Feb. 6, 1951 W. D. JOHNSON 2,540,530

CUTTERHEAD

Filed Nov. 8, 1949 2 Sheets-Sheet 1

Fig-1

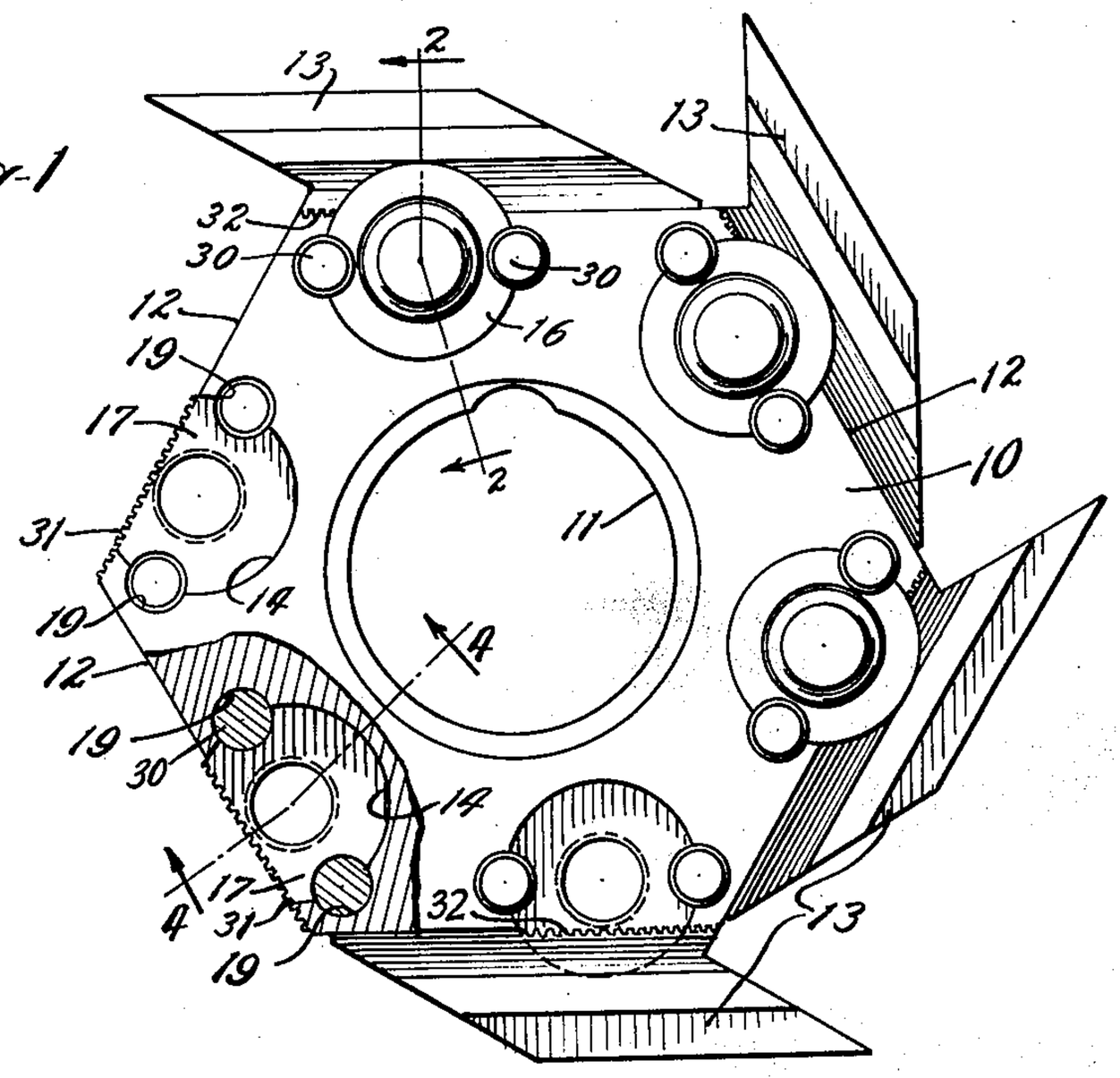


Fig-2

