

T. MCGARRITY.
MACHINE FOR GRINDING SPIRALLY TWISTED OR FLUTED TOOLS.
APPLICATION FILED DEC. 16, 1910.

997,685.

Patented July 11, 1911.

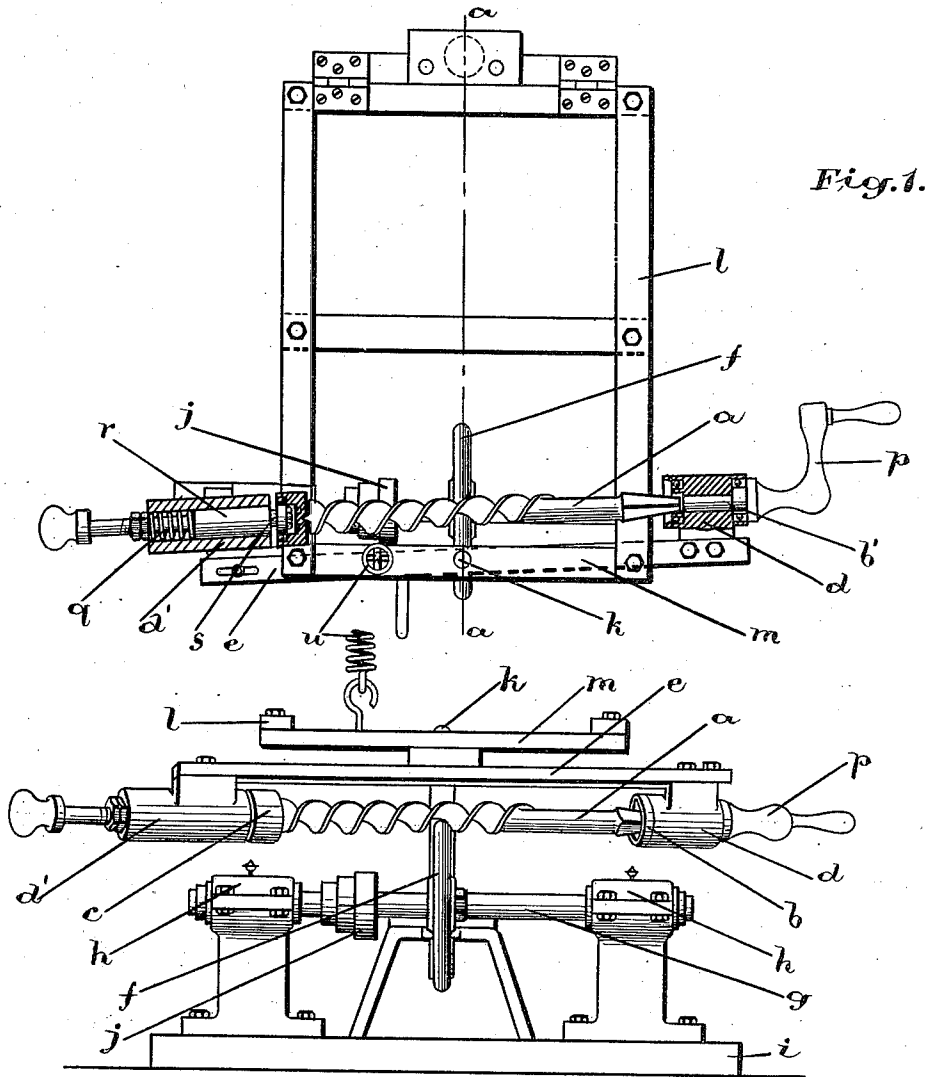


Fig. 2.

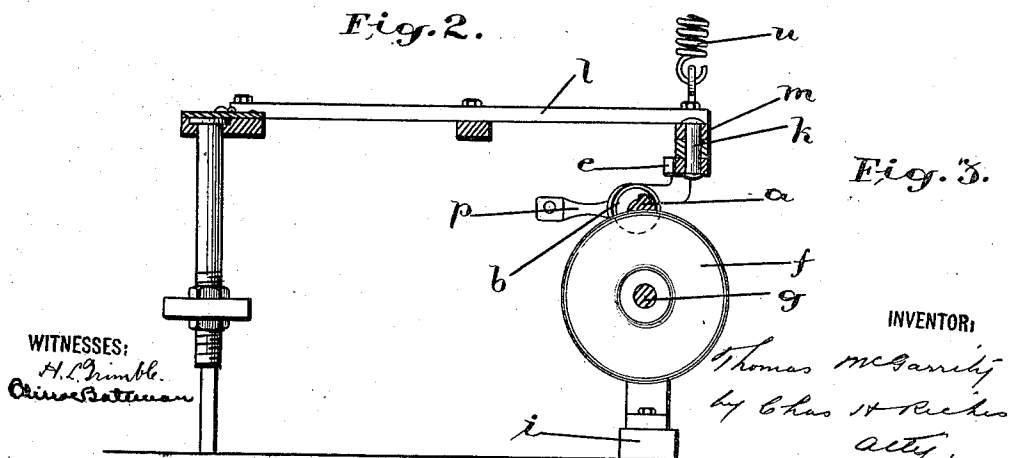


Fig. 3.

WITNESSES:
H. L. Grindle.
Chas. Patterson

INVENTOR,
Thomas McGarrity
by Chas H. Riches
atty.

UNITED STATES PATENT OFFICE.

THOMAS McGARRITY, OF PETERBOROUGH, ONTARIO, CANADA, ASSIGNOR TO DOUGLAS J. LUNDY, OF PETERBOROUGH, CANADA.

