June 25, 1929. F. R. WEAVER 1,718,325

LOCK JOINT GROOVING HEAD

Filed June 13, 1928

Fig. 1.

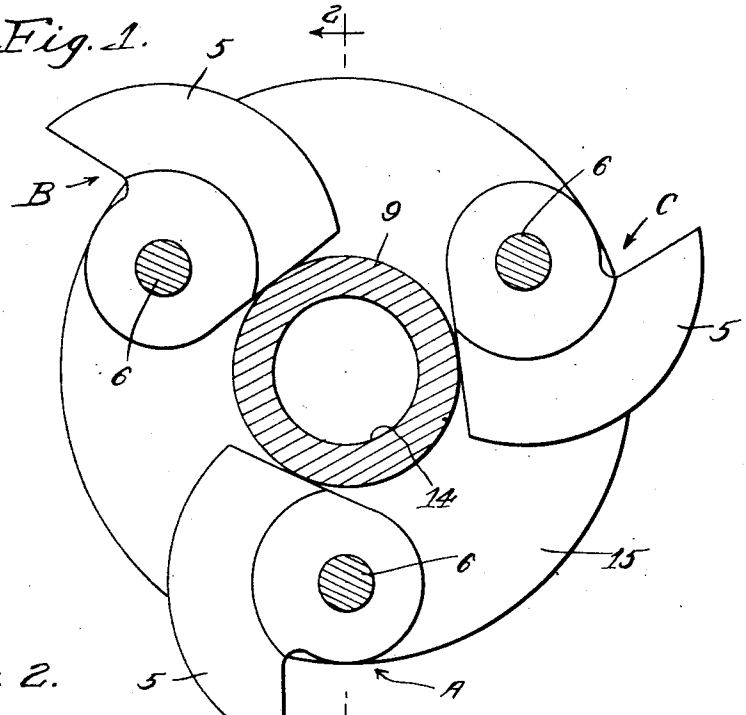
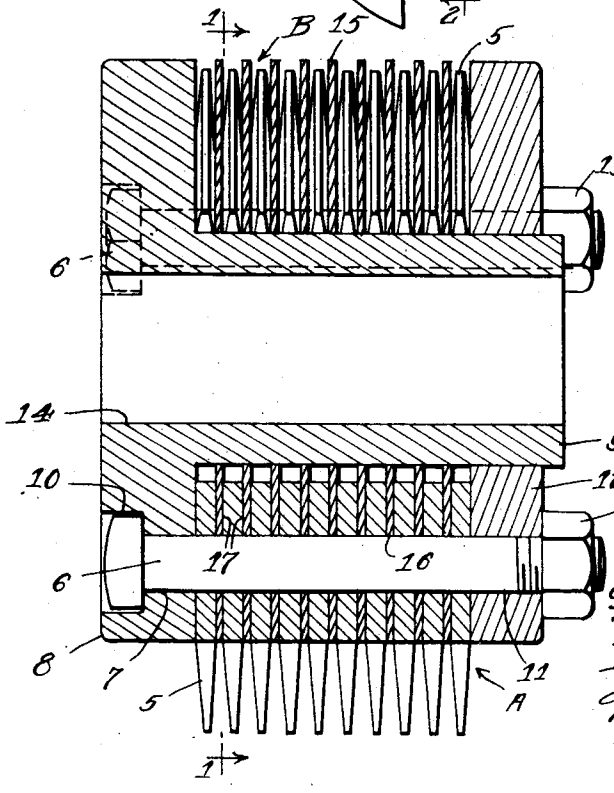


Fig. 2.



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UNITED STATES PATENT OFFICE.

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LOCK-JOINT GROOVING HEAD.

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This invention relates to woodworking cutter heads generally and, while more particularly concerned with a lock joint grooving head for end-matching various work, is adaptable to any head of a generally similar type employing rows of bits arranged to be mounted in a similar manner.

Cutter heads of the type referred to were heretofore constructed having each row of bits held in assembled relation on the head by means of a through bolt, the bits being assembled on the bolt with spacing washers interposed therebetween. It was soon found that the mere tightening of the bolt could not be relied upon to keep the individual bits from turning out of position. This led to the drilling of holes through each row of bits and washers, in addition to the bolt holes, for the reception of a pin to interlock all of the bits and washers of each row. It has, however, been found that while this expedient prevents any individual bit from turning out of position, and the entire row is not apt to turn, there is, nevertheless, the objection that the damaging of any one or more of the bits necessitates either the grinding off of all of the bits of the row to restore the same to useful condition, or else the damaged bits have to be discarded and new ones substituted. The objections to either procedure are self-evident.

