patent No. EP 0 692283 indicate that primarily such construction solutions are pursued that focus on increasing torsional resistance and less attention is dedicated towards seeking optimal construction solutions for the motion-of the ski, especially the ski's sidewall and top edges, through the mass of snow during all the stages of the turn.

[0029] The mentioned patented solutions generally do not treat skiing as a 4-dimensional biomechanical issue. This encompasses all three special dimensions (axes x, y, and z) and the time component. Even the patent that discusses measurements of the effectiveness of the alpine ski in terms of grip (No. EP2343107 A1 of 17 December, 2010, by authors Puget Nicolas and Vailli Johan), discusses the grip of the edge on a level surface, which means that the measurements of grip performance do not take into account the fact that the ski also moves through the mass of snow, not just on it.

[0030] One can discuss modern skiing in terms of the ski moving through the mass of air, on the snow surface, and through the mass of snow. All three of the highlighted factors always occur in all forms and ways of skiing, what changes is only their individual intensity or effect.

[0031] Thus, in downhill competitive skiing, the prevailing dimensions are movement through the mass of air and movement on the snow surface and less the movement through the mass of snow. On the other hand, competitive slalom or giant slalom on medium-hard snow surface, the movement component through mass of snow is in our opinion a very important dimension. Such relationships also apply to recreational and children's skiing with the distinction that the effects of these dimensions are less obvious, but are nonetheless present and important. These effects can be simply noticed in the movement of an individual skier, especially from the aspect of what is happening to their ski during the entire time the skier is performing a turn and linking together multiple turns.

[0032] The issue of the movement of the ski through the mass of air and on the mass of snow has been examined by various entities, from the scientific aspect as well as the aspect of developing new skis.

[0033] But the issue of the movement of the ski through a mass of snow has largely been ignored, even in scientific research, thus it stands to reason that there is practically no true technological solutions for a modern way of skiing in this field. Our solution arises from the fact we have taken into account all three dimensions that affect the effectiveness of the ski's movement - movement through the mass of air, on the mass of snow and through the mass of snow.

[0034] With soft snow surfaces, one of the main issues is the "cleaning" of the ski or the ejection of excess/carved snow and pushing it away from the ski, while with icy surfaces the issue is the optimal exact carving of the edge into the icy surface and the simultaneous ejection of the icy surface (pieces) away from the ski, because these

excess pieces of the mass of ice impair and hinder the performance of a smooth and accurate turn.

[0035] The existing solutions for designing the ski and cross-sections are shown on figure 1a. It is evident from selected cross-sections on figures 1-3 that the angles of the ski sidewall in relation to the gliding base are right-angled or very close to being right-angled.

[0036] When the ski is tilted, the top part of the sidewall 10 and the top edge 11 hit the mass of snow and prevent the optimal beginning of the turn with the edge 6 carving at the front part of the ski 3. This issue also continues in the central part and in the rear tail part of the ski 4 prevents an optimally reliable and quick exit from the turn.

[0037] In practice, the designs are mainly such that the angles $\propto 1$ of the ski sidewall 12 are too big/steep. Consequently, the carved-off mass of snow, which is the result of the turn being guided along the edge 6, has nowhere to move or its pushing away from the ski is ineffective. Thus, a part of the support force from edge 6 is transferred onto the ski sidewall 10 and the upper edge 11, due to which the ski could start yielding which is reflected into the vibrations of the front part all the way to the height under the boot. And if the support force has substantially shifted from the margin of the edge 2 and the side of the edge 7 onto the ski sidewall 10 and the top edge, a slip and a fall occur.

[0038] For recreational skiers, this issue is reflected as unreliable skiing with the presence of fear, frequent ruining of balance and unconnected and rough turns, while for children this is reflected in the their mistrust of the ski and a presence of excessive fear.

[0039] These issues start even in the event of smaller tilting of the ski, but are even more obvious at larger tilt or higher velocities, which strongly depends on the snow surface and whether the skiing is recreational or competitive.

[0040] The traditional designs of the basic structural elements of skis, such as the gliding base 5, the edge 6, ski sidewall 10 and top layers of the ski 11, are in majority of cases designed so that they do not allow for an optimal transfer of the load force on the ski while steering during a turn onto the margin of the edge 2.

SHORT DESCRIPTION OF FIGURES

[0041]

FIGURE 1a

Shows the ski in a characteristic top view and cross-section which clearly shows the ski sidewall as one of the basic structural elements of the ski.

FIGURES 1-3

Figure 1-3 show the typical cross-sections of individual parts of the ski, namely the front I-I, the centre II-II, and the tail of the ski III-III.

FIGURES 4-6

The figures show typical cross-sections of individual parts of the ski, namely the front I-I, the centre II-II,

and the tail of the ski III-III which are designed according to this patent and which show that the ski sidewall is designed in a concave curve and that the edge of the top surface of the ski is removed from the axis of the edge.

FIGURE 7

Shows a detail of the design of the ski sidewall and edge in the existing traditional designs and the design according to this patent.

FIGURE 8

The figure shows the basic structural elements in relation to the composite functional concave curve and its changing parameters for different types of skis.

FIGURE 9a

The figure shows the vertical functional concave curve which runs from the edge of the edge all the way to the top of the ski's top surface.

