

No. 765,906.

PATENTED JULY 26, 1904.

H. H. RUSSELL.
ADJUSTABLE COLLAPSING TAP.

APPLICATION FILED DEC. 7, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

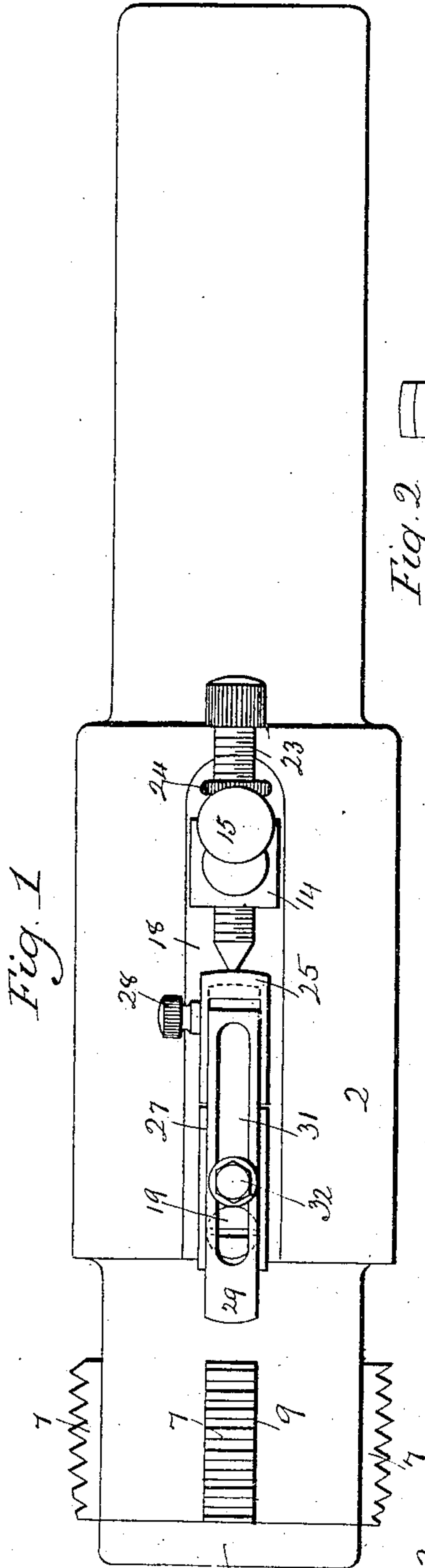


Fig. 1

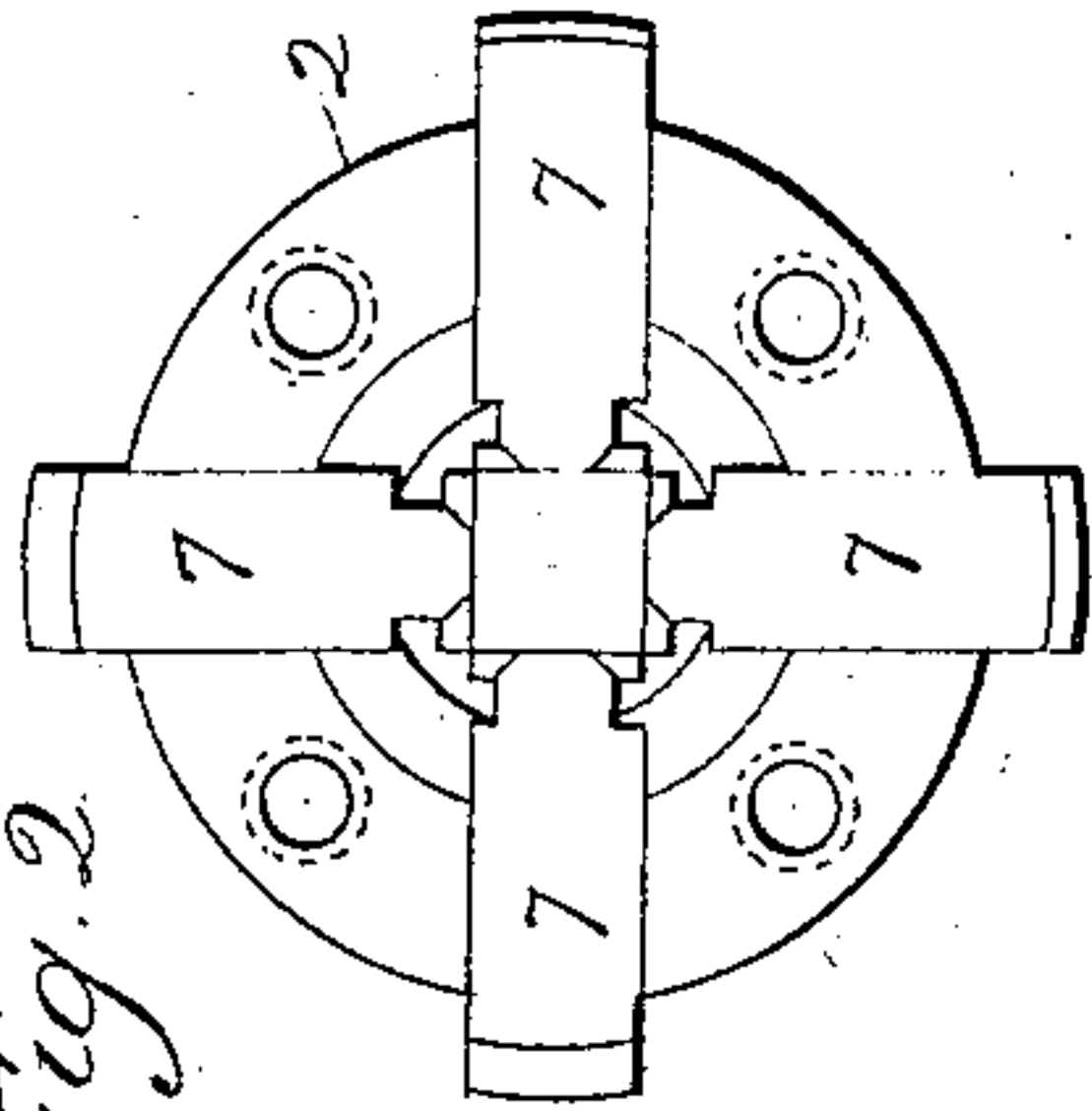


