

B. M. W. HANSON.  
TAPER ROUGHING TOOL.  
APPLICATION FILED MAR. 9, 1908.

938,484.

Patented Nov. 2, 1909.

Fig. 3.

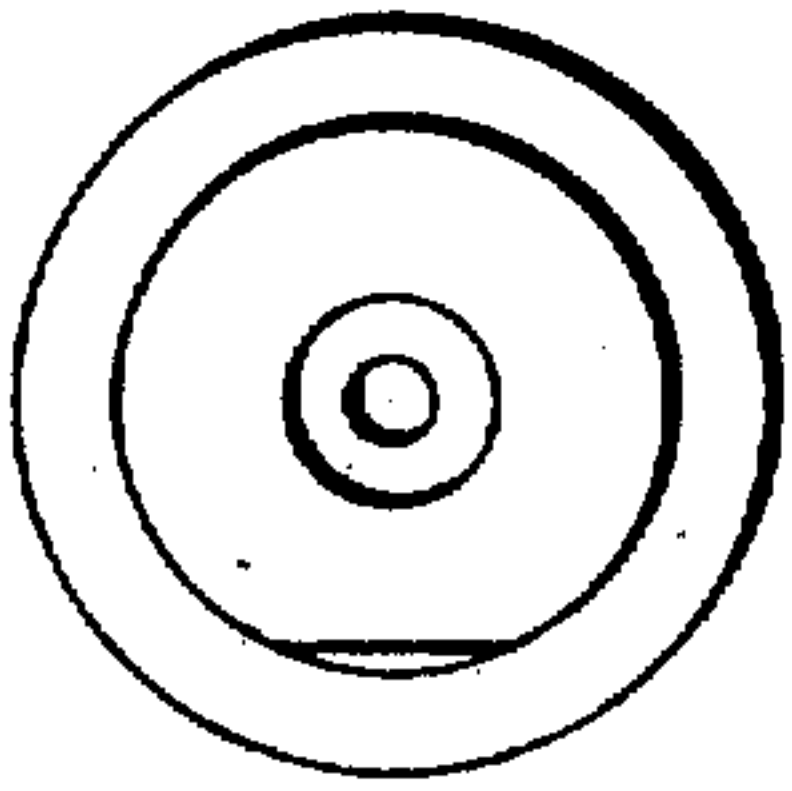


Fig. 1.

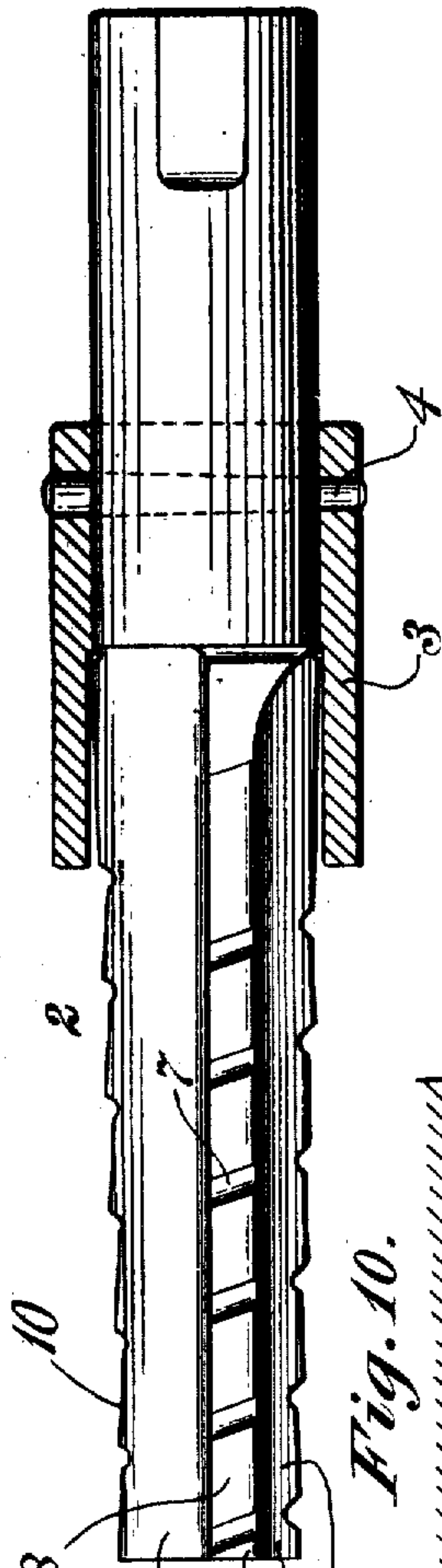


Fig. 2.

