The present invention relates to a device that is mounted on a ski and to a method for the practice of alpine skiing using the said device. The device according to the invention, mounted on a ski or embedded into it, comprises a long rod (1 or 60) and a short rod (2 or 61), fastened at their threaded external ends (e, f, a', b') into some nuts (8, 9, 62, 63) that are joined together with some molded parts (11, 12, 64, 65) embedded into the ski (10). The rods (1 and 2) transmitting the force to an upper plate (29) through hydraulic means, while the rods (60 and 61) transmit the force to another plate (68) through mechanical means. The method according to the invention is characterized by that during a turning movement made by the skier there is a partial taking over of the resulting forces applied to the tip and tail areas of the ski, in relation to the central part of the ski, which produce a longitudinal bending during a turning movement by the skier, and using the force that results from this to effect a mechanical work that results in an interactive positioning of the gliding plane of the ski in relation to the skier’s sole plane, and returning to the initial position as soon as the ski is no longer bent.
Device and Method for Alpine Ski

This invention relates to a device that is mounted on a ski and to a method for the practice of alpine skiing using the said device.

There are known devices that consist for example of plates, bearings, springs, pistons or rods, representing an interface between the ski runner and the sole of the skier, mounted on the runner or embedded in its body, their purposes being to rise the skier's sole above the level of the ski runner, modify the hardness of the ski, reduce vibrations, and facilitate the natural curvature of ski runners during turning movements.

Thus, an integrated system is widely known and used in ski-building that controls the longitudinal flexibility of the skis through the action of control button with several adjustment levels installed at the tail, whose effect is to longitudinally stress up or release two integrated rods in the upper part over the entire length of the ski, by compressing or decompressing two springs fixed at their ends, previously, at the tip of the ski; this stressing up or release means that the longitudinal curvature of the ski during turning movements can be set in accordance with the wish of the skier to either make a large-radius turning movement or a small-radius movement, thus controlling the response of the ski runner to the external forces that bend it out on the horizontal axis during a turning movement.

Such devices have certain disadvantages, for example they only ensure the adjustment of longitudinal bending during turning movements, as described above, or they only reduce vibrations, and ensure an even bending of the ski over its longitudinal axis during a turning movement, or elevate the bindings-boots system against the snow layer etc., without reducing the effort exerted by the skier during turning movements by an additional inclination of the ski runner on its edge, which would contribute to increased safety and efficiency.

After reviewing the publications that constitute the present stage of known development in the technical field of ski equipment, we have not found any devices or methods to control the modification of the position of the ski runner against the foot sole of the skier during a turning movement.
The problem that our invention manages to resolve is that of achieving an interactive control to change the position of the ski against the skier's sole and the snow-layer plane during the execution of a turning movement in alpine skiing.

Unexpectedly, we found out that, by partial taking over the forces applied on the tail and tip areas of the ski that longitudinally hook the ski during a turning movement, and by their effecting of a mechanical work that acts, preferably, by mechanical or electro-hydraulic means, between the sliding plane of the ski and the support plane of the skier's sole, an additional tilt on the ski edge is created against the snow-layer plane, as well as a distancing from the same plane of boots and bindings, simultaneously ensuring reduced vibration in the tip and tail areas of the ski, while the longitudinal ski flexing is also uniform in the area of the boot sole.

The device for alpine skiing to be mounted on a ski or embedded into it, comprises a long rod and a short rod, fastened at their threaded external ends into some nuts that are joined together with some molded parts embedded into the ski, the said rods transmitting the force to an upper plate through hydraulic means, or in an alternative embodiment the rods transmit the force to another plate through mechanical means, in the case of hydraulic means the ends that are inside the rods being in connection with some pistons placed into two median cylinders, to the front and to the back, provided with chambers that communicate by means of a conduit, which in turn communicates by means of a short pipe, against a hole, with a distributor that has a cylindrical and translating sliding valve which directs the pressure fluid from cylinders to and from several pistons, mounted laterally to the left and to the right, placed into four cylinders mounted vertically, with two lower chambers of the first two cylinders being joined together by means of a lateral pipe, while the chambers of the other two cylinders are joined together by means of another lateral pipe, and some rods of the pistons support an upper plate at the level of the vertical cylinders and mounted on the ski, which contain several pressure sensors that transmit the information through an electrical circuit to some solenoids that modify the position of a core connected to the cylindrical sliding valve, while the lateral pipes are connected to the distributor through two pipes; the upper plate being articulated by means of joints, one to the front and one to the back, placed in the middle of the ski, allowing the plate to rotate around its longitudinal axis and a joint also allows the plate to move over a relatively short distance along its longitudinal axis.

