No. 874,871. PATENTED DEC. 24, 1907.

E. S. SHIMER.

ROTARY CUTTER HEAD.

APPLICATION FILED MAY 24, 1907.

3 SHEETS—SHEET 1.

Fig. 1

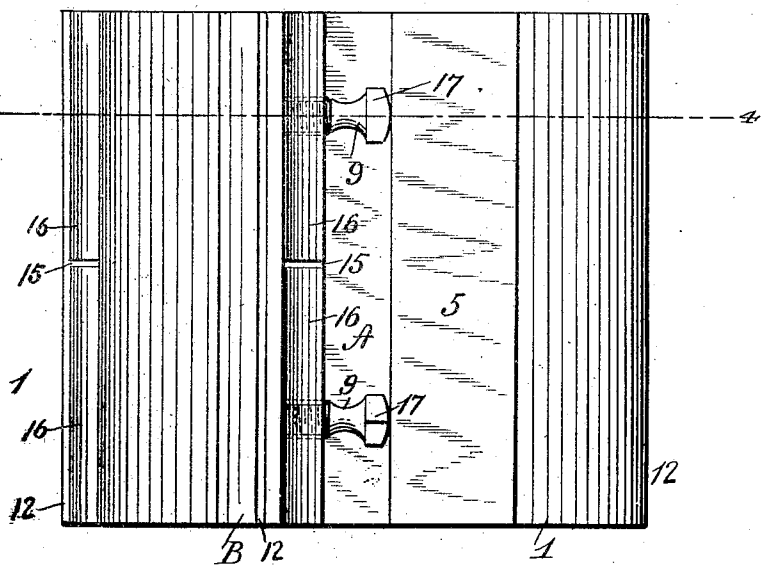
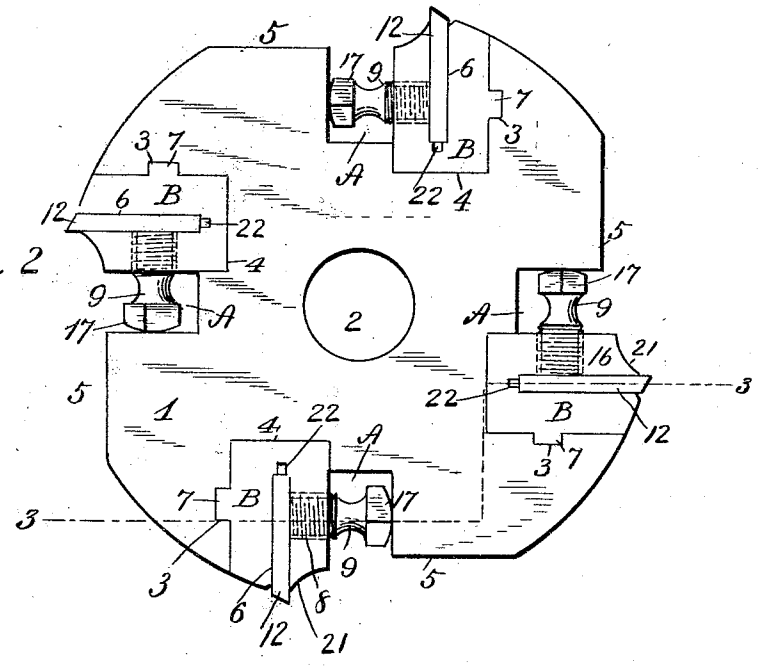


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 3.