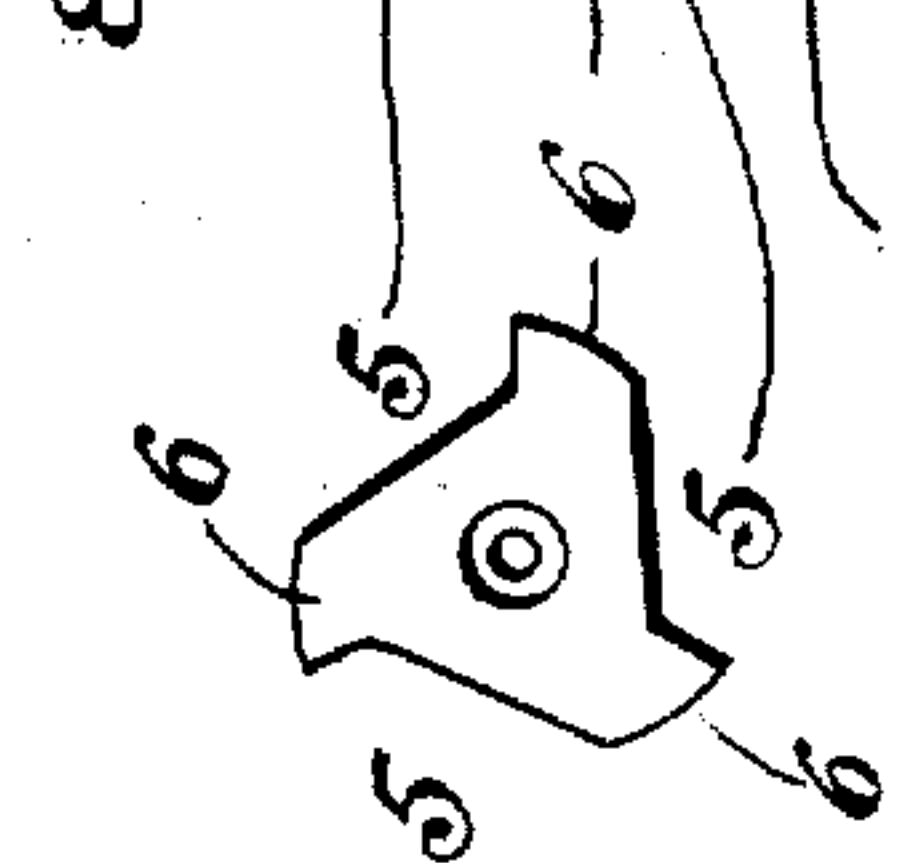


Fig. 10.

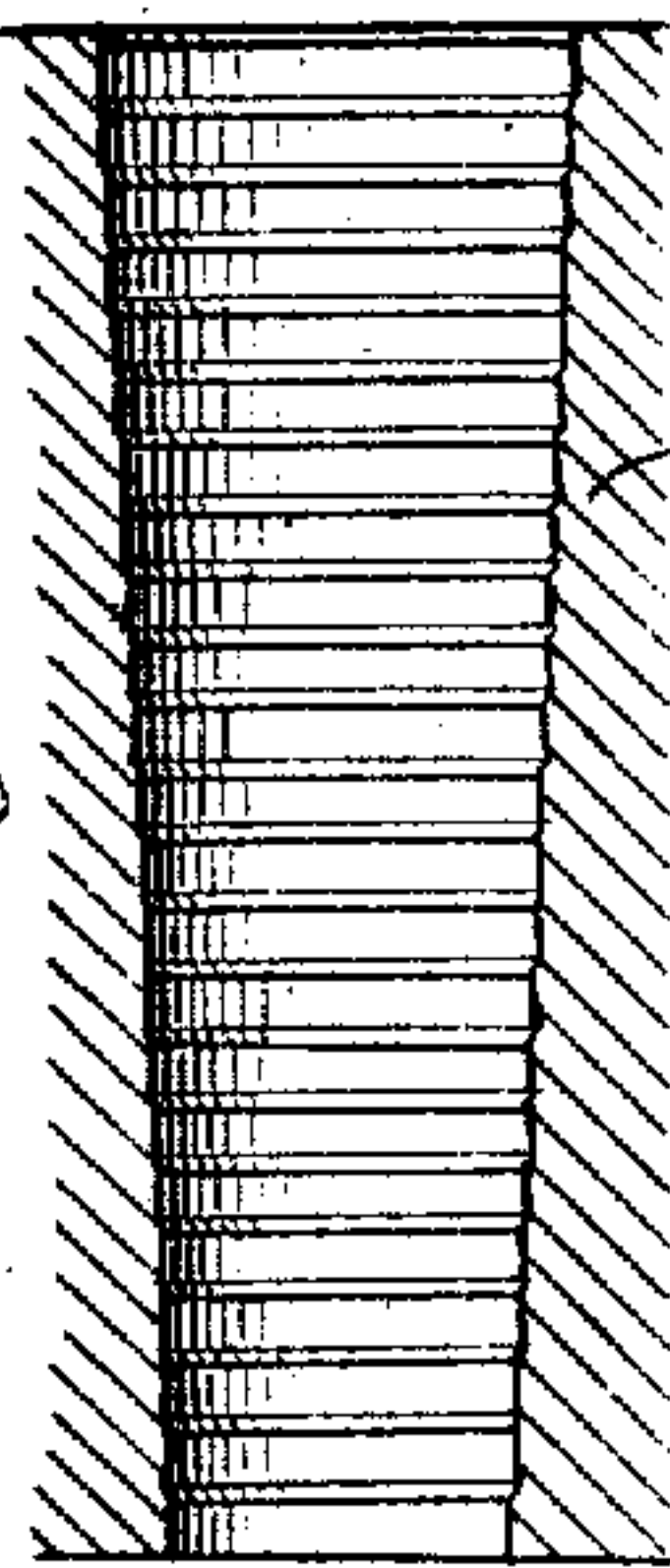


Fig. 6.

