

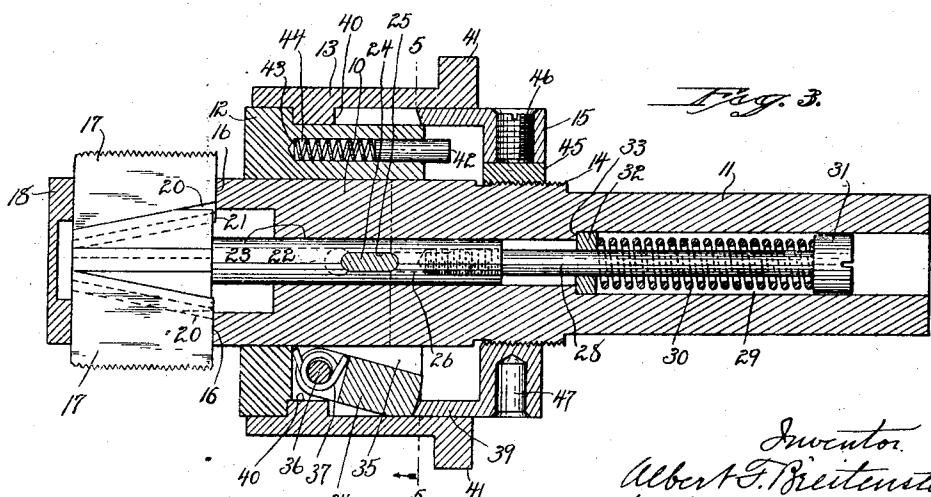
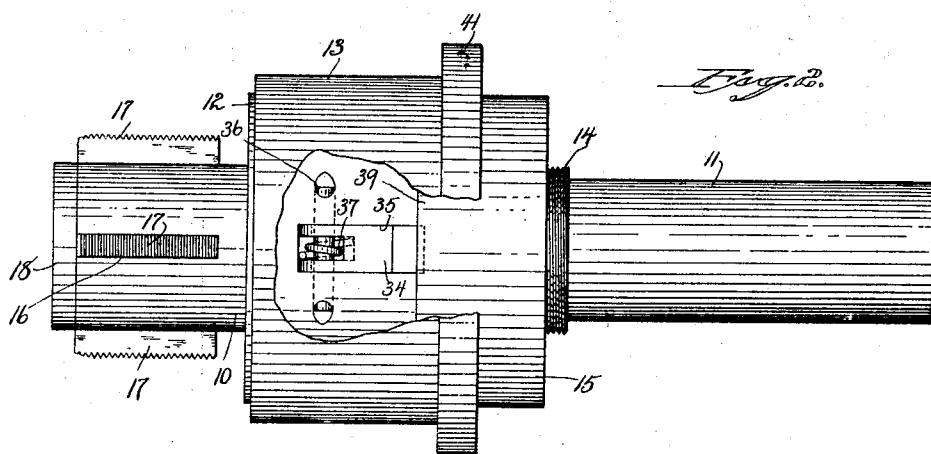
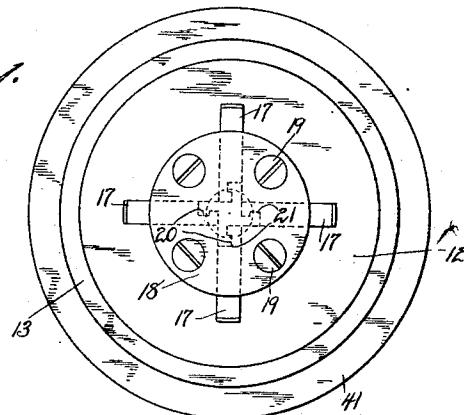
March 17, 1925.

