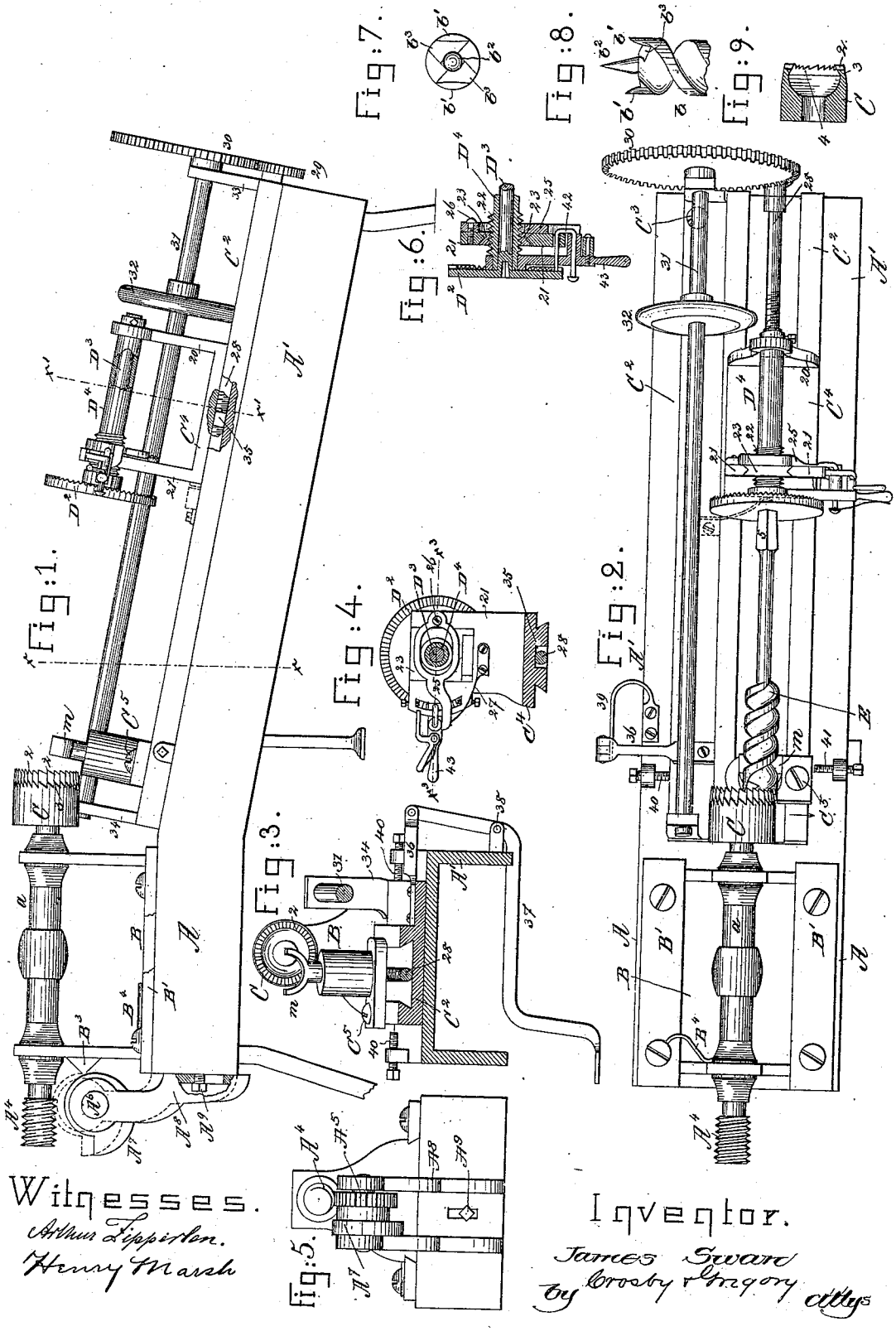
(No Model.)