Another embodiment of the device according to the invention consists in the fact that the said distributor has a casing provided with holes, against which there are two
cylinders containing two pistons that are in contact with each one of two springs, and also two expansion chambers.

Still another embodiment of the device according to the invention consists in the fact that the front-end joint includes a molded part embedded into the ski, which encases and fastens the front median cylinder and supports a longitudinal spindle that goes through a hinge ear to the front of the plate, while the back-end joint comprises a molded part embedded into the ski that encases and fastens the back cylinder and supports a spindle that goes through a back hinge ear of the plate.

Another embodiment of the device according to the invention lies in the fact that each of the four sensors includes two contacts, normally closed and normally open, that creates the link between a continuous power source and two solenoids that can change the position of the core along with the cylindrical sliding valve it is affixed to.

The device according to the invention also solves the problem through the fact that, if the plate is operated through mechanical means, the two internal end parts that have affixed on them some wedge-shaped parts at an angle of 10° - 45°, which in turn are placed into special seats, delimitated below by the upper surface of the ski and above by the lower molded wall of an upper plate, these seats being so shaped as to allow the pieces to glide in concurrence with the ski getting further out from the upper plate, guided by a front joint and by a back joint, situated laterally against an exterior edge between the upper surface of the ski and the lower molded wall of the upper plate, the front joint allowing the ski to rotate around a longitudinal axis situated at the level of the outside edge, and comprising a spindle fastened to the ski, around which the hinge ear of a part fastened to the plate can rotate, while the back joint has two degrees of freedom: one to rotate around the same longitudinal axis, and the other to glide along it, and it comprises another spindle fastened to the ski, which rotates and glides inside another hinge ear of another part affixed to the plate, the ski being articulated against the inside edge with the upper plate by means of two springs, placed vertically to the front and to the back, respectively, which are fastened with their upper ends to the plate and with their lower ends to the ski, by means of screws.

The device described above is placed under the right foot of the skier; the building of the device for the left foot mirrors the design of the former.

Another aspect of the invention is a method which applies by means of the device and solves the problem by partially taking over the resulting forces applied to the tip and tail areas of the ski, in relation to the central part of the ski, which produce a longitudinal
bending during a turning movement by the skier, and using the force that results from this to effect a mechanical work that results in an interactive positioning of the sliding plane of the ski in relation to the skier's sole plane, and returning to the initial position as soon as the ski is no longer bent.

The method according to the invention consists also in the fact that the interactive positioning of the ski in relation to the skier's sole plane is being achieved by hydraulic means and by the resulting force and, depending on the sense of the turning movement, there is a simultaneous positioning of both skis in relation to the skier's sole plane, increasing the inclination angle between the snow layer plane and the skier's sole surface, the value of this additional angle being mainly determined by the elasticity of the ski, its shape, the weight of the skier, the radius of the turn and the speed of turning.

The method according to the invention provides the fact that the interactive position is achieved through mechanical means by the resulting force, a situation where the skier's sole that finds itself on the outside of the turn is inclined against the snow surface at a larger angle than the usually known inclination of the ski, through the mechanical movement of a plate that is in contact with the ski boot sole, so that it creates an additional force that transmits to the ski at the level of its edge.