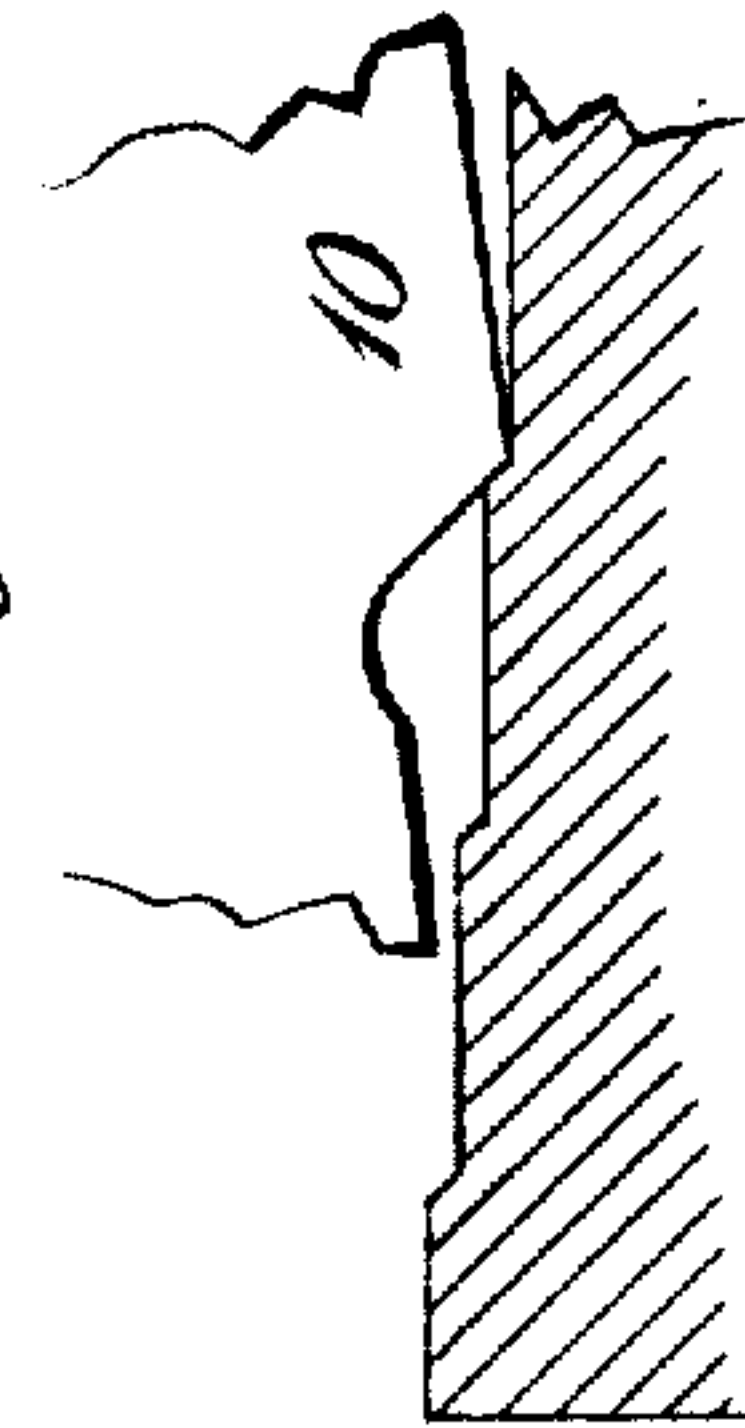


Fig. 5.

