

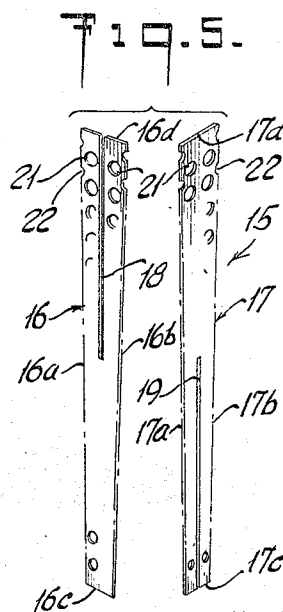
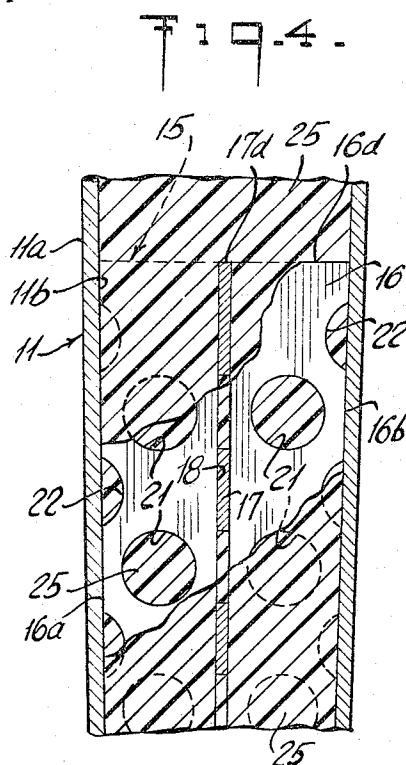
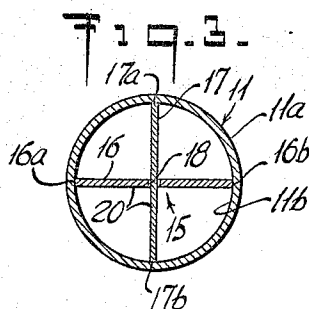
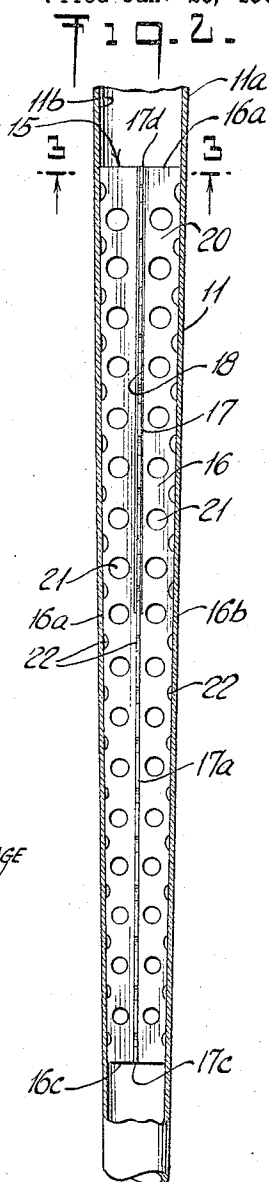
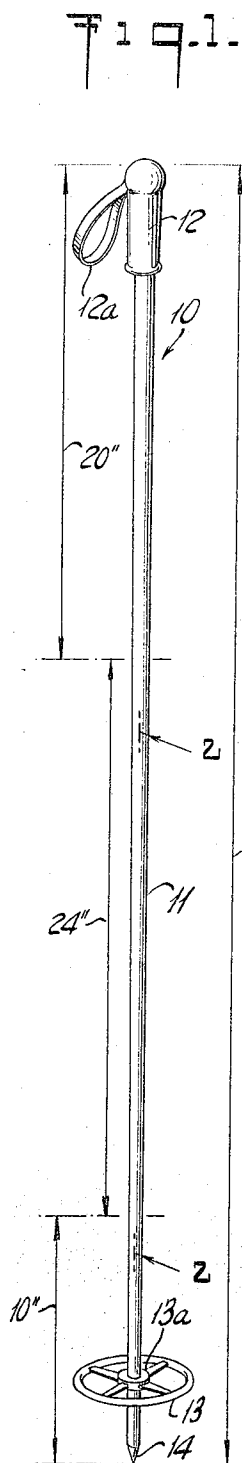
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3,265,401

REINFORCEMENT FOR A POLE

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3,265,401

REINFORCEMENT FOR A POLE

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4 Claims. (Cl. 280—11.37)

This invention relates to improvements in a pole such as a ski pole.

