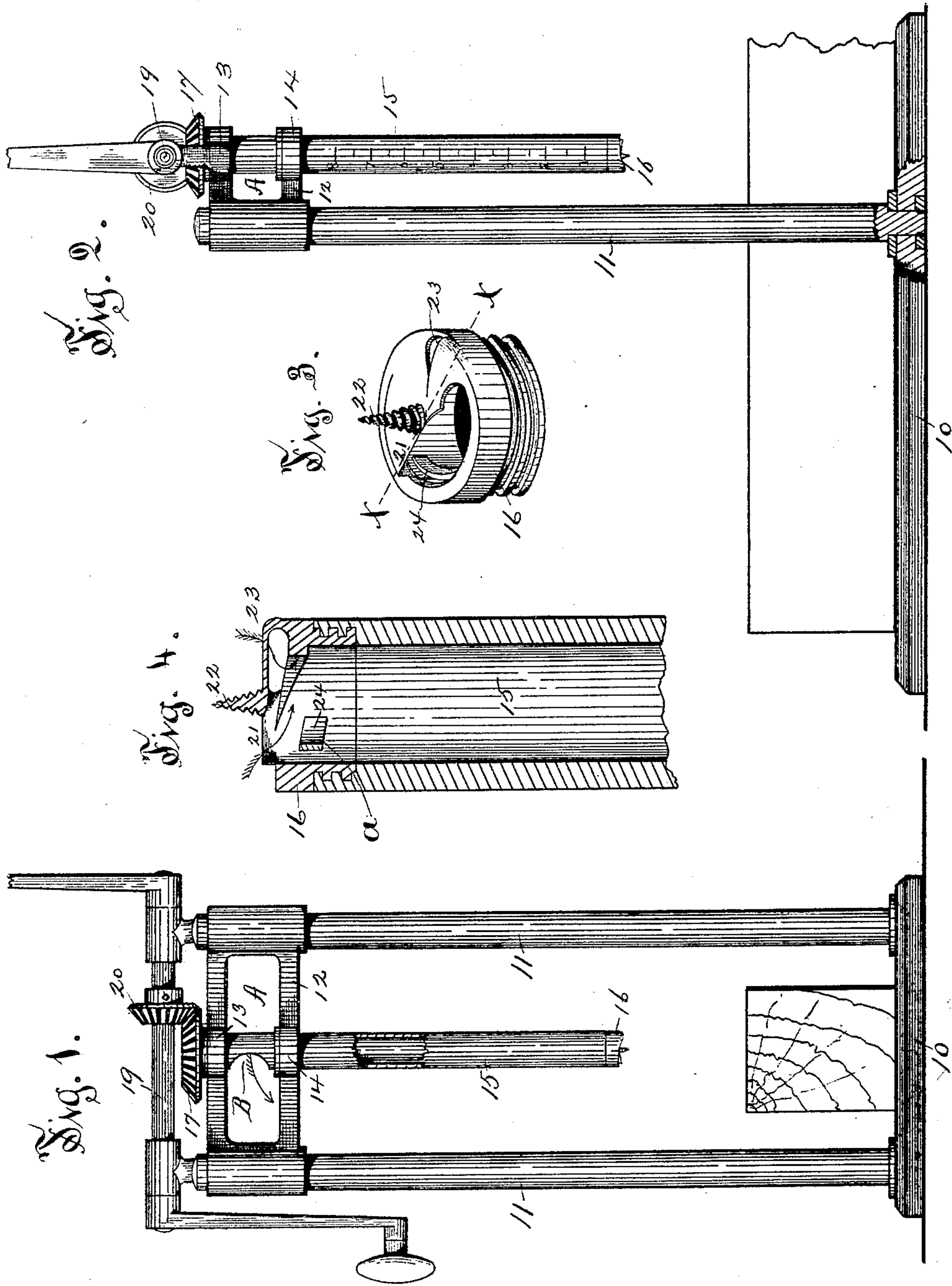


P. MILLER.  
AUGER.

No. 424,565.

Patented Apr. 1, 1890.



Witnesses

Henry A. Kingbury  
Abner W. Luther.

Inventor

Philip Miller

By His Attorney

Frank H. Allen.