FIGURE 9b

The figure shows the inclined functional concave curve which runs from the edge of the edge all the way to the top of the ski's top surface.

FIGURE 9c

The figure shows the design of the functional concave curve of the sidewall in the shape of short flat surfaces.

Figure 10

Shows the ejection of carved snow during the stage of the turn.

[0042] In order for the tilt of the ski to be unimpaired and optimal, the structural elements of the ski, shown in figure 7 such as the gliding surface 5, edge 6, ski sidewall 10, top edge and top surface 11, must be structurally changed so that such tilt is fast, accurate, and does not impair or decelerate the movement of the ski throughout all stages of the turn.

[0043] Figure 7 shows the ratio between the traditional design and the design according to this patent. The outside edge of the ski sidewall 10, designed according to traditional, existing method 12, runs mainly under the same angle α 1 as the angle of the edge side 7, or is slightly increased. This represents a large problem because the force is transferred onto the margin of the edge 2, at the ski's greater tilt via the edge side 7 onto the ski sidewall 10 which in this case is designed as a structural solution 12. Besides the above, the snow mass that is pushed out has no space for a more effective ejection away from the side of the edge 7 and the ski. This creates the generally known issue that the ski vibrates and if the tilt of the ski or the force onto the edge 6 does not decrease, a slip occurs and the skier falls.

[0044] The subject-matter of the invention is a more effective design of the basic structural elements of the ski, such as the gliding base 5, edge 6, ski sidewall 10, top edge and top of the ski 11. Characteristic for the patent is that the ski edge 6 in connection with the ski sidewall 10 and the top edge and top surface 11 is structurally

linked in a way 15 that enables a better grip on soft and hard snowy surfaces and so that it also enables a more effective ejection of mass of snow or ice from under the ski, mainly the margin of the edge 2, the edge side 7, and the ski sidewall 10 based on aerodynamic and hydrodynamic laws of motion.

[0045] The technical issue resolved by the invention refers to the above specifications that the ski moves through mass of air, on the snow surface and through the mass of snow, whereby the solution ensures that the ski has the best possible grip during all the stages of the turn and on all types of snow surfaces.

[0046] The starting technical solution is designed so that the ski edge 6, at a custom angle of ε depending on the type and way of skiing, passes into the ski sidewall 10 which is at a greater angle of α than the angle of the edge ε and the ski sidewall 10 is designed in a composite functional concave curve 15 which is shown on figure 8. At the point of inflexion, the functional concave curve passes into a smaller connecting radius 13 which continues as a straight edge side 7 all the way to the lower point of the edge as the margin of the edge 2. Line 12 shows the traditional design of the sidewall as the outside edge which when the ski is tilted impairs the movement through the mass of snow. Such a solution slows down the ski and prevents making a clean turn.

[0047] By changing the size of the radius 14 and angle α of the composite functional concave curve 15, various types and shapes of the curve are obtained which are characteristic in terms of the fact that some are more appropriate for slalom skis, others for giant slalom, all the way to the type of the curve that is suitable for downhill skis. Generally, the rule applies that the larger radius 14 and the smaller angle α are more suitable for slalom skis and that the smaller radius 14 and the larger angle α is more suitable for downhill skis.

[0048] The composite functional concave curve 15 thus when inclining the ski ensures a more effective grip of the edge from the margin of the edge 2 all the way to its top point where it passes into the connecting radius 13. The concave design of the ski sidewall 10 all the way to its closing with the ski's top layers 11 ensures a suitable space for effective ejection of the mass of snow. The shape of the curve and the hydrodynamic laws ensure that the ejection is directed correctly, namely away from the ski, and is very effective. Thus, throughout all the stage of the turn, the edge 6 always remains clean all the way from the margin of the edge 2 up to the point it passes into the connecting radius 13.

[0049] Because the angle α is larger than in known solutions, the top edge of the ski does not hit the mass of snow at larger tilts of the ski. The composite functional concave curve 15 thus ensures a greater transfer of force onto the bottom margin of the edge 2 and also onto the side of the edge 7, therefore the grip of the ski is better and at the same time it also ensures that the ski mostly moves along the margin of the edge 2 or along the side of the edge 7 and in exceptional cases of extreme tilting

of the ski also along the part of the composite functional concave curve 15 which is shaped so that the ski glides smoothly and at a reduced degree of friction, because the ejection of carved snow is effective and reliable.

[0050] Figure 9a shows the design of the functional concave curve 15 all the way from the margin of the edge 2 to the top point of the ski which closes with the top layers of the ski 11. In this case, the side of the edge 7 is curved which provides an even greater effectiveness of the grip at the point of the margin of the edge 2 and the edge's side 7. Such a design is especially recommendable on icy snow surfaces. Structurally, the composite concave curve 15 is designed so that the transitions between the construction materials are completely without edges and smooth.

[0051] Angle α 2 of the functional concave curve 15 is in this case relatively large, therefore such a design could be suitable for competitive downhill skis or recreational skis, because when inclining the skier can "lean" on the ski sidewall 10 and thus mitigates the balance problem during all the stages of the turn.