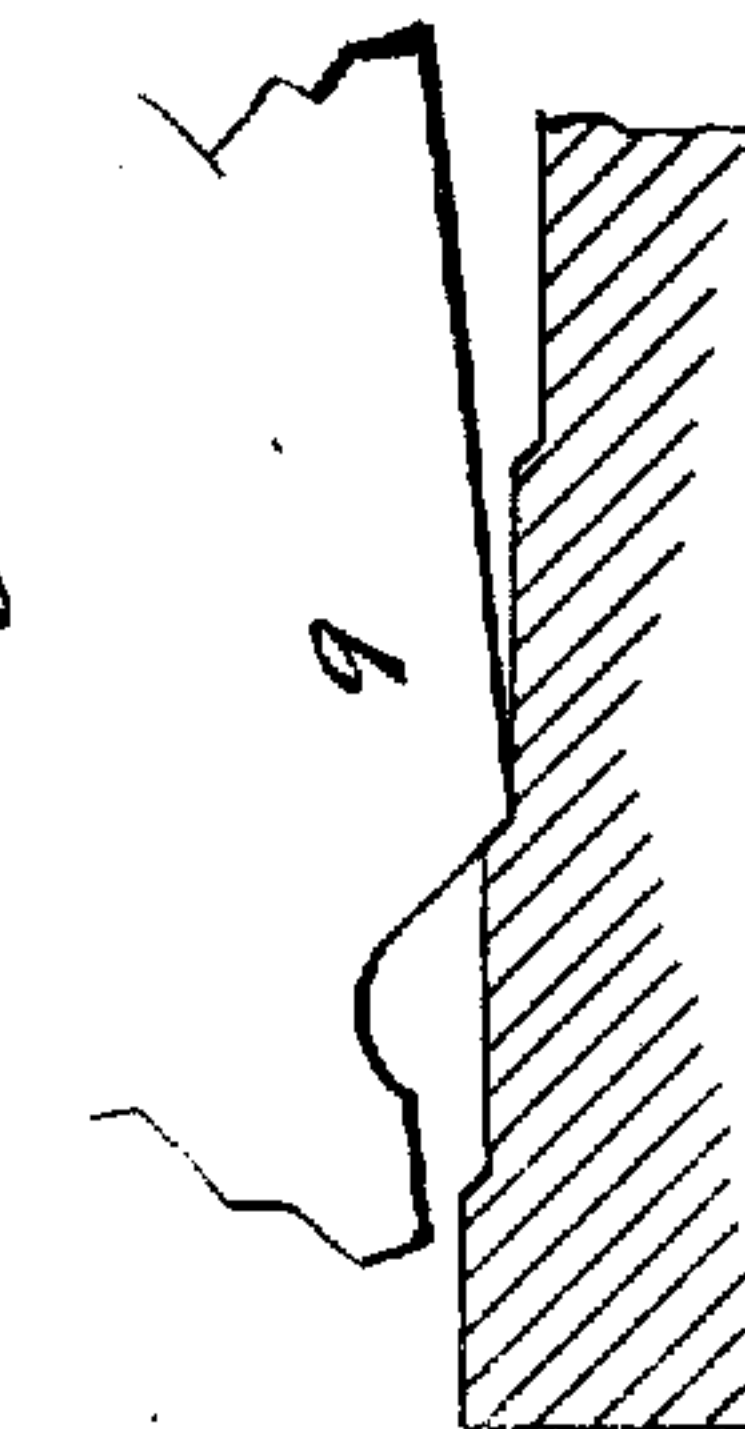


Fig. 4.

