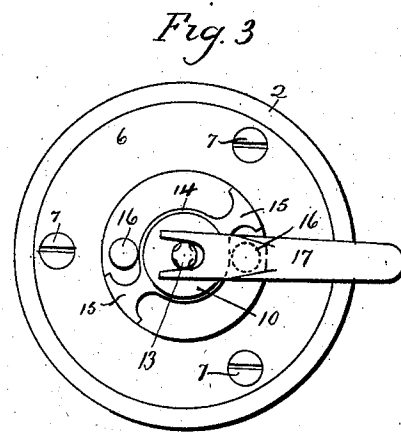
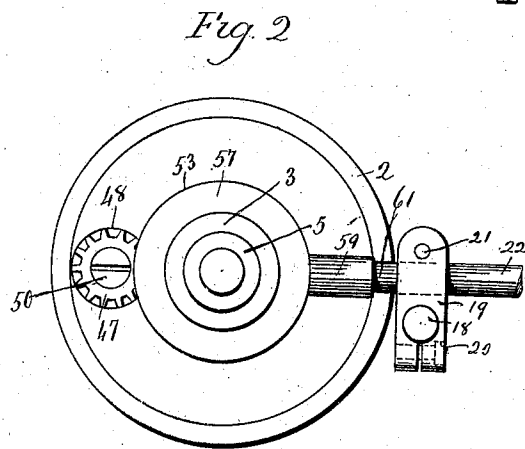
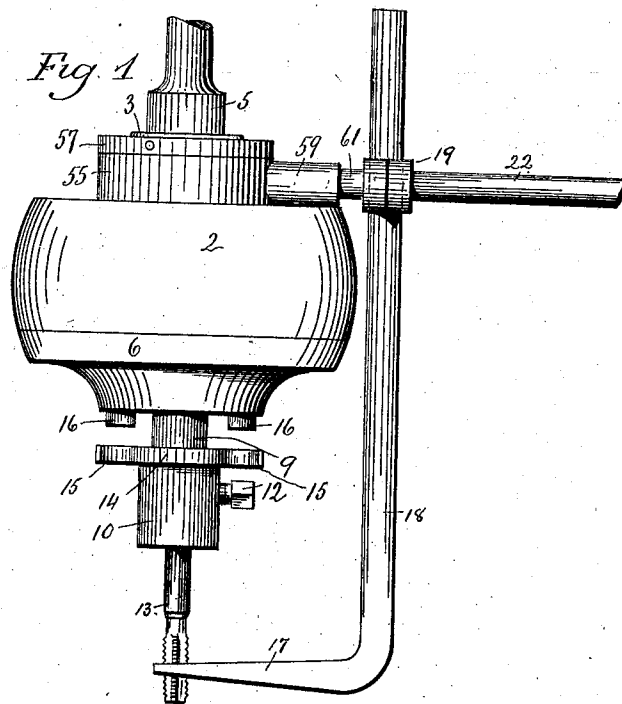


No. 823,546.

PATENTED JUNE 19, 1906.

J. PETRELLI.
DRILLING AND TAPPING DEVICE.
APPLICATION FILED MAR. 14, 1905.

2 SHEETS—SHEET 1.



Witnesses.
J. H. Shumway
Clara L. Reed.