[0052] Figure 9b shows the design of the composite functional curve 15 which is under a smaller angle α 2, which provides a smooth, extreme tilting of the ski and guiding the ski solely along the margin of the edge 2 and the side of the edge 7 throughout all the stages of the turn. Such a solution is very suitable for slalom skis and for skiing on icy snow surfaces.

[0053] Figure 9c show the design of the composite functional curve 15 in concave shape with short flat surfaces that run along the entire length of the ski sidewall 10. The characteristic of this design is that individual flat sections achieve a similar functional structural design of the sidewall 10 which provides space for ejecting the mass of snow and a more effective grip of the bottom margin of the edge 2 in the mass of snow when the tilt of the ski is greater.

[0054] Figure 10 shows the path of the movement of the carved mass of snow from the margin of the edge 2 through the edge side 7 and the composite functional concave curve 15 as the ski sidewall 10 and the leaving of the pushed out mass of snow above the top layers of the ski 11. Such a design of the construction of the ski sidewall 10 creates a space for unimpaired movement of excess or carved mass of snow and its shape and construction characteristic accelerates its movement. At the same time, such a design ensures a more optimal transfer of force onto the margin of the edge 2 and the edge side 7. In more extreme tilts, the movement of the ski with the ski sidewall 10 is designed with a composite functional concave curve 15, and is more effective, because it ensures less friction and greater control of the ski's movement through the mass of snow.

Claims

1. The line construction of the edge and the sidewall of

the ski which structurally links the gliding base (5), ski edge (6), ski sidewall (10), and top layers (11), is connected and assembled so that it forms a composite functional concave curve (15) which runs under a larger angle α as the base angle of the edge side (7), whereby the structural elements are connected in a way that enables the changing of the curve parameters and starts on the edge of the edge (2), and ends on the top edge of the top surface of the ski (11).

2. The line construction of the edge and the ski sidewall according to claim 1, for which it is characteristic that the transition from the edge side (7) through the dampening layer made of rubber (8) and reinforcing layer (9) is made in a connecting radius into a concave structure of the sidewall (10).

3. The line construction of the edge and the ski sidewall according to claim 1, for which it is characteristic that it is possible to change the incline α of the concave curve of the sidewall (15), (10).

4. The line construction of the edge and the ski sidewall according to claim 1, for which it is characteristic that the ski sidewall (10) is made with various concave radiuses (14).

5. The line construction of the edge and the ski sidewall according to claim 2, for which it is characteristic that the concave curve (15) runs all the way from the edge of the edge (2), through the edge side (7), the dampening layer (8), reinforcing layer (9), and ski sidewall (10) to the top edge of the ski's top layer (11.)

6. The line construction of the edge and the ski sidewall according to claim 2, for which it is characteristic that the structure of the edge (6), the dampening layer (8), the reinforcing layer (9), ski sidewall (10) and the ski's top surface (11) ensures that the incline α of the concave curve (15) can be changed by radius (14) as well as by angle α .

7. The line construction of the edge and the ski sidewall according to claim 3, for which it is characteristic that design of the structural elements of the edge (6), the dampening layer (8), the reinforcing layer (9), ski sidewall (10) and the top surface (11) is made with flat sections of individual structural elements (17) so that they link with one another into a concave composite curve.

8. The line construction of the edge and the ski sidewall according to claim 3, for which it is characteristic that changing individual structural elements (5), (6), (7), (8), (9), (10), (11) in terms of their length and angle changes the concave angle α of the composite curve (17) as well as its radius (14).

