

(No Model.)

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J. O. MORSE, Dec'd.

J. O. MORSE, Jr., administrator.

EXPANDING TAP.

No. 284,220.

Patented Sept. 4, 1883.

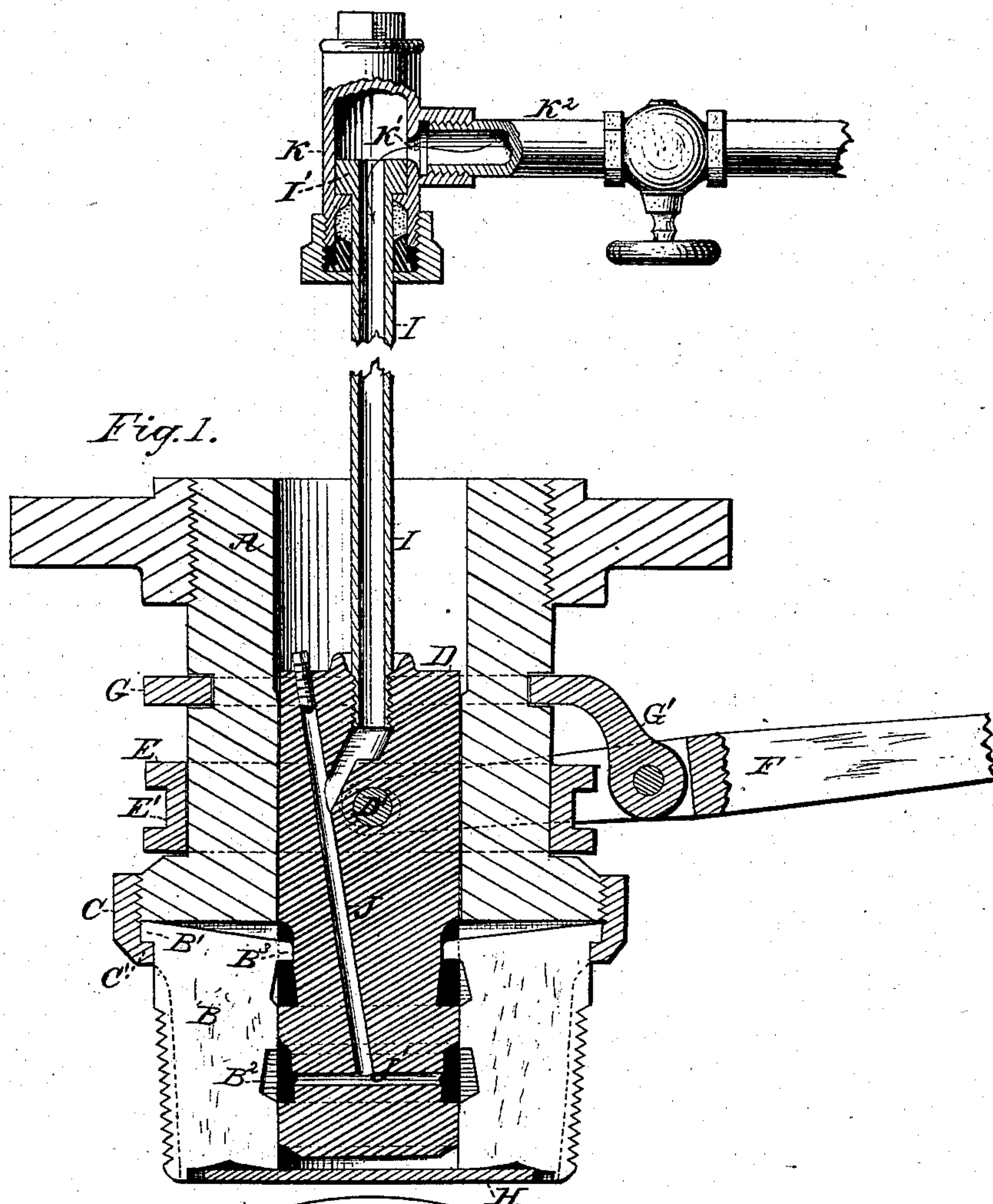
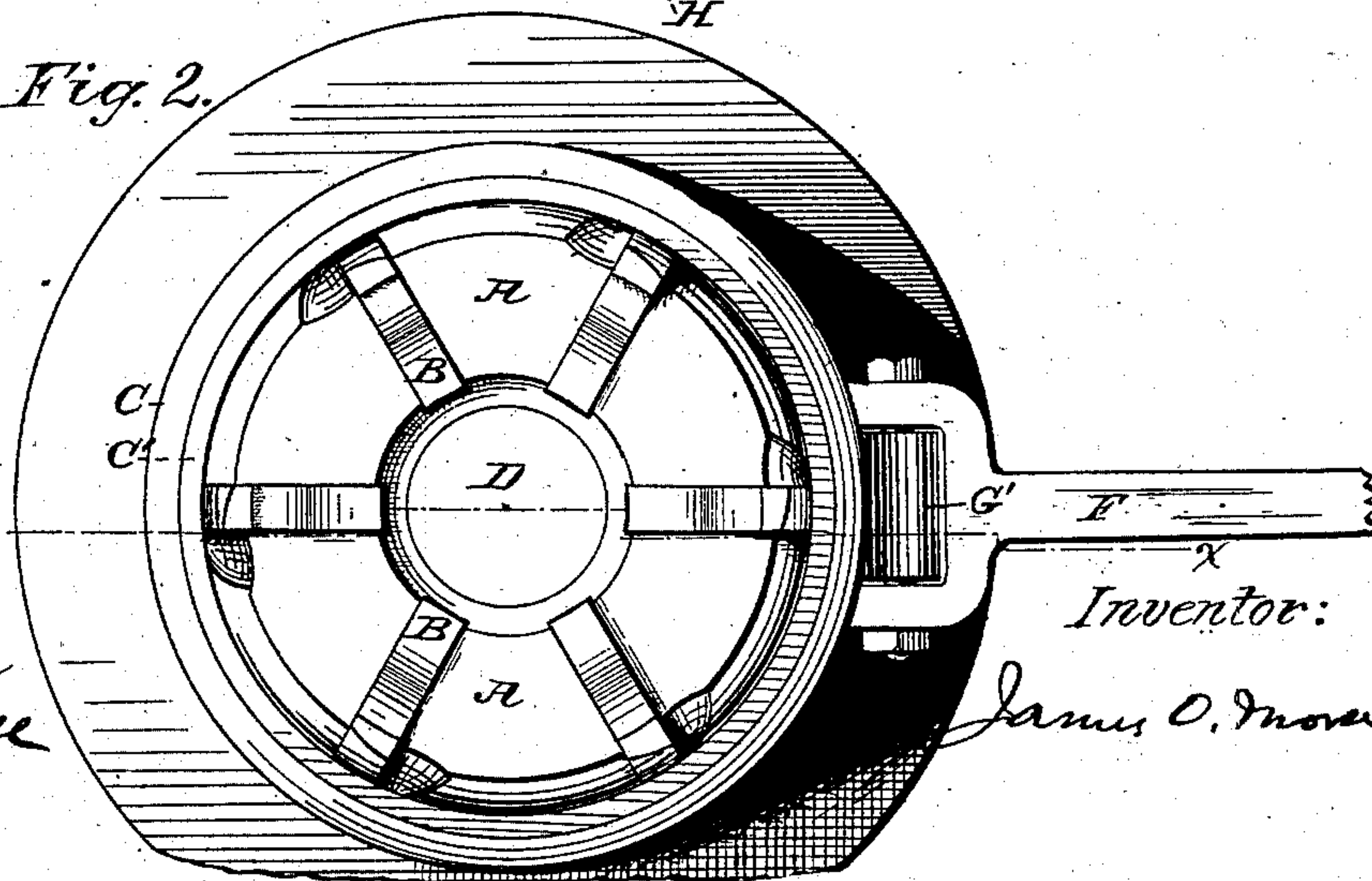


Fig. 2.



