

930,477.

W. H. HUDSON.
TREPHINE.
APPLICATION FILED AUG. 8, 1908.

Patented Aug. 10, 1909.

Fig. 1.

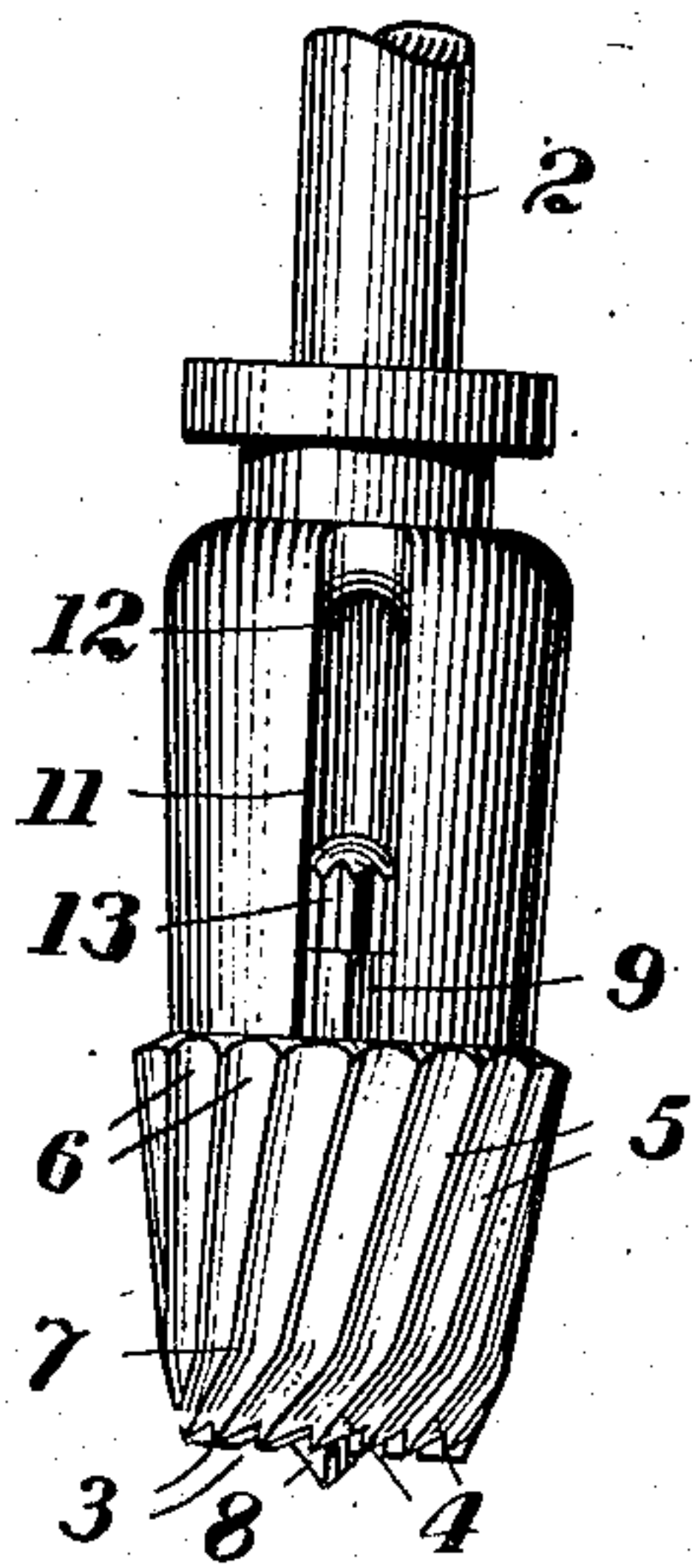


Fig. 2.

