Jan. 23, 1951 L. BEERLI 2,539,224

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FIG. 1

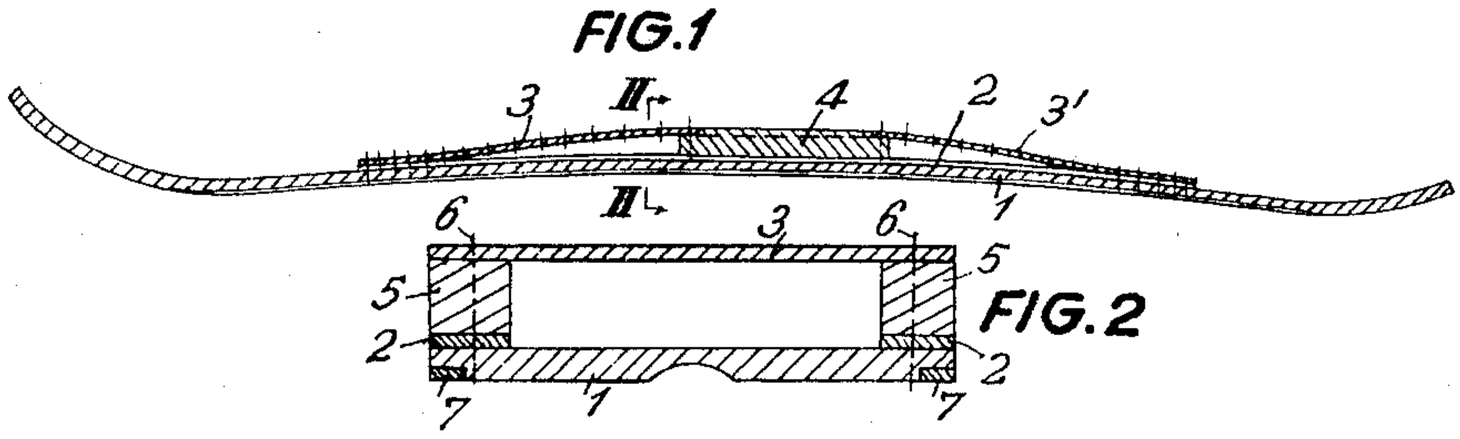

FIG. 2

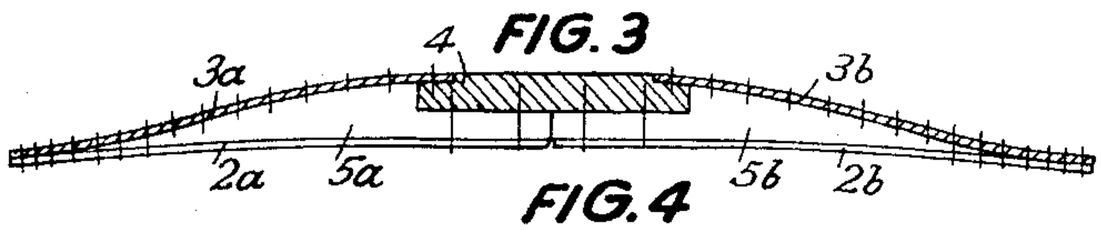

FIG. 3

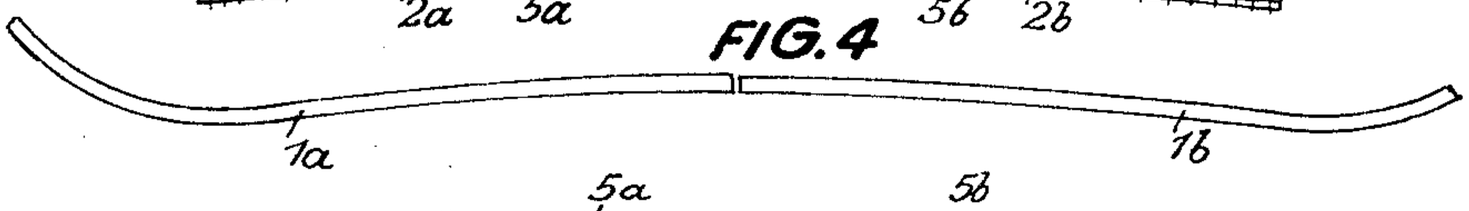

FIG. 4

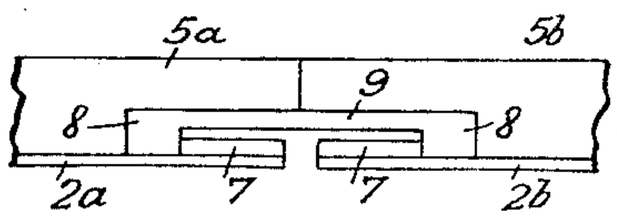

FIG. 5

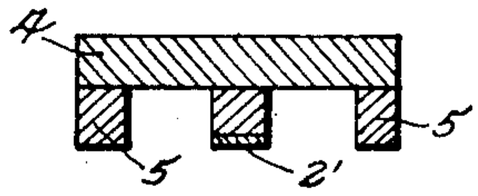

FIG. 6

FIG. 7.