It is the principal object of my invention to provide a novel construction and arrangement of parts in a cutter head of the character described which, while it allows individual grinding and setting or resetting of any of the bits in any one or more of the rows, positively insures a good frictional hold for all of the bits when the through bolts are tightened. According to my invention I provide spacing rings fitting about the center hub and provided with holes to receive all of the through bolts, to take the place of the separate spacing washers otherwise provided between the bits of each row. With this construction, the tightening of the bolts causes each of the bits to be clamped firmly between the rings, and the fact that the latter are not free to turn with respect to the bolts, as were the washers heretofore employed, practically eliminates the tendency for the bits to turn with respect to the bolts. The construction is, furthermore, of advantage, not only in reducing the number of parts and accordingly facilitating assembling, as well as cutting down cost, but from the standpoint that the spacing rings locate the bits of the different rows accurately in alignment with one another for the accurate cutting of grooves, such as is required for end-matching, and said rings also serve to gauge the depth of cut in a manner which will soon appear.

The invention is illustrated in the accompanying drawing, wherein—

Figure 1 is a transverse section through the cutter head of my invention taken on the line 1—1 of Fig. 2; and

Fig. 2 is a central longitudinal section taken on the line 2—2 of Fig. 1.

Both sections are taken looking in the directions indicated and the same reference numerals are applied to corresponding parts.

The head illustrated, as indicated above, is made for the purpose of end-matching various work and utilizing short stock in jointing it together at an angle, as required, for example, in automobile body work. This work necessitates the use of rows of bits 5, three such rows being shown at A, B, and C, and it is important that the corresponding bits of all of the rows be disposed in accurate alignment to cut uniform and evenly spaced grooves, so that the finished pieces will fit together properly and make workmanlike joints. As stated before, it has heretofore been common practice to mount the bits 5 on through bolts 6 with ordinary spacing washers interposed between adjoining bits for the spacing thereof. The bolts 6 may be mounted on any suitable body member; they are shown as entered through holes 7 in the flange 8 of the center hub 9 and with the square heads thereof suitably received in recesses 10 in the flange to hold the same against turning. The bolts pass through holes 11 provided in a clamping collar 12 fitting over the end of the center hub 9 and have nuts 13, the tightening of which is designed to clamp the bits 5 in operative position. The center hole 14 in the hub 9 permits the mounting of the head on a spindle in the usual manner, the spindle ordinarily being disposed vertically with the collar 12 forming the top of the head. However, the disposition of the head is immaterial.

According to my invention, instead of us-

ing ordinary spacing washers between the bits 5 on the through bolts 6, which it was practically impossible to keep from turning by mere tightening of the bolts, or instead of drilling holes through the bits and washers of each row and entering pins therethrough to interlock the bits and washers, which gave rise to the objections above noted, I provide spacers in the form of annular plates or rings 15 fitting about the hub 9 and provided with holes 16 registering with the holes 7 and 11 to receive the through bolts 6. These rings, it will be evident, fill in the spaces otherwise left between the rows of bits so that no pocket is left for chips to lodge and require cleaning out; also, when the rings have a circular periphery, as they are herein shown, and are of such diameter that the periphery is coincident with the hubs or shanks of the bits, as shown, they incidentally serve by engagement with the work at the end of the grooving cut to accurately gauge the depth of the cut, so that a large number of pieces of work can be grooved to the same uniform depth without any difficulty. These spacers obviously need not be circular to serve their purpose; they might, for example, be triangular in the present embodiment. At any rate, each spacer or annulus serves the purpose of three separate and distinct spacing washers in a cutter head having three rows of bits, such as the present one. Accordingly the number of parts required is greatly reduced and the matter of assembling is greatly facilitated. However, the principal feature in the use of the spacers 15 lies in the fact that they cannot turn on the bolts, so that the mere tightening of the bolts results in the positive frictional holding of each bit by reason of engagement of the spacers with the opposed flat faces 17 on the hub or shank of each bit. The bits are shown in Fig. 1 as having the backs thereof engaging the hub 9, but it should not be understood from this that the hub is intended to serve as a means of preventing the bits from turning on the bolts; the bits shown are new ones that have not been reground. After grinding and resetting of the bits, it is obvious that they will no longer engage the hub but will have to rely entirely on the clamping action exercised by the spacers when the bolts are tightened to be held in proper position. It is evident that there will be little or no likelihood of any bit turning out of position so long as the through bolts are kept tightened; also that whenever any bit is damaged it can be reground separately and turned into line with the other bits, thereby giving the maximum of service.

