(No Model.)

J. SWAN.

TOOL FOR CUTTING THE FLOOR LIPS AND CUTTING SPURS OF AUGER BITS.

No. 307,074. Patented Oct. 21, 1884.

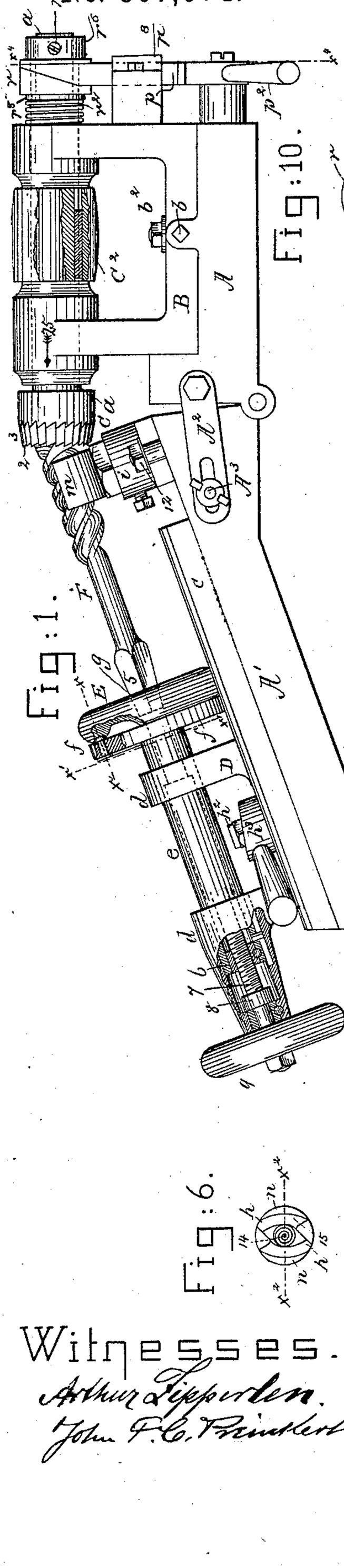

Fig:1.

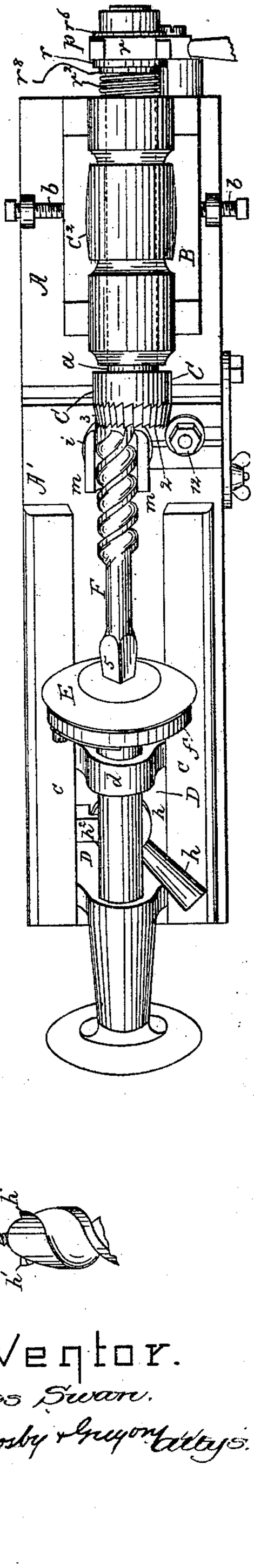

Fig:2.

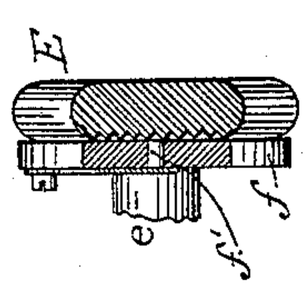

Fig:3.

