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SKI POLE SHAFTS

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FIG. 1

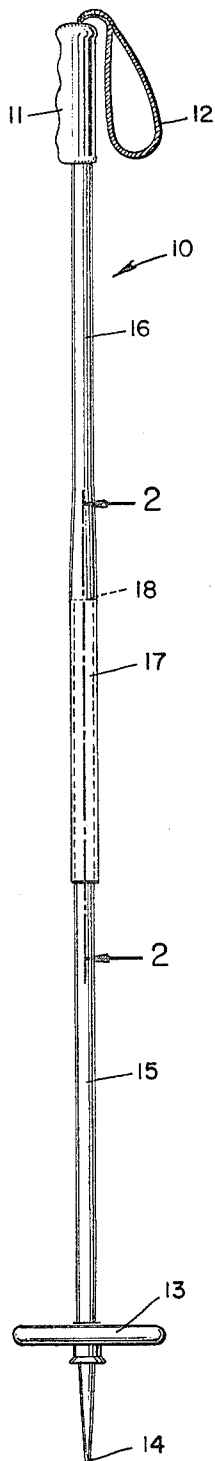


FIG. 2

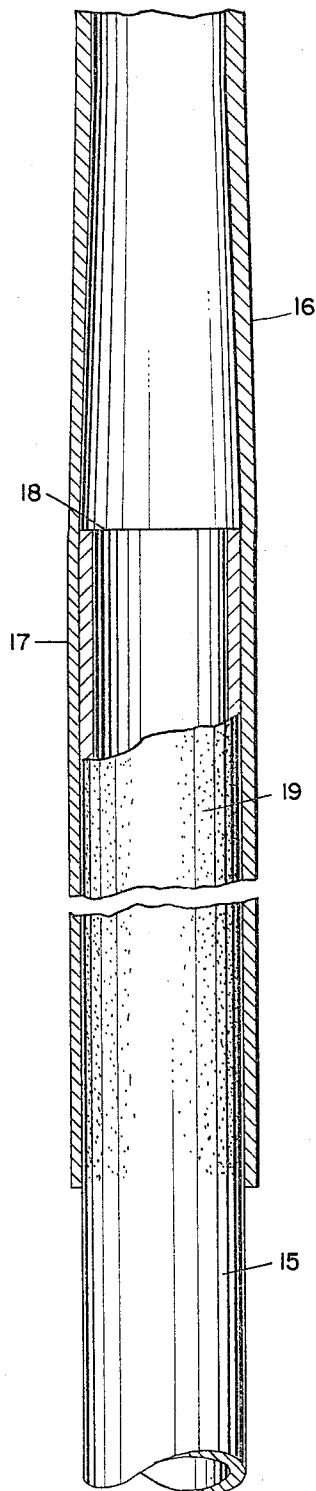
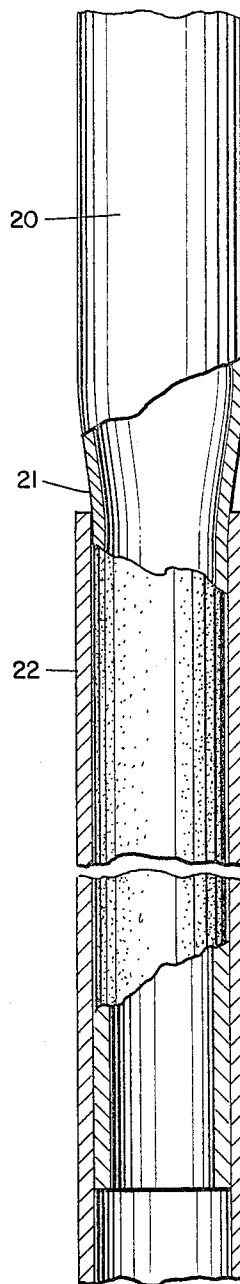


FIG. 3



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1

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SKI POLE SHAFTS

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This invention relates to ski poles.