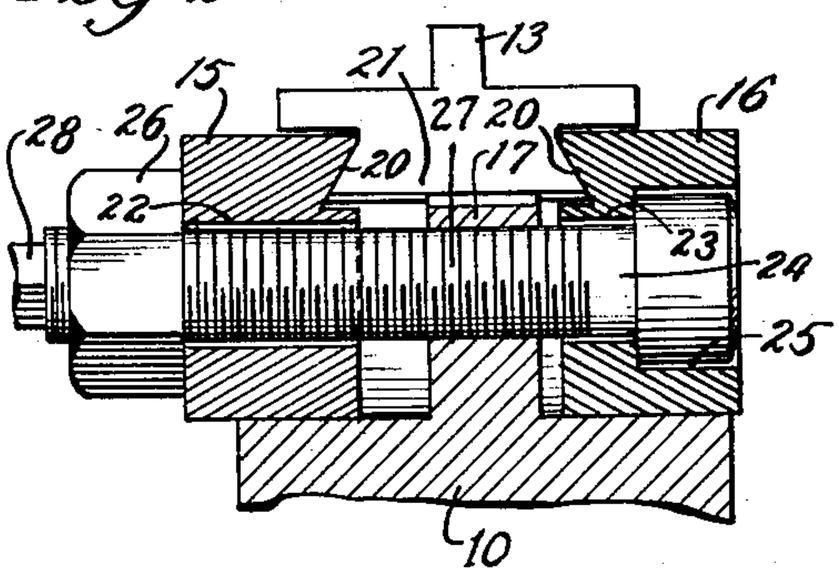


Fig-3

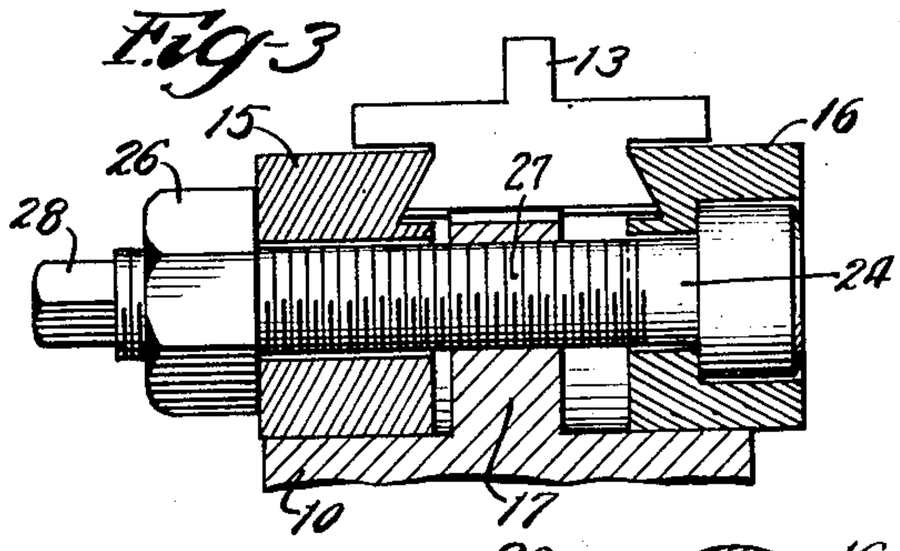


Fig-4

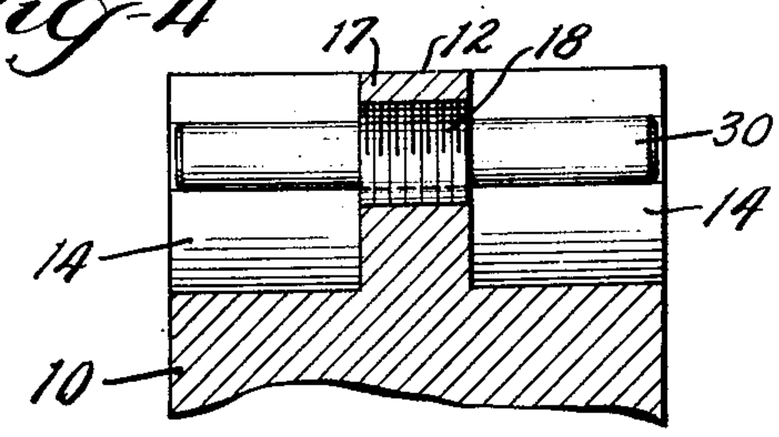
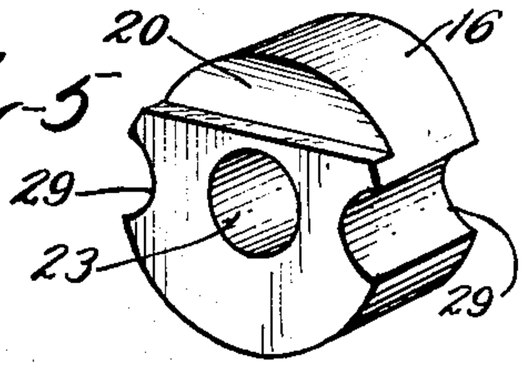


