

No. 631,509.

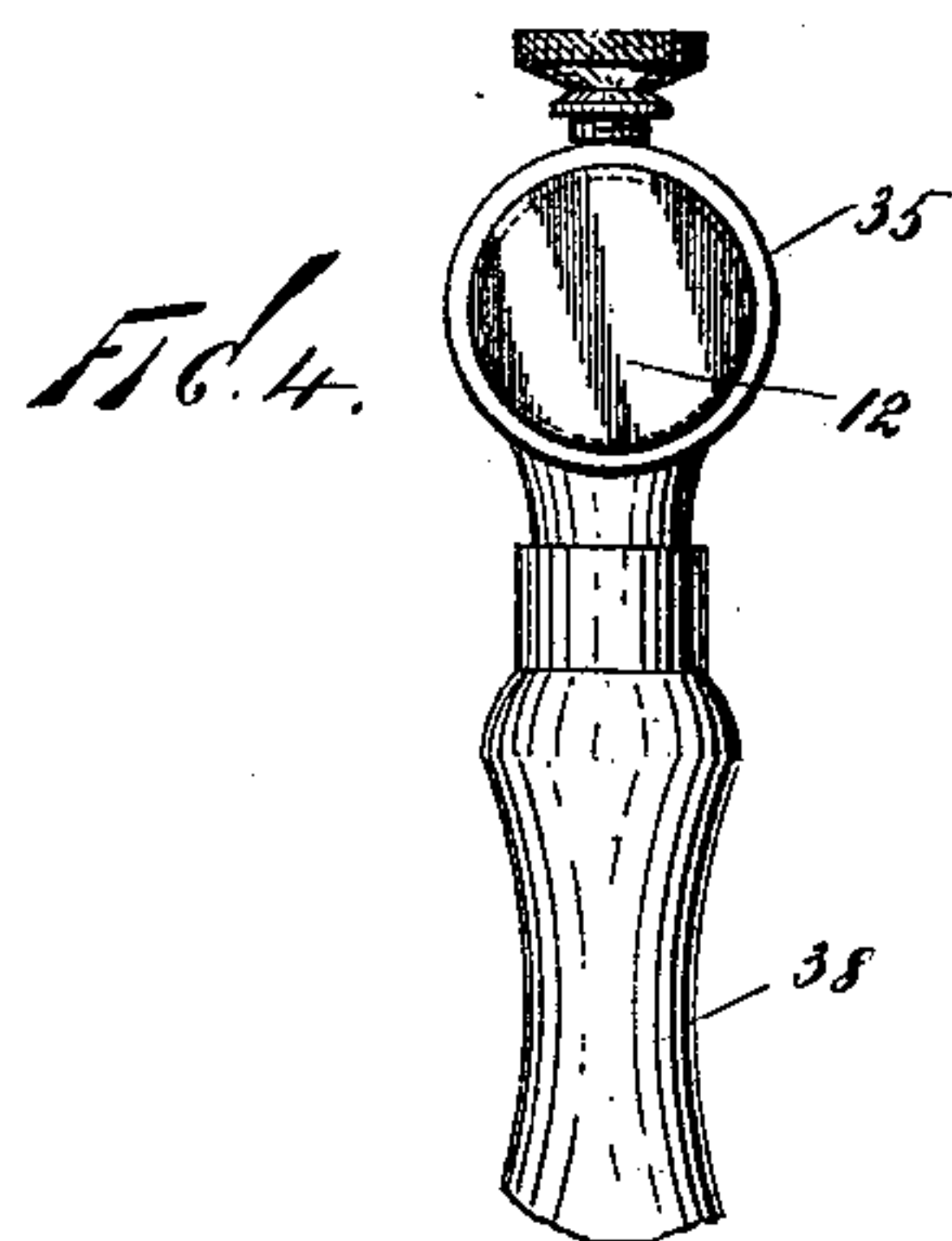
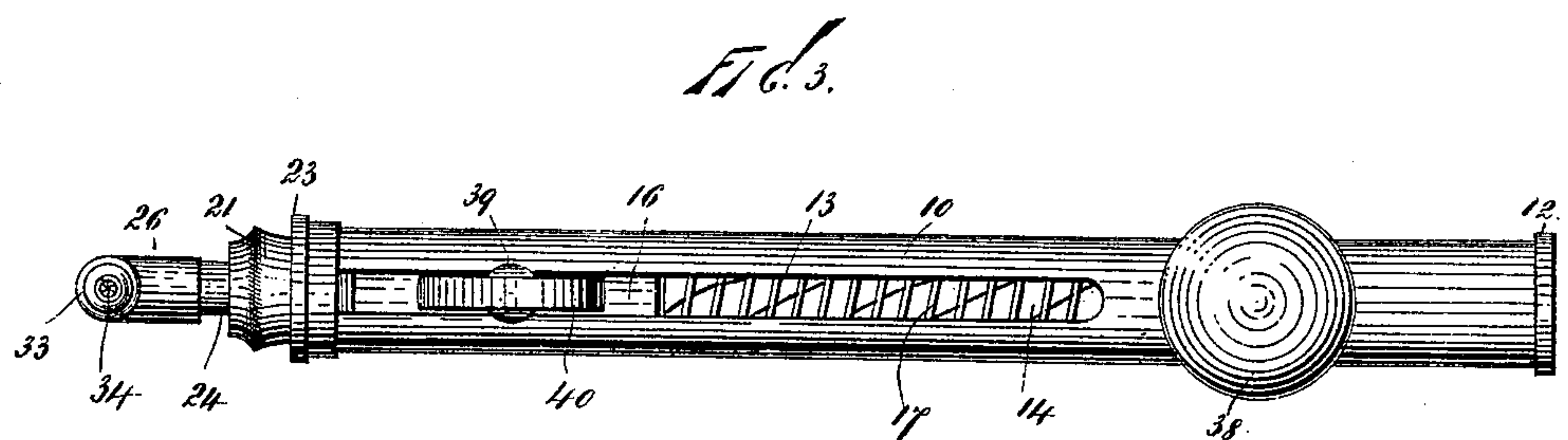