1,530,293

A. F. BREITENSTEIN  
ROTARY COLLAPSING TAP

Filed May 8, 1923

2 Sheets-Sheet 1



Inventor  
Albert F. Breitenstein  
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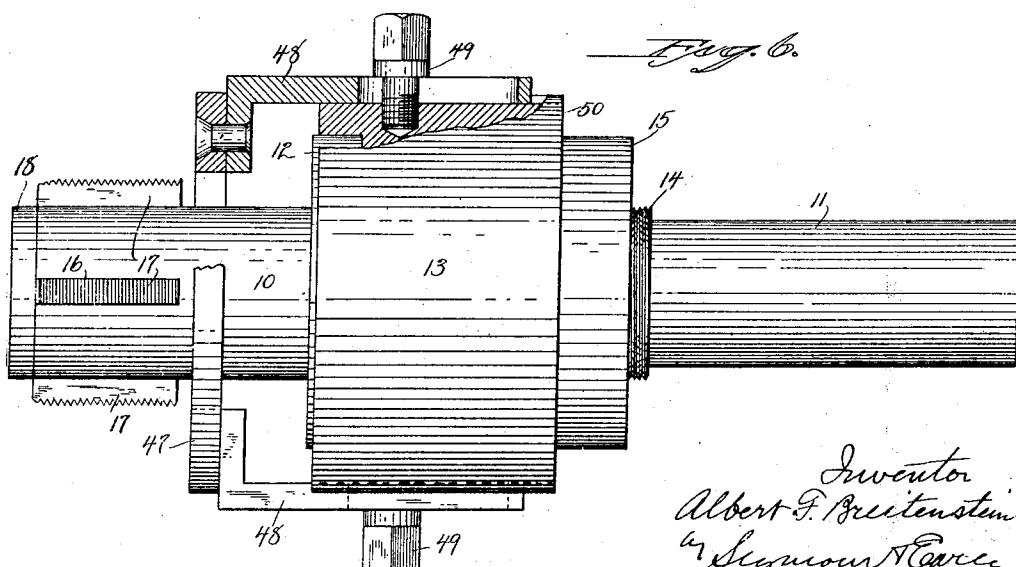
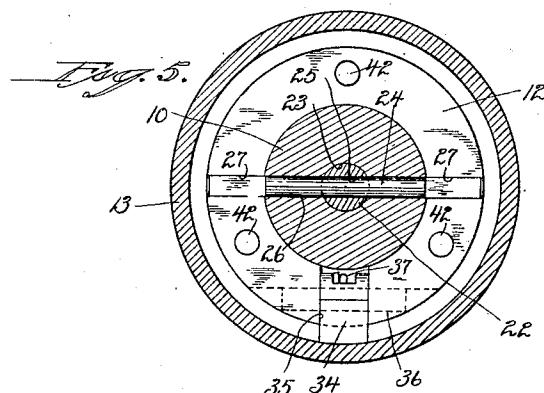
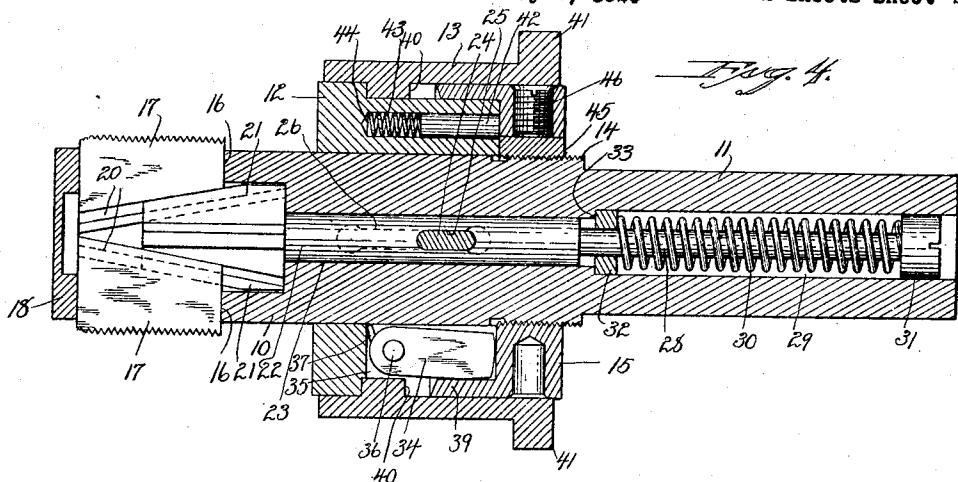
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A. F. BREITENSTEIN  
ROTARY COLLAPSING TAP

Filed May 8, 1923

2 Sheets-Sheet 2



Inventor  
Albert F. Breitenstein  
by Seymour Carey  
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Patented Mar. 17, 1925.

