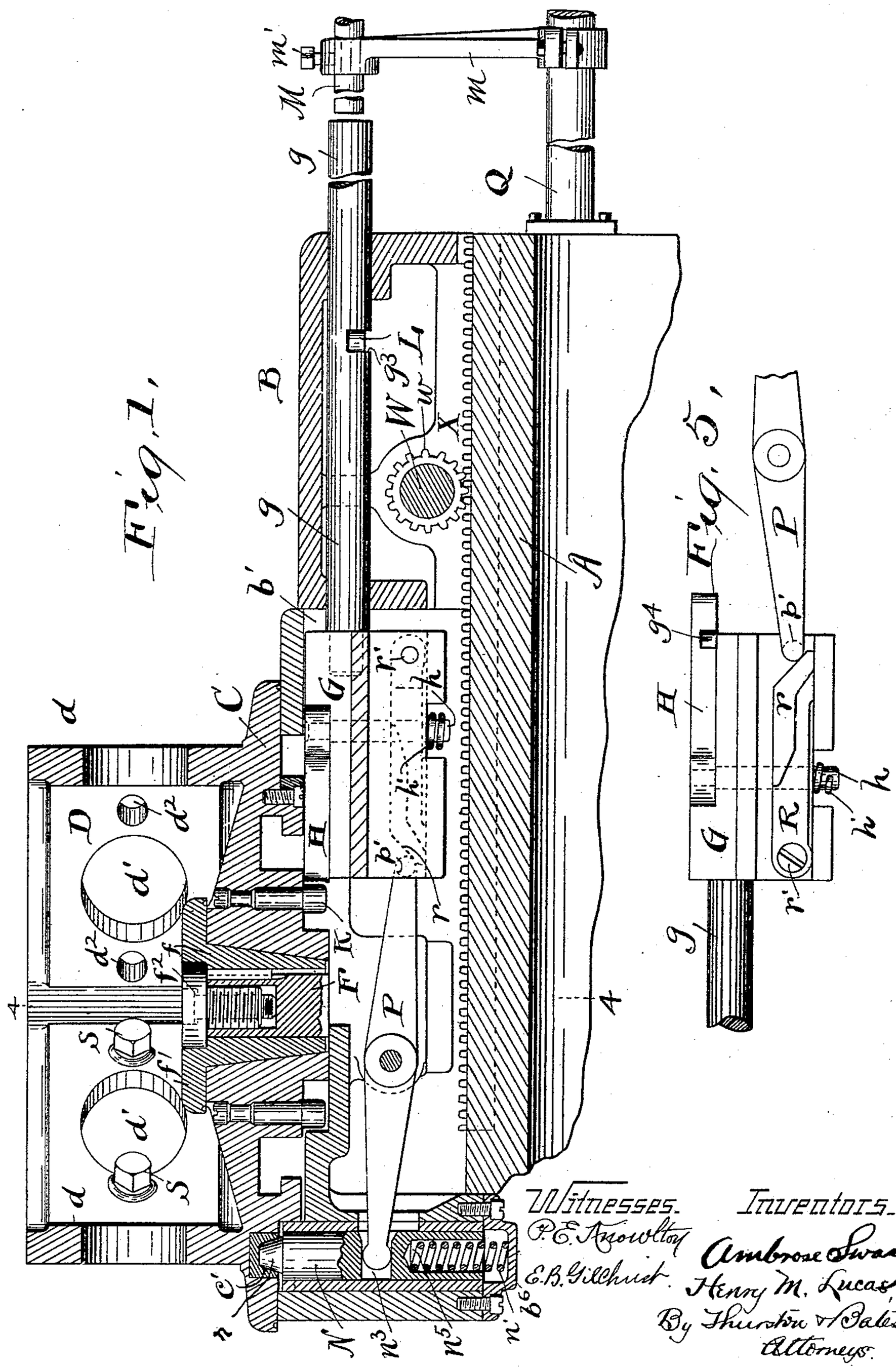
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A. SWASEY & H. M. LUCAS.

TURRET LATHE.

(Application filed Mar. 27, 1899.)

