(No Model.)

H. R. TILLISON.

CUTTER HEAD.

No. 593,500. Patented Nov. 9, 1897.

Fig. 1.

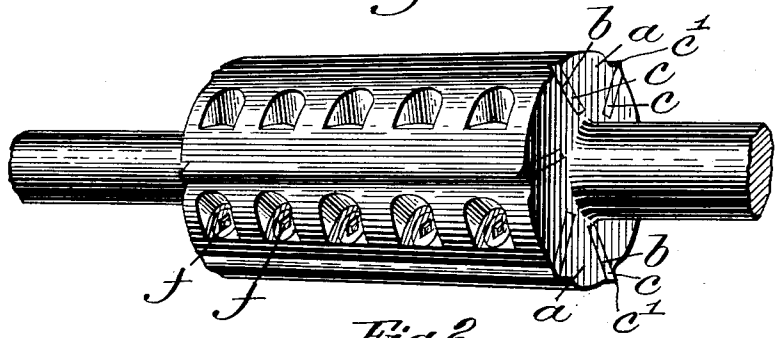

Fig. 2.

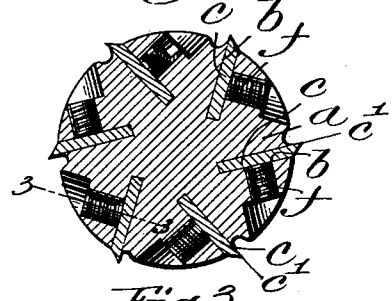

Fig. 3.

Fig. 4.

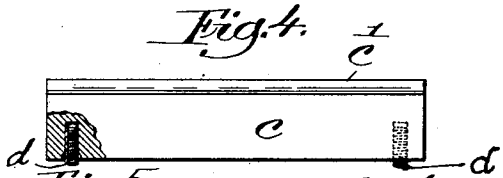

Fig. 5.

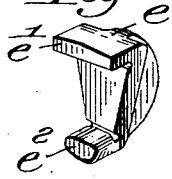

Fig. 6.

Witnesses:
Fred A. Gruneaf.
Thomas J. Drummond.

Inventor:
Hosea R. Tillison.
by Crosby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

HOSEA R. TILLISON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE S. A. WOODS MACHINE COMPANY, OF SAME PLACE.

CUTTER-HEAD.

SPECIFICATION forming part of Letters Patent No. 593,500, dated November 9, 1897.

Application filed February 17, 1897. Serial No. 623,790. (No model.)

To all whom it may concern:

Be it known that I, HOSEA R. TILLISON, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Cutter-Heads, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The matter of the adjustment of the several blades of a cutter-head, particularly in woodworking machinery, is of extreme importance, it being vital that the cutting edges of the blades should be absolutely uniform, lying in one and the same peripheral surface or path of movement, as otherwise the work done by the cutter-head would be uneven and entirely unsatisfactory. However, as heretofore constructed it has been exceedingly difficult to secure this accuracy of alinement and the requisite perfection of adjustment, particularly in woodworking cutter-heads, in which the necessary angle or bevel of the cutting edges of the blades is such as to require that they should be independently sharpened and adjusted, it being customary to set one blade and then adjust the other blades by tapping them slightly one way or another with a hammer in order to get them as nearly in proper position as possible. Even with the most experienced skill, however, this and other methods of adjustment are unsatisfactory. To the end therefore of providing means for securing a quick and perfect adjustment, as well as providing an improved cutter-head having an unyielding support for the blades and improved means of securing the latter therein, I make a cutter-head of any desired form, providing the same with slots or recesses to receive the blades, and between the blades and fixed rests, preferably the bottoms of the slots, I introduce adjustable alining stops for accurately gaging the cutting edges of the blades when the latter are dropped into the slots. By this means the blades are automatically adjusted without any further trial. The blades are ground as desired and are then applied to a chosen standard or gage, being adjusted thereto by a screw, block, or other alining stop or adjusting means, said means being preferably, as herein shown, on the blade itself. Adjustment is made to cause the blade and its alining stop to accurately fit the gage, and this having been done the blade is simply dropped into place in its slot and fixedly secured, the previous gaging thereof making it an absolute certainty that all the blades will be in the desired proper alinement and also invariably in one and the same cutting circle without any further attention.

My invention also includes improved means of securing the blades, whereby is prevented the tendency of the blades to creep up when the securing-bolts or set-screws are tightened against their sides. This part of my invention consists of deflecting the set-screws slightly to the right, so that the forward movement of the screw has a downward action on the blade, thereby counteracting all tendency the latter might have to creep up in the opposite direction.

The details of my invention will be more fully apprehended in the course of the following description, taken in connection with the accompanying drawings, illustrative thereof, and will be more particularly defined in the appended claims, which form a part of this specification.

In the drawings, Figure 1 is a perspective view showing a surface-planer cutter-head embodying my invention. Fig. 2 is a transverse vertical section thereof. Fig. 3 is an enlarged detail in horizontal section on the line 3 3, Fig. 2. Fig. 4 is an enlarged detail view in elevation of one of the cutter-blades and partly broken away in order to show the detail arrangement of one form of adjusting means. Fig. 5 is a perspective view of one form of gage used in connection with my invention. Fig. 6 is a detail view of a wrench used to tighten special screws employed for securing the blades.

For convenience of illustration and description I have herein shown my invention applied to a cylindrical cutter such as is commonly employed in wood-planers, although I wish it understood that my invention is applicable to any form of cutter-head.

The body *a* of the cutter-head is provided with a plurality of longitudinal slots *b*, extending a considerable distance therein toward the center, but in planes tangential thereto,

as shown. These slots are carefully milled out, so as to be absolutely uniform in depth, or are otherwise provided with rests, ledges, or abutments which are absolutely uniform in depth from the outermost edges of the slots.