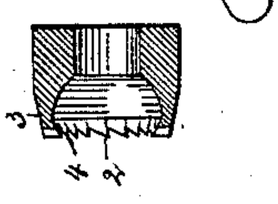

Fig:5.

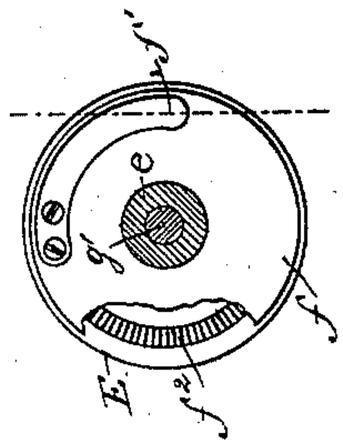

Fig:4.

Fig:6.

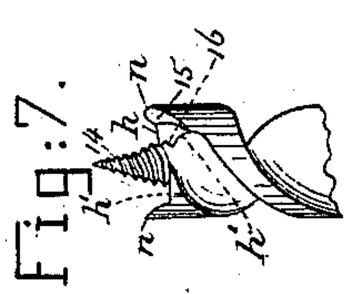

Fig:7.

Fig:8.

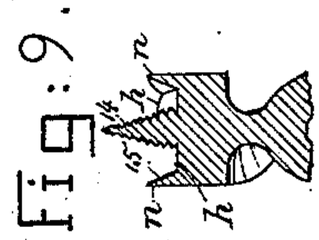

Fig:9.

Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES SWAN, OF SEYMOUR, CONNECTICUT.

TOOL FOR CUTTING THE FLOOR-LIP AND CUTTING-SPUR OF AUGER-BITS.

SPECIFICATION forming part of Letters Patent No. 307,074, dated October 21, 1884.

Application filed October 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES SWAN, of Seymour, county of New Haven, State of Connecticut, have invented an Improvement in Mechanism for Manufacturing Spur Bits or Augers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention has for its object the production of a machine by which to automatically mill and bevel truly the floor-lip and cutting-spurs of auger-bits. Heretofore this work has been done by several cutting-disks, one being used after the other, and the portions of the bit acted upon by the said cutters have then always been finished with a file, for the surface left by the cutters is neither sufficiently true nor smooth, for the bit has always been held by hand during such operation. By my invention these several handlings of the bit and its treatment with several tools and then with files is obviated, and the floor-lip and cutting-spurs are finished truly and smoothly with one operation, a single novel tool being used and the bit being held by a suitable holder or rest.

In accordance with my invention the bit is first roughly formed by forging or otherwise to outline the point for the leading-screw and portions for the floor-lip and spurs, and the pod is formed as now commonly practiced in the manufacture of spur-bits, and the bit is then annealed and straightened, and the point for the leading-screw is milled true to its base, and the outside of the cutting-spurs is turned or milled true, all as usual. In this condition the shank of the bit is placed in a holder or chuck, and the pod at or near the other end of the bit is placed in or on a suitable rest, so that a cylindrical milling-tool—such as will be herein described—may act to cut the floor-lip at an incline, the tool being so shaped and the devices for holding and supporting the bit being so placed with relation to the center of the milling-tool that the floor-lip is cut at the proper incline, or is given, as it is termed, the proper "fall" or "clear," or so that the floor-lip does not bear on the solid wood back of its cutting-edge. The milling-tool employed is cylindrical and has milling-teeth at its annular end and also at its outer side, which teeth are preferably beveled to act upon and cut the inner face of the spur at an inclination to the floor-lip, and this tool is also so shaped at its interior and just at its end as to enable it to cut laterally into the face of the point to be threaded for the leading-screw, so as to enable the cutting-edge of the floor-lip to meet the said point and form a part of one of the screw-threads which is to be subsequently formed thereon. As the bit is advanced on the milling-tool, or vice versa, the latter, besides beveling the floor-lip, also bevels the cutting-spur from its edge toward the floor-lip; and it will be also noticed that the inner wall of the said spur will be left concave and circular, whereas in all other similar bits wherein the spur is finished with a file, as usual, the inner side of the spur is straight or convexed.

