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LOCKING CAM FOR TOOLHOLDERS

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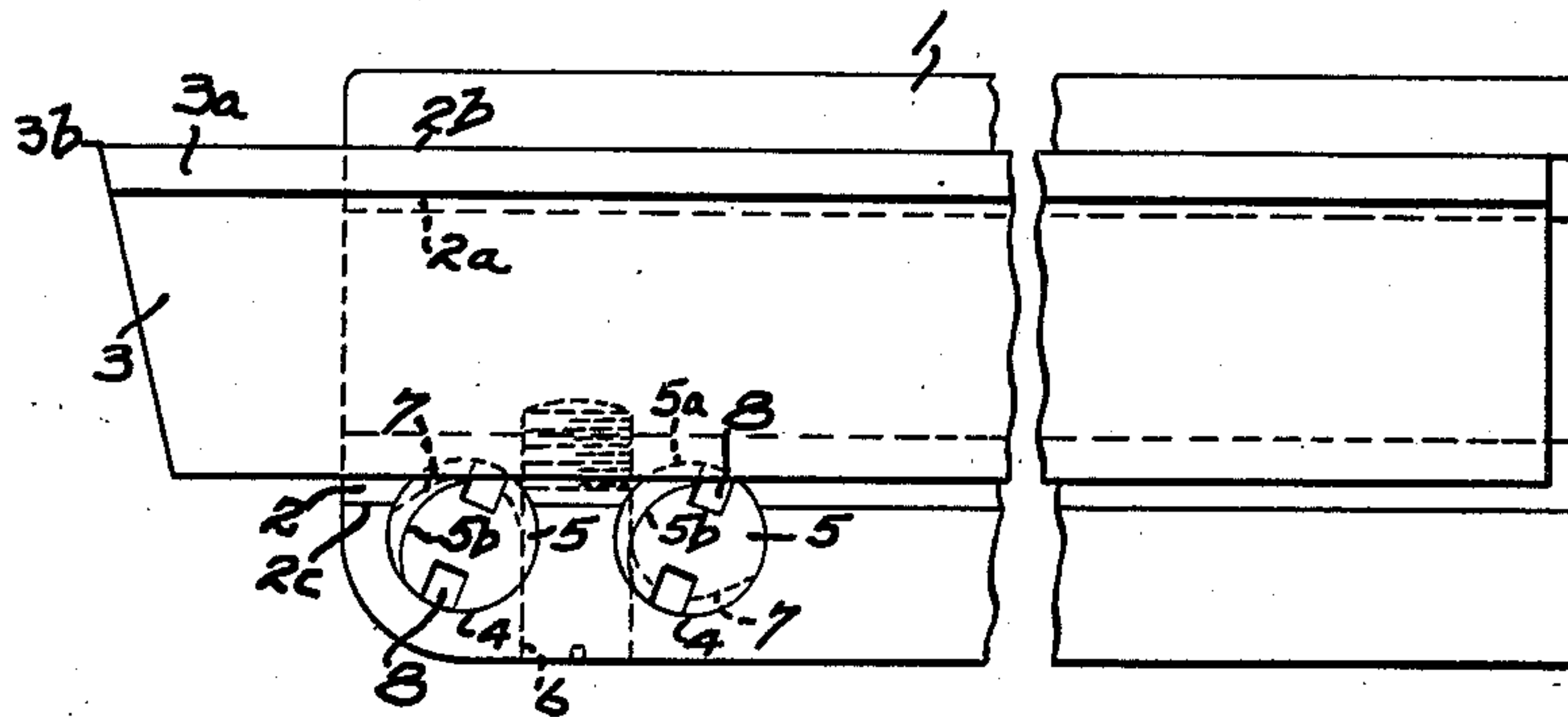