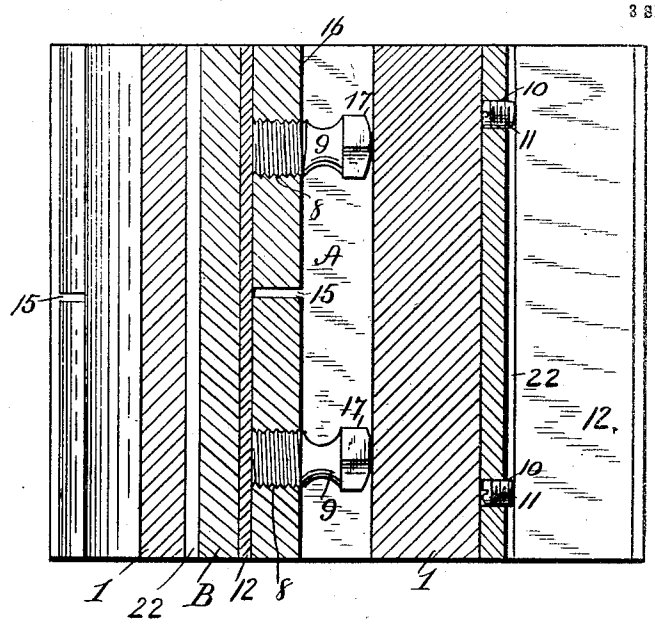
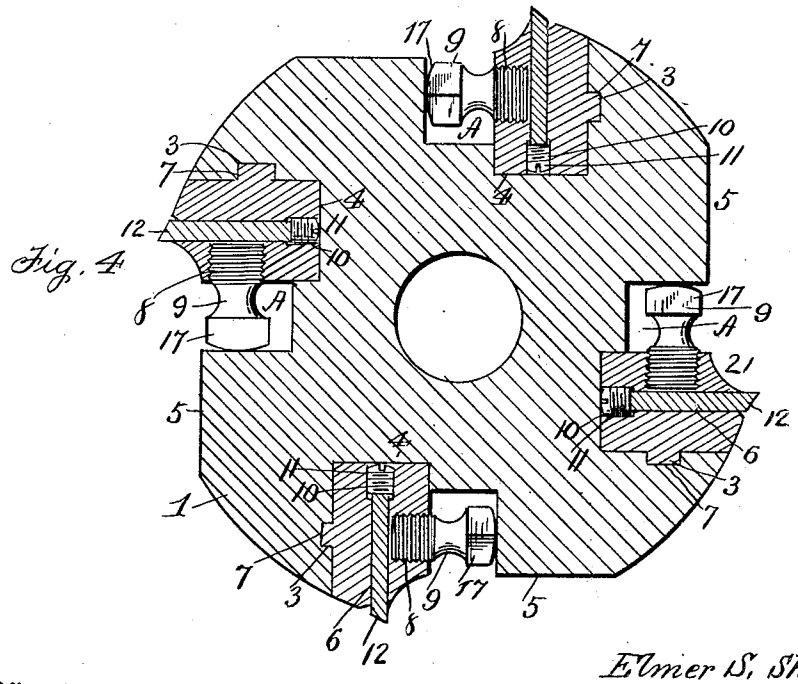


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

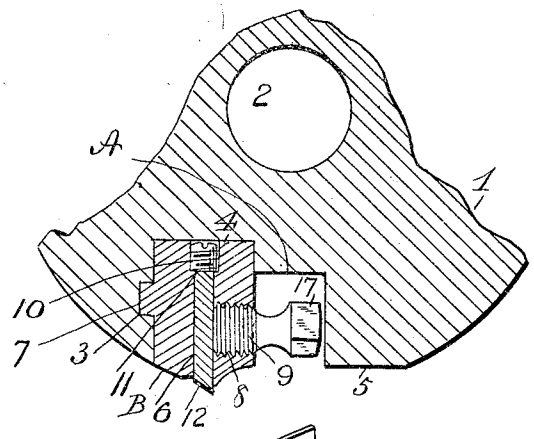


Fig. 6.

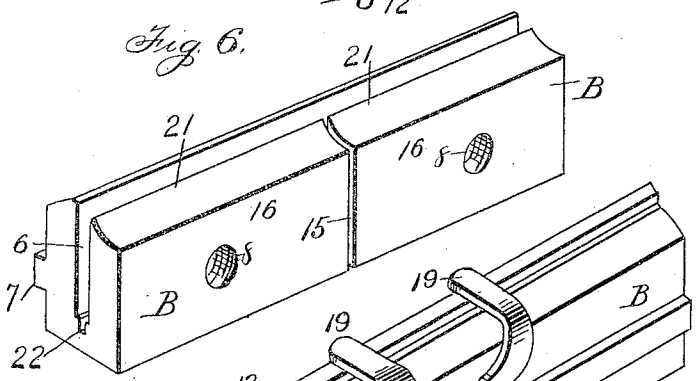


Fig. 7.

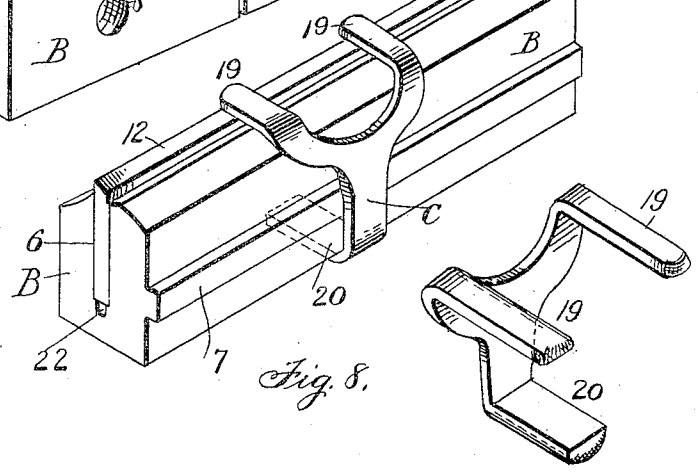


Fig. 8.