1,530,293

# UNITED STATES PATENT OFFICE.

ALBERT F. BREITENSTEIN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE GEOMETRIC TOOL CO., OF NEW HAVEN, CONNECTICUT.

## ROTARY COLLAPSING TAP.

Application filed May 8, 1923. Serial No. 637,492.

To all whom it may concern:

Be it known that I, ALBERT F. BREITENSTEIN, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in 5 Rotary Collapsing Taps; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Fig. 1 a view in front elevation of a rotary collapsing tap embodying my invention.

Fig. 2 an underside view thereof with a portion of the operating-ring broken away.

Fig. 3 a view thereof in central, longitudinal section, as open.

Fig. 4 a corresponding view thereof, as collapsed.

Fig. 5 a view in transverse section on the line 5—5 of Fig. 3.

Fig. 6 a view in side elevation, partly in section, of one of the modified forms which my improvement may assume.

My invention relates to an improved rotary collapsing tap, the object being to provide, at a low cost for manufacture, a simple, compact and reliable tap of the character described.

With these ends in view, my invention consists in a rotary collapsing tap having a locking-pawl released by the linear movement of a member of the tap, preparatory to collapsing the same.

My invention further consists in a rotary collapsing tap having certain other details of construction as will be hereinafter described and pointed out in the claims.

In carrying out my invention, as herein shown, I employ a tap-body 10 having an integral shank 11, by means of which the tap is mounted in the spindle or corresponding part of the machine in which the tap is used. The said tap-body mounts a pawl-carrying ring 12, which has sliding linear movement upon it and which in turn mounts an operating-sleeve 13, which has sliding linear movement upon it. At its rear end the tap-body is formed with a threaded shoulder 14 for the reception of an internally-threaded pawl-abutment ring 15. At its

forward end the body is formed with four equidistant radial slots 16 respectively receiving four chasers 17 held in place by a cap 18 fastened by screws 19 to the front face of the body. These chasers are formed, 60 in the usual manner, with inclined slots 20 receiving undercut inclined ribs 21 formed integral with the forward end of a plunger 22 located in a concentric bore 23 in the tap-body.

The pawl-carrying ring 12 is coupled to the plunger 22 by means of a transversely-arranged coupling-bar 24 passing through a diametric slot 25 in the plunger, and through a diametric clearance-slot 26 in the 70 tap-body, its ends being entered into slots 27 in the ring itself, as shown in Fig. 5, whereby the ring moves the said plunger when the tap is set, and the plunger moves the ring when the tap is tripped. The 75 clearance-slot 26 aforesaid in the tap-body is long enough to permit the ring and plunger to have sufficient conjoint movement to permit the collapsing and re-setting of the tap.

At its rear end, the plunger is formed with a threaded bore for the reception of the threaded inner end of a plunger-screw 28 mainly located in a bore 29 in the shank 11. This screw carries a helical tap-collapsing spring 30, interposed between its head 31 and a washer 32 abutted against a shoulder 33 produced at the inner end of the bore 29 by making the same larger than the bore 23 formed in the tap-body for the 90 reception of the plunger.

The pawl 34 aforesaid is located in a longitudinal slot 35 formed in the periphery of the pawl-carrying ring 12, mounted upon a pin 36 therein, and operated by a 95 pawl-spring 37 encircling the said pin and arranged to exert a constant effort to throw the pawl outward into its locking position, in which it engages with the beveled edge of the forwardly-projecting, annular flange 100 39 of the pawl-abutment ring 15. For disengaging the said pawl from the said edge of the flange 39, the operating-sleeve 13 is formed with an inwardly-projecting, annular rib 40 which co-acts with the outer 105 face of the pawl to unlock the same. By mounting the sleeve 13 upon the ring 12, so as to have sliding movement thereupon for forcing the pawl 34 into its retired position, I secure not only marked economy of 110

space but the sleeve serves to exclude chips and other foreign matter from the interior of the tap, and so avoids the fouling of the same.