The method according to the invention refers also to the fact that the skis achieve a rotation movement around a longitudinal axis, the amount of angular movement depending mainly on the amount of the longitudinal bending of each ski during a turning movement, simultaneously with the achievement of a relative movement along a longitudinal axis against the skier's sole planes and the upper plates of the devices.

The method according to the invention refers also to the fact that, during a turn made by the skier, the resulting forces applied to the tail and tip areas of the ski are partially taken over, in order to effect a mechanical work whose result is to move along the gliding plane of the ski against the skier's sole plane.

The device and method according to the invention provide the following advantages:

- increased efficiency and safety of the skier during turning movements;
- reduced vibrations in the tail and tip areas of the ski, during a turning movement;
- reduced effort for the skier while making a turn, as a result of the change in the tipping angle of the ski;
- relatively long operating life.
We shall now give two examples of how to build the device and apply the method of
the invention, as shown in Figures 1 to 15, which illustrate:
- Figure 1 is an illustration of a skier while turning to the left, as well as the positioning of his
  legs while taking a turn;
- Figure 2 is an illustration of the position of a skier's legs while taking a left turn, but this
time with an electrical-hydraulic device according to the invention mounted on the skis;
- Figure 3 is an illustration of the position of a skier's legs while taking a left turn, but this
time with a mechanical device according to the invention mounted on the skis;
- Figure 4 is an illustration in perspective of a ski turning to the left, provided with an
electrical-hydraulic device according to the invention;
- Figure 5 is a section view of the front joint of the upper plate of the electrical-hydraulic
device mounted on a ski, partially illustrated;
- Figure 6 is a section view of the back joint of the upper plate of the electrical-hydraulic
device mounted on a ski, partially illustrated;
- Figure 7 is an exploded view of an electrical-hydraulic device mounted on a ski;
- Figure 8 is a detail A as illustrated in Figure 7, representing the mounting of the front-end
  rod of the electrical-hydraulic device on the tip of the ski;
- Figure 9 is an operation scheme for the electrical-hydraulic device;
- Figure 10 is an electrical operation scheme for the electrical-hydraulic device;
- Figure 11 is a view in perspective of a ski turning to the left, having a mechanical device
  according to the invention mounted on it;
- Figure 12 is an exploded view of a mechanical device mounted on a ski;
- Figure 13 is a detail B as seen in Figure 12;
- Figure 14 is an illustration of the front-end lateral joint of the upper plate pertaining to a
  mechanical device mounted on a ski under the right foot;
- Figure 15 is an illustration of the back-end lateral joint of the upper plate pertaining to a
  mechanical device mounted on a ski under the right foot.

The device according to the invention comprises some rods, a long front-end one 1
and short back-end one 2, from whose inner ends, a and b, two pistons, 3 and 4, are put
into cylinders 5 and 6, which are median and to the front and to the back respectively.
These cylinders have two chambers, c and d, joint together with a conduit 7, frontally
connected to cylinders 5 and 6.
Rods 1 and 2 have threaded outer ends, e and f, fastened to the nuts 8 and 9 that are joined together by means of a molded part 11 to the front and a molded part 12 to the back, embedded in the ski 10, inside the area of a tip g, and in the area of a tail h.

Conduit 7 connects by means of a short pipe 13, through a hole i, with a distributor 14 that has a translating cylindrical sliding valve, which directs the pressure fluid from cylinders 5 and 6, during a turning movement with a ski 10, to and from pistons 15 and 16, laterally mounted to the right above edge i, as well as to and from two other pistons 17 and 18, laterally mounted to the left of edge i. Pistons 15, 16, 17 and 18 are put into cylinders 19, 20, 21, and 22, vertically mounted. Lower chambers j and k of cylinders 19 and 20 are joined by means of a lateral pipe 23, while lower chambers l and m of cylinders 21 and 22 are joined by means of another lateral pipe 24.

Pistons 15, 16, 17, and 18 connect with rods 25, 26, 27, and 28 that go outside cylinders r, 19, 20, 21, and 22 and support an upper plate 29.