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UNITED STATES PATENT OFFICE.

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ROTARY CUTTER-HEAD.

No. 874,871. Specification of Letters Patent. Patented Dec. 24, 1907.

Application filed May 24, 1907. Serial No. 375,479.

To all whom it may concern:

Be it known that I, ELMER S. SHIMER, a citizen of the United States, residing at Milton, in the county of Northumberland and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Cutter-Heads, of which the following is a specification.

This invention relates to rotary cutter heads for wood-working machines of that class in which the cutters or bits consist of relatively thin blades which are securely mounted in the cutter head and re-inforced to enable them to withstand the strain to which they are subjected during operation.

The use of thin steel blades in cutter heads is desirable for several reasons, among which may be named the considerable difference in cost between light, thin and thick, heavy blades, which is obviously in favor of the former. The light thin blades may be ground or sharpened and kept in good condition more easily and at less expense than the heavier blades. The light blades may also, as a rule, be more easily and conveniently fitted and adjusted for operation. On the other hand the lighter and thinner the blades have been made, the greater has been the liability to breakage and injury. Some difficulty has also been experienced in clamping and securing a very thin blade or bit with the requisite degree of firmness and security.

In view of the foregoing facts, the present invention has for its object to provide improved means for securing or mounting light, thin cutting blades or bits in a rotary cutter head, in such a manner that they will be absolutely secure; that they may be easily detached for sharpening or other purposes; that they may be readily and quickly adjusted so as to present their cutting edges in precisely the proper plane; and that each blade shall be strongly re-inforced.

A further object of the invention is to provide a bit holder which shall possess superior advantages in point of simplicity, durability and general efficiency, and in which shall be included that portion of the cutter which is known as the chip-break, so that, when the latter becomes worn, or injured, it may be replaced without discarding the cutter head.

Further objects of the invention are to simplify and to improve the construction and operation of this class of devices.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts, which will be hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of the invention; it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and modifications within the scope of the invention may be resorted to when desired.

In the drawings—Figure 1 is a side elevation of a rotary cutter head embodying the invention. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical sectional view taken on the plane indicated by line 3—3 in Fig. 2. Fig. 4 is a horizontal sectional view taken on the plane indicated by the line 4—4 in Fig. 1, and showing the bits or blades clamped in the holders and the latter secured in the cutter head in position for operation. Fig. 5 is a horizontal sectional detail view taken on a plane similar to Fig. 4, through a portion of the cutter head and one of the bit holders, but showing the latter loosely engaging the body of the cutter head. Fig. 6 is a perspective view showing one of the bit holders detached, the bit having been removed therefrom. Fig. 7 is a perspective view of one of the bit holders with the bit in position therein, and showing also a gage for the adjustment of the bit. Fig. 8 is a detail view of the gage, detached.

Corresponding parts in the several figures are denoted by like characters of references.

The body 1, of the improved cutter head is of the approved approximately cylindrical shape, it being provided with an axial aperture 2, for the passage of the shaft or mandrel upon which it is to be mounted for operation.

The body 1, is provided with longitudinal grooves or recesses A, affording seats for the bit holders B. Within the scope of the invention the cutter may be provided with any desired number of bits, each mounted in a holder engaging a recess in the cutter head; in the accompanying illustration a cutter head has been shown provided with four bits or holders, which are mounted in recesses formed at equal distances apart.

Each of the recesses A is provided in its rear wall with a longitudinal groove 3, and the bottom of each recess is provided adjacent to the rear wall with an offset forming a distinct groove 4; it being understood that the term "rear" wall is used with reference to the direction in which the cutter head rotates when in operation. Portions of the wall, or outer surface of the body 1, are removed adjacent to the front wall of each recess A, thus presenting adjacent to the front wall of each of said recesses a flat surface 5.

Each of the bit holders consists of a clamp formed of a block of metal of suitable dimensions, the width being equal to the width of the bottom grooves 4 of the recesses A, wherein the said blocks are fitted, as will be very clearly seen in Figs. 2 and 4 of the drawing. Each of the blocks B, is provided with a longitudinal bit-receiving groove 6, extending through the entire length thereof intermediate the front and rear sides; each of said blocks is further provided with a longitudinal rib 7 formed on the rear side thereof for engagement with the grooves 3 of the recesses A. The front wall of each of the bit holders is provided with threaded apertures 8, for the passage of clamping screws 9, and the back of each of the bit holders is provided with threaded apertures 10, for the reception of the adjusting screws 11, bearing against the back of the blade or bit 12, which is fitted in the slot 6 of the holder.

