Feb. 22, 1966 R. A. HYDE 3,235,978

SHOE WITH TENDON GUARD

Filed Oct. 4, 1963 2 Sheets-Sheet 1

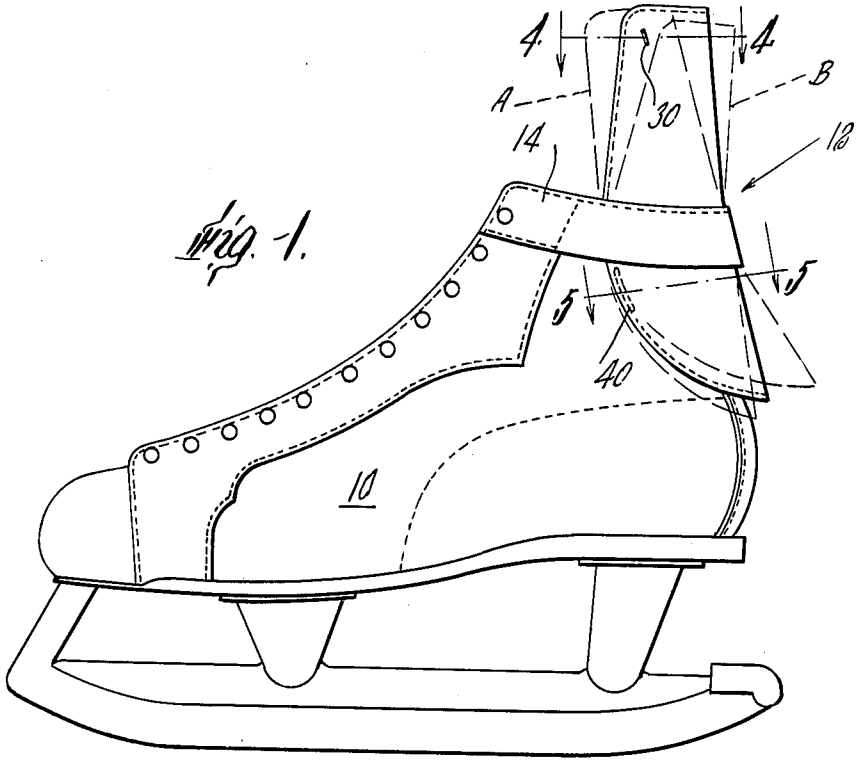


Fig. 1.

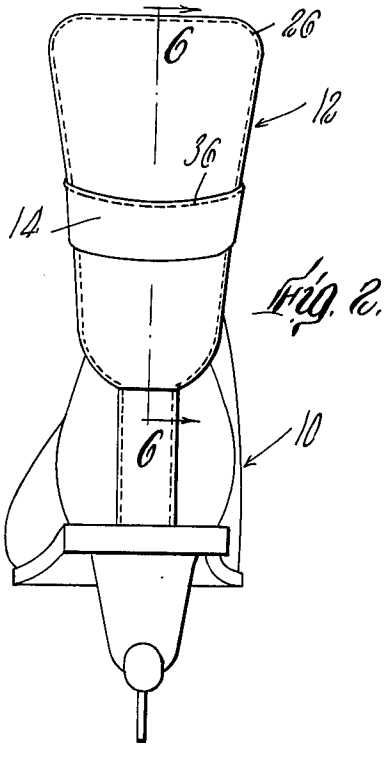


Fig. 2.

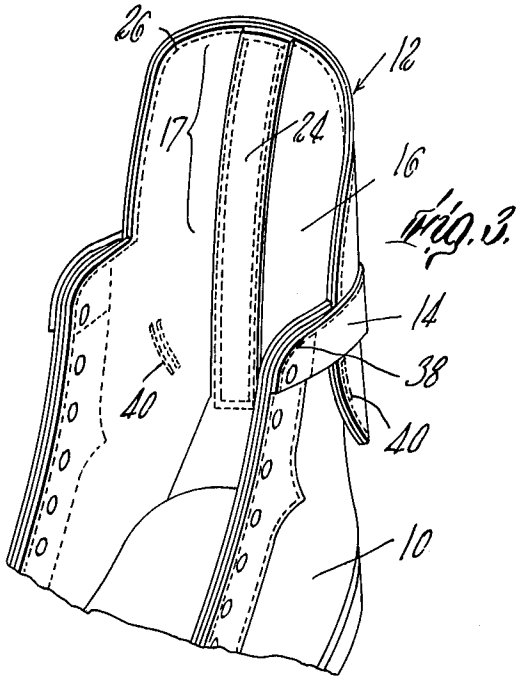


Fig. 3.