Some years ago, the great advantages of a lightweight ski pole were recognized and a light-weight aluminum ski pole was accordingly introduced with pronounced advantages, but with considerable disadvantages. As against the advantages of satisfactory balance, desirable swing-weight or inertia, relief from fatigue of a skier due to the weight of a steel pole, and all-around better maneuverability, there existed disadvantages which the industry has up to now been unable to solve. The greatest disadvantage is that the aluminum shaft of the light-weight pole, even though fabricated of a heat-treated alloy, is softer than the hardened edges of skis. Accordingly, in many kinds of falls the hardened steel edges of the ski act like a saw and may dent or gouge out a notch in the aluminum shaft, usually in a lower portion thereof. Thereafter undue pressure on the ski pole might cause it to easily bend and collapse. The relative softness of the aluminum shaft made it also subject to injury due to blows from other objects.

The disadvantages of the light-weight aluminum pole stimulated the introduction of a light-weight steel pole which largely overcame the nicking or notching problem. In order to attain the same lightness as the aluminum pole, a smaller diameter of steel tubing was necessary. However, this created another problem in that the new light-weight steel pole was excessively flexible whereas a satisfactory ski pole must be rigid to assure precision in use. In the aluminum pole, rigidity was attained by using a relatively large outside diameter of about $\frac{3}{4}$ ". The steel pole had a considerably reduced diameter to attain lightness, but, as stated above, the pole was too flexible.

Attempts have been made to solve the problems recited above, but, to my knowledge, without success because of the contradictory requirements involved.

With the foregoing in mind I have devised a pole which solves the above problems by the following means:

The lower half of the pole is fabricated of light-weight steel tubing. The upper half of the pole is fabricated of light-weight aluminum tubing. The lower half of the pole is partially telescoped into the aluminum upper half and is bonded in place. A variety of advantages accrues from such structure. Thus, the lower half of the pole is resistant to nicking or notching since it is fabricated of tempered and hardened steel. The upper half contributes considerably toward the over-all lightness of the pole since such upper half is aluminum which is formed so as to be of about the same weight as the light-weight steel tubing of the lower half.

The improved pole is further extremely strong in the critical area, i.e. the center portion, since it has a double wall thickness where the tube portions are overlapped. This adds desired rigidity so that the pole will take a much greater stress before bending or collapsing and will avoid a tendency to bend or whip during high speed use. In fact, my pole has a great tendency to resist bowing or arcing under any conditions since it has three distinct stress areas, one on each side of the overlap, and the overlap itself. This distributes the stress to the three areas and achieves great strength, rigidity, notch and fracture resistance, combined with light-weight and desirable balance and swing-weight.

My invention will be further understood from the following description and figures wherein:

2

FIGURE 1 is an elevational view of a ski pole constructed according to this invention;

FIGURE 2 is an enlarged cross-sectional view as taken along the line 2—2 of FIGURE 1, and;

FIGURE 3 is a view similar to FIGURE 1 but illustrating a modified embodiment.

Referring to FIGURES 1 and 2, the ski pole 10 is provided with the usual handle 11, strap 12, ring 13 and swaged pointed end 14 of the shaft, all of which may be conventional. However, the shaft is made up as will be now described.

The bottom portion 15 is fabricated of heat-treated alloy steel. As an example, seamless steel tubing, No. 4140 or its equivalent is satisfactory, such steel having been heat-treated to approximately 45 Rockwell C. However, any conventional steel tubing may be employed.

Upper portion 16 is fabricated of light-weight thin walled aluminum tubing. Such aluminum tubing may be of a conventional temper such as T6 No. 7075. While this material is generally referred to as aluminum, it is a conventional heat-treated aluminum alloy, any conventional type of which may be employed.

Lower portion 15 is telescoped into upper portion 16 for a distance of about 10" thus producing the double-walled overlapping portion 17. In order to create a firm connection, upper portion 16 is swaged down from a normal outer diameter of .695" at the overlapping portion to an outer diameter at the upper portion thereof of .675". The swaging commences at a point about 10" above the bottom edge of upper portion 16 so that somewhat of an internal shoulder 18 is formed at said point to serve as a seat for the upper edge of lower portion 15. Accordingly, lower portion 16 has a fairly tight fit into the lower end of upper portion 16.