Fig. 1

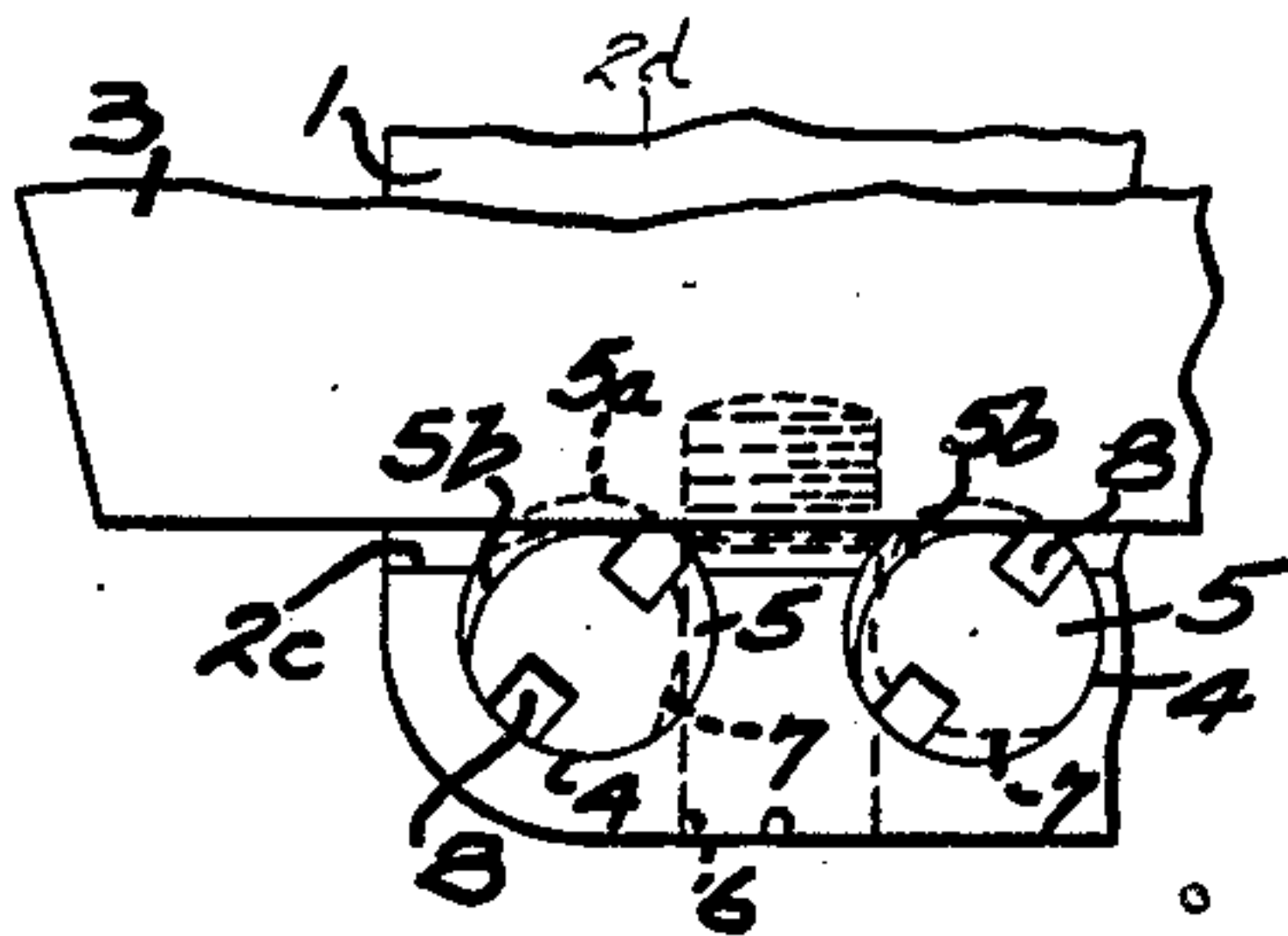


Fig. 2

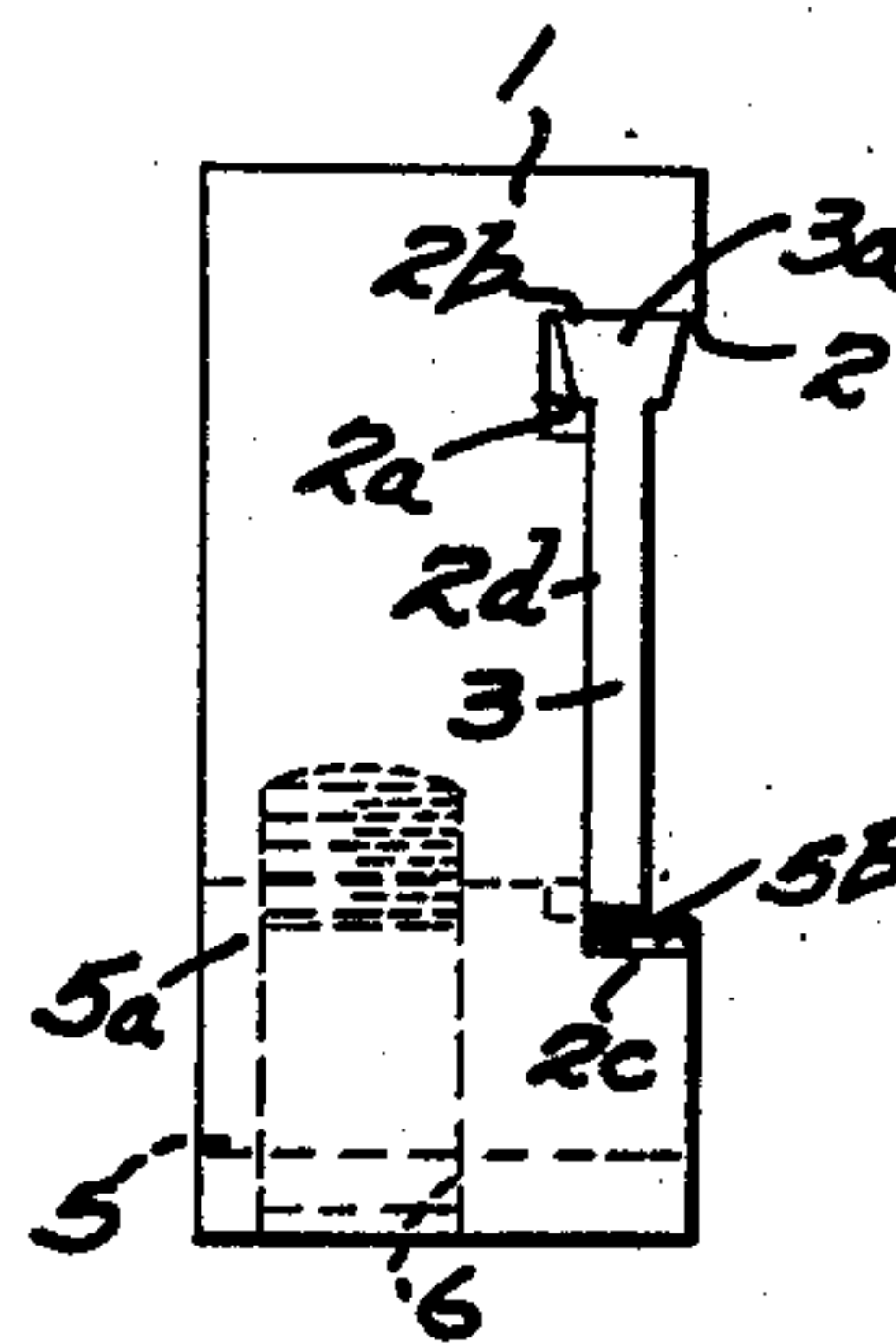


Fig. 3

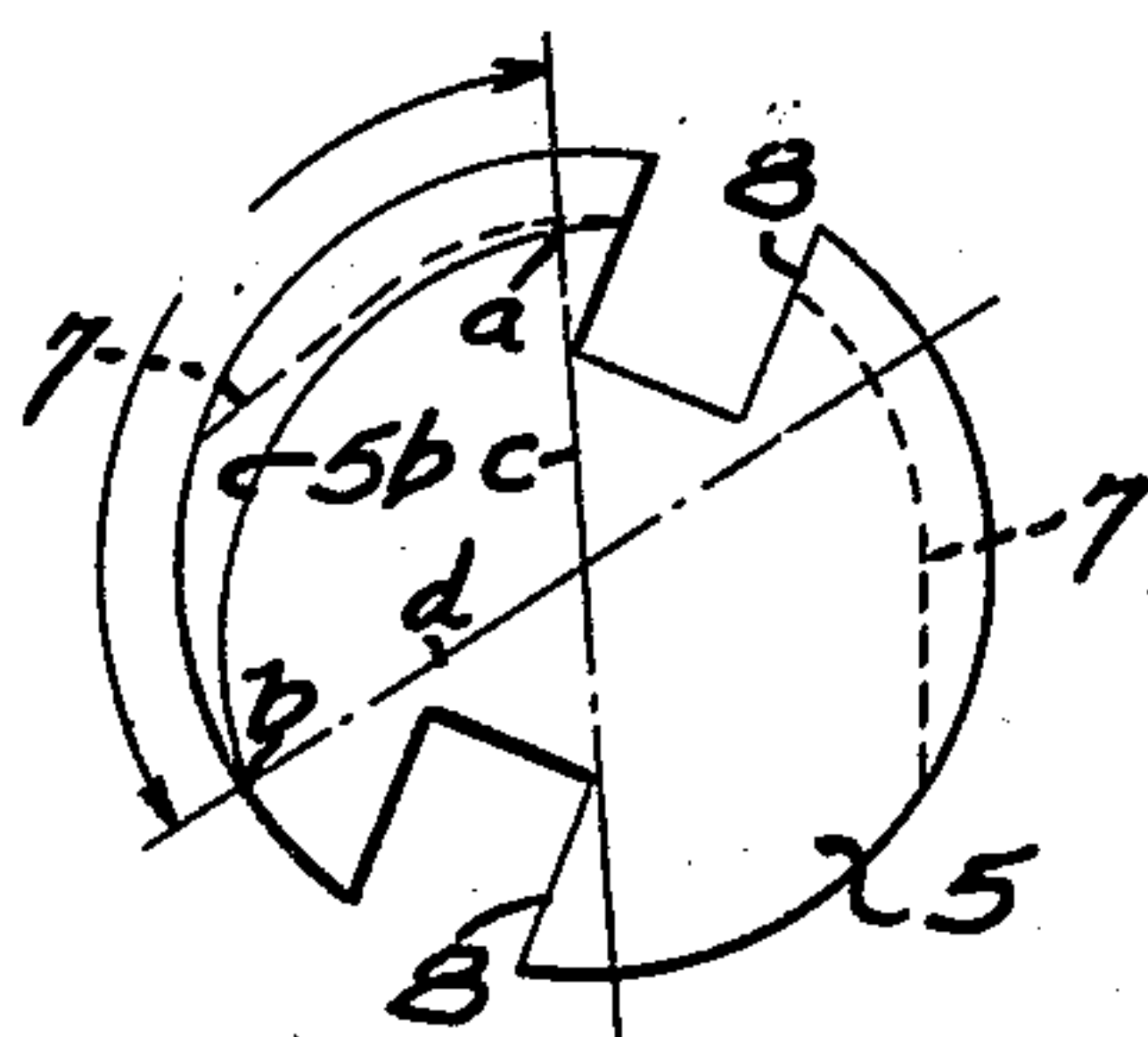


Fig. 4

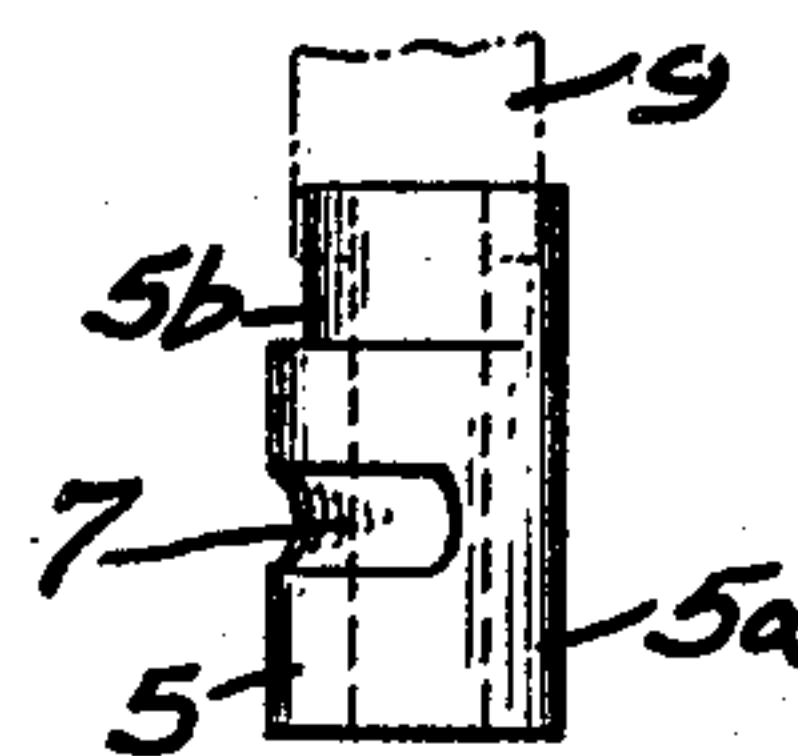


Fig. 5

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LOCKING CAM FOR TOOLHOLDERS

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7 Claims. (Cl. 29—96)

This invention relates to improvements in locking cam arrangements for toolholders. Cams of this nature are sometimes employed for engaging one side of a tool or blade to hold it immovable between them and an opposed portion of a toolholder, as shown in my Patent No. 2,223,831, issued on December 3, 1940. Such cams must in many instances be made so that they do not project beyond either side of the holder in which they are mounted, and they are liable to be subjected to sudden and excessive strains when the blade is taking a deep cut, or if the blade should break when in use. It is therefore very necessary that the cams be as strong as possible. In the patent above referred to, the cams are provided with longitudinally disposed wrench receiving openings, and it is found that these openings weaken the cams so that when they are subjected to the strains above referred to they sometimes break.

