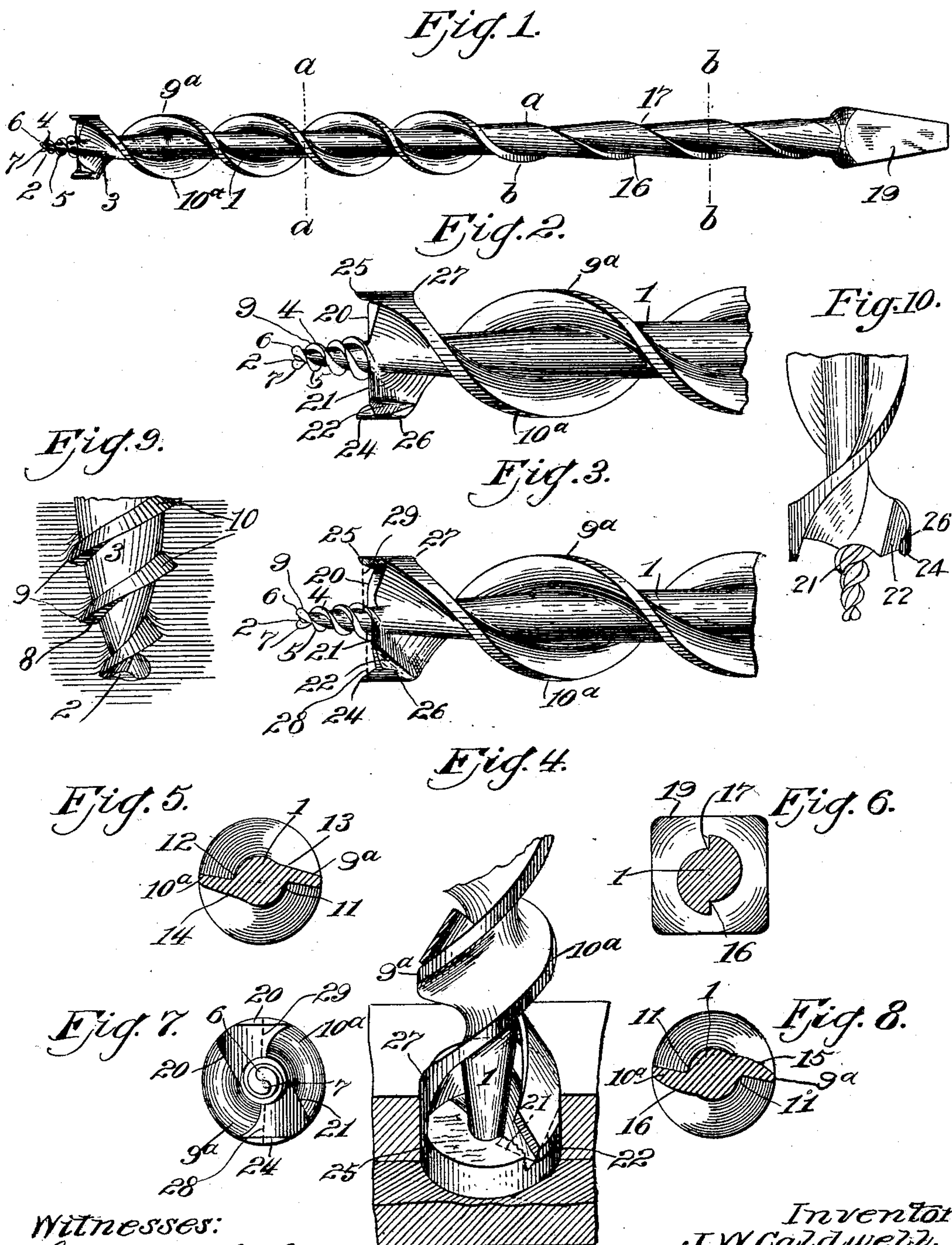


J. W. CALDWELL.
 AUGER BIT.
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Patented Nov. 16, 1909.



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UNITED STATES PATENT OFFICE.

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AUGER-BIT.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN WILLIAM CALDWELL, a subject of the King of Great Britain, a resident of Coolamon, New South Wales, Australia, and temporarily residing in New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Auger-Bits, of which the following is a specification.

This invention pertains to augers, bits or drills and may be especially adapted for use in woodworking.

It is very important that a bit in order to be practical for all purposes, shall be equally adapted for boring in a hard wood as well as in a soft wood, whereby in either of these woods the bit will cut a smooth hole in a rapid, efficient and easy manner, and without the necessity of exerting too much power in working the bit. Such is one of the designs of this invention in combination with the objects of causing the bit to enter quickly into the wood; to efficiently cut the chip quickly and also quickly cause the removal or conveyance of the chips away from the working point and out of the hole through the instrumentality of a specially designed mechanical construction.

