

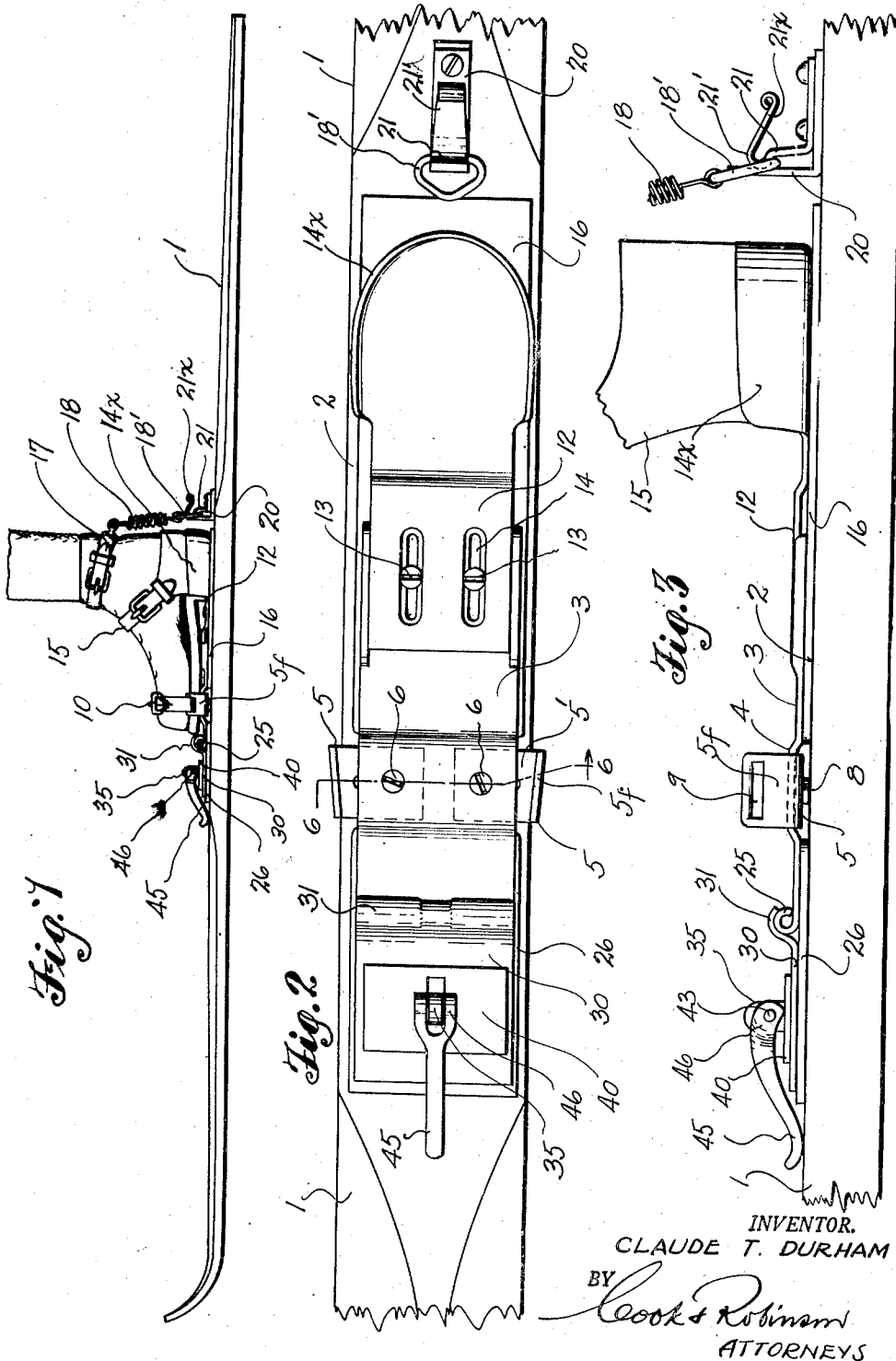
Dec. 20, 1949

C. T. DURHAM
SKI BINDING

2,491,485

Filed May 7, 1946

2 Sheets-Sheet 1



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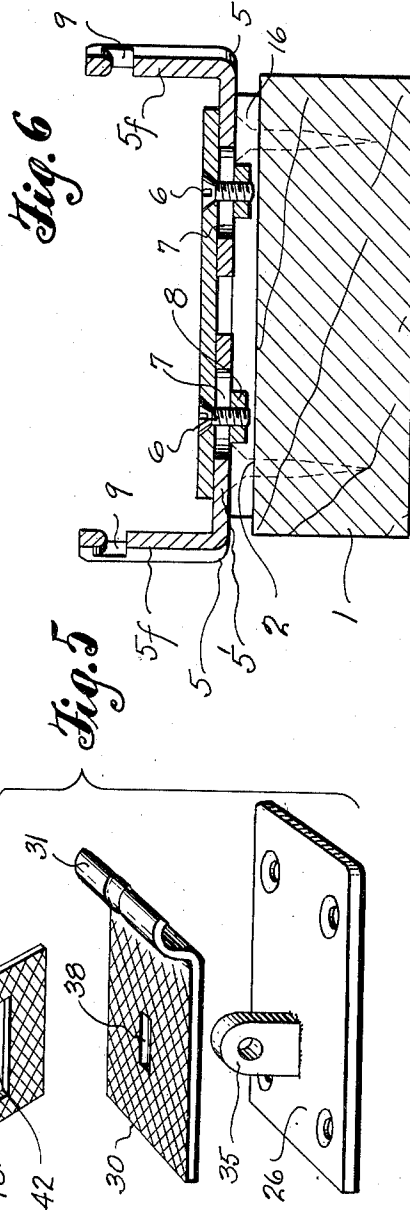
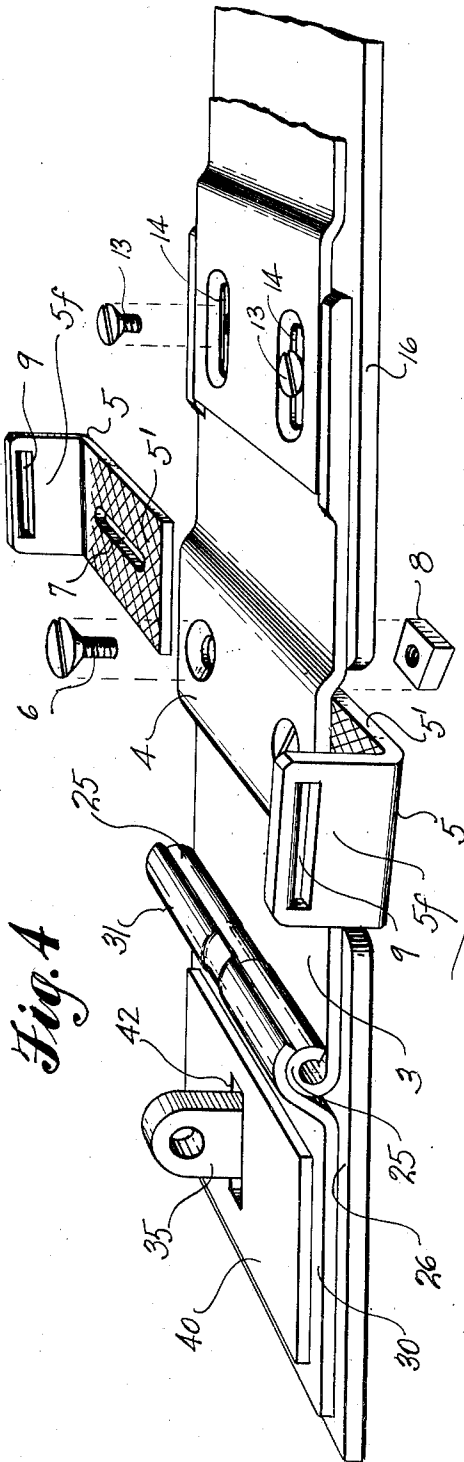
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2 Sheets-Sheet 2



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2,491,485

SKI BINDING

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10 Claims. (Cl. 280—11.35)

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This invention relates to skis and it has reference more particularly to improvements in means for the securing of skis to the shoes of the person wearing them, and which securing means is generally referred to as a "ski binding."