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James O. Morse

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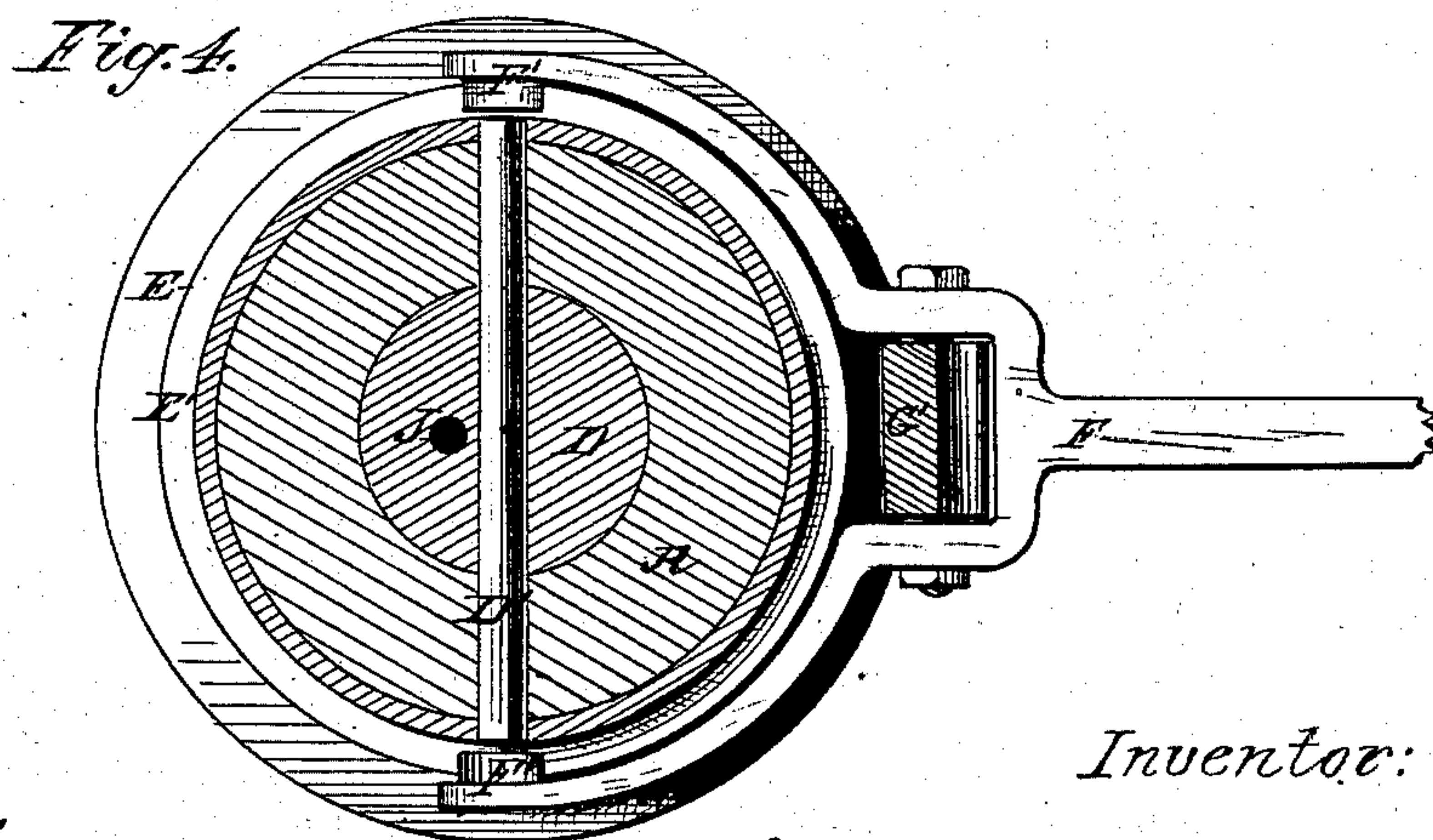