In line with cylinders 19, 20, 21, and 22 on the ski 10, there are several pressure sensors 30, 31, 32 and 33, which transmit the information about the position of ski 10, by means of an electrical circuit 34, to solenoids 35 and 36, thus modifying the position of a core 37 that commutes the cylindrical sliding valve 38 of the distributor 14.

Pipe 23 connects with the distributor 14 by means of a pipe 39, which joins it to the hole n of the distributor 14, while pipe 24 connects with the distributor 14 by means of a pipe 40 that links it to the hole o of the distributor 14.

The sliding valve 38 in the distributor 14 is operated by two springs, 41 and 42, and an external controlling part p of this part controls the core 37 that reacts to the front and back solenoids 35 and 36, powered by the control of sensors 30, 31, 32 and 33, from a source 43 of continuous electrical power.

Each one of sensors 30, 31, 32 and 33 includes two contacts, r and s, normally closed and normally open, which make the link between source 43 and solenoids 35 and 36.

An outer casing 44 of the distributor 14 has two holes, t and u, where two cylinders are mounted, 45 and 46, which contain pistons 47 and 48 in contact with one of springs 49 and 50.

Inside cylinders 45 and 46 two expansion chambers, v and x, are created.

The ski 10 is articulated by means of two joints, 51 and 52, placed in the middle on the front-end and back-end respectively of the upper plate 29. Joint 51 is placed to the front under the tip end g of the upper plate 29, which lets the ski 10 rotate around an
upper longitudinal axis, while the back-end joint 52 allows the ski 10 to rotate around the same longitudinal axis, in concurrence with a gliding movement along it, over a distance of a few millimeters.

Joint 51 is made of a molded part 53, embedded into the ski 10, which on the outside contains and fastens cylinder 5 and a longitudinal axis 54 that goes through a front hinge ear 55 of the plate 29. The back joint 52 comprises a molded part 56, embedded into the ski 10, which on the outside contains and fastens cylinder 6 and supports a longitudinal axis 57, which goes through a back hinge ear 58 of the plate 29.

During a turning movement on a ski 10 provided with a device to control its position, we assume that the upper plate 29 is fixed, since it does not change its position against the plane of the skier's sole 59, instead the ski itself 10 increased or reduces its inclination on the edge with the value of the angle $\alpha$.

The device remains inactive if the ski 10 glides on the snow maintaining contact with the entire sole, leading to the opening up of contacts $r$, normally closed by the pressure sensors 30, 31, 32, and 33, or, if the ski 10 has no contact with the snow, when the contacts $s$, normally open, remain open, from the pressure sensors 30, 31, 32, and 33. Device inactivity translates into a lack of change in the intermediate and stable position of the cylindrical sliding valve 38, a position where the hydraulic liquid remains blocked.

The device that controls the position of the ski 10 in relation to the plane of the skier's sole 59 becomes active in a situation where the ski 10 dips over one of the two edges, right or left, in order to initiate the turning movement, and the ski starts to bend in a longitudinal plane under the influence of external forces, and, due to the shutting up of the normally closed contacts $s$ inside the pressure sensors 30, 31, or 32 and 33 on the part corresponding to the turning side, the distributor 14 opens up one of the two circulation ways for the fluid in the hydraulic circuit.

When initiating the turning movement, for example to the left, the device for controlling the position of the ski 10 in relation to the skier's sole plane 59, according to the invention, becomes activated through the tipping of the ski 10 over the edge $r$, and, by closing up the normally open contacts $s$ and opening up the normally closed contacts $r$ normal in the pressure sensors 32 and 33, which are put against the edge $r$ inside the turning arc, due to the pressure exerted on them and by maintaining in an open position the normally open contacts $s$ situated in pressure sensors 30 and 31, which are placed against the edge $i$ outside the turning arc, the result is that solenoid 36, powered by the continuous electrical power source 43, changes the position of core 37 together with the
sliding valve 38, to a position where the pressure becomes directed towards pipe 40 through the hole o, a position in which, by pushing pistons 3 and 4 through rods 1 and 2 activated by the external forces, that bend the ski along a longitudinal axis, pressure is being created inside chambers c and d of cylinders 5 and 6, which is transmitted through conduits 7 and 13 to the distributors 14, and through conduits 40 and 24 to the inner chambers l and m of cylinders 21 and 22, thus modifying the position of pistons 17 and 18, lowering them down by means of rods 27 and 28 on the left lateral side of the ski 10, increasing its inclination on edge i'. Due to the mechanical joints 51 and 52 of the upper plate 29, the right lateral side of the ski 10 corresponding to edge i' comes up, pressing down rods 25 and 26 that push the pistons 15 and 16, and the pressure fluid in the inner chambers j and k of cylinders 19 and 20 is led through conduit 23 and 39 through the distributor 14 towards the expansion chamber x, where it will modify the position of piston 48, thus compressing the spring 50.

