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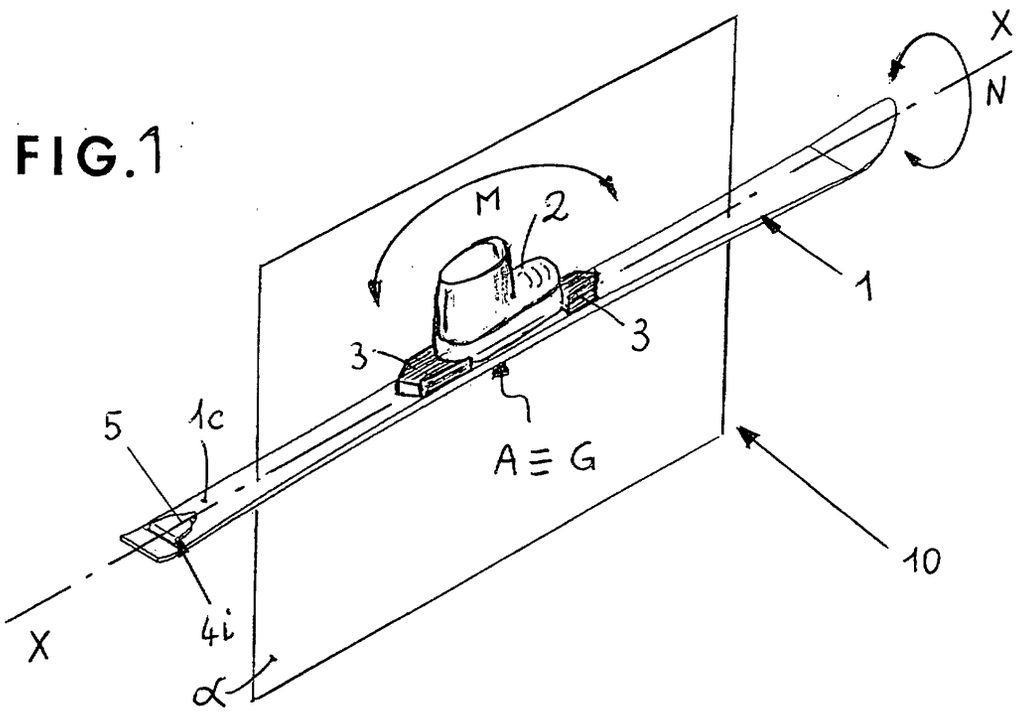
(54) Ski-boot and ski assembly provided with balancing weights

(57) An assembly (10) comprising ski (1), ski-boot (2) and bindings (3) for fixing the ski-boot (2) onto the ski (1) are described, fixing together of said parts being performed in a zone of the ski (1) comprising a point, called point of attachment (A), one or more weights (4i) of variable size being fixed onto the upper side of the said ski (1) and having dimensions and being positioned so that the centre of gravity (G) of the assembly (10) substantially coincides with the said point of attachment (A).

FIG.1



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Description

[0001] The present invention relates to the technological sector of skis and the associated accessories which allow optimum performance to be achieved in all the sporting disciplines of downhill skiing. More particularly, the invention relates to an assembly consisting of ski, ski-boot and associated bindings in which one or more weights of variable size are mounted on the ski in order to achieve better balancing of the ski itself and a reduction in the vibrations of its various parts caused by the fact that the pressure stresses acting on the zone of bearing contact of the ski with the snow change continually and very rapidly as regards the intensity and the point of application.

[0002] According to the present state of the art, skis are known where one or more weights are applied in predefined positions which, however, are determined to a large extent by the respective manufacturers.

[0003] In the patent application published under number DE 2709517, for example, inertial masses of variable magnitude are arranged along the ski, but no particular teaching is provided as regards the magnitude of these masses and the points where they are applied.

[0004] The inventor has realised that the addition of these weights may to a certain extent improve the performance of a ski but, not having thoroughly analysed the physical problem to be solved, leaves it to the user to determine in each case the size of the weights and their location on the basis of his/her personal sensations.

[0005] It is obvious that such a system has not offered any objective solution to the problem of balancing a ski.

[0006] The patent US-A-5203583 also envisages the arrangement of several masses and determines the weight, in grammes, of each of them and the points where they are to be arranged, but these teachings, since they relate to the ski only and do not refer to the ski/ski-boot/binding assembly, do not allow one to obtain advantages irrespective of the type of ski-boot used, its weight, the weight of the bindings and the weight of the ski.

[0007] Basically, hitherto, it had been realised only that the addition of weights to a ski improves its stability and handling, but no precise criterion had been defined as to where these weights may be precisely and effectively located and the magnitude of said weights.

[0008] The inventors of the present invention, however, have defined in an objective manner a precise criterion for determining the magnitude of the abovementioned weights and their location. They have in fact found that, during a descent, the entire ski-boot/ski/bindings assembly is subject to a rotation both about the longitudinal axis of the ski and in a vertical plane about the point where the weight of the ski, ski-boot and associated bindings (as well as the skier him/herself) bear on the ground.

[0009] This point coincides substantially with the point of attachment of the ski-boot on the ski and is located inside the zone of the bindings, in an approximately central position.