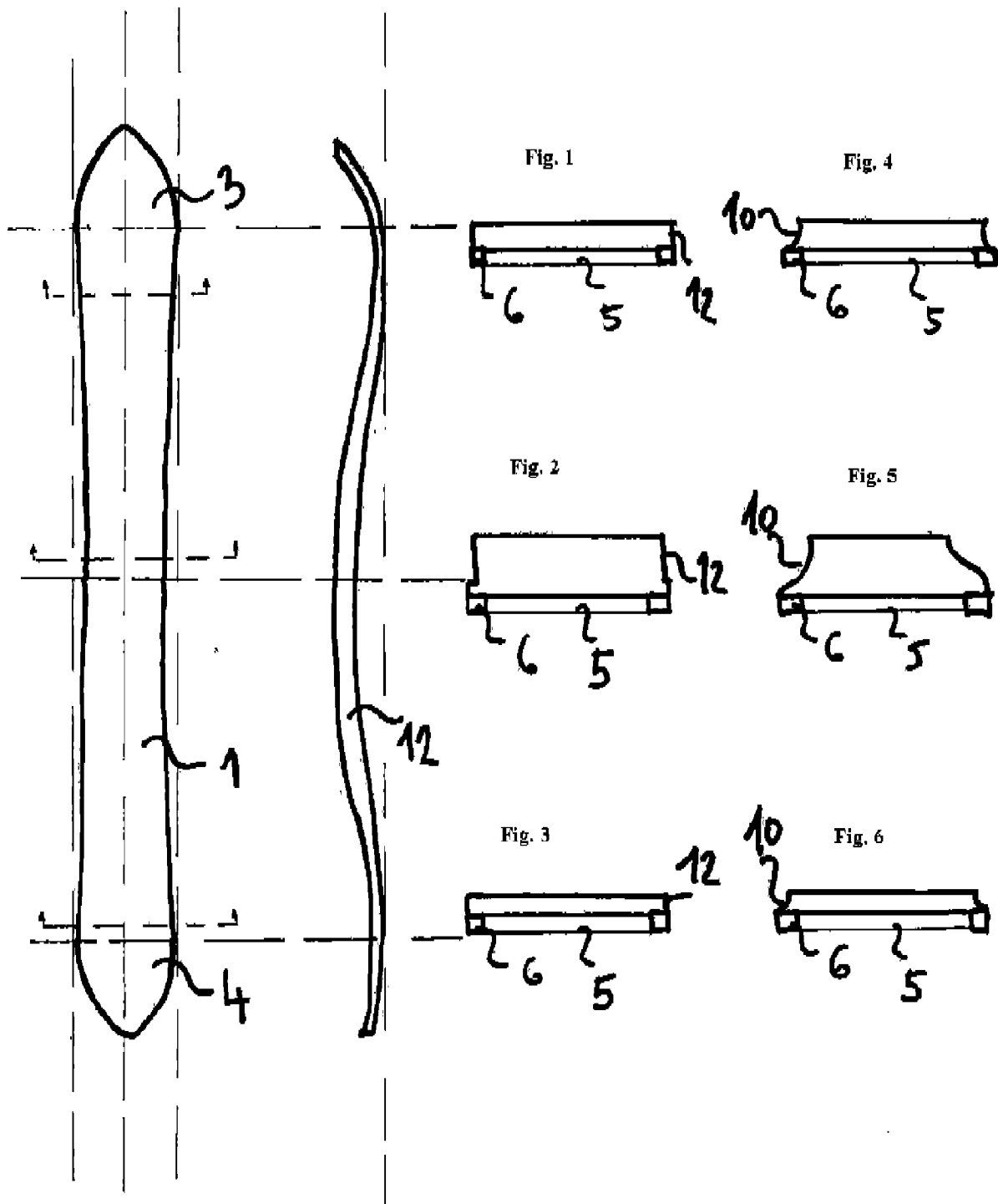


Fig. 1a