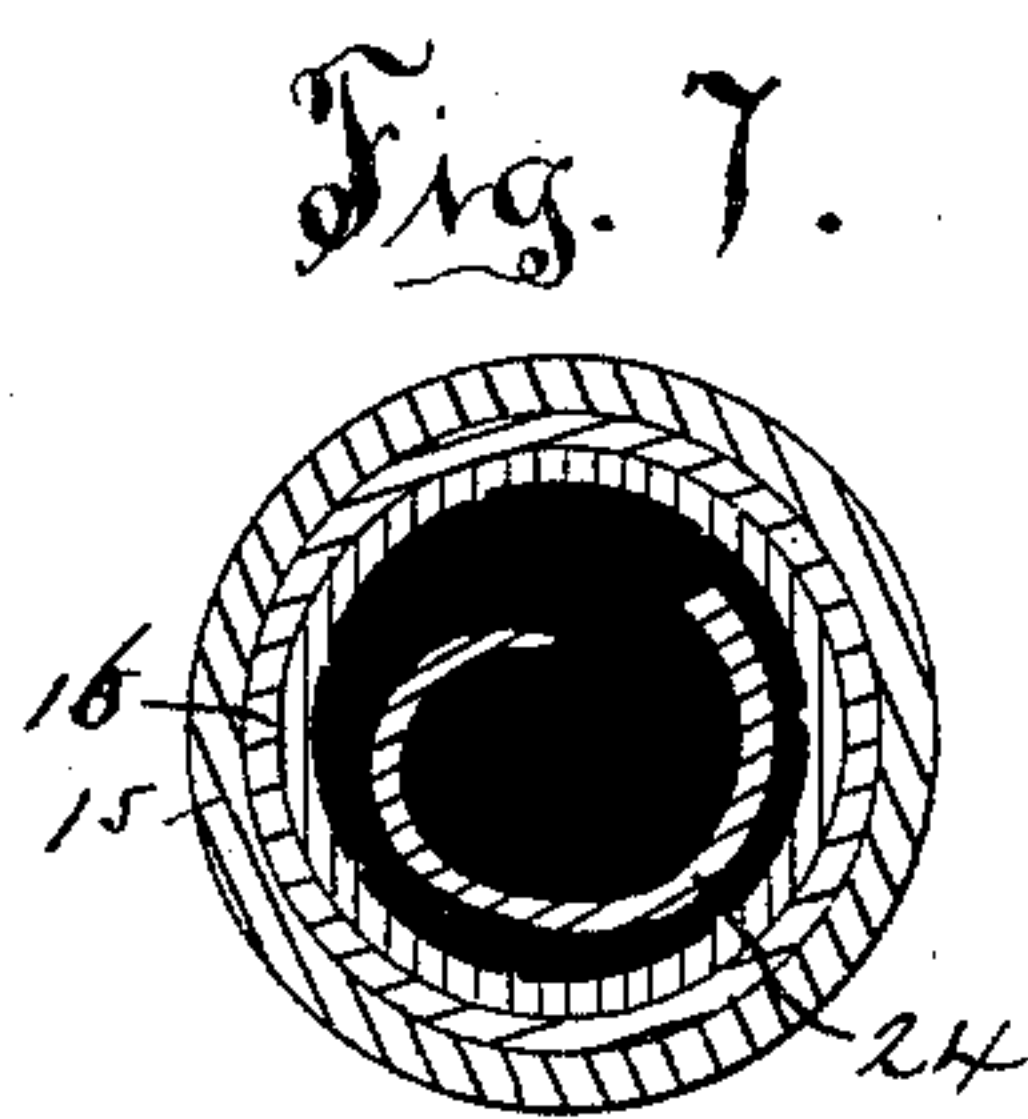
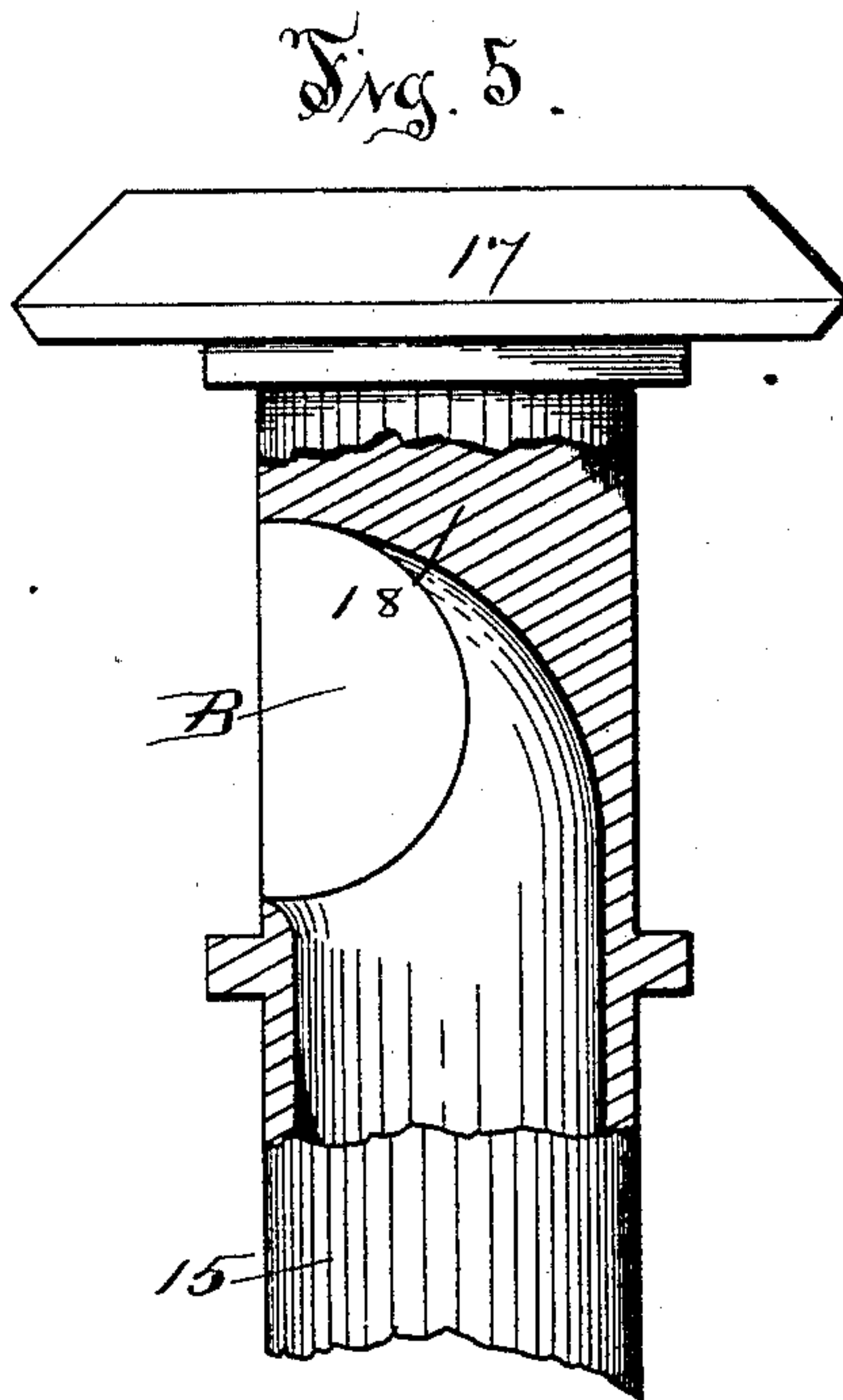
