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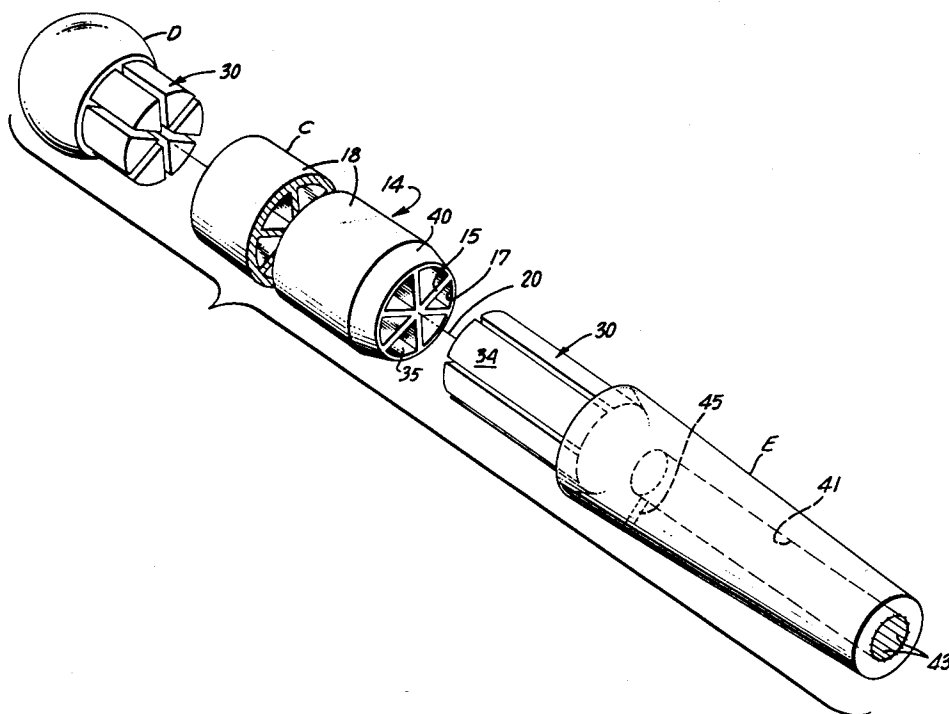
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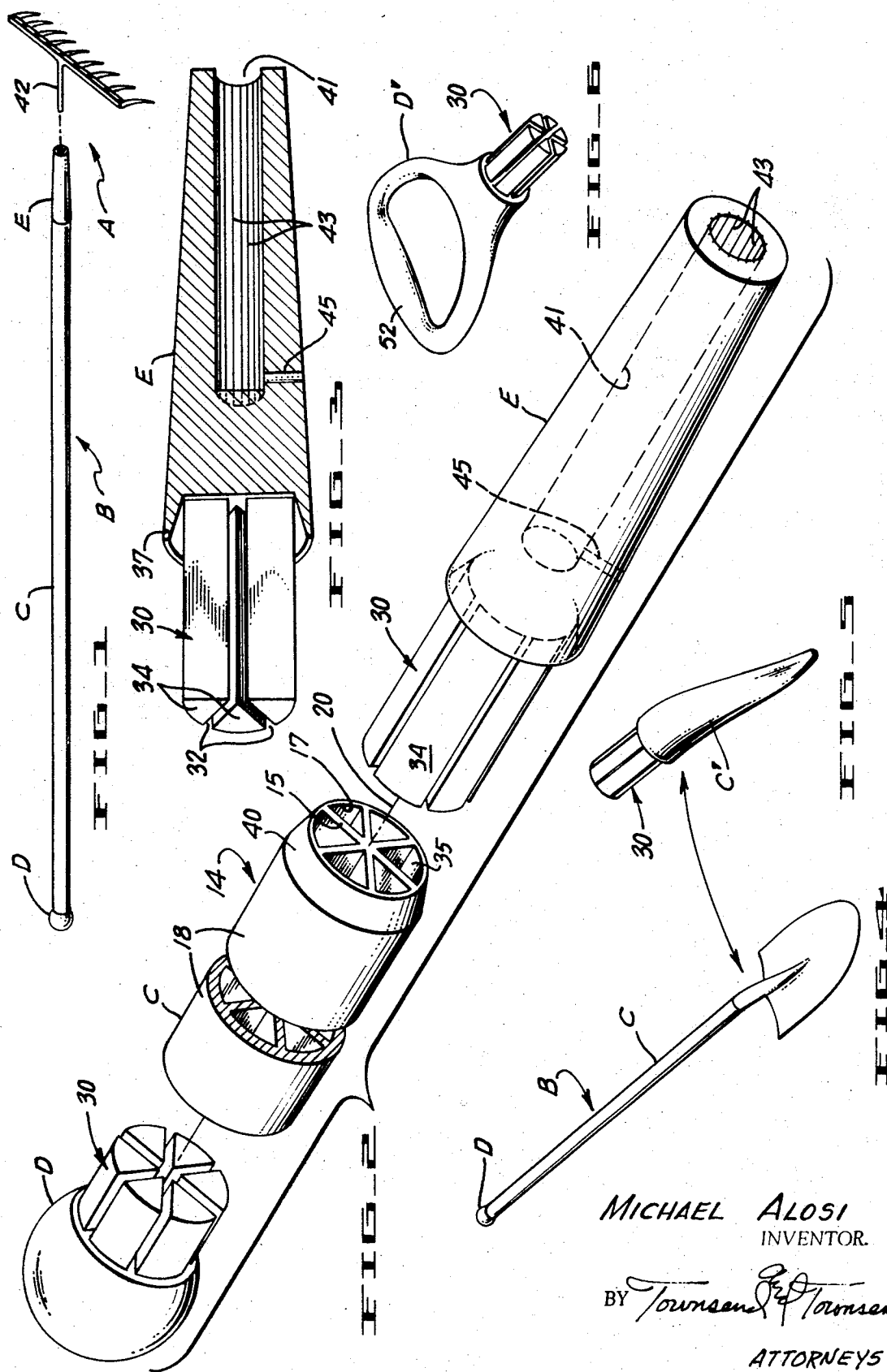
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[54] **TOOL HANDLE**
 4 Claims, 6 Drawing Figs.

