A. H. HAWKINSON.

MORTISING TOOL.

APPLICATION FILED SEPT. 10, 1921.

1,401,469.

Patented Dec. 27, 1921.

Fig 1.

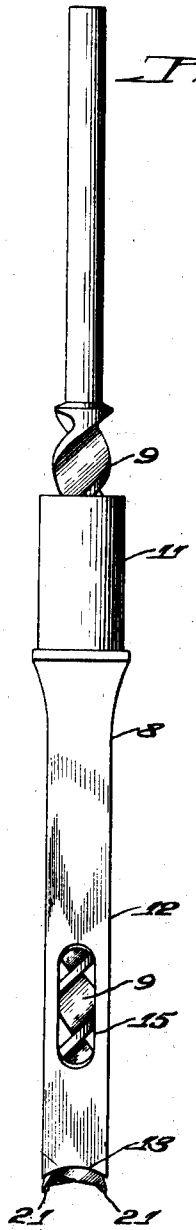


Fig 2.

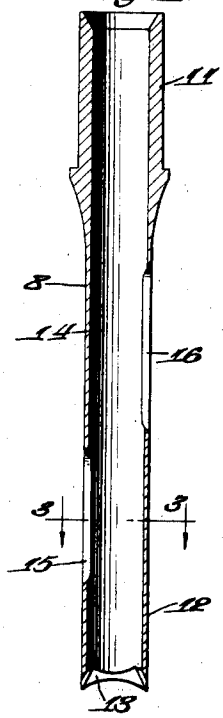


Fig 3.

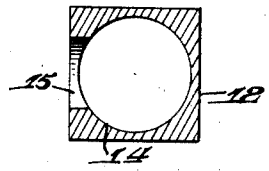


Fig 7.

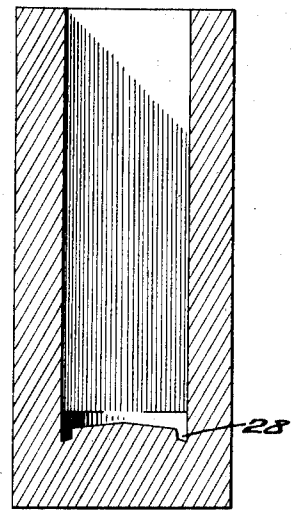


Fig 4.

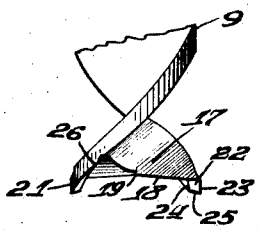


Fig 5.

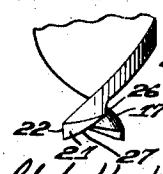
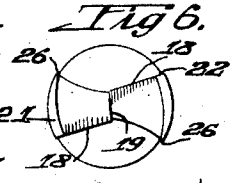


Fig 6.



Inventor.

Adolph H. Hawkinson

By Ira J. Wilson

Atty.

UNITED STATES PATENT OFFICE.

ADOLPH H. HAWKINSON, OF ROCKFORD, ILLINOIS, ASSIGNOR TO GREENLEE BROS. & CO., OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS.

MORTISING-TOOL.

1,401,469. Specification of Letters Patent. Patented Dec. 27, 1921.

Application filed September 10, 1921. Serial No. 499,629.

To all whom it may concern:

Be it known that I, ADOLPH H. HAWKINSON, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Mortising-Tools, of which the following is a specification.

This invention relates in general to mortising tools, and has more particular reference to the hollow chisel type. This comprises a boring bit in combination with a hollow chisel adapted to be operated in unison by a mortising machine for simultaneously boring a hole and cutting it square, rectangular, or any shape in cross section, other than circular.