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SHOE WITH TENDON GUARD

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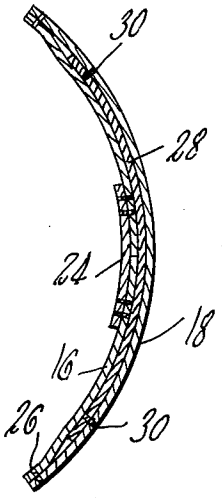


Fig. 4.

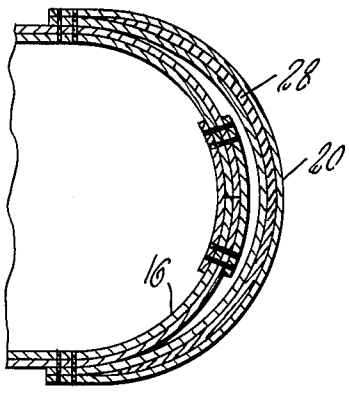


Fig. 5.

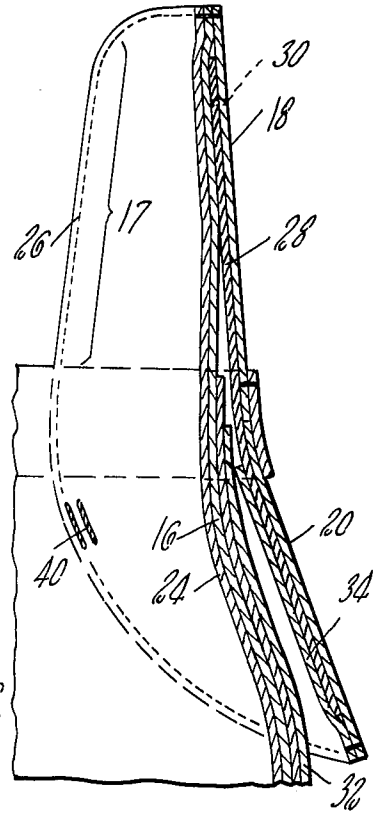


Fig. 6.

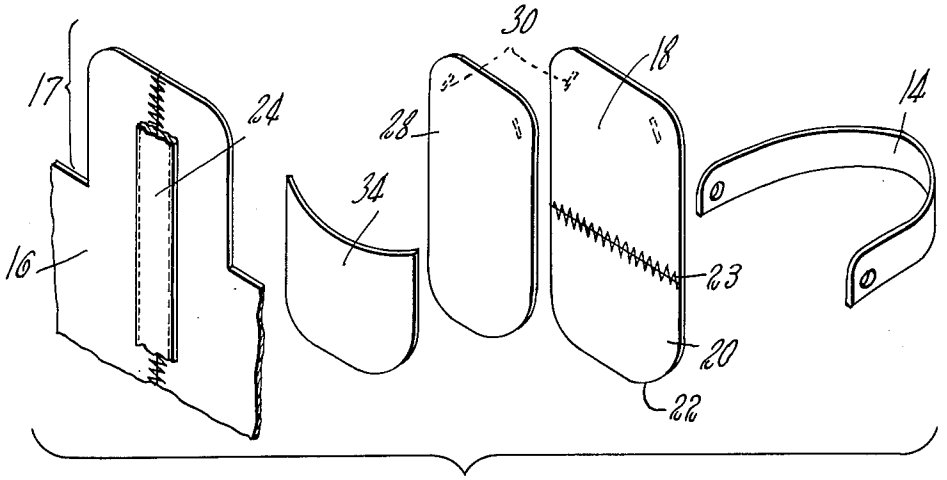


Fig. 7.

United States Patent Office 3,235,978 Patented Feb. 22, 1966

3,235,978

SHOE WITH TENDON GUARD

Ralph A. Hyde, Newton Center, Mass., assignor to A. R. Hyde and Sons Co., Cambridge, Mass., a corporation of Massachusetts

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7 Claims. (Cl. 36—2.5)

This invention relates to shoe skates and in particular to the problem of providing an effective, convenient and comfortable tendon guard for such shoes. Although the invention is contemplated primarily for use with ice hockey skates, it is in some respects applicable to other types of athletic footwear.