It is an object of the invention to provide a locking cam arrangement for toolholders wherein the cams are so constructed that they will withstand heavy strains without breaking when pressure is suddenly exerted upon their camming faces.

Another object of the invention is to provide a locking cam arrangement for toolholders wherein the cams are provided with opposed peripheral wrench receiving slots so positioned relative to the camming faces that solid metal extends between the latter and the cam axes, since all sudden strains such as those herein contemplated must necessarily be exerted radially through the cams.

A further object of the invention is to provide a locking cam which is simple and cheap to make and easy to rotate when in position in a toolholder.

Having thus briefly stated some of the objects and advantages of the invention I will now proceed to describe a preferred embodiment thereof with the aid of the accompanying drawing, in which:

Figure 1 illustrates a side elevation of a toolholder in which the blade is held by locking cams, and

Figure 2 is a partial side view thereof.

Figure 3 is a front elevation of the toolholder and blade.

Figure 4 is an enlarged end view of one of the locking cams, and

Figure 5 is a side view of one of the locking cams.

Referring to the drawing, 1 designates a tool-

holder longitudinally along one side of which a recess 2 is formed which is of increased depth for a short distance from one longitudinal margin as shown at 2a. Thus one side wall 2b of the recess is deeper than the opposite side wall 2c. 3 denotes a blade mounted in the recess 2 and having a head 3a of increased width along one longitudinal margin which extends into the deeper recess portion 2a. One side of the blade rests against the base 2d of the recess 2 and the forward extremity of the blade projects beyond the holder 1 and has a cutting edge 3b formed across the outer face of the head 3a. The said outer face of the head is retained against the side wall 2b of the recess 2 by means hereinafter described, and the opposite side wall 2c of the recess extends beneath and is spaced from the adjacent side of the blade 3.

Extending transversely through the holder 1 beneath the recess 2 are two parallel apertures 4 in each of which the cylindrical portion 5a of a locking cam 5 is mounted for rotation. Formed part way around the cylindrical portions 5a are circumferential grooves 7 which receive opposite sides of a pin 6 mounted in the holder. This pin holds both locking cams 5 against axial movement, and, due to the fact that the grooves 7 do not extend completely around the cams 5, limits the rotation of the latter. Formed around the cams 5 beneath the blades 3 are camming faces 5b which, when the cams are turned, engage the adjacent edge face of the blade 3 and force the outer face of the head 3a into intimate contact with the side wall 2b of the recess 2, thereby holding the blade immovable in the holder 1. In this connection it will be noted that in order to tighten the camming faces 5b against the adjacent edge face of the blade both cams must be turned in a clockwise direction—see Figures 1 and 2. Pressure exerted upon the cutting edge 3b of the blade by work being machined tends to force the latter inwardly into the holder 1, and any such movement tends to turn the cams 5 so that their camming faces 5b more firmly engage the blade.

The locking cams 5 are provided with radially opposed wrench receiving openings or slots 8 which extend inwardly from the cam peripheries. It may also be pointed out that the camming surfaces 5a extend angularly between the points a and b (Figure 4) and the slots 8 are so disposed that any strain exerted upon the said faces between these points passes radially to the cam axes through solid, imperforate portions of cams as indicated by the lines c and d. Since any sudden excessive load exerted upon the blade 3 must be transmitted radially through the cams

it is found that cams provided with such wrench receiving slots withstand very heavy loads without breaking because they are not weakened by the slots 8. These slots preferably extend throughout the length of the cams 5 and assist in chip clearance as such cuttings may pass therethrough and can be readily dislodged therefrom. 9 indicates a wrench in engagement with cam slots 8, though obviously the wrench may be applied to the other end of the cam if desired.

While in the foregoing the preferred construction has been described and shown, it is understood that the construction is susceptible to such alterations and modifications as fall within the scope of the appended claims.