(No Model.) 3 Sheets—Sheet 1.



Witnesses.
P. E. Knowlton
E. B. Gilchrist.

Inventors.
Ambrose Swasey
Henry M. Lucas,
By Thurston & Bates,
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

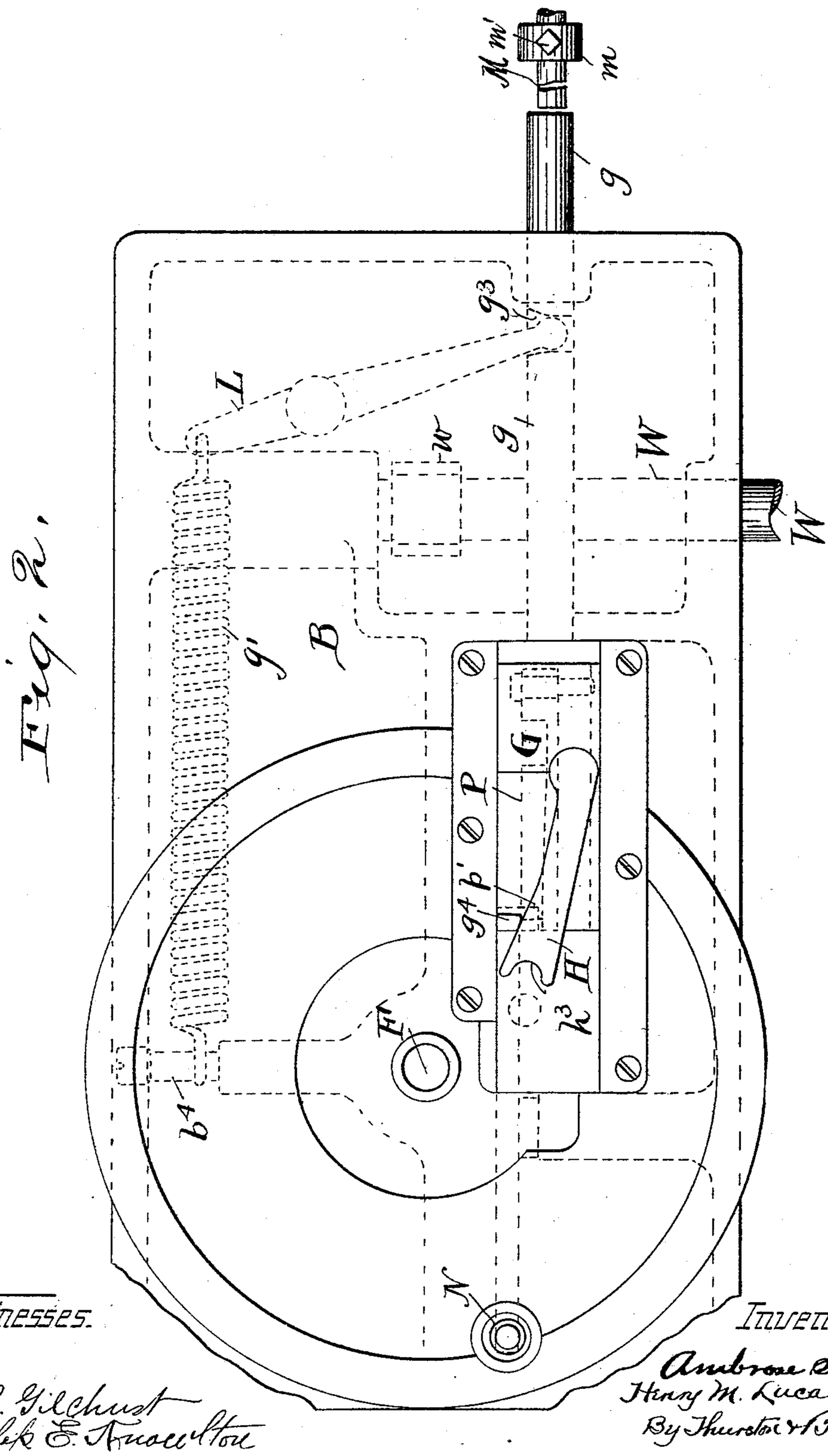
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Witnesses.