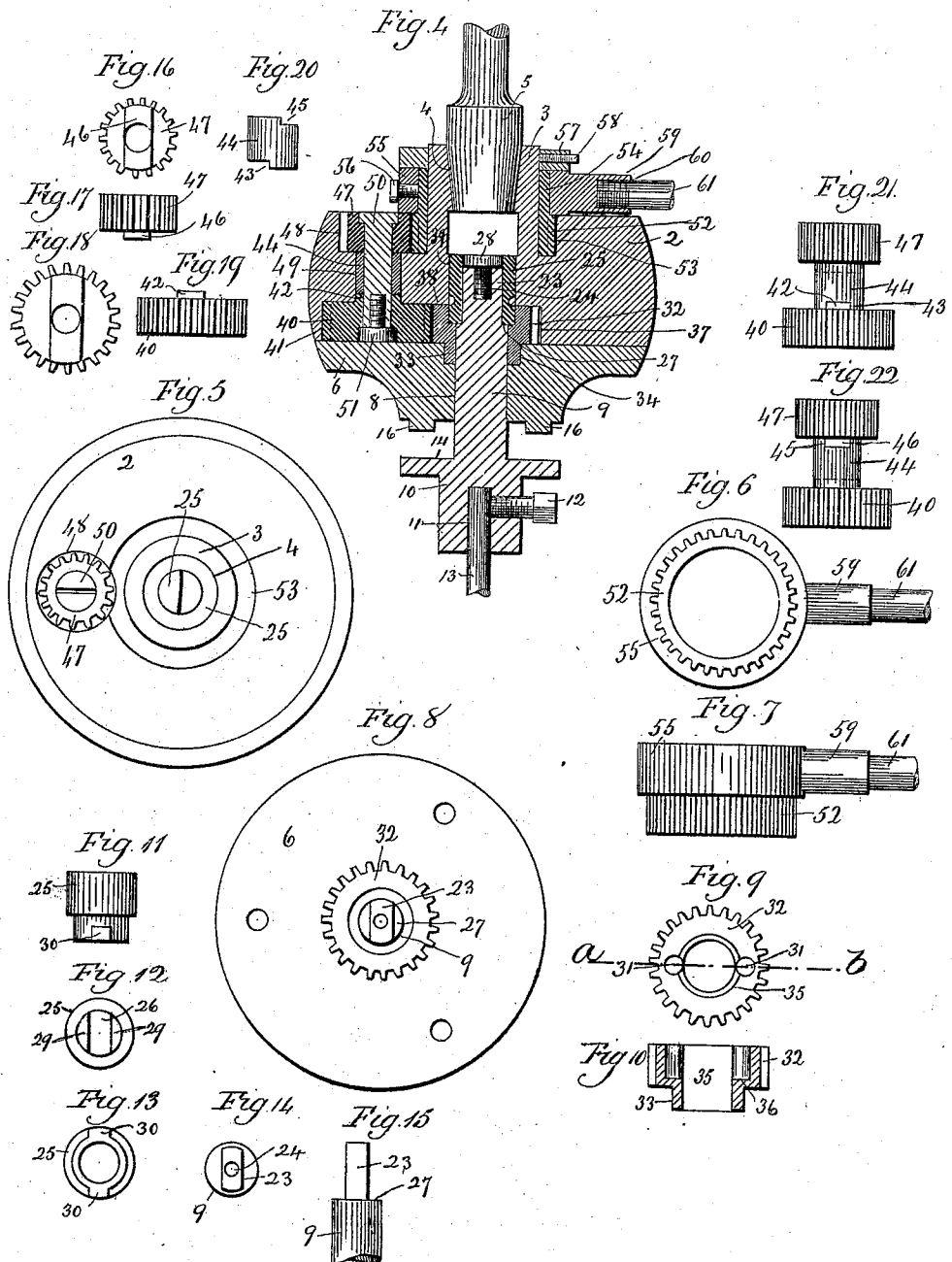
Joseph Petrelli.
Inventor.
Bates Seymour & Co.

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2 SHEETS—SHEET 2.



Witness.
J. W. Humphrey
Clara L. Reed.

Joseph Petrelli.
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UNITED STATES PATENT OFFICE.

JOSEPH PETRELLI, OF NEW HAVEN, CONNECTICUT.

DRILLING AND TAPPING DEVICE.

No. 823,546.

Specification of Letters Patent.

Patented June 19, 1906.

Application filed March 14, 1905. Serial No. 250,042.

To all whom it may concern:

Be it known that I, JOSEPH PETRELLI, 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 Improved Drilling and Tapping Device; 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 view in side elevation of my improved drilling and tapping device; Fig. 2, a plan view thereof with the main portion of the stop-arm broken away; Fig. 3, a reverse plan view thereof; Fig. 4, a broken view of the device in vertical section; Fig. 5, a plan view of the device with the non-rotatable gear, non-rotatable gear-collar, and stop-arm removed; Fig. 6, a reverse plan view of the non-rotatable gear, non-rotatable gear-collar, and stop-arm, the main portion of the latter being broken away; Fig. 7, a view thereof in side elevation; Fig. 8, a detached plan view of the cover, reversing-gear, and tap-spindle; Fig. 9, a detached plan view of the reversing-gear; Fig. 10, a sectional view on the line *a b* of Fig. 9; Fig. 11, a detached view, in side elevation, of the clutch-collar; Fig. 12, a plan view thereof; Fig. 13, a reverse plan view thereof; Fig. 14, a detached plan view of the tap-spindle; Fig. 15, a broken view thereof in side elevation, showing its inner end and tang; Fig. 16, a reverse plan view of the driving-pinion; Fig. 17, a view thereof in side elevation; Fig. 18, a plan view of the driven pinion; Fig. 19, a view thereof in side elevation; Fig. 20, a detached view, in side elevation, of the sleeve employed to couple the two pinions together; Fig. 21, a detached view, in side elevation, showing the driving and driven pinions as coupled together by the said coupling-sleeve; Fig. 22, a corresponding view of the pinions and sleeve turned one-quarter turn, so as to show the locking-rib on the driving-pinion.

My invention relates to an improved drilling and tapping device for lathes and drill-presses, the object being to produce a compact, effective, and convenient device for doing drilling and tapping without resorting to a machine furnished with reverse-motion gearing.

With these ends in view my invention con-

sists in a drilling and tapping device having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention as herein shown I employ a chambered case 2, of flattened circular shape, formed with a hub 3, having a tapered concentric opening 4 for the reception of the tapered end of a stem 5, the other end of which is inserted into the chuck or jaws or spindle of any ordinary drill-press or lathe, whereby the case is driven. The said body 2 is furnished with a circular plate-like cover 6, secured in place by screws 7, and formed with a central bearing-hole 8 for the reception of a tool-carrying spindle or driven shaft 9, which is both rotatable and longitudinally movable therein. At its outer end the said spindle is provided with a chuck 10, consisting, as shown, of a cylindrical head, formed with a counterbore 11 and with a set-screw 12. As shown, the device is furnished with a tap 13; but it will be understood, of course, that the tap may be replaced by a drill. As the reversing-gearing of the device is only brought into play when it is being used as a tapping device it seemed best to show a tap rather than a drill. The particular means carried by the spindle 9 for holding drills and taps may be varied, as found convenient. The spindle 9 also carries on its projecting outer end a coupling-head 14, having two oppositely-extending coupling-arms 15 15, the opposite faces of which are cut away for engagement with two oppositely-located coupling-pins 16, projecting from the outer face of the cover 6 and located on opposite sides of the bearing-hole 8 aforesaid. The said tap 13 is embraced by the flattened fork 17 of a gage, having a long shank 18 passing through and adjustable in a clip 19, having an adjusting-screw 20, and secured by a clamping-screw 21 upon the stop-arm 22, which will be described later on. As soon as the said fork 17 has been engaged by the work the movement of the case 2 toward the work or the movement of the work toward the case 2 is blocked, but the case continues to revolve, whereby the screw-threads of the tap 13 draw the same into the hole in the work, and therefore draw the spindle 9 outward away from the said case, until at length the coupling-arms 15 are disengaged from the coupling-pins 16, so that although the case continues to revolve rotary motion is no longer imparted to the tap.

The time has now come for reversing the tap, which is done by raising the spindle of the drill-press by the usual feed-lever, or by moving the spindle of the tail-stock of the lathe, as the case may be, until the reversing-gearing of my improved device has been brought into play.

To provide for reversing the tap 13, I form the inner end of the spindle 9 with a flattened tang 23, having a screw-hole 24. Over this tang I set a clutch-collar 25, having an oblong opening 26, corresponding to the cross-sectional shape of the tang 23, which prevents the collar from rotating with respect to the spindle. The outer end of the said collar 25 rests upon a shoulder 27, formed upon the spindle by producing the tang 23, and the collar is held in place by means of a screw 28 entering the screw-hole 24, the head of the screw entering the inner end of the collar and bearing upon two shoulders 29, formed within the collar on opposite sides of its oblong opening 26 and produced by the formation of the same. The outer end of the said collar is reduced in diameter and formed with two oppositely-projecting coupling-lugs 30, arranged to engage (when brought into position by the outward movement of the clutch-collar with the tap-spindle) with a pair of coupling-pins 31, projecting inwardly into the circular opening of a driven reversing-gear 32, loosely mounted upon the inner end of the spindle 9 and bearing upon the inner face of the cover 6 aforesaid, the said gear being also furnished with a sleeve 33, entering a circular recess 34 in the cover 6. To adapt the said gear 32 to receive the outer end of the collar 25 and provide clearance for the coupling-lugs 30, it is formed with a central recess 35, Fig. 10, into which the pins 31 aforesaid project. The bottom wall 36 of the recess 35 is engaged by the lower edges of the lugs 30 to limit the outward movement of the spindle. The said gear 32 is housed within a central circular recess 37, extending into the case 2, the inner face of the said gear engaging with the inner face 38 of this recess to hold the gear against inward displacement. A concentric recess 39, leading out of the bottom of the recess 37, receives the extreme inner end of the spindle 9 and the clutch-collar 25. The recess 39 in turn opens into the tapered hole 4, receiving the tapered end of the stem 5.