Other objects among those which will appear obvious, are also to provide a specially constructed screw point the primary object of which is that its threads may be so constructed as to successfully prevent the same from choking in hard and in gummy wood, and also to reduce or minimize the resistance; also to build channels within the worm of a much greater width than the chip which is to be cut so that the latter may travel with practical freedom along the worm without the slightest liability of choking; also to reduce the worm conveyer which will cause a continuous movement of the chips so that congestion around the stem may be avoided; also to provide a main cutter which will enter the wood after an undercutting spur lip has scribed and cut its circle, and after which an upper side cutter will cut the uplifted or displaced chip.

These objects residing in combination in a construction produce such obvious results as will give to a bit of this character all the qualities of an easy boring bit; of a rapid boring bit, and of a non-choking boring bit, and the organization herein displayed will render the structure highly efficient, practical, durable and inexpensive to manufacture.

One embodiment of these features as a mechanical construction is set forth and disclosed in the accompanying drawings in which—

Figure 1 represents a view in elevation of a bit having the quick acting screw point, specially arranged spur lips and cutting lips, and wide open pitch worm conveyer, and a spiral grooved stem beyond the terminus of the worm. Fig. 2 is an enlarged fragment of the same view showing more in detail the arrangement of the screw point and the cutters. Fig. 3 is a similar view showing in opposite the arrangement of the cutters. Fig. 4 is a perspective illustrating the manner in which the cutters enter the wood and lift the chip, and the manner in which such lifted chip is afterward cut by an upper cutter. Fig. 5 is a transverse section on line *a—*a** Fig. 1, showing the configuration or contour of the spiraled angular blades of the worm. Fig. 6 is a transverse section on line *b—*b** of said Fig. 1 showing the arrangement of the grooved stem. Fig. 7 is a bottom plan view of the cutting end portion of the bit, Fig. 8 is a cross section showing a modified form of the shape of the worm blades, Fig. 9 is an enlarged view of a screw point, and Fig. 10 shows the cutting end of the auger in perspective.

Similar characters of reference indicate like parts throughout the figures.

To the lower extremity of the stem 1 is a screw point 2 of such a character for instance as that shown and described in the patent granted to me October 24, 1899, and bearing Number 635,297, which comprises a cone provided with two wide open pitch spiral threads 4 and 5, which terminate at or beyond the apex of said cone in two radial cutting lips 6 and 7, the said threads decreasing in size as they proceed to said lips. It is to be understood however in this connection, as far as the point of this thread is concerned, that while I prefer to use the two cutting lips 6 and 7, each of the threads 4 and 5 may so terminate as to form a single cutting drill point or any form of point which may be found most desirable and practicable.

Spiraled around a portion of the stem 1 are two worm blades 9^a and 10^a of wide open pitch; these angularly shaped worms are preferably straight and slightly undercut as at 11 and 12, on their top forward surface, and each may be beveled as at 13 and

14 on their under rear surface or the surface opposite the straight surface, as seen at Fig. 5, or if desired the surface 13 and 14 of said worm blades may be oveled as at 15 and 16, as seen at Fig. 8. The pitch of course of the angular blades 9^a and 10^a is to be regulated in accordance with the size of chip the tool is designed to cut. By reason of the top of the blade being higher at the peripheral portion than at the stem portion, the chip or cutting will be elevated at its outer or peripheral part and therefore will avoid being wedged between the stem and the wall of the bore, which will greatly facilitate the exit of the chips from the hole being cut. For example, if the tool cuts an inch hole the chip will be one-half an inch wide, the space or opening between the spiral blades which form the channel for clearance must necessarily be more than one-half an inch wide between the channels throughout the entire length of the worm, so that the wood may travel through without the liability of choking or congestion, hence reducing resistance. There is a special advantage to be derived from this design of bit on this account. At or near such a point as may be designated by *a* and *b* Fig. 1, the spiral blades 9 and 10 diminish in size and the diminishing channels caused thereby continue along the stem, as grooves 16 and 17, the design of which is to assist and cause the progressing chips to continue their travel out of the hole. It is obvious however that I need not be confined to the use of a spiral groove for this purpose as any means designed for continuing to convey these chips and applied to the stem or shank of the bit may be employed consistently within the purview of this invention. The stem 1 of course is provided with the usual driving head 19 which may be of any suitable size and shape to be adapted to any machine or auger.

The lower portion or extremity of each of the spiral blades 9^a and 10^a of the angularly shaped worm terminates in a cutting lip 20 and 21, as clearly illustrated in Figs. 2, 3, and 7. These cutting lips may, in the present instance and preferably so, extend beyond the side spur cutters to an extent sufficient to permit the uplifting of the chip before it is finally severed by an upper side cutter, hereinafter to be more fully referred to, (it being here remarked that the lower cutters are intended to only sufficiently score the base of the bore to allow the chip lifters to tilt the chip from the center toward the wall of the hole) and in order to reduce resistance and minimize waste power, the side edge of said projecting cutter is reduced to practically a knife edge by causing said cutter to be beveled off, as at 22.