MACHINE FOR GRINDING SPIRALLY TWISTED OR FLUTED TOOLS.

997,685.

Specification of Letters Patent. Patented July 11, 1911.

Application filed December 16, 1910. Serial No. 597,724.

To all whom it may concern:

Be it known that I, THOMAS McGARRITY, of the city of Peterborough, in the county of Peterborough, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Machines for Grinding Spirally Twisted or Fluted Tools; and I hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to a machine for grinding that class of tools such as, augers, twist drills, and the like in which the circumference of the tools is spirally twisted or fluted.

In the case of augers, the spiral twists are arranged only for the purpose of affording egress to the cuttings, and consequently the efficiency of the tool is not dependent on the accuracy of the grinding. In the case of twist drills however, it is necessary to accurately grind the lands to produce true, straight, and smooth holes, or in other words, the circumference between the flutes is "backed over," to give clearance, the object of this clearance being to prevent the drill from seizing or grinding against the wall of the hole when the cutting edges wear off, the keenness and durability of the cutting edges being governed by, the amount of clearance given by the angle of one cutting edge to the other, and, by the degree of twist of the flute. The angle, of the spiral twist in the case of augers, and, of the flute in the case of twist drills, varies at every point in the diameter from the circumference to the center, and it therefore follows that the position of the tool with regard to the grinder must continually change to enable it to be properly ground.

The object of my invention is therefore to devise a machine by which the spirality of the circumference may be accurately followed in the elementary grinding to prepare the tool for the finishing grinding, and in carrying out this elementary grinding, I find it necessary to support the blank in such a manner that it can be adjusted to the variations of the spiral and maintained in correct relation to the grinder. The means by which this object is carried out consists essentially of an oscillating member, from which the tool blank is supported in operative relation with the grinder, and a pivoted supporting member to which the oscillating

member is attached, as hereafter set forth and particularly pointed out in the claims.

For an understanding of the invention reference is to be had to the following description and to the accompanying drawings in which:—

Figure 1, is a plan view partly in section of my apparatus. Fig. 2, is an end elevation of the same, looking at it from the front, and, Fig. 3, is a longitudinal section on the line *a-a* Fig. 1.

Like characters of reference refer to like parts throughout the specification and drawings.

One end of the tool blank *a*, which has been previously shaped in the rough, is placed in the head stock *b*, and the other end is placed in the tail stock *c*, the head and tail stocks being revolubly mounted in hangers *d d'* rigidly attached to the oscillating bar *e*, by which the spiral surfaces are maintained in operative relation with the grinder *f*. The grinder is fixed on the shaft *g* journaled in bearings *h* rigidly secured to the bed plate *i*, the shaft being provided with cone pulleys *j* by which the grinder may be revolved at various speeds.

Owing to the grinder revolving in a fixed position, it is necessary during the grinding operation, to continuously change the angle of the tool blank to bring the surfaces of the spirals into contact with the grinding surface, and for this purpose the oscillating bar *e* is mounted to turn freely on a pivot stud *k* attached to the supporting frame *l*. The supporting frame is hinged to a pivot bar *m* turnable on the supporting element *l* which may be either a stand or a hanger. The shank *b'* of the head stock is provided with a crank *p* by which the tool blank is rotated for the grinding operation, and the shank *s* of the tail stock is slidable lengthwise in the bearings *d'* to permit of the tool blank being placed in position in, and, removed from, the apparatus, the tail stock having a spring *q* engaging at one end with the bearings *d'* and at the other end with an enlargement *r* of the tail stock shank *s* to yieldingly hold the tail stock in contact with the tool blank, and to yield lengthwise for the purpose of introducing the tool blank into the apparatus.

In carrying out the grinding operation, one end of the tool blank is held by the head

stock, and the other end by the tail stock. The supporting frame is then lowered until the circumference of the tool blank comes into contact with the grinder, the oscillating bar being turned so that the grinder will accurately follow the spirality of the twists, flutes or lands. As the grinding progresses, from one end of the tool blank to the other, the supporting frame and pivot bar are turned to move the tool blank in a lengthwise direction to bring the different turns of the spirals, flutes, or lands into contact with the grinder. For changing the position of the circumference of the tool blank, the crank of the head stock is turned to rotate the tool blank during the grinding operation.

When the tool blank is ground, a spring *u*, attached to the supporting frame and to the overhead structure, raises the supporting frame to an inoperative position, and retains it until the supporting frame is again lowered for the further use of the apparatus.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a machine for grinding spirally twisted or fluted tool blanks, the combina-

tion of a supporting element turnable lengthwise with regard to the length of the tool blank, and a holding element oscillatingly connected to the supporting element.

2. In a machine for grinding spirally twisted or fluted tool blanks, the combination of a pivot bar, a supporting frame hinged to the pivot bar, to move lengthwise of the tool blank, an oscillating bar turnably connected to the supporting frame, and means attached to the oscillating bar for holding the tool blank.

3. In a machine for grinding spirally twisted or fluted tool blanks, the combination of a pivot bar, a supporting frame hinged to the pivot bar, to move lengthwise of the tool blank, an oscillating bar turnably connected to the supporting frame, and means attached to the oscillating bar for holding the tool blank, said means consisting of a yielding tail stock engaging one end of the tool blank, and a rotatable head stock engaging the other end.

Peterborough, November 24th, 1910.

THOMAS MCGARRITY.

Signed in the presence of—
WILLIAM J. FERGUSON,
W. S. DAVIDSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."