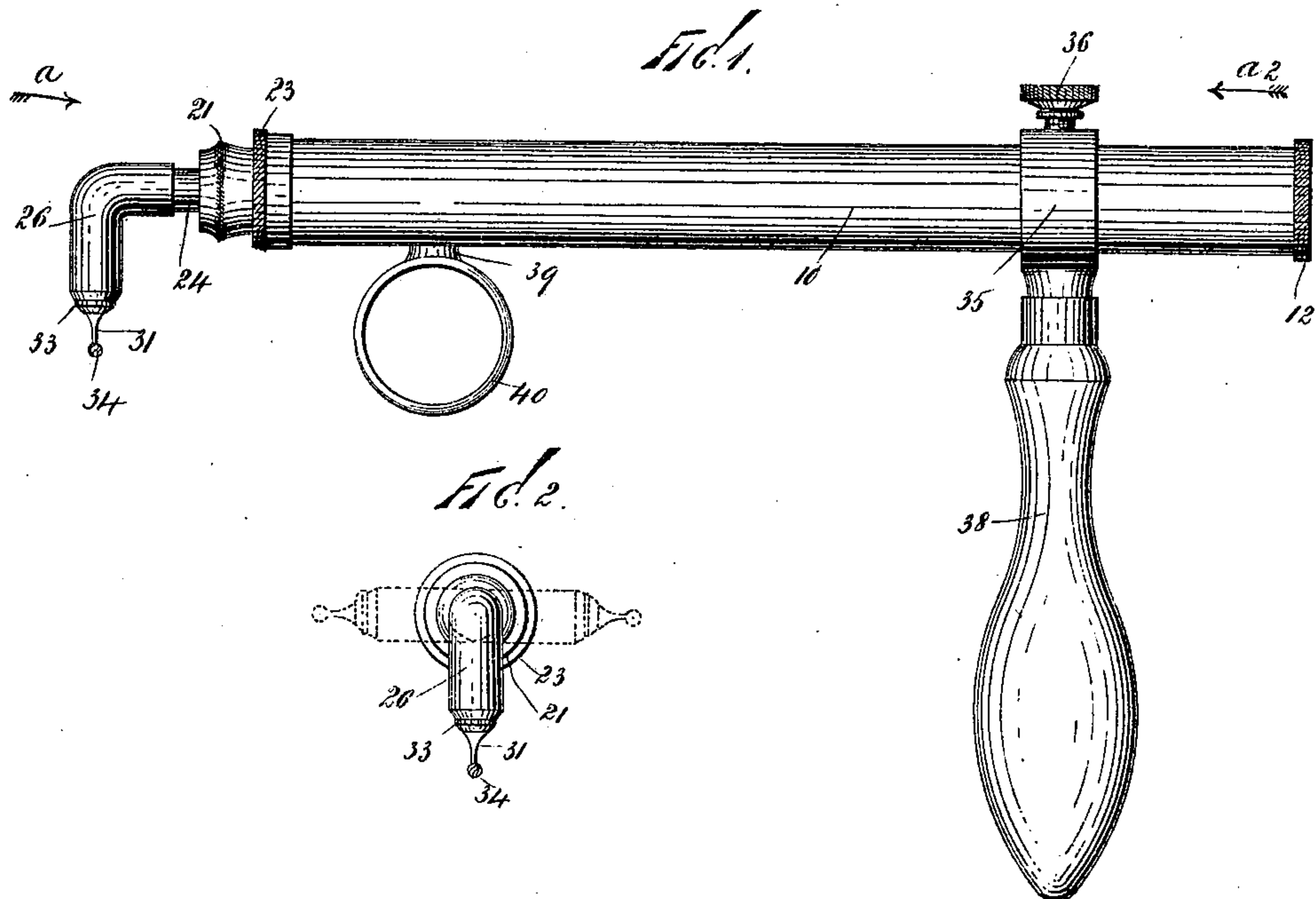
Patented Aug. 22, 1899.