Fig-5



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CUTTERHEAD

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Fig-6

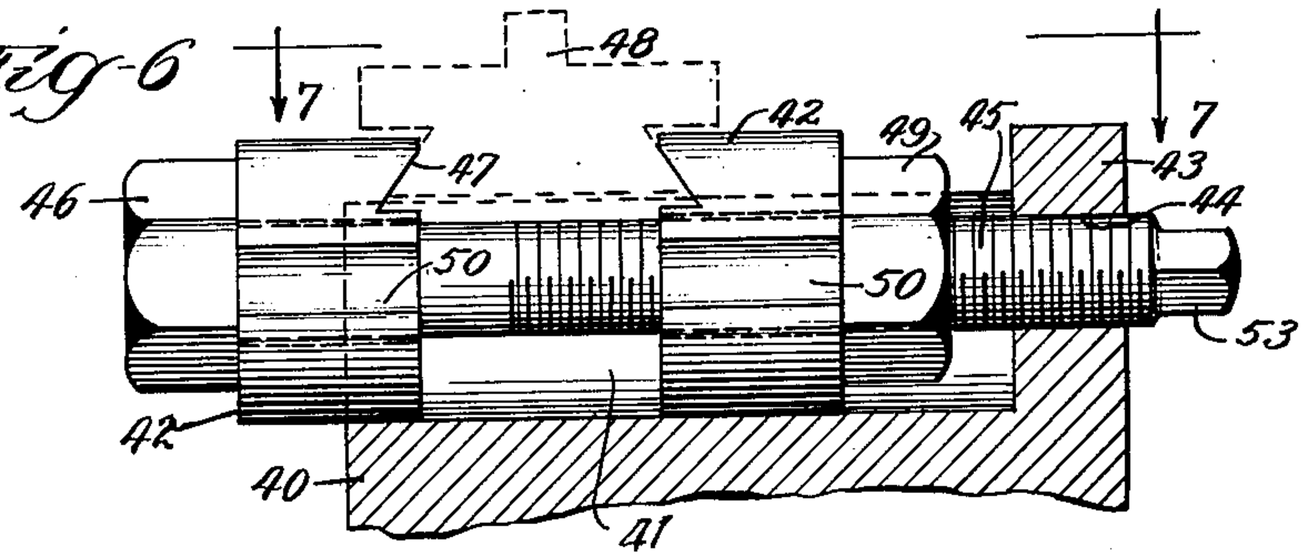


Fig-7

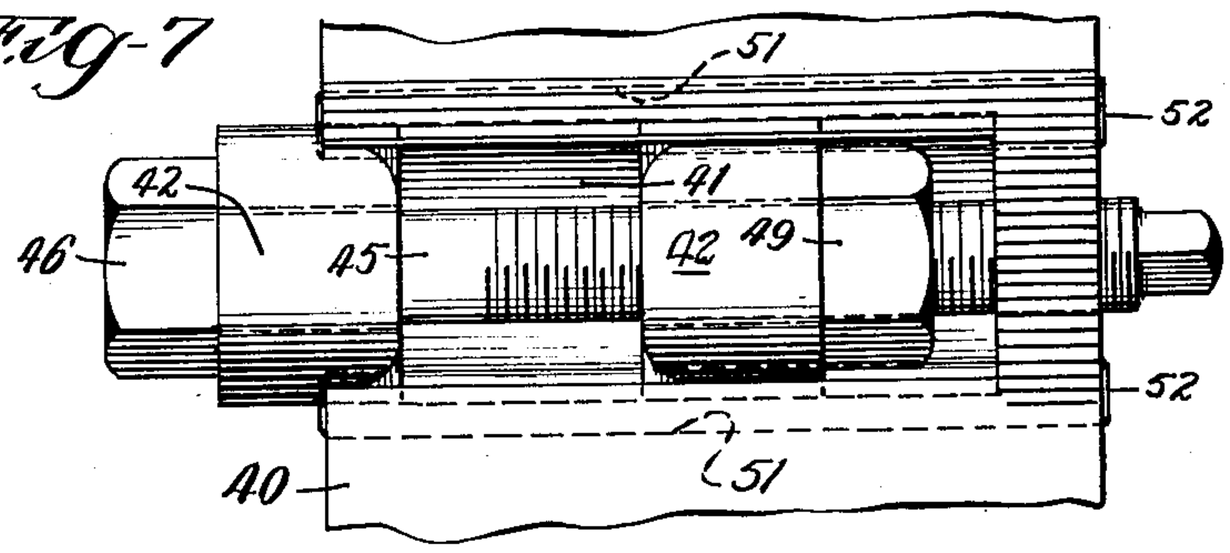


Fig-8

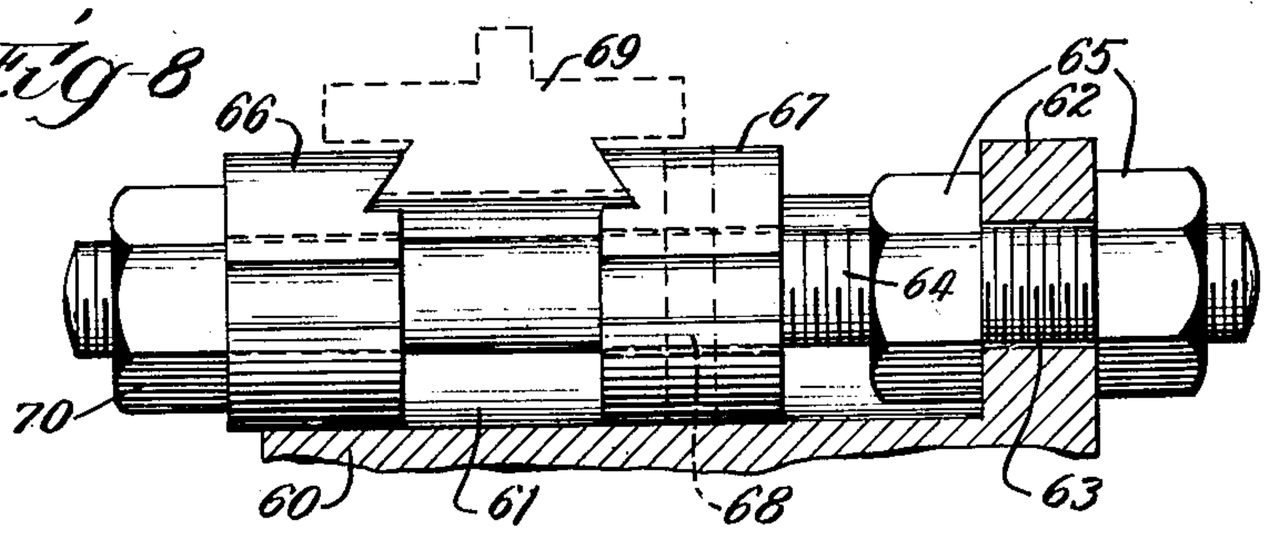
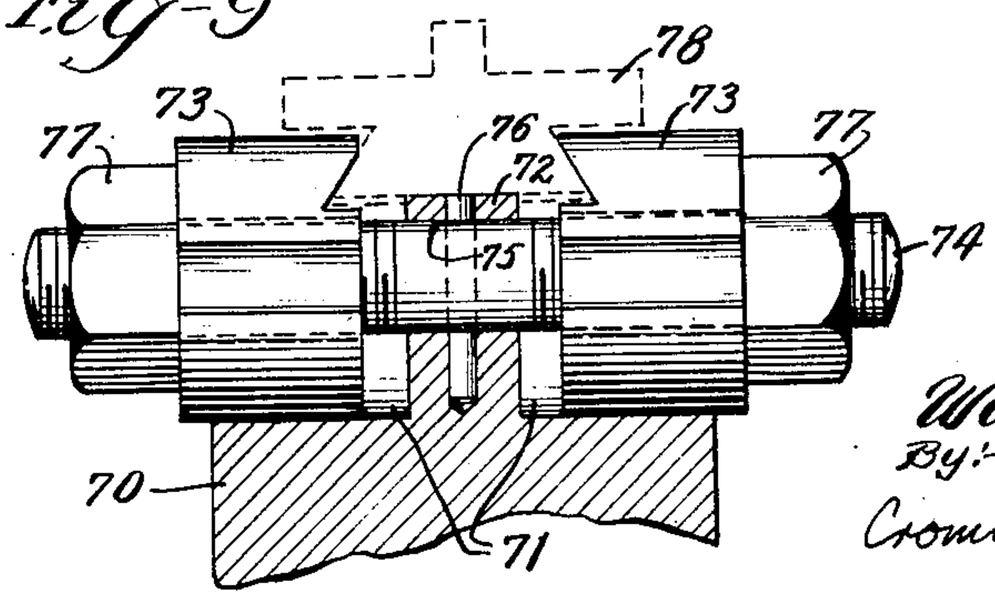


Fig-9



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2,540,530

CUTTERHEAD

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Application November 8, 1949, Serial No. 126,164

20 Claims. (Cl. 144—225)

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This invention relates to cutter heads which are used in woodworking machines, and is particularly concerned with improvements in the manner in which the bits are attached to the heads.

It is a general object of the invention to provide a cutter head having improved fastening means for securing the bits thereon whereby each bit is individually clamped and independently adjustable laterally and axially of the head.

It is a more specific object of the invention to provide a cutter head having supporting surfaces for the bits and fastening means for securing the bits thereon whereby each bit is provided with full support on the head and whereby the bits are securely clamped to the head to resist centrifugal force and cutting impact while at the same time permitting individual adjustment of the bits axially and laterally of the head.

It is another object of the invention to provide a cutter head having fastening means for securing a bit thereon which includes a micrometer screw providing individual, axial adjustment thereof with a positive control.