J. SWAN.

MACHINE FOR THE MANUFACTURE OF AUGER BITS.

No. 313,456. Patented Mar. 3, 1885.



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UNITED STATES PATENT OFFICE.

JAMES SWAN, OF SEYMOUR, CONNECTICUT.

MACHINE FOR THE MANUFACTURE OF AUGER-BITS.

SPECIFICATION forming part of Letters Patent No. 313,456, dated March 3, 1885.

Application filed June 23, 1884. (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 Machines for the Manufacture of Auger-Bits, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The machine herein described is an improvement on that represented in application No. 108,321, filed by me October 6, 1883. The machine referred to in the said application contains a hollow or cylindrical cutting-tool provided with cutting-teeth at its end and at its periphery, and internally near its end the said tool has a cutting-rim, and the bevel, fall, or pitch of the floor-lip from its cutting-edge backward is determined by the angular presentation of the auger-bit to the circular-cutting tool, such angular presentation being entirely controlled by placing the two parts of the bed of the machine in different planes. In practice I have found that the value of the bit described in that application may be enhanced, or its qualities be improved, by prolonging the cut made in it by the internal cutting-rim referred to, said cut being extended forward closer to the point of junction of the cutting-edge of the floor-lip with the screw, and backward far enough to come below the cutting-edge of the other floor-lip, the prolongation of such cut for a greater distance about the base of the screw finishing the cutting-edges of the floor-lip both above and below the point where the said edges radiate from the said screw. In the said application the bit is held stationary, or is not rotated at all, when the tool is being rotated to cut the floor-lip and shape the inner side of the spur, and at such time the end teeth of the tool and the external bevel-teeth take equal bearing on the metal of the bit; but, in the improved machine to be herein described, as soon as the internal cutting-rim is brought into use to cut the base of the screw I desire to immediately free the bit from contact with the said beveled teeth, and to do this I have pivoted the guide for the bit-holding carriage at one side of what would be considered the center of the tool or its shaft, so that as the said guide is moved to enable the internal cutting-rim of the tool to enter the base of the screw the bit is moved in the arc of a circle sufficiently to release the inside of the spur from cutting contact with the beveled teeth external to the cutting-tool, and also far enough to remove the floor-lip from the pressure against it of the annular teeth at the end of the tool, except at a point very close to the base of the screw, and if the bit were not then rotated at all the bevel-teeth would not cut the spur. While the bit is being partially rotated in one and then in the opposite direction, as stated, it is also moved longitudinally, to thus enable the cut made in the base of the screw to have substantially the pitch of the floor-lip. This is effected, as herein shown, by placing the shank of the bit-holding chuck in a threaded sleeve, the thread of the sleeve being of substantially the pitch of the floor-lip. Changing the position laterally of the chuck holding the bit prior to the action of the internal rim of teeth of the tool to effect the cut in the base of the screw, besides removing the beveled series of external teeth from contact with the spur, also changes the relative angles of the bit and tool, angles which were established when the end teeth of the tool cut the floor-lip, and, to avoid changing this predetermined angle of the floor-lip, as well as to avoid marring the floor-lip, while the bit is being partially rotated first in one and then in the opposite direction to enable the cut at the base of the screw to be extended, as stated, I have mounted the chuck shaft or stem in vertically-movable bearings, so that the end of the bit may rise and fall slightly while the bit is being so partially rotated, thereby enabling the angle, pitch, or fall of the floor-lip to be maintained. The partial rotation of the bit, as stated, after the formation of the floor-lip and spur enables the front and back edges of the spur to be cut away, thus making the spur of the desired width from front to back, and, if desired, the bit may be rotated so far in one and then in the opposite direction as to cut away the inner side of the spur from its back and front edges to substantially its center, in which case the inner face of the spur would be substantially convex instead of concaved, and such cutting away of the spur at front leaves the cutting-edge of the floor-lip extended farther beyond the front edge of the spur than in the bit made

in the machine referred to in the said application. The larger the bit the greater the necessity of raising and lowering its end while partially rotating it to extend the cut in the base of the screw.