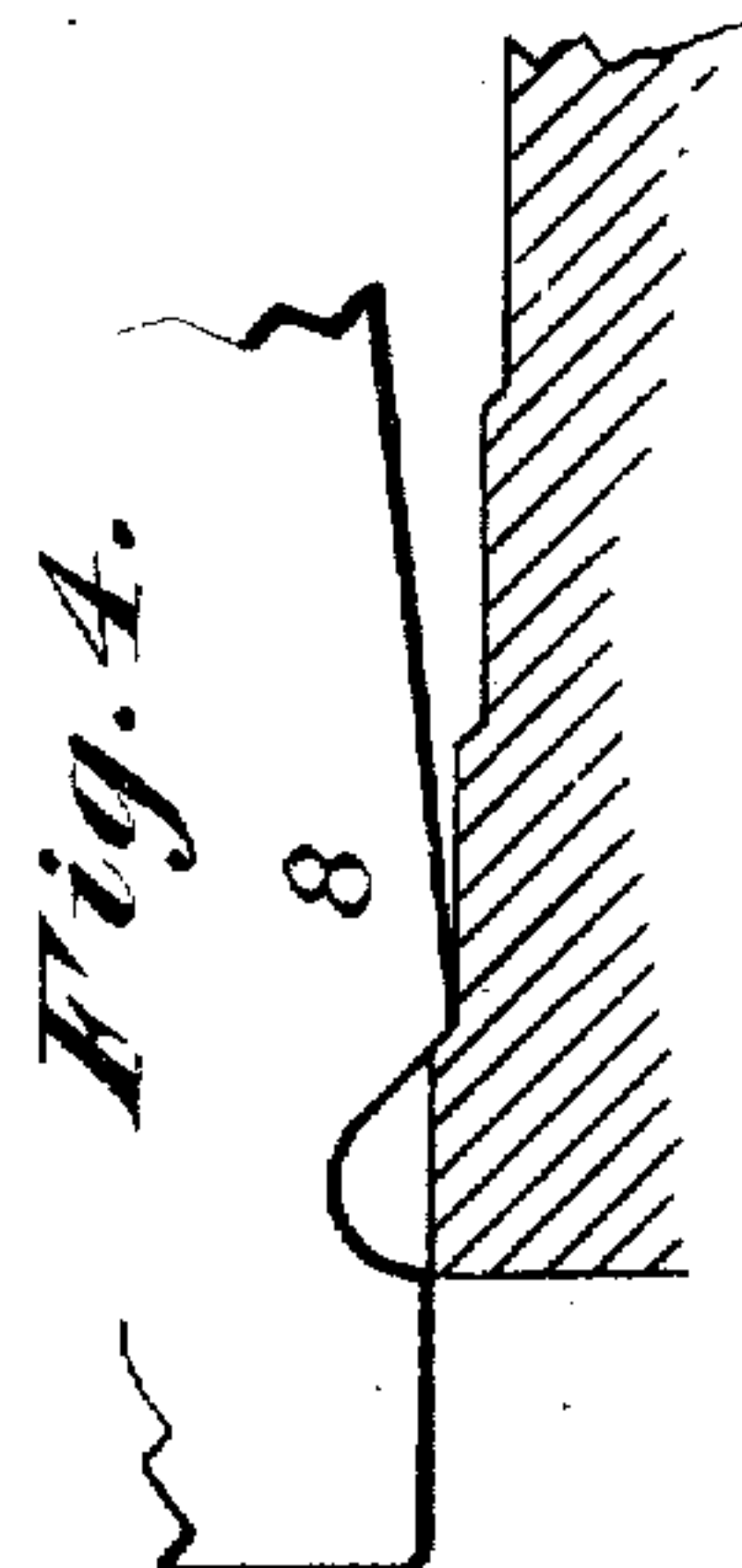


Fig. 9.

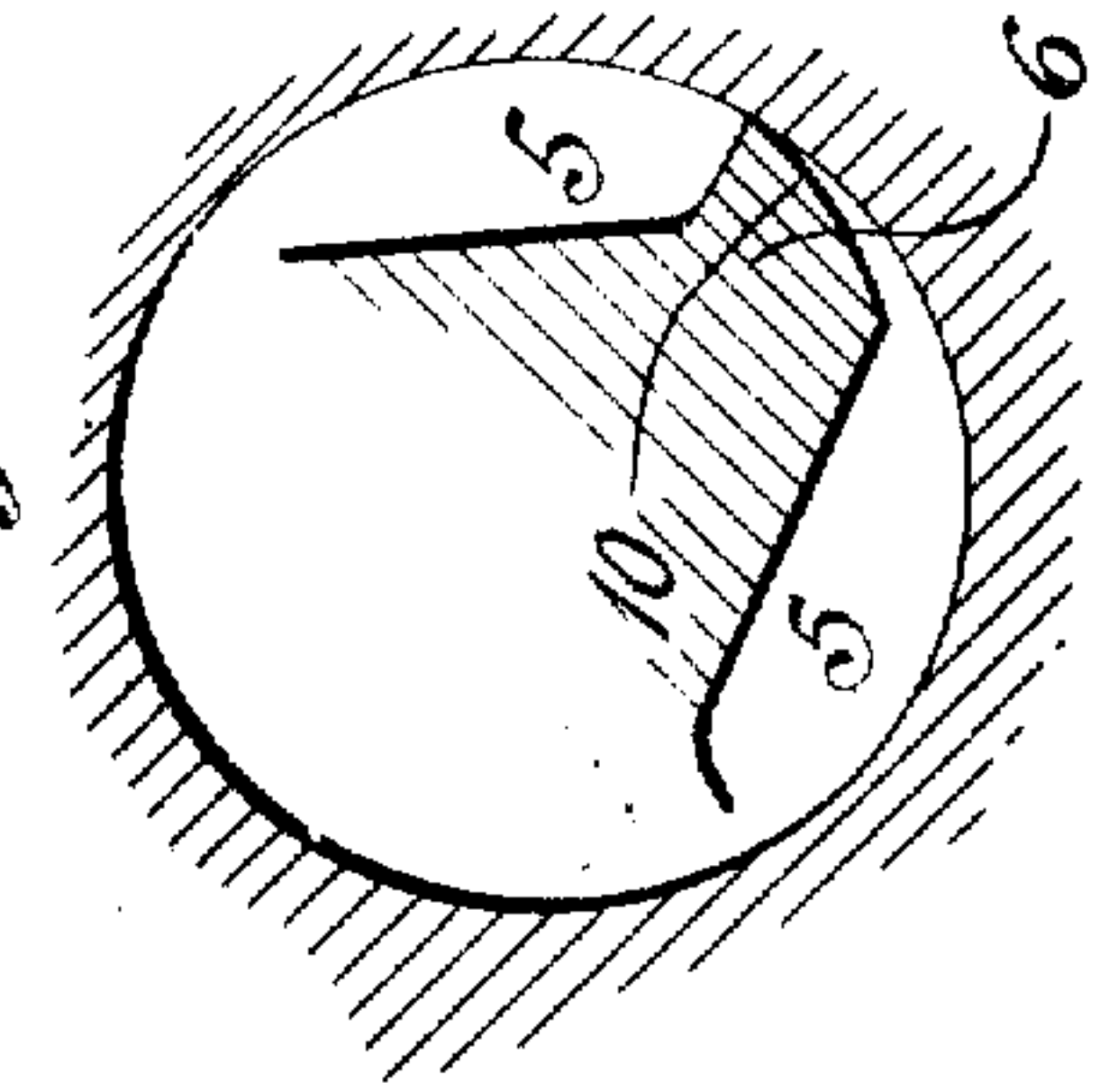


Fig. 8.

