

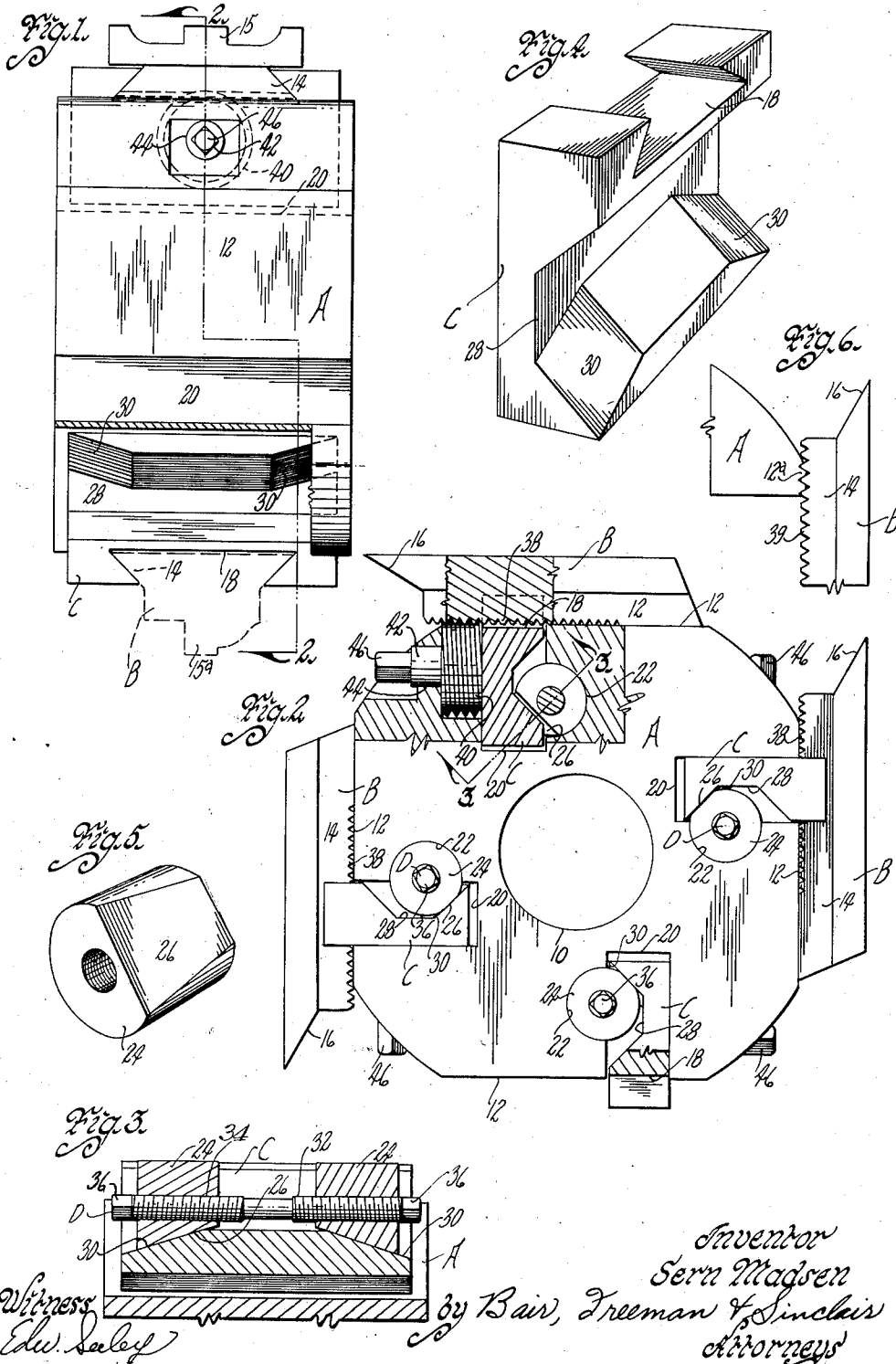
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CUTTER HEAD BIT CLAMP

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CUTTER HEAD BIT CLAMP

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An object of my present invention is to provide a cutter head bit clamp which is universally adjustable, is simple in arrangement of the parts thereof and is inexpensive from a manufacturing standpoint.