The lateral inclination of the ski 10 against the plate 29 and the skier's sole plane 59 is continuous up to its point of maximum curvature.

When closing the turning movement, just as the skier reduces the inclination of the ski 10 over the edge i', the longitudinal bending of the ski 10 decreases gradually, making the pressure in chambers c and d of cylinders 5 and 6 to go down, and the fluid circulation described above starts up again but in reverse, until the ski 10 has completely reduced its longitudinal bending and the upper plate 29 returns once again to its initial parallel position with the skier's sole plane 59.

As for the opposite turning movement, that is towards the right side, the cylindrical sliding valve 38 is operated by solenoid 35 in the position where the pressure is being directed in the second circulation sense, through hole n, and then through pipes 39 and 23 towards chambers j and k of cylinders 19 and 20, pushing down pistons 15 and 16 that lower down the lateral right side of the ski 10 corresponding to edge i'; pistons 17 and 18 being compressed by the upper plate 29, they direct the pressure fluid through holes o and t towards the expansion chamber v in cylinder 45, thus compressing spring 49 with piston 47.

Under normal conditions, between the sliding planes of the skis 10 and the snow layer plane, during the execution of a turning movement, there are two angles: \( \theta_{\text{exterior}} \) and \( \theta_{\text{interior}} \) corresponding to the outside (exterior) ski and the inside (interior) ski respectively, as seen against the turning arc, which are equal to the inclination angles of the skier's sole plane in relation to the snow layer; these angles \( \theta \) have different values, \( \theta_{\text{exterior}} \) being
higher than $\theta_{\text{interior}}$. In a situation where on each of the two skis 10 there is an electrical-hydraulic device, during the execution of a turning movements, between the gliding planes of the skis 10 and the snow plane, two angles are being formed, $\theta_{\text{exterior}}$ and $\theta_{\text{interior}}$, with a higher value than those of angles $\theta_{\text{exterior}}$ and $\theta_{\text{interior}}$, while between the planes of the skier's soles 59 and the gliding planes of the two skis 10 several angles are being formed: $\alpha$, opening towards the inner part of the turn, $\alpha_1$ corresponding to the ski on the outside of the turn, and $\alpha_2$ corresponding to the ski on the inside of the turn, where $\alpha$ is larger than $0.2$.

This design alternative for the device operates identically on both skis 10, the left one and the right one, meaning that the skis 10 can be successfully used on any type of snow layer, at any speed and on any type of slopes, both in the case of slopes with large-arc turns and long direct downhill runs, and where the run is sinuous, involving frequent changes of direction to the left or to the right; in such situations, the device ensures an interactive positioning by increasing the inclination angle $\theta$ to $\theta_{\text{interior}}$ on the edge in relation to the snow layer, for both skis 10, by controlling their position in relation to the skier's sole plane 59 on both edges, 1' or l', for each ski 10, inside or outside the turning arc.