In the accompanying drawings, each bit holder has been shown provided with two clamping screws 9, and the rear wall of each of said holders is provided with a slot 15, whereby it is divided into separate leaves 16, each having an individual clamping screw; it is to be understood that when additional clamping screws are employed the back wall of the holder will be provided with additional slots so that each clamping screw will be mounted in an individual leaf or section of the back wall of the holder. The clamping screws are provided with heads 17, which are of polygonal shape so as to afford seats for an ordinary wrench by means of which said screws may be adjusted; it will furthermore be noted that the outer faces of the heads 17 are convexed or rounded for convenient engagement with the front walls of the recesses A.

In Figs. 7 and 8 has been illustrated a gage C by means of which the bit or blade may be accurately fitted in the holder in such a manner that the cutting edge will project precisely the requisite distance; said gage consists of a spider or body 18, having laterally extending arms 19, 19 and 20, which are spaced apart a distance equal to the distance between the back of the holder B and the edge of the plate 12. By adjusting the gage upon the holder, as shown in Fig. 7 of the drawings, the arms 19 will constitute a stop to prevent the cutting edge from advancing beyond a predetermined point; thus, by manipulating the adjusting screws 11, the bit or blade will be forced outward in the slot 6 until the cutting edge projects the desired distance beyond the holder, when it will be checked by contact with the arms 19. By this simple device, the blade or bit may be very quickly adjusted and this device will obviously be found extremely useful whenever the blades or bits are to be re-adjusted after being sharpened, to enable proper adjustment to be made to compensate for the material lost in sharpening or grinding. Thus by this simple device, the blades may be almost instantaneously fitted in a true and correct position, and the efficiency of the cutter head will thereby be largely increased.

When the holders B are removed or detached from the cutter head, the bits or blades may be secured therein by tightening the clamping screws 9, as will be readily understood. While the said screws are tightened, the holder B may readily be adjusted in its appropriate recesses A by sliding it endwise into the groove 4 of said recess, the tongue or rib 7 upon the rear of the holder engaging the groove 3, so that the holder will be very securely retained, and re-inforced against the lateral strain to which it is subjected during operation.

After the holder has moved or adjusted to its proper position clamping screws are turned outward in the threaded apertures in which they are respectively mounted, until the convex faces of said screws engage the front walls of the recesses A; by tightening the ends of the screws up against the wall of the recesses the front wall of the holder will be forced in the direction of the bit or blade 12, which will thus be clamped securely between the front and rear walls of the holder B while the latter is bodily forced in the direction of the rear wall of the recess A, where it will be frictionally retained with great security. Thus it will be noted that the bits or blades are secured in operative position, not by actual engagement with the clamping screws, but by being clamped between the rear walls and the leaves 16, constituting the front walls of the holders B; thus, practically the entire surface of the bits will be clamped, and the said bits will be held far more securely, and with less danger of breaking down under a heavy strain, than if they were held by direct engagement with clamping screws or similar securing devices.

The outer edges of the back walls of the bit holders are concaved to form the chip break 21. In all cutter heads, the chip break, which is that portion which is immediately adjacent to the front side of the bit or cutter is particularly exposed to wear

and to injury; and cutter heads frequently have to be discarded owing to excessive wear of these parts. By the present invention, as soon as the chip-break becomes excessively worn, it may be renewed by simply substituting a new bit holder, the body of the cutter head remaining intact. This is an advantage which will be readily appreciated by those skilled in the art to which this invention appertains.

The operation and advantages of this invention will be readily understood from the foregoing description taken in connection with the drawings hereto annexed. Usually in cutter heads where thin blades are used, such blades are held in position by clamping devices whereby said blades are clamped upon the head direct making the adjustment inconvenient and tedious, and by no means very efficient. By the present invention, very thin blades or bits may be advantageously applied, and such bits or blades may be easily, quickly and accurately adjusted, and will be retained by the holders in a very secure and efficient manner, in such a manner that breakage or injury to the blades will be almost impossible. By supplying each cutter head with two sets of the improved bits and holders, as soon as one set of bits become dull they may be detached and replaced by others in a few minutes' time, thus avoiding the loss of time, and enabling work to be continued practically without delay; this, it will be understood, is an extremely important and valuable feature of the invention. The bit holders are so constructed and arranged that, in the event of accident to the holder or to the bit, a new piece can be inserted without loss of the entire head, or inconvenience caused by delay.