What I claim is:

1. A locking cam including a circular portion terminating at one extremity in a portion having a camming face thereon which extends around less than 180 degrees, radially opposed wrench receiving slots formed in said cam and extending throughout its length, said slots being so located relative to the camming face that all imaginary lines drawn radially from any portion of the latter through the cam axis extend entirely through solid parts of the cam.

2. A locking cam including a circular portion to be mounted for rotation and a portion having a camming face thereon, said camming face extending around less than 180 degrees, diametrically opposed peripheral wrench receiving slots formed in the cam and extending throughout its length, said slots being so located relative to the camming face that all imaginary lines drawn radially through any portion of the latter from the cam axis extend entirely through solid portions of the cam.

3. A toolholder having a recess formed lengthwise in one side thereof against the base of which one side of a blade is adapted to rest, one side wall of the recess forming a bearing for one longitudinal edge of the blade, spaced rotary cams mounted transversely through the holder having camming faces thereon which extend partway around their peripheries, said camming faces being positioned beneath the other longitudinal edge of the blade, means for holding both cams against axial movement and permitting their rotation, each cam having radially opposed wrench receiving slots formed longitudinally therein throughout its entire length, each cam being adapted to be turned to engage the blade between the camming face thereon and said side wall of the recess, and said slots being so positioned relative to the camming faces that an imaginary line drawn from any point on either camming face to its cam axis passes entirely through an imperforate part of the cam.

4. A toolholder having a recess formed lengthwise in one side thereof against the base of which one side of the blade is adapted to rest, one side wall of the recess forming a bearing for one longitudinal edge of the blade, spaced rotary cams mounted transversely through the holder having camming faces thereon which extend around less than 180 degrees and are positioned beneath the other longitudinal edge of the blade, a pin mounted in the holder, peripheral grooves formed in the cams engaged by said pin, each cam having opposed wrench receiving slots formed longitudinally at least through its camming portion, each cam being adapted to be turned to engage

the blade between the camming face thereon and said side wall of the recess, and said slots being so positioned relative to the camming faces that an imaginary line drawn from any point on either camming face to its cam axis passes entirely through an imperforate part of the cam.

5. A toolholder having a recess formed lengthwise in one side thereof against the base of which one side of a blade is adapted to rest, one side wall of the recess forming a bearing for one longitudinal edge of the blade, spaced rotary cams mounted transversely through the holder having camming faces thereon which extend partway around their peripheries, said camming faces being positioned beneath the other longitudinal edge of the blade, means for holding both cams against axial movement and permitting their rotation, each cam having radially opposed wrench receiving slots formed longitudinally therein throughout their length, each cam being adapted to be turned so that the blade is engaged between the camming face thereon and said side wall of the recess, and said slots being so positioned relative to the camming faces that an imaginary line drawn from any point on either camming face to its cam axis passes entirely through imperforate parts of the cam.

6. A toolholder having a recess formed lengthwise in one side thereof against the base of which one side of a blade is adapted to rest, one side wall of the recess forming a bearing for one longitudinal edge of the blade, spaced rotary cams mounted transversely through the holder having peripheral grooves formed therein and camming faces thereon which extend partway around their peripheries, a pin mounted in the holder engaging the peripheral groove in both cams, said camming faces being positioned beneath the other longitudinal edge of the blade, said cams having radially opposed wrench receiving slots formed longitudinally therein, each cam being adapted to be turned to engage the blade between the camming face thereon and said side wall of the recess, and said slots being so positioned relative to the camming faces that an imaginary line drawn from any point on one of said faces to its cam axis passes entirely through parts of the cam which are solid throughout their length.

7. A toolholder having a recess formed lengthwise in one side thereof adjacent the base of which one side of a blade is adapted to rest, one side wall of the recess forming a bearing for one longitudinal edge of the blade, spaced rotary cams mounted transversely through the holder having camming faces thereon which extend around less than 180 degrees, each camming face being positioned beneath the other longitudinal edge of the blade, each cam having a peripheral groove therein, a pin mounted in the holder extending into both grooves, each cam having radially opposed wrench receiving slots formed therein extending longitudinally throughout its length, each cam being adapted to be turned so that the blade is engaged between the camming face thereon and said side wall of the recess, and said slots being so positioned relative to the camming faces that an imaginary line drawn from any point on one of said faces to its cam axis passes through an imperforate part of the cam.

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