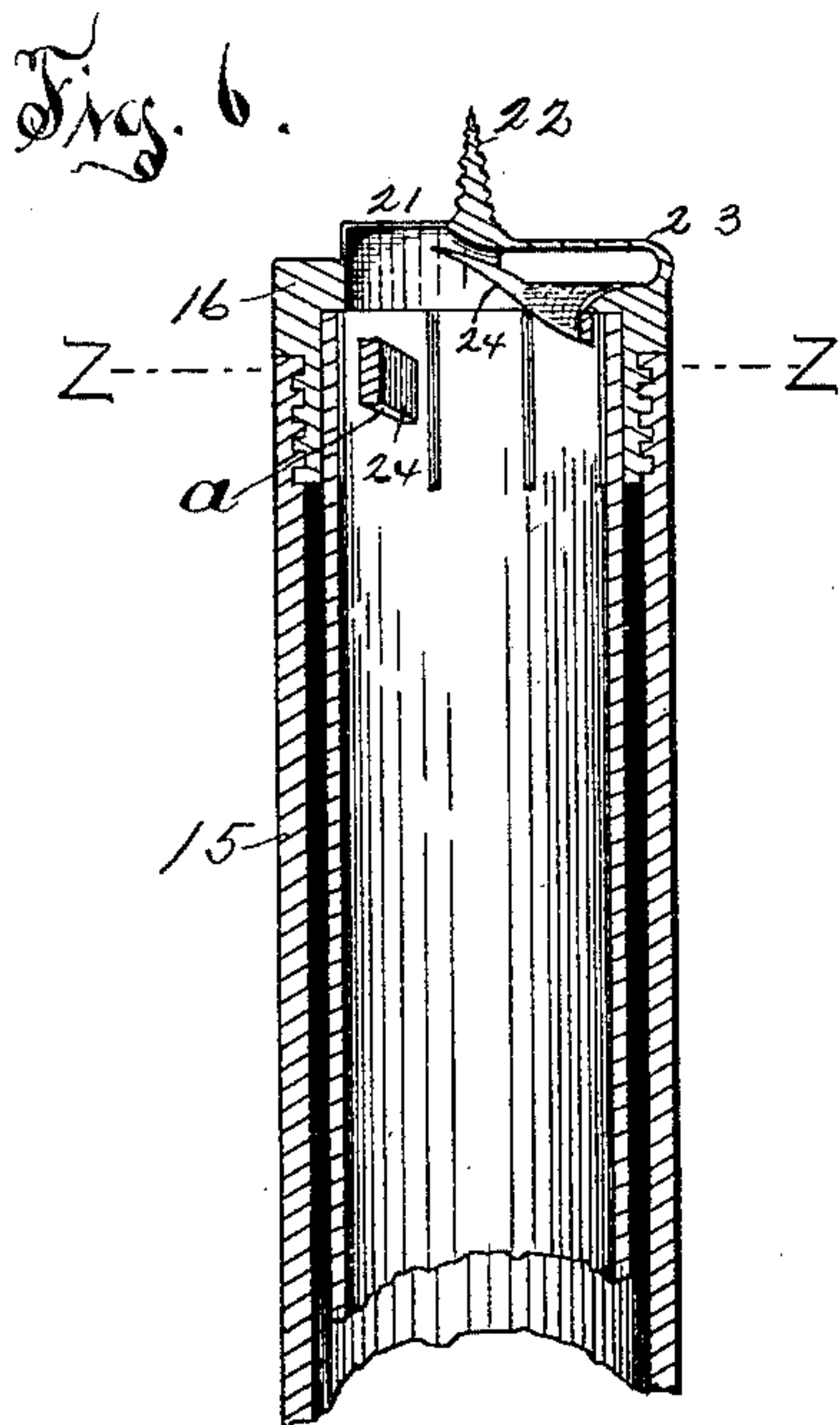
(No Model.)