The construction of these tools has been practically standardized and unchanged for many years. Their use, however, especially in hard woods, is not satisfactory, in that the percentage of replacements due to injuries, breakages and short life of the tools, is comparatively high. These injuries are generally caused by excessive heating of both the bit and chisel, which results from the inherent design of these parts. For example, the spurs on the bit are so shaped as to function in a wedging action, which when the bit is used in hard woods develops excessive frictional heat, thereby destroying the temper and eventually distorting or flattening the spurs and rendering the bit useless. Furthermore, it has been the practice to slot or rifle the bore in the chisel. This not only weakens the chisel, but causes the wood fiber to pack in the slots and retard clearance of the chips, thereby further developing excessive frictional heat which invariably results in disabling the tool.

The primary object of the present invention is, therefore, to overcome the objections herein-above noted, and to provide a superior and more efficient mortising tool, and one which will properly function under all conditions of usage, especially in hard woods.

In furtherance of this general object, I have improved both the chisel and bit constructions; and inasmuch as these tool elements jointly perform the mortising operation, they combine to effect the greatest efficiency. These improvements will be more particularly pointed out hereinafter.

Another object is to provide a mortising tool of such novel construction that it may be manufactured at a comparatively low cost and will practically and effectually serve the purpose intended.

Other objects and attendant advantages will be appreciated by those skilled in this art as the invention becomes better understood by reference to the following description when considered in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a mortising tool embodying my invention;

Fig. 2, a longitudinal section through the chisel;

Fig. 3, a cross-section through the chisel taken on line 3—3 of Fig. 2;

Fig. 4, an enlarged side view of the cutting end of the bit;

Fig. 5, a similar view looking at the right hand side of Fig. 4;

Fig. 6, an end view of the cutting end of the bit; and

Fig. 7, a longitudinal section through a mortising block, showing the cutting effect of the bit and chisel.

The mortising tool comprises a hollow square cutting mortising chisel and a twisted double-spur bit designated generally by reference characters 8 and 9 respectively. The chisel has the usual shank 11, blade 12 and cutting bevels 13. The chisel has a cylindrical bore 14, which it will be noted is not slotted or rifled, but has a smooth surface which is a true circle in cross section. Chip openings 15 and 16 are formed in opposite walls of the blade, it being noted that the opening 15 is positioned relatively close to the cutting bevels and that the opening 16 commences above the upper point of the opening 15, thereby leaving an intermediate imperforate body portion. These combined openings give an outlet for the chips substantially throughout the length of the blade and are so arranged as to not weaken the blade.

The bit with the exception of the cutting end is of the conventional spiral or twisted type. Referring now more particularly to Figs. 4 to 6 inclusive, it will be observed that each wing 17 terminates in a cutting edge 18, reaching from a center lip 19 to a pilot spur 21. Particular attention is directed to the general shape of the spurs. Each spur is designed to cut its path in the

wood as distinguished from being pressed through the wood in a wedging action, as is the common practice with the conventional spur previously used. The present spur has a face 22 in the plane of the adjoining cutting edge 18, which face is defined by outer and inner cutting edges 23 and 24 and an intermediate cutting edge 25. The body of the spur is widest at its face and gradually diminishes in width toward its drill end 26. The under surface 27 of the spur follows the general incline of the hollow. It will thus be seen that the proper cutting edges 23, 24 and 25 will cut an annular groove 28, Fig. 7, and that the stock removed will be carried upwardly through the hollows of the bit along with the chips cut by the edges 18. It will further be noted that the stock displaced by the spurs is actually cut out and is not wedged or compressed to give way to the spurs as is the case with the conventional spurs now in general use. As a result of the present construction, the cutting action of the bit is very efficient and the heat developed is not of sufficient consequence to impair the operation.

