(No Model.)

J. E. LOW & M. DAHL.

TOOL HOLDER.

No. 491,316. Patented Feb. 7, 1893.

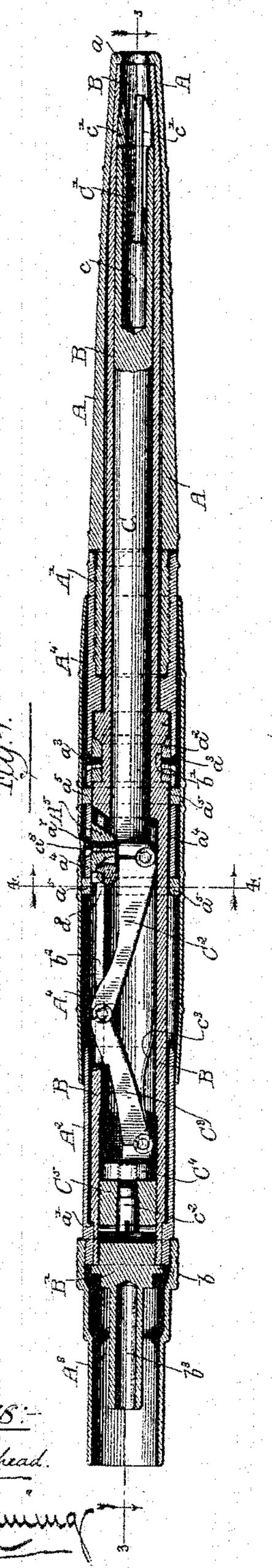

Fig. 1.

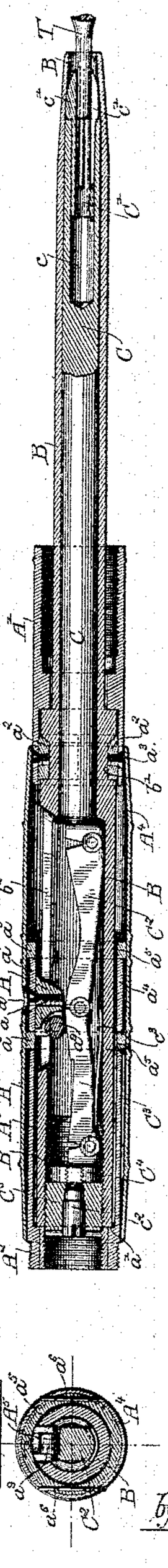

Fig. 2.

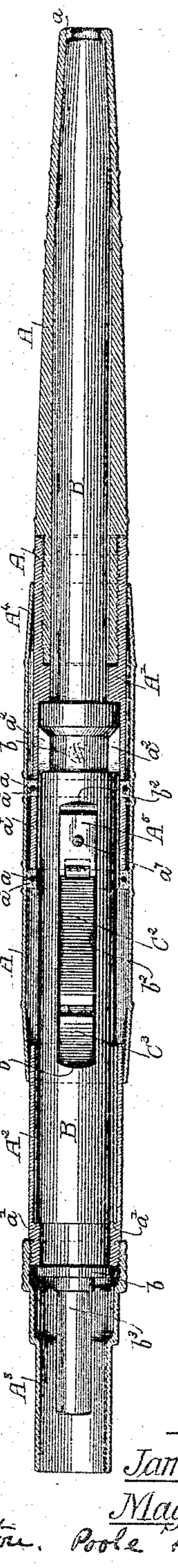

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES E. LOW AND MAGNUS DAHL, OF CHICAGO, ILLINOIS; SAID DAHL ASSIGNOR TO SAID LOW.

TOOL-HOLDER.

SPECIFICATION forming part of Letters Patent No. 491,316, dated February 7, 1893.

Application filed September 22, 1890. Serial No. 365,794. (No model.)

To all whom it may concern:

Be it known that we, JAMES E. LOW and MAGNUS DAHL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tool-Holders or Clutches; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention has for its object to provide certain improvements in the construction of rotating tool holders such, for example, as are commonly used in connection with dental engines, though adapted for other uses.

A principal feature of the improvement consists in the employment of a toggle as a means for giving a longitudinal movement to one of the parts of the clutch with respect to another for the purpose of closing the clutch upon the shank of the tool.

The invention consists, however, in other features of construction also as will hereinafter fully appear from the description of the accompanying drawings.

