April 22, 1969 G. TANGORRA 3,439,434

SKI SHOE

Filed Oct. 23, 1967

Fig. 1

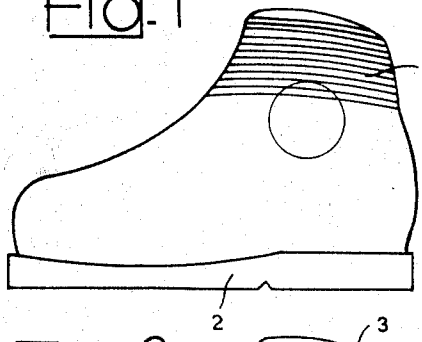


Fig. 2

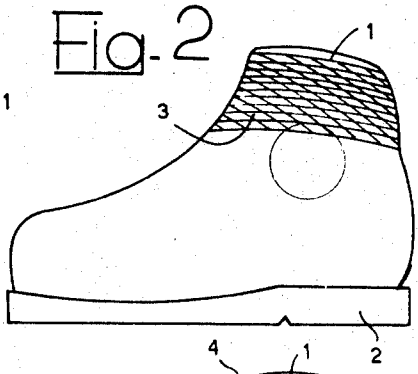


Fig. 3

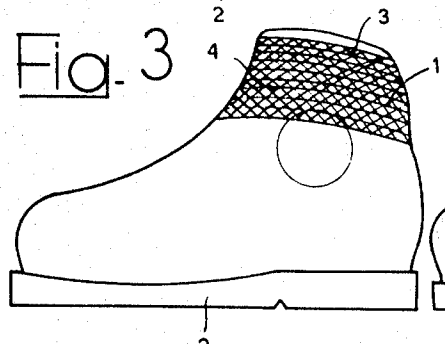


Fig. 4

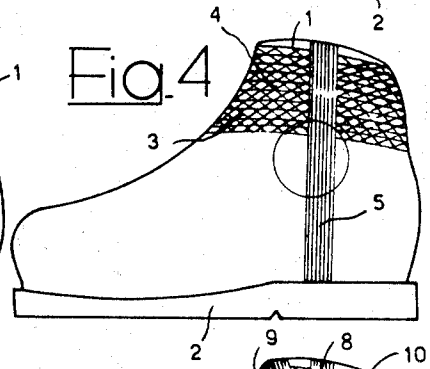


Fig. 5

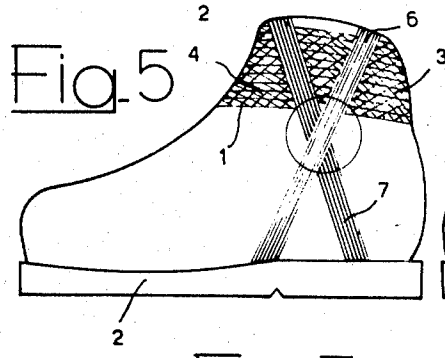


Fig. 6

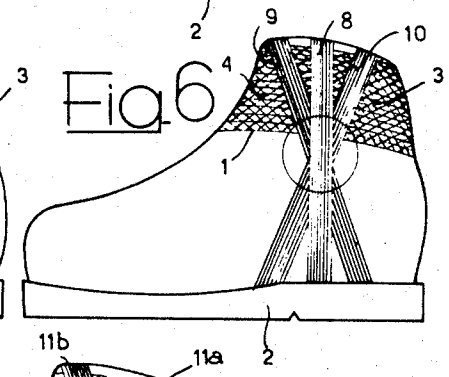
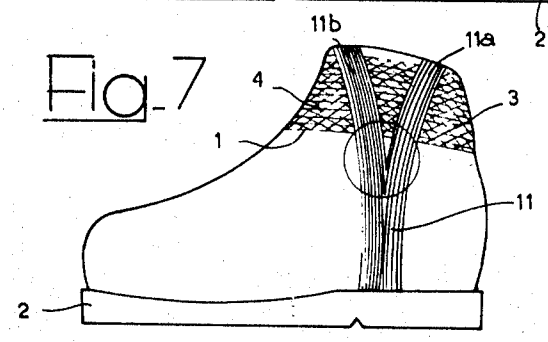