[0010] The inventors have therefore determined that, in order to reduce the vibrations of the two parts of a ski situated "upstream" and "downstream" of the abovementioned point of attachment, it is necessary to reduce to a minimum the magnitude of the masses of these parts which, as a result of the associated moment of inertia, may amplify the vibrations thereof generated during the abovementioned rotational movements and acting both individually and in combination with each other.

[0011] The inventors have therefore deduced that the best result can be obtained by applying one or more weights (preferably only one, as will be seen below) having a weight and location such as to ensure that the centre of gravity of the ski/ski-boot/bindings assembly coincides with the already mentioned point of attachment.

[0012] In this way the inertial masses along the tip part and the tail part of a ski are overall as small as possible since, when skiing under varying conditions, the mass of one of these parts necessarily becomes greater than the minimum value required and the result is that this part oscillates and vibrates more intensely. Moreover, it is of no use from the point of view of practical results if the other part is more rigid and less mobile; on the contrary, the ski will be more unbalanced since the two parts, i.e. tip and tail, which form said ski behave in a very different manner when subject to dynamic stresses.

[0013] Since usually the point of attachment of a ski-boot on the associated ski is set back towards the tail thereof, the tail part of the ski is substantially shorter and has a mass which is smaller than that of the tip part such that the centre of gravity of the assembly is displaced towards the tip of the ski, slightly beyond said point of attachment. The preferred solution proposed by the inventors is therefore that of applying a single weight in the vicinity of the tail of each ski so as to cause the centre of gravity of the ski/ski-boot/bindings assembly to coincide substantially with the point of attachment.

[0014] Obviously, where required by particular circumstances, several weights may also be applied onto the same ski, with one always being applied so as to obtain the result described above.

[0015] The present invention therefore relates to an assembly consisting of ski, ski-boot and bindings as described in the preamble of the accompanying Claim 1 and characterized by that described in the characterizing part of the same claim.

[0016] A preferred embodiment according to the invention is now described, with reference also to the accompanying drawings in which:

- Figure 1 shows a perspective view of the said preferred embodiment of the invention;
- Figure 2 shows a plan view of the additional weight of the assembly shown in Figure 1, contained within

a casing with an aerodynamic shape which is applied onto the tip of each ski;

- Figure 3 shows the perspective view of a plate housed in the casing according to Figure 2 and having shaped compartments designed to contain bodies with matching shapes.

[0017] Figure 1 shows an assembly 10 according to the present invention: a ski-boot 2 is fixed onto bindings 3 (usually a plate) integral with the ski 1. The upper side of the ski 1, in the vicinity of its tail 1c, has fixed to it a weight 4i consisting of a casing 5 which is fixed by means of screws or the like onto the ski 1 and containing, inside it, a plate 6 (Fig. 3) which has compartments 7n, each of which is shaped so as to house, inside it, without substantial play, a body 8n which is preferably made of metal and has a matching shape and predefined weight. (The arrow F in Figure 3 shows how a body 8n is inserted into a compartment 7n).

[0018] The weight of each body 8n and/or the number of bodies 8n inserted into the abovementioned plate 6 may be varied, depending on the weight of the individual parts 1, 2, 3, forming the assembly 10 in each example of application, so as to cause the centre of gravity G of the assembly 10 to coincide with the said point of attachment A of the bindings 3 on the ski 1.

[0019] With an assembly 10 thus formed, optimum dynamic balancing of the ski 1 is achieved, with a reduction in the amplitude of the vibrations generated during the movement by its rotations (arrow N) about its longitudinal axis X-X and/or about its point of attachment A (arrow M) in a vertical plane α passing through the point of attachment A itself.

[0020] While the bodies 8n, as already mentioned, are preferably made of metal (for example lead, steel or the like), both the plate 6 and the casing 5 may be made using one of the numerous synthetic resins known to persons skilled in the art.

[0021] In order to reduce to a minimum the albeit small resistance to forward movement produced by the casing 5, the inventor envisages that it be made with an aerodynamic shape, for example such as that shown in the drawings.

[0022] If, for design requirements, it is required to apply one or more further weights onto the front part of the ski 1, the overall weight of the mass 4i applied onto the tail part 1c of the ski 1 must consequently be increased (example not shown in the figures) so as to ensure always that the said point of attachment A coincides with the centre of gravity of the assembly.

[0023] With use of an assembly provided in accordance with the invention exceptional results in terms of balancing, stability and handling are achieved.

