

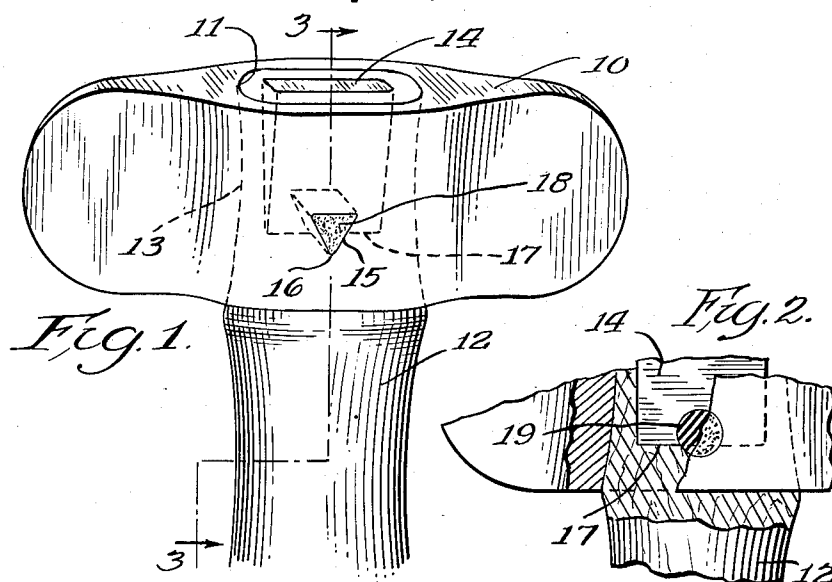
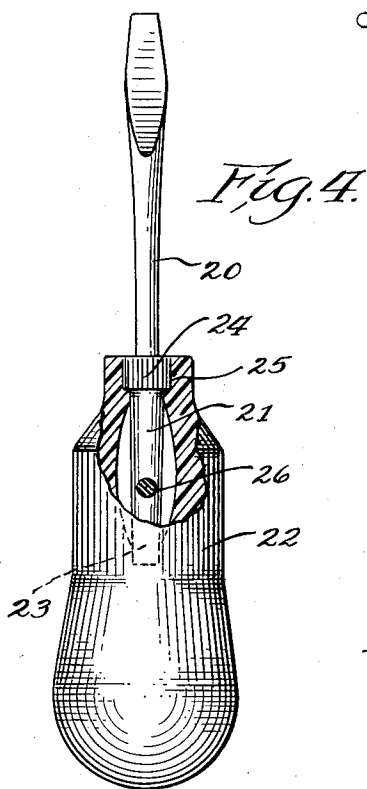
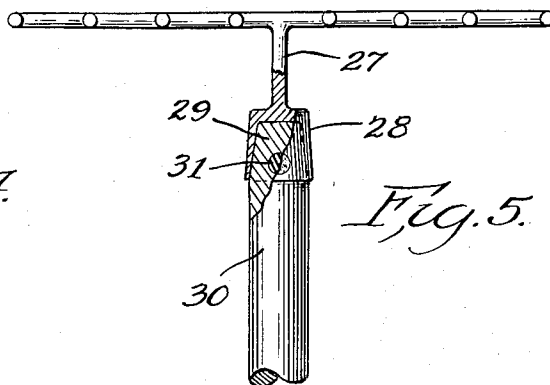
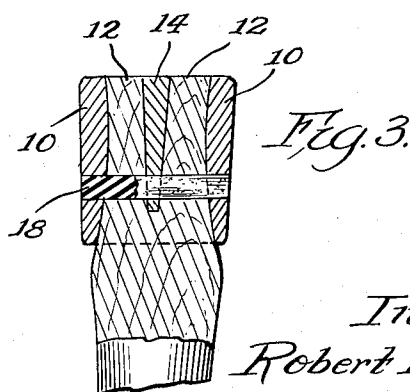
Jan. 10, 1961

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2,967,738

TOOL HANDLE FASTENING

Filed April 9, 1958



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2,967,738

TOOL HANDLE FASTENING

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Filed Apr. 9, 1958, Ser. No. 727,408

3 Claims. (Cl. 306—33)

This invention relates to various types of tools having associated therewith non-metallic handles, and the invention is directed primarily to the manner in which the tool is affixed to the handle.

Some tools, such as screwdrivers, for example, require non-metallic handles for their insulating properties, but there is always the problem of obtaining a firm, non-rotative relationship between the screwdriver blade and the handle, whether the latter be made of wood, plastic, or some other non-metallic material.

The same problem is present in another way in the case of axes, in which the wooden handle is ordinarily held in place within the ax head by a wedge. Oftentimes the wedge becomes loosened, with the result that the ax comes off the handle.

The present invention provides a simple manner for securing tools of various kinds to non-metallic handles, and it consists primarily in the use of a locking pin formed of a mastic material which can be poured or forced into place to form the locking pin structure, and which then hardens to become a permanent locking pin.

The material used for the locking pin has the added property of being strongly adherent, not only to metal but to non-metallic materials, and is also characterized by toughness and resistance to corrosion.