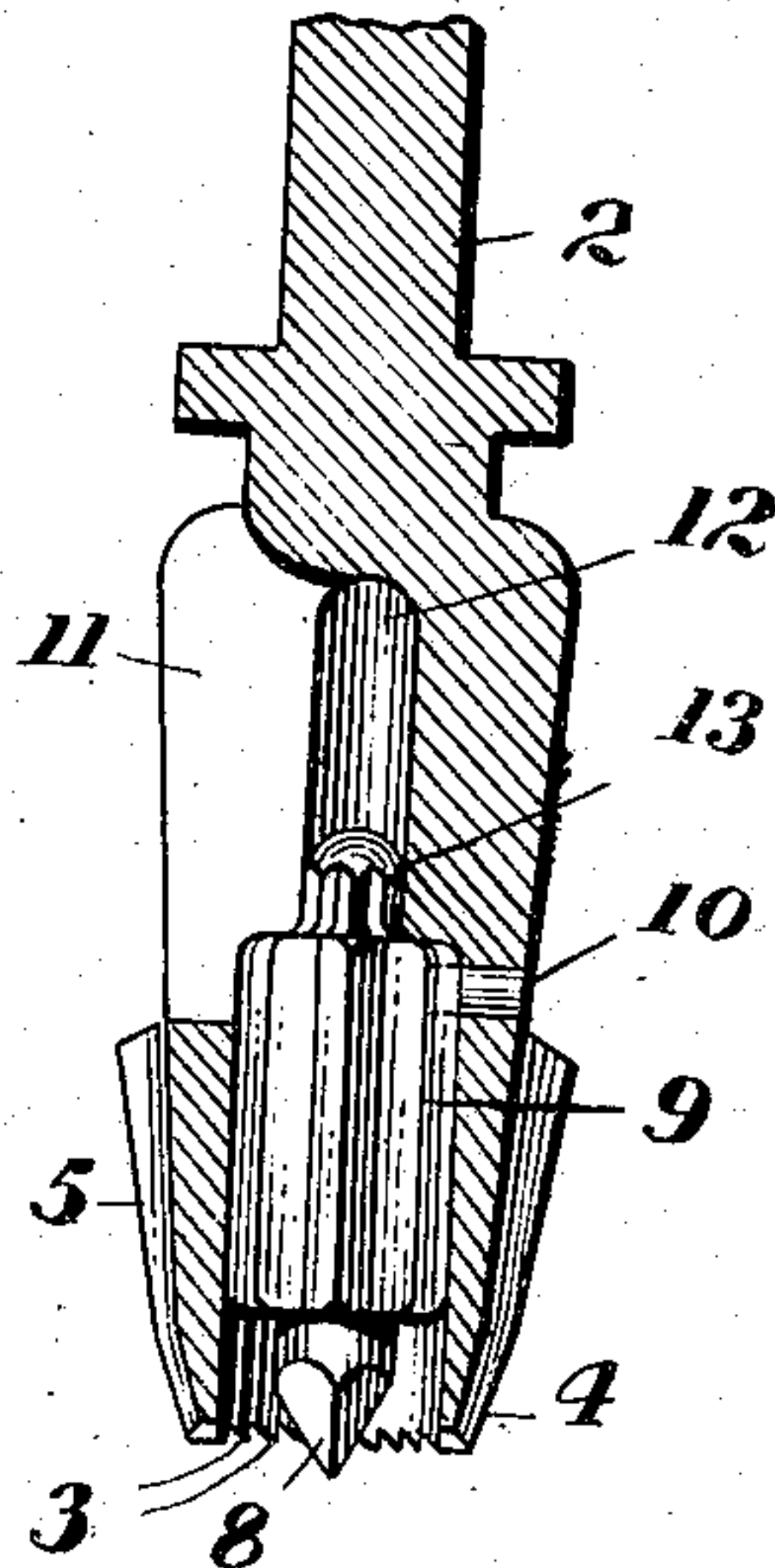


Fig. 3.