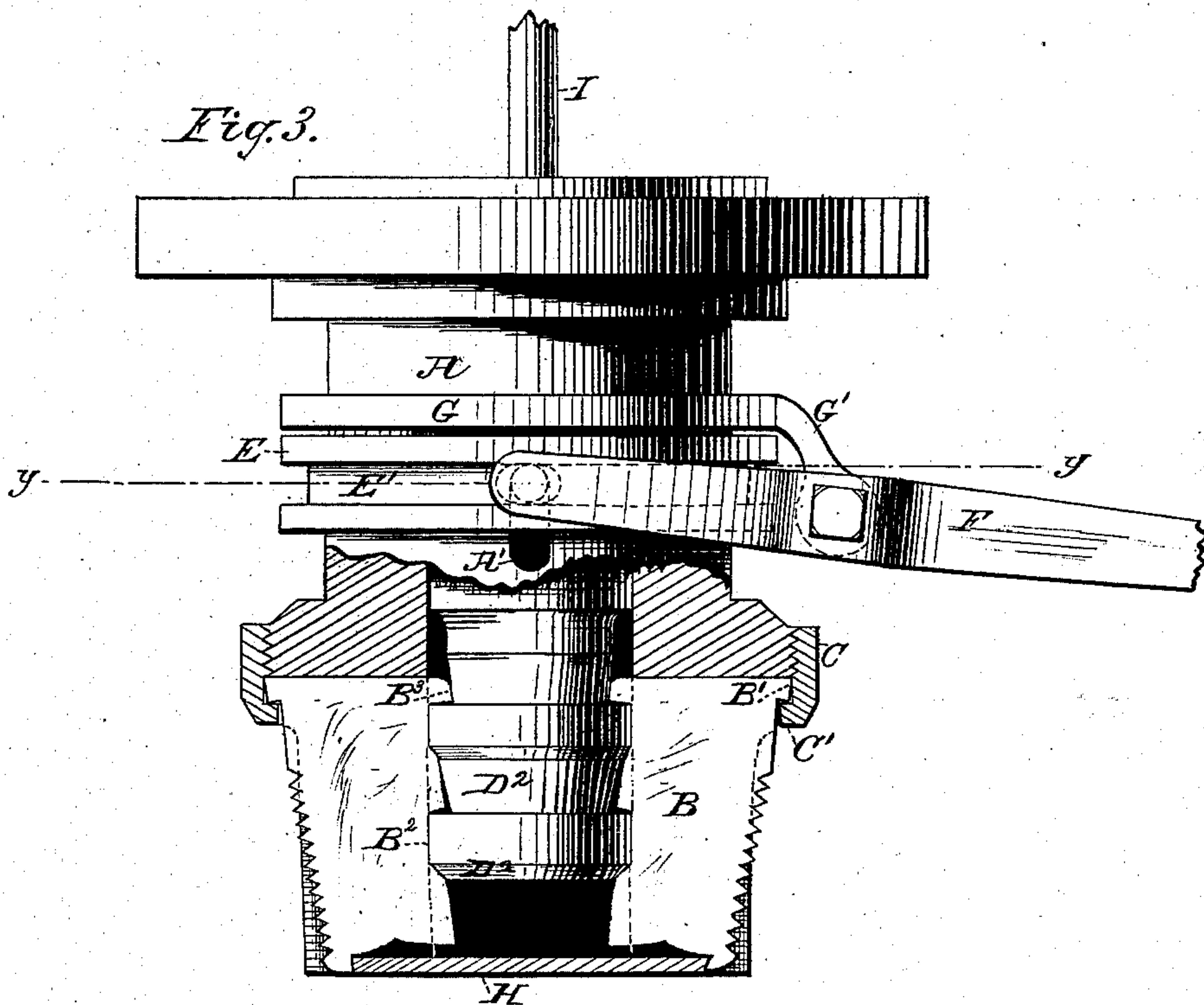
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UNITED STATES PATENT OFFICE.