A further object is to provide a cutter head and bit clamp of novel construction which permit both sidewise and endwise or cutting depth adjustment of the bit.

Still a further object is to provide a cutter head with bit faces arranged at right angles to radial lines from the center of the cutter head, with bits arranged with their longitudinal dimension in the plane of rotation and engaging the faces for both longitudinal and transverse movement over the faces for thus adjusting the bits.

Still a further object is to provide an effective clamping means for holding the bits against the faces, which clamping means extend into slots of the cutter head and are securely clamped in their clamping position by specially arranged clamping wedges.

Still a further object is to provide a cutter head and bit clamp which can be easily machined and need not be fitted with extreme accuracy which makes other types of bit clamps expensive.

A further object is to provide wedges for tightening the bit clamps which exert forces at such an angle that centrifugal and working forces are counteracted and resisted entirely by the wedges without stresses being transmitted to the screw which clamps the wedges together.

Another object is to provide a means for longitudinally adjusting the bits regardless of any position laterally to which they may have been adjusted.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of a cutter head and bit clamp embodying my invention, a part thereof being shown in section.

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a perspective view of a clamping element;

Figure 5 is a perspective view of a clamping wedge; and

Figure 6 is a modification of a part of Figure 2.

On the accompanying drawing, I have used the reference character A to indicate a cutter head. The head A has a bore 10 through which a rotating shaft extends for supporting the cutter head.

The cutter head A has a plurality of spaced bit faces 12 arranged at right angles to radial lines through the center of the head A. Against each bit face 12, a bit B is adapted to be positioned. The bits B have dovetailed bases 14 and cutter faces 15. The cutter faces 15 are milled to the patterns desired for the molding or the like to be cut. The forward edges of the bits B are sharpened on an incline as indicated at 16 so as to provide acute angle cutting edges for the bits.

The dovetailed bases 14 of the bits B merely rest against the bit faces 12 of the cutter head A and when in such position, it will be obvious that they can be adjusted either longitudinally or laterally on the faces. They are retained against the faces by clamping elements C having dovetailed recesses 18 to receive the dovetailed bases 14. The clamping elements C extend slidably into slots 20 of the cutter head A.

It will be obvious that movement of the clamping elements C toward the bottoms of the slots 20 will draw the inner faces of the bits B against the bit faces 12. For causing such inward movement of the clamping elements, I provide the following described mechanism.

Semicircular grooves 22 are milled through the head A. These grooves as well as the slots 20 extend axially relative to the bore 10. Within the semicylindrical grooves 22, cylindrical clamping wedges 24 are floatingly arranged. These members are cylindrical with the exception of flat inclined faces 26 which are best shown in Figure 5.

As best shown in Figure 4, the clamping element C is provided with a depression 28 and with inclined faces 30. The faces 30, it will be noted by referring to Figure 2, are arranged at an angle relative to the bit faces 12.

Extending through the wedge members 24, is an adjusting screw D. It has right and left hand threads 32 and 34 and angular heads 36 for rotating the screw. It will be obvious that drawing the wedge members 24 together will exert a force at right angles to the inclined faces 30, which will result in pulling the clamping elements C toward the bottoms of the slots 20, the thrust of

the wedges being taken by the side of the groove 22 opposite the inclined faces 26 and 30.

If desired, a fine adjustment can be provided for the longitudinal adjustment of the bits B.

5 The bits B for this purpose are transversely serrated as indicated by the teeth 38.

Rotatably and non-slidably mounted in the cutter head A is a screw element 40. It has a stub shaft 42 journaled in a bore 44 and the
10 axle terminates in an angular head 46 for adjusting purposes.

In adjusting the device with the wedge blocks 24 loose, the entire assembly of bit B, clamping element C and wedge operating parts 24 and D
15 can be shifted longitudinally relative to the axis of the cutter head. The bit B can be longitudinally shifted on the bit face 12 by rotating the threaded element 40 in the proper direction to adjust the cutting edge of the bit toward and
20 away from the center of the cutter head for depth adjustment and for slightly changing the profile of the resulting cut if desired. The adjusting screw D may then be tightened for tightening the wedges 24, the clamping element C
25 and the bit B.

