June 17, 1941. D. A. WALLACE 2,246,152

SKI AND SKI SHOE ASSEMBLY

Filed May 22, 1939

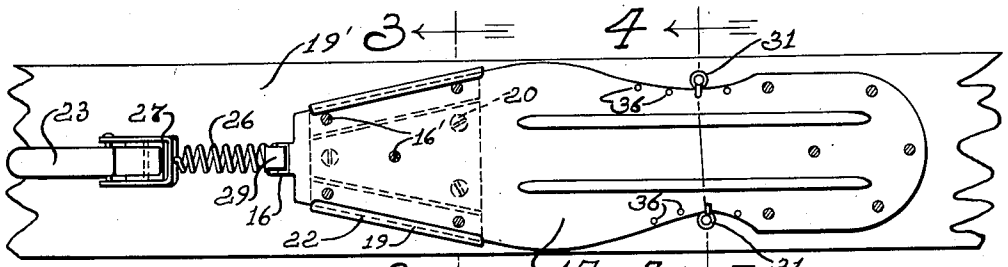



Fig. 2.

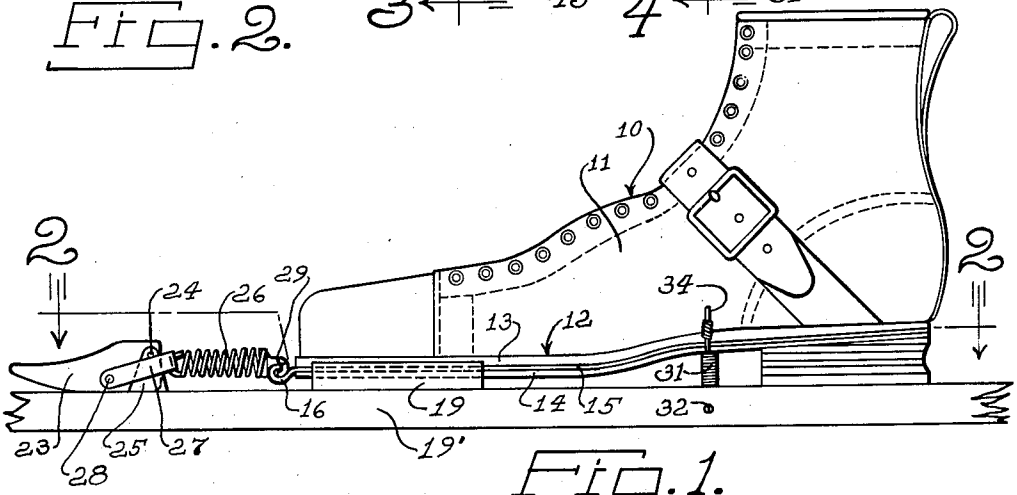



Fig. 1.

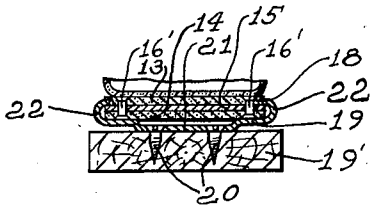



Fig. 3.

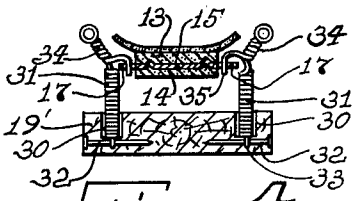



Fig. 4.

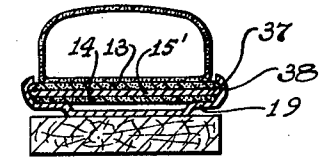



Fig. 5.

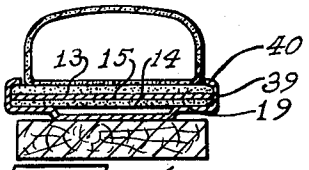



Fig. 6.

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## SKI AND SKI SHOE ASSEMBLY

David A. Wallace, Detroit, Mich.

Application May 22, 1939, Serial No. 275,021

11 Claims. (Cl. 280—11.35)

This invention relates to an improved ski, ski shoe and assembly thereof.

More particularly the invention pertains to the provision in an assembly of this kind of improved mechanism for detachably operatively mounting a shoe on a ski.

One of the main objects of the invention is the provision of simple and inexpensive ski shoe attaching mechanism which is of exceedingly light weight.

Another object of the invention is the provision of ski shoe attaching apparatus of this kind wherein all parts are confined within the planes of the longitudinal side edges of the ski so as to facilitate placement of each of a pair of skis in close side by side adjacency during skiing.