JAMES O. MORSE, OF ENGLEWOOD, NEW JERSEY; JAMES O. MORSE, JR.,
ADMINISTRATOR OF SAID MORSE, DECEASED.

EXPANDING TAP.

SPECIFICATION forming part of Letters Patent No. 284,220, dated September 4, 1883.

Application filed September 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES O. MORSE, of Englewood, in the county of Bergen and State of New Jersey, have invented certain new and
5 useful Improvements in Expanding Taps, of which the following is a description in such full, clear, and exact terms as will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part thereof.

The invention relates to taps for cutting internal screw-threads, and particularly to that class of taps the thread-cutting dies of which are arranged to expand and collapse; and the
15 new features of improvement are as follows: first, a cylindrical plunger, which is provided with transverse beveled grooves, and is arranged to operate upon the inner edges of the thread-cutting dies to retract and expand
20 them; second, lubricating the cutting-dies from an axial or interiorly-located duct in such manner that the outward flow of the lubricant prevents chips or shavings of metal or grit of any kind from lodging between the
25 movable parts of the tap; third, a cut-off connected with the device which supplies the lubricating material, and so operated as to stop the flow of the lubricant when the cutting-dies are retracted; and, fourth, improved means
30 for operating the plunger which expands and contracts the cutting-dies, all as hereinafter more fully explained.

In the accompanying drawings, Figure 1 is a central section on the plane xx of Fig. 2. Fig. 2 is an end view with the cap-plate removed. In these views the cutters are expanded. Fig. 3 is a side or elevation view, with that part of the stock which holds the dies represented as in central section; and
40 Fig. 4 is a cross-section on plane yy of Fig. 3. The supply-pipe and cut-off device of the lubricating mechanism are omitted from the last three figures.

Referring to the figures of drawings more
45 in detail, A is the shell or body of the tap, which at its lower end is radially mortised for the reception of the thread-cutting dies B.

C is a threaded collar which screws upon the exterior of the shell A. This collar has
50 an inwardly-projecting flange, C', which over-

hangs the heads of the mortises for the cutting-dies sufficiently to form seats for the projections B' upon the heels of the dies, and constitutes hinge-bearings for the cutters, as it is upon these projections that the cutters swing
55 when being spread out or withdrawn.

D is a plunger which has a longitudinal reciprocating movement in the central bore of the stock. A bolt, D', passes through this plunger and the slots A' in the walls of the
60 stock, and fastens the plunger to an external traveling ring, E. The traveling ring E is provided with a groove, E', which admits the bosses F' on the bifurcated end of the shipping-lever F, and this shipping-lever is piv-
65 otally connected to the end of the fulcrum-arm G', turning down from the anchor-ring G, fitting loosely in a groove in the body of the tap. It will be seen that by this arrangement of these parts depressing or elevating the
70 shipping-lever raises or lowers the traveling ring, and with it the plunger, and that this longitudinal motion of the plunger is wholly independent of the circular motion of the tap when in operation. When the plunger is at the
75 upper limit of its throw, the thread-cutting dies are collapsed, as shown in Fig. 3, the notches B² on the inner edges thereof meshing with the stock of the plunger between the beveled
80 grooves D². As the plunger descends, the walls of the beveled grooves D² bear against the inner edges of the beveled projections on the dies and force the dies outwardly, and when the dies are fully expanded the inner edges
85 of these projections rest upon the cylindrical surface of the plunger, as seen in Fig. 1. During and near the end of the return-stroke of the plunger, as the correspondingly-shaped parts of the plunger and dies are in position to mesh, the shoulders B³, projecting from the
90 upper ends of the dies, engage with the shoulder formed by the upper groove in the plunger, the further movement of which causes the dies to swing inwardly to a distance equal to the depth of the grooves therein.

H is a cap-plate fastened to the body of the tap, and serving to close the ends of the die-mortises and prevent the escape of lubricating material and the ingress of dirt or chips of metal; and it acts also as a support for the
100

lower ends of the dies, they being circularly chamfered, so as to bear upon the edge of this plate at any point of the arc through which they swing.