Fig. 7



United States Patent Office 3,439,434
Patented Apr. 22, 1969

3,439,434

SKI SHOE

Giorgio Tangorra, Milan, Italy, assignor to Superga S.p.A., Turin, Italy

Filed Oct. 23, 1967, Ser. No. 677,231
Claims priority, application Italy, Mar. 22, 1967, 51,020/67
Int. Cl. A43b
U.S. Cl. 36—2.5 15 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to ski shoes and has for its object the provision of a ski shoe which exhibits the desired degree of rigidity across the shoe without the hitherto experienced lack of flexibility along the shoe, this end being achieved by the provision in a shoe according to the invention of at least one layer of cord fabric at the region of the upper which lies above the upper region adapted to cover the ankle bone of a wearer, and the provision also of reinforcement structures in the form of non-extensible tapes which extend generally in the direction of the height of the upper and over the said ankle bone region. Where there are a plurality of cord fabric layers at the top of the shoe upper it is possible to sandwich the tapes therebetween. Various constructions for the cord fabric layers are given by way of example and it is generally preferred to have at least one said layer with the cords thereof parallel to the plane of the shoe sole.

The present invention relates to ski shoes and more particularly to a rubber ski shoe the upper of which is flexible in a longitudinal direction but so stiffened as to resist bending in a transverse direction.

It is known that a ski shoe should meet the requirements of modern ski techniques by having its uppers, more particularly that portion of its upper which extends above the level of the region adapted to cover the anklebone, sufficiently rigid to oppose tendencies of the foot to bend laterally at the ankle.

In the past the provision of this rigidity across the shoe has unfortunately led to an objectionable lack of flexibility of the said portion of the upper along the length of the shoe, and this has frequently been the cause of fractures of the tibia and fibula of a wearer at the level just above the top edge of the upper. Various suggested remedies to the above drawback have proved variously unsuccessful. For instance, reductions made in the thickness of the upper at its front and rear portion, respectively, have adversely affected the rigidity of the upper in a transverse direction, and proved inconsistent with the need for a satisfactory closure of the upper at the front.

It is an object of the present invention to solve the aforementioned problems.

According to these and other objects, the invention consists in a ski shoe wherein:

(a) The region of the upper above the region thereof adapted to cover the ankle bone of a wearer comprises at least one layer of cord fabric, and

(b) The upper is stiffened in a transverse direction by the provision of reinforcement structures on each upper side either over a said layer or layers or between said layers, the said reinforcement structures comprising groups of substantially longitudinally non-extensible tapes formed from cord fabric with wires extending in the direction of the tape length, the said structures extending generally in the directions of the height of the upper and over the said region thereof adapted to cover the ankle bone of a wearer.

Advantageously, at least one layer of cord fabric comprises cords which extend parallel to the plane of the shoe sole. Advantageously also, where a plurality of cord fabric layers are provided, at least some of the cords of the said layers are inclined with respect to the plane of the shoe sole either all in the same direction or in two opposite directions, and the cords within each individual layer are parallel with one another within the said layer.

Preferably, the wires of the reinforcement tapes extend parallel with one another within a said tape and are embedded in a layer of suitable material, preferably more rigid than the material incorporating the cords of the cord fabric. Advantageously also the reinforcement structures comprise a pair of tape groups so inclined in opposite directions with respect to the plane of the shoe sole that they intersect each other at the said region of the upper adapted to cover the ankle bone of a wearer.