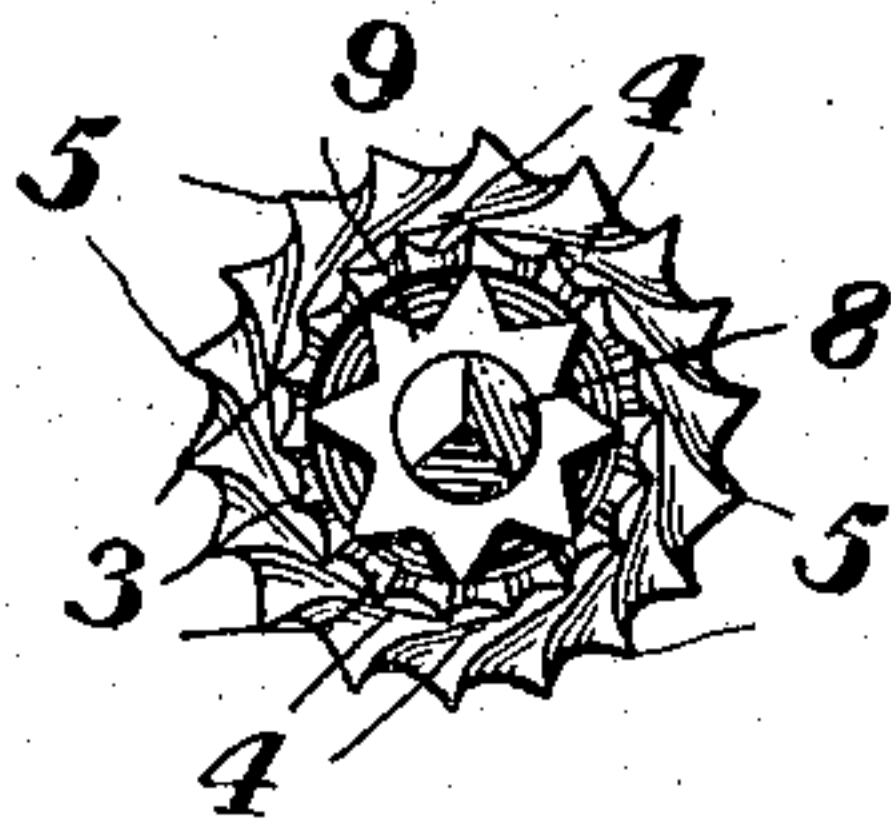


Fig. 4.