Further and other objects of the invention will become apparent as the disclosure proceeds and the description is read in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view showing an ax which is secured to a handle by a locking pin of the type disclosed herein;

Figure 2 shows another form of locking pin;

Figure 3 is a sectional view on the line 3—3 of Figure 1;

Figure 4 is a side elevational view of a screwdriver with parts being broken away to illustrate the manner in which this invention is applied to a screwdriver; and

Figure 5 illustrates the manner in which the invention is applied to another type of tool—in this instance, a rake.

It should be understood that the invention may be embodied in various forms, and the specific description which follows is for the purpose of complying with Section 112 of the Patent Act.

In Fig. 1, there is shown an ax having a double bladed head 10, provided with a handle receiving aperture 11 adapted to receive a wooden handle 12. The aperture 11 is preferably shaped to provide a constricted portion 13, so that when the handle 12 is fitted within the aperture 11 a wedge 14 may be driven downwardly onto the handle and lock the handle within the blade.

A triangular shaped opening 15 extends laterally through the head 10, handle 12, and wedge 14, with the apex 16 of the triangular opening extending below the lower edge 17 of the wedge. A locking pin designated 18 is then molded in place, and preferably this is accomplished by forcing into the opening 15 a suitable mastic material, such as Thiokol, which is a copolymer of sodium polysulfide and ethylene dichloride or dichloro-ethyl

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ether. This material, when mixed with an accelerator in the manner disclosed, for example, in Sanborn application Ser. No. 618,278, filed October 25, 1956, may be extruded into the opening, and will then harden in place, forming a strong, durable, tough material that is resistant to a wide range of solvents and ages well. This material is sufficiently tough to firmly lock the wedge within the upper part of the handle 12, and the triangular shape of the locking pin 18 resists any upward displacement of the wedge 14.

Instead of having the locking pin 18 of triangular shape, it may be of circular shape, as indicated at 19 in Fig. 2, but in such a case the center of the circular opening is preferably above the bottom edge 17 of the wedge, so that upward displacement of the wedge relative to the pin is prevented not only by the bonding action of the Thiokol wedge, but also by the shape of the pin itself.

It should be understood that the Thiokol, when extruded into place, forms a strong bond with all parts with which it comes in contact, including both metal and wood, as shown particularly in Fig. 3.

In Fig. 4, a screwdriver is shown having a blade 20, the lower portion 21 of which extends into a handle 22, which may be of wood or plastic material, the latter being drilled or otherwise formed with a suitable axial aperture 23 to receive the lower portion 21 of the blade.

The intermediate portion of the blade 20 may be enlarged as indicated at 24 and fluted to mate with a correspondingly fluted portion 25 of the handle 22, so as to resist relative rotation between the handle 22 and the blade 20.

In this instance, the blade 20 is held within the handle 22 by means of a locking pin 26, which is also molded in place in the same manner and of the same material as described with reference to the locking pin 18 of the ax shown in Fig. 1. In this instance, the pin may be cylindrical in form for the sake of simplicity.

In Fig. 5, a rake is shown comprising a metal rake head 27 having a handle receiving cap 28 into which the end 29 of a wooden handle 30 is inserted. A hole is drilled through the cap 28 and the end 29 of the handle, and, again, a locking pin 31 of the type previously described is molded in place, and serves to lock the handle to the rake head.

It should be understood that, although Thiokol has been mentioned as a preferred material for formation of the molded pin, other like materials might be used, including the natural and synthetic rubber compounds, rubber phenolic compounds, compounds with rubber base incorporating a phenolic resin, polyurethane and rubber, polyesters, epoxides, silicones, and the like.

Common characteristics that are required for the purpose of this invention are:

A. That the material may be extruded or otherwise forced into the pin opening in the tool, and hence molded in place.

B. That the material have adhesive properties which bind it securely to all forms of material, including particularly, metal, wood, and plastic.

C. That the material become hard or semi-hard upon setting.

D. That the hardened material be tough but not brittle or susceptible to shattering upon impact. In this manner, the molded pin can absorb shock without fracturing.

An important advantage of the invention is that the locking pin strongly adheres to all of the elements through which it is received, regardless of what material be employed to form the particular tool to which it is applied. This is achieved without effecting any chemical or physical change in the properties of the materials to which the pin is bonded.

The foregoing description and the drawing merely illus-

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trate several specific embodiments of the invention, and it should be understood that the invention is not limited thereto.

I claim:

1. In a tool comprising a metal member having an aperture opening therethrough, a non-metallic handle having one end of split section disposed in said aperture and frictionally engaged with said member in pressure tight contact by means of a wedge disposed centrally in said aperture in spreading relation within said split section of the handle, said split section, said member, and said wedge having communicating openings therethrough defining a through passage in said tool; the improvement wherein said passage has a firm locking element both impact-shock-resistant and impact cushioning to prevent loosening of said locking element in said tool and wherein said locking element comprises a plastic type bonding material completely filling said passage and setting in situ therein to bond all surrounding walls thereof to form an impact-resistant molded counterpart of said passage that rigidly fixes said member, said handle, and said wedge in solid predetermined fixed cooperating relation.

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2. The tool of claim 1 wherein the aligned openings in the metal member, the handle, and the wedge are of a triangular cross-section.

3. The tool of claim 1 wherein the aligned openings in the metal member, the handle, and the wedge are of a circular cross-section.

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