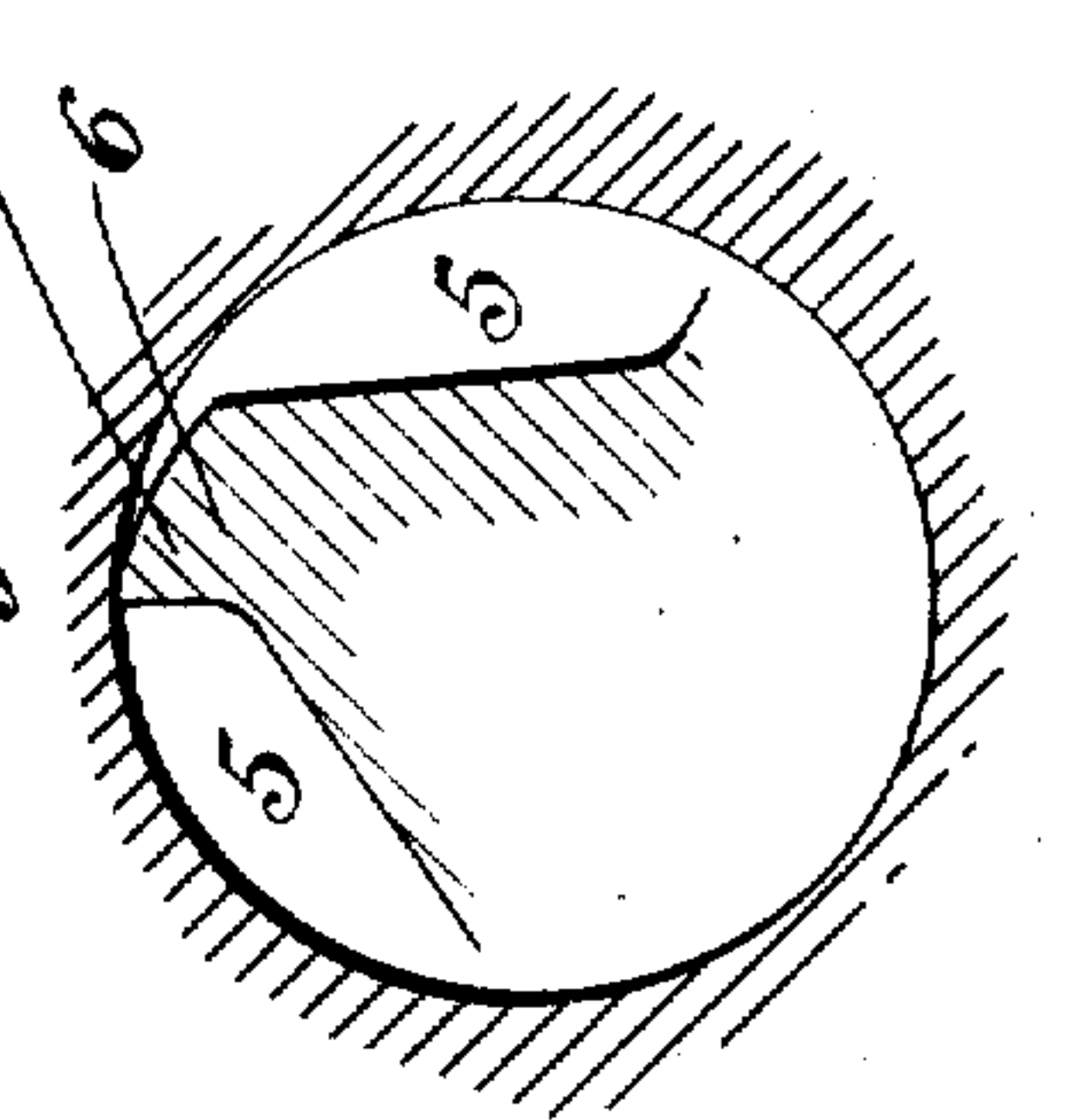
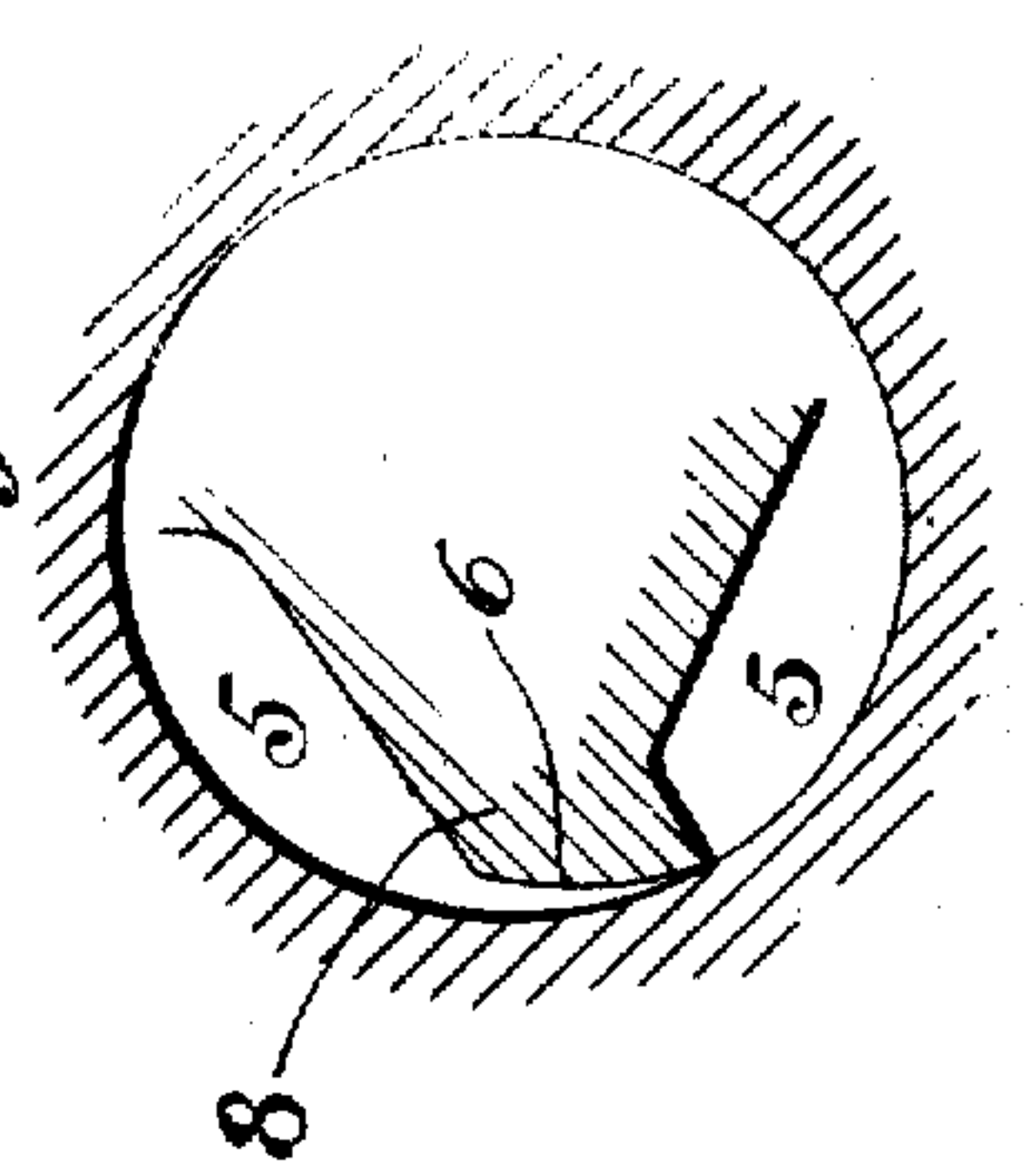