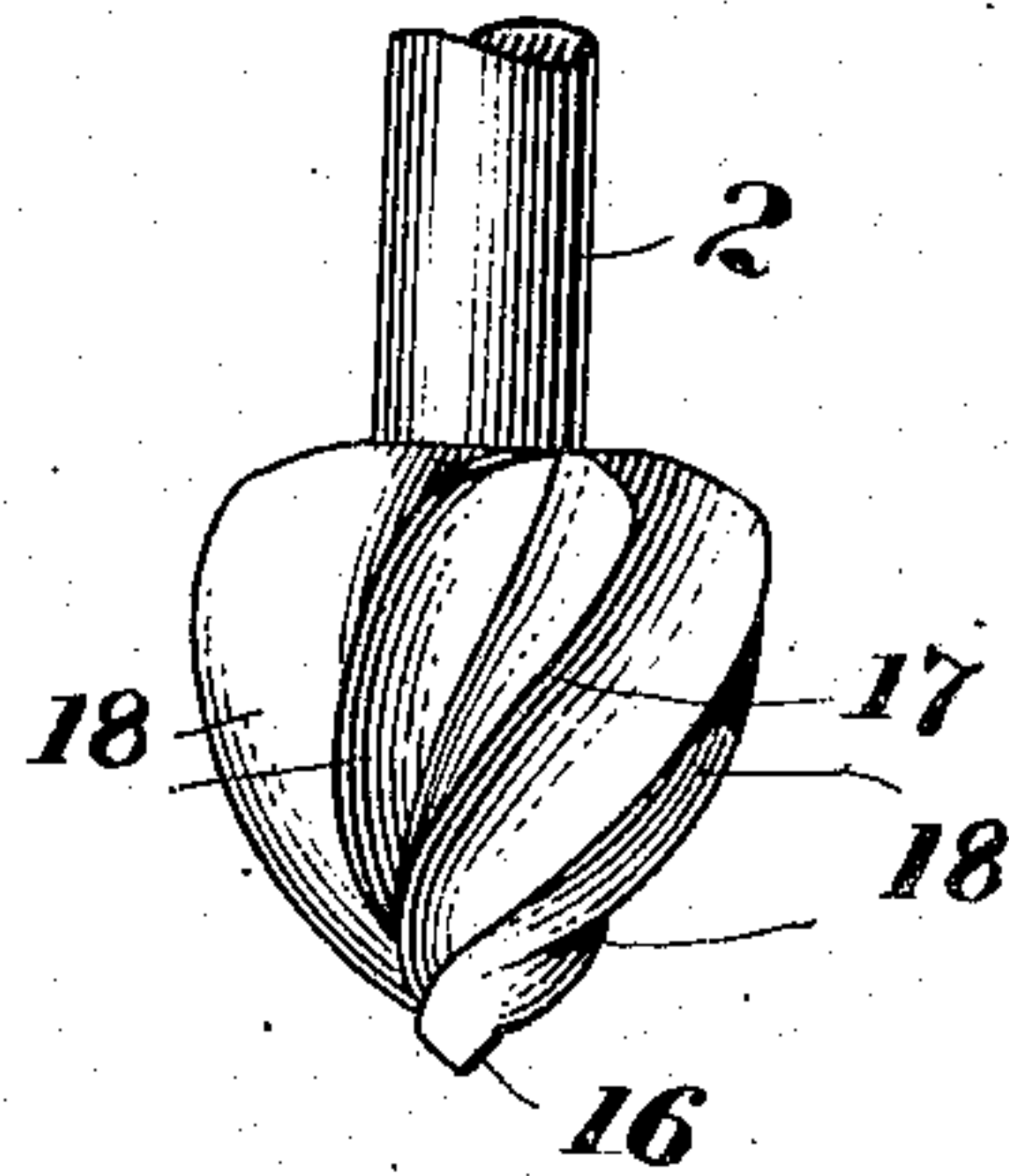


Fig. 6.

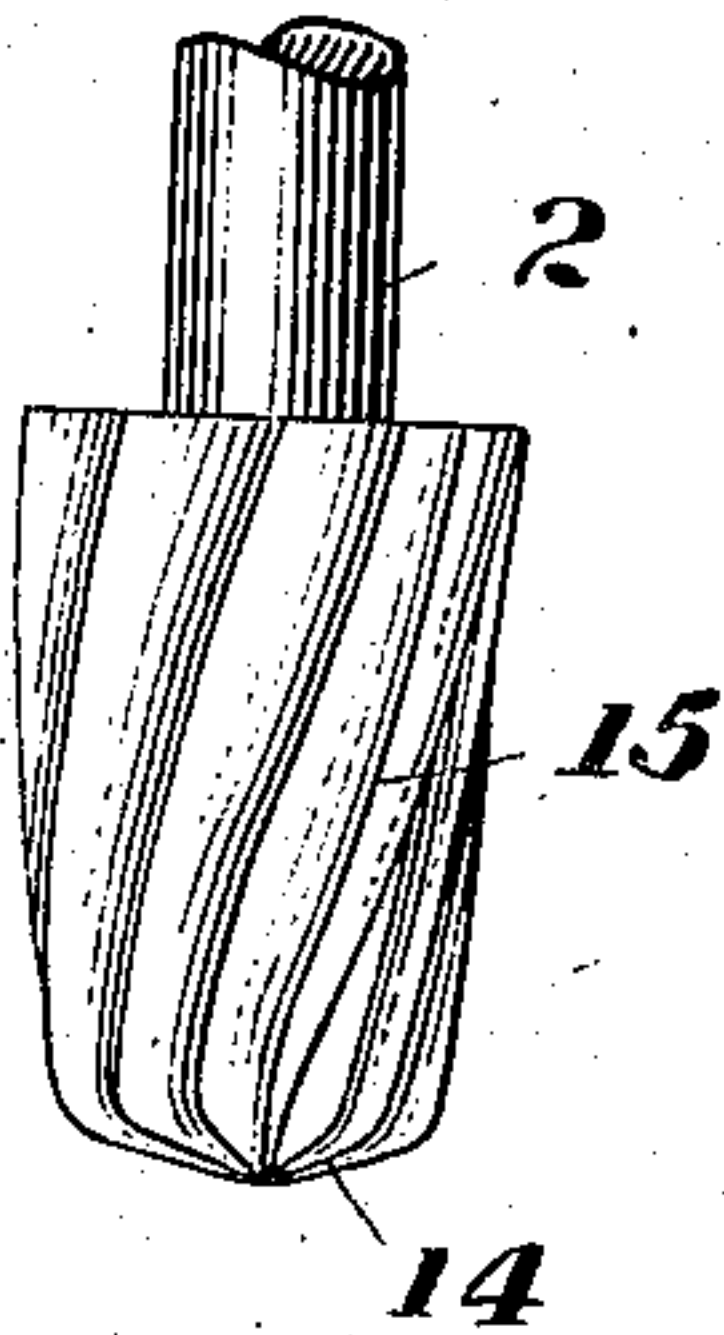


Fig. 5.