Figure 1 is a side elevation, partially broken out, of a machine embodying my invention; Fig. 2, a top view of Fig. 1, the bit being, however, shown in place; Fig. 3, a section of Fig. 1 in the dotted line *x*; Fig. 4, a section in the dotted line *x' x'*; Fig. 5, a left-hand end view of Fig. 1, the worm-gear being shown lifted into engagement with the worm; Fig. 6, a cross-section of Fig. 4 in the line x^3 x^3. Figs. 7 and 8 represent bits finished by my improved machine, and Fig. 9 a section of the tool.

The parts A A of the bed are arranged at such different angles as to insure for the floor-lip its established pitch. The tool-carriage B, provided with bearings for the shaft *a*, is fitted to slide in guides B', when desired. The shaft *a* has fast upon one end of it a rotating cutting-tool, C, substantially such as described in my said application, and therefore not herein broadly claimed, the said tool having the same end teeth, 2, external bevel-teeth, 3, and cutting-rim 4. The rear end of the shaft *a* has an attached worm, A^4, which, provided the worm-gear A^5 is engaged with it, as in Fig. 5, rotates the shaft A^6, having the attached cam A^7, so that the latter acting against one of the uprights of the carriage B, or a lug thereon, effects the movement of the said carriage toward the rest *m*, which is the same as in the said application, as the tool is cutting the floor-lip and spur. In this instance the upright has a lug or projection, B^3, against which the said cam acts, and a spring, B^4, moves the carriage in the opposite direction. When it is not desired to move the carriage B longitudinally, the bracket A^8, connected with the bed A by screws A^9, is lowered, as in full lines, Fig. 1, such being its normal position, for preferably the bit will be fed forward to the tool, as will be hereinafter described.

The frame C^2, on which slides the chuck-holding carriage C^4, is pivoted to the bed A' at C^3, so that the acting end of the bit E, supported in the usual rest, *m*, also attached to the said frame C^2 by a screw, C^5, may be swung a little in the direction of the arrow, Fig. 2, when the cutting-rim 4 is to be made to cut into the base of the leading-screw to complete the edges of the floor-lip above and below at the junction of the said edge with the said leading-screw, such movement of the end of the bit in the arc of a circle removing the inner side of the spur from the cutting action of the teeth 3, and also from pressure of the series of teeth 2, except at the inner edge of the said series, thus preventing the marring of the floor-lip while the rim 4 is doing its work, the bit at such time being partially rotated. The frame C^2 is herein shown as provided with an arm, 36, which has jointed to it one end of an elbow lever or treadle, 37, pivoted to a lug on the bed A at 38. A spring, 39, normally acts to keep the frame C^2 against the stop 40, a similar stop, 41, at the opposite side of the frame and bed acting to limit the movement of the frame in that direction when the operator applies his foot to the lever 37. The squared end 5 of the bit is placed in a central opening or socket in the bit-holding chuck D^2, having a shaft or stem, D^3, the rear end of which is extended loosely into the sleeve D^4, the latter being secured loosely at its rear end in the upright 20 of the carriage C^4, the said sleeve in the front end having cut upon it a screw-thread, 22, corresponding substantially in pitch with the pitch of the cut which the rim 4 is to cut in the base of the leading-screw. The screw-threaded part of the sleeve is surrounded by a threaded nut, 23, which is grooved at its sides, and fitted to slide up and down in a slot or guide in the upright 21 of the carriage C^4. The sleeve D^4 is embraced by a yoke, 25, pivoted at 26 on the upright 21, the free end of the said yoke being normally kept elevated by a spring, 27, the yoke thus acted upon serving to lift the sleeve and its nut in the upright 21. The head of the bit-holding chuck D^2 at its rear side is notched, and the said notches are engaged by a pawl or pin, 42, (shown best in Fig. 6,) carried by the lever-arm 43, having its hub fastened to the threaded sleeve D^4. The chuck D^2 is made adjustable in position for the purposes stated in the said application, and when in adjusted position is held by the said pawl or pin. While the toothed rim 4 is cutting into the bit, as stated, the chuck and bit are partially rotated by depressing the lever 43, and at the same time the sleeve is partially rotated, and by reason of the thread 22 cut thereon and in engagement with the nut 23, the said sleeve and the chuck within it are carried forward for a distance determined by the extent of the rotation of the sleeve and the pitch of the thread 22, such forward movement of the chuck and bit insuring the proper pitch to the cut made by the cutting-rim 4. At the same time that the lever 43 is depressed it acts on the yoke 25 and depresses it, so that the yoke depresses the sleeve and chuck for a slight distance, such depressions being necessary to avoid changing the angle of the floor-lip. The frame C^2 has lugs to receive a screw-shaft, 28, which, restrained from longitudinal movement, has at its rear end a gear, 29, which is engaged by a gear, 30, on the shaft 31, having a hand-wheel, 32, and supported in suitable bearings, 33 34, of the frame C^2. The rotation of the hand-shaft causes the rotation of the screw 28, which, in engagement with a threaded half-nut, 35, of the carriage C^4, (see Fig. 1,) effects the travel of the carriage at the proper speed while the floor-lip of the bit is being cut.