It is another object of the invention to provide a cutter head having fastening means for the bits which permits individual, lateral adjustment of each bit in a positive manner and independently of the remaining bits.

It is another object of the invention to provide a cutter head having means for fastening thereon bits provided with dovetail tongues wherein the fastening means is so constructed that it adapts the head to receive bits of any width within the range of the head and having variations in width of dovetail and inaccuracies of location of dovetail with respect to the blade pattern.

These and other objects of the invention will be apparent from a consideration of the cutter head which is shown by way of illustration in the accompanying drawings, wherein:

Fig. 1 is an end view, with portions broken away, of a cutter head embodying the principles of the invention;

Fig. 2 is a section taken generally on the lines 2—2 of Fig. 1;

Fig. 3 is a section similar to that shown in Fig. 2 but with the cutter blade in a different axial position;

Fig. 4 is a cross section taken generally on the line 4—4 of Fig. 1;

Fig. 5 is a perspective view of one of the bit clamping members;

Fig. 6 is a section similar to the view in Fig. 2 showing a modified form of cutter head;

Fig. 7 is a view taken generally on the lines indicated at 6—6 in Fig. 6, showing a portion of the peripheral surface of the modified cutter head;

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Fig. 8 is a section similar to the view in Fig. 6 showing a further modified form of cutter head; and

Fig. 9 is a section similar to the view in Fig. 6 showing a still further modified form of cutter head.

The cutter head shown in Figs. 1 to 5 of the drawing comprises a body portion 10 which is provided with a central aperture 11 for receiving the shaft on which the head is mounted and a plurality of peripheral faces or edge surfaces 12 on which the bits or cutter blades 13 are seated. While the head shown accommodates six bits 13 it will be understood that the head may be constructed to receive any number of the bits desired. Also the body 10 is shown as a solid member but it may be made in several parts.

Each of the bit receiving faces 12 on the head 10 is provided with an axially extending pair of aligned recesses or grooves 14 which are circular in cross-section and which form a track or way for a pair of bit clamping members 15 and 16. The circular recesses 14 extend inwardly of the outer end faces of the body 10 and terminate at a fixed web or rib portion 17 which extends radially of the body 10 and between the grooves 14. The fixed rib members 17 may be integrally formed with the body 10 or they may be secured in fixed relation thereto. Each web or rib 17 is provided with a threaded aperture 18 which is centrally located relative to the recesses 14 and which extends in a direction axially of the head. Oppositely disposed axially extending semi-circular grooves 19 are provided in the recesses 14 and extend through the central web 17 for a purpose which will be described.

The bit clamping members 15 and 16 which are adapted to be positioned in sliding relation in the groove 14 at opposite sides of the fixed web member 17 are provided with inclined downwardly wedging surfaces 20. The surfaces 20 engage with the correspondingly inclined side edges of the dovetail tongues 21 on the bits 13. The clamping members 15 and 16 are provided with central apertures 22 and 23, respectively, which are adapted to receive in sliding relation the clamping bolt 24. The clamping member 16 is provided with an enlarged aperture 25, as illustrated, for receiving the head of the bolt 24 or it may be identical with the clamping member 15 and the head of the bolt 24 may be allowed to protrude from the outer face thereof.

The bolt 24 is of sufficient length to provide a threaded end portion which extends beyond the clamping member 15 and is provided with a nut 26. By taking up on the nut 26 the clamping members 15 and 16 may be drawn toward each other to clamp the bit 13 in position on the head 10. The clamping bolt 24 is threaded at 27 in-

termediate its ends for engagement in the threaded aperture 18 in the fixed web member 17. The bolt 24 is provided on its outer end with a square shank 28 to receive a wrench for turning the bolt relative to the fixed web 17. Other means for turning the bolt relative to the web 17 may be provided, such as a recessed hexagon in the head or screw driver slots at either end of the bolt.

The clamping members 15 and 16 are provided with oppositely disposed semi-circular recesses or grooves 29 which cooperate with the grooves 19 in recesses 14 for receiving the pins 30. The pins 30 extend the entire width of the body 10 of the cutter head, the recesses 14 and the fixed web portion 17 being grooved or apertured as described to accommodate the pins 30.

Each of the faces 12 of the body 10 is provided with a series of transversely extending impact resisting corrugations 31 at one end thereof which also extends across the outer face of the fixed web portion 17. The cutter bits 13 are provided with cooperating transversely extending corrugations 32 on the one end which engage with the corrugations 31 on the face 12.