The reversing-gear 32 meshes into a driven pinion 40, corresponding to it in size and number of teeth, and housed in a chamber 41, corresponding to the chamber 37, but located at one side thereof. The pinion 40 is formed upon its inner face with a locking-rib 42, entering a locking-slot 43, formed in the adjacent end of a coupling-sleeve 44, the opposite end of which is formed with a slot 45, receiving a locking-rib 46, formed upon the adjacent face of a relatively smaller driving-pinion 47, housed in a chamber 48, formed in

the opposite face of the case 2 from the said chamber 41. The said chambers 41 and 48 are connected by a concentric hole 49, receiving the said coupling-sleeve 44. A coupling-stud 50, passing through the pinion 47, through the sleeve 44, and the pinion 40, receives a retaining-screw 51, whereby the pinion 40, sleeve 44, and pinion 47 are coupled together to function as one piece, turning upon the same axis. The said driving-pinion 47 meshes into an externally-toothed annular fulcrum-gear 52, located in an annular recess 53, formed in the case 2, encircling the foot of the hub 3 and opening into the chamber 48 aforesaid, the said gear 52 being relatively larger than the driven or reversing gear 32, with which it is concentric in arrangement. The said gear 52 has a sleeve 54 smaller than it is in diameter and fitting into a collar 55, in which it is held against rotation by a screw 56, which, however, does not bind the collar and sleeve so tightly together but what one will slip upon the other so as to prevent breakage in case of any obstruction to the free working of the device. The screw 56 constitutes, therefore, not only a binding-screw, but also a safety device, and may be replaced by any equivalent means for the purpose. The sleeve 54 fits snugly over the hub 3, which turns within the sleeve as the case 2 rotates, the gear 52 and collar 55 being secured in place by means of a washer 57 encircling the said hub 3 and held in place by a set-screw 58. The collar 55 is provided with an arm 59, having a threaded socket 60 receiving a stop-arm 22, which extends radially outward and engages with some fixed object, such as a part of the drill-press or the lathe or some other fixed point.

It will be understood from the foregoing that as the case is rotated forwardly the driving-pinion 47 and the driven pinion 48, which rotate together on the same axis, revolve planetwise with the said case around the gears 52 and 32, into which they are respectively meshed, whereby the gear 32 is rotated in a reverse direction from the case 2 by the said pinions which are actuated in rotation by the riding of the driven pinion 47 over the gear 52, which by being normally held against rotation constitutes a point of purchase for the actuation of the said reversing-gear 32, which is always turning in the reverse direction from the case. Now whenever the spindle is moved outward, not only far enough to uncouple it from the cover 6, but also to bring its lugs 30 into engagement with the pins 31 of the said gear 32, then the said gear will immediately begin to rotate the spindle in the opposite direction from the direction in which the case is moving, whereby the tap carried by the spindle will be backed out, so to speak, from the hole in which it has been cutting.

It is apparent that in carrying out my in-

vention some changes from the construction herein shown and described may be made. I would therefore have it understood that I do not limit myself thereto, 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 a drilling and tapping device, the combination with a rotatable case, of a tool-carrying spindle, an externally-toothed fulcrum-gear and a driven gear differentiated from each other in size and concentric with the said case and spindle, a driving-pinion and a driven pinion differentiated in size, rotating on the same axis, meshing directly into the fulcrum and driven gears respectively, and revolved planetwise around the same with the case, and means for coupling the said spindle with the case for its rotation therewith and for coupling the said spindle with the said driven gear for its reverse rotation thereby.

