(No Model.)

W. MATHER.

EXPANSIBLE AND COLLAPSIBLE SCREW TAP.

No. 387,431. Patented Aug. 7, 1888.

Fig. 1

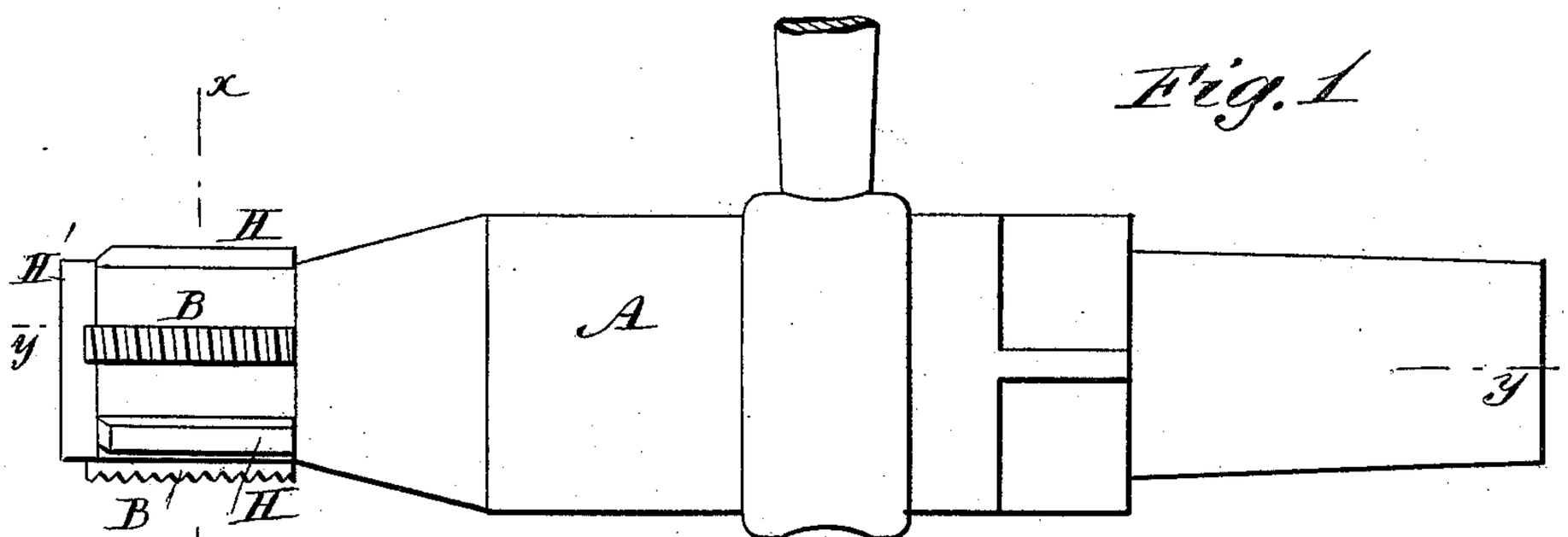