The device according to invention, in the case of operating the plate by hydraulic means, includes two rods, 60 and 61, one to the front and long, the other to the back and short, provided with two outer ends a' and b', fastened up, able to adjust the ski 10 by means of two nuts, 62 and 63, joined together by means of two molded parts 64 and 65, one to the back and one to the front, preferably embedded into the ski 10 in the area of the tip g and that of the tail h, respectively. Rods 60 and 61 are fastened with two inside ends, c' and d', into parts 66 and 67, wedge-shaped at an angle of $10^\circ - 45^\circ$, placed into two seats e' and f', delimited at their lower side by the upper surface g' of the ski 10, and at their upper side by a molded lower wall h' of an upper plate 68. The skis 10 are articulated by the upper plates 68 by means of two joints, 69 and 70, to the front and to the back respectively, situated up and laterally against the edge i' of the ski 10 outside the turning arc and l' of the ski 10 inside the turning arc.

Joint 69 allows the ski 10 to rotate around a longitudinal axis, concurrent with and above the edge i', and comprises a spindle 71 fastened to the 10, around which a hinge ear j' can rotate, pertaining to a part 72 fastened to plate 68, while joint 70 has two degrees of freedom: one to rotate around the longitudinal axis mentioned above, and the other to glide along it; this joint comprises a spindle 73 fastened to the ski 10, which glides and rotates inside a hinge ear k' of a part 74 fastened to the plate 68.
The ski 10 has against the inside turning edge I' two springs 75 and 76, vertically placed, which are fastened laterally, at the front-end and back-end respectively, on to the upper plate 68; the upper ends of these springs are fastened to the upper plate 68, while their lower ends are fastened to the ski 10, by means of some screws 77.

The skier has his right foot on the plate 68, and on the ski 10, corresponding to his left foot, there is another device to control the position of the ski 10 in relation to the skier's sole plane 59, provided with another upper plate; this situation is not illustrated in the drawings.

The device we are referring to is the one mounted under the right foot of the skier, and the device for the left foot has a mirroring design.

Knowing that in alpine skiing the most important support for the skier during a turning movement takes place on the inner edge I' of the ski 10 at the outside part of the turn, the mechanical building alternative operates characteristically on this edge, which leads to dedicating one ski for use under the left foot, while the other remains dedicated to the right foot. Thus, the ski described and illustrated in the figures of this alternative detail the construction of the device mounted on the right-foot ski; the design for the device on the left-foot ski mirrors the former.

When initiating the turn to the left, as soon as the ski 10 tips over the edge I', it starts to bend gradually in a longitudinal fashion, until the turn has the minimum radius desired by the skier, and this makes the rods 60 and 61, fastened at the outside ends a' and b', threaded and adjustably fixed by means of nuts 62 and 63, adjustably fastened by means of the molded parts 64 and 65, embedded into a tip g, and into a tail h, respectively, of a ski 10, to push with their ends c' and d' on to the wedge-shaped parts 66 and 67, and these start to further the surface g' of the ski 10 from the molded lower wall h' of an upper plate 68.

The ski 10, which is articulated on to the plate 68 by means of joints 69 and 70, situated above and against an outer edge I', comes down in a longitudinal plane and forms an additional inclination angle $\alpha_3$ and $\alpha_4$, which makes the angle $\theta_{\text{exterior}}$ to increase, becoming $\theta_{2\text{exterior}}$, and the angle $\theta_{\text{interior}}$ to decrease with a smaller value than the first angle, becoming $\theta_{2\text{interior}}$.

When closing the turn, as soon as the skier reduced the inclination of the skis 10 on the edge I', the longitudinal bending of the skis 10 decreases gradually, making rods 60 and 61 fastened to the tip g and to the tail h of each ski 10 to retreat together with those...
wedge-shaped parts 66 and 67, reducing at the same time the additional inclination angles \( \alpha_3 \) and \( \alpha_4 \), until the ski 10 glides in parallel with the skier’s sole plane 59.

If the skis 10 are provided with a mechanical device according to the invention, during the execution of a turn, between the snow-layer plane and the gliding planes of the skis 10 two angles are developed, \( \theta_{26x} \) and \( \theta_{26y} \), where the value of the first angle, corresponding to the ski 10 which finds itself towards the outer part of the turn, is higher than the second angle, corresponding to the ski 10 which finds itself towards the inside of the turn. Concomitantly, two other angles develop: an angle \( \alpha_3 \) whose opening is inside the turn, and corresponding to the ski 10 outside the turn, and angle \( \alpha_4 \) whose opening is outside the turn, corresponding to the other ski 10.