With regard to the combined operation of the bit and chisel, it will be observed that the bit travels at a relatively high speed, approximately 3000 R. P. M., although this speed may, of course, be varied according to the diameter of the tool and the nature of the work. The bit and chisel bear at all time the operative relation shown in Fig. 1. As the tool is fed into the wood stock, the bit cuts a hole, the diameter of which is equal to the over-all width of the chisel. This is by reason of the fact that the spurs are set out from the twisted body of the bit. The chips cut both by the bit and the chisel will be carried up and discharged first through the opening 15 until the opening is closed by the feed of the tool into the wood, whereupon the chips will discharge through the opening 16. By positioning the opening 15 in such proximity to the cutting end of the tool as to not weaken the chisel structure, the chips will clear very effectively during the first portion of the mortising operation, thereby greatly facilitating the clearance of chips, during the remaining portion of the operation. In other words, there is practically no friction developed by clogging or jamming of chips during the initial portion of the operation, which if continued during the latter portion might develop such excessive heat as to injure the tool. By the provision of a smooth face bore as distinguished from a slotted or rifled bore, I have eliminated the possibility of the wood fiber packing in the longitudinal slots or grooves and causing the development of frictional heat and its resulting danger. Furthermore, by eliminating the rifling the chisel is materially strengthened, and has a greater capacity for the conduction of heat. The function of the spurs in cutting the hole to the proper size rather than by wedging their way through the wood has been already referred to, and it will be manifest that the heat developed by the spurs will not be dangerous; and furthermore that by giving sufficient body to the spurs the heat will be conducted and dissipated through the bit body. Both the chisel and bit combine, therefore, to reduce the development of heat and to promote greater capacity and efficiency in tools of this character. As a result, these tools may be used in every-day continuous service in hard woods with a remarkably low percentage of breakages and replacements. In addition to the superior operation resulting from the novel construction, this mortising tool is more durable and has greater life under most severe working conditions than any prior mortising tool of its kind.

It is believed that the foregoing conveys a clear understanding of the objects prefaced above, and while I have illustrated but a single working embodiment of my invention, it should be understood that considerable change might be made in details of construction without departing from the spirit and scope of the invention as expressed in the appended claims.

I claim:

1. A mortising tool comprising in combination a hollow square-cutting chisel and a boring bit, the bit having pilot spurs each having a face defined by cutting edges for cutting out an annular passage.

2. In a mortising tool, a bit, each wing of which terminates in a cutting edge reaching from a center lip to an outer spur, each spur having a face defined by an inner and an outer cutting edge and shaped to diminish in width toward its trailing end.

3. A mortising tool comprising in combination a hollow chisel and a bit, the bore of the chisel being unrifled and the bit having cutting spurs shaped to provide substantially flat cutting faces disposed transverse to the path of rotation.

4. In a mortising tool, a bit the cutting edge of which is shaped to provide spurs each having cutting edges for cutting an annular passage for the spurs, and each spur being widest at its cutting end and gradually diminishing in width toward its trailing end.

5. In a mortising tool, the combination of a hollow square-cutting chisel, a bit therein having outset spurs each shaped to provide a face defined by cutting edges for cutting out an annular passage. the outer diameter of which is substantially coincident with the width of the chisel.

6. In a mortising tool, a double-spur bit the spiral body of which terminates in cutting edges reaching from an inner point sub-

stantially to the outer side and having a spur at the outer end of each cutting edge, each spur having a cutting face coincident with the adjoining cutting edges and defined at its inner and outer sides by cutting edges.

7. A mortising tool comprising in combination a hollow square-cutting chisel and a boring bit, the blade of the chisel having cutting bevels at one end and having an elongated opening intersecting one of its side walls and bore adjacent to said cutting bevels, a second elongated opening through the diametrically opposite wall and located between the first mentioned opening and the shank end of the chisel, and the bit having opposite spurs, each shaped to provide a face defined by cutting edges for cutting out an annular body, the outer diameter of which is substantially coincident with the width of the blade.

8. A mortising tool comprising in combination, a hollow chisel and a bit, the chisel having an elongated chip opening adjacent to its cutting end and another farther from said end, at the opposite side of and spaced longitudinally from the first opening, leaving an imperforate body portion between the openings.

9. In a mortising tool, a double-spur bit, the spurs of which are outset and shaped to provide an inner and outer cutting edge, the inner side of each spur being curved so that the radial thickness of the spur body converges substantially from the cutting end to the trailing end.

ADOLPH H. HAWKINSON.