It is the principal object of this invention to provide a ski binding that will serve effectively and satisfactorily all the general requirements of a ski binding, but which embodies means that will permit the ski to be automatically released from the shoe in the event that such release should be desirable, or necessary to prevent injury to the skier.

More specifically stated, it is the principal object of this invention to provide a novel and satisfactory ski binding wherein a plate to which the skier's shoe is bound, is operatively secured to the ski by a yieldable clamp member that operates to automatically release the shoe plate from the ski when the connection is placed under a predetermined amount of strain beyond that required for retaining the connection for normal skiing or strain which might be considered abnormal.

It is also an object of the invention to provide means whereby the securing clamp may be adjusted to retain the connection with different amounts of resistance against releasing according to the desires of the user.

Still further objects of the invention reside in the provision for adjusting the securing parts to accommodate shoes of different size and to accommodate the clamp to the requirements of the individual using the skis.

Other objects of the invention reside in the details of construction and combination of its parts, and in the mode of application of the binding as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a side view of a ski equipped with a releasable binding embodied by the present invention.

Fig. 2 is an enlarged, top view of the binding and hinge clamp mechanism.

Fig. 3 is a side view of the parts shown in Fig. 2.

Fig. 4 is a perspective view of various parts of the present binding.

Fig. 5 is a perspective view of the hinge clamp parts in disassembled relationship for better understanding.

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Fig. 6 is a cross section taken on line 6—6 in Fig. 2.

Briefly described, the present device comprises a plate to which the shoe of the wearer may be secured, and which, in turn, is operatively secured at its forward end to the ski by a releasable hinge clamp that will automatically release the ski runner from the shoe plate when placed under a predetermined amount of abnormal strain.

This device may be used with the usual form of ski boot.

Referring more in detail to the drawings—

1 designates a ski which may be one of usual form with a flat top surface 2 at the proper location for the affixing of the present parts for securing the ski to the user's shoe.

As shown best in Figs. 1 and 2, the present ski binding comprises a flat metal plate 3 which I call the "shoe plate," and which extends lengthwise of the ski. This particular plate has an upwardly offset portion 4 thereacross, beneath which the flat, inner end portion 5' of laterally and oppositely extending toe strap attaching plates 5 are located and secured for endwise adjustment, as shown best in Fig. 6. Each of these plates 5 is adjustably secured to the upwardly offset part 4 of plate 3 by flat-headed screw bolts 6 that extend downwardly through holes in the plate 3 and through longitudinal slots 7 in the adjustable plates 5' and have nuts 8 threaded onto their lower ends for securing the adjustment. The outer end portions of the plates 5 are upturned to form retaining flanges 5f that may be disposed against opposite edges of the shoe sole, and in these flanges, slots 9 are provided for receiving the toe strap, as shown in Fig. 1 at 10, whereby the toe is secured against the plate 3.

It is also desirable that the engaged surface of the parts 5' and plate 3 be roughened or knurled, as indicated, to prevent slippage when clamped together.

The rear end portion of the shoe plate 3 underlies a heel plate 12 which is adjustably secured thereto by one or more clamp bolts 13. As here shown, two bolts 13 extend through longitudinal slots 14 in plate 12 and are threaded into the plate 3 to secure the heel plate in adjustment. This form of connection permits the heel plate 12 to be adjusted from and toward the toe clamps 5 to accommodate the length of shoe worn and at the same time provides for holding the parts 3 and 12 in rigid association.

The heel plate 12 is shown as being equipped with the usual type of heel guard 14x about its rearward end in which the heel portion of the

wearer's shoe is contained and to which a tie strap 15 may be attached as in Fig. 1, and extended over the instep of the wearer's foot, thus to secure the plate to the shoe.

The rear end of plate 3 and the heel plate also are shown as resting upon a flat metal plate 16 that is secured to the top surface of the ski.

It is desirable that an ankle tie be used, as shown in Fig. 1. This tie comprises a strap or band 17 that may be releasably applied about the ankle, and to which band, at the back of the heel, one end of a short, coiled spring 18 is attached; the other end of the spring having a ring 18' attached thereto that is releasably held in a spring clip device that is mounted on the ski, rearwardly of the heel plate.