2 Sheets—Sheet 2.

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*Alonzo M. Luther*

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By *his* Attorney  
*Frank H. Allen*



# UNITED STATES PATENT OFFICE.

PHILIP MILLER, OF NORWICH, CONNECTICUT.

## AUGER.

SPECIFICATION forming part of Letters Patent No. 424,565, dated April 1, 1890.

Application filed September 19, 1889. Serial No. 324,461. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP MILLER, a citizen of the United States, residing in the city of Norwich, county of New London, and State of Connecticut, have invented certain new and useful Improvements in Augers, which improvements are fully set forth and described in the following specification, reference being had to the accompanying two sheets of drawings, in which—

Figure 1 shows a single-tube auger of my improved form, properly supported in a boring-machine of the class commonly used for mortising timbers, said Fig. 1 being a front elevation of such a machine. Fig. 2 is a side elevation of said mortising-machine. Fig. 3 is an enlarged perspective view of a cutter-head embodying certain of my improvements hereinafter specified; and Fig. 4 is a longitudinal sectional view of said cutter-head on line X X, showing also a portion of the attached barrel or tubular section of the auger. Fig. 5 shows enlarged, and partly in section, the end of the tube through which the chips are discharged. In Fig. 6 I have shown in longitudinal section my new form of cutter-head attached to a double-shell auger, and in Fig. 7 a cross-section of such an auger on line z z of Fig. 6.

My invention has special relation to hollow augers of the class that delivers the chips through an opening at the rear end of the barrel or body-section.

On the 15th day of December, 1885, Letters Patent No. 332,274 of the United States were issued to me for a hollow auger the body portion of which was formed of two concentric tubes, the inner one being provided to conduct the chips to the rear end of the complete auger, said inner tube being so connected (by back gearing with the outer tube) that it remained stationary while said outer tube rotated around it. This construction is especially valuable for augers of great length, as the spiral chips move steadily rearward through the non-rotatable tube and do not break apart and clog the passage as they would if caused to rotate in and with a single tube. I have now so improved the construction of the cutter-head that it may be used as well with short augers having a single tube as with long ones having a double tube.

My invention further consists in providing a graduated scale on the barrel of augers of this class, so that in boring the operator may see at a glance the depth reached without removing the auger from the wood.

Referring to the drawings, the numeral 10 denotes a base-board having uprights 11 secured thereto. These uprights may be round, as here shown, or may be of other suitable shape, and form ways on which a carriage 12 is arranged to slide, said carriage being formed with bearings that fit said uprights. Carriage 12 is formed as a yoke, whose center portion projects laterally, and is cut away, as at A, to form two journal-bearings 13 14, that are in vertical alignment. In these bearings a single-tube auger is journaled. Said auger is formed with a tubular body-section 15, a cutting-head 16, and a bevel-gear 17, the latter being either formed as an integral part of the body or secured thereto, as may be preferred. The tubular body 15 is partially cut away, as at B, to provide an exit for the chips that pass upward within said tube, and the wall opposite said opening is filled in, as shown at 18 in Fig. 5, so that the chips as they move upward in tube 15 are guided toward said opening and prevented from clogging.