The invention of this milling-tool constitutes the subject-matter hereof, and the other parts of the machine are included in the application for Letters Patent, Serial No. 137,123, filed July 8, 1884; but I have herein shown and described such other parts in order to fully illustrate the operation of the milling-tool. Having finished the floor-lip and spur at one side of the point, the bit will be turned one-half around and the other floor-lip and spur will be treated in like manner. After this the point will be threaded to form the leading-screw, and the bit will be finished as usual, thus doing away with a file with which to give shape to the floor-lips and spurs.

Figure 1, in side elevation partially broken out, shows a machine for the manufacture of spur-bits in accordance with my invention; Fig. 2, a top view thereof; Fig. 3, a section of the chuck and part of the spindle and locking device for the chuck on the dotted line $x\,x$. Fig. 4 is a section on the dotted line $x'\,x'$, Fig. 1, partially broken out. Fig. 5 is a section of the cutting-tool detached. Fig. 6 is an end view of the head of a finished spur-bit; Fig. 7, a side elevation of the head of the bit; Fig. 8, a similar view with the bit rotated one-fourth around. Fig. 9 is a section of Fig. 6 on the line $x^2\,x^2$, and Fig. 10 a section of Fig. 1 on dotted line x^4.

Referring to the drawings, which represent one form of apparatus by which my invention may be practiced, A A′ designate the two

parts of the bed of the machine, the said parts being arranged in different planes, so that the bit being milled may be held at an angle with relation to the center of motion of the milling-tool to thus give the proper clear or incline to the floor-lip, and to place that part of the bit being treated in proper contact with the tool. As herein shown, these two parts A A′ are hinged together or pivoted the one with relation to the other, so that one may be more or less inclined with relation to the other, according to the inclination desired for the floor-lip, there being suitable adjusting devices, A^2, and set-screws A^3 to confine the said parts in adjusted position. The part A serves as a support for the head B, having suitable bearings for the shaft or arbor *a*, (shown in dotted lines, Fig. 2,) upon the end of which is secured my improved milling or cutting tool C, the said shaft having upon it a suitable belt-pulley, C^2, the head being slotted and made adjustable by suitable adjusting devices, *b* b^2. (Shown in Figs. 1 and 2 as screws.)

The tool C, as herein shown, is made as part of a cylinder, and has a series of teeth, 2, at its outer annular end, and is beveled at its exterior, near its outer end, and is provided with a series of teeth, 3, and just within its outer end the said tool is provided with a cutting-rim, 4. The portion A′ of the frame has guideways *c c*, to receive the carriage D, which has suitable bearings, *d*, to support the spindle *e*, upon which is a face, disk, or arm, *f*, provided, as herein shown, with a pawl, *f′*, to engage ratchet-teeth or recesses f^2, made at the inner side of a chuck or holder, E, having a central aperture, *g*, (see dotted lines, Fig. 1,) to receive and hold the squared end 5 of the shank of the bit F, the said chuck or holder having a pintle, *g′*, Fig. 4, to enter a recess in the end of the spindles. This pawl and ratchet enables the chuck or holder to be turned more or less to accommodate the floor-lip and spur of the bit to the milling-tool C, notwithstanding variations in position of the corners of the squared ends of the bits with relation to the edge of the floor-lip, such variations occurring by slight differences in the amount of twist put into the pod.