5 For the sliding linear movement of the operating-sleeve 13 upon the pawl-carrying ring, the sleeve is provided at its rear end with an annular abutment-flange 41, the opposite faces of which engage with suitable abutments associated with the machine in which the tap is used, and not shown because common practice.

For cushioning the collapsing action of the tap, I preferably employ a plurality of buffer-pins 42 (Figs. 3 and 4), each operated by a spring 43, such pins and their springs being located in holes 44 formed in the pawl-carrying ring 12, in position for the pins to co-act with the forward face 20 of the pawl-abutment ring 15. For locking the adjusting-ring 15 in any desired position of adjustment, I employ a friction-shoe 45, which is jammed upon the threaded shoulder 14 of the tap-body by a set-screw 25 46. A spanner-wrench hole 47 in the ring 15 provides for turning the same as required for setting the chasers and compensating for their wear.

In the operation of my improved rotary collapsing tap, the chasers are held in their projected or cutting positions, by the engagement of the pawl 34 with the beveled forward edge of the flange 39 of the pawl-abutment ring 15, as shown in Fig. 3. Just before the tapping has been carried to the required depth, the forward face of the tripping-flange 41 engages with one of the fixed abutments of the machine, whereby the forward movement of the operating-sleeve 40 is arrested. In the further forward movement of the tap, the pawl 34 rides over the unlocking tripping-rib 40 of the sleeve, whereby the pawl is lifted out of engagement with the edge of the flange 39 of the ring 15, thus releasing the plunger 22 to the action of its spring 30, which immediately retracts it, with the effect of collapsing or retracting the chasers 17. The tap, now withdrawn from the work, moves rearwardly sufficiently to cause the rear face of the flange 41 of the operating-ring 13 to engage with the other fixed abutment of the machine, whereby the rearward movement of the operating-ring is arrested, as well as the rearward movement together of the pawl-carrying ring and plunger. The continued rearward movement of the tap-body compresses the collapsing-spring 30 and forces the chasers into their cutting or projected positions, this rearward movement of the tap-body, while the pawl-carrying ring and plunger are held stationary, being permitted by the clearance-slot 26 in the tap-body. At the limit of the latter movement, the edge 65 of the flange 39 has been moved sufficiently

rearward to permit the pawl-spring 37 to throw the pawl into its locking position, as shown in Fig. 3. The device having been thus re-cocked or re-set, is ready for another threading operation.

In the modified construction shown by Fig. 6 of the drawings, the flange 41 of the sleeve 13 is dispensed with and replaced by a tripping-plate 47, which engages directly with the work for tripping the device, this plate being fastened to two oppositely-located arms 48 adjustably secured by bolts 49 to the operating-ring 13. Under this construction, the rear face 50 of the operating-ring 13 engages with the fixed abutment of the machine for cocking the device.

I claim:

1. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a ring having sliding movement upon the said body and connected with the said plunger for movement therewith, an operating-sleeve having sliding movement upon the said ring, a detent carried by the said ring and moved into its retired position by the sliding of the said sleeve thereupon, and an abutment-member mounted upon the said body and co-acting with the said detent for holding the chasers in their projected positions against the tension of the said collapsing-spring to the action of which they are released for being collapsed, by the retirement of the said detent by the said sleeve.

2. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a ring having sliding movement upon the said body and connected with the said plunger for movement therewith, an operating-sleeve having sliding movement upon the said ring, a detent carried by the said ring and moved into its retired position by the sliding of the said sleeve thereupon, and an abutment-ring mounted upon the said body and co-acting with the said detent to hold the chasers in their projected positions against the tension of the said collapsing-spring to the action of which they are released for being collapsed by the retirement of the said detent by the said sleeve.

3. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a ring having sliding movement upon the said body and connected with the said plunger for movement therewith, an operating-sleeve having sliding movement upon the said ring, a detent carried by the said ring, and an abutment-ring adjustably mounted upon the said body in position to co-act with the said detent and telescoping within the said sleeve.

4. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a pawl-car-

5 ing ring mounted upon the said body and having sliding movement thereon, a pawl carried by the said ring and having swing-  
ing movement in a plane parallel with the longitudinal axis of the tap, an operating-  
sleeve having sliding movement upon the pawl-carrying ring and moved into its re-  
tired position by the sliding of the said sleeve thereupon, and a pawl-abutment ring  
10 mounted upon the body and co-acting with the said pawl for holding the chasers in their cutting positions against the tension of the collapsing-spring to the action of which they are released for being collapsed by the retirement of the said detent by the said sleeve.  
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5. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a ring having  
20 sliding movement upon the said body, a pawl carried by the said ring in position to swing in a plane parallel with the longitudinal axis of the tap, an operating-sleeve having sliding movement upon the pawl-carrying ring and moved into its retired position by the sliding of the said sleeve thereupon, a pawl-abutment ring mounted upon the tap-body and co-acting with the said pawl for holding the chasers in their cutting positions against the tension of the collapsing-spring to the action of which they are released for being collapsed by the retirement of the said detent by the said sleeve, and means interposed between the pawl-carrying ring and the pawl-abutment ring for cushioning the collapsing action of the device.

6. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a ring having sliding movement upon the tap-body, a pawl carried by the said ring and swinging in a plane parallel with the longitudinal axis of the tap, an operating-sleeve having sliding movement upon the pawl-carrying ring and moved into its retired position by the sliding of the said sleeve thereupon, a pawl-abutment ring mounted upon the tap-body and co-acting with the said pawl for holding the chasers in their cutting positions against the tension of the collapsing-spring to the action of which they are released for being collapsed by the retirement of the said detent by the said sleeve, and buffer-pins mounted in the pawl-carrying ring and co-acting with the pawl-abutment ring for cushioning the collapsing action of the device.

7. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a ring having sliding movement upon the said body and coupled with the said plunger for movement therewith, an operating-sleeve having sliding movement upon the said ring and provided with an annular tripping-flange, a

detent carried by the said ring and moved into its retired position by the sliding of the said sleeve thereupon, and an abutment-member carried by the said body in position to coact with the said detent for holding the cutters in their projected positions against the power of the collapsing-spring to the action of which they are released for being collapsed by the retirement of the said detent by the said sleeve. 70 75

8. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a pawl-carrying ring having sliding movement upon the body, an operating-sleeve having sliding movement upon the pawl-carrying ring, a coupling-bar passing through the plunger and body and entering the pawl-carrying ring for coupling the same to the plunger, and a pawl positioned in the pawl-carrying ring so as to swing in a plane parallel with the longitudinal axis of the tap, operated by the said operating-sleeve for collapsing the tap, and co-acting with a fixed part of the tap to hold the chasers in their cutting positions.

9. In a rotary collapsing tap, the combination with the body, plunger, chasers and collapsing-spring thereof; of a pawl-carrying ring having sliding movement upon the body, an operating-sleeve having sliding movement upon the pawl-carrying ring and moved into its retired position by the sliding of the said sleeve thereupon, a pawl-abutment ring adjustably mounted upon the body and having a forwardly-extending flange, and a pawl mounted in the pawl-carrying ring, so as to swing in a plane parallel with the longitudinal axis of the tap, and co-acting with the said flange for holding the chasers in their cutting positions against the opposition of the collapsing-spring to the action of which they are released for being collapsed by the retirement of the said detent by the said sleeve. 110

10. In a rotary collapsing tap, the combination with the body, chasers, plunger and collapsing-spring thereof; of a pawl-carrying ring mounted upon the said body and having sliding movement thereon, a pawl carried by the said ring and having swinging movement in a plane parallel with the longitudinal axis of the tap, and an operating-sleeve having sliding movement upon the said pawl-carrying ring and provided with an annular rib co-acting directly with the said pawl to unlock the same. 115 120

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

## ALBERT F. BREITENSTEIN.

**Witnesses:**

GEORGE L. DRAFFAN,  
FREDERICK O. UIHLEIN.