In said drawings: Figure 1 is a longitudinal section of the complete tool holder taken in the plane in which the toggle works, the members of said toggle and its immediate connections being shown in side elevation. The toggle in this figure is shown retracted, giving the gripping members of the clutch their open position ready to receive the shank of the tool. Fig. 2 is a similar view of the parts immediately concerned with the toggle mechanism, showing the toggle extended and the clutch gripping the shank of a tool. Fig. 3 is a longitudinal section of the external and non-rotating parts of the tool holder as employed in connection with dental engines and an elevation of the interior and rotating parts, the section being taken in a plane at right angles to that of the section shown in Figs. 1 and 2, or, in other words, at right angles to the plane in which the toggle works. Fig. 4 is a transverse section in the plane of the line 4—4 of Fig. 1.

In the adaptation of the invention to use in connection with dental engines illustrated in the foregoing figures, the external and non-rotating parts which inclose the rotating members consist of a tip A, a cylindric sleeve A′ secured to the tip A, a cylinder A^2 separated by a distance from the cylinder A′, a tube-guard or sleeve A^3 screwed to the cylinder A^2, and a longitudinally sliding external sleeve A^4 covering the space between the cylinders A′ and A^2 and carrying the presser by which the interior toggle is extended. Within the shell composed of these members is a continuous, rotating tube B extending from the interior shoulder *a* at the outer end of the tip A to the outer end of the cylinder A^2. Within said cylinder the tube bears against an annular shoulder *a*′ and thereby retains said cylinder outwardly in position.

B′ is a plug screwed into the inner end of the tube B and provided with an annular shoulder *b* which extends beyond the adjacent periphery of said tube and into bearing against the end of the shell cylinder A^2. This plug thus retains the cylinder A^2 inwardly in place. At *b*′ the tube B is provided with a circumferential groove into which is fitted a ring a^2, formed in semicircular halves which are fastened to the shell cylinder A′ by screws a^3 or otherwise, and this ring holds the parts A′ and A in their proper relation to said tube B. For a short distance from the end of the tube B which occupies the tip A of the shell its interior is tapered or contracted, as clearly indicated in Figs. 1 and 2.

The tube B is provided with a longitudinal slot b^2 between the proximate ends of the cylinders A′ and A^2 of the shell, and through this slot projects inwardly the presser A^5, movable in the slot by a lengthwise movement of the sleeve or shell A^4 for the purpose of pressing inward and extending the toggle. Thus entering the slot b^2, the presser must rotate with the tube B. To have, at the same time, proper engagement with the sleeve A^4 so as to be slid thereby, it is attached to a ring a^4 which is revoluble within the slide and is held in place with respect thereto by the rings a^5 a^5 secured to and within the said slide. The mode of fastening the rings a^5 to the sliding cylinder A^4 here shown is specially illustrated in section in Fig. 4 wherein a^6 a^6 are pins thrust through both the slide and the rings. The ring a^4 is shown fastened to

the presser A^5 by a screw a^7, accessible through a hole a^8 in the slide.

C is a rod fitted to slide lengthwise in the tube B and extending from the slot b^2 to or nearly to the mouth of the tip A. At its end adjacent to said mouth it is provided with, or constructed to form, a spring clutch which may close upon the shank of a tool T by outward movement within the tapered end portion of the tube B and may open or spread its jaws to release the tool upon the retraction of the rod. Such a spring clutch construction involves the familiar device of lengthwise slits in a tube, the jaws separated by the slits being forced toward each other to grip a tool shank as they are pushed into the contraction of a tube surrounding it and springing apart again to release the tool upon their retraction from such contracted portion of the tube. In the present instance the rod C is not itself split at its end but is provided with a longitudinally drilled hole c which receives a second, split or slitted tube C' fastened securely in the hole c and presenting a series of compressible jaws c' c' beyond the end of the rod C and within the tapered portion of the tube B. By making the jaws c' of a tube separate from the rod C they may be hardened more conveniently and reliably and may be removed and replaced as occasion may require. No novelty is claimed for this feature.