S. F. NICHOLS.
HAND DRILL.

(Application filed Mar. 25, 1898.)

(No Model.)

3 Sheets—Sheet 1.



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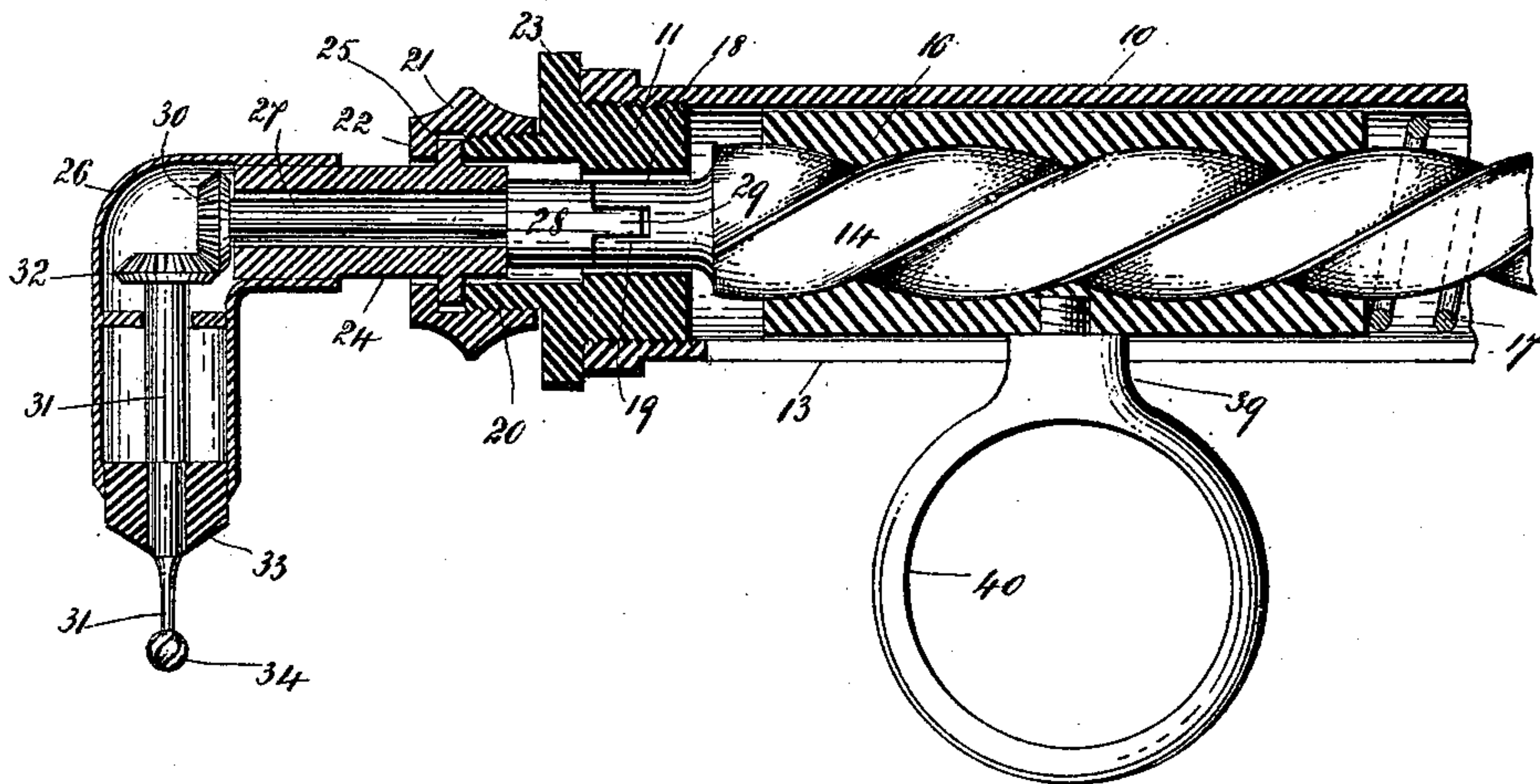
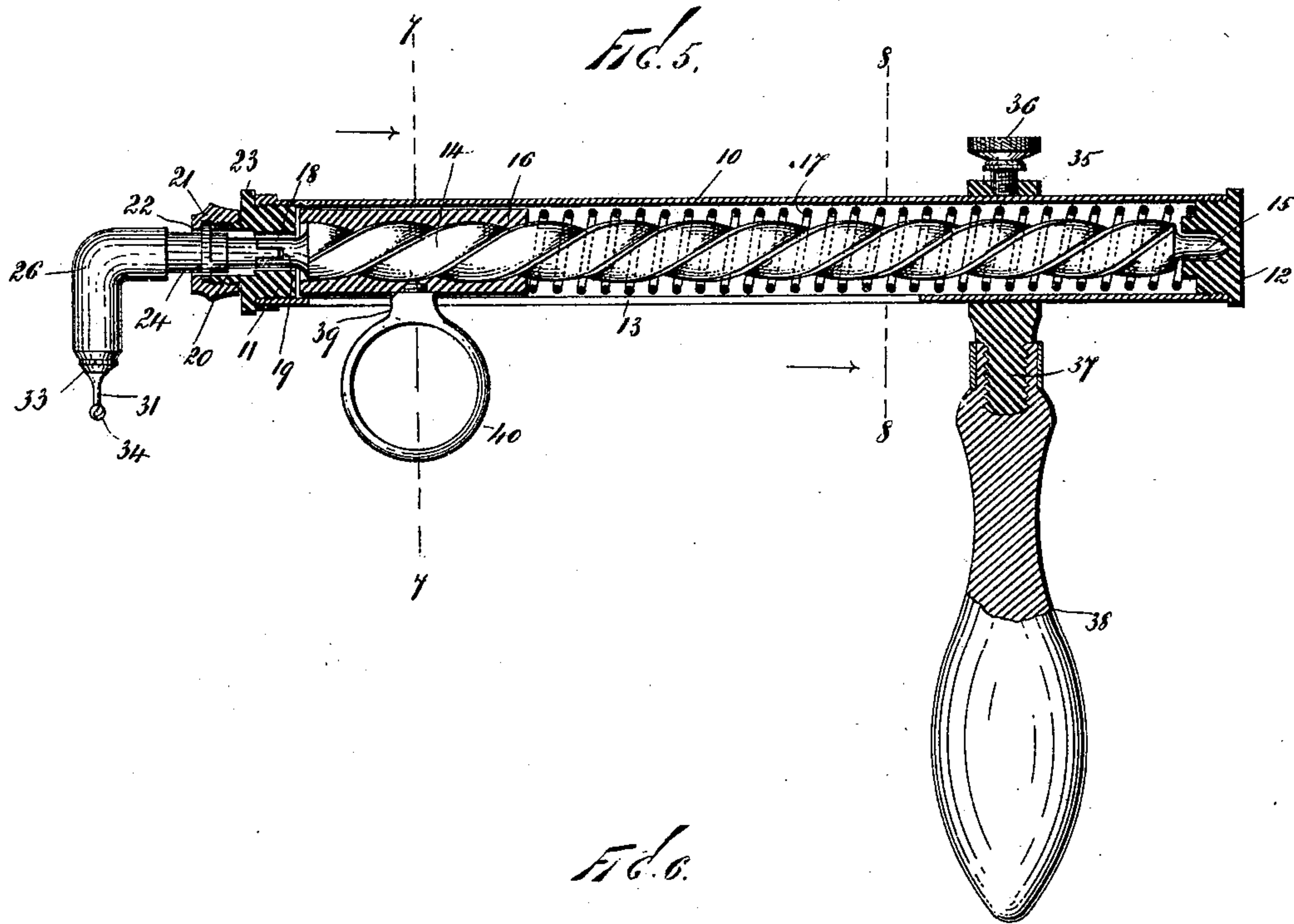