Claims

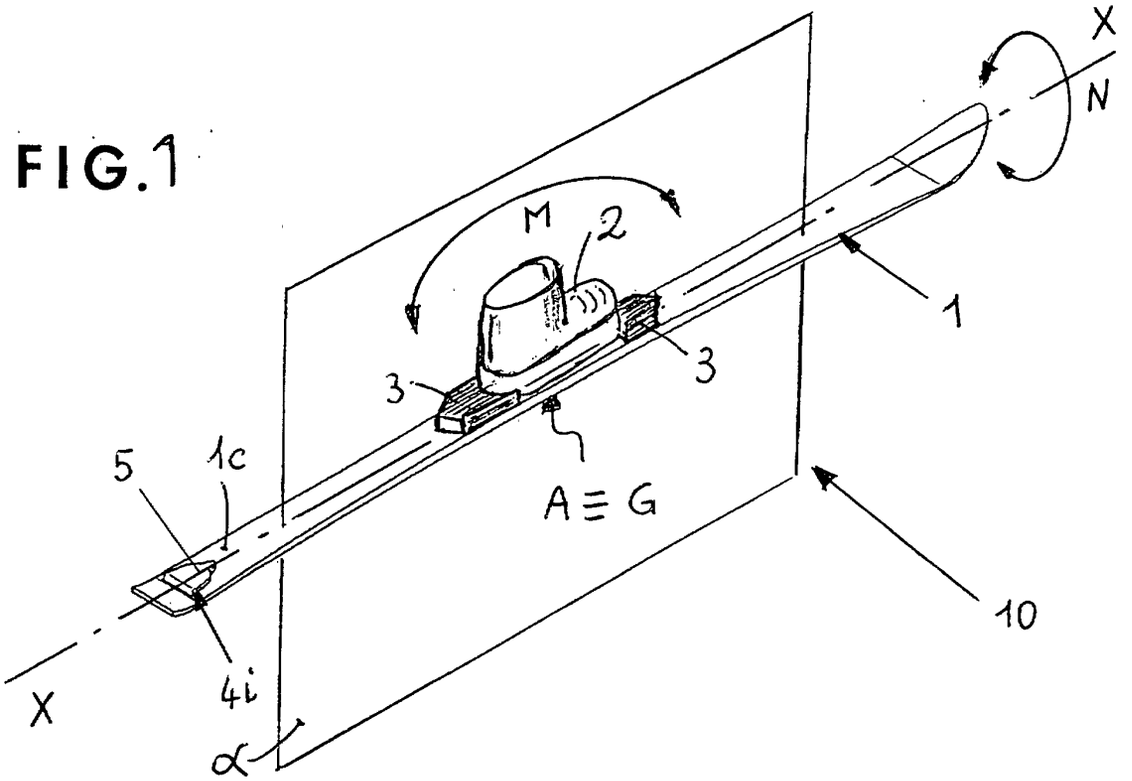
1. Assembly (10) consisting of ski (1), ski-boot (2) and bindings (3) for fixing the ski-boot (2) onto the ski (1), fixing together of said parts being performed in a zone of the ski (1) comprising a point, called point of attachment (A), **characterized in that** one or more weights (4i) of variable size are fixed onto the upper side of the said ski (1) and have dimensions and are positioned so that the centre of gravity (G) of the assembly (10) substantially coincides with the said point of attachment (A).

2. Assembly according to Claim 1, in which a single weight (4i) is applied onto the rear part of the ski (1) in the vicinity of its tail (1c).

3. Assembly according to one of the preceding claims, in which the said one or more weights (4i) each consist of a casing (5) containing inside it a plate (6) with several shaped compartments (7n), each of which is able to house a body (8n) having a predefined weight and with a shape matching said compartment.

4. Assembly according to Claim 5, in which the said casing (5) is shaped externally with an aerodynamic shape designed to reduce the air resistance produced by the forward movement of the ski (1).

FIG.1



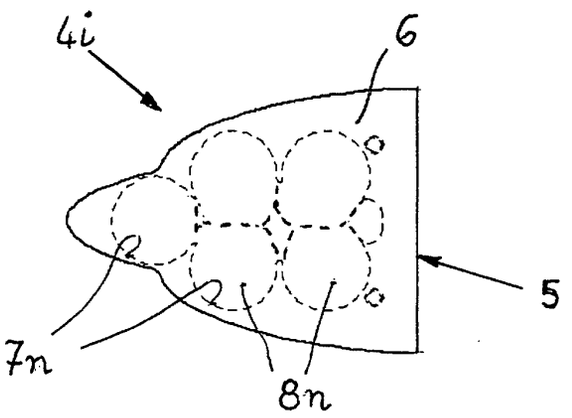


FIG.2

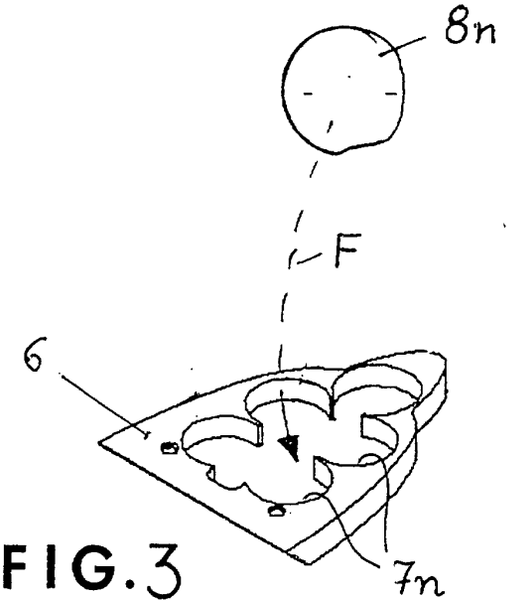


FIG.3