The angle \( \alpha_3 \) created by the mechanical device is the angle with the main contribution to the increased efficiency of making the turn, through the inclination over the edge \( \tau \) of the ski 10 outside the turn, while the angle \( \alpha_4 \), even though it has negative effects, to reduce the inclination over the edge \( \tau \) of the ski 10 inside the turn, is much less important, due to the reduced support of the skier’s foot on the inside ski 10, the more so as the value of the angle \( \alpha_3 \) is much higher.

This alternative embodiment of the device, mounted on the skis 10 or integrated into their bodies, does not operate identically during a turning movement on both skis 10, i.e. left and right, and that is why we recommend that it be used on the skis 10 for a sinuous run, which involves frequent changes in direction, to the left or to the right, such as for a slalom race, this being a situation where the device ensures the interactive position needed by increasing the inclination angle against the snow plane over the edge \( \tau \) of the ski 10 under the foot that finds itself outside the turn, by controlling its position in relation to the skier’s sole plane 59, and by decreasing the inclination angle against the snow plane over the edge \( \tau \), with a smaller amount than its outside counterpart, due to a smaller longitudinal bending of the ski 10 that is beneath the foot inside the turn.

During the turn, the vibrations that come up in the ski 10 are buttressed by the changes over time of the positioning of the ski 10 against the skier’s sole 59.
CLAIMS

1. Device for alpine skiing, to be mounted on a ski or embedded into it, characterized in that it comprises a long rod (1 or 60) and a short rod (2 or 61), fastened at their threaded external ends (e, f, a', b') into some nuts (8, 9, 62, 63) that are joined together with some molded parts (11, 12, 64, 65) embedded into the ski (10), the rods (1 and 2) transmitting the force to an upper plate (29) through hydraulic means, while the rods (60 and 61) transmit the force to another plate (68) through mechanical means, in the case of hydraulic means the ends (a and b) that are inside the rods (1 and 2) being in connection with some pistons (3 and 4) placed into two median cylinders (5 and 6), to the front and to the back, provided with chambers (c and d) that communicated by means of a conduit (7), which in turn communicates by means of short pipe (13), against a hole (i), with a distributor (14) that has a cylindrical and translating sliding valve (38), which directs the pressure fluid from cylinders (5 and 6) to and from several pistons (15, 16, 17 and 18), mounted laterally to the left and to the right, placed into four cylinders (19, 20, 21 and 22) mounted vertically, with two lower chambers (j and k) of the first two cylinders (19 and 20) being joined together by means of a lateral pipe (23), while the chambers (i and m) of the other two cylinders (21 and 22) are joined together by means of another lateral pipe (24), and four rods (25, 26, 27 and 28) of the pistons (15, 16, 17, and 18) support an upper plate (29) at the level of the vertical cylinders (19, 20, 21 and 22) mounted on the ski (10), which contain several pressure sensors (30, 31, 32 and 33) that transmit the information through an electrical circuit (34) to a series of solenoids (35 and 36) that modify the position of a core (37) connected to the cylindrical sliding valve (38), while the lateral pipes (23 and 24) are connected to the distributor (14) through two pipes (39 and 40); the upper plate (29) being articulated by means of joints (51 and 52), one to the front and one to the back, placed in the middle of the ski (10), allowing the plate (29) to rotate around its longitudinal axis, and joint (52) also allows the plate (29) to move over a relatively short distance along its longitudinal axis.