Fig. 2

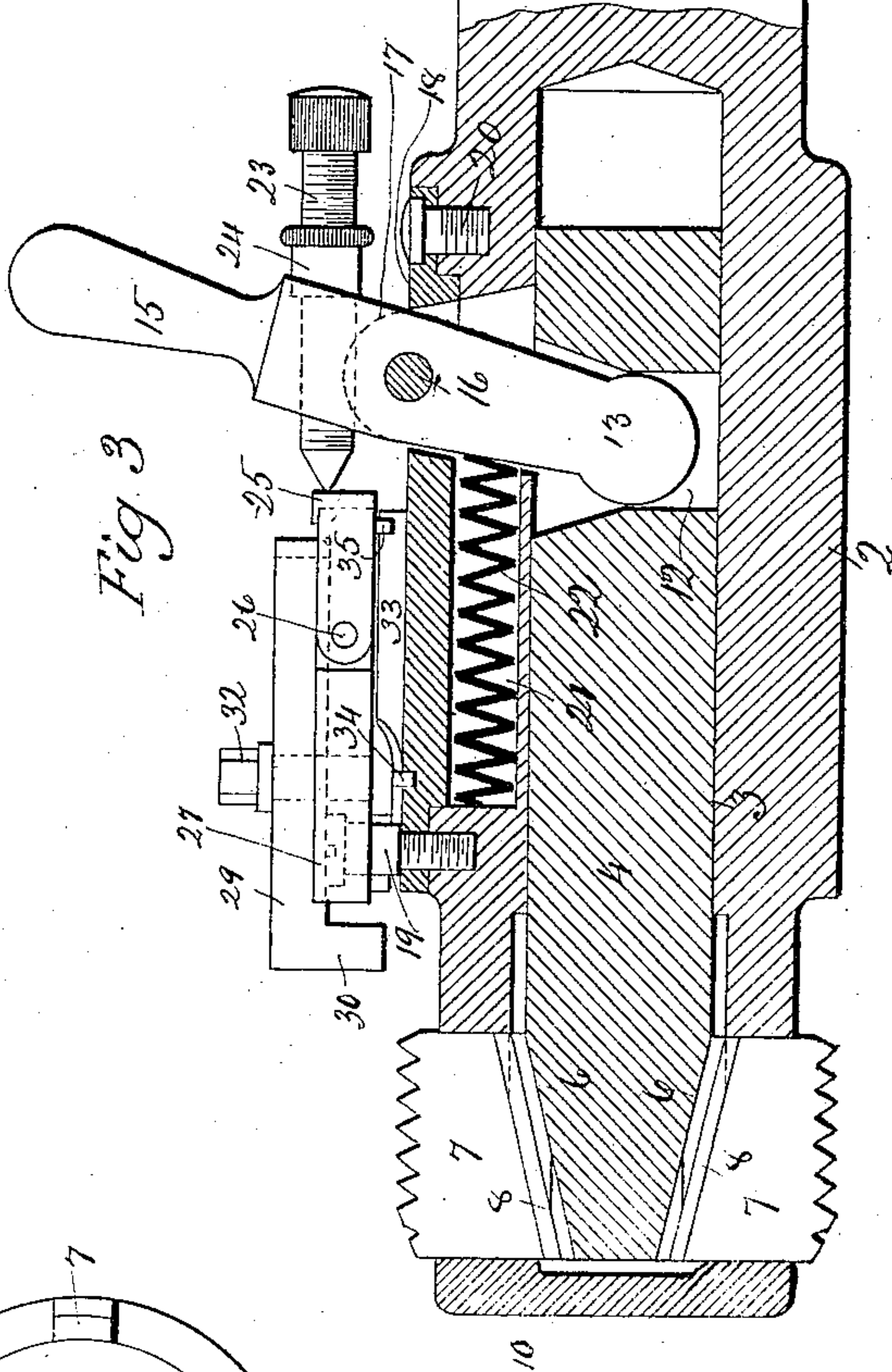


Fig. 3

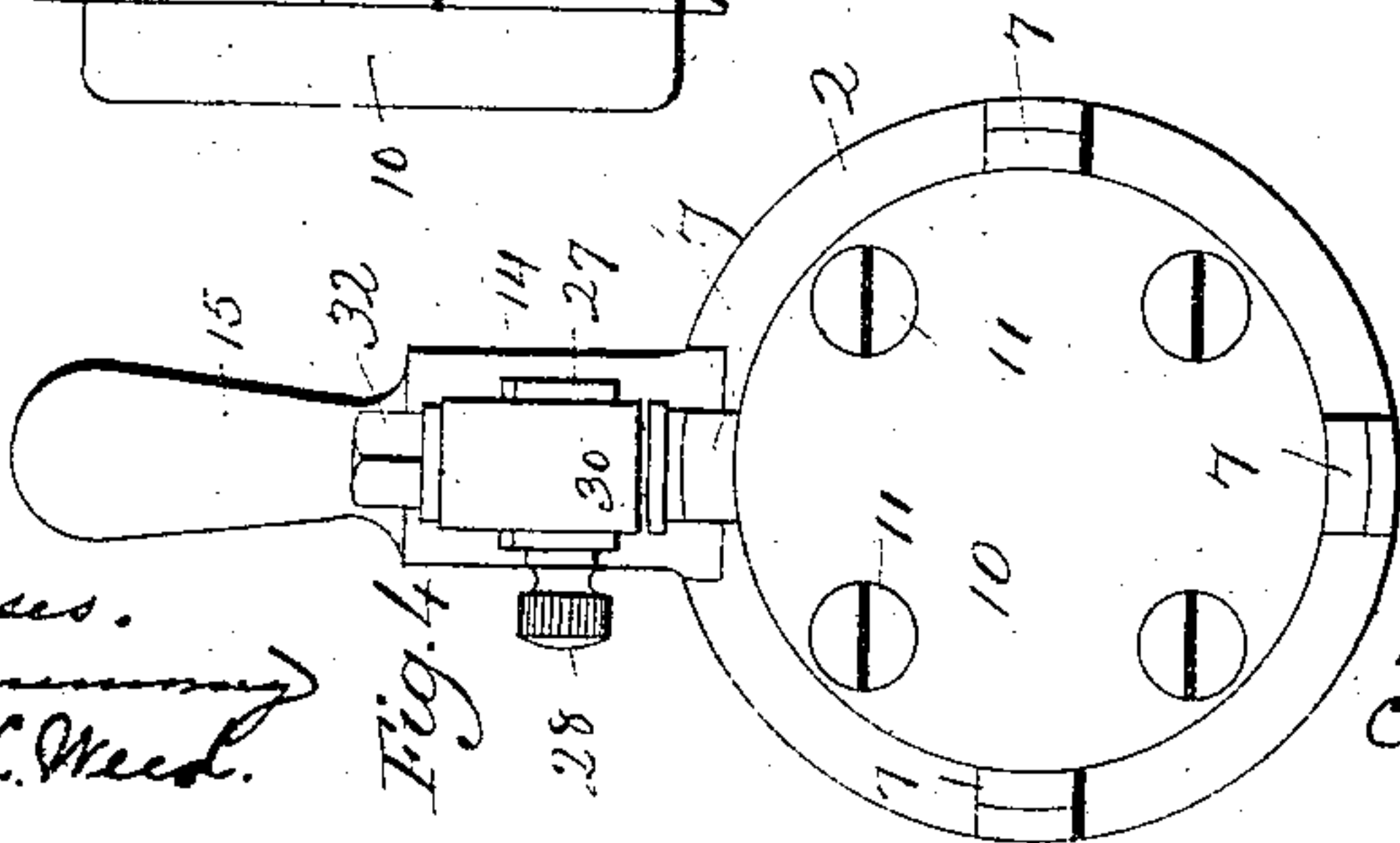


Fig. 4