Another object of the invention is the provision in a ski shoe of improved attaching means which is so constructed and arranged as to distribute throughout the entire sole, instep and heel portions of the shoe the force reactions applied thereon by and through the ski carried portions of the attaching mechanism.

Still further objects of the invention are the provision of improved means for so wedgingly clamping the toe end portion of the shoe sole and attaching plate as to accommodate relative free and unobstructed bending of the shoe at the region of the junction of the sole and instep portions thereof; to provide improved means for resiliently, yieldably urging the heel of the shoe against the ski; to provide means of this kind which is carried by the ski and conveniently detachably engageable with the shoe at various locations thereon so arranged as to selectively place the resilient means under different amounts of tension; and to provide recesses in the ski for receiving the resilient means and which are of sufficient depth to confine the latter against protruding laterally of the length of the ski when the resilient members are not in use.

Additional objects of the invention are the provision of improved means for resiliently urging the shoe forwardly to releasably hold the toe end portion of the shoe wedgingly clamped without interfering with the foregoing bending action during skiing maneuvers which require such bending action; and to provide releasable means of this character which is substantially unaffected by such shoe bending operations.

Illustrative embodiments of the invention are shown in the accompanying drawing, in which:

Fig. 1 is a fragmentary side elevational view of a ski and ski shoe assembly embodying the invention.

Fig. 2 is a longitudinal sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse vertical sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a transverse vertical sectional view taken on line 4—4 of Fig. 2.

Fig. 5 is a transverse vertical sectional view similar to Fig. 3 but showing a modified form of the invention.

Fig. 6 is a transverse sectional view similar to Figs. 3 and 5 but showing a further development of the invention.

In the form of the invention shown in Figs. 1 to 4, inclusive, the improved ski shoe, generally designated by the numeral 10, comprises an upper portion 11 and a sole portion, generally designated by the numeral 12, which extends integrally from the front to the rear extremities of the shoe. The portion 12 comprises upper and lower layers 13 and 14, respectively, of conventional shoe sole material, such as leather. Disposed between the layers 13 and 14 is an intermediate layer 15 comprising flexible sheet metal, The intermediate layer 15 is provided at its front end with a forwardly and exteriorly protruding hook 16 and the edge portions of the latter layer extend beyond the edges of the upper and lower layers of the sole at the instep portion thereof as illustrated at 17 in Fig. 4. The three layers of which the sole of the shoe is formed are rigidly secured together by suitable rivets 16' which may extend through apertures formed in the layer 15. As illustrated in Fig. 3, the upper layer 13 has recessed edge portions 18 at the toe end part of the shoe for receiving a clamping member hereinafter described.

A clamping member, generally designated by the numeral 19, is secured to the ski 19' by screws 20 and comprises a channeled shaped sheet metal bracket having a web portion 21 provided with apertures through which the screws 20 extend and having upwardly and inwardly bent side walls 22 which converge forwardly for clampingly engaging the toe portion of the sole 12.

As illustrated in Fig. 3, the inwardly extending upper edge portions of the side walls 22 of the clamping member are adapted to be received in the recesses 18 formed in the opposite edges of the upper layer 13 of the sole and these inwardly extending parts of the side walls 22 are

adapted to have metal to metal contact with the surfaces of the intermediate layer 15 of the sole which are exposed at the recesses 18.

The shoe 10 is adapted to be urged forwardly and retained in securely clamped engagement with the clamping member 19 by apparatus mounted on the ski in advance of the clamping member and which comprises an operating lever 23 pivotally mounted at 24 on a bracket 25 fixed on the upper side of the ski. The lever 23 is pivotally connected to one end of a coil spring 26 by a yoke 27 which is pivotally attached to the lever 23 at 28. The upper end of the spring 26 is provided with a hook 29 which is detachably engageable with the forwardly protruding hook 16. The pivot 28 is so located on the lever 23 as to tend to urge the latter in a counter-clockwise direction about the pivot 24 when the lever is disposed in the position shown in Fig. 1, in which position the spring 26 is tensioned to urge the shoe 10 forwardly. When the lever is rotated in a clockwise direction from the position shown in Fig. 1, the tension of the spring is released to accommodate detachment of the hook 29 from the hook 16.