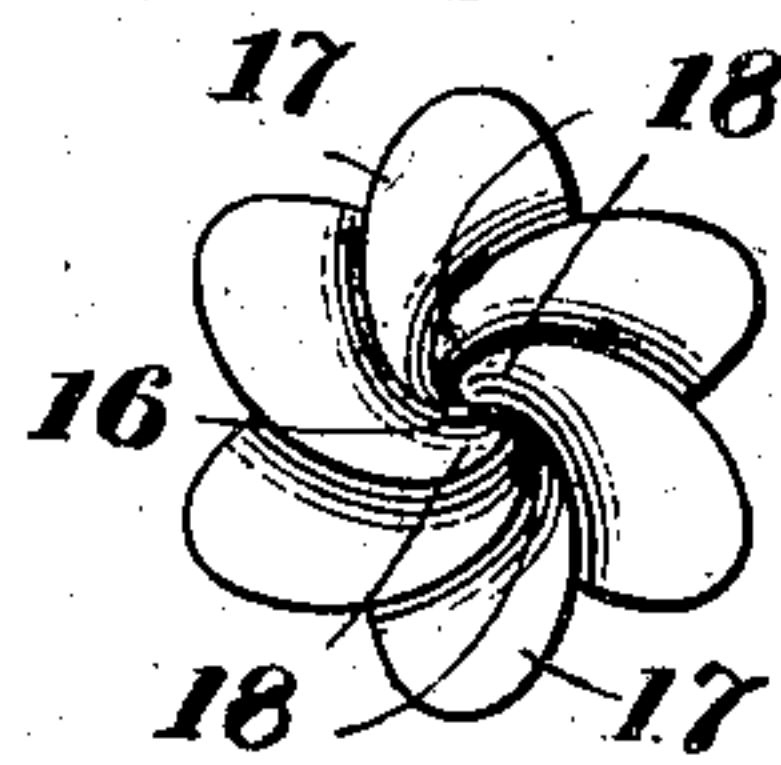
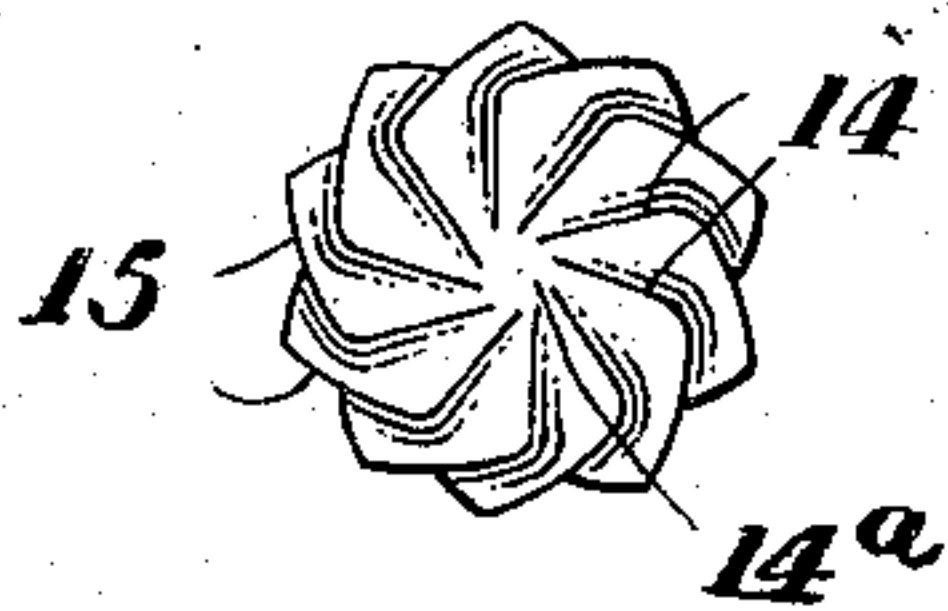


Fig. 7.



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TREPHINE.

No. 930,477.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed August 8, 1908. Serial No. 447,579.

To all whom it may concern:

Be it known that I, WILLIAM HENRY HUDSON, a citizen of the United States, residing at Montgomery, in the county of Montgomery and State of Alabama, have invented certain new and useful Improvements in Trephines, of which the following is a specification.

The present invention relates to that class of surgical instruments known as trephines.