The bits 13 are clamped to the head 10 by the clamping elements 15 and 16 which are secured in axial alignment by the clamping bolt 24. In order to adjust the bits 13 individually of the head body 10 in the axial direction of the latter it is merely necessary to rotate the bolt 24 by applying a wrench to a squared end 28. This provides micrometer adjustment of the cutter bits and permits positive location of the individual bits relative to the cutter head and to each other. This construction permits the use of any width of bit within the range of the head and accommodates any inaccuracy in the manufacture of the bits. The location and width of the dovetail with respect to the pattern need not be accurate due to the micrometer control of the axial adjustment of the individual bits. Each of the bits has adequate support on the body of the cutter head and impact resistance is provided by the inter-engaging serrations on the bits and the bit supporting faces on the head. The bits are securely clamped to resist centrifugal force and the impact of cutting in all operations of the cutter head.

The bit clamping members 15 and 16 are cylindrical as illustrated, but they may be hexagonal or of some other shape with the recesses or pockets 14 formed to accommodate the particular shape of the same and with the pins 30 eliminated where the shape of the members is such that rotation in the pockets cannot occur.

A modified form of the invention is illustrated in Figs. 6 and 7 wherein the bit receiving faces of the cutter head 40 are each provided with an axially extending recess 41 which is circular in cross-section and which forms a track or way for a pair of bit clamping members 42. The recess 41 extends axially across the head 40 and terminates at one end in a fixed web portion 43 which is shown integral with the body 40 but which may be secured thereto as a separate member. The web or member 43 is provided with a threaded aperture 44 which is aligned with the recess 41 and which is adapted to receive the threaded end of a clamping bolt 45. The bolt 45 extends axially in the recess 41 and carries the bit clamping elements 42 in sliding relation thereon. One of the clamping elements 42 is adapted to be positioned against the head 46 of the bolt 45 and the other clamping element 42 is arranged in spaced relation for engagement with the downwardly inclined wedging surfaces 47 of

the dovetail tongues on the cutter blade or bit indicated at 48. The clamping elements 42, which may be identical with the clamping element 15 previously described, are held in clamping relation with the bit 48 by a nut 49 positioned on the bolt 45 inwardly of the fixed web 43. The clamping elements 42 are provided with oppositely disposed semi-circular grooves 50, for cooperation with similar grooves 51 in the walls of the head 40 which define the recess 41, for accommodating pins 52 to hold the clamping elements in onrotatable relation in the recess 41, the pins 52 extending into aligned apertures in the web member 43 as shown. The clamping bolt 45 is provided with a squared head 53 or other means for accommodating a tool to rotate the same. With this construction clamping bolt 45 may be rotated to axially position the clamping element 42 which is remote from the web or anchor member 43 after which the bit 48 may be clamped between the elements 42 by rotation of the nut 49 on the bolt 45.

Another modified form of the invention is illustrated in Fig. 8 wherein the head 60 is provided with an axially extending recess 61 terminating at its one end in a fixed web 62 which is apertured at 63 to receive a clamping bolt 64 in slidable relation therein. The clamping bolt 64 is threaded at opposite ends and is secured in adjusted position in the aperture 63 by a pair of clamp nuts 65 arranged on opposite sides of the fixed web 62. Cooperating bit clamping elements 66 and 67 are mounted on the bolt 64. The clamping elements 66 and 67 are identical with the clamping element 15 previously described except that clamping element 67 is secured in fixed relation on the bolt 64 by a cross pin 68, while clamping element 66 is slidably positioned on the bolt 64 for engaging in clamping relation the bit indicated at 69. Clamping element 66 is shiftable on the bolt 64 toward and from clamping element 67 by means of a nut 70 on the end of the bolt 64 which is remote from the fixed web member 62. With this construction the clamping element 67 may be axially adjusted in the recess 61 by movement of bolt 64, after which the bolt 64 is secured to the web member 62 by the clamp nuts 65. The clamping element 66 is then shifted by the nut 70 to lock the bit 69 between the clamping elements 66 and 67.

A further modified form of the invention is illustrated in Fig. 9 wherein the bit receiving faces of the cutter head 70 are provided with pairs of aligned inwardly extending recesses 71 which are separated by intermediate web members 72. Clamping elements 73, which may be identical with the clamping element 15 previously described are mounted in the recesses 71 in slidable relation on a clamping bolt 74 which extends through a central aperture 75 in the web member 72 and which is secured therein by a pin 76. The bolt 74 is threaded at opposite ends and provided with a pair of clamp nuts 77 which are adapted to shift the clamping elements 73 toward and from each other and into engagement with the bit 78. With this construction either one of the clamping elements 73 may be axially adjusted in its recess 71 and thereafter the other clamping element shifted to clamp the cutter blade or bit in position.

While specific details of construction of the device are shown in the illustrated form of the invention, it will be understood that modification of the same may be resorted to within the

spirit of the invention and the scope of the appended claims.

