The present invention provides an improved hockey stick shaft (10) with improved handling characteristics which is particularly useful for street hockey. The shaft has an elongated main body portion (11) and one or more rib portions (12A, 12B, 12C, 12D) coextruded on the exterior surface of the main body portion, wherein the coefficient of friction of the main body portion is less than the coefficient of friction of the rib portion(s). The invention also includes a hockey stick (15) having a shaft with such characteristics.
HOCKEY STICK SHAFT

TECHNICAL FIELD

[0001] The present invention relates generally to a shaft for a hockey stick and, more particularly, to a hockey stick shaft and hockey stick having improved handling characteristics.

BACKGROUND ART

[0002] Many different hockey stick shafts have been made and used for street hockey. Most frequently, wooden shafts have been offered which require that a plastic blade be screwed into or adhered to the distal end of the shaft, and that a rubber handle or butt end be attached to the proximal end of the shaft. Alternatively, hockey tape is often used to create a handle or butt end. In addition, a variety of plastic shafts have been offered, typically hollow, which require the addition of a blade and a handle or butt end as described in connection with wooden shafts. One disadvantage of such shafts is that they do not allow street hockey players, often using their bare hands, or winter gloves or mittens, rather than protective hockey gloves, to firmly grasp and/or adequately control such shafts. Accordingly, many players add friction tape or other tape to such shafts, often in the locations where a player’s hands are positioned when shooting.

[0003] There is a need, therefore, for an improved hockey stick shaft which provides improved handling characteristics and allows street hockey players to securely grasp the shaft.

DISCLOSURE OF THE INVENTION

[0004] With parenthetical reference to the corresponding parts, portions or surfaces of the disclosed embodiment, merely for purposes of illustration and not by way of limitation, the present invention provides an improved hockey stick shaft (10) and hockey stick (15) which are particularly useful for street hockey. In one aspect of the invention, the hockey stick shaft comprises an elongated main body portion (11) and at least one rib portion (12A, 12B, 12C, 12D) coextruded with the main body portion, wherein the rib portion(s) have a higher coefficient of friction than the coefficient of friction of the elongated main body portion, thereby providing a secure and comfortable grip.

[0005] In one aspect of the invention, the main body portion has a generally rectangular cross-section (see, FIG. 4). In another aspect of the invention, the main body portion is hollow. In yet another aspect of the invention, the main body portion comprises polypropylene, polyethylene, vinyl or acrylonitrile butadiene styrene, or other plastic materials. In another aspect of the invention, the rib portion(s) comprise(s) ethylene vinyl acetate, sanoprene or low-density polyethylene, or other plastic materials.

[0006] Another aspect of the invention includes a hockey stick blade (14) fastened to the distal end of the main body portion of the shaft. In yet another aspect, the main body portion has an exterior surface and a longitudinal axis, and the rib portion(s) are coextruded on the exterior surface of the main body portion generally parallel to the longitudinal axis of the main body portion. Another aspect of the invention is a hockey stick (15) comprising a hockey stick shaft having an elongated main body portion (11) and at least one rib portion (12A, 12B, 12C, 12D) coextruded with the main body portion, wherein the rib portion(s) have a higher coefficient of friction than the coefficient of friction of the main body portion. In other aspects, the main body portion (11) may be extruded independently of the rib portion(s), and the rib portion(s) may be subsequently extruded on the main body portion.

[0007] The general object of the invention is to provide an improved hockey stick shaft with improved handling capabilities. Another object is to provide a shaft having ribs with a relatively low coefficient of friction. Another object is to provide a hockey stick shaft wherein one or more ribs are coextruded on the surface of the main body portion of the hockey stick shaft.

[0008] Another object is to avoid the expense and inconvenience of using tape to create a grippable area on a hockey stick shaft. Yet another object is to provide a hockey stick with a shaft having these characteristics.

[0009] These and other objects and advantages will become apparent from the foregoing and ongoing written specification, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a side view of the hockey stick shaft of the present invention.

[0011] FIG. 2 is a front view of the hockey stick shaft of the present invention.

[0012] FIG. 3 is a perspective view of the hockey stick shaft of the present invention.

[0013] FIG. 4 is a top, cross-sectional view of the hockey stick shaft of the present invention.

[0014] FIG. 5 is a side view of the hockey stick of the present invention.

