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TOOL HOLDER

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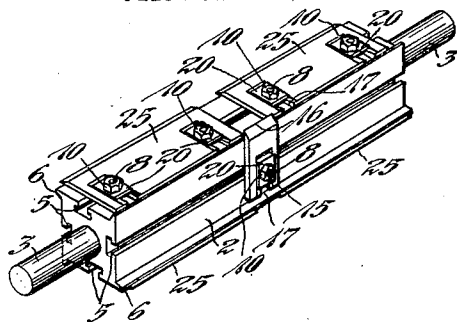


Fig. 1.

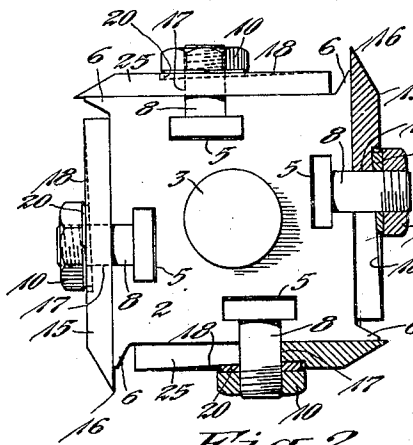


Fig. 2.

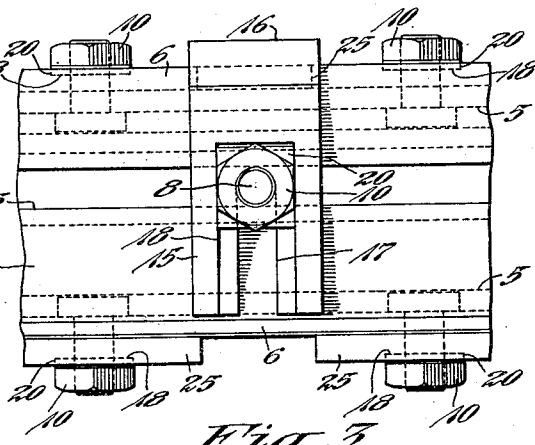


Fig. 3.

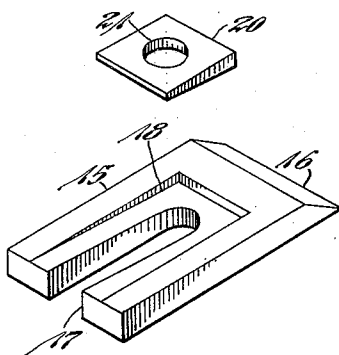


Fig. 4.

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UNITED STATES PATENT OFFICE

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TOOL HOLDER

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This invention relates to tools or cutters for use on various wood- and metal-working machines, and particularly to an improved means for mounting the cutters on the rotary or stationary tool-holder of the machine.

A principal object of the invention is to provide a cutter of the type specified adapted to be securely attached to the tool-holder of the machine to prevent it from becoming loosened or displaced thereon, whereby to insure a greater degree of safety in operation and to guard against mutilation of the work being operated upon.

Another object of the invention is to provide a cutter of the type specified which is attached to the holder by means of the ordinary bolt and nut arrangement to provide for convenient adjustment, while being securely held in adjustment without danger of its becoming loosened or displaced.

Another object of the invention is to provide a cutter of the type specified which is adapted for high-speed rotation with its fastening means so constituted as to tend to tighten or clamp it more firmly to the holder under the action of centrifugal force.

Further objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention, by way of example, as illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of a tool- or cutter-holder employed on wood-planing machines and illustrating a plurality of the present improved cutters mounted thereon;

Fig. 2 is an enlarged view of the same, showing certain of the cutters in section to better illustrate the attaching means;

Fig. 3 is an enlarged front view of the tool-holder; and

Fig. 4 is an enlarged composite perspective view showing the improved cutter and the wedge-shaped washer employed therewith.