I claim:

1. In combination, a cutter head having a transverse groove therein, and a bit provided with a dovetail tongue on the bottom thereof extending at right angles to the groove, the cutter head having a fixed web member dividing the groove into two spaced end portions, a pair of bit clamps slidable in the groove end portions, and means to connect the bit clamps in clamping relation with the tongue on the bit and in adjustable relation with the fixed web member.

2. In combination, a cutter head, a cutting blade and clamping means to fasten the blade to the head, said head having a supporting surface for said blade, said surface having a groove extending axially relative to said head, a fixed member extending across said groove, axially spaced shiftable clamping members in said groove adapted to engage said blade in interlocking relation, and means adjustably connected to said fixed member to shift said clamping members toward each other in said groove whereby to adjustably clamp said blade to said head.

3. A cutter head having a transverse groove, an anchor member projecting radially into a portion of said groove intermediate the ends thereof, said anchor member having an axially extending aperture, a bit overlying said groove and having a tongue on the bottom thereof at right angles to said groove, transversely spaced clamping members in interlocking relation in said groove and engageable with said tongue to draw the bit radially toward the head, said clamping members being individually shiftable in said groove toward and away from said anchor member and provided with axially extending apertures, and a clamping bolt extending through the apertures in said clamping members and said anchor member, said bolt being in threaded engagement with said anchor member whereby to axially adjust said bit relative to said head.

4. In combination, a cutter head having a transverse groove therein, and a cutter blade having a dovetail tongue on the bottom thereof extending at right angles to the groove, a fixed divider member extending radially of the head intermediate the ends of the groove, a pair of blade clamps slidable in the groove and a bolt connecting the blade clamps in clamping relation with the tongue on the blade and in adjustable relation with the divider member.

5. In a cutter head adapted to receive in clamping relation thereon a cutting blade, said head having a supporting surface for said blade, said surface having a groove extending axially relative to said head, a fixed web member extending radially of the head, axially spaced shiftable blade clamping members in opposite ends of said groove adapted to engage the base of said blade in interlocking relation, and a threaded bolt and nut adjustably connected to said fixed member to shift said clamping members in said groove whereby to adjustably clamp said blade to said head.

6. A cutter head for supporting a cutter blade, said head having a transverse groove, an anchor member projecting radially into a portion of said groove intermediate the ends thereof, said anchor member having an axially extending threaded aperture, said cutter blade being adapted to overlie said groove and having a securing portion on the bottom thereof at right angles to said groove,

transversely spaced clamping members in sliding relation in said groove and engageable with said securing portion to draw said blade radially toward the head, said clamping members being provided with axially extending apertures, a threaded clamping bolt extending through the apertures in said clamping members and in threaded engagement in the aperture in said anchor member whereby to adjust said clamping member axially relative to said head, and a nut on said clamping bolt to lock the clamping members against the blade after axial adjustment on the head has been made.

7. In combination, a cutter head having a transverse groove therein, and a bit provided with a securing tongue on the bottom thereof extending at right angles to the groove, a fixed web member extending into the transverse groove, bit clamping means slidable in the groove, and means to connect the clamping means with the securing tongue on the bit and in adjustable relation with the fixed web member.

8. In a cutter head having clamping means to fasten a cutting blade thereto, said head having a supporting surface for said blade, said surface having a pair of axially aligned grooves extending toward each other, a fixed member extending between said grooves, axially spaced shiftable clamping members in said grooves adapted to engage said blade in interlocking relation, and means adjustably connected to said fixed member and detachably connected to said clamping members to move said clamping members toward each other whereby to adjustably clamp said blade to said head.

9. In a cutter head having clamping means adapted to secure a cutting blade thereto, said head having a supporting surface for said blade, said surface having a groove extending axially relative to said head, a fixed web member integral with said head and extending radially into said groove, axially spaced shiftable clamping members in opposite ends of said groove having means thereon adapted to engage said blade in interlocking relation, and rotatable means adjustably connected to said web member to shift said clamping members axially in said groove and a second rotatable means to shift one of said clamping members relative to the other whereby said blade may be adjustably clamped to said head.

10. A cutter head for supporting a cutter blade having a tongue on the bottom thereof, said head having a blade supporting surface, said surface having a groove extending axially of the head, an anchor member projecting radially into a portion of said groove intermediate the ends thereof, said anchor member having an axially extending threaded aperture, said blade being adapted to be positioned in overlying relation to said groove with the tongue on the bottom thereof at right angles to said groove, transversely spaced clamping members in interlocking relation in said groove and adapted to engage said tongue to draw said blade radially toward the head, said clamping members being individually shiftable in said groove toward and away from said anchor member, said clamping members having axially extending apertures aligned with the aperture in said anchor member, a clamping bolt extending through the apertures in said clamping members and in threaded relation in the aperture in said anchor member, a clamping nut on said bolt whereby said blade may be axially adjusted relative to said head, and said blade supporting surface having axially extending impact resisting

ridges thereon adapted to interengage with cooperating ridges on the bottom of said blade.