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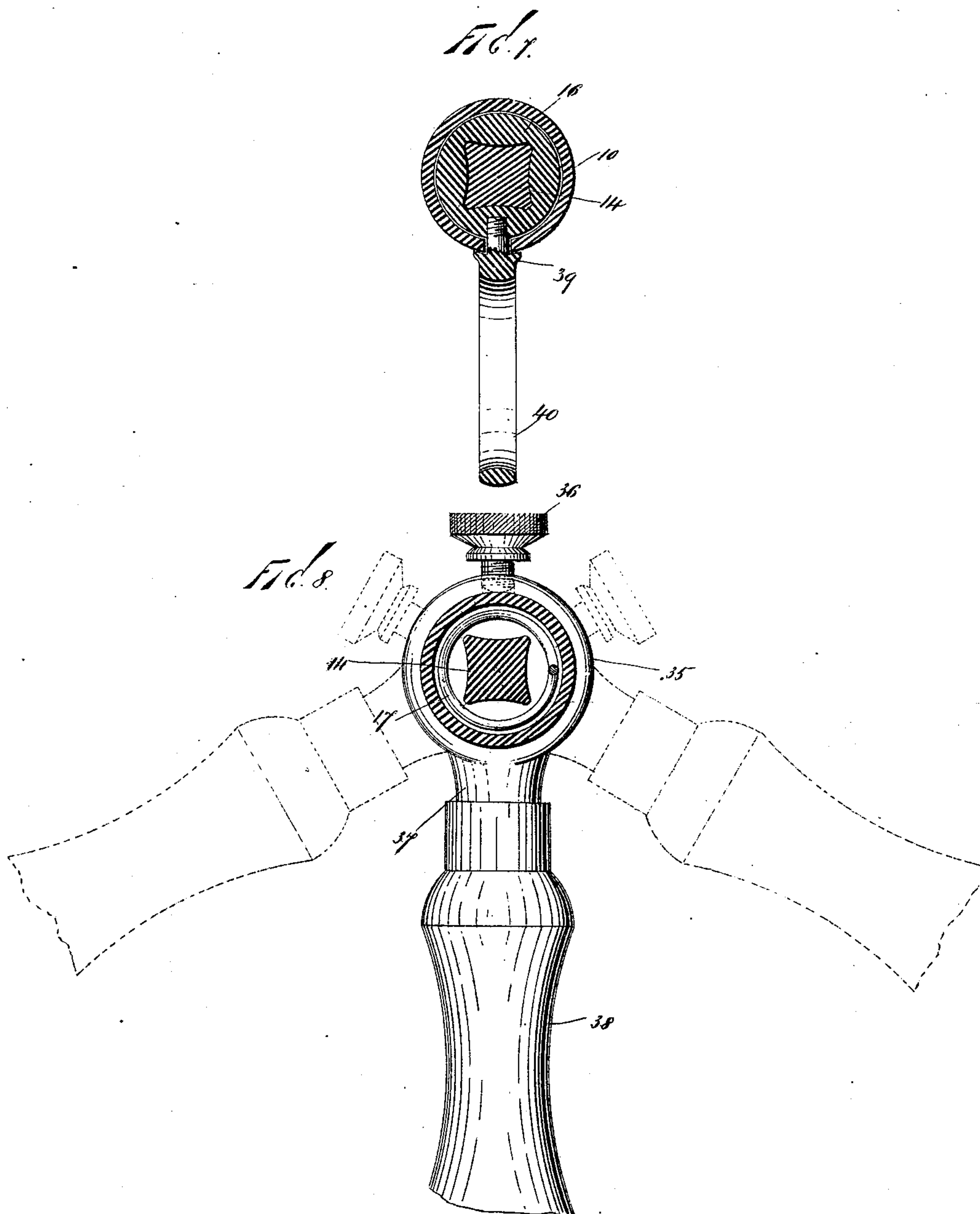
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