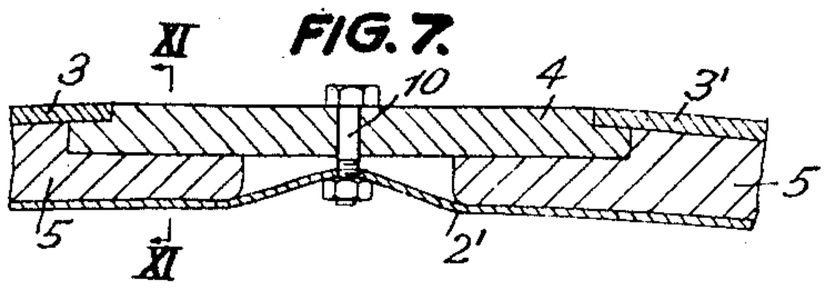

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FIG. 8

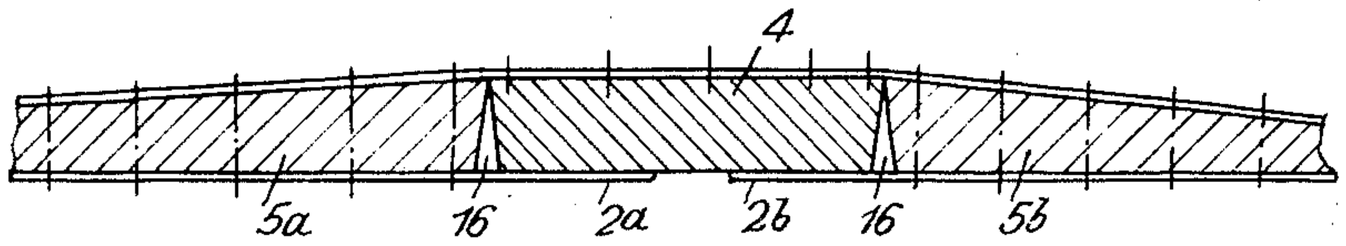


FIG. 9

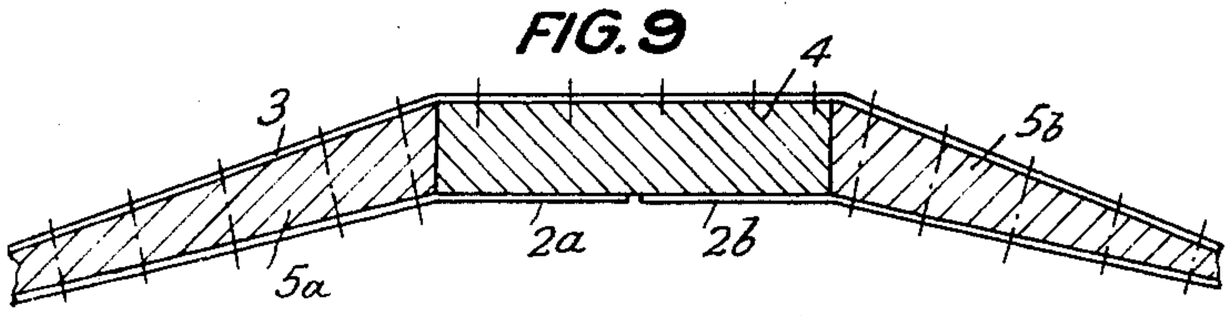
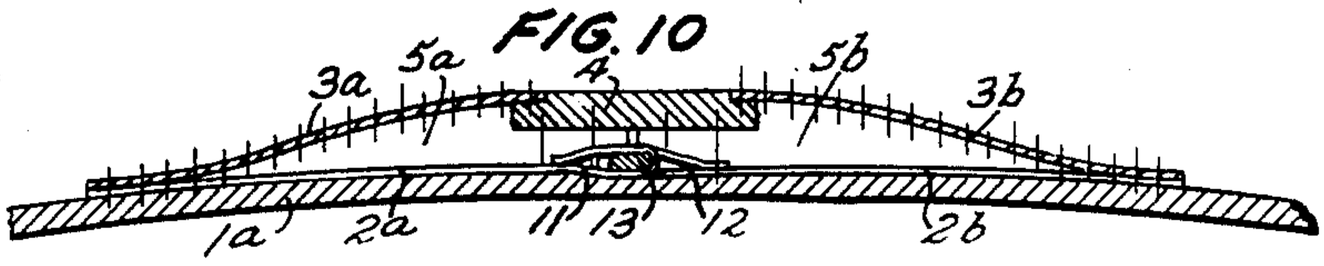