Fig. 7.



Witnesses:

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*Fred H. Carpenter*

Inventor:

*B. M. W. Hanson*  
By his Attorneys,

*Sutherland & Anderson*



# UNITED STATES PATENT OFFICE.

BENGT M. W. HANSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF NEW JERSEY.

## TAPER-ROUGHING TOOL.

938,484.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed March 9, 1908. Serial No. 419,860.

*To all whom it may concern:*

Be it known that I, BENGT M. W. HANSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Taper-Roughing Tools, of which the following is a specification.

This invention relates to taper roughing tools, the object of the invention being to provide an effective implement of this character capable of covering a greater area in its action than certain forms of such devices with which I am familiar and which is primarily intended to rough out taper holes prior to their being dressed down by a reamer.

In the drawings accompanying and forming a part of this specification, I have shown in detail one simple form of embodiment of the invention which to enable those skilled in the art to practice the same, will be set forth in detail in the following description while the novelty of the invention will be included in the claims succeeding said description.

Referring to said drawings, Figure 1 is a side elevation of a taper roughing tool involving my invention. Fig. 2 is an elevation from one end of the tool. Fig. 3 is an elevation from the opposite end of the same. Figs. 4, 5 and 6 are diagrammatic views in sectional side elevation showing the character of work performed by the implement. Figs. 7, 8 and 9 are cross sectional elevations, and are like the three preceding figures on an exaggerated scale, and, Fig. 10 is a longitudinal section of the work.

Like characters refer to like parts throughout the several figures.