A horizontal shaft 19 is supported in bearings formed on carriage 12. Said shaft has at each end an operating-handle, and also bears a bevel-gear 20, that meshes with the gear 17 above described, and it will be understood without further explanation that the rotation of the horizontal shaft 19 will cause the simultaneous rotation of the vertical auger.

The tube 15 has marked on its circumference a graduated scale of inches and any desired parts of inches, as shown in Fig. 2. If it is desired to bore a hole of a given depth—as, for example, six inches—it is only necessary for the operator to force the auger into the wood until the six-inch mark is reached. This construction avoids the frequent withdrawal of the auger and measuring of the hole as now practiced. The cutting-head 16 is of peculiar construction.

Two or more cutting-lips are provided, one of which is a pod-cutter 21, that cuts the main or larger chip and extends from the feed-screw 22 outward to a point near but not



quite to the perimeter of the complete cutter-head. A second pod-cutter 23 is provided, preferably opposite the cutter 21, that cuts a narrow strip from the wood surrounding the hole made by said cutter 21, said second cutter 23 being so shaped that it projects slightly beyond the perimeter of the cutter-head and leaves a hole somewhat larger than said head, thus allowing the auger to enter without undue friction.

The object of providing cutters of different diameters is to strip up the wooden core or chip, thus rendering it flexible and more easily disposed within the hollow body of the auger. I have shown but one of these stripping (outside) cutters 23; but, if desired, another similar cutter, describing a circle between those of the two described cutters, may be provided.

In place of the spiral guide employed in my said earlier patent to conduct the chips into the tube, I have substituted a simple tongue or guard 24, that is of peculiar construction and serves to separate and guide the two chips made by the described cutters, and also to bring said chips together at the proper time in such relation to each other that the strip which comes from the outside cutter 23 is delivered between the spiral layers of the chip made by the main cutter 21. As the chip from the cutter 23 passes inward it engages the inner face of the guard 24, as shown by the arrow at right hand in Fig. 4, and is gradually compressed into a smaller diameter as it advances. Meanwhile the strip from the cutter 21 as it passes inward engages and rides on the edge *a* (lower edge, as illustrated in Figs. 3, 4, and 6) of the guard 24. When the end of said guard is reached, the two chips are brought together, the chip from the outer or stripping cutter being reduced in diameter and sandwiched between the layers of the companion chip. Said chips, being then of considerably less diameter than the hole in the tube or body of the auger, pass with very little friction through said tube, and are delivered through the opening B above described. The tongue or guard 24 is so formed that its lower edge *a*, along which the chip from the cutter 21 rides, is of considerable pitch, so that said chip is forced into the tube as the auger rotates. Said guard is also formed as a portion of a

helical coil, or, in other words, gradually approaches the axial center of the auger, so that the chip from the outer cutter is gradually bent and compressed into a much smaller circle as it rides along the inner face of said guard and passes into the tube of the auger.

When the form of cutter-head just described is used with a double-tube auger, as illustrated in Fig. 6, the end of the inner tube which forms the throat, into which the chips pass from the cutters, should extend into said head beyond the guard or tongue 24, so that the chips may be delivered immediately into the non-rotatable throat instead of first striking the rotating outer tube. This location of said throat forms an essential feature of my invention, and reduces the liability of clogging that otherwise would result.

Having described my invention, I claim as new and wish to secure by Letters Patent—

1. As an improvement in hollow augers, a tubular shell having a lateral opening at or near the rear end of said tube to provide an exit for the chips, the wall opposite said opening being filled in, as at 18, to guide said chips toward said exit.

2. In combination with a tubular body-section, a cutter-head having a main or principal cutter located between the perimeter and axial center of said head, a stripping-cutter located at said perimeter, as set forth, and a tongue or guard within the cutter-head, having a helical inner face leading inward from the said outer or stripping cutter, and also a spiral inner edge leading from said main cutter, all substantially as and for the purpose specified.

3. A tubular body-section, a cutter-head having a main cutter located between the perimeter and axial center of said head, a stripping-cutter located at said perimeter, as set forth, and a tongue or guard within the cutter-head, having a helical inner face, in combination with an inner non-rotatable tube projecting into said cutter-head beyond the said tongue or guard, as described, and for the object specified.

PHILIP MILLER.

Witnesses:

FRANK H. ALLEN,  
CHAS. F. THAYER.