This clip device comprises a metal bracket 20 fixed to the ski and having an upwardly extended leg. A spring snap 21 also is attached to the bracket and this is formed with a head portion 21' that may be applied through the ring 18' and against the upwardly extended leg of the bracket. The ring, under a predetermined pull, will be released by the spring clip but will hold under the strain of normal use. To aid in depressing the spring clip, for application of the ring thereto, it is formed with an extended release arm 21x.

The special feature of the present ski binding device resides in the provision of automatically releasable clamp elements which permits the quick release of the ski from the shoe plate should this become necessary, to avoid injury to the user.

It is shown best in Fig. 3 that the forward end of the shoe plate 3 is formed in an upwardly and backwardly turned curl 25 forming a cylindrical bearing portion across the forward end of the plate. Also, it is shown that a flat plate 26 is secured permanently to the flat top surface of the ski at a location just ahead of the normal position of the shoe plate and this extends a short distance beneath the shoe plate as a support for its forward end portion.

Overlying the forward end portion of the affixed plate 26 is a clamp plate 30 of spring metal which has its transverse rearward edge portion formed into an upwardly and rearwardly directed, cylindrically curved flange 31 that fits closely or tightly over the top portion of the cylindrical curl at the forward end of the shoe plate to secure the latter to the ski and to permit a certain free up and down hinging action of the rear end portion of the shoe plate.

Fixed rigidly on the plate 26 at about its center, is a rigid, vertical post 35. This extends upwardly through a slot 38 provided in the plate 30 to hold the latter plate against endwise or lateral movements. Overlying the clamp plate 30 is a tension adjusting plate 40 that has an elongated slot 42 formed lengthwise thereof and through which the upper end portion of the post 35 extends. Pivotaly attached to the upper end of the post 35 by a pivot pin 43 is a clamping lever 45. This has a bifurcated head portion 46 providing cam surfaces at opposite sides of the post adapted to be swung into clamping contact with plate 40 to hold it at any set position of longitudinal adjustment as permitted by reason of the longitudinal slot 42 therein.

It is desirable here also that the engaged surfaces of the plates 30 and 40 be knurled or roughened to avoid possible slippage when clamped together.

The relationship of cam head to lever arm is

such that when the lever is swung forwardly and downwardly against the ski, as seen in Fig. 3, the high point of the cam head passes just beyond dead center position relative to the pivot pin and thus the cam will be held against accidental release from its clamping position.

It is to be understood that the endwise adjustment of plate 40 provides that it may be shifted toward or from the hinge connection, and in its closest position to the hinge axis, it gives the greatest holding tension on plate 30, and shifted to its opposite limit, it gives the least resistance to release of the shoe plate. Therefore, any desired holding effect between these limits of tension may be obtained by adjusting the plate 40 accordingly in its endwise direction.

With the ski binding so arranged, it will be understood that should it be placed under any unusual strain, such as that which might cause injury to the skier, the hinged connection between plate 30 and shoe plate 3 will be automatically released and thus the breaking of the ski or the leg or ankle of the skier, or other injury, is avoided. Should the strain on the hinge be applied in a lateral direction on the heel portion of plate 3, the rounded curl at the forward end of the shoe plate will pull out from beneath the flange at one end of the connection and then the part 3 will snap free. If the heel swings upwardly over the toe and forwardly, then the toe plate will engage the rear edge of the flange of plate 30 and the curl will be pried out from beneath the flange.

The main features of this clamping device resides in the provision for automatically releasing the shoe when any abnormal strain arises, but the holding of the parts together for all normal skiing operations. Also, in the adjustability of holding tension that may be placed on the clamping plate, to determine the force required to release the connection.

The present design might be altered in various respects without departing from the spirit of the invention, and materials used in the construction of parts would be selected to meet requirements in the best manner and to avoid unnecessary weight.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. A ski binding of the character described comprising a shoe plate adapted to lie flatly upon a ski, and equipped for its securement to the skier's shoe, and a clamp plate adapted to be fixed to the ski, forwardly of the shoe plate and having a part thereof designed to be overlapped with the forward end portion of the shoe plate, said shoe plate being formed across its forward end with a bead and said overlapping portion of the clamp plate having a groove hingedly seating the bead therein, to secure the shoe plate to the ski in a hinged connection, permitting upward swinging of the rear portion of the shoe plate from the ski; said clamp plate being yieldable for automatic disconnection of the shoe plate from the ski under abnormal strain.