One object of the invention is to provide an improved ski pole of increased strength and of increased resistance to denting, while still of light weight. Another object of the invention is to increase the rigidity and reduce the flexing of the pole under stress conditions of use.

Another object of the invention is to provide a ski pole, meeting the above requirements, the component parts of which can be readily fabricated and assembled.

In accordance with a preferred embodiment of the invention, I provide an elongated, hollow, thin walled shaft having a downwardly tapered bore. I provide an axially extending insert within and intermediate the ends of the bore. This insert has at least three circumferentially spaced vanes, the outer edges of which correspond in taper with and abut frictionally flush against the surface of the bore. Such insert, which may optionally consist of two interlocking plates shaped to cross at right angles and thereby provide four vanes, may be readily frictionally assembled within the bore of the hollow shaft.

As one of the particular features of the invention, a filling material is provided, in situ, to bond the vanes in place and to strengthen the pole. Specifically, in accordance with known techniques, materials are poured into the hollow shaft which react in situ to form a material such as foam polyurethane. This material extends the length of the pole, or at least to the upper level of the insert, and also extends against the vanes. As a feature of the invention, the vanes have apertures through which the fill extends bondingly so as to fix the insert in position within the shaft.

Optionally, the fill may be provided in several pours, of different density, for example, of greater density at the bottom, where the bore is of relative small diameter, of intermediate density in the zone of the insert, and of reduced density in the top of the pole.

The insert serves to rigidify the pole, and thereby to strengthen it and reduce its flexing. The foam fill serves to hold the vanes from twisting or turning, fixes the vanes axially within the pole and adds strength to the aluminum skin of the pole. As a further feature, the foam fill prevents the aluminum skin of the pole from denting as readily as would be otherwise possible, and also reduces vibration of the pole.

Other objects and advantages of the invention will become apparent from the following description, in conjunction with the annexed drawing, in which preferred embodiments of the invention are disclosed.

In the drawing,

FIG. 1 is an elevational view of the improved ski pole, in accordance with the invention, in vertical position.

FIG. 2 is a vertical section on line 2—2 of FIG. 1, essentially showing the zone in which the insert is located. FIG. 2 shows the condition of the assembly prior to the fill.

FIG. 3 is a section on line 3—3 of FIG. 2.

FIG. 4 is an enlarged fragmentary view, similar to FIG. 2, and showing the assembly with the foam fill in position.

FIG. 5 is an exploded perspective view of the insert.

Upon reference to the drawing in detail, it will be noted that the drawing shows a ski pole 10 comprising hollow shaft 11, handle 12 for the upper end of shaft 11 and

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snow engaging member 13 mounted on shaft 11 adjacent its tip end.

Shaft 11 is essentially conventional, the invention residing in the elements inserted within the bore of shaft 11. Shaft 11 is made of light metal alloy or other known material for this purpose. Specifically, it is preferable to use a light weight aluminum alloy sufficiently heat-treated and cold-worked to provide maximum strength. The material is drawn, in conventional manner, to provide the shaft 11 which is substantially uniformly downwardly tapered from its top to at least the general vicinity of its lower end, as clearly shown in the drawing. Shaft 11 may be approximately 54 inches in length, by way of example, and may have an outside diameter of approximately three-quarters of an inch at its upper end. The outside diameter of shaft 11 in the general vicinity of its lower end may be approximately one-half inch. Within the limits of presently known drawing techniques, shaft 11 has a peripheral wall 11a of approximately uniform thickness throughout the length of shaft 11. Accordingly, the peripheral wall of the internal bore 11b of shaft 11 is also downwardly tapered, corresponding to the outer surface of wall 11a.