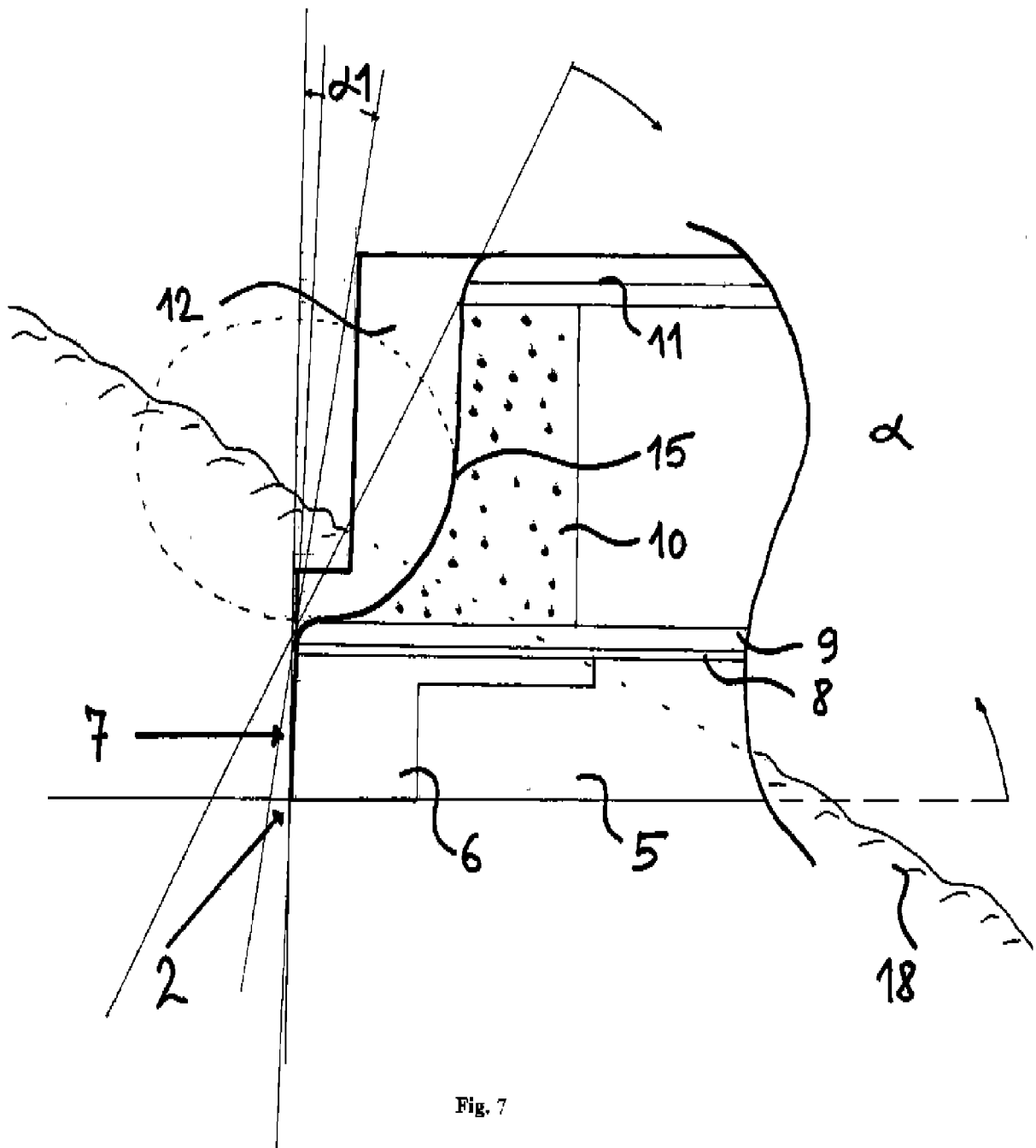


Fig. 7