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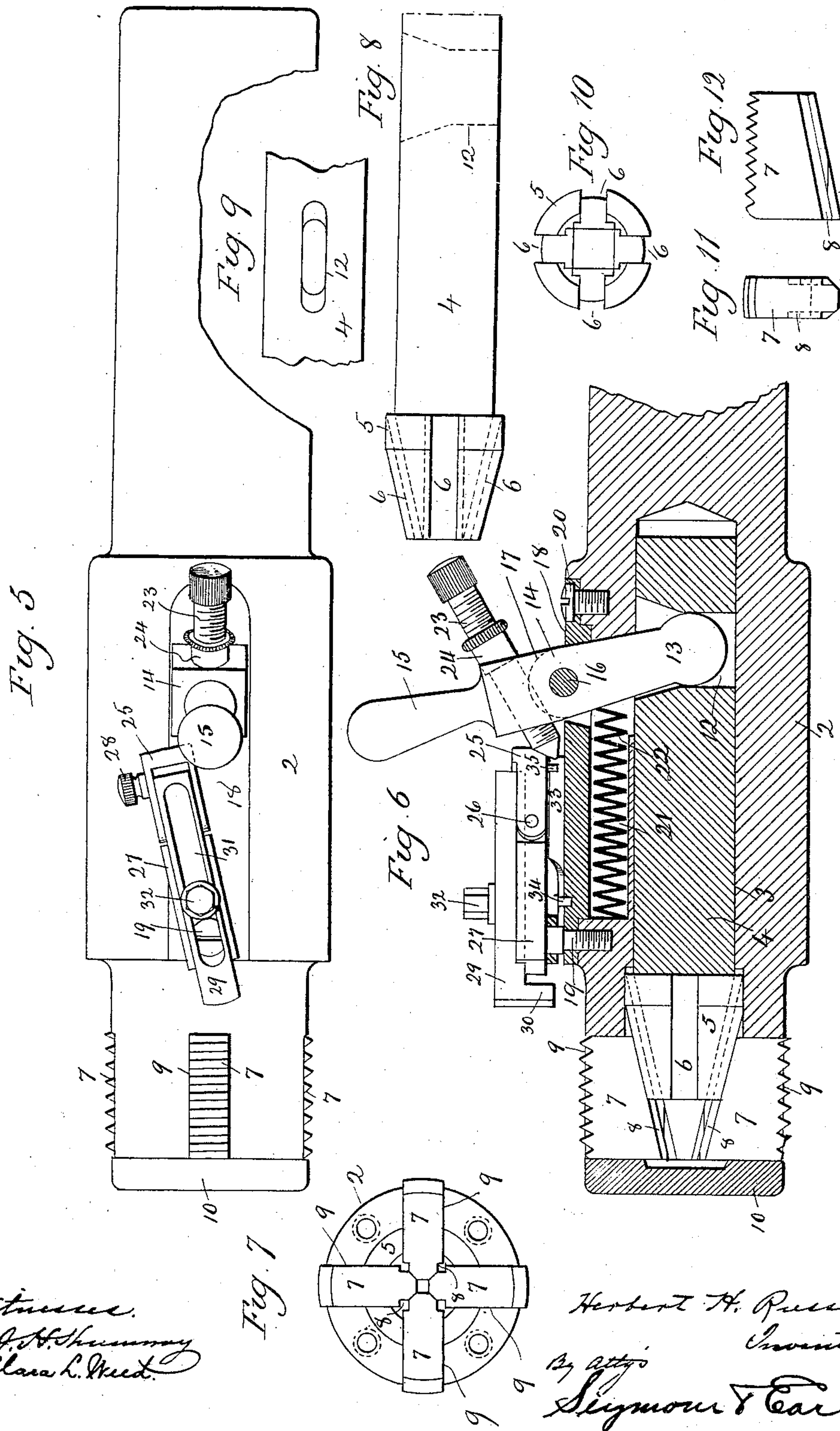
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