A pair of recesses 30 is formed in the upper side of the ski 19' substantially in alignment with the exposed edge portions 17 of the intermediate layer or metal plate 15. These recesses are located at about the middle of the length of that portion of the ski which registers with the instep part of the shoe 10, and in each recess is disposed a coil spring 31 having its lower end fixed to the ski by a pin 32 driven into the edge of the ski and inserted through a loop 33 on the lower end of the spring 31. The wire of which the spring 31 is formed is twisted about itself at the upper end of the body portion of the spring, as illustrated at 34 in Fig. 4, and at the extreme end of the wire is provided a downwardly extending pin portion 35. The opposite edge portions of the layer 15 located at the instep part of the shoe are provided with spaced apertures 36 into which the pin 35 of each of the spring is selectively receivable, respectively.

During certain skiing operations it is desirable that the ski shoe be permitted to flex easily at the forward end of the instep portion of the shoe and throughout forwardly adjacent parts of the sole thereof. When this action is desired the springs 31 may be disengaged from the shoe and permitted to contract partly into their respective recesses 30. The latter are sufficiently deep and restricted to confine the springs against outer displacement beyond the planes of the edge portions of the ski when the springs are not in operation. When it is desired to yieldably urge the heel of the shoe against the ski, the pins 35 may be selectively engaged in the apertures of the exposed edge portions 17 of the layer or plate 15 in order to selectively tension the springs 31.

The springs 31 predetermine the force with which the heel end portion is urged against the ski independently of the resilient means by which the shoe is maintained in clamped engagement with the clamping member 19, and flexing of the shoe either when accommodated by the springs 31 or during operation while the springs are disengaged from the shoe in no way influences the apparatus by which the toe end portion of the shoe is clamped and yieldably urged forwardly.

In the form of the invention illustrated in Fig. 5, the ski shoe and assembly and the apparatus by which these parts are operatively secured together are substantially identical to the structures shown in Figs. 1 to 4, inclusive, and corresponding parts are designated by the same numerals. In this form of the invention the intermediate layer 15' is provided with upwardly bent opposite edge portions 37 at the toe end portion of the shoe. The portions 37 extend externally of the upper and lower layers 13 and 14 of the sole and are enveloped by similarly curved side wall portions 38 of the clamping member 19. The walls 38 of the clamping member are thus brought into metal to metal contact with the curved edge portions of the intermediate layer 15' without engaging the conventional shoe sole material of the upper and lower layers 13 and 14, thus protecting the latter from wear and injury by engagement with the clamping member.

In the form of the invention illustrated in Fig. 6, there is shown a composite shoe sole substantially identical to that shown in Figs. 1 to 4, inclusive, with the exception that the portion of the sole with which the clamp 19 coacts is not recessed as illustrated at 18 in Fig. 3. In this form of the invention the clamp 19 has upwardly extending forwardly tapering side walls 39 on which are provided inwardly extending arcuate flanges 40 which fit over the uppermost layer 13 of the sole and contact directly therewith.

Although but several specific embodiments of the invention are herein shown and described, it will be understood that various changes in the size, shape and arrangement of parts may be made without departing from the spirit of the invention.

What I claim is:

1. A ski and ski shoe assembly including a clamp member on said ski for receiving the toe end portion of the sole of said shoe, said ski having a recess in the upper side thereof registering with the instep portion of said shoe when the toe of the latter is engaged in said clamp member, and a spring disposed in said recess having one end fixed to said ski and the other end detachably securable to said shoe, said spring when detached from said shoe being confined by said recess in a predetermined position between the longitudinal edges of said ski.

2. A ski and ski shoe assembly including a clamp member on said ski for receiving the toe end portion of the sole of said shoe, said ski having a recess in the upper side thereof registering with the instep portion of said shoe when the toe of the latter is engaged in said clamp member, a spring disposed in said recess having one end fixed to said ski and the other end detachably securable to said shoe, said spring when detached from said shoe being confined by said recess in a predetermined position between the longitudinal edges of said ski, and means operating solely on the toe end portion of said shoe for releasably holding said end portion in said clamp member.

3. A ski and ski shoe assembly including a ski shoe having a sole portion comprising upper and lower layers of conventional shoe sole material and an intermediate layer of flexible sheet metal, said intermediate layer having portions exposed at the front and side edge portions thereof, a clamp member on said ski for receiving the toe end part of said sole portion having inwardly extending flanges engageable with said exposed side edge portions of said intermediate metal sole layer, means on said ski in advance of said clamp for urging said shoe into engagement with the latter including a resilient element detachably

securable to the portion of said intermediate layer which is exposed at the front end of said sole, and resilient elements attached to said ski rearwardly of said clamp member and detachably engageable with said exposed side edge portions of said intermediate metal layer for yieldably holding the heel of said shoe against said ski.