SAMUEL F. NICHOLS, OF NEW YORK, N. Y.

HAND-DRILL.

SPECIFICATION forming part of Letters Patent No. 631,509, dated August 22, 1899.

Application filed March 25, 1898. Serial No. 675,155. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. NICHOLS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Hand-Drills, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to hand-drills; and the object thereof is to provide an improved device of this class which is simple in construction and operation and which is particularly adapted for use as a dental drill, but which may be used wherever hand-drills are required.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a side view of my improved drill. Fig. 2 is an end view looking in the direction of the arrow *a* of Fig. 1. Fig. 3 is a bottom plan view of the drill shown in Fig. 1. Fig. 4 is an end view looking in the direction of the arrow *a*² of Fig. 1. Fig. 5 is a view similar to Fig. 1, the body portion of the drill being shown in longitudinal vertical section. Fig. 6 is a view similar to Fig. 5, on an enlarged scale, showing a part of the body portion of the drill and the drill-head in section. Fig. 7 is a section on the line 7 7 of Fig. 5, and Fig. 8 is a section on the line 8 8 of Fig. 5.

In the drawings forming part of this specification the separate parts of my improvement are designated by the same numerals of reference in each of the views, and in the practice of my invention I provide a tubular casing 10, the ends of which are closed by screw-threaded plugs 11 and 12, respectively, and the bottom of the casing 10 is provided with a longitudinal slot 13, which extends through the greater part of its length, but both ends of which are closed.