The handle 12, which closes the upper end of bore 11b, may be of any suitable type generally used on ski poles, and preferably includes a wrist strap 12a. The snow engaging member 13 may be of any suitable type, such as a basket ring, generally used on ski poles, and includes a hub 13a mounted upon shaft 11 slightly above the tip 14 of shaft 11, by any suitable means. Tip 14 may be of any suitable type generally used on ski poles, and is inserted into the lower end of shaft 11, so as to close the lower end of bore 11b, by any suitable means (not shown).

In accordance with the invention, insert 15 is placed within bore 11b. While a number of constructions are possible for insert 15, one simple construction is shown in the drawing. In this construction, insert 15 comprises a pair of elongated plates 16 and 17 of the same overall shape and dimensions. Plates 16 and 17 may be of any suitable material. Optionally, they are stamped from any suitable lightweight but strong metal. Alternatively, they may be molded from rigid plastic.

Plate 16 is elongated in the direction of the axis of the bore 11b and has side edges 16a and 16b, bottom edge 16c and upper edge 16d. Plate 17 correspondingly has side edges 17a and 17b, bottom edge 17c and upper edge 17d. The edges 16a and 16b are straight and downwardly convergent. Accordingly, plate 16 is downwardly tapered, the taper of plate 16 being the same as the taper of bore 11b, at least within the zone of shaft 11 in which the insert is to be placed. Within this zone, the width of plate 16 corresponds to the diameter of bore 11b, at each level of plate 16, so as to insure a close frictional fit of plate 16 within bore 11b, with plate 16 extending diametrically as well as axially, and with the plate edges 16a and 16b closely frictionally abutting the wall of bore 11b. It will be understood that a corresponding discussion applies to plate 17.

The end edges 16c and 16d of plate 16 extend transversely to the axis of shaft 11 in the inserted condition of plate 16. Of course, corresponding statements apply to plate edges 17c and 17d. Plate 16 has an axially extending slot 18 extending from edge 16d toward edge 16c, the lower end of slot 18 being substantially equidistant with respect to the edges 16c and 16d. The width of slot 18 is substantially equal to the thickness of plates 16 and 17.

Plate 17 has a slot 19 corresponding to slot 18, except that slot 19 extends from edge 17c upwardly to the midpoint of plate 17.

Plates 16 and 17 are assembled before insert 15 is placed in bore 11b. For this assembly, the plates are placed end to end and at right angles to each other with the edges 17c and 16d adjacent each other, and the plates are then slid toward each other with plate 17 entering slot 18 and with plate 16 at the same time entering slot 19. The plates are slid within the slots until edges 16d and 17d are on the same level, and edges 16c and 17c are on the same level. In this position, the upper end of slot 19 and the lower end of slot 18 are in contact, with plate 17 frictionally received within the entire length of slot 18 and with plate 16 frictionally received within the entire length of slot 19. Such assembly of plates 16 and 17 of insert 15 thereby defines four vanes 20. These vanes 20 radiate outwardly from the central axis of insert 15, upon which slots 18 and 19 are located. Also, such vanes 20 are circumferentially spaced ninety degrees apart. Furthermore, the outer edges of vanes 20 (the edges 16a, 16b, 17a and 17b respectively) correspond in taper with the surface of bore 11b.

While other constructions of insert 15 are possible, the disclosed construction is highly preferred since it makes it possible to fabricate insert 15 of extremely lightweight material. It is possible to use such lightweight material in view of the provision of the foam plastic fill to be described below. If insert 15 were extruded in a single piece, it would have to be substantially heavier and would require considerably greater expense of fabrication, than is the case with the preferred construction. In any event, whatever the construction, there should be at least three vanes 19. Of course, in the preferred construction, as indicated above, there are four such vanes.