The bit holder B is preferably provided with a narrrow slot or groove 22, extending from the bottom of the bit receiving groove in the direction of the back of the block constituting the holder, which is thereby rendered sufficiently flexible or resilient to enable the clamping jaws formed by the front and rear walls of the holder to get a firm grip upon the bit under the tension of the clamping screws 9.

I claim—

1. A cutter head having a longitudinal recess, a longitudinally slotted bit holder slidably engaging the recess, a blade or bit held in the slot and clamping screws engaging the bit holder and having heads adapted for engagement with one wall of the recess.

2. A cutter head having a longitudinal recess provided with grooves or offsets, a longitudinally slotted bit holder slidably engaging the recess and having portions engaging the grooves or offsets, a blade or bit held in the slot and clamping screws engaging the bit holder and adapted to be tightened against one wall of the recess.

3. A cutter head having a longitudinal recess, a bit holder engaging the recess and having a longitudinal bit receiving groove, and clamping screws extending through one wall of the bit holder and having heads adapted for engagement with one wall of the recess.

4. A bit holder for cutter heads, consisting of a block having a longitudinal bit receiving recess and slots whereby one of the side walls of said recess is sub-divided into a plurality of wings or leaves, and clamping screws engaging the individual wings or leaves.

5. A bit holder for cutter heads, consisting of a grooved block one side of which is subdivided into a plurality of bit engaging wings or leaves.

6. A cutter head having a longitudinal recess, in combination with a bit holder consisting of a grooved block one side of which is subdivided into a plurality of bit engaging wings or leaves, and means whereby said wings or leaves may be individually tightened.

7. A cutter head having a longitudinal recess in combination with a bit holder held in the recess and consisting of a block having a bit spanning groove and a plurality of bit engaging wings or leaves, a bit seated in the groove, and clamping screws extending through the individual wings or leaves and having heads engaging a wall of the recess.

8. A cutter head having a longitudinal recess provided with longitudinal grooves in the bottom and in the rear wall thereof, a bit holder consisting of a block having a bit spanning groove, said block being adapted for engagement with the bottom groove of the recess and provided with a tongue engaging the groove in the back wall of the recess, and a clamping screw extending through one wall of the bit holder and adapted for engagement with the front wall of the recess in the cutter head.

9. A cutter head having longitudinal recesses provided with grooves or offsets disposed approximately at right angles to each other, in combination with bit holding members slidably engaging the recesses and having portions engaging the grooves or offsets of said recesses, said bit holding members being provided with bit spanning grooves and with clamping screws, the opposite ends of which are adapted for engagement, respectively, with the bit and with a side wall of a recess in the cutter head.

10. The combination with a cutter head having longitudinal recesses, of bit holding members located in said recesses and having bit-spanning grooves, and clamping means engaging walls of the recesses and the side walls of the bit holders for simultaneously clamping the latter upon the bits and securing them in the recesses of the cutter head.

11. The combination with a cutter head having a longitudinal recess, of bit holding members detachably held in said recess, and having bit-spanning grooves, thin blades or bits fitted in the grooves of the bit holding members, and means for clamping the latter upon the side faces of the bits.

12. The combination with a cutter head having a longitudinal recess, of a bit holder consisting of a block having a bit-spanning groove and a narrow kerf extending from the bottom of the latter in the direction of the back of the holder, a bit seated in the groove of the holder, and means engaging a side wall of the recess in the cutter head, for springing the side walls of the holder into engagement with the side faces of the bit.

13. A cutter head having a longitudinal recess, a bit holder engaging the recess and having a bit-spanning groove, adjusting screws extending through the back of the holder into the bit-spanning groove, and clamping screws engaging one of the side walls of the holder, and adapted for engagement with a side wall of the recess in the cutter head.

14. A cutter head having a longitudinal recess, and a flattened portion adjacent to the front wall of the said recess, in combination with a bit holder having a bit-spanning groove, and means for securing the bit in the groove of the holder and the holder in the recess of the cutter head.

15. In a rotary cutter head, a body having a recess in combination with a bit holder engaging said recess, and having a bit spanning groove, a bit seated in the groove and clamping means engaging the cutter head to secure the bit holder in position, the said clamping means engaging also the bit holder to clamp the latter upon the bit.

16. In a rotary cutter head, a body having a longitudinal recess and bit holder engaging said recess and having a longitudinal bit spanning groove, the front wall of said bit holder being provided with a grooved or concaved edge constituting a chip break.

17. A bit holder for rotary cutter heads consisting of a block having a bit-spanning groove, and a chip break formed adjacent to said groove.

In testimony whereof I affix my signature, in presence of two witnesses.

ELMER S. SHIMER.

Witnesses:
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F. D. LONGMORE