[0015] FIG. 6 is a perspective view of the hockey stick of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] At the outset, it should be clearly understood that like reference numerals are intended to identify the same structural elements, parts, portions or surfaces consistently throughout the several drawing figures, as such elements, parts, portions or surfaces may be further described or explained by the entire written specifications, of which this detailed description is an integral part. Unless otherwise indicated, the drawings are intended to be read together with the specification, and are to be considered a portion of the entire written description of this invention. As used in the following description, the terms “horizontal”, “vertical”, “left”, “right”, “up”, “down” and the like, as well as adjectival and adverbial derivatives thereof (e.g., “horizontally”, “rightwardly”, “upwardly”, “radially”, etc.), simply refer to the orientation of the illustrated structure as the particular drawing figure faces the reader. Similarly, the terms “inwardly”, “outwardly” and “radially” generally refer to the orientation of a surface relative to its axis of elongation, or axis of rotation, as appropriate.
Referring now to the drawings, the hockey stick shaft 10 of the present invention is illustrated in FIG. 1. The hockey stick shaft 10 has a substantially rigid elongated main body portion 11 made from a wide variety of materials such as polypropylene, polyethylene, vinyl or acrylonitrile butadiene styrene (ABS). In this preferred embodiment, the elongated main body portion is made from polypropylene. FIG. 1 illustrates two rib portions 12A, 12B which are coextruded relative to the longitudinal axis of the elongated main body portion 11. In this embodiment, the rib portion, and, more particularly, the outer surface of the rib portion, has a coefficient of friction greater than the coefficient of friction of the outer surface of the main body portion 11. The rib position(s) may be made from a wide variety of materials including ethylene vinyl acetate, sanoprene or low-density polyethylene. Sanoprene is used in a preferred embodiment.

FIG. 2 is a front view of the hockey stick shaft 10 of the present invention. This view illustrates the outer surface of the main body portion 11 and a side view of two of the four rib portions 12B, 12C in this embodiment. Similarly, FIG. 3 is a perspective view of the hockey stick shaft 10 of the present invention. Each of the four ribbed portions 12A, 12B, 12C, 12D are illustrated in FIG. 3. FIG. 4 is a top, cross-sectional view of the hockey stick shaft which illustrates each of the four ribbed portions 12A, 12B, 12C, 12D and the generally hollow main body portion 11. The cross-section may be, but is not necessarily, rectangular. The sides of the main body portion are substantially planar, but, in other embodiments, may be concave or convex.

In a preferred embodiment, the main body portion material and the rib portion material are fed simultaneously into an extrusion machine (also referred to as a co-extrusion device or extrusion device), whereupon the extrusion machine coextrudes the main body portion and rib portion(s). The described methods and other methods of coextrusion are known to those skilled in the art, and variations are contemplated herein. For example, the main body portion 11 may first be extruded through an extrusion machine, and one or more rib portion(s) 12A, 12B, 12C, 12D later extruded on the main body portion. The materials are coextruded to form a hockey stick shaft having, in one embodiment, four generally parallel rib portions extending parallel to the longitudinal axis of the shaft over the full length of the main body portion. Other embodiments may include rib portions which are not parallel to the longitudinal axis of the main body portion, not parallel to each other, or which do not extend its full length. Such rib portions may be extruded/formed in any suitable manner. The described methods and other methods of coextrusion are known to those skilled in the art, and variations are contemplated herein.

The hockey stick 15 of the present invention is illustrated in FIGS. 5 and 6. FIG. 5 is a side view of the hockey stick 15 which illustrates the main body portion 11, two of the four rib portions 12A, 12B, a butt end or handle 13 attached to the proximal end of the main body portion 11, and a blade 14 attached to the distal end of the main body portion 11. The shape of the blade is known to those skilled in the art, and is subject to several variations. FIG. 6 is a perspective view of the hockey stick 15 which illustrates the main body portion 11, handle 13, blade 14 and two rib portions 12C, 12D. The blade in this embodiment is adhered to the main body portion. It may be connected in any desired manner, or may be extruded with the main body portion to form a single piece.

While there has been described what is believed to be the preferred embodiment of the present invention, those skilled in the art will recognize that other and further changes and modifications may be made thereto without departing from the spirit of the invention. Therefore, the invention is not limited to the specific details and representative embodiments shown and described herein. Accordingly, persons skilled in this art will readily appreciate that various additional changes and modifications may be made without departing from the spirit or scope of the invention, as defined and differentiated by the following claims. In addition, the terminology and phrasing used herein is for purposes of description and should not be regarded as limiting.