Another advantage in the use of these spacers instead of individual spacing washers lies in the fact that much greater accuracy in the spacing of the bits is obtainable. The reason for this is that a single spacer plate is much more apt to be of the same thickness at each bolt hole than three or more washers are apt to be of the same thickness, or at any rate give the same spacing, unless great care is taken in the production thereof. Thus there is little or no danger of misalignment of the corresponding bits of the various rows.

It is believed the foregoing description conveys a clear understanding of my invention and of its various objects and advantages. It should be understood that while reference has been made to the application of my invention particularly in a lock joint grooving head, the form of bits employed is immaterial and the invention may be embodied in cutter heads for other purposes. The appended claims have accordingly been drawn to cover all legitimate modifications and adaptations, properly coming within the spirit and scope of the invention.

I claim:

1. In a cutter head comprising one or more rows of bits, a rotary center hub, one or more bolts disposed substantially parallel with the hub on a certain radius with respect thereto and mounted so as to revolve therewith, said bolts each having a row of bits assembled thereon, and means for uniformly spacing the bits and holding the corresponding bits of different rows accurately in alignment in the plane of rotation, as well as clamping the same securely in such positions against turning on the bolts, said means comprising flat spacing plates, all of the same thickness, each disposed in the plane of rotation between bits of all of the rows and fitting about said hub and having holes therein to receive said bolts so as to be positively held against turning relative to the hub, the tightening of said bolts serving to draw the plates together and thereby clamp the bits therebetween.

2. In a cutter head comprising one or more rows of bits, a rotary center hub, one or more bolts disposed substantially parallel with the hub on a certain radius with respect thereto and mounted so as to revolve therewith, said bolts each having a row of bits assembled thereon, and means for spacing the bits and holding the corresponding bits of different rows accurately in alignment in the plane of rotation, as well as clamping the same securely in such positions against turning on the bolts, said means comprising flat spacing plates, each disposed in the plane of rotation between bits of all of the rows and fitting about said hub, the said plates being held against turning relative to said hub, the tightening of said bolts serving to draw the plates together and thereby clamp the bits therebetween.

3. A cutter head comprising a rotary center hub having an annular flange on one end thereof, a plurality of through bolts disposed parallel with the hub and passing through holes provided in said flange in circumferentially spaced relation, rows of bits mounted on said bolts, each of said bits being arranged for individual rotary adjustment about its

bolt as a center, a clamping collar fitting over the other end of said hub and having the bolts entered in holes therein, the tightening of the bolts serving to draw the clamping collar toward the aforesaid flange, and a plurality of flat spacers fitting about the hub between the collar and flange and having holes therein to receive all of said bolts, the said spacers being disposed between adjoining bits so as to hold the same in accurately spaced relation and the corresponding bits of the various rows in alignment in the plane of rotation, said spacers being also arranged in the tightening of the bolts to clamp the bits in position.

4. A cutter head as set forth in claim 3 wherein said flange has recesses therein to receive the heads of the through bolts to hold the bolts against turning, and wherein the bolts have the other ends thereof threaded and passing through the holes provided in the clamping collar, there being nuts threading on said bolts and jamming against the outside of the collar.

5. A cutter head as set forth in claim 3 wherein each of the bolts has its headed end received in a counterbored recess provided in connection with one of the bolt holes provided to receive the same in the flange and clamping collar so as to hold the bolt against turning, and wherein the other end of the bolt is threaded and extends through its hole, there being a nut threading on the projecting end of said bolt.

6. A cutter head comprising, in combination, a rotary center hub having an annular flange provided on one end thereof, a clamping collar fitting over the other end of said hub and movable toward said flange, bolts entered through registering holes provided in the flange and collar respectively, and cutter bits mounted on said bolts having means for spacing the cutting edges thereof in predetermined spaced relation, said flange having recesses therein for the reception of the headed ends of said bolts to hold the same against turning, and there being nuts threading on the other ends of said bolts which project through the holes provided in the clamping collar.