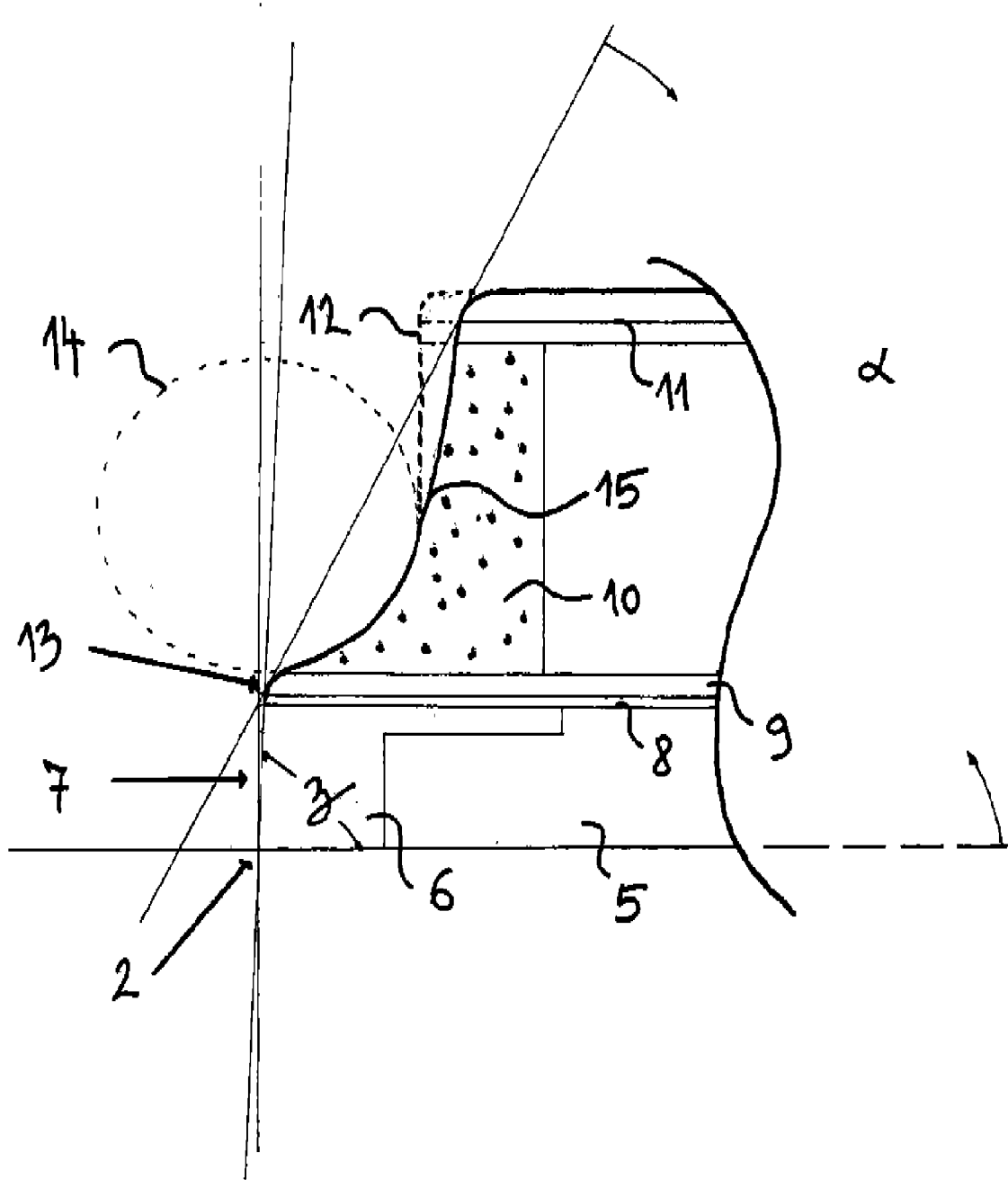


Fig. 8

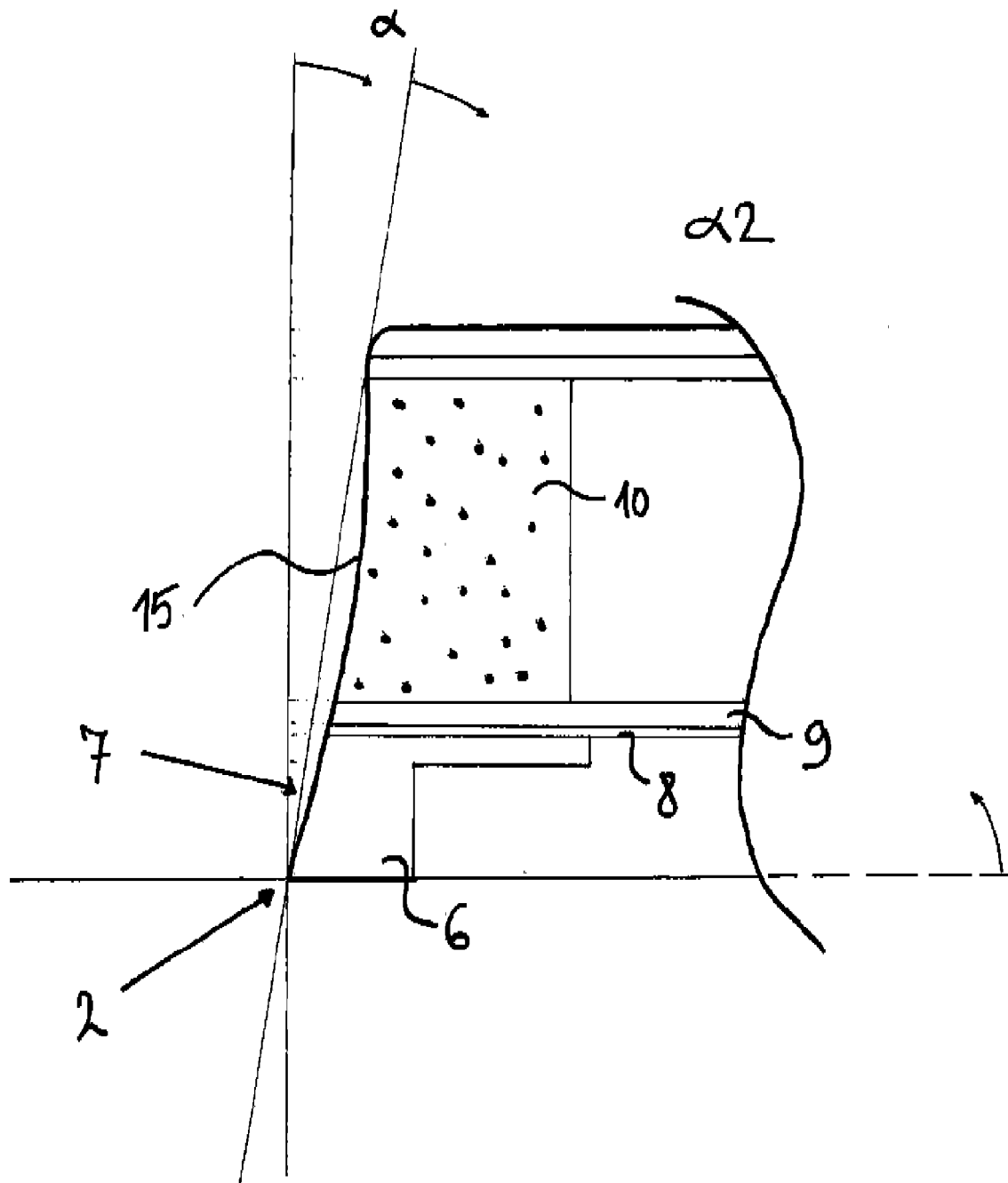