FIG. 10



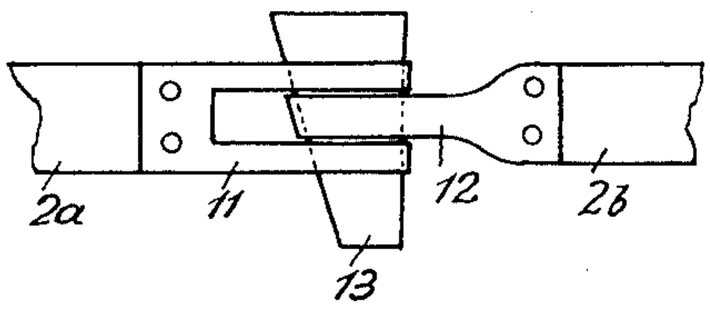


FIG. 11

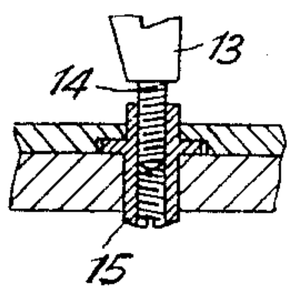


FIG. 12

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UNITED STATES PATENT OFFICE

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Louis Beerli, Engelberg, Switzerland

Application February 27, 1946, Serial No. 650,423
In Switzerland October 7, 1944

Section 1, Public Law 690, August 8, 1946
Patent expires October 7, 1964

2 Claims. (Cl. 280—11.13)

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My present invention relates to structural improvements in skis, in particular to a ski of the composite type made of wood and a plastic; and the objects of my improvements are first, to provide a metal-reinforced resilient truss structure adapted to take up tensile and compressive stresses, second, to afford means for varying the initial or preliminary stress in the said truss so as to adapt the ski to the weight of its user, and third, to generally provide such a combination of wood and plastic as to prevent too great a deflection of the loaded ski.

I attain these and related objects by the ski shown, in various forms of invention, in the accompanying drawings, in which—

Fig. 1 is a small scale longitudinal sectional view of a ski,

Fig. 2 is a transverse cross-section on larger scale, on line II—II, of Fig. 1,

Fig. 3 is a longitudinal section through the truss structure of a modified embodiment,

Fig. 4 is a side view of the base or slide plate of the ski, comprising two separate portions; and

Fig. 5 is a side view of parts of the ski, partly broken away, showing elements of a different embodiment for providing variant tension in tension members;

Figs. 6 and 7 are respectively transverse and longitudinal sectional views of tension varying means according to a different embodiment;

Figs. 8 and 9 are fragmentary longitudinal sectional views of another embodiment of the invention;

Fig. 10 is a side view of a ski having a tension applying means according to a different embodiment;

Fig. 11 is a plan view of Fig. 10;

Fig. 12 is a sectional view partly broken away of operating means for the embodiment of tension applying means according to Figs. 10 and 11.

In the ski shown in Figs. 1 and 2, the slide plate 1, entirely or partly made of a plastic, is secured to a resilient truss structure adapted to distribute the weight of the person over the slide plate as uniformly as possible. The said truss comprises a metal reinforcement for taking up the tensile stresses and consisting of two steel bands 2, compression plates 3, 3′ made of a plastic for taking up the compressive stresses, and a center piece 4 to which the binding tackle is secured, which latter is not shown. Instead of the compression plate 3, 3′ and the center piece 4, a single integral member could be used. The compression plates 3, 3′ and steel bands 2 are held at the correct distance by the gauge blocks or sleepers 5 and are interconnected, at least partly, by fastening means known per se such as, e. g. rivets 6. Such riveting may extend over the entire length of the truss structure, and suitably is reinforced at the ends in view of the different cases of loading. The slide plate 1, which serves as running face, may be detachably or fastly secured to the said truss. It stiffens the ski laterally and advantageously is provided with steel protector edges 7. Instead of providing two steel bands 2, only one may be provided for, as shown e. g. in the design according to Fig. 6.