11. A cutter head having means for securing in cutting position thereon a bit, said securing means comprising an anchor member projecting radially of the head and having an aperture therein extending axially of the head, a pair of bit clamping members positioned at either side of said anchor member and adapted to be moved toward each other into clamping relation with the bit when the bit is positioned on the head, means for moving said clamping members toward each other, said last mentioned means being adjustably connected with said anchor member whereby said bit may be clamped to said head in axially adjusted position.

12. A cutter head and means for securing in clamped relation thereon a bit, said securing means comprising a radially extending web member on said head, said web member having an aperture extending axially of said head and said head having pockets extending axially on opposite sides of said web member, a pair of bit clamping members slidable in said pockets and a bolt member threadedly engaged in the aperture in said web member for moving said clamping members axially on said head and into the bit clamping position.

13. A cutter head and means for mounting thereon a cutter blade, said cutter head having an anchor member extending radially thereof and provided with an axially extending aperture, a threaded bolt adjustably mounted in the aperture in said anchor member and having a nut thereon, a pair of blade clamping elements on said bolt at opposite sides of said anchor member, said clamping elements adapted to be moved toward a blade positioned over said anchor member to clamp said blade in axially adjusted relation on said head, and guide means for maintaining said clamping elements in non-rotative relation relative to said bolt and nut during their movement.

14. In combination, a cutter head having a transverse groove therein, and a bit provided with a dovetail tongue on the bottom thereof extending at right angles to the groove, the cutter head having a fixed web member extending radially into the groove, a pair of bit clamps slidable in the groove, and means to connect the bit clamps in clamping relation with the tongue on the bit and in adjustable relation with the fixed web member.

15. In combination, a cutter head, a cutting blade and clamping means to fasten the blade to the head, said head having a supporting surface for said blade, said surface having a groove extending axially relative to said head, a fixed member extending across said groove, spaced clamping members shiftable in said groove and adapted to engage said blade in interlocking relation, and means engageable with said fixed member to shift said clamping members in said groove whereby to adjustably clamp said blade to said head.

16. A cutter head having a transverse groove, an anchor member projecting radially into a portion of said groove intermediate the ends thereof, said anchor member having an axially extending aperture, a bit overlying said groove and having a tongue on the bottom thereof at right angles to said groove, transversely spaced clamping members in interlocking relation in said groove and engageable with said tongue to

draw the bit radially toward the head, said clamping members being individually shiftable in said groove toward and away from said anchor member and provided with axially extending apertures, and a clamping bolt extending through the apertures in said clamping members and said anchor member, said bolt being in fixed relation in the aperture in said anchor member and having nuts in threaded relation on the ends thereof for shifting and clamping said members relative to said bit whereby to axially adjust said bit relative to said head.

17. In a cutter head adapted to receive in clamping relation thereon a cutting blade, said head having a supporting surface for said blade, said surface having a groove extending axially relative to said head, a fixed web member extending radially of the head at one end of said groove, axially spaced shiftable blade clamping members in said groove adapted to engage the base of said blade in interlocking relation, and means including a threaded bolt adjustably connected to said fixed member to shift said clamping members toward each other in said groove whereby to adjustably clamp said blade to said head.

18. A cutter head for supporting a cutter blade, said head having a transverse groove, an anchor member projecting radially into a portion of said groove at one end thereof, said anchor member having an axially extending threaded aperture, said cutter blade being adapted to overlie said groove and having a securing portion on the bottom thereof at right angles to said groove, transversely spaced clamping members in sliding relation in said groove and engageable with said securing portion to draw said blade radially toward the head, said clamping members being provided with axially extending apertures, and means including a threaded clamping bolt extending through the apertures in said clamping members and in threaded engagement in the aperture in said anchor member whereby to axially adjust said blade relative to said head.

19. A cutter head and means for mounting thereon a cutter blade, said cutter head having an anchor member extending radially thereof and provided with an axially extending aperture, a bolt adjustably mounted in the aperture in said anchor member, a pair of blade clamping elements on said bolt, one of said clamping elements being secured in fixed relation on said bolt, the other of said clamping elements being adapted to be moved relative to said fixed element to clamp a blade positioned over said groove in axially adjusted relation on said head, and means on said bolt for moving said clamping elements on said bolt.

20. A cutter head adapted to receive in clamping relation thereon a cutting blade, said head having a supporting surface for the blade, said surface having a groove extending axially relative to said head, a fixed member extending into said groove, spaced clamping members shiftable in said groove and having means for engaging the blade in interlocking relation, and means engaged with said fixed member to shift said clamping members in said groove whereby to adjustably clamp the blade to said head.

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No references cited.