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ABSTRACT: A tool handle having an elongate handle body with a cap at one end and a ferrule section at the opposite end, the ferrule section being attached to the working member of the tool, such as a spade or rake. The handle body is tubular and includes a plurality of longitudinally extending radial webs spanning the interior cross section of the tube for imparting maximum strength to minimum of handle material. Provision is made for plugs to interconnect the cap and ferrule section to the handle body.





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TOOL HANDLE

This invention relates to tool having working members such as shovels, rakes and the like, and specifically discloses a lightweight tool handle formed in a novel geometric configuration for providing optimum handle strength with a minimum of material.

Tool handles heretofore have been normally fabricated from wooden shafts. These wooden shafts, commonly of oak, birch, and the like, have the disadvantage of warping, weathering and splintering when used for prolonged periods of time. Further, wooden tool handle shafts often shrink when exposed to inclement weather resulting in loosening of their attached working member from the shaft.

Recently wooden tool handle material has become in extreme short supply. Such handle material, manufactured from only premium grades of wood, has been in such demand that natural sources are no longer sufficient.

The present invention provides a lightweight, strong and durable tool handle. This tool handle, manufactured from extruded fiber glass, plastic, aluminum or the like, does not warp, weather or splinter when used. Further, the artificial material is not subject to shrinkage. Finally, the tool handle can be fabricated from readily available materials so that the limitations of natural supply are no longer of consideration to tool handle manufacture.

The disclosed tool handle includes an elongate handle body of improved bending resistance with a cap and ferrule section that can be fitted to the respective ends of the handle body by preformed plugs.