2. A ski binding of the character described comprising a shoe plate adapted to lie flatly upon a ski, and equipped for its securement to the skier's shoe, and a clamp plate adapted to be fixed to the ski, forwardly of the shoe plate and having a rear portion thereof designed to be overlapped with the forward end portion of the shoe plate, said shoe plate being formed across its forward end with a bead and said overlapping portion of the clamp plate having a groove hingedly seating

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the bead therein to secure the shoe plate to the ski in a hinged connection, permitting upward swinging of the rear portion of the shoe plate from the ski; said clamp plate being yieldable for automatic disconnection of the shoe plate from the ski under abnormal strain, and means for adjusting the holding tension of the clamp plate.

3. The combination with a ski, of a ski binding comprising a shoe plate adapted to lie longitudinally upon the ski and to be secured to the skier's shoe, and having a transverse bead across its forward end portion, and a resilient clamp plate secured to the ski forwardly of the shoe plate and having its rear end portion overlying the said transverse bead in a holding connection about which the shoe plate has a hinge action toward and from the ski, and which connection is automatically releasable under abnormal strain.

4. The combination with a ski of a ski binding comprising a shoe plate adapted to lie longitudinally upon the ski and to be secured to the bottom of the skier's shoe, and having a transverse bead thereon across its forward end, and a resilient clamp plate secured upon the ski forwardly of the shoe plate and having its rear end portion formed to holdingly overlie the said transverse bead, to secure the forward end of the shoe plate to the ski in a transversely hinged connection about which the shoe plate may swing from and toward the ski and from which hinged connection the shoe plate bead may be disengaged by upward springing of said resilient clamp plate beyond its normal range of travel.

5. A combination as recited in claim 3 wherein means is provided for increasing or decreasing the holding effect of the said clamp plate on the said transverse bead of the shoe plate.

6. The combination with a ski, of a ski binding comprising a shoe plate that is adapted to lie flatly and longitudinally upon the ski and is equipped for its securement to the bottom of the skier's shoe; said shoe plate having a cylindrical bead formed across its forward end portion, and a clamp plate of resilient metal secured upon the ski forwardly of the shoe plate and having a transverse rearward end portion formed in a cylindrically curved seat, to overlie the said bead of the shoe plate to secure the latter to the ski in a transverse, hinged connection that permits

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free upward hinging of the heel portion of the shoe plate to a definite position beyond which the bead will be unseated from the clamp plate due to its resiliency.

7. A combination as recited in claim 6 wherein the clamp plate has an opening therethrough and a post is fixed in the ski and extended upwardly through said opening, and means is applied to the post to secure the clamp plate in functional position and whereby its holding effect on the hinge bead may be increased or decreased.

8. The combination with a ski, of a ski binding comprising a shoe plate adapted to lie longitudinally upon the ski and equipped for its securement to the skier's shoe; said plate having a transverse cylindrical bead across its forward end as a hinge axis, a post fixed in the ski forwardly of the shoe plate, a clamp plate formed with an opening to receive said post therethrough, and adapted to lie upon the ski when so applied, and having its rearward end portion upwardly formed in a cylindrically curved flange that overlies and secures the shoe plate to the ski in a hinged connection permitting the shoe plate to swing upwardly to a limited extent, a slotted tension plate disposed against the top of the clamp plate with said post extended through said slot and a clamp lever pivoted on the post and adapted to be engaged against said tension plate to hold the clamp plate in position.

9. A combination as recited in claim 8 wherein the slot of the tension plate is of such length as to permit the plate to be adjusted toward or from the bead to increase or decrease the resistance of the clamp plate to release of the shoe plate.

10. A combination as in claim 8 including also a resilient ankle tie having a connection with the ski rearwardly of the shoe plate that is releasable under unusual pull.

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