It has for its object the provision of an instrument which will eliminate the danger, heretofore present in trephining, of cutting through the bony structure of the skull and puncturing the covering of the brain or the brain proper, unless the utmost care be exercised and the depth of the cut be accurately gaged by frequent observations during the operation. This elimination of dangerous cutting is secured by providing the instrument with means for effecting an automatic stopping of the advance of the cutting portion so soon as such cutting portion has perforated the skull and resistance to the action of the cutting portion ceases; and, stated more specifically, the invention contemplates providing a trephining instrument with cutting teeth, combined with which are stopping wings adapted to engage the wall of the perforation and stop the advance of the tool immediately the cutting teeth have perforated the bone and resistance to the action of the cutting teeth ceases.

In order that the invention may be thoroughly understood by those skilled in the art to which it belongs, I have illustrated in the drawings herewith several embodiments of my invention, and in said drawings, Figure 1 is a side view of a trephine constructed in accordance with my invention. Fig. 2 is a sectional view of the trephine shown in Fig. 1. Fig. 3 is a bottom view of the same. Fig. 4 is a side view of a perforator. Fig. 5 is a bottom view of the perforator, shown in Fig. 4. Fig. 6 is a side view of the follower. Fig. 7 is a bottom view of the follower shown in Fig. 6.

Referring to the drawings by numerals, like numbers indicating like parts in the several views, 2 indicates the shank of the tool, which is of ordinary or any desired construction and adapted to be placed in a hand-bit or engine-chuck, as may be desired.

The active head of the tool comprises cutting teeth 3, (see Fig. 1), which are of the type commonly used in trephines, and which

form the active entering or perforating portion of the tool, and which, when the tool is operated, penetrate the bone and feed forward in the usual manner. Extending from said cutting teeth 3, but at an angle thereto are wings 4, the said wings 4 being arranged also at an angle relative to the longitudinal axis of the tool, as shown.

The wings 4 are somewhat sharply inclined to the longitudinal axis of the tool and will follow the lead of the teeth 3 so long as the teeth find resistance to their cutting action, but so soon as the cutting teeth 3 perforate the bone and resistance ceases, the wings 4 take on a screw-like action and, biting in the wall of the perforation, check the tool and bind it against further advance.

As is well known the skull at its thicker portions presents a structure of different character being made up of a hard outer plate, an intermediate spongy or cellular structure, and an inner hard plate, and in order that the tool may not be checked when the cutting teeth enter the intermediate or cellular layer, as would be the case if the wings 4 continued in the same direction around the head or body of the trephine owing to the temporary reduced resistance to the advance of the cutting teeth as they enter the cellular portion and the resultant tendency to lock and bind, I preferably provide the extension wings 5 which, as clearly shown in Fig. 1, are not so much inclined to the longitudinal axis of the tool as are the wings 4 and are practically continuations of the wings 4, being joined thereto at the point 7 on curved lines. I have found that by thus varying the angles of the two sets of stopping wings 4 and 5, danger of checking the tool when the cutting teeth strike the cellular portion of the skull is eliminated, and that the tool as thus made will feed through this cellular structure which offers less resistance, and will only be checked or stopped when resistance to the action of the cutting teeth occurs by reason of an actual perforation and complete severance of the button.

Preferably the wings 4 and 5 are separated by round grooves 6 so that good clearance will be secured and danger of choking the tool with bone dust eliminated, and I find further that by joining the wings 4 and 5 on a curve as shown at 7, instead of at an abrupt angle, a much smoother operation of the tool is secured.

In the form of the tool shown in Figs. 1, 2, and 3, in which a hollow or button-forming trephine is shown with my invention applied thereto, the usual center-pin 8 is provided, but the center-pin as invented by me has a body portion 9 provided with alternate ribs and grooves which form clearance channels between the inner wall of the trephine bore and the body-portion 9 of the center-pin 8. By this construction, while the center-pin body will have a close sliding fit within the bore of the trephine, all danger of particles of bone dust jamming between the body 9 of the center-pin and the wall of the trephine bore is eliminated, as these particles will pass into the clearance grooves. Furthermore these clearance grooves have the additional function of engaging the center-pin holding-lug 10 (see Fig. 2) so that when the center-pin is inserted any one of the clearance grooves may engage the holding-lug 10 and the necessity of inserting the center-pin 8 in a certain angular relation in the trephine bore to engage said lug is done away with. The body portion 2 of the trephine is provided with the usual slot 11 in one side to permit the center-pin or the bone button to be pushed out, and said slot 11 opens into an elongated bore 12 which receives a relatively short tail 13 extending upwardly from the body-portion 9 of the center-pin 8, this extended bore providing a relatively large opening and one in which there is no danger of dust collecting and jamming the tail 13 of the center-pin 8 when it is inserted. Preferably the tail 13 is provided with alternate ribs and grooves in the same manner as the body 9 so as to prevent jamming and provide clearance spaces for bone dust.