Mounted in the tubular casing 10 is a main shaft 14, provided with a screw-thread of great pitch and one end of which is pivoted in the plug 12, as shown at 15, and mounted on said shaft is a short cylinder 16, which is provided with a central longitudinal bore having a female thread corresponding with the thread on the shaft 14, and between the cylinder 16

and the plug 12 is a spiral spring 17. That end of the shaft 14 opposite the plug 12 is provided with a cylindrical extension 18, in which is formed a transverse slot 19, which opens outwardly, and said cylindrical extension 18 rests in a central bore formed in the plug 11 and said plug 11 is provided with an outwardly-directed screw-threaded tubular extension 20, on which is mounted a screw-threaded cap 21, the outer end of which is provided with an inwardly-directed annular flange 22, and said plug 11 is also provided with an annular flange 23, which abuts against the end of the tubular casing 10. I also provide a short tube 24, which passes through the cap 21 and into the screw-threaded extension 20 and which is provided adjacent to its inner end with an annular flange 25, which abuts against the end of said extension, and said tube 24 is held in place by the annular inwardly-directed flange 22 on the cap 21.

In the form of construction shown in the drawings I connect with the outer end of the tube 24, in any desired manner, an elbow-tube 26, and mounted in the tube 24 is a short supplemental shaft 27, which is provided at its inner end with a cylindrical head 28, on which is formed a flat lug or projection 29, which is adapted to enter the slot 19 in the cylindrical extension 18 of the main shaft 14, and said supplemental shaft 27 is adapted to revolve in the tube 24 and is provided at its outer end with a beveled gear-wheel 30, and mounted in the arm of the elbow-tube 26, which projects at right angles to the tube 24, is a short drill-shaft 31, on the upper end of which is a beveled gear 32, which operates in connection with the beveled gear 30, and the lower end of the drill-shaft 31 passes through a plug 33 and is provided at its lower end with a drill 34, which may be of any desired form.

Mounted on the tubular casing 10 is a band 35, through which is passed a set-screw 36, and one side of said band is provided with a screw-threaded extension 37, by means of which a handle 38 is connected therewith, and by means of the set-screw 36 and the band 35 the handle 38 may be adjusted longitudinally and held in any desired position on the casing 10 and may also be turned and adjusted laterally with reference thereto. The cylinder 16 in the tubular casing 10, which is

adapted to move on and longitudinally of the main shaft 14, is provided at one side with a lug 39, which passes through the slot 13 in the tubular casing 10 and which is provided with a ring 40, and by means of the cap 21 the tube 24 may be turned and adjusted laterally, so that the angular extension thereof which carries the drill-shaft 31 may be held at any desired lateral angle with reference to the casing 10.

It will be understood that the cylindrical head 28 of the supplemental shaft 27 is always connected with the main shaft 14, as shown in Fig. 6, and said supplemental shaft 27 is turned or operated by the said main shaft, and the operation will be readily understood from the foregoing description when taken in connection with the accompanying drawings and the following statement thereof:

In practice the handle 38 is grasped in the hand and the index or other finger is passed through the ring 40, and by pulling on the ring 40 in the direction of the handle 38 the cylinder 16 will be caused to move along the main shaft 14 in the direction of said handle, and then by releasing said ring or by releasing the pressure thereon the spring 17 will force said cylinder outwardly into the position shown in Fig. 5. It will be understood that this operation may be performed very quickly, all that is necessary being a quick pull on the ring 40 and an equally quick relaxation of the pressure applied thereto, and in this operation the cylinder 16 is moved back and forth, as described. This operation also gives to the main shaft 14 a quick revolution in both directions, and this movement is transmitted to the supplemental shaft 27 by the cylindrical head 18 of the main shaft. The movement of the shaft 27 is transmitted to the drill-shaft 31, and said drill-shaft is similarly operated, being revolved rapidly in one direction and the movement thereof being correspondingly reversed and said shaft being as rapidly revolved in the opposite direction. This movement may be kept up as long as it is desired to operate the drill, and it will be apparent that many changes in and modifications of the construction herein described may be made without departing from the spirit of my invention or sacrificing its advantages.

By supporting the drill-shaft 31 at an angle to the main and supplemental shafts, as shown and described, my improved drill is rendered particularly applicable for dental operations, and the said elbow-tube, or that part thereof which carries the drill-shaft 31, may be laterally adjusted on its supports, which also facilitates said operation.