Fig. 2

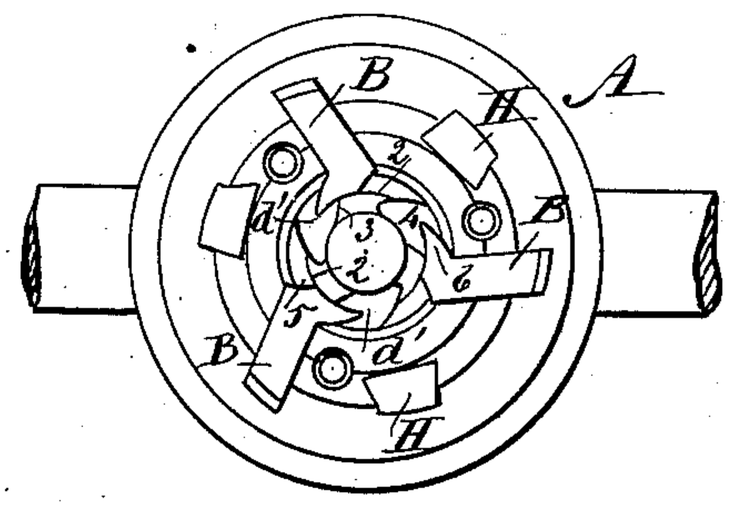

Fig. 3

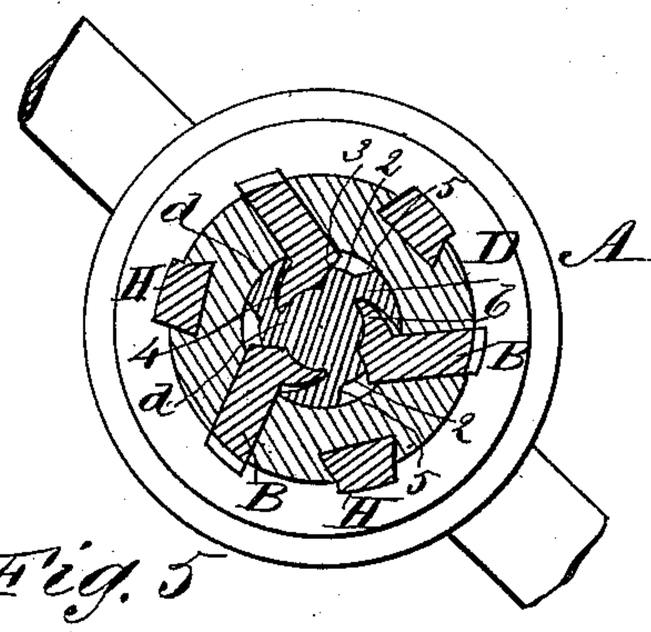

Fig. 5

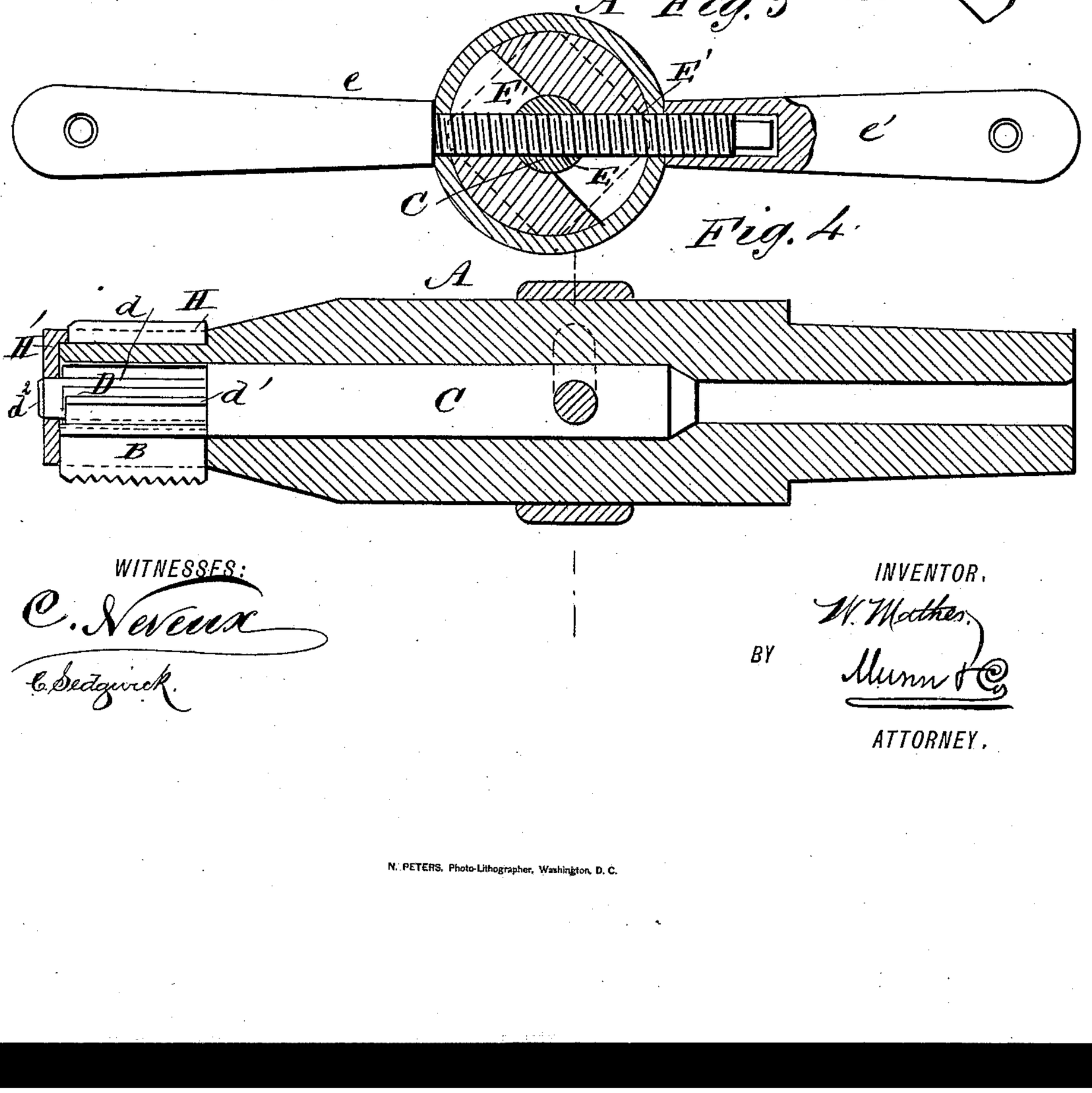

Fig. 4.