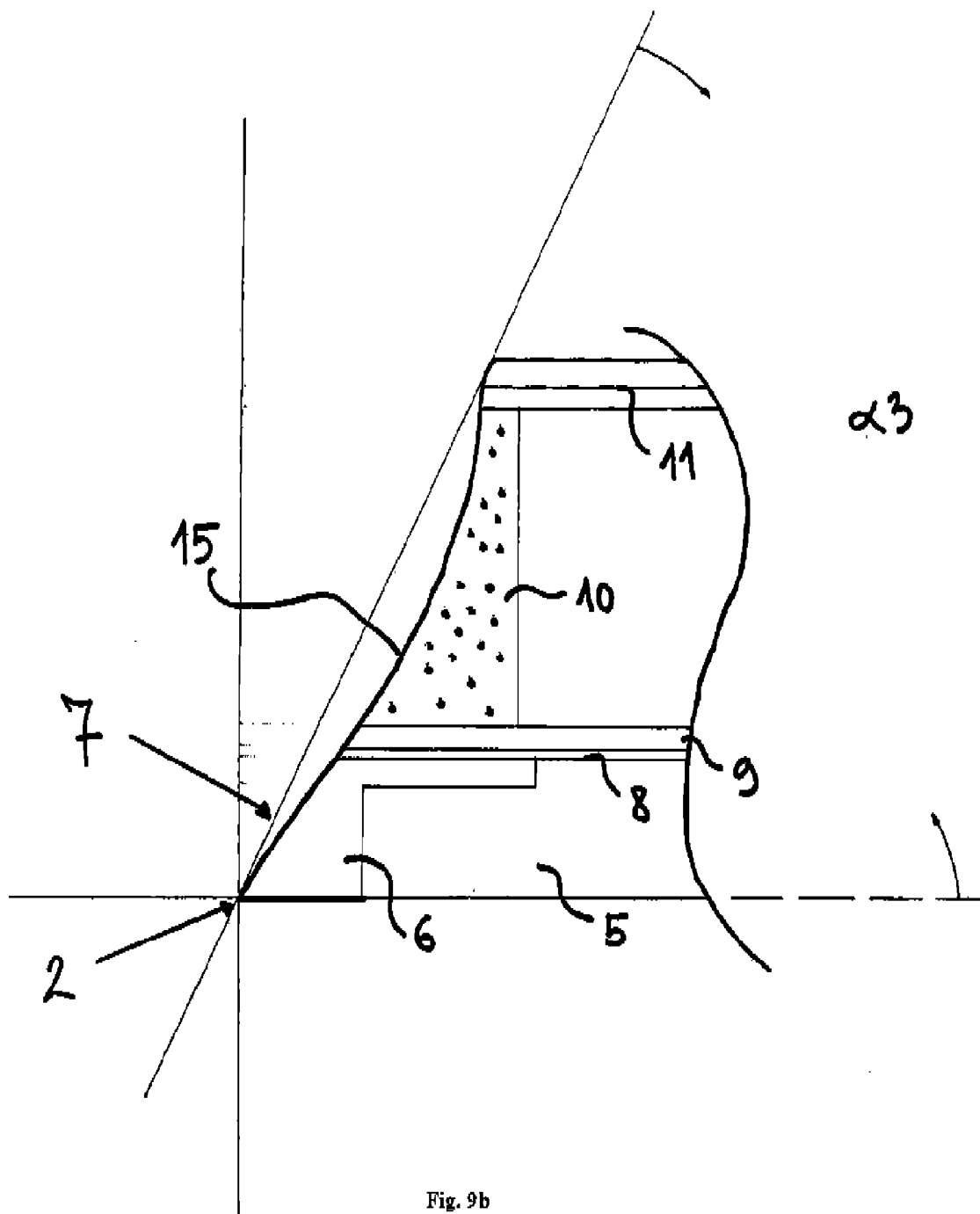


