No. 735,413. PATENTED AUG. 4, 1903.

C. O. SCHELLENBACH.

EXPANDING TOOL.

APPLICATION FILED JULY 16, 1902.

NO MODEL.

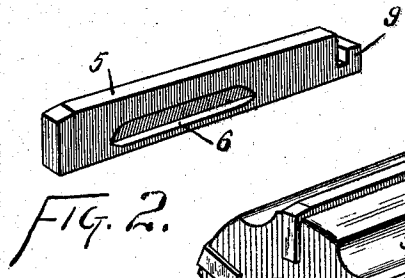


FIG. 2.

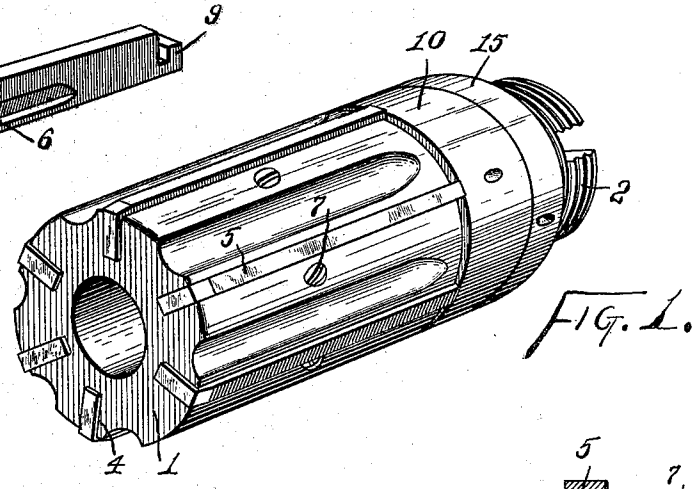


FIG. 1.

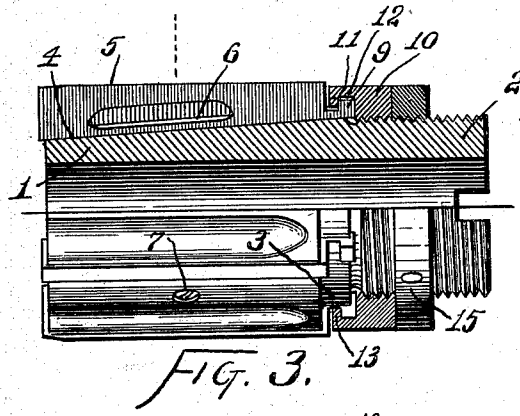


FIG. 3.

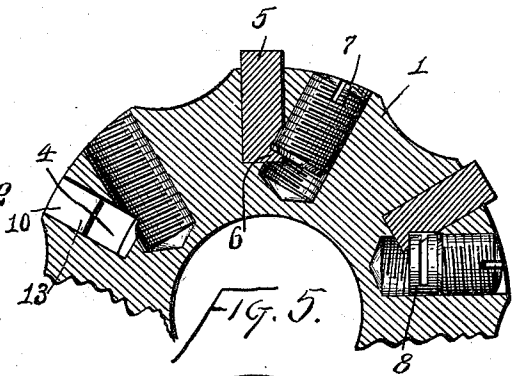


FIG. 5.

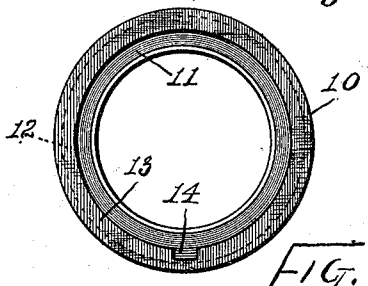


FIG. 4.

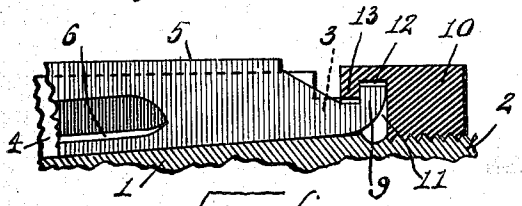


FIG. 6.

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No. 735,413. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

CHARLES O. SCHELLENBACH, OF NEWPORT, KENTUCKY.

EXPANDING TOOL.

SPECIFICATION forming part of Letters Patent No. 735,413, dated August 4, 1903.

Application filed July 16, 1902. Serial No. 115,748. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. SCHELLENBACH, a citizen of the United States, residing at Newport, Campbell county, Kentucky, have invented certain new and useful Improvements in Expanding Tools, of which the following is a specification.

This invention, pertaining to improvements in expanding tools, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a reamer embodying my invention; Fig. 2, a perspective view of one of the blades; Fig. 3, a side elevation, part longitudinal section, of the reamer; Fig. 4, an elevation of the inner face of the adjusting-nut; Fig. 5, a transverse section, on an enlarged scale, of a portion of the body of the reamer; and Fig. 6, a longitudinal section of a portion of the reamer, showing a modified form of coupling between the blades and the adjusting-nut.