E. B. Gilchrist
Philip E. Thwaites

Inventors.

Ambrose Swasey
Henry M. Lucas,
By Thurston & Bates,
Atty's.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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A. SWASEY & H. M. LUCAS.

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Fig. 4.

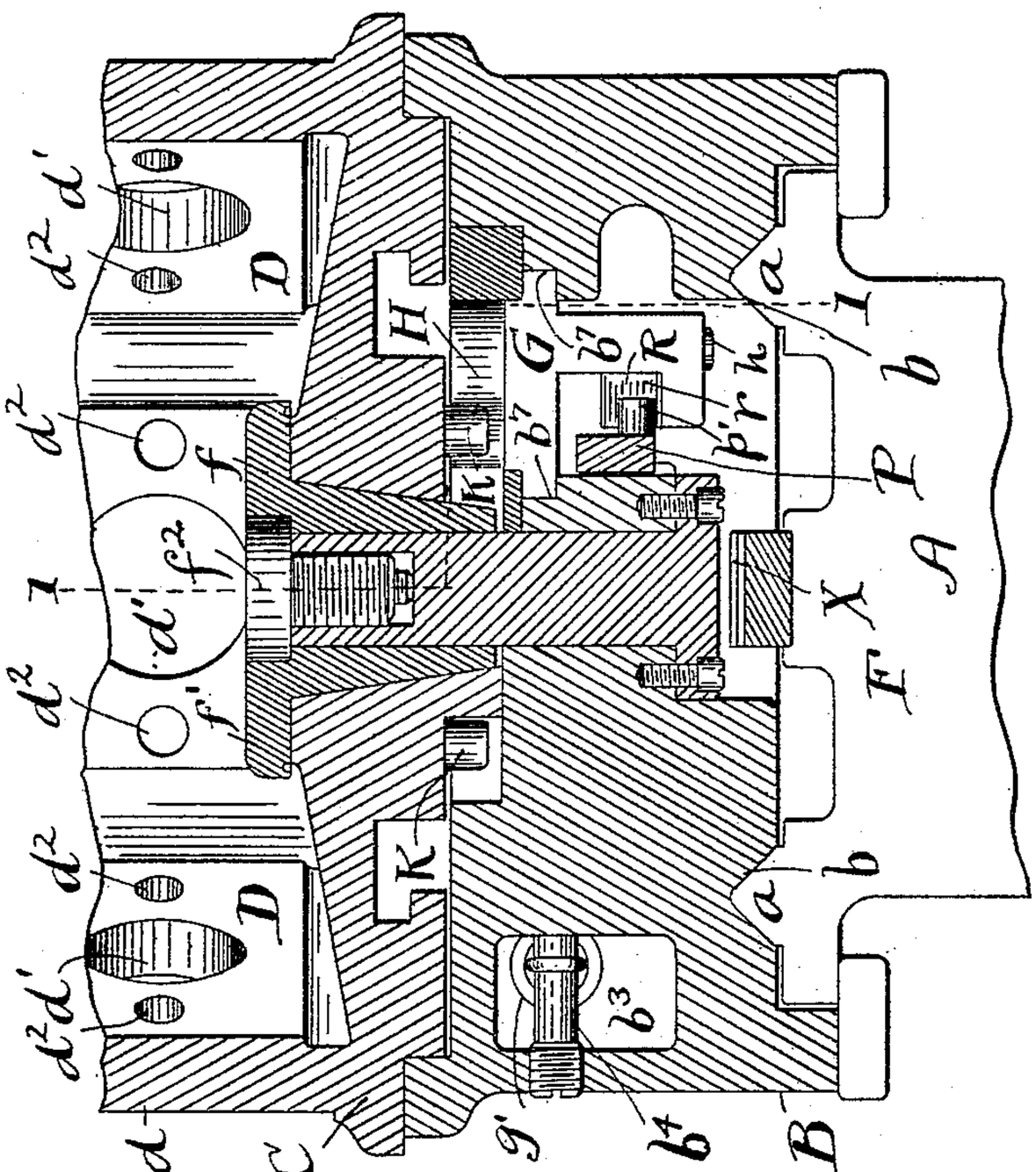
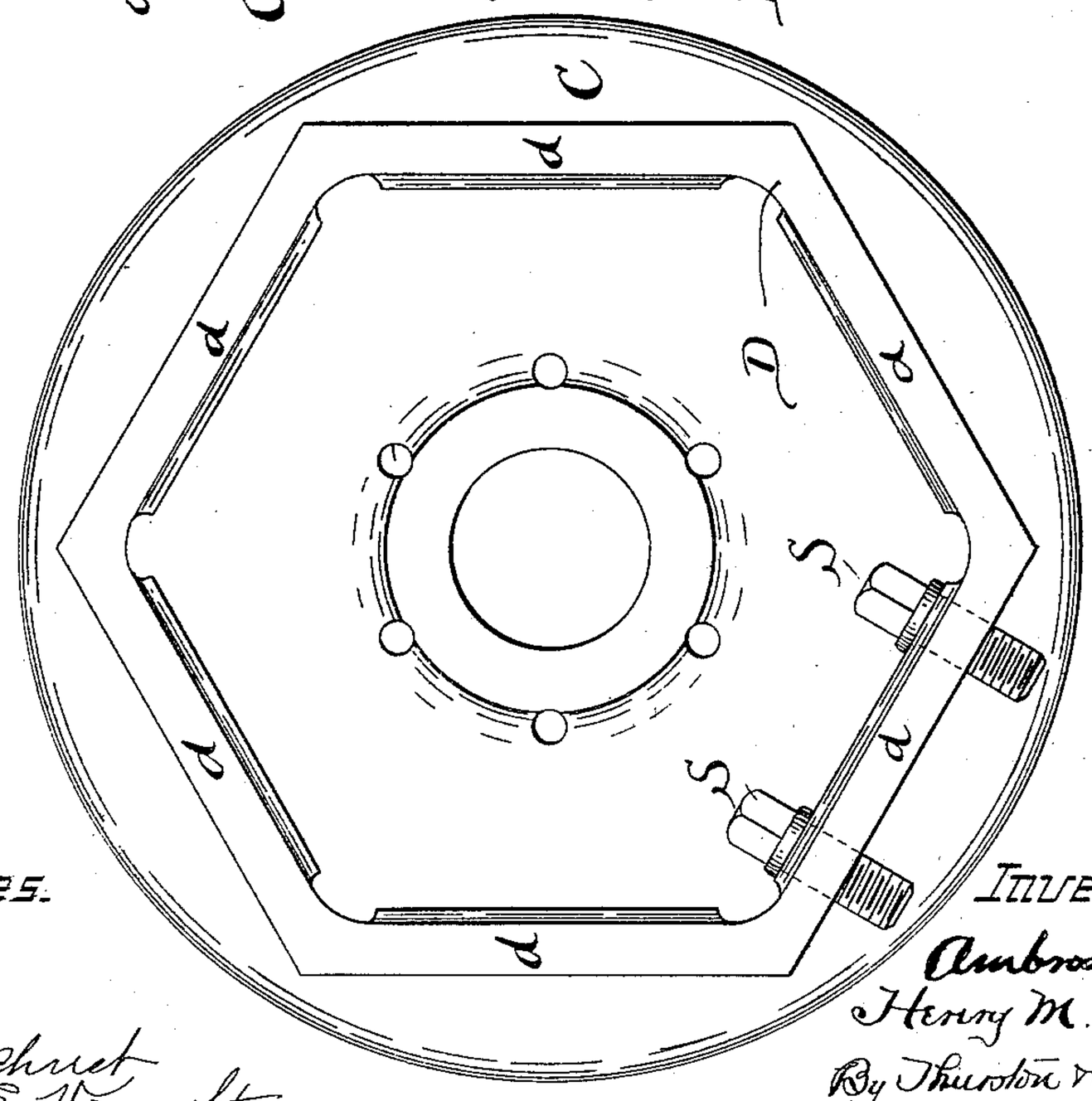


Fig. 3.