These and other objects and advantages of the invention will be clear from the following description, given with reference to the accompanying drawings which are by way of example and in which:

FIG. 1 is a diagrammatical side elevational view of a partially constructed ski shoe according to the present invention, the top portion of the upper of the said partially constructed shoe being formed from cord fabric with its cords parallelly disposed;

FIG. 2 is a view similar to that of FIG. 1 of a partially constructed shoe according to the present invention, the top portion of the upper of the shoe being formed from cord fabric in a manner modified with respect to that of FIG. 1;

FIG. 3 is a view similar to that of FIGS. 1 and 2 of a partially constructed shoe in accordance with the present invention, the top portion of the upper thereof being also formed from cord fabric but in a manner modified with respect to that of FIGS. 1 and 2; and

FIGS. 4 to 7 are diagrammatical side elevational views of four ski shoes constructed in accordance with the invention, in each of which the top portion of the upper is formed from cord fabric in the manner illustrated in FIG. 3 and is reinforced against transverse bending with respect to the longitudinal direction of the shoe by the provision of variously arranged tapes of cord fabric including metal cords.

Like reference numerals are used for parts throughout the figures and it is here to be noted that although FIGS. 4 to 7 each illustrate an at least substantially finished shoe, the initial construction of which is in accordance with FIG. 3, any of the finished shoes of FIGS. 4 to 7 may equally well be initially constructed in accordance with either of FIGS. 1 and 2. It is thus to be borne in mind that the seven figures of the accompanying drawings effectively constitute twelve different figures.

In FIG. 1 of the drawings, there is diagrammatically shown a ski shoe of which a top portion of the upper, which commences at the region adapted to cover the ankle bone of a wearer's foot, is formed from one or a plurality of first layers of cord fabric, the cords **1** of which extend parallel with one another and with the plane of the shoe sole **2**.

According to the embodiment shown in FIG. 2, in addition to this first layer or layers of cord fabric, the cords **1** of which are all arranged parallel to the plane of the sole **2**, one or a plurality of further layers of cord fabric are provided, the cords **3** of which further layers extend parallel with one another but are so inclined to the plane of the sole **2** as to intersect the cords **1** of the first layer or layers.

In the embodiment shown in FIG. 3 the said top portion of the upper comprises one or a plurality of first layers of cord fabric, wherein the cords **1** extend parallel

with the sole **2**, and various further layers, the cords **3**, **4** of which extend respectively parallel to one another in each said layer, but are respectively oppositely inclined with respect to the plane of the sole **2**. The cords **3** therefore cross the cords **4** and the cords **1** which are parallel to the sole plane.

The angles which the cords **3** and **4** make with the plane of the sole **2** should not exceed 70° if limitation of the flexibility of the top portion of the upper in a direction lengthwise of the shoe is to be avoided.

The fabric employed preferably comprises cords consisting of natural, artificial or synthetic textile materials, and particularly suitable are rayon, nylon, glass or similar materials and highly anisotropic materials. The rubber mixes incorporating these cords should exhibit considerable resiliency in order to permit angular relative movements of the cords during bending of the top portion of the upper in a direction lengthwise of the shoe.

In accordance with an essential feaure of the invention and in order that the required degree of rigidity of the upper and more particularly the top region thereof, may be attained and bending in a transverse direction be resisted, the upper is stiffened, after construction as detailed above, by the incorporation therein of reinforcing structures as shown in FIGS. 4 to 7.

The reinforcing structure shown in FIG. 4 comprises, on each side of the upper, a group **5** of parallel tapes which are substantially non-extensible in the direction of their length and which comprise, for instance, one or a plurality of layers of cord fabric which is formed from wires embedded in a rubber mix. Such wires are preferably steel wires and the mix is preferably more rigid than the mix which incorporates the previously described cords **1**, **3** and **4**. In the embodiment of FIG. 4 the tapes extend in a direction which is substantially perpendicular to the plane of the shoe sole **2** and over that region of the upper which is adapted to cover the ankle bone.

In the embodiment shown in FIG. 5 the reinforcement comprises, on each side of the upper, a pair of tape groups **6**, **7**, which are both similar in structure to the above described groups **5** but oppositely inclined, for instance by 10–15°, with respect to a plane perpendicular to the sole **2**. In this way the tapes cross one another at that region of the upper which is adapted to cover the ankle bone, that is to say at the level whereat that portion of the wall of the upper which is made from cord fabric commences.