The handle body comprises an elongate cylinder of circular cross section extending substantially the entire length of the handle. A plurality of radial webs each extending substantially the entire length of the cylinder reinforce the interior of the tubular handle. The webs are spaced angularly one from another by angles not greater than 120°. Typically, these webs are integral with the cylinder sidewalls at their respective edges and integral with one another at the axis of the cylinder.

An advantage of the webs is that they prevent collapse of handle body sidewalls, providing the tool handle with improved resistance to bending.

An additional advantage of this invention is that the ends of the handle body define female apertures into which the cap and ferrule section of the handle can be readily inserted and bonded. The webs as extending radially across the circular section of the handle body define pie-shaped voids at both ends of the handle. These pie-shaped voids accommodate complementary pie-shaped tines of male plugs attached to the cap and ferrule section of the tool handle. The apertures in combination with the pie-shaped tines of the plugs form surfaces along which the cap and ferrule section can be bonded to the handle body providing for convenient tool handle assembly.

Other objects, features and advantages of the present invention will be more apparent after referring to the following specification and attached drawing in which:

FIG. 1 is a perspective view of a rake having the artificial tool handle of the present invention attached thereto;

FIG. 2 is an enlarged view of the handle body, cap and the ferrule section of the tool handle, the central portion of the handle being cut away;

FIG. 3 is a perspective cross-sectional view of the ferrule section of the tool handle illustrating specifically the protruding tines forming the plug member for interconnection to the handle body;

FIG. 4 is a perspective of a spade utilizing the handle of this invention;

FIG. 5 is an enlarged perspective of the ferrule section of the spade of FIG. 4 showing a solid and curved shaft member for insertion interior of a conventional shovel ferrule; and

FIG. 6 is a perspective of a spade handle adapted for insertion at the opposite end of the handle body.

With reference to FIG. 1, a rake A is shown attached to a tool handle B. Handle B comprises a handle body C, having a cap D at one end and a ferrule section E at the opposite end

for accommodating the working end of the tool, here shown as a rake.

With reference to the exploded view of FIG. 2, handle body C is here shown as an integrally formed member. Body C is tubular and consequently has concentric inside boundary 17 and outside boundary 18. Interior of body C there is a plurality of radially extending webs 15, these webs extending the entire length of the handle body.

Webs 15 reinforce the tubular handle against bending forces when the handle is in use. The webs, shown in FIG. 2 separated by equal angular intervals of 60° extend the entire length of the handle and prevent the cylinder sidewalls collapse.

The tubular construction of main handle body C has several advantages over wooden tool handles. First, this tubular handle is not solid throughout and therefore can have a weight less than that of solid handles. Secondly, hollow cylinder 14 has the bulk of its mass located within its tubular walls at a maximum distance from its central axis 20. At this maximum distance, the material of handle A is disposed at a location where it can resist bending with maximum effect.

Handle body C is typically made of plastic or metal and is typically formed by extrusion. Materials recommended for the fabrication of this tool handle include fiber glass, aluminum and other lightweight structural materials.

Webs 15 are here shown integral with cylinder 14 at the point they contact the cylinder sidewalls. Similarly, the webs are shown integral with one another at the cylinder axis 20. Such construction is not a necessary element of this invention. The webs can be formed separately from the cylinder and thereafter inserted into its interior. Moreover, each of the radially extending strips of the webs can be formed separately and thereafter joined. Finally, the webs 15 can be fabricated from a first material, such as plastic, and the tube fabricated from a second and different material such as aluminum.

Regarding cap D and ferrule section E, each of these respective members has affixed thereto a plug 30. Plug 30 is cylindrical in shape having a diameter slightly less than the inside diameter 17 of cylinder 14. This plug defines therethrough a plurality of radially extending spacial intervals 32 (FIG. 3), which intervals are complementary to webs 15 of handle A. These respective intervals divide each plug 30 into 6 pie-shaped tines 34 complementary to the pie-shaped voids 3 found at the respective handle ends.