What is claimed is:
1. A hockey stick shaft, comprising:
   an elongated main body portion having an exterior surface and a first coefficient of friction; and
   at least one rib portion having an exterior surface and a second coefficient of friction, said rib portion and said main body portion being coextruded at the time of formation;
   wherein said second coefficient of friction is greater than said first coefficient of friction.
2. The hockey stick shaft as set forth in claim 1 wherein said main body portion has a generally rectangular cross-section.
3. The hockey stick shaft as set forth in claim 1 wherein said main body portion comprises polypropylene, polyethylene, vinyl or acrylonitrile butadiene styrene.
4. The hockey stick shaft as set forth in claim 1 wherein said rib portion comprises ethylene vinyl acetate, sanoprene or low density polyethylene.
5. The hockey stick shaft as set forth in claim 1 wherein said main body portion is hollow.
6. The hockey stick shaft as set forth in claim 1, further comprising:
   a hockey stick blade fastened to the distal end of said main body portion.
7. The hockey stick shaft as set forth in claim 1 wherein said main body portion has an exterior surface and a longitudinal axis, and wherein said rib portion is coextruded on said exterior surface of said main body portion generally parallel to said longitudinal axis.
8. The hockey stick shaft as set forth in claim 1 wherein said rib portion extends from a proximal end of said main body portion to a distal end of said main body portion.
9. A hockey stick, comprising:
   a hockey stick shaft having an elongated main body portion with an exterior surface having a first coefficient of friction, at least one rib portion with an exterior surface having a second coefficient of friction, wherein said rib portion and said main body portion are coextruded at the time of formation, and wherein said second coefficient of friction is greater than said first coefficient of friction; and
   a hockey stick blade.
10. The hockey stick as set forth in claim 9, further comprising:

a handle.

11. A method of forming a hockey stick shaft, comprising:

introducing into an extrusion device material with a first coefficient of friction, for forming a main body portion of said hockey stick shaft;

introducing into an extrusion device material with a second coefficient of friction, for forming a rib portion of said hockey stick shaft;

coe-xtruding said main body portion material and said rib portion material through said extrusion device to form said hockey stick shaft with said rib portion extending outwardly from an exterior surface of said main body portion.

12. The method as set forth in claim 11, further comprising:

attaching a blade to said hockey stick shaft.

13. A hockey stick shaft, comprising:

an elongated main body portion having an exterior surface and a first coefficient of friction; and

at least one rib portion having an exterior surface and a second coefficient of friction, said rib portion being extruded on said main body portion;

wherein said second coefficient of friction is greater than said first coefficient of friction.

14. The hockey stick shaft as set forth in claim 13 wherein said main body portion has a generally rectangular cross-section.

15. The hockey stick shaft as set forth in claim 13 wherein said main body portion comprises polypropylene, polyethylene, vinyl or acrylonitrile butadiene styrene.

16. The hockey stick shaft as set forth in claim 13 wherein said rib portion comprises ethylene vinyl acetate, sanoprene or low density polyethylene.

17. The hockey stick shaft as set forth in claim 13 wherein said main body portion is hollow.

18. The hockey stick shaft as set forth in claim 13, further comprising:

a hockey stick blade fastened to the distal end of said main body portion.

19. The hockey stick shaft as set forth in claim 13 wherein said main body portion has an exterior surface and a longitudinal axis, and wherein said rib portion is coextruded on said exterior surface of said main body portion generally parallel to said longitudinal axis.

20. The hockey stick shaft as set forth in claim 19 wherein said rib portion extends from a proximal end of said main body portion to a distal end of said main body portion.

21. A hockey stick, comprising:

a hockey stick shaft having an elongated main body portion with an exterior surface having a first coefficient of friction, at least one rib portion with an exterior surface having a second coefficient of friction, wherein said rib portion is extruded on said main body portion, and wherein said second coefficient of friction is greater than said first coefficient of friction; and

a hockey stick blade.

22. The hockey stick as set forth in claim 21, further comprising:

a handle.

23. A method of forming a hockey stick shaft, comprising:

introducing into an extrusion device material with a first coefficient of friction, for forming a main body portion of said hockey stick shaft;

introducing into an extrusion device material with a second coefficient of friction, for forming a rib portion of said hockey stick shaft;

extruding said main body portion material through said extrusion device;

extruding said rib portion material through said extrusion device;

to form said hockey stick shaft with said rib portion extending outwardly from an exterior surface of said main body portion.

24. The method as set forth in claim 23, further comprising:

attaching a blade to said hockey stick shaft.

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