FIG. 6 shows a shoe wherein the reinforcing structure comprises a combination of the arrangement shown in FIGS. 4 and 5. Thus, on each side of the upper there is provided a tape group **8** which is exactly similar to the tape group **5** shown in FIG. 4 and which extends substantially perpendicular to the sole and two inclined tape groups **9**, **10**, which are exactly similar in form and location to the tape groups **6** and **7** shown in FIG. 5. The crossing of the tape groups **8**, **9** and **10** is also situated substantially at that region of the upper whereat that portion of the wall of the upper which is made from cord fabric commences.

In the shoe shown in FIG. 7 the reinforcing structure for the upper is differently composed but again provide resistance against bending in a transverse direction. In this case the structure comprises, on each side, a Y-shaped group **11** of tapes of cord fabric which are made from metal cords. As shown, the diverging branches **11***a* and **11***b* of this group meet at that region of the upper whereat that portion of the wall of the upper which is made from cord fabric commences.

Various modifications of the invention of course possible within the scope of the appended claims and it is to be borne in mind, for instance, that although the reinforcing structures have been referred to herein as being superposed on the cord fabric layers, it is possible also to sandwich the said reinforcing structures between the said cord fabric layers.

What I claim is:

1. A ski shoe wherein:
(a) the region of the upper above the region thereof adapted to cover the ankle bone of a wearer, comprises at least one layer of cord fabric, and
(b) the upper is stiffened in a transverse direction by the provision of reinforcement structures on each upper side, the said reinforcement structures comprising groups of substantially longitudinally non-extensible tapes formed cord fabric with wires extending in the direction of the tape length, the said structures extending generally in the direction of the height of the upper and over the said region thereof adapted to cover the ankle bone of a wearer.

2. A ski shoe according to claim **1**, wherein a plurality of layers of cord fabric are provided and the said reinforcement structures are sandwiched therebetween.

3. A ski shoe as claimed in claim **1**, wherein a plurality of said layers of cord fabric are provided and the said reinforcement structures are superposed thereabove.

4. A ski shoe as claimed in claim **1**, wherein a single layer of cord fabric is provided and the said reinforcement structures are superposed thereabove.

5. A ski shoe as claimed in claim **1**, wherein at least one said layer of cord fabric comprises cords which extend parallel to the plane of the shoe sole.

6. A ski shoe as claimed in claim **1**, wherein a plurality of said cord fabric layers are provided, the cords within each individual said layer being parallel with one another within the said layer.

7. A ski shoe as claimed in claim **1**, wherein a plurality of said cord fabric layers are provided and at least some of the cords of the said layers are inclined with respect to the plane of the shoe sole.

8. A ski shoe as claimed in claim **7**, wherein the said cords of the said layers are inclined all in the same direction with respect to the said shoe sole.

9. A ski shoe as claimed in claim **7**, wherein the said cords of the said layers are inclined with respect to the plane of the said shoe sole in two opposite directions.

10. A ski shoe as claimed in claim **1**, wherein the cords of the cord fabric are embedded in a mix of relatively soft consistency.

11. A ski shoe as claimed in claim **1**, wherein the wires of the reinforcement tapes extend parallel with one another within a said tape and are embedded in a layer of suitable material.

12. A ski shoe as claimed in claim **11**, wherein the said layer of suitable material is more rigid than the material incorporating the cords of the said cord fabric.

13. A ski shoe as claimed in claim **1**, wherein at least some of the tape groups are arranged perpendicular to the plane of the said shoe sole.

14. A ski shoe as claimed in claim **1**, wherein the said reinforcement structures comprise a pair of tape groups so inclined in opposite directions with respect to the plane of the shoe sole that they intersect each other at the said region of the said upper adapted to cover the ankle bone of the wearer.

15. A ski shoe as claimed in claim **1**, wherein the said reinforcement structures comprise tape groups of Y-shape of which the divergent branches commence at the said region of the said upper adapted to cover the ankle bone of a wearer.

References Cited

UNITED STATES PATENTS

3,239,952	3/1966	Lange et al.	36—2.5

FOREIGN PATENTS

201,269	11/1938	Switzerland.
390,724	8/1965	Switzerland.

PATRICK D. LAWSON, *Primary Examiner.*