HERBERT H. RUSSELL, OF NEW HAVEN, CONNECTICUT.

ADJUSTABLE COLLAPSING TAP.

SPECIFICATION forming part of Letters Patent No. 765,906, dated July 26, 1904.

Application filed December 7, 1903. Serial No. 184,206. (No model.)

To all whom it may concern:

Be it known that I, HERBERT H. RUSSELL, of New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Adjustable Collapsing Taps; and I do hereby declare the following, when taken in connection with the accompanying drawings and the numerals of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of a collapsing tap constructed in accordance with my invention; Fig. 2, a view in front elevation of the front end of the device with the jaw-retaining plate removed; Fig. 3, a view of the device, partly in elevation and partly in vertical longitudinal section, showing the positions of the several parts when the jaws are locked in their projected or working positions; Fig. 4, a view of the device in front elevation with the parts in the same positions and with the jaw-retaining plate in place; Fig. 5, a plan view of the device, showing the parts in the positions when the operating-handle is tripped and the jaws are retracted; Fig. 6, a view of the device, partly in elevation and partly in vertical longitudinal section, showing the parts of the device in same positions; Fig. 7, a view in front elevation of the front end of the device with the jaw-retaining plate removed and the jaws in their retracted positions; Fig. 8, a detached view in side elevation of the plunger; Fig. 9, a broken plan view of the plunger, showing the flaring slot formed therein for the reception of the operating-handle; Fig. 10, a detached view of the plunger in front elevation; Fig. 11, a detached view in front elevation of one of the jaws; Fig. 12, a corresponding side view thereof.

My invention relates to an improvement in adjustable collapsing taps, the object being to produce a simple, strong, and effective tool constructed with particular reference to convenience of operation and the reduction of the number of the parts to the minimum.

With these ends in view my invention consists in an adjustable collapsing tap having certain details of construction and combina-

tions of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention as herein shown I employ a cylindrical body 2, the rear end of which is adapted to permit the tool to be applied to any ordinary drill or lathe. The forward end of this body is formed with a deep concentric chamber 3 for the reception of a bolt-like plunger 4, the outer end of which is formed with a conical head 5 larger in diameter than it is and traversed by four oppositely-undercut or T-shaped grooves or T-slots 6, which conform to its pitch or taper and which are arranged quartering. These T-slots respectively receive four radially-removable jaws 7, the cutting outer edges of which are threaded in the usual manner and the inner edges of which are inclined to conform to the pitch of the conical head 5 and each provided with a pair of oppositely-located longitudinal grooves 8, correspondingly pitched and adapting the inner edges of the jaws to be inserted into the said oppositely-undercut or T-shaped slots 6, whereby the jaws are positively connected with the plunger 4, but free to be moved radially outward or inward, according as the plunger is moved forward in its chamber 3 or rearward therein. By forming the head 5 with oppositely-undercut or T-shaped slots and providing the inner edge of each jaw with a pair of grooves the jaws are moved radially in and out, each with an equal pull and thrust on each side, whereby any tendency of the jaws to cramp when being so moved is obviated. It will of course be understood that the plunger is operated in one direction for moving the jaws outward into their projected or cutting positions and in the opposite direction to retract the jaws into their collapsed or retired or non-cutting positions. The said jaws, it should now be explained, are located in radial slots 9, formed at equal distances from each other in the forward end of the body 2 and retained in the said slots 9 by means of a disk-shaped jaw-retaining plate 10, held in place by screws 11, entering the body at points between the slots.