At its opposite or inner end the rod C is attached to a toggle composed of the arms C^2 C^3 jointed to each other and one of them, C^2, jointed to the extremity of the rod C. The other arm C^3 is, at its outer end, jointed to a stationary part C^4, here shown in the form of a disk secured by a screw c^2 to a plug C^5 which is screw-threaded into the open end of the tube B. This construction gives adjustability of position to the stationary part C^4, and by such adjustability of said part the rod C may be slid forward in the tube B to a greater or less extent, as desired, or a definite throw may be given thereto by a certain determinable movement of the toggle presser. The toggle C^2 C^3 is arranged with its arm C^2 opposite the slot b^2 of the tube B and has its movement in the plane of said slot, and when the toggle is bent or retracted, as by a spring c^3, said toggle will be deflected toward or into said slot b^2, as shown in Fig. 1. The presser A^5 is arranged to bear on the outer surface of said toggle arm C^2 so that by moving the slide A^4 which carries said presser in a direction away from the tip of the instrument said presser will slide upon said outer surface of the arm C^2 and straighten the toggle, thereby causing the rod C to move outwardly within the tube B and the clutch to clamp the tool shank, as shown in Fig. 2. The movement of the slide and its presser is desirably such that the presser will be carried at its point of bearing on the toggle a little past the central joint of the latter, as indicated in Fig. 2, so that the tendency of the toggle to flex will contribute to the retention of the presser in its proper place when the toggle is extended. We prefer to give to the surface of the toggle arm C^2 upon which the presser bears the longitudinally and inwardly curved or concave contour illustrated in Figs. 1 and 2, so that the movement of the clutch rod C will be accomplished in a relatively short movement of the slide A^4 and its presser A^5. We also prefer to provide the presser A^5 with an anti-friction roller a^9 to render the movement of the slide more easy and to prevent wear. Manifestly an inward projection like A^5 upon the sliding ring to which it is attached is only needful to the avoidance of too great protrusion of the toggle, when retracted, through the slot of the tube B, and when the toggle is allowed to protrude sufficiently said projection may be omitted and the ring itself will become the presser.

The rotation of the tube B is accomplished by the application of force to the plug B' for which purpose said plug is shown provided with a shank b^3 to which the power is applied through any suitable means. In the case of a dental engine such means will commonly be a rotating, flexible shaft or other well known device for the purpose, but in other adaptations of the invention, as for example, to a watchmaker's lathe, the shank b^3 may be provided with a pulley to receive a driven belt or cord. The tube rotates the plug C^5 which, through the screw c^2, rotates the stationary member C^4 of the toggle clutch mechanism and the parts connected therewith. If desired, the rod C, instead of being rotated through the toggle, may be splined or in any other familiar way made to revolve with the tube B while allowing longitudinal movement thereof.

In adapting the invention to other uses than that of a dental engine various modifications in formal features of construction will of course be made and they may obviously be made without departure from said invention.

In another application Serial No. 407,425, filed by us October 1, 1891, we have illustrated and described a toggle as being positively actuated in both directions, such construction being therein specifically claimed subject to the generic claim herein contained. We make no specific claim, therefore, to such mechanism in this application.

We claim as our invention:

1. In a clutch or tool holder having relatively stationary and longitudinally movable parts for the contraction and expansion of the clutch, the combination with the longitudinally movable member, of a toggle for imparting longitudinal motion thereto and means for actuating said toggle.

2. In combination with the relatively stationary and longitudinally movable members of a clutch device, a toggle arranged to give the longitudinal movement to one of said members, and a sliding sleeve or ring for extending the toggle.

3. The combination with the tube B provided with a slot, of a clutch rod C, a toggle applied to said rod, and a ring surrounding the tube B arranged to press on the toggle for the extension of the latter.

4. The combination with a tube provided with a slot and interiorly tapered at its end, of a rod fitted to said tube and carrying spring clutch jaws within the tapered end of the tube, a toggle arranged opposite the slot and working in the plane thereof, one of the arms of said toggle being attached to the rod and the other to a stationary part, a sliding ring embracing the tube B and provided with a presser having bearing upon the toggle through the slot.

5. The combination with the slotted tube B, sliding rod C carrying clutch jaws, toggle arms C^2 C^3, the adjustable part C^4 connected with the toggle, and a sliding ring for extending the toggle.

6. The combination of a non-rotating shell composed of parts of which the parts A′ and A^2 are separated by a space, and a surrounding sleeve covering said space and adapted to slide on the adjacent members of the shell, of a rotating tube B provided with a slot opposite the space in the shell and suitably shouldered to the shell for the retention of the parts of the latter in their places on said tube, a rod C carrying spring jaws, a toggle attached to said rod and to a stationary member, a ring surrounding the tube B and provided with a presser bearing upon the toggle, and means for retaining said ring in place with respect to the surrounding sleeve while revoluble with respect thereto, substantially as described.

7. The combination of the shell composed of the members A A′ A^2 A^3 and sliding member A^4 of the revoluble tube B properly shouldered with the separated portions of the shell for their retention in place thereon, the rod C carrying the spring clutch jaws of the clutch proper, the adjustable part C^4, the toggle members C^2 C^3 connected with the parts C and C^4, a spring arranged to flex said toggle, a ring a^4 revoluble within the sleeve A^4 and provided with a presser bearing upon the toggle, and retaining shoulders on the interior of the slide A^4.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of two witnesses.

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MAGNUS DAHL.

Witnesses:
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GEORGE W. HIGGINS, Jr.