4. A ski and ski shoe assembly including a ski shoe having a sole portion comprising upper and lower layers of conventional shoe sole material and an intermediate layer of flexible sheet metal, said intermediate layer having an integral forwardly extending attaching element and exposed portions at the instep part of said sole, a clamp member on said ski for receiving the toe end portion of said sole having inwardly extending flanges for enveloping side edge portions of said intermediate layer and at least one of said first mentioned layers of said sole, means on said ski in advance of said clamp member for urging said shoe forwardly into engagement with the latter including a member detachably securable to said attaching element, and a resilient member fixed at one end to said ski rearwardly of said clamp member and having its opposite end portion detachably securable to said exposed portions of said intermediate layer.

5. A ski and ski shoe assembly including a ski shoe having a sole portion comprising upper and lower layers of conventional shoe sole material and an intermediate layer of flexible sheet metal, said intermediate layer having an integral forwardly extending attaching element and exposed portions at the instep part of said sole and provided with a plurality of spaced apertures, a clamp member on said ski for receiving the toe end portion of said sole having inwardly extending flanges engaged over portions of the side edges of said sole, means on said ski in advance of said clamp member for urging said shoe forwardly into engagement with the latter including a member detachably securable with said attaching element, and a pair of resilient members, each fixed at one end to said ski and having an opposite end selectively engageable in one of said apertures of said exposed portions of said intermediate layer.

6. A ski and ski shoe assembly including a ski shoe having a sole portion comprising upper and lower layers of conventional shoe sole material and an intermediate layer of flexible sheet metal, said intermediate layer having exposed edge portions at the instep part of said shoe provided with spaced apertures, means for fixing the toe end portion of said sole to said ski, and a pair of springs each fixed to said ski and having an element selectively engageable in the apertures of one of said exposed edge portions of said intermediate layer respectively.

7. A ski and ski shoe assembly including a ski shoe having a sole portion comprising upper and lower layers of conventional shoe sole material and an intermediate layer of flexible sheet metal, said intermediate layer having exposed edge portions at the instep part of said shoe provided with spaced apertures, means for fixing the toe end portion of said sole to said ski, said ski having a pair of recesses in its upper side registering with the instep portion of said shoe, and a pair of springs each fixed to said ski and disposed partly in one of said recesses and having an element selectively engageable in the apertures of one of said exposed edge portions of said intermediate layer respectively, said springs when detached from said shoe being adapted to be confined by said recesses to the space between the side edges of said ski.

8. A ski and ski shoe assembly including a ski shoe having a sole part comprising a layer of conventional shoe sole material and a flexible sheet metal layer having a forwardly extending attaching element and laterally protruding edge portions, means for detachably securing the toe end portion of said sole to said ski including a member releasably securable to said attaching element, and means fixed to said ski detachably securable to said edge portions of said intermediate layer for resiliently urging the heel of said shoe against said ski.

9. A ski and ski shoe assembly including a ski shoe having a sole part comprising a layer of conventional shoe sole material and a flexible sheet metal layer having a forwardly extending attaching element and laterally protruding edge portions, means for detachably securing the toe end portion of said sole to said ski including a resilient member releasably securable to said attaching element and a lever for tensioning said resilient member, and means fixed to said ski detachably securable to said edge portions of said metal layer for resiliently urging the heel of said shoe against said ski.

10. A ski and ski shoe assembly including a ski shoe having a sole portion comprising conventional shoe sole material and rigid elements projecting from the front and instep side edge portions of said sole, a clamp member on said ski for receiving the toe end part of said sole portion, means on said ski in advance of said clamp for urging said shoe into engagement with the latter including a connecting element detachably securable to said front rigid protruding element, and resilient means attached to said ski rearwardly of said clamp member and detachably engageable with said rigid protruding element of the instep side edge portions of said sole for yieldably urging the heel of said shoe against said ski.

11. A ski and ski shoe assembly including a ski shoe having a sole portion comprising conventional shoe sole material and having a forwardly extending attaching element at its front end and apertured rigid elements located at the opposite edges of its instep portion, a clamp member on said ski for receiving the toe end portion of said sole, means on said ski for urging said shoe forwardly into engagement with said clamp including a member detachably securable to said forwardly extending attaching element, and resilient means fixed on said ski in registration with the instep portion of said shoe having elements selectively engageable in the apertures of said rigid apertured elements of the edges of the instep portions of said shoe for urging the heel end part of said shoe toward said ski.

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