The blades are provided adjacent each end or at other intervals throughout their lower edges with screws adjustable therein, as shown in detail in Fig. 4. As the several blades become dull by use or otherwise injured they are removed from their slots and sharpened as desired. After being sharpened they are applied to a gage *e*, preferably of U shape, with one comparatively wide side *e'* and an opposite parallel shorter side e^2, the edge side of the blade being applied to the side *e'* of the gage. The adjusting screw or stop *d* is then carefully turned outward until it fits exactly within the gage against the side e^2, causing the edge of the blade to just touch along the opposite side *e'*. The screw *d* at the opposite end of the blade and others, if they are used, are similarly adjusted and gaged. The blade is inserted in its slot until the heads of the adjusting screws or stops touch the bottom thereof of the other rest, the blade being then set up tightly by its fastening-screws *f*. The next blade is similarly adjusted and fastened, and so on with all the succeeding blades, the result being that the cutting edges *c'* of all the blades fall within one and the same cylindrical surface, being necessarily in absolutely perfect alinement, without any experimental tests whatever being required for the reason that each blade has been adjusted accurately by the adjusting-screws acting as alining stops to fit one and the same unvarying gage *e*.

It is not necessary to carry out my invention that the alining stops should be provided in the form of the screws *d*, nor that they should be located in the blades themselves, inasmuch as any other means of adjustment between the bottoms or rests of the slots and the sharpened edges of the blades is within the contemplation of my invention—that is to say, the screws *d* could be inserted in the bottom of the slot, for instance, and used in connection with a depth-gage in the same way as the screws on the blade are used in connection with a width-gage, or any other means may be employed for filling up the intervening space between the bottom of the slot and the lower edge of the blade or between any portion of the blade and a fixed rest and capable of being accurately adjusted, so as to be capable of a predetermined measurement before the blade is dropped in place.

A further extreme advantage of my invention resides in the fact that it enables the cutting circle of the cutter-head to be readily maintained unvarying, notwithstanding the grinding away of the blades in sharpening them, for the reason that the blades are always set to a standard gage in connection with the alining stops. As at present constructed the grinding of the outer edges of the knives changes the cutting circle, reducing the diameter of the cutter-head, and usually necessitating that the "presser-bar after the cut" and sometimes the chip-breaker shall be readjusted thereto.

By my invention the blades of the cutter are moved outwardly as they are ground away, thereby keeping the cutting circle unchanged, so that the presser-bar does not require altering.

By having the blades supported on either side by a solid wall of metal, as is shown, the slots being of a width to accurately receive the cutting-blades and extending tangentially at an angle to suit the particular purpose for which the cutter-head is used, it will be seen that the blade is reinforced and rendered unyielding, so that it cannot possibly vibrate, as it would if held merely by a set-screw or clamping means here and there along its lengths, as is at present the practice.

I prefer to make the slots *b* of a width to permit the blades to fit closely therein, so as to be capable of easy removal or insertion without looseness, thereby providing a cutter-head capable of the finest and most accurate work required.

Referring to Fig. 3, it will be seen that I have provided a plurality of set-screws *f* for clamping the blades in fixed adjustment within their slots *b*, these screws having square ends *f'* and socket-heads f^2 to receive the ends *g'* of the wrench *g*. This construction permits the use of an extended threaded surface to give rigidity and extended holding surface for the screws, the screw proper being enabled thereby to occupy all the space available, a considerable part of which would otherwise be required to accommodate the head of the screw.

It will be observed that the screw-holes are not perpendicular to the surface of the blades, but are slightly deflected to the right at their outer ends, the object of this feature of my invention being to prevent the tendency of the blades to creep up. This latter tendency is occasioned largely by the turning of the screw against the plane surface of the blade, thereby producing a twisting action on the blade tending to lift the blade and shove it out of its proper position, so that it would result that a blade properly and accurately alined would afterward be found to be entirely out of adjustment when the tightening-bolts were set up.

By my invention the downgoing or right-hand edges only of the inwardly-moving screws bear against the surface of the blade, thereby tending in no way to lift the blades, but rather to set them still more firmly in the proper predetermined adjustment.

While I have herein described the preferred embodiment of my invention and the various details thereof, I wish it to be clearly understood that I am in no wise limited thereto, inasmuch as many changes and substitutions and modifications in details of construction,

arrangement, and combination of parts may be resorted to without departing from the spirit and scope of my invention.

What I claim is—

1. In a cutter-head, having a removable blade, a rear abutment for the blade, a fastening-screw operating in said head endwise against the side of said blade, said screw being deflected from a perpendicular thereto so as to bear on the blade with a tendency downward away from the edge of the blade when being set up, substantially as described.

2. The combination with a cutter-head provided with a plurality of rests to receive the blades, said rests being in one and the same circle concentric with said head, and a plurality of removable blades extending at the same angle to the center, of means to maintain unvarying the cutting circle of the cutter-head notwithstanding the sharpening of the blades, said means comprising a plurality of adjustable stops carried by the inner edge of each blade, and an unvarying gage to which each blade may be fitted by the adjustment of its said stops before being placed in the head, whereby when the blades are dropped into their several positions the stops will engage said rests and the cutting edges will all fall in one and the same circle, the same as previously occupied, substantially as described.

3. A gage for the purpose set forth, said gage being substantially **U**-shaped, and having one wide side and an opposite narrow side parallel thereto, said two sides being rigidly maintained in fixed position relatively to each other, with an uninterrupted free space between them to receive a blade, said gage being adapted to receive the blade against its intermediate or bottom portion of the **U** between said two sides thereof, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOSEA R. TILLISON.

Witnesses:

GEO. H. MAXWELL,

FREDERICK L. EMERY.