At its rear end the plunger 4 is formed with a vertically-arranged flaring or bell-mouthed slot 12, receiving the rounded inner end 13 of

an operating-lever 14, furnished with an operating-handle 15 and swinging upon a heavy pin 16, mounted in an upwardly-projecting lug 17, formed at the rear end of a removable cover 18, held in place by screws 19 and 20 and closing in the open side of a spring-chamber 21, formed in the body 2 in line with the plunger-chamber 3 and receiving a coiled operating-spring 22, the forward end of which impinges against the forward end of the chamber 21 and the rear end of which impinges against the forward edge of the operating-lever 14 at a point below the pivot 16 thereof. Under this arrangement the spring exerts a constant effort to swing the lever, so as to retract the plunger 4, and hence retract or collapse the jaws 7.

In order to project the jaws 7, the plunger 4 is thrown forward by manually swinging the handle 15 rearward, whereby the lower end of the lever is moved forward and the spring 22 compressed. To hold the parts mentioned in these positions, I employ an adjusting-screw 23, mounted in the upper end of the lever and provided with a knurled binding-nut 24, impinging against the rear edge of the same. The end of this screw is pointed to engage with the slightly-rounded rear end of a yoke 25, swinging in a vertical plane upon a pin 26, passing transversely through a tripping-lever 27, which swings upon the screw 19, which passes through its forward end, as well as through the cover 18, as aforesaid. The said yoke 25 is furnished with a knurled button 28, by means of which it is operated. In case it is not desired to use this yoke it may be retired by lifting it by its button into a vertical position, in which case the end of the adjusting-screw 23 will coact directly with the extreme rear end of the said tripping-lever 27.

A longitudinally-adjustable tripping-arm 29, carried by the lever 27 and arranged in line therewith, has at its forward end a depending finger 30, which is engaged by the work when the same is brought into contact with it by the entrance of the jaws into it to the desired extent, which is predetermined when the tool is set. The work, whatever it may be, will be rotating and come into engagement with the said arm and push it sideways, so to speak. The said arm is formed with a long slot 31, provided for its adjustment back and forth on the tripping-lever 27 and receiving a binding-screw 32, which enters the same. The said tripping-lever and arm are restored to their normal positions, in which they are in line with the body 2 and in which the rear end of the lever is in position to coact with the adjusting-screw 23 by means of a flat spring 33, located beneath the said lever and having the screw 19 passed through its forward end and also held in place by means of a pin 34 entering the removable cover 18. At its rear end this spring is con-

nected by a pin 35 with the rear end of the tripping-lever.

Now with reference to the operation of my improved tool it will be understood that whenever the handle 15 is manually pulled rearward for the projection of the jaws 7 the spring 33 will at once act to swing the tripping-lever 27 into line with the pointed end of the adjusting-screw 23, whereby the plunger will virtually be locked in its projected position, and hence the jaws 7. The plunger and jaws will remain so locked until the completion of the "cut," at which time the work itself, which is revolving, will impinge or rub against the tripping-finger 30 of the tripping-arm 29, which will be pushed sidewise against the tension of the spring 33 and carry with it the tripping-lever 27, which will thus be disengaged from the nose of the adjusting-screw 23. As soon as this takes place the operating-spring 22 will act to push the operating-lever rearward, with the effect of retracting the plunger 4, and hence the cutting-jaws 7, after which the jaws will, so to speak, be backed out of the work, which they will clear. Preparatory to using the tap again, the handle will be manually pulled back, leaving the spring 33 free to act to bring the tripping-lever into position to be engaged with the adjusting-screw 23, which effects the relocking of the jaws in their projected positions. The adjusting-screw 23, as it may now be explained, provides for the fine adjustments of the tool, while the yoke 25 provides for the coarse adjustments of the tool and is used so as to avoid the necessity of disturbing the adjustment of the screw. When the yoke is in use, it secures a longer throw for the plunger and a greater outward projection of the cutting-jaws so the same cut deeper, the difference in the projection of the jaws when the yoke is used and when it is not used being represented by the thickness of the metal at the rear end of the yoke. In case the tool is being used to make only one cut the yoke would not be employed; but when it is desired to do a particularly nice job two cuts are made, the tap being used without the yoke for the first cut and with the yoke for the second cut. The cutting of the metal will then be done partly at the first cut and completed at the second cut. The yoke is in reality a finishing attachment.