In Figs. 7 and 8, *b* represents the twisted part of a bit; *b'*, the spurs; b^2, the leading-screw, its thread being, however, omitted; and b^3 the floor-lip; and b^5 part of the cut made by the rim 4, the said cut being extended

about half-way around the base of the leading-screw.

I claim—

1. In a machine for the manufacture of auger-bits, a hollow rotating cutting-tool and a carriage to support it, combined with the chuck-holding carriage, and a frame to support it, one of the said parts being pivoted—as, for example, the frame at C^3—out of line with relation to the other, as described, whereby the inner side of the spur and the floor-lip of the bit at its junction with the spur may be quickly relieved from the action of the cutting-tool, and the annular series of internal teeth of the said tool be brought into position to cut into the base of the screw, substantially as described.

2. The rotating cutting-tool and its carriage, combined with the chuck-holding carriage and chuck, and sleeve to receive it mounted in vertically-movable bearings in the said chuck-holding carriage, to operate substantially as described.

3. The rotating cutting-tool, the chuck-holding carriage, the threaded sleeve, and the threaded nut to receive it, combined with the bit-holding chuck connected with the said sleeve, and with means, substantially as described, to partially rotate the said chuck and sleeve, the latter when partially rotated moving longitudinally, and carrying the chuck and bit with it, substantially as described.

4. In a machine for the manufacture of auger-bits, the rotating cutting-tool, the frame C^2, the chuck-holding carriage thereon, and the rest for the end of the bit to be milled, combined with the sleeve, the chuck therein, and the vertically-movable bearing for the sleeve, whereby the sleeve and chuck may be lowered as the bit is partially rotated, to operate substantially as described.

5. The rotating cutting-tool, its carriage, the chuck-holding carriage, and bit-holding chuck, threaded sleeve, and threaded vertically-movable bearing-nut therefor, combined with means to rotate the said chuck and sleeve, substantially as described.

6. The rotating cutting-tool, its carriage, the chuck-holding carriage, and the chuck thereon, combined with a screw to engage and move the latter carriage, substantially as described.

7. The rotating cutting-tool, its carriage, the pivoted frame, the rest for the bit, the chuck to hold the bit, and the chuck-holding carriage mounted on the said frame, combined with means, substantially as described, to change the relative positions of the said rest and tool, as described, to enable its rim 4 to cut into the base of the leading-screw.

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

JAMES SWAN.

Witnesses:
G. W. GREGORY,
W. H. SIGSTON.