As is well known, the cutters employed for

turning, planing and boring various materials such as wood, metal or composition are rotated at very high speed and considerable centrifugal force is exerted upon them which tends to draw them radially outwardly from the axis of the tool-holder. When heavy cuts are taken the fastening or clamping means is liable to become loosened and the cutter released and cast off from the holder. Accidents of this nature are common and often result in serious injury to the workmen or attendant and damage to the machine.

It is the aim of the present invention to eliminate this hazardous condition by providing attaching means for the cutter which is capable of withstanding the maximum centrifugal force under high speed operation and which automatically counteracts the tendency of the cutter to work loose by wedging or clamping it more firmly in place on the holder.

Referring to the drawings, 2 designates a tool-holder such as commonly used on wood-planing machines and to which the present improved cutter is adapted for attachment. It is to be understood, however, that the invention is adapted for use on tool-holders, posts and like devices of various types, the term "holder" being hereinafter employed in a generic sense to indicate any form of cutter-body or support whether rotatable or otherwise.

The holder as herein shown comprises a four-sided mandrel or support of the required length which is affixed to a spindle or mandrel 3 and rotatable therewith. The spindle 3 is journaled in the bearings of the planer, boring-tool or other machine, not shown, and usually carries a pulley driven by a belt connected to a suitable source of power to rotate the cutter-holder and its attached cutters at a speed of 5000 revolutions or more per minute.

The four sides or flat surfaces of the holder 2 are provided with longitudinal T-slots 5

arranged slightly offset with respect to its central axis, see Fig. 2, and extending throughout the length of the holder. The T-slots 5 are adapted to receive the square heads of bolts 8 employed for attaching the cutters to the sides of the holder in the manner as later explained. Referring particularly to Fig. 2, the sides of the holder 2 are projected at the corners to form overhanging ledges 6 which extend the bearing surface for the cutters whereby to prevent vibration or chattering at their cutting edges.

Referring now to Fig. 4, the improved cutter 15 consists of a substantially rectangular blade of hardened metal, one end of which may be ground to form a chisel edge 16. The edge 16 may be of any desired form or contour depending upon the cross-sectional shape of the moulding or other piece to be planed. It will be observed by reference to Fig. 1 that cutters of varying widths may be employed on the holder in accordance with the character of work to be performed. In the set-up illustrated in this view, relatively wide cutters 25 are provided on two sides of the holder 2 for planing the top of the wooden strip and the narrower cutters 15 are used on the alternate sides for forming a channel in the work. For this class of work the cutting edges of the two narrow blades 15 are adjusted at a greater distance radially from the axis of the holder than the edges of the blades 25, see Fig. 2.

The cutter 15 is provided with a centrally-disposed opening or milled slot 17 for receiving the projecting end of the bolt 8 which fastens it in place on the holder 2. The blade 15 also has a tapered or inclined cavity or recess 18 in its upper surface extending longitudinally on either side of the slot 15 with its deepest portion toward the cutting edge of the tool.

Cooperating with the inclined bottom of the recess 18 in the cutter blade 15 is a rectangular clamp-washer or wedge 20, shown in detail in Fig. 4. The wedge 20 is provided with a central hole 21 for receiving the end of the bolt 8 and is formed with an inclined bottom face conforming to the tapered bottom of the cavity 18 in the cutter 15.

With relatively narrow cutters 15 only one fastening bolt and wedge is required, but with cutters 25 of greater width a plurality of bolts and wedges are employed and the blades are therefore slotted and recessed at a plurality of points as shown in Fig. 1.

The preferred form of construction of the cutter and its fastening means having now been described in detail, the method of attaching the tool to the holder will next be explained. To attach a cutter 15 to the holder 2 the square-headed bolt 8 is placed in the T-slot 5 and slid therealong to the desired location. The blade or cutter 15 is

then adjusted in position with the end of the bolt 8 projecting through its slot 17 and a washer 20 placed thereover. The inclined bottom of the washer 20 seats in the bottom of the tapered cavity 18 in the cutter and is clamped thereagainst by means of a nut 10, the nut being screwed down tightly against the washer to bind the tool firmly in position on the holder 2. Before tightening the nut 10 the cutter 15 is adjusted to the desired position and squared both laterally and longitudinally, its longitudinal adjustment governing the depth of cut to be taken. The wide cutters 25 are attached in a similar manner by employing a suitable number of bolts and wedges engaging their slots and recesses 17 and 18, respectively.