In the form of the tool shown in Figs. 4 and 5, in which a perforator is shown, an ordinary diamond-shaped point 16 is provided, and from this point extend wings 17 and 18, the wings 17 running directly from the point 16, as shown in Fig. 5, while the wings 18 branch from the wings 17 just below or away from the point 16, the said wings 18 it will be apparent have a different relation to the point 16 than do the wings 17, the wings 17 being extended from the point on each side so as to form together with the point 16 the drilling and cutting instrumentality, while the wings 18, since they do not come to the center 16 but branch from the periphery of the cutting wings 17 at points offset or to one side of the point 16, will engage and bite into the walls of the perforation immediately the leading cut or action of the point 16 and wings 17 ceases, which will occur, of course, as soon as the point 16 penetrates the skull and resistance to its advance ceases.

The wings 17 and 18 run preferably in the form of spirals, and so long as the point

16 finds resistance to its cutting or drilling action the wings 17 and 18 will follow with a reaming action, but the instant the point 16 perforates and ceases to lead the tool the spirally-inclined wings 18 act in a screw-like fashion, biting into the wall of the perforation and binding the tool against further rotation in the same manner as in the form shown in Figs. 1, 2 and 3.

In the adaptation of my invention shown in Figs. 6 and 7, it is applied to a follower, designed to follow the preliminary perforation made by the perforator just described, in which the cutting teeth 14 lie across the face of the tool and meet at a smooth dull center 14^a instead of having a hollow or bored-out body-portion, so that while the cutting teeth 14 have an efficient action, the point 14^a is smooth and has no penetrating action this tool being adapted to drill a clean perforation instead of cutting out a button, as in the form heretofore described. This action of the teeth is the same, and their angular relation is generically the same as that described in connection with the other forms, for when the cutting teeth 14 perforate the bone and resistance to their advance ceases the stopping teeth or wings 15 take hold of the wall of the perforation and stop the advance of the tool.

It will be seen that in the operation of the several forms shown, so long as the cutting teeth or point find an active resistance to their advance they will continue to cut and feed forward under the necessary pressure, while the stopping wings will simply follow without biting into the wall of the perforation until the perforation is completed by the cutting teeth or point and resistance to their advance ceases, whereupon the stopping wings will operate with a screw like action, biting into the wall of the perforation and stopping the tool at once, so that the operator, by the checking of the tool, will not only be advised of completion of the perforation, but unless an enormous turning pressure be applied sufficient to splinter or shatter the skull area surrounding the perforation, he will be unable to advance the tool further.

While I have shown a particular embodiment of my invention, I wish it to be understood that this is merely illustrative and not restrictive of my invention, and as I believe that I am the first to provide a tool of the character described, which has means for automatically stopping its advance so soon as the cutting teeth cease to meet with resistance, I do not limit myself to any of the details shown and described except so far as I am limited by the prior art to which the invention belongs.

Having fully disclosed my invention, I claim:

1. A tool of the class described having cutting means, and means operative to stop

the advance of the tool immediately resistance to the advance of said cutting means ceases.

2. A tool of the class described having cutting means, and stopping wings operative to stop the advance of the tool immediately resistance to the advance of the cutting means ceases.

3. A tool of the class described having cutting teeth, and two sets of stopping wings angularly disposed relative to each other.

4. A tool of the class described having cutting teeth and two sets of angularly disposed stopping wings the active edges of which wings merge on a curve.

5. A tool of the class described having a perforating crown, and stopping means adjacent said crown to engage the wall of the

perforation and stop the advance of the tool immediately resistance to the advance of the perforating crown ceases.

6. A trephine having a removable center-pin provided with grooves extending from one end to the other.

7. A trephine having a removable center-pin provided with alternate parallel ribs and grooves extending longitudinally from one end to the other.

8. A trephine having a removable center-pin having alternate V-shaped ribs and grooves extending from one end to the other.

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

WILLIAM HENRY HUDSON.

Witnesses:

Q. P. SILER,

J. L. BORROW.