Instead of a pawl and ratchet, I might use a set-screw or other holding device, and I shall therefore denominate the said pawl and ratchet or its described equivalent as the "chuck-retaining device." The carriage D will have a suitable eccentric clamp, h^3, to lift a wedge, h^2, by which to secure said carriage in adjusted position in the guideways. The spindle *e* has a nut, 6, which receives a screw, 7, provided with a suitable collar, 8, which permits the screw to be rotated in the bearing *d* by the hand-wheel 9, but prevents the said screw from being moved longitudinally. So, by turning the said screw the spindle and chuck may be advanced at the proper speed, according to the speed at which it is desired to cut the floor-lip and spur. The portion A′ also has adjustably connected with it by bolt 12 a socket, *i*, which receives the round stem or shank of the rest *m*, which is shown as a concaved block, the said shank being adjustably held to enable the head of the bit to be placed in exactly the proper position with the tool to act properly upon it.

Referring to Fig. 7, it will be seen that the floor-lip *h* is inclined backward from its cutting-edge *h′*, and this inclination may be varied more or less by the relative differences between the levels of the parts A A′ of the frame. The shape of the inner wall of the cutting-lip *n* will depend upon the shape of the cylindrical tool, and will be more or less beveled, according to the bevel of the said tool, and the tool being circular externally it is obvious that the inner wall, 15, of the spur *n*, next the point 14 to be made into a leading-screw, (see Fig. 6,) will be left concave and circular, rather than straight or convex, one or the other of which conditions has always heretofore existed, as this part of bits has been universally finished by filing.

The bit produced by my improved machine herein described forms the subject-matter of another application, No. 108,323, filed October 6, 1883, and so does also a modified form of tool to be used in the manufacture of augers or bits having a side lip or sharpened portion extended from the cutting-edge of the floor-lip toward the shank. The spur makes an annular cut into the wood in advance of the floor-lip; but the side lip of a common auger does not attack the wood in the bottom of the hole being bored in advance of the floor-lip. When the floor-lip and spur have been cut to the proper depth, the rim 4 is made to cut into the base of the point 14 to form a groove, 16, which constitutes a part of the last thread at the base of the leading-screw, the part of the said thread which is formed by the said rim being practically a continuation of the cutting-edge of the floor-lip. This may be done by changing the relative positions laterally of the tool and bit, and by moving either the rest or the head.

Instead of moving the spindle-chuck and bit longitudinally by the screw and nut described, the arbor *a* may be moved longitudinally as the cutter forms the floor-lip and the inner face of the cutting-lip, and to do this I have provided the following means: The belt-pulley C^2 is connected with the shaft *a* by a spline, so that the said shaft may be moved longitudinally in its bearings and with relation to the pulley C^2, by means of the advancing mechanism, which, as herein shown, is composed of a forked beveled-face slide-bar, *p*, which enters an annular groove in a collar, *r*, loose on the shaft *a*, one side of the wall of the said groove being straight or annular, while the other wall is beveled to correspond with the bevel at the rear side of the slide. The shaft *a* has fastened upon it by the screw r^5 the collar r^6, against which collar one end of the loose collar *r* rests. A spring, r^2, is arranged on the shaft *a*, between the bearing for

the shaft and the collar r^8, fast on the shaft a, and forming an abutment for collar r, so that the tendency of the spring, when not compressed by the action of the slide-bar p, is to force the collar r against the collar r^6, and draw the cutter and shaft back from the end of the bit. The toothed slide-bar p is held in the guide p^8, and its upward movement by the toothed sector-lever p^2 moves the loose collar r toward the shaft-bearing, and causes the inner end of the said collar to act against the collar r^8, and move the shaft a, with its attached cutting-tool C, forward in the direction of the arrow 25, causing the said tool to gradually cut the floor-lip of the bit.

I claim—

1. The metal-cutting tool C, having a cylindrical body, and provided with an annular cutting end to cut the floor-lip of a spur-bit, and with a cylindrical cutting periphery located just back of the said end, to cut the inside of the cutting-spur of the bit, while the annular cutting end of the tool cuts the floor-lip of the bit, substantially as described.

2. The metal-cutting tool C, provided with the cutting-surfaces 2 and 3, and with an internal cutting-rim, substantially as described.

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

JAMES SWAN.

Witnesses:

GEO. W. GREGORY,

B. J. NOYES.