The finger-piece 40 is preferably connected with the cylinder 16, as shown in Figs. 5, 6, and 7, said finger-piece being provided with a shank having a screw-threaded extension which passes through the slot or opening in the bottom of the tubular casing 10; but any

desired means may be provided for connecting these parts.

My improved drill is simple in construction and operation and perfectly adapted to accomplish the result for which it is intended and will be found to be of great value wherever hand-drills are required, and the same is particularly adapted for use in dentistry work.

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

1. A hand-drill, comprising a tubular casing the ends of which are closed by plugs, one of which is provided with a central bore, and a screw-threaded extension, said casing being also provided in one side thereof with a longitudinal slot, a handle mounted on said casing and longitudinally adjustable thereon, a main screw-threaded shaft mounted in said casing, one end of which is pivoted in one of said plugs, and the other end of which is provided with a cylindrical extension which enters the bore in the other plug, a cylinder mounted on said main shaft within said casing and provided with a central longitudinal bore having a thread which corresponds with that formed on said main shaft, said cylinder being also provided at one side with a finger-piece which passes through the slot in said casing, a spiral spring mounted in said casing between said cylinder and the pivoted end of said shaft, a cap mounted on the extension of the plug having a central bore, a tube which passes through said cap and into said extension, and is held in place by said cap, a supplemental shaft mounted in said tube and provided at its inner end with a head which is adapted to engage with the cylindrical extension of the main shaft, a beveled gear mounted on the outer end of said supplemental shaft, a tube connected with the tube in which the supplemental shaft is mounted, and a drill-shaft mounted in said last-named tube, and a beveled gear-wheel mounted on the inner end of said shaft in mesh with the beveled gear-wheel on said supplemental shaft.

2. A hand-drill, comprising a tubular casing having a longitudinal slot in one side thereof, a rotatable main shaft mounted therein, a sliding cylinder mounted on said shaft and provided with a finger-piece which passes through the slot in the tubular casing, said cylinder and said shaft being provided with corresponding threads, a spiral spring mounted in said casing and adapted to bear on the inner end of said cylinder to force it outwardly, a drill-shaft in operative connection with the end of said main shaft, and a handle mounted on said casing and laterally and longitudinally adjustable thereon, substantially as shown and described.

3. A hand-drill, comprising a main tubular casing provided in one side with a longitudinal slot, and the ends of which are closed by

plugs, one of which is provided with a central bore, and a tubular screw-threaded extension, a spring-operated cylinder mounted in said casing and provided with a finger-piece which passes through the longitudinal slot therein, a main shaft rotatably mounted in said casing passing through said cylinder, and provided at one end with a cylindrical extension which projects into said bore, said shaft and said cylinder being correspondingly threaded, a drill-shaft in operative connection with said extension and laterally adjustable, a handle mounted on said casing and longitudinally and laterally adjustable thereon, substantially as shown and described.

4. A hand-drill, comprising a tubular casing having a longitudinal slot in one side thereof, and the ends of which are closed by screw-threaded plugs, one of said plugs being provided with a central bore, and a tubular screw-threaded extension, a main screw-threaded shaft mounted in said casing, one end of which is pivoted in one of said plugs, and the other end provided with a cylindrical extension which enters the bore of the other plug, a spring-operated screw-threaded cyl-

inder mounted on said shaft and provided with a finger-piece which projects through the slot in the casing, a tube which enters the said screw-threaded extension of the plug provided with a central bore, and is adapted to turn therein, means for connecting said tube with said plug, a supplemental shaft mounted in said tube and adapted to engage with the main drill-shaft, a beveled gear connected with the outer end of the supplemental shaft, an elbow-tube connected with the last-named tube, a drill-shaft mounted in said elbow-tube and provided with a beveled gear-wheel, and a beveled gear-wheel mounted on the inner end of said drill-shaft and adapted to operate in connection with the said beveled gear on the supplemental shaft, and a handle mounted on said casing, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 23d day of March, 1898.

SAMUEL F. NICHOLS.

Witnesses:

L. M. MULLER,
M. R. KNOWLES.