The vulnerability of the Achilles tendon to serious injury has been recognized through the ages, and a number of different types of guards have been employed in an attempt to protect it. The danger is particularly great in hockey due to the close proximity of the tendon to the skate blades of the other skaters and the high speed and forcefulness with which the game is played.

Until the present invention, however, no one has been able to devise a fully satisfactory guard. The tendon guards of the prior art fall into two types, those in which the guard is fully attached to the shoe, and those in which the guard is provided as an accessory, separate from the shoe. Each type has serious disadvantages.

In the attached type, the lower extent of the guard is fixed to the rear of the shoe. This results in an extremely stiff, immobile and uncomfortable shoe, due to the fact that the guard must have in it material strong enough to resist a forceful blow by a skate blade. Furthermore, when the wearer's ankle flexes, the guard necessarily receives stretching and buckling forces, depending upon the direction of the ankle movement. In particular, when the ankle flexes back, the top of the shoe is forced back and exerts downward pressure on the middle portion of the guard. The only way that the middle of the guard can absorb this downward pressure is by buckling. On the other hand, when the ankle flexes forward, the middle of the guard is subjected to upward forces and stretches. This stretching and buckling weakens and produces permanent wrinkles in the guard, and these wrinkles, being in the above mentioned stiff and strong material, penetrate into the shoe and scrape against the foot of the wearer, causing severe discomfort and at times skin breakdown. Furthermore, such weakening of the guard lessens its ability to protect the wearer.

The accessory guard has an additional set of problems. There is the bothersome inconvenience of installation and removal each time the shoes are used. Also, separate guards represent additional items of equipment that must be accounted for, and being small, they are easily lost or mislaid. More important is the problem of temporarily attaching the guard to the main body of the shoe. Because the attachment must be secure and foolproof if the guard is to be effective, the usual method is to provide eyelets in the guard that coincide with the top eyelets on the front of the shoe, the shoe lace thus serving the dual purpose of closing the shoe and securing the guard. However, the tightness requirements in the laces for securing the guard are often greater than those for tying the shoe, posing for the wearer a dilemma in which he must either put up with an insecure guard or with overly-tight shoes and impeded blood circulation. Furthermore, the laces alone are not adequate to secure the guard, so further buckles, strings, metal spring clips or the like must be provided, complicating the installation and removal process, but still falling short of doing a fully satisfactory job. A still further disadvantage of the accessory guard is the fact that its upper portion overlaps and extends above the main body of the shoe, resulting in a discontinuous inner lining and additional discomfort for the wearer, as well as an unattractive product in terms of its marketability.

It is therefore the object of the invention to provide a shoe skate incorporating a tendon guard as an integral part of the shoe in an improved construction, without the loss of ankle mobility.

A further object of the invention is to provide a hockey shoe with an integral tendon guard that does not produce discomforting wrinkles and weakened material in response to ankle flexing by the wearer.

These objects are accomplished by a novel construction, in which the upper part of the tendon guard is attached to the main body of the shoe, with the lower part of the guard free, during skating, to move relative to the main body of the shoe. In this manner, when the middle of the guard is subjected to upward force by forward flexing of the wearer's ankle, the lower part is free to pivot rearwardly, eliminating stretching. And when the middle of the guard is subjected to downward pressure by backward flexing of the ankle, the lower part of the guard is free to slide downwardly relative to the back of the shoe body, eliminating buckling. Thus, the stretching and buckling of the prior art are transformed by the invention into free pivoting and sliding and though the guard is integral with the shoe, the back of the shoe can consist of comfortable, flexible leather, that is not rigidified by the guard.

Furthermore, great mobility is provided. Due to the freedom of the lower part of the guard to move rearwardly from the main body of the shoe, the upper part of the guard is freed to tilt forwardly when the wearer leans in that direction, thus giving close protection to the wearer without the use or discomfort of lacings.

Additional aspects of the invention's novel construction, as well as further objects and advantages of the invention, will appear in the course of its detailed description below. In order to further aid in the understanding of the invention, a preferred embodiment thereof is shown in the accompanying drawings, in which:

FIG. 1 is a side view of the shoe, the dotted line A illustrating the leaning forward skating position, the dotted line B illustrating the leaning backward skating position, and the solid line the upright skating position of the guard;

FIG. 2 is a rear view of the shoe;

FIG. 3 is a perspective view from above showing the rear inside of the shoe;

FIG. 4 is a horizontal cross-sectional view through line 4—4 in FIG. 1;

FIG. 5 is a horizontal cross-sectional view through line 5—5 in FIG. 1;

FIG. 6 is a vertical cross-sectional view through line 6—6 in FIG. 2; and

FIG. 7 is an exploded view showing various parts of the guard and shoe upper, with the inner vertical stay shown broken away to reveal the two-piece construction of the inner lining.

Referring to the drawings, FIGS. 1–3 give a broad view of the shoe and tendon guard including the main shoe body **10**, the tendon guard **12**, and the continuous inner lining **16**.

The outer cover of the guard is preferably constructed from upper and lower pieces **18**, **20** of 1/16" cowhide (FIGS. 6, 7) that abut each other at abutment line **23** and are joined together by zigzag stitching which is covered by horizontal top stay **14**. The upper part **18** of the outer cover is of approximately rectangular shape with rounded corners. Lower part **20**, on the other hand, has a smoothly curved side and lower perimeter **22**.

When the outer cover of the guard is incorporated into the shoe it, like the other members of the guard, is

curved about a vertical axis to conform with the shape of the shoe. In addition, the two-piece construction of the guard outer cover enables the guard to have an upward curvature about a horizontal axis, concave outwardly, thus enabling the guard to naturally follow the general outline of the back of the wearer's foot, and to flare the upper part of the guard rearwardly so that it does not interfere with the leg when the leg is flexed rearwardly of the shoe.

The inner lining **16** of the shoe (FIGS. 3, 4, 7) is preferably of a two piece 1/16" cowhide construction, zig-zag stitched together along a vertical abutment line (FIG. 7). The abutment line is covered by inner vertical stay **24**, which stay is stitched to the inner lining. Inner lining **16** has a top part **17** (FIGS. 3, 7) which extends upward substantially beyond the main body of the shoe, in order to provide a continous inner lining over the full extent of the shoe and guard. The top part **17** of the inner lining **16** is shaped so that its perimeter will match the perimeter of the top part **18** of the outer cover of the guard, which two matching perimeters are stitched together by stitching **26** (FIGS. 3, 4, 6). The upper portion of the guard is thus permanently and securely attached to the shoe.

Sandwiched between the guard top outer cover **18** and the top inner lining **17** is a ballistic cloth member **28**, preferably 3/32" thick woven nylon such as used in bullet-proof vests. This cloth member **28** has an outline geometrically similar to that of the entire outer cover **18, 20**, but of a somewhat smaller scale, so that when the ballistic cloth **28** is placed against the outer cover, the edges of the outer cover will extend beyond those of the cloth by an amount sufficient to allow the outer cover to be stitched without the stitches passing through the cloth **28**. In this manner the edges of the ballistic cloth are fully enclosed and the stitching operation need not contend with the toughness of cloth **28**. The ballistic cloth itself is cemented to the outer cover and the lining and is stitched to the outer cover only at the top by two bar stitch points **30**, said stitches not passing through the inner lining (FIGS. 1, 7). From its upper end between the lining and outer cover, the cloth **28** continues down along the outer cover **20**, passing outside, and beyond the rearwardmost part of the main body of the shoe, which is the outer vertical back stay **32** (FIG. 6). The bottom portion of the cloth **28** is retained against the outer cover part **20** by a second sandwich, this one formed by the lower part **20** of the outer cover and an inside guard lining **34**. Inside guard lining **34** is shaped to match the smoothly curved lower perimeter **22** of outer cover **20**, to which it is attached by stitching along its edges.

According to the invention, neither the inside guard lining **34** nor the botom part **20** of the outer cover is attached to the main shoe body, except at a pair of relatively high points, to be mentioned below. The entire bottom part of the guard is thus free to pivot rearwardly or slide downwardly relative to the main shoe body, and yet is securely kept in protective position at all times.

In addition to the preferred stitching **26**, the guard is preferably secured to the shoe in two further respects.

First, the horizontal stay **14** is provided external to the outer guard cover **18, 20**, consisting of a relatively narrow strip of leather long enough to run along the entire perimeter of the main shoe body **10** all the way around the back of the shoe. The stay covers the abutment line between the top and bottom of the outer cover. The width of the guard is substantially less than the length of the stay **14**, and the result is that the ends of the stay extend beyond the sides of the guards. The central portion of the stay is stitched on its upper horizontal border to the guard outer cover at **36** (FIGS. 2, 6) and the protruding ends of the stay are stitched to the main shoe at **38** (FIG. 3).

Finally, and importantly, bar stitches **40** (FIGS. 1, 3, 6) at both sides of the guard just below the stay **14**, generally above the ankle bone, run entirely through the guard and inner lining **16**, further securing the sides of the guard to the shoe and limiting the pivoting and sliding of the guard to the needed range. The location of these bar stitches is important in striking the proper balance between the guard's freedom to pivot and slide relative to the shoe, and its integral incorporation into the shoe proper, thus giving the guard of the invention all the advantages of one piece construction without the normal disadvantages of immobility, discomfort, wrinkling and weakening.

In use, the invention performs advantageously in several respects. When the ankle is flexed forward (position A, FIG. 1) the lower part of the guard is free to pivot rearwardly from the shoe, thereby increasing mobility but without any stretching or other distorting of the guard. On the other hand, when the ankle is flexed backward (position B, FIG. 1), the lower part of the guard slides downward along the back of the shoe body. Once again, great mobility is provided, but without the buckling or distorting of the guard that normally accompanies such movement of the wearer, the sliding action taking the place of the buckling. Thus, harsh wrinkles do not develop and the usual problems of the integral guard are eliminated. In addition, the continuous inner lining **28** offers a smooth surface against the foot and presents a much finer appearance than the discontinuous surface present when an accessory guard is attached to a shoe.

Finally, it should be pointed out that, although the invention realizes a great improvement in the action of tendon guards, its simplicity and low cost of manufacture compare favorably with the guards heretofore available.

While the above description has been given in great detail, the preferred embodiment thus set forth should, of course, be taken only as illustrative of the invention and in no way as excluding from the true scope and spirit of the invention variations that will occur to those skilled in the art.

What is claimed is:

1. An athletic shoe of the type described having an Achilles tendon guard of stiff and unstretchable material, said tendon guard comprising an elongated member extending generally vertically from a lower part beginning at a lower end located to the rear of the main body of the shoe near the level of the counter to an upper part ending at an upper end located substantially above the level of the main body of the shoe, said shoe further having means for non-removably mounting the upper part of said tendon guard to the main body of the shoe, the lower part of said guard being free in its operable position to move rearwardly away from the main body of the shoe when the top of a said body is drawn forwardly and to slide down relative to the back of the main body of the shoe when the top of said body is forced rearwardly.

2. The athletic shoe of claim **1** wherein the inner lining of the shoe extends upwardly beyond the top of the main body of the shoe, said lining extension being integral with the upper part of said guard, said lining thus helping to permanently mount said guard while allowing the lower part of said guard to move rearwardly relative thereto.

3. The athletic shoe of claim **1** wherein said tendon guard includes an outer cover formed of upper and lower parts set at an angle to each other, making the vertical profile of the guard concave outwardly, so that when the bottom part of the guard rests against the main body of the shoe, the upper part flares rearwardly.

4. The athletic shoe of claim **1** wherein an outer horizontal back stay is provided, a part of said stay extending about and being secured to the middle part of the guard, said part of said stay being unconnected to the main body of the shoe, and said stay having end exten-

sions located forwardly of said guard, secured to the main body of the shoe.

5. The athletic shoe of claim 2 wherein said guard includes an outer cover, a ballistic cloth member somewhat smaller than said cover, and a lower inside guard lining joined to the lower part of said guard, said ballistic cloth member sandwiched at its upper portion between said cover and said upper extension of said inner lining, and at its lower portion between said cover and said inside guard lining.

6. The athletic shoe of claim 2 wherein said shoe further has means for additionally joining said guard to said lining and the main body of said shoe at two points along the perimeter of said guard and just below its middle.

7. The athletic shoe of claim 1 wherein the lower part of said guard has a smoothly curved side and bottom

perimeter, said entire perimeter being unconnected and free to move relative to the main body of the shoe.

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