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EXPANSIBLE AND COLLAPSIBLE SCREW-TAP.

SPECIFICATION forming part of Letters Patent No. 387,431, dated August 7, 1888.

Application filed May 12, 1888. Serial No. 273,680½. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MATHER, of the city, county, and State of New York, have invented a new and Improved Collapsing and Expanding Screw-Tap, of which the following is a full, clear, and exact description.

My invention relates to an improvement in collapsing and expanding screw-taps, and has for its object to provide a means whereby the cutting-dies may be effectually and expeditiously projected outward or drawn inward, so that when the screw-thread has been cut the dies may be so manipulated as to enable the tap to be withdrawn without the necessity of a reverse rotary movement for that purpose.

The invention consists in the construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation. Fig. 2 is a plan view with the cap removed. Fig. 3 is a transverse section on line *x x* of Fig. 1. Fig. 4 is a longitudinal section on line *y y* of Fig. 1, and Fig. 5 is a central transverse section.

In carrying out the invention the casing consists of a hollow mandrel, A, provided at the cutting end with longitudinal slots or seats for the cutting-dies B. A spindle, C, is adapted to turn in the hollow of said mandrel, provided at the lower end with a cam, D, consisting of the reduced extremity *d*, and spaced longitudinal wings *d'*, radiating therefrom. The said cam D is produced by forming longitudinal undercut grooves, whereby a shoulder, 2, is obtained, having a cam-face adapted to force the dies outward, a re-entering inclined surface, 3, and the essentially V-shaped recess 4, the outer wall of which is adapted to engage the lip of the die, hereinafter described, and draw the same inward. The periphery of the spindle intervening the under-cuts, and which constitutes the outer surface of the wings *d'*, is shaped to snugly fit the bore of the mandrel. The lower extremity, d^2, of the spindle is reduced and adapted to extend beyond the mandrel.

A longitudinal lip, *b*, is produced upon one inner side of the dies B, the inner surface of said dies being concaved to fit the convex inner wall of the V-shaped recess 4, and likewise the shoulder 2 of the cam, when the dies are respectively thrown outward and drawn inward, as best shown in Figs. 2 and 3.

The inner edge of the dies is inclined outward in direction of the smooth face, which inclination is purposed to correspond with the re-entering inclined surface 3 of the cam when the dies are drawn in, as shown in Fig. 3, and the similarly-inclined surface 5 of the cam extending outward from the shoulder 2 to the outer cylindrical surface of the wings when the dies are thrown outward, as best shown in Fig. 3.

The spindle is provided with a threaded aperture, E, at or about the center, and in the mandrel opposite the said spindle-aperture a diametrical slot, E', is produced. The spindle is reciprocated through the medium of a sectional handle, one of which, section *e*, is provided with a reduced exteriorly-threaded end adapted to enter the mandrel-slot at one side, pass through the spindle-aperture, and project beyond the opposite side of the mandrel. The section *e'* is provided with a threaded longitudinal bore to receive the projecting threaded end of the section *e*, as best shown in Fig. 5.

Reaming-dies H are located in the forward or cutting end of the mandrel between the several dies B, and the dies when inserted in the longitudinal slots or seats of the mandrel and into the under-cuts of the cam are retained in position by a cap-plate, H', apertured to receive the reduced end of the spindle and likewise suitable screws, which latter are entered into the lower edge of the mandrel.

In operation, to expand the dies the handle-sections are turned to the right, whereupon the spindle revolving in that direction causes the concave surface of the dies to ride up upon the cam-face of the shoulders 2 and the inclined surface of the dies to bear against the inclined faces 5 of the cam, as illustrated in Fig. 2. When the handle is turned in the opposite direction, the V-shaped recess is brought opposite the die seats or slots, and the said dies are drawn inward and seated in the said recesses by the engagement with the outer face of the lip of the wings *d'* or the outer wall of recess 4, as best shown in Fig. 3.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the lipped cutting-dies, of a winged cam for adjusting the said cutting-dies inwardly and outwardly, substantially as shown and described.

2. The combination, with a mandrel and a spindle rotating in the same provided with a winged cam at one end, of lipped cutting-dies held in said spindle, said dies being carried outward and inward by said cam, substantially as shown and described.

3. The combination, with a mandrel, a spindle rotating in the same, a winged cam integral with one end of said spindle, and a sectional handle passing through the spindle and mandrel, of lipped cutting-dies held in the mandrel in engagement with the cam, substantially as shown and described.

4. The combination, with a mandrel and a spindle held to rotate in the same provided with a series of longitudinal under-cuts in the cutting end forming the cam-shoulder 2, the re-entering inclined surface 3, the V-shaped recess 4, the inclined surface 5, and the wings *d'*, of cutting dies held in the mandrel provided with a longitudinal lip upon one side and having inclined and concaved inner edge, substantially as and for the purpose specified.

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Witnesses:
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