Plug 30 is fitted interior of handle A by having its respective pie-shaped tines 34 coated with a bonding agent and aligned with the pie-shaped voids 35 of the handle. Thereafter, the cap or ferrule to 35 plug 30 is attached is inserted in handle body C by placing each one of its tines 34 into a void 35.

To reinforce its attachment, ferrule section E is provided with an upward and tapering skirt about the base of its respective plug 30. Skirt 37 defines along its wall adjoining plug 30 a conical surface. Complementary to skirt 37, body C has a conical end 40 so as to fit snugly between plug 30 and skirt 37. The conical surface of skirt 37 of the ferrule section and the conical end 40 of the handle, when joined, provide an additional surface for bonding the handle body C and ferrule E together.

To accommodate the rake illustrated in FIG. 1, ferrule section E is concentrically bored opposite plug 30 with a bore 41. Bore 41 is the surface along which ferrule section C attaches to the shank 42 of the working member, here shown as a rake.

To facilitate the bond of the shank 42 of the working member D, bore 40 may be configured longitudinally along the inside surface thereof with a plurality of ridges 43. Ridges 43 comprise grooves or notches cut along the length of the bore which form surfaces to which bonding agents fastening shank 41 into the ferrule section can adhere.

Bore 40 is tapped at its uppermost end with an aperture 45. Aperture 45 communicates the interior of bore 41 with the exterior of the ferrule section allowing any excess bonding agent to escape from the interior of bore 40.

Ferrule section C can be configured to mate with any number of tools. For instance, with reference to FIG. 5, a spade is illustrated. This spade has a curved ferrule 50, into which a ferrule section C' illustrated in FIG. 5, can be placed. Likewise, it may be desired to replace cap D with a spade handle D' having a hand grip 52 configured therein. Such substitutions of the handle and members can be readily made provided the member includes a plug 30.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications can be practiced within the spirit of the invention as limited only by the scope of the appended claims.

I claim:

1. A tool handle comprising in combination: a main handle body and a ferrule section; said main handle body including a cylindrical member of circular cross section extending the length of said handle body; at least three planar webs extending radially the length of said cylinder from the axis of said cylinder to the sidewalls thereof; each of said webs having equal angular intervals about the axis of said cylinder less than 120° whereby the outside surfaces of said webs in combination with the inside periphery of said cylinder wall defines a plurality of pie-shaped voids at both ends of said handle; said ferrule section having means for connecting the working member of said tool affixed to one end and a plug section at the opposite end for telescopically engaging said pie-shaped voids at one of said handle ends; said plug section defining a plurality of pie-shaped tines extending outwardly from said ferrule section less than the length of said handle; each of said tines separated by radially extending spatial intervals complementary to the in-

tervals between said webs whereby said tines of said plug may be telescopically engaged interior of said pie-shaped voids of said handle.

2. A tool according to claim 1 and wherein: said main handle body has a cap affixed to the opposite end; said cap having a plug section defining a plurality of pie-shaped tines extending outwardly from said ferrule section less than the length of said handle.

3. A tool according to claim 1 and wherein: said ferrule section has a skirt defining a conical surface extending upwardly about the base of said plug; and said main handle body has a conical end for complementary engagement interior of said conical surface of said skirt.

4. A coupling for interconnecting portions of a tool handle comprising: a main handle body defining a female plug member; said female plug member defining a cylindrical aperture intersected by a plurality of radially and longitudinally extending webs; a ferrule section having a plug protruding therefrom; said plug having a diameter less than the diameter of the cylindrical female plug member of said handle and further defining a plurality of radially and longitudinally extending voids complementary to said webs whereby said plug is divided into a plurality of pie-shaped tines telescopically engagement interior of said handle plug member; said main handle body having a conical section adjoining said defined cylindrical aperture; said ferrule section including a skirt extending from the base of said plug; said skirt having a complementary conical surface tapering upwardly and outwardly from said plug for complementary engagement with the taper of said main handle body.

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