As has been stated the lower portion of each of the spiral worms is provided with

lower and upper cutters, the former of which is designated as 24 and 25, and the latter as 26 and 27. In the present instance the lower cutters 24 and 25 may only be of a length sufficient to enable them to scribe a circle of such depth as to enable the cutting lips 20 and 21 to take hold of and start the uplifting of the chip. By shortening these cutters to this extent it will be observed that the space 28 and 29 between the hilt of the screw point and said cutters is materially widened and permits the easy passage of the material therebetween, which is effective for permitting more easy working of the bit. The upper cutting spur lips 26 and 27 are preferably located above the spur lips 24 and 25, and back from the elongated cutting lips 20 and 21, and these completely cut the chips after they have been uplifted to an angle by the bevels 22 and 23. And the special formation and construction of the worm as hereinbefore referred to is such as will enable said chip to freely travel up and out of the hole without the slightest possibility of choking.

Now it will be observed that I have provided a bit which is capable of quickly entering the wood, boring a hole whose wall throughout would be substantially smooth through which the quickly accumulating chips resulting from the quick action of the cutting parts of the bit may be effectually conveyed away from the working point without any liability of choking whatsoever, and which will be further conveyed beyond the terminus of the worm conveyer through the instrumentality of a specially constructed stem when the tool is disposed deeply within a hole so that resistance due to packing of the chips either within the worm or around the stem beyond the worm may be materially reduced or entirely obviated. It is also to be noted that the screw point employed in this construction is of that quick acting character and possesses such holding advantages as will quickly carry the bit into the wood to effect quick boring and in combination with this feature the cutters are so constructed and arranged, as hereinbefore set forth, that their operation is effectually commensurate with the quick acting powers of the screw point, which draws the entire structure into the wood.

Having thus described my invention, I claim:

1. An auger comprising a shank with spiral side wings or blades reduced throughout the upper part of their extension to a comparatively shallow rib or flange.

2. An auger comprising a shank with spiral side wings or blades reduced throughout the upper part of their extension to a comparatively shallow rib or flange, whose upper face is substantially transverse to the axis of the bit at each horizontal element,

while the periphery and lower face merge and extend from the upper face to the face of the next lower convolution.

5 3. An auger comprising a shank provided with one or more cutting lips having its cutting edge extending outward to the periphery of the auger, the lip also having a peripheral beveled cutting edge extending rearward from the outer extremity of the
10 said cutting edge.

4. An auger comprising a shank provided with one or more cutting lips having its cutting edge extending outward to the periphery of the auger, the lip also having a peripheral
15 beveled cutting edge extending rearward from the outer extremity of the said cutting edge, that is formed by beveling the normal top surface of the said cutting lip, at its outer portion.

20 5. An auger comprising a shank provided with one or more cutting lips having its cutting edge extending outward to the periphery of the auger, the lip also having a peripheral beveled cutting edge extending rearward from the outer extremity of the
25 said cutting edge, and an upwardly projecting spur beginning at the rear of said peripheral cutting edge and extending rearward.

30 6. An auger comprising a shank provided with one or more cutting lips having its cutting edge extending outward to the periphery of the auger, the lip also having a peripheral beveled cutting edge extending
35 rearward from the outer extremity of the said cutting edge, and an upwardly projecting spur beginning at the rear of said peripheral cutting edge and extending rearward, said spur having its forward longitudinal
40 extending edge beveled.

7. An auger comprising a shank provided with one or more cutting lips having its cutting edge extending outward to the periphery of the auger, the lip also having a peripheral beveled cutting edge extending
45 rearward from the outer extremity of the said cutting edge, and an upwardly projecting spur beginning at the rear of said peripheral cutting edge and extending rearward, and downwardly extending spurs located
50 opposite said spurs.

8. An auger comprising a stem of substantially cylindrical form, and having one or more blades spiraled around the stem, the blade having its upper surface formed
55 with rectilinear elements extending radially inward and inclined downwardly from the periphery to the stem, whereby the chips or cuttings are deflected upwardly at their peripheral portions.

9. An auger comprising a stem of substantially cylindrical form, and having one or more blades spiraled around the cylindrical stem, the blade having its upper surface formed with rectilinear elements
65 extending radially inward and inclined downwardly from the periphery to the stem, whereby the chips or cuttings are deflected upwardly at their peripheral portions, the under side of the blade being inclined downwardly toward the stem, whereby the blade
70 is of decreased thickness from the stem to the periphery, substantially as set forth.

Signed at Nos. 9 to 15 Murray st., New York, N. Y., on the 22nd day of May 1903. 75

JOHN WILLIAM CALDWELL.

Witnesses:

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FRED. J. DOLE.