In assembly of insert 15 with shaft 11, the insert 15 can be simply dropped into bore 11b, through the open upper end thereof, prior to mounting of handle 12 on the upper end of shaft 11. Insert 15 then drops until the edges of the vanes are in flush abutment with the wall of bore 11b. The precise axial location of insert 15 relative to shaft 11 will depend upon the respective upper and lower diameters of insert 15 and the length thereof.

As an important feature of the invention, the vanes 20 are provided with apertures through which the foam plastic fill can pass, for bonding purposes. The apertures also lighten the insert. Each plate 16 and 17 has horizontal rows circular apertures 21, two per row, as shown in FIG. 5. Accordingly, each vane 20 has a vertical succession of apertures 21, one above the other, as best shown in FIG. 2, along the entire height of the vane. In addition, each vane 20 has vertically successive notches 22 extending from its outer edge and located outwardly of apertures 21. Vertically, notches 22 and apertures 21 may alternate.

In the claims, unless otherwise specified, the term "apertures" includes notches 22 or apertures 21. Depending upon desired dimensions, either notches 22 alone, apertures 21 alone, or both may be used.

As a further importance feature of the invention, after the insert is in place, and before the top of the pole is closed, a foam plastic fill 25 is formed in situ within bore 11b, to the bottom thereof and extending upwardly, optionally to at least the upper end of the insert and even beyond that point as shown in FIG. 4.

By way of example, the known required chemicals for reaction in situ to produce foam polyurethane may be dispensed into bore 11b, within which they react to form the desired final composition. There may be one such fill, or several partial fills, one on the other. In the case of several partial fills, they may be controlled, in known manner, to be of different densities, for example, of

greatest density at the bottom, least density at the top and intermediate density in between.

It will be especially noted that the fill 25 extends through apertures 21 and notches 22, as shown in FIG. 4. Accordingly, the vanes are bonded to the fill and prevented from shifting vertically or flexing. Accordingly, the insert with apertures, together with the fill, permit great improvement in pole quality with minimum addition in weight. The construction increases resistance of the pole to flexing or denting, and dampens vibrations thereof.

While I have disclosed a preferred embodiment of the invention, and have indicated various changes, omissions and additions which may be made therein, it will be apparent that various other changes, omissions and additions may be made in the invention without departing from the scope and spirit thereof.

While polyurethane foam is the preferred foamed plastic, other plastic or plastic-like materials having similar properties when in a foamed state can be utilized. Thus, foamed rubber latex is amenable to utilization in the present invention. In general, the foamed plastic is formed in situ by adding the plastic and generating gases by the addition of a suitable gas releasing agent while maintaining an elevated temperature. Alternatively, gas may be bubbled into the desired area so as to form the foamed plastic therein.

Optionally, after assembly of plates 16 and 17, their ends may be secured together from moving, as by welding or swaging in the case of metal, or cement or chemical or other welding in the case of plastic.

I claim:

1. In a pole and the like, the combination of an elongated, hollow, thin-walled shaft having a downwardly tapered bore which has an axis, an axially extending rigid insert within said bore intermediate its ends and having at least three radially extending, circumferentially spaced vanes the outer edges of which correspond in taper with and about frictionally flush against the surface of said bore, and an in situ foam plastic fill within said shaft and filling said bore from below to above said insert, said vanes having apertures through which said fill extends bondingly to fix said insert in position within said shaft.

2. Combination according to claim 1, said insert comprising two plates one having an axial slot from its upper end to its midpoint and the other having an axial slot from its lower end to its midpoint, said plates interlocked to form four vanes with each plate frictionally received within the full length of the slot of the plate.

3. Combination according to claim 2, said apertures extending to the outer edges of said vanes.

4. Combination according to claim 2, said apertures being vertically aligned and spaced in a single vertical row in each vane.

References Cited by the Examiner

UNITED STATES PATENTS

1,994,069	3/1935	Fletcher	273—80
2,123,311	7/1938	Muller-Roggli	280—11.37
2,767,461	10/1956	Lebold et al.	

FOREIGN PATENTS

723,671	8/1942	Germany.
229,442	4/1944	Switzerland.

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