By positively connecting the cutting-jaws with the plunger in the manner described the jaws are retracted without the use of springs, which is a great advantage, inasmuch as the springs are liable to break and derange the device. This objection to other devices is entirely overcome by my device.

It is apparent that in carrying out my invention some changes from the construction herein shown and described may be made. I would therefore have it understood that I do not limit myself to such construction, but hold

myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected with the plunger for operation thereby, an operating-lever connected with the plunger, a spring for automatically retracting the plunger and hence the jaws, and a tripping instrumentality coacting with the said lever for holding the plunger in its projected position against the tension of the said spring and also operated by the work for releasing the lever and hence the plunger to the action of the spring.

2. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected therewith for operation thereby, a spring for automatically retracting the plunger, an operating-lever connected with the plunger, an adjusting-screw mounted in the said lever, and a tripping instrumentality engaging with the said screw and acting through the same and the lever to hold the plunger in its projected position against the tension of the said spring and operated upon by the work to release the lever, and hence the plunger to the action of the said spring.

3. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected with the outer end of the plunger by means of which they are projected, an operating-lever for the said plunger, a spring coacting with the said lever for moving the plunger rearward, an adjusting-screw mounted in the lever, and means interposed between the work and the said screw and coacting with the same for holding the jaws projected while they are cutting and engaged by the work and thereby disengaged from the screw for releasing the lever to permit the spring to retract the jaws.

4. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected with the plunger, an operating-lever for the plunger, an adjusting-screw mounted in the lever, a pivotal tripping-lever interposed between the work and the screw and coacting with the screw to hold the jaws in their projected positions while they are cutting and engaged by the work and thereby disengaged from the screw for releasing the lever, and a spring for operating the plunger to retract or collapse the jaws when the lever is released by the screw.

5. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, an operating-lever therefor, radially-movable cutting-jaws connected with the plunger, a spring-chamber formed in the said body, a spring located therein for operating the operating-lever, a removable cover for the spring-chamber, an adjusting-screw mounted in the said lever, a swinging spring-actuated tripping-lever for coaction with the said screw, and a tripping-arm carried by the tripping-lever and engaged directly by the work for swinging the tripping-lever to release the operating-lever to the action of the spring.

6. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected with the plunger for operation thereby, an operating-lever for the plunger, a spring for automatically retracting the plunger and hence the jaws, an adjusting-screw mounted in the lever for securing a fine adjustment of the said jaws, a tripping instrumentality engaging with the said screw for holding the lever and hence the plunger in its projected position against the tension of the said spring and engaged by the work for releasing the lever and hence the plunger to the action of the said spring, and a device carried by the said tripping instrumentality and coacting with the said screw to permit a finishing cut to be made.

7. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected with the plunger, a plunger-operating lever, a plunger-operating spring, an adjusting-screw mounted in the plunger-operating lever, a tripping-lever, and a yoke pivotally connected with the tripping-lever for coaction with the screw to change the throw of the plunger without adjusting the screw.

8. In an adjustable collapsing tap, the combination with a chambered body, of a plunger located therein, radially-movable cutting-jaws connected with the plunger, a plunger-operating lever, a plunger-operating spring, a removable cover applied to the body to close in the said spring, a plunger-operating lever pivoted to the said cover, an adjusting-screw mounted in the said lever, a spring-actuated swinging tripping-lever coacting with the screw, and an adjustable tripping-arm mounted upon the said lever.

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

HERBERT H. RUSSELL.

Witnesses:

CLARA L. WEED,

GEORGE D. SEYMOUR.