In the drawings, ignoring Fig. 6 entirely for the present, 1 indicates the cylindrical body of the reamer, the same having a diameter somewhat less than that of the hole with which the reamer is to deal; 2, a threaded portion of reduced diameter at the heel end of the body; 3, a cylindrical portion between the main body portion and the threaded reduction, this intermediate portion having a diameter less than that of the main body and greater than that of the threaded portion; 4, a circumferential series of longitudinal grooves in the body, the depth of these grooves increasing toward the point of the reamer and their depth at their heel ends extending to about the top of the thread of the threaded portion of the body, the cross-section of these grooves being preferably rectangular; 5, blades seated in the grooves of the body and capable of longitudinal motion therein, the inner edges of these blades seating on the floors of the grooves in the body; 6, an upwardly-presenting ledge extending longitudinally along one face of each blade near its base, this ledge being produced in the illustrated construction by longitudinally grooving the face of the blade, the lower shore of this groove forming the ledge in question; 7, screws threaded into the body, one alongside and near each blade, the axes of these screws being at such angle to the radii of the body that the inner ends of the screws will project into the grooves of the body and over the ledges on the blades and prevent the outward movement of the blades; 8, a cushion shown as interposed between the inner end of one of the screws and the blade-ledge with which it coöperates, the cushion being illustrated as having the form of a disk slotted at its side, so as to form a spring; 9, an outwardly-projecting hook formed at the heel end of each blade; 10, an adjusting-nut screwing upon the threaded portion of the body; 11, a counterbore at the inner face of this nut adapted to fit upon the intermediate body portion 3; 12, a circumferential enlargement at the root of the counterbore in the adjusting-nut to receive the hooks of the blades, the width of this enlargement corresponding with the width of the blade-hooks; 13, an inwardly-projecting annular flange formed at the inner extremity of the adjusting-nut by the grooving of the counterboro, this flange engaging freely between the hooks and the heel ends of the blades; 14, a notch cut through the flange 13 and having a width equal to that of the hooks of the blades, and 15 a lock-nut screwing upon the threaded portion of the body against the heelward face of the adjusting-nut.

This reamer may be expanded by the manipulation of the adjusting-nut alone after the lock-nut has been released, the retreating adjustment of the adjusting-nut drawing the blades up the inclines of the grooves in which they are seated, and thus expanding the reamer. The set-screws need not clamp the blades, but may take simply a fair bearing on the ledges. If these ledges are accurately produced, so that they will be parallel with the under surfaces of the blades, then the ends of the screws need no further provision; but if there is a lack of parallelism at the ledges, due to the hardening of the blades, then it may be desirable to provide compensation at the points of the set-screws, which may be done by introducing a more or less yielding cushion between the ledges and the points of the screws. Such yielding cushion may well take the form of a spring, and the slotted disk illustrated furnishes a substan-

tial and economical form of spring for the purpose.

In assembling the parts the adjusting-nut is put in place and its notch brought opposite a groove, whereupon a blade may be placed in the groove and pushed endwise to bring its hook into proper engagement with the adjusting-nut, the set-screw then being set inwardly to prevent outward displacement of the blade, and so on successively with each blade. It might be thought that in turning back the adjusting-nut to expand the reamer the hooks would tend to pull out of the notch as the notch successively passed the hooks, but practice shows such not to be the case, for the notch has the same width as the hook. By bringing the notch opposite a hook the blade can be withdrawn from the adjusting-nut, but it will not withdraw itself therefrom; but the nut may be turned onward in either direction without causing the notch to catch upon the hook. The blades may be removed by slacking back the set-screws and then withdrawing the blades endwise one by one as the notch is brought opposite them. The adjusting-nut may be removed without removing the blades by adjusting the nut heelward to near the extreme position and then shifting the blades endwise one by one as the notch is brought opposite them, the nut being later entirely removed, the blades remaining in the body and retained therein by the set-screws. The notch is not essential, though it is very convenient. By relieving the hooks, as indicated in Fig. 6, the blades may be removed by a hinge-like motion after the set-screws are retracted.

The fitting of the flange of the counterbore upon the intermediate cylindrical portion between the main body and the threaded portion prevents access of cuttings to the interior of the adjusting-nut. The hooks and the hook-engaging features of the adjusting-nut had best be so dimensioned that the thrust of the nut upon the heel ends of the blades will be at the heel extremities of the hooks, as this will permit of the desired fitting of these parts being effected by convenient grinding at the heel ends of the hooks, a plan of construction much preferable to that of fitting the flange of the nut into the notch of the hook.

Attention is particularly called to the facts, first, that the blades are tapering blades; second, that their inner edges rest directly upon the floors of their receiving-grooves; third, that the diameter of the tool is adjusted by longitudinally shifting these wedge-shaped blades; fourth, that the nut which adjusts these blades is a traveling nut; fifth, that this nut has direct engagement with the blades; sixth, that the turning of this nut is the only manipulation necessary to the adjustment of the blades, and, seventh, that while the screws 7 may, if desired, be employed as clamping-screws for the blades they need not so act and will generally be employed merely as retaining-screws to keep the blades in the body of the tool, while permitting their free longitudinal adjustment.

I claim as my invention—

1. The combination of the body having inclined longitudinal grooves and a threaded portion, an inwardly-flanged counterbored nut upon said threaded portion, longitudinally and radially adjustable blades mounted in said grooves, hooks upon the blades engaging said counterbored nut and a cylindrical portion upon the body in juxtaposition to the hooks and engaging the flange of the nut.

2. In an expanding tool, the combination, substantially as set forth, of a body provided with longitudinal grooves with focally-converging floors, a threaded portion at one end of the body, an adjusting-nut upon said threaded portion and having a notched inwardly-projecting flange, blades seated in the grooves of the body, hooks upon the ends of the blades engaging the flange of the adjusting-nut, and means for retaining the blades within the grooves.

CHARLES O. SCHELLENBACH.

Witnesses:
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