5 Attached to the plunger is a pipe, I, which conducts any suitable lubricating-fluid from a reservoir properly located and connected with such pipe to a centrally-located duct, J, from which radial ducts J' distribute it to the mor-
10 tises containing the cutters, upon the faces of which cutters it flows to their cutting-edges. By this arrangement the lubricant flows from within the tap outwardly, and thereby prevents the chips of metal from working in be-
15 tween the moving parts of the tap, which, if not prevented, would not only clog such parts and impede their working, but cause them to become unnecessarily worn. The pipe I terminates in a piston-head, I', contained in a
20 slide-valve, K, and since the pipe I partakes of the longitudinal movement of the plug, it will be seen that whenever the cutting-dies are expanded, and thereby ready for operation, the piston-head I' will be below the port K' and
25 permit the lubricating material to feed to the cutters; but when the cutters are collapsed for withdrawal from the work a supply of the lubricant is no longer needed, and accordingly lifting the plunger to collapse the dies for
30 withdrawal will also move the piston-head over and close the port K', and thus stop the flow of the lubricant.

When the tap is in operation, the piston-head I' turns freely in the valve K, which is
35 provided with a suitable stuffing-chamber for preserving a tight joint. A pipe, K², leading into the side of the valve, is connected with a reservoir containing the lubricating material.

The advantages of this form of plunger and
40 thread-cutting dies are, particularly, that by having two or more beveled grooves in the plunger space is provided for the inward swing of the cutters without the necessity of completely withdrawing the plunger from behind
45 the dies, which also admits of a much shorter throw of the plunger than would be necessary were the same extent of wedge-shaped or conical surface all in one. The bearing-surface afforded for the dies when expanded is parallel to
50 the axis of the tap, as distinguished from a bevel or conical bearing, and hence the pressure and strain which the dies receive are transferred from one die to the opposite one, and not to the mechanism which actuates the plun-
55 ger or holds it in position, the plunger acting in this case, when the dies are expanded, simply as a block to keep them expanded, and by having the swinging or hinge bearings of the dies upon their outer edges and the shoulders

which engage with the plunger to retract them 60 on their inner edges considerable leverage is obtained, which facilitates their movement.

I do not confine myself to the use of the form of cut-off for the lubricating device above de-
scribed, as obviously other forms of valves 65 can be made to serve the same purpose; nor do I restrict myself to the use of the lubricating device in any particular form of die-ex-
70 panding taps, for manifestly this manner of lubricating the dies is applicable to other forms of taps, and it is not necessary in all cases that the lubricating device be attached to the plunger of a thread-cutting tap or the
75 interiorly-located duct be through its axis, for such duct or conduit may be in the body of the tap and the lubricating mechanism at-
tached thereto.

Although I have shown and described a tap having a number of cutting-dies, it is plain that the improvements set forth herein are applica- 80 ble to a tap having but a single die.

I am aware that conical or wedge-shaped plungers have been used to expand and re-
tract the swinging dies of taps, and I do not claim such construction; but 85

What I do claim as new is as follows:

1. The combination, in an expanding tap, of swinging thread-cutting dies and a plunger provided with grooves, the inclined walls of which bear against projections on the cutting- 90 dies to expand such dies, said plunger being also provided with bearings, which are parallel to the axis thereof for said dies to rest upon when expanded.

2. The combination, in an expanding tap, 95 of swinging thread-cutting dies and a plunger, said dies being provided with shoulders upon their inner edges, which are arranged to engage with a shoulder on the plunger for the purpose of withdrawing the dies, substantially 100 as described.

3. In a thread-cutting tap, the combination of expansible cutting-dies and a plunger for operating such dies, which is provided with an interiorly-located lubricating-duct, sub- 105 stantially as shown and described.

4. The combination, in a tap, of expansible cutting-dies, a pipe or duct for conveying lu-
bricant to such dies, and a cut-off for regulat- 110 ing the flow of the lubricant, which is automatically operated by connection with the devices which expand and retract said dies, substantially as and for the purpose set forth.

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