2. In a drilling and tapping device, the combination with a rotatable case, of a tool-carrying spindle, an externally-toothed fulcrum-gear concentric with the said case and spindle, a relatively smaller driven gear concentric with the said case and spindle, a driving-pinion and a relatively larger driven pinion rotating together on the same axis, meshing directly into the said fulcrum and driven gears respectively and revolved planetwise around the same with the case, and means for coupling the spindle with the case for its rotation therewith and for coupling the spindle with the driven gear for its reverse rotation thereby.

3. In a drilling and tapping device, the combination with a rotatable case, of a longitudinally-movable tool-carrying spindle arranged to be coupled with the said case, an externally-toothed fulcrum-gear concentric with the said case and spindle, a driven gear concentric with the said case and spindle and having a central opening through which the spindle extends upward into the case, a driving-pinion and a driven pinion differentiated in size, rotating on the same axis, meshing directly into the fulcrum and driven gears respectively and revolved planetwise around the same, and a clutch-collar non-rotatably connected with the upper end of the spindle and adapted to be engaged with the said driven gear for the rotation of the spindle thereby.

4. In a drilling and tapping device, the combination with a rotatable case, of a longitudinally-movable tool-carrying spindle arranged to be coupled with the said case, an externally-toothed fulcrum-gear concentric with the said case and spindle, a driven gear

concentric with the said case and spindle and having a circular central opening through which the spindle extends upward into the case, coupling-pins carried by the said driven gear and projecting into the central opening thereof, a driving-pinion and a driven pinion differentiated in size, rotating on the same axis, meshing directly into the said fulcrum and driven gears respectively and revolved planetwise around the same with the case, a clutch-collar non-rotatably connected with the upper end of the said spindle and adapted to be entered at its lower end into the said opening in the driven gear, and coupling-pins carried by the said clutch-collar and engaging with the coupling-pins carried by the said driven gear for coupling the spindle with the driven gear by which it is rotated.

5. In a drilling and tapping device, the combination with a rotatable case, of a longitudinally-movable tool-carrying spindle arranged to be coupled with the said case, an externally-toothed fulcrum-gear concentric with the said case and spindle, a driven gear concentric with the said case and spindle and having a central opening through which the spindle extends upward into the case, a driving-pinion and a driven pinion differentiated in size, rotating on the same axis, meshing directly into the fulcrum and driven gears respectively and revolved planetwise around the same with the case, a clutch-collar fitted over the upper end of the said spindle and adapted to be coupled with the said driven gear, and a screw entering the upper end of the said clutch-collar on which it has bearing and also entering the upper end of the said spindle, whereby the collar is secured in place against endwise movement.

6. In a drilling and tapping device, the combination with a rotatable chambered case having a cover, of a tool-carrying spindle entering the case through the cover, an externally-toothed fulcrum-gear and a driven gear differentiated from each other in size and concentric with the said case and spindle which latter passes through the driven gear, a driving-pinion and a driven pinion differentiated in size, rotating on the same axis, meshing directly into the fulcrum and driven gears respectively and revolved planetwise around the same with the case the cover of which closes in the said driven gear and driven pinion, and means for coupling the spindle with the case for its rotation therewith and for coupling the spindle with the driven gear for its reverse rotation thereby.

7. In a drilling and tapping device, the combination with a rotatable case, of a longitudinally-movable tool-carrying spindle arranged to be coupled with the said case and having a flattened tang at its upper end, an externally-toothed fulcrum-gear concentric with the said case and spindle, a driven gear

concentric with the said case and spindle and
having a circular central opening through
which the spindle projects upward into the
case, a driving-pinion and a driven pinion
5 differentiated in size, rotating on the same
axis, meshing directly into the fulcrum and
driven gears respectively and revolved plan-
etwise around the same, and a clutch-collar
applied to the upper end of the said spindle
15 over the said tang and adapted to be engaged

with and disengaged from the said driven
gear by means of which the spindle is rotated.

In testimony whereof I have signed this
specification in the presence of two subscrib-
ing witnesses:

JOSEPH PETRELLI.

Witnesses:

CLARA L. WEED,
GEORGE D. SEYMOUR.