7. A groove-cutting, wood-working head of the character described, comprising a rotary body member, one or more bolts carried thereby parallel with the axis thereof, the said bolts being held against turning, a row of bits assembled on each bolt and projecting from the head, and means on the bolt for uniformly spacing the bits and holding the corresponding bits of different rows in accurate alignment in the plane of rotation, as well as clamping the same securely in such positions, said means comprising flat spacers, all of the same thickness, assembled on the bolt between the bits, the said spacers being each held against turning relative to the bolt and the tightening of the bolt serving to draw the spacers together to clamp the bits therebetween.

8. A groove-cutting, wood-working head of the character described, comprising a rotary body member, one or more bolts carried thereby parallel with the axis thereof, a row of bits assembled on each bolt and projecting from the head, and means on the bolt for uniformly spacing the bits and holding the corresponding bits of different rows in accurate alignment in the plane of rotation, as well as clamping the same securely in such positions, said means comprising flat spacers, all of the same thickness, assembled on the bolt between the bits, the said spacers being each held by the bolt against movement relative to the body member and being held against turning about the bolt as a center, and the tightening of the bolt serving to draw the spacers together to clamp the bits therebetween.

9. A groove-cutting, wood-working head of the character described, comprising a rotary center hub, one or more bolts carried thereby parallel with the axis thereof, a row of bits assembled on each bolt, and means for uniformly spacing the bits and holding the corresponding bits of different rows in accurate alignment in the plane of rotation, as well as clamping the same securely in such positions, said means comprising flat spacers, all of the same thickness, assembled on and fitting about the hub between the bits, the said spacers being each held against turning relative to the hub, and the tightening of the bolt serving to draw the spacers together to clamp the bits therebetween.

10. A groove-cutting, wood-working head of the character described, comprising a rotary body member, a plurality of bolts carried thereby parallel with the axis thereof at approximately the same radius with respect thereto and in substantially uniformly circumferentially spaced relation relative thereto, a row of bits assembled on each of said bolts, each bit being mounted on the bolt by the hub portion thereof and projecting outwardly from the head, and means for uniformly spacing the bits and holding the corresponding bits of different rows in accurate alignment in the plane of rotation, as well as clamping the same securely in such positions, said means comprising a series of flat spacer rings, all of the same thickness, provided with holes for the reception of said bolts and assembled on the bolts between the hub portions of the bits, in substantially concentric relation to the body member, the said spacer rings being arranged in the tightening of the bolts to clamp the bits therebetween, and the said spacer rings having circular peripheries, the same being arranged by engagement with the work to gauge the depth of the grooves cut by the bits.

11. A groove-cutting, wood-working head

of the character described, comprising a rotary body member, a plurality of bolts carried thereby parallel with the axis thereof at approximately the same radius with respect thereto and in substantially uniformly circumferentially spaced relation relative thereto, a row of bits assembled on each of said bolts, each bit being mounted on the bolt by the hub portion thereof and projecting outwardly from the head, and means for uniformly spacing tne bits and holding the corresponding bits of different rows in accurate alignment in the plane of rotation, as well as clamping the same securely in such positions, said means comprising a series of flat spacer plates, all of the same thickness, provided with holes for the reception of said bolts and assembled on the bolts between the hub portions of the bits, the said spacer plates being arranged in the tightening of the bolts to clamp the bits therebetween, and the portions of said spacer plates between the rows of bits serving by the taking up of the spaces otherwise left between the rows of bits to prevent chips from lodging therein.

12. A groove-cutting, wood-work head of the character described, comprising a rotary body member, a plurality of bolts carried thereby parallel with the axis thereof at approximately the same radius with respect thereto and in substantially uniformly circumferentially spaced relation with respect thereto, a row of bits assembled on each of said bolts, each bit being mounted on the bolt by the hub portion thereof and projecting outwardly from the head, and means for uniformly spacing the bits and holding the corresponding bits of different rows in accurate alignment in the plane of rotation, as well as clamping the same securely in such positions, said means comprising flat spacers, all of the same thickness, assembled on the bolts between the hub portions of the bits and reaching from one bolt to the next and so on around so that the spacing means for the bits of one row are coordinated with the spacing means for the bits of the other rows, and are not free to turn or move out of operative position, the said spacers being arranged in the tightening of the bolts to clamp the bits therebetween.

In witness of the foregoing, I affix my signature.

FRANK R. WEAVER.