Fig. 9a



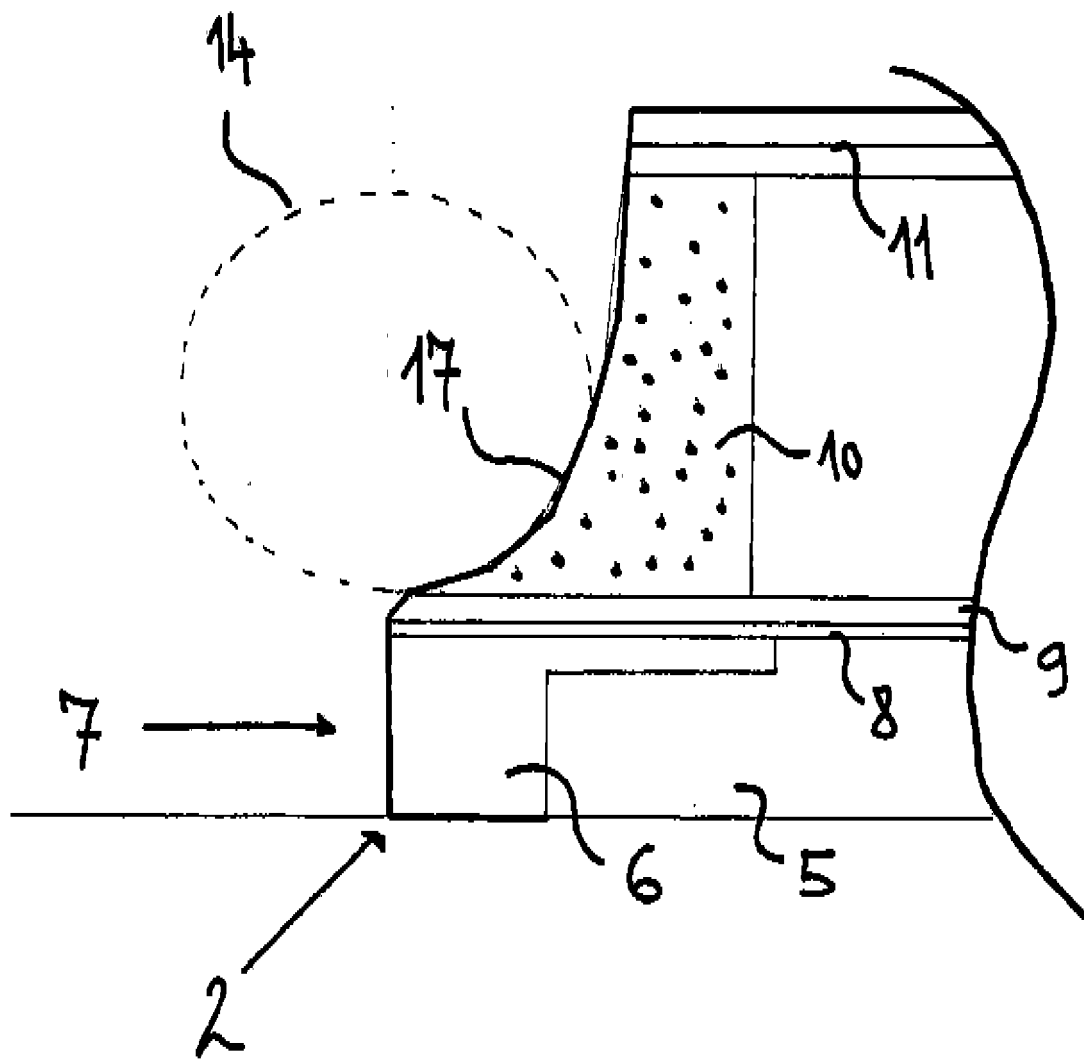


Fig. 9c

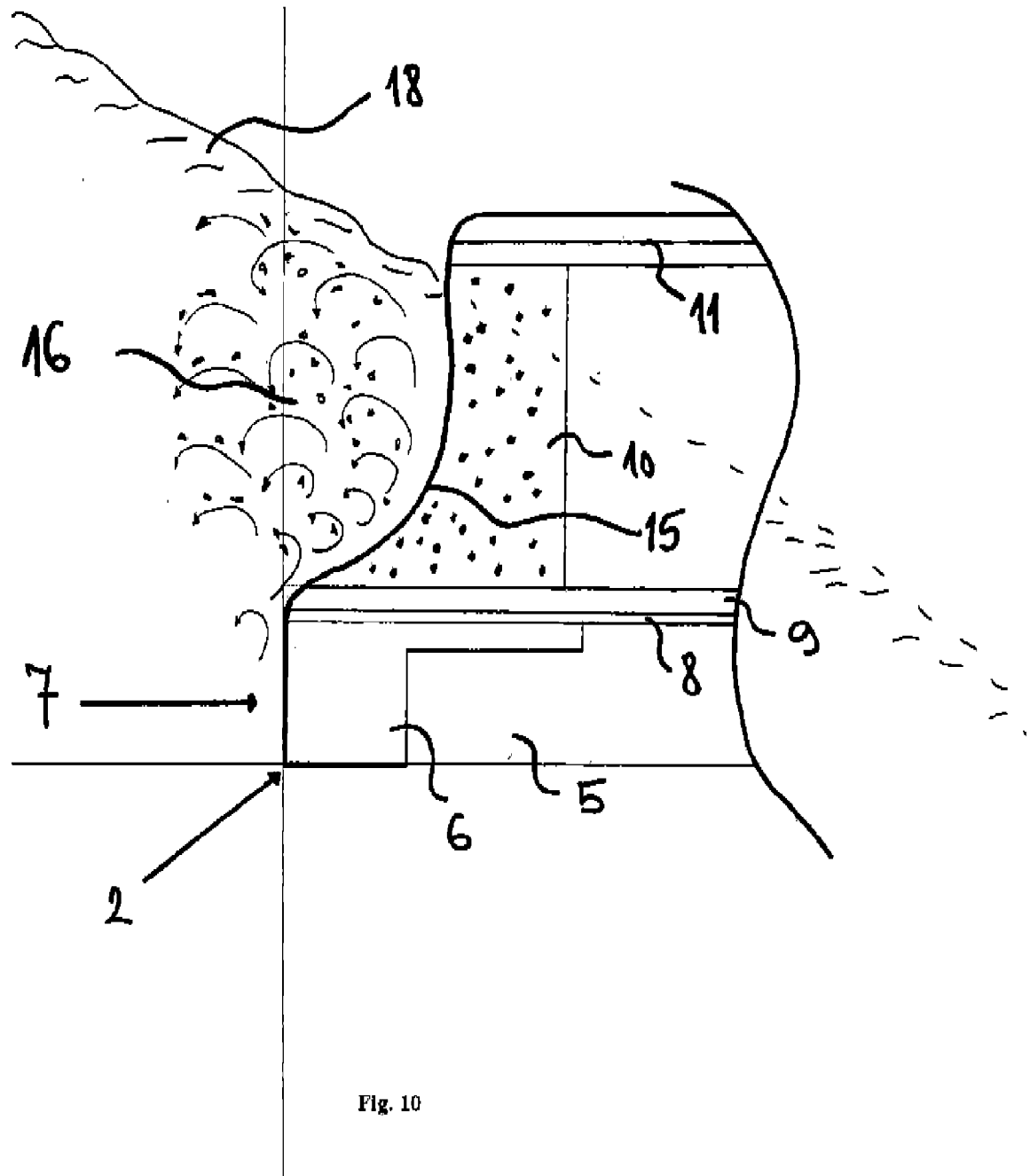


Fig. 10



EUROPEAN SEARCH REPORT

 Application Number
 EP 15 46 8001

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 5 335 931 A (LACROIX JACQUES [FR] ET AL) 9 August 1994 (1994-08-09) * column 5, line 11 - column 5, line 19; figure 11 *	1-4 5-8	INV. A63C5/04 A63C5/048
X,D A	EP 0 628 327 A1 (ROSSIGNOL SA [FR]) 14 December 1994 (1994-12-14) * column 5, line 34 - column 5, line 53; figure 12 *	1-4,6,8 5,7	
X	DE 591 150 C1 (FRITZ FORCHTNER) 17 January 1934 (1934-01-17) * page 1, line 49 - page 1, line 63; figures 5,6 *	1,3,4	
X	US 1 998 702 A (JOHN BOLINE) 23 April 1935 (1935-04-23) * column 1, line 36; claim 1; figures 15,17,18 *	1,3,4	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 August 2015	Examiner Murer, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 46 8001

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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