Witnesses.

E. B. Gilchrist
Philip E. Thurston

Inventors.

Ambrose Swasey
Henry M. Lucas,
By Thurston & Bates
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

AMBROSE SWASEY AND HENRY M. LUCAS, OF CLEVELAND, OHIO, ASSIGNORS TO WARNER & SWASEY, OF SAME PLACE.

TURRET-LATHE.

SPECIFICATION forming part of Letters Patent No. 632,905, dated September 12, 1899.

Application filed March 27, 1899. Serial No. 710,613. (No model.)

To all whom it may concern:

Be it known that we, AMBROSE SWASEY and HENRY M. LUCAS, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Turret-Lathes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The objects of the invention are, first, to produce a machine of maximum efficiency both with respect to the variety of work it is capable of performing and of its adaptability to the use of several tools at one time; second, to facilitate the connection of the tools and tool-holders to the turret, and as a consequence to simplify the design and construction of tools and tool-holders adapted to be so connected, and, third, to produce as simple and inexpensive a machine as is consistent with the desired efficiency.

The invention relates, primarily, to the construction of the turret, to which most of the valuable features to be pointed out are due. It also relates to the mechanism for turning the turret automatically when the turret-slide is moved back from the work, and also to the indexing mechanism for holding the turret in proper position relative to the work.

In the drawings, Figure 1 is a longitudinal section through the turret and turret-slide of a lathe embodying our invention, the section being in the plane indicated by the dotted lines 1 1 of Fig. 4. Fig. 2 is a plan view of the turret-slide and the mechanism carried thereby for turning and indexing the turret. Fig. 3 is a plan view of the turret, and Fig. 4 is a transverse vertical sectional view in the plane indicated by line 4 4 of Fig. 1. Fig. 5 is a view of the sliding block G and parts which coöperate therewith from the opposite side to that shown in Fig. 1.

Referring to the parts by letters, A represents the lathe-bed, which is provided with the usual V-guides *a* for the turret-slide.

B represents the turret-slide, having coöperating V-shaped ways. The mechanism for causing this turret-slide to move backward and forward is no part of the present invention, and any suitable mechanism may be employed. The drawings show for the purpose a shaft W, mounted in the slide and carrying a pinion *w*, which engages with the rack X, which is fixed to the bed.

C represents the base-plate of the turret, which is rotatably mounted upon the turret-slide, and D is the turret, which is formed integral with said base-plate. The base-plate rests upon the slide, and a vertical stud F, which is secured to the slide, projects through a tapered axial hole in the base-plate. A tapered sleeve *f*, which fits this hole, embraces the stud F and is keyed to it. This sleeve serves as the bearing upon which the base-plate turns. It is provided on its upper end with a head *f'*, which bears upon the top of the base-plate and holds it down upon the slide, and this sleeve is held in the desired relation to the base-plate by a screw f^2, which passes through it and screws into the stud F. This screw also furnishes means for adjusting the sleeve downward to compensate for wear. The turret is composed of a plurality of preferably vertical plates *d*, whose ends are united, and the outer and inner faces of each are parallel. The turret having the described construction is therefore in a form which may be called a "hollow" polygon—that is to say, it is in the form of an equilateral polygon both externally and internally. Through each of these sides *d* a hole *d'* is formed for the work to pass through, and each of these holes, when the side in which it is formed is facing the work, is in line with the work-holding spindle, and in each side are also formed a plurality of holes d^2. The tools or tool-holders may be made fast to any one of the sides of this polygonal turret and to either the outer or the inner face of that side, as may be most convenient, by means of screws *s*, which pass through these holes d^2 and screw into the back plate of the tool or tool-holder. It is obvious that when the tools or tool-holders may be secured to a side of the turret by means of screws passing through said side and screwing into said back plate the design and construction of the tools or tool-holders may be greatly simplified in comparison to those which must be fastened to the turret by means of screws which pass through the tool or tool-holder from the front thereof and screw into the turret, because the

working parts of the tool or tool-holder in such cases must be so arranged and placed as to leave room not only for the screws themselves, but for a wrench or screw-driver to operate them.