With the cutter blades attached to the holder 2 in the manner as above explained they may be rotated to plane, shape or channel the strip of wood as it is fed thereunder or thereover as the case may be. During their high-speed rotation, especially when heavy cuts are taken and when knots appear in the wood, the cutters are subjected to a severe longitudinal thrust and sharp impacts on their cutting edges. This thrust is taken by the end of the slot 17 bearing against the shank of the bolt 8, see Fig. 2. The cutters are also subject to the effect of centrifugal force which tends to throw the blades outwardly from the axis of rotation. This latter force causes the washer 20 to wedge more firmly between the bottom of the tapered recess 18 of the cutter and the under side of the nut 10 to effectually restrain the cutter from radial movement in this direction. The cutter is thus securely held from moving outwardly radially of its axis of rotation or beyond the position to which it is first adjusted. Stated briefly, the clamping action is rendered more effective under the action of centrifugal force and the adjustment made more secure so that the cutters will not be displaced to score the work being operated upon. Moreover, the danger of the blade becoming loosened and throwing off from the holder is entirely removed which is of utmost importance as eliminating the danger of accident and serious injury to the operator.

The improved cutter is readily adjusted on its holder and maintained in adjustment under hard service over long periods of use. The improved cutter may be used on holders or cutter-bodies already in use without necessitating alteration in their structure.

While the improved cutter and its attaching means are herein shown as applied to a cutter-head of a wood-working machine, it is to be understood that the device may be used with equal success on boring, reaming, planing and shaping machines employed in the metal-working art. For example, when used on the reciprocating tool-carrier of

shapers or the like, the cutter is prevented from sliding out of adjustment to spoil the work.

Various modifications other than those herein noted may be made in the structure and arrangement of the parts of the improved device without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect,

I claim:

1. In a device of the type specified, the combination of a tool-holder, a cutting tool seated against the side of the holder and provided with an inclined face on its side opposite from the holder, a wedge adapted to engage against the inclined face on the tool, and means operating on the wedge to clamp it against the inclined face on the tool to secure the latter against movement on the holder.

2. In combination with a tool-holder having a bolt projecting therefrom, a cutter having an opening for receiving the bolt and provided with an inclined seat, and a wedge engaging the inclined seat on the cutter and clamped thereagainst by the bolt.

3. In combination with a tool-holder having a bolt projecting therefrom, a cutter having an opening for receiving the bolt and inclined faces at the sides of said opening, and a wedge-shaped element seated against the inclined faces on the cutter and provided with an opening for the bolt to adapt the latter to secure said element in place to clamp the cutter to the holder.

4. The combination of a tool-holder provided with a T-slot, a bolt having a head held in said slot, a tool provided with an opening for receiving the bolt and formed with an inclined face, and a wedge seated against the inclined face of the tool and clamped in place by the bolt to secure the cutter in operative position on the holder.

5. The combination of a tool-holder, a bolt thereon, a tool formed with an opening for receiving the bolt and a recess having an inclined bottom, and a wedge seated against the inclined bottom of the recess and engaged by the bolt to clamp the tool to the holder and secure it from movement thereon.

6. The combination of a rotary tool-holder having flat sides with T-slots therein, bolts having heads held in the T-slots, cutter-blades seated against the sides of the holder and formed with openings for receiving the bolts, wedges on the bolts engaging against the blades, and nuts on the bolts for binding the wedges against the blades to clamp the latter in place on the holder.

In testimony whereof I hereunto affix my signature.

CLARENCE S. WITHERS.