However, it is best not to rely on a frictional fit between the steel tubing of portion 15 and the aluminum tubing of portion 16 so I apply an adhesive or bonding material 19 which produces a very firm and secure connection in the overlapping area 17. For example, I apply an epoxy adhesive or the like to the upper end of tube 15 before inserting it into tube 16, said epoxy material forming a very firm bond.

As an example of dimensions, let us assume that the length of the pole 10 from its very top to its very bottom is 54". Overlap 17 may be approximately 10". This means that the remaining portions of the upper and lower sections are 22" each. It will be seen therefore that the overlapping section 17 is disposed exactly centrally of the overall length of the pole.

By virtue of the foregoing construction, the lower portion of the pole, which is most subjected to damaging blows, is most resistant thereof because of its hardened steel fabrication. The upper portion is of aluminum and therefore contributes to the desired over-all lightness. The overlapping section is directly in the center which is normally the point of greatest stress when the pole is subjected to bending stress. Such bending will be resisted by the double walled nature of the overlapping area.

In FIGURE 3 the upper aluminum tubing of upper section 20 is swaged inwardly commencing about 10" from its lower end so as to produce somewhat of a shoulder 21. The steel tubing of lower portion 22 telescopes the reduced lower portion of tube 20 and is secured thereto as by an epoxy bonding material or the like. The same advantages accrue as in the previous embodiment described above.

In order to describe further representative details, it may be noted that the normal thickness of the tubing of upper portion 16 is about .032, while the normal thickness of the tubing of lower portion 15 is about .015, such normal thickness referring to the unswaged portions

3

of the tubing. Of course, these measurements are merely typical.

As noted above, the division of the shaft into three areas aids in the division of stress and maximizes its rigidity. The overlap 17 is centralized and the weight of the upper portion 16 is preferably, but not necessarily, the same as that of lower portion 15, so that the balance of the shaft is of maximum advantage. Of course, the portion 15 is narrower than the portion 16 and it may be thinner walled, thus equalizing the weight of the portions notwithstanding their being fabricated of steel and aluminum respectively.

I have described preferred embodiments of my invention but it is obvious that numerous omissions or alterations may be made without departing from its spirit.

What is claimed is:

1. In a ski pole, a shaft divided into at least an upper portion and a lower portion connected thereto, said upper portion being of aluminum alloy, and said lower portion being of steel alloy which is harder than said aluminum alloy so as to be more resistant to damage from external blows, both of said portions being of tubing, the end of one being telescoped into the end of the other and being bonded thereto by adhesive, said telescoping being of a length of approximately 10 inches so as to produce a centrally disposed double-walled area of 10 inches, said double-walled area being at the exact center of the over-all length of the poles, and said upper portion being substantially of the same weight as said lower portion.

2. In a ski pole, a shaft having a lower portion of steel tubing and an upper portion of aluminum tubing, said steel tubing being of a hardness greater than said aluminum tubing and of a material which is heavier than said aluminum tubing, the diameter of said lower portion being less than that of said upper portion, and said lower portion being telescoped into said upper portion and being bonded therein by adhesive, the relative hardness of said lower portion rendering it resistant to damage from external blows and the relative lightness of the material of said upper portion contributing to the

4

over-all lightness of the pole, the telescoping area comprising a double-walled thickness of about 10 inches at the exact center of the length of the shaft.

3. A shaft according to claim 2 and wherein said upper portion is formed with an internal shoulder to seat the end of said lower portion in the telescoped position.

4. In a ski pole having a snow ring, a shaft divided into at least an upper portion and a lower portion connected thereto, both of said portions being located above said snow ring, said upper portion being of an aluminum alloy and said lower portion of a steel alloy whereby said lower portion will be more resistant to damage from external blows.

5. A ski pole according to claim 4 and wherein said upper portion is of aluminum alloy tubing, and said lower portion is of steel alloy tubing which is harder than said aluminum alloy so as to be more resistant to damage from external blows.

6. A ski pole according to claim 5 and wherein the end of one tubing is telescoped into the end of the other, and is bonded thereto by adhesive.

7. A ski pole according to claim 6 and wherein said telescoping is centrally disposed on said shaft.

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