It is apparent that tools and tool-holders may not only be secured to the outer faces of the turret, but as well to the parallel inner faces thereof. If there should be a piece of work upon which four tools could operate advantageously upon four different parts thereof, these tools could be set tandem, one to the outer face of one side of said turret and one to the inner face thereof, and one to the outer and one to the inner face of the side of the turret diametrically opposite. Of course it will only occasionally happen that four tools thus set can be used advantageously at the same time upon the same piece of work; but it not infrequently happens that two tools may be advantageously used, and with a turret having the construction described these tools may be secured to the turret in such of the four positions referred to as are most suitable.

We are aware that turrets have been constructed that are externally of polygonal form; but we do not believe that a turret has heretofore been constructed which is polygonal both internally and externally and the sides of the two polygons are parallel. It is obviously an essential characteristic of a turret having the capabilities described as belonging to that turret which is shown that the internal conformation of the turret be similar to the external conformation and that the inner and outer faces of each side thereof shall be parallel, and in this form of the turret is found the gist of the present invention in so far as it relates to the turret itself without respect to its operating mechanism.

We will now proceed to describe the mechanism shown for turning the turret to bring the different tools into line with the work and for properly indexing the turret; but it will be understood that the turret itself, having the characteristics heretofore described, is capable of being moved and indexed by various kinds of mechanism.

In a recess b' in the top of the turret-slide is a sliding block G, which is movable in guideways b^7. To the rear end of this block is secured a long tailpiece g, which extends out through the rear end of the turret-slide. A spring g' of some sort is employed to cause said block to move rearwardly to the end of the recess. This spring may be of any convenient form and may be placed in any convenient position. As a matter of convenience the spring employed is a contractile coil-spring which lies in a hole b^3 in the slide and one end is secured to a pin b^4, which is fast to the slide. The other end is secured to one end of a lever L, which is pivoted to the slide. The other end of the said lever engages in a slot g^3 in the tailpiece g.

An adjustable abutment M is provided for engagement with the rear end of the tailpiece g when the slide has been moved back to draw the tool off the work. This abutment is a rod which may be adjusted through the upper end of a standard m, which is secured to a rod Q, which projects from the end of the machine-frame. This abutment-rod may be made fast to the standard by the set-screw m'. The abutment is adjustable, so that it may be able to act upon the tailpiece of this sliding block as soon as the tool leaves the work, however far the slide may then have moved back.

On the under side of the base-plate C is a ratchet composed of as many downwardly-projecting pins K as there are sides to the turret. A pawl H is mounted upon the sliding block G—that is to say, it is secured to a stud h, which is rotatably mounted in the block—and a rat-trap spring h', acting upon the lower end of this stud, acts to so turn it as to move the pawl into the position shown in the drawings, where it is stopped by the engagement of the pawl with a shoulder g^4 on the block G. When in this position, it is adapted to engage with one of the pins on the turret base-plate. The end of this pawl which faces these pins has a notch h^3, which is adapted to take over the pin when the sliding block is moved toward it.

In the turret base-plate there are as many tapered holes c' as there are sides to the turret. In the turret-slide is a vertically-movable indexing-pin N, having a tapered upper end n, which is adapted to enter these holes. An expansion coil-spring n' lies in a hole n^5 in the pin and is compressed between the upper end of this hole and a plate b^6, secured across the lower end of the holes. This spring therefore acts to move the indexing-pin upward whenever it is permitted to so move. A lever P is pivoted to the turret-slide and enters a slot n^3 in the indexing-pin, whereby it may move said pin. The other end of this lever has a laterally-projecting pin p', which is adapted to engage with a cam-shaped projection r on the side of the lever R, which is pivoted to the sliding block on a horizontal pivot r'. When the turret-slide moves backward, the tailpiece of the sliding block engages with the abutment, the result being that said sliding block is stopped, while the slide continues its rearward movement. The end of the pawl H engages with the proper pin K on the turret and causes it to turn. Just before this engagement of the pawl and pin the cam-shaped projection r just referred to engages beneath the projecting pin p' on the lever P, and as it moves under this projