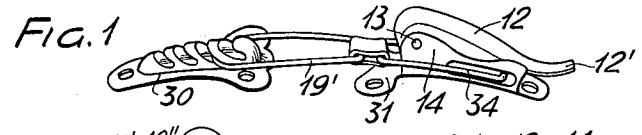
July 5, 1966 A. S. STEINBERG 3,258,820

PULL FASTENING DEVICE FOR SHOES AND MORE PARTICULARLY FOR SKI SHOES

Filed April 28, 1964 2 Sheets-Sheet 1

FIG. 1



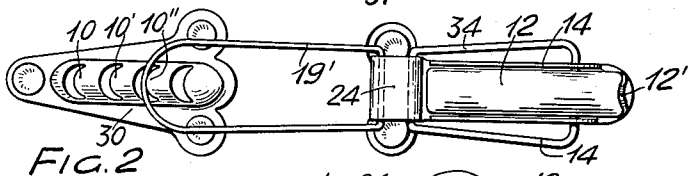


FIG. 2

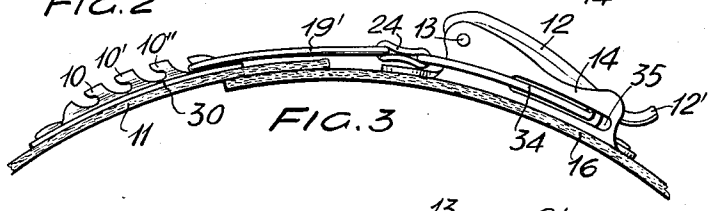


FIG. 3

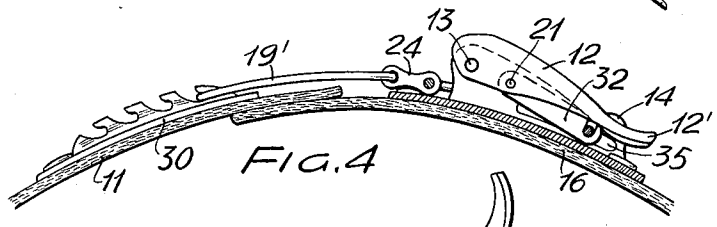


FIG. 4

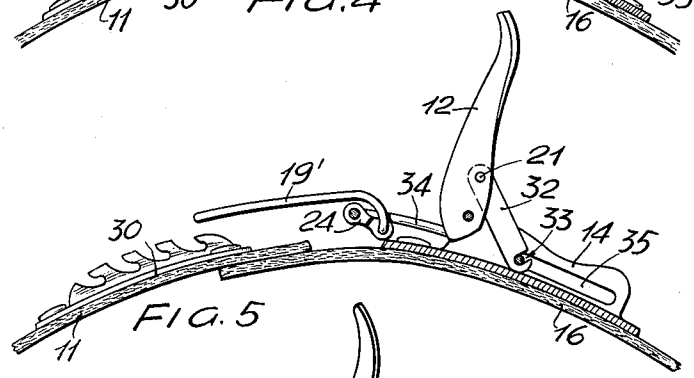


FIG. 5

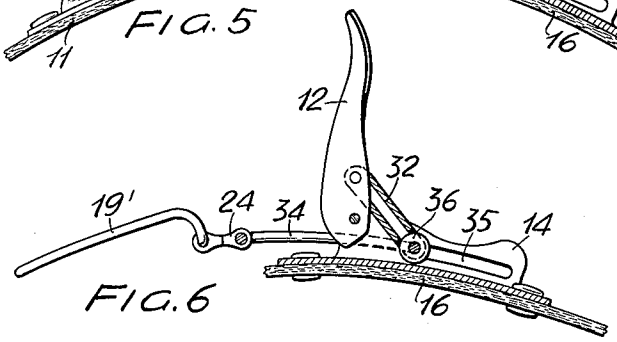


FIG. 6

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PULL FASTENING DEVICE FOR SHOES AND MORE PARTICULARLY FOR SKI SHOES

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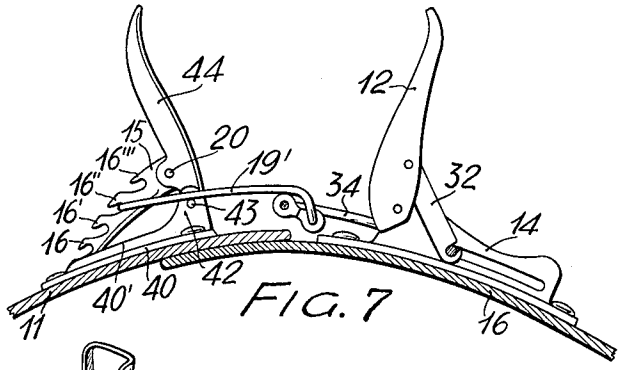

FIG. 7

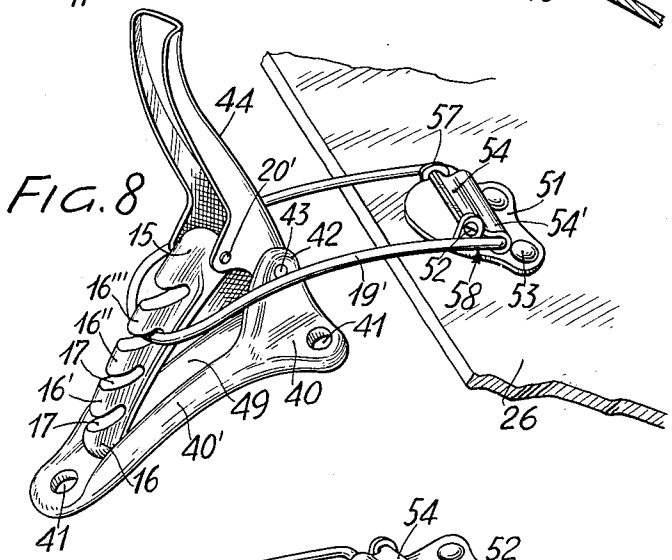

FIG. 8

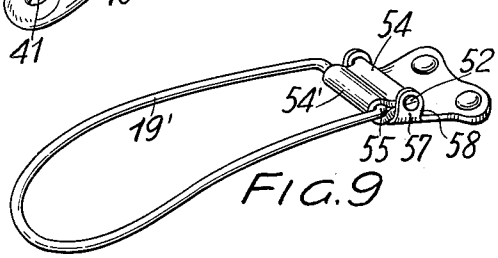

FIG. 9

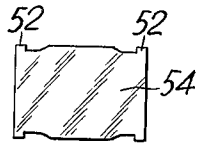

FIG. 10

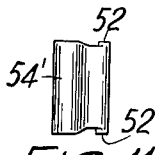

FIG. 11

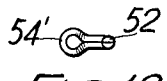

FIG. 12

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3,258,820

PULL FASTENING DEVICE FOR SHOES AND MORE PARTICULARLY FOR SKI SHOES

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6 Claims. (Cl. 24—70)

Conventional pull fastening devices for retaining the shoes and more particularly ski shoes in closed position are usually formed with pairs of elements engaging each other, one element being fixed to one side of the shoe upper and the other element being fixed to the opposite side, one of said elements consisting of at least a hook, a button or the like and the other one consisting of a linked pull system comprising a lever and a tension member, which are connected to each other by means of an elbow joint element.

The present invention provides for a considerable improvement in shoe fastening devices especially to increase the efficiency thereof.

The characteristical feature of the pull device according to the present invention is to maintain the tension member of the elbow joint system constantly parallel to the support base portion and therefore to the upper of the shoe. Thanks to this feature when the tension member is not operative it is made to stay in raised position parrel to the shoe upper thereby greatly facilitating and speeding up the fastening operation. More particularly, said arrangement is made possible by having two lateral slots provided in the side bearings of the lever, said lateral slots being adapted to receive the common pivot of the intermediate arm and of the tension member sliding therein so as to have the tension member move on a path which is parallel to the support base portion.

The fastening device of the invention may be completed with some modified means and namely: instead of engaging a stationary rack-like element, the U-shaped tension member may engage a movable rack element forming a part of an auxiliary lever fastening device. In this way it is possible to obtain at the moment of the closing operation a second adjustment or regulation of the pulling action.

The double link joint system for attachment of the U-shaped tension member may be provided with a third adjustment arrangement by having one of its pivots mounted on a support means with upright bearings providing for two pull positions, i.e. one with the joint system stretched forwards and the other one with the joint system turned over backwards and passing the dead center. In this way the tension member may be shortened thus allowing for a third adjustment of the whole fastening unit.

The following detailed specification refers to the accompanying drawing which diagrammatically shows some practical solutions:

FIG. 1 is a perspective view of a fastening device in closed position.

FIG. 2 is a slightly enlarged plan view of the device shown in FIG. 1.

FIG. 3 is a lateral view of FIG. 2.

FIG. 4 is the same view as in FIG. 3 wherein some details are sectioned.

FIG. 5 is a view of the device of FIG. 4 in open position.

FIG. 6 is a detailed view of FIG. 5 which is partially modified.

FIG. 7 is a side view of a modification of the device shown in FIGS. 1–5 in open position and with a second pull adjustment.

FIG. 8 is a perspective view of a variant of FIG. 1 with the addition of two adjustment arrangements in a position corresponding to the starting of the pulling action.

FIG. 9 is a view of the U-shaped tension member which is to be directly applied to the upper of the shoe with its length adjusting device in extended position.

FIGS. 10–12 are views of constructive details of the intermediate link element of the tension member shown in FIGS. 8 and 9.

Referring more particularly to FIGS. 1–5 the upper of the shoe has the hook element **30** applied to its side **11** and the hooking element **14, 31, 19'** applied to its other side **16**, said hooking element consisting: of a plate **31** with bearings **14** carrying the pivot **13** for the lever **12**; of a second pivot **21** which is carried by the lever **12** and which secures the intermediate arm **32** pivotally, said intermediate arm **32** being provided at its opposite end with a recess **33** that is adapted to receive the transverse portion of a first tension member **34** passing through said open recess **33**; and of two parallel slots **35** provided in the bearings **14** of the plate **31** which are adapted to have the tension member **34** slide therein.

The lever **12** is completely comprised within the side bearings **14** while the tension member **34** is situated outside of said side bearings except for its transverse portion which is journaled in **33**.

The intermediate arms **32** may have different shapes in accordance to the practical solutions or embodiments of the device. In FIG. 6 for instance, the pivot arrangement **33** is provided with a slide roller **36**.

The first tension member **34** is connected to the second tension member **19'** in any preferred suitable manner over connection means **24** which is intended to prevent twistings or deflections of the rod portions of said member especially if it is made in a single piece. In the embodiment of FIGS. 5 and 6 the connection means **24** is shown in its extended position and in its turned over position to provide for a further length adjustment of the tension member system **34–19'**.

FIG. 7 is a view of a double pull fastening device wherein the hook rack element **30**, which in FIG. 1 is stationary, has been replaced by a similar but mobile element **15** with hook like teeth **16, 16', 16''**.

Said movable element **15** is pivoted in **20** on a lever **44** which is in its turn pivoted in **43** to the bearings **42** of a support plate **40**. This support plate is secured to the upper of the shoe with nails passing through the holes **41** and is provided with a front portion having projecting parallel edges **40'** which define therebetween a central channel **49** adapted to receive the free end **16** of the movable member **15** sliding therein. The tension member **19'** engages said hook rack element which is displaced by pressing down the lever **44**, thus realizing a second pull system which is symmetrical to the one comprising the lever **12**.

The fastening device to the left of FIG. 7 could also be used alone whenever a double pulling action is not required. Such an embodiment is shown in FIGS. 8 and 9. The device consists in this case of two portions and namely: of a main portion which is suited to be applied to a side of the shoe upper and is made of a base portion **40** with attachment holes **41** and upright bearings **42** projecting from that end of the plate which is in proximity of the upper's edge. Said bearings **42** are provided with the pivot **43** having the handle lever **44** journaled thereon, said lever being provided with two projecting portions, the movable rack element **15** is pivotally connected to. The inclined teeth **16** of the element **15** define therebetween intermediate spaces **17**. The ring portion of the connecting tension member **19'** is made to hook into one of said intermediate spaces **17**, said tension member being

pivotally connected to the base plate **51** which is secured to the other side **26** of the upper by means of the nails **53**.

The base portion **40** has two lateral edges **40'** extending from the bearings **42** in longitudinal direction, said edges defining a channel **49** which serves as a slide guide for the suitably rounded free end of the rack element **15**. The fulcrum center **20'** between the handle lever **44** and the rack element **15** is chosen to be higher than the pivot point of the handle lever **44** so that the inclination of the rack element **15** with respect to the base channel **49** never exceeds 45° whatever the position of the handle lever **44** might be. The base portion **40** with its bearings **42** in proximity of the upper's edge cushions the fastening pressure which is thus transferred from the front portion of the instep laterally towards the bottom of the shoe.

Furthermore the application center of the fastening pressure which is determined by the free end of the rack element **15** is not stationary but, on the contrary, moves during the fastening operation along the guide channel **49** whereby every excessive localized stress is prevented from acting on a single point of the foot.

The other portion of the pull device, namely the connection ring **19'** is pivotally connected to a base plate **51** which is also provided with upright bearings **57** carrying the pair of pivots **52** with the intermediate element **54** journaled thereon, which in its turn has the ring **19'** pivoted thereto in **55**. This intermediate element is made of a rectangular plate **54** (FIG. 10) having the ends of the longitudinal edges provided with projections **52** so that by folding said plate in the middle (as shown in FIGS. 11 and 12) the combined projections **52** are made to form a pivot which is adapted to enter into a hole of the bearings **57** while the middle portion **54'** forms a sleeve that is adapted to receive the two ends of the rings **19'** bent at a right angle. The portions of the bearings **57** which are located upstream with respect to the combined pivots **52** are recessed as in **58** to form a safe seat for the sleeve **54'** in the over turned position shown in FIG. 8. The sleeve **54'** is tightly engaged therein and is prevented from being unintentionally pulled out of its seat even when a high stress is applied. The change from the position of FIG. 8 to the position of FIG. 9 may take place only by intentional action of the wearer. This constructive arrangement has the advantage that the link member **55** of the ring **19'** may be disposed either in the position of FIG. 8 i.e. upstream of the pivots **52** with respect to the upper's edge **26** or, as shown in FIG. 9, downstream of said pivots **52**, whereby it is made possible to control practically the length of the tension member, this arrangement serving as a further adjustment of the fastening device.

I claim:

1. A pull device for fastening two shoe portions comprising a tension member pivotally connected to one portion of the shoe and extendable to the other portion, base plate means fixedly attached to the other portion of the shoe, said base plate means having slide channel means, lever means pivoted to rotate towards and away from the pivotal connection of said tension member, hook rack means hinged at one end to said lever means, said hook rack means having a plurality of hooks for receiving said tension member, said hook rack means having the other end slidable in said slide channel means of said base plate means, the two shoe portions being pulled together by movement of said hook rack means when said lever means is rotated away from the pivoted connection of said tension member.

2. The apparatus as claimed in claim **1**, wherein said hook rack means is hinged at said lever means at a position between the center of said lever means and the pivotally mounted end of said lever means, the distance between the hinged connection of said hook rack means and the base plate means always being sufficiently less than the length of said hook rack means to maintain said hook rack means at an inclination angle less than 45° with respect to said base plate means in order to facilitate operation of the pull device.

3. The apparatus of claim **1** wherein said other end of said hook rack means may be swung in an upward arc to a position enabling convenient initial engagement with said tension member, tension being applied to said tension member upon the return of said other end of said hook rack means to said slide channel means.

4. The apparatus of claim **1** and further including a base means fixedly connected on the one portion of the shoe, connection means pivotally mounted at one end to said base means, said tension member being pivotally connected to the other end of said connection means, said connection having an extended position and an overturned position to allow the extended position of said tension member to be adjusted.

5. The apparatus of claim **4** wherein said base means includes two upright shoulder means, said connection means being comprised of a plate having a pair of lateral projections on each end, said plate being folded to adjacently dispose said pairs of lateral projections to form link pivot means, said link pivot means being pivotally centered in said upright shoulder means of said base means to allow said connection means to assume either of two said positions.

6. The apparatus of claim **1** wherein said tension member is pivoted on base means fixedly attached to the second side of the shoe upper, said base means having slot portions, lever pull means pivotally mounted on said base means and connected to one end of said tension member for applying tension to said tension member, arm means being pivotally connected at one end to said lever pull means, said arm means having a second end slidably mounted in the slot portions of said base means in order to delimitate the movement of said arm means.

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