A great many advantages arise from constructing a cutter head and bit clamp in the manner disclosed.

Endwise and sidewise adjustment of the bit is
30 easily accomplished.

The particular arrangement of the parts provides sufficient clamping power to hold a bit in working position without the usual serration engagement between the cutter head and bit.

35 The adjustment screw 40 provides micrometer adjustment for the cutting depths of the bits.

The machining operations on all parts of the device are simple and do not require extreme accuracy as in many other types of cutter heads.
40 If desired, serrations 39 can be cut in the head A to engage the serrations 38 to more rigidly retain the bit in clamped position and square with the cutter head. This arrangement can be substituted for the screw 40.

45 The clamping means holds the bit with equal firmness regardless of the adjustment or location of the bit and the clamping pull of the jaws of the element C is always equal on both sides of the bit.

50 The double opposed wedges always exert equal and balanced wedging effect with the inclined faces 26 always seating squarely on the faces 30 and the opposite sides of the clamps 24 accurately seat in the grooves 22 which are
55 milled semicylindrical.

The grooves 22 permit plenty of stock in the cutter head and thus there is unlimited strength to prevent distortion thereof due to clamping stresses.

60 The angle of the faces 26 and 30 is about twenty degrees so that friction will almost but never quite lock the wedges in place.

Centrifugal forces and working stresses from the bit are counteracted and resisted entirely
65 by the wedges and the friction angle permits no stress to be transmitted to the clamping screw itself.

The screw being double threaded into the wedges keeps the wedges spaced and insures
70 ready unclamping when desired. The screw is preferably short enough so that it does not project beyond the cutter head, one end of which might be up against the frame of a ma-

chine. The screw is squared on both ends as indicated at 36 so as to facilitate adjustment.

Both the mechanical advantage of the screw D acting on the wedge blocks 24 and the inclined faces 26 and 30 coacting with each other
80 greatly multiplies the clamping pull on the bit. This permits using a smaller screw and a lighter wrench without sacrifice of clamping strength.

The clamping stresses are all in the blocks 24 which may be made solid and quite rugged
85 as will be obvious from an inspection of the drawing.

The universal adjustment of the bit allows the widest possible range of set-up.

The depth adjustment for the bits of the type called "milled to pattern" insures that they
90 may be set on the head to require a minimum of subsequent grinding and jointing, thus insuring maximum service or life from the bits and requiring a minimum of set-up time.

Slight alteration of the pattern to be cut or correction for errors in the profile of the bits are possible by the two available bit adjust-
95 ments.

The clamping elements will not alter the balance of the head by virtue of movement of their parts.

Some changes may be made in the construction and arrangement of the parts of my device, without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a device of the class described, a cutter holder having a face adapted to travel in one direction, a slot cut in said face at right angles to the direction of movement of said face, a semicylindrical groove cut in one side of said slot and parallel therewith, a clamping element
115 in said slot, a bit against said face and coacting with said clamping element to thereby be drawn against said face, serrations in the bottom of said bit and extending laterally thereacross, a member rotatably and non-slidably mounted relative to said cutter head and having a screw threaded periphery meshing with said serrations, means for clamping said clamping element comprising an inclined face on said
120 clamping element, a cylindrical member in said groove having an inclined flat face to engage the inclined face of said clamping element and means for moving said cylindrical member longitudinally of said groove to force said clamping element into said slot.

2. In a cutter head construction, a head having a face to receive thereon a bit, a bit on said face, an axially arranged slot in said head, a clamping block having a body radially and axially movable in said slot, said clamping block
135 engaging said bit to hold it against said face when said block is drawn into said slot, symmetrical angular faced notches in the body of said block, wedges having each an angular flat face to engage said angular faced notches and screw means to move said wedges axially in opposite directions whereby said wedges engage and draw inwardly said clamping block with a
140 symmetrically applied force, the entire assembly of bit, clamping block, wedges and screw means being adjustable axially as a constantly symmetrical unit.

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