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When the ski deflects, the said steel bands 2 are practically not elongated. Since the slide plate 1 is comparatively thin, its elongation upon deflection is also so small that the steel edge 7 may be fastly secured thereon. A ski of the character described thus may be provided with an ideal type of edge protector in the form of an integral steel band extending over the entire running face length and screwed down on to the slide plate 1 or fastly riveted thereto in a most simple manner.

The said truss structure as well as the slide plate comprising the running face may be built up of individual parts which may be replaced when damaged; a broken ski tip thus may be readily replaced.

The modified truss design shown in a longitudinal section in Fig. 3 comprises a steel-band reinforcement of two individual parts 2*a*, 2*b*, two longitudinal sleepers 5*a* and 5*b*, and a compression plate made of two portions 3*a*, 3*b* and the center piece or binding-tackle anchor block 4 having a depth sufficient to rest upon shoulders of sleepers 5*a* and 5*b*. The compression-plate member 3*a*, the longitudinal sleeper 5*a*, and the edge-protector 2*a* are interconnected to form the front portion of the ski; and the parts 3*b*, 5*b* and 2*b* likewise form the rear portion of the ski. The said two portions and their component parts suitably are made in the same sizes and dimensions so as to be interchangeable. The said parts may be interconnected and secured to the center piece 4, e. g., by means of screws, and may be adapted to be detachable and disconnectible. The slide plate is subdivided into the members 1*a* and 1*b* (Fig. 4) which are interconnected and detachably secured to the truss structure by means not shown.

In Fig. 5 a detachable connection of the two steel-band reinforcements 2*a* and 2*b* is shown. Additional reinforcements in form of steel-strips 7 are fastly secured to the inward edges of the two steel bands 2*a* and 2*b*, and engaged by the lugs 8 of a strap 9.

The more uniform the weight of the user is distributed over the running face by means of the truss structure, the less the maximum face-pressure defining the depth of the running trace in the snow, and the faster the ski.

The slide-plate portions projecting beyond the truss ends suitably are strongly bent down so that they snuggle the corrugations of the ground surface when riding over a rugged trail; and they may be made yielding in such a degree as to snuggle the track nearly without incurring any resistance even when running in a curve.

The resilience or initial stress of the ski may be adapted to the body-weight of the rider by subjecting the steel bands **2** to a corresponding preliminary tension. To this end, straps **9** of different length may be provided for, which selectively may be incorporated according to the initial or preliminary stress desired.

The variation in the initial stress in the truss structure attained by varying the overall length of the steel band **2**, extends over the said truss for only such a distance as the said band is not rigidly secured to the sleeper **5**. Only the ends of the steel bands **2***a* and **2***b*, therefore, are riveted to the said sleepers **5** and compression plates **3**.

Such a ski, when running over corrugated ground, will be much better and closer applied to the ground than when the said bands were riveted or fastly secured to the said sleepers over the entire length of the latter. Such favorable action would be impaired only to a limited extent, if the steel band, aside from its ends, also were rigidly secured to the sleeper at its midpoint.

Figs. 6 and 7, a cross-section and a longitudinal section respectively through the center portion of a truss structure, illustate how the length of a reinforcing steel band **2'** (only one of the latter being present) may be varied by means of a bolt **10** acting transversely to the length of band.

A further form of the means for changing the length of the steel band is shown in Figs. 10–12, and comprises straps **11** and **12** riveted to the ends of the steel bands **2***a* and **2***b*, between which a wedge **13** is driven for the purpose of decreasing

the distance therebetween and thus the overall length of the said bands.

The wedge **13**, as shown in Fig. 8, may be provided with a stud screw **14**, and a nut **15** coacting therewith could be actuated from the outside, i. e. from the ski sideface, for adjusting the said wedge. As shown in Fig. 8 (a partial longitudinal section) a certain clearance **16** is provided for in the truss structure between the ends of the center piece **4** and the inner ends of the sleepers **5***a* and **5***b*, which permits of drawing together the steel bands **2***a* and **2***b* into a position shown in Fig. 9. The compression plate **3** in this case is shown to be continuous.

What I claim and desire to secure by Letters Patent is:

1. A ski of the class described comprising in combination a plate made of plastic and containing the running face, a resilient truss structure to which said plate is fixed, at least one metallic band forming part of said truss structure for the purpose of taking up tensile stresses, at least one plate-shaped member made of plastic forming part of said truss structure, said plate-shaped member having its ends rigidly connected to said metallic band, and means for supporting the plate-shaped member in raised position above the metallic band to take up compressive stresses when the ski is deflected.

2. A ski according to claim 1, said metallic band comprising two parts, and means for pulling said parts of the band together for the purpose of varying the initial tension thereof.

LOUIS BEERLI.

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