My invention may be incorporated with advantage in taper roughing tools of various styles; the tool shown in the drawings is denoted in a general way by 2 and is of the "fluted" type. I have shown as connected with said tool a stop-sleeve as 3, which in practice is slipped over the same and is united separably therewith in any suitable manner, for instance by a key or pin as 4 passing through registering perforations in the sleeve and tool respectively. The forward end of this sleeve by abutting against the work prevents the tool entering too far into a hole therein. The use of a sleeve, however, in conjunction with the im-

plement is not a matter of any consequence as the invention does not reside therein but in the tool.

The tool 2 is shown as having several flutes 5 by which there are formed several lands 6. There may be any desirable number of flutes and lands, three of each being illustrated.

In one of its general aspects a taper roughing tool involving my invention has longitudinally extending rows of teeth, the teeth of the rows being in staggered relation with respect to each other. By virtue of this relation I attain an important function in that as the tool is rotated the teeth of the several rows cover wide areas, much wider in fact than if they were laterally aligned or in transverse coincidence. I may secure the staggered relation of the cutting teeth in many ways but find a simple mode of doing so by spirally disposing said teeth by reason of which the teeth of one row are situated alternately with respect to, or overlap the teeth of the adjacent row or rows, assuming that as shown there are three rows.

The spiral disposition of the teeth may be obtained for illustration by spirally grooving the lands 6 as at 7, the groove being interrupted by the flutes. Each land therefore has several transverse notches across the same and at an oblique disposition to the longitudinal axis of the tool. The grooving of the lands in the present case makes three longitudinally extending rows of teeth which for convenience will be designated respectively by 8, 9 and 10. An advantage follows the formation of a spiral groove as described in that the several cutting teeth have their operative or working portions at an acute angle which effectively act upon the stock or work; this also provides for ample clearance.

It will be assumed that the cutting tooth in Figs. 4 and 7 is one of the teeth 8, that the tooth shown in Figs. 5 and 8 is one of the teeth 9, and finally that the tooth shown in Figs. 6 and 9 is one of the teeth 10.

In use the tool is mounted in the customary manner and is therefore advanced in the direction of its length and simultaneously rotated to enter and also turn in a previously-made hole in the work or stock 11. As the tool turns in contact with the wall of such hole, the teeth 8, 9 and 10 which collectively present a transversely



disposed row do not follow a path at right angles to the longitudinal axis of the tool but their trend is in a direction oblique to such axis, the consequence being that while  
 5 all three teeth are concurrently acting upon the wall of the hole they are operating upon surfaces which are laterally separated relative to the length of the tool, and the result  
 10 of this is that the field covered by the tool is very much greater than where the teeth are in register in a direction at right angles to the longitudinal axis of the tool. I might state that in describing the action of one  
 15 tooth of each row particularly in connection with the enlarged diagrammatic views Figs. 4 to 9 inclusive, this only represents in part the complete action of the tool. The operation referred to in detail is repeated with  
 20 all the teeth of the tool. I wish to make it clear that each tooth follows its individual track and not the track of another tooth whereby I attain the new result hereinbefore set forth.

In Fig. 10 I have shown a hole after it  
 25 has been cut by the tool; the latter leaves on the wall of the hole several shallow ridges which can be quickly and easily removed with an ordinary reamer.

My taper roughing tool as will be evident  
 30 has longitudinal rows of teeth the teeth of each row being out of circumferential line with the teeth of the adjacent row. Each of said teeth has a front end clearance or relief portion as shown in Fig. 1 and also  
 35 clearance or relief portions on the outer surface thereof one of which extends longitudinally of the tool and the other laterally of said tool. Said longitudinal clearance or relief portion is usually made by forming  
 40 the teeth upon a back taper as illustrated in

Figs. 4, 5 and 6. The lateral clearance portions of said teeth are best illustrated in the diagrammatic Figs. 7, 8 and 9.

With a tool of the kind noted I can initially ream out a hole almost friction-  
 45 lessly and in a greatly less time than is possible with the ordinary tool.

In practice the tool will be given a taper sufficient to meet the conditions under which  
 50 it is operated.

It will be apparent from what has heretofore been stated that I have described one advantageous embodiment of my invention; many variations may be made from the disclosure of the present description and draw-  
 55 ings, within the scope of my claims.

Having described the invention, what I claim is:

1. A taper roughing tool having longitudinally disposed rows of teeth the teeth  
 60 of each row being out of circumferential line with the teeth of the adjacent row and each tooth having a front end clearance portion and also having clearance portions on the outer surface thereof longitudinally and  
 65 laterally of the tool.

2. A taper roughing tool having lands and also having a spiral groove intersecting said lands to form thereon teeth provided with front end clearance portions and  
 70 each tooth being upon a back taper and also inclined laterally on the outer surface thereof to present two additional clearance portions.

In testimony whereof I affix my signature  
 75 in presence of two witnesses.

BENGT M. W. HANSON.

Witnesses:

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EVERETT E. ARNOLD.