2. Device according to claim 1, characterized in that the distributor (14) has a casing (44) provided with holes (t and u), against which there are two cylinders (45 and 46) containing two pistons (47 and 48) that are in contact with each one of two springs (49 and 50), and the cylinders (45 and 46) also containing two expansion chambers (v and x).
3. Device according to claim 1, **characterized in that** the front-end joint (51) includes a molded part (53) embedded into the ski (10), which encases and fastens the front median cylinder (5), and supports a longitudinal spindle (54) that goes through a hinge ear (55) to the front of the plate (29), while the back-end joint (52) comprises a molded part (56) embedded into the ski (10) that encases and fastens the median back cylinder (6) and supports a spindle (57) that goes through a back hinge ear (58) of the plate (29).

4. Device according to claim 1, **characterized in that** each of the four sensors (30, 31, 32 and 33) include two contacts (r and s), normally closed and normally open, that create the link between a continuous power source (43) and two solenoids (35 and 36) that can change the position of the core (37) along with the cylindrical sliding valve (38) it is affixed to.

5. Device according to claim 1 **characterized in that**, in the case of operating the plate (68) through mechanical means, the two internal end parts (c' and d') that have affixed on them some wedge-shaped parts (66 and 67) at an angle of 10° - 45°, which in turn are placed into special seats (e' and f'), delimited below by the upper surface (g') of the ski (10) and above by the lower molded wall (h') of an upper plate (68), these seats (e' and f') being so shaped as to allow the pieces (66 and 67) to glide in concurrence with the ski (10) getting further out from the upper plate (68), guided by a front joint (69) and by a back joint (70) situated laterally against an exterior edge (i') between the upper surface (g) of the ski (10) and the lower molded wall (h) of the upper plate (68), the front joint (69) allowing the ski (10) to rotate around a longitudinal axis situated at the level of the outside edge (i), and comprising a spindle (71) fastened to the ski, around which the hinge ear (j) of a part (72) fastened to the plate (68) can rotate, while the back joint (70) has two degrees of freedom: one to rotate around the same longitudinal axis, and the other to glide along it, and it comprises another spindle (73) fastened to the ski (10), which rotates and glides inside another hinge ear (k) of another part (74) affixed to the plate (68), the ski (10) being articulated against the inside edge (l) with the upper plate (68) by means of two springs (75, 76) placed vertically, to the front and to the back respectively, which are fastened with their upper ends to the plate (68) and with their lower ends to the ski (10), by means of screws (77).

6. Method for alpine skiing to be used with the device defined in claims 1-5, **characterized in that** during a turning movement made by the skier there is a partial taking over of the resulting forces applied to the tip and tail areas of the ski, in relation to
the central part of the ski, which produce a longitudinal bending during a turning movement by the skier, and using the force that results from this to effect a mechanical work that results in an interactive positioning of the gliding plane of the ski in relation to the skier's sole plane, and returning to the initial position as soon as the ski is no longer bent.

7. Method according to claim 6, characterized in that the interactive positioning of the ski in relation to the skier's sole plane is achieved by hydraulic means and by the resulting force, and, depending on the sense of the turning movement, there is a simultaneous positioning of both skis in relation to the skier's sole plane, increasing the inclination angle between the snow-layer plane and the skier's sole surface, the value of this additional angle being mainly determined by the elasticity of the ski, its shape, the weight of the skier, the radius of the turn and the speed of turning.

8. Method according to claim 6, characterized in that the interactive position is achieved through mechanical means by the resulting force, a situation where the skier's sole that finds itself outside the turn is inclined against the snow surface at a larger angle than the usually known inclination of the ski, through the mechanical movement of a plate that is in contact with the ski boot sole, so that it creates an additional force that transmits to the ski at the level of its edge.

9. Method according to claims 6 to 8, characterized in that the skis achieve a rotation movement around a longitudinal axis, the amount of the angular movement depending mainly on the amount of the longitudinal banding of each ski during a turning movement, simultaneously with the achievement of a relative movement along a longitudinal axis, against the skier's sole planes and the upper plates of the devices.

10. Method according to claims 6 to 9, characterized in that during a turn made the skier, the resulting forces applied to the tip and tail areas of the ski are partially taken over, in order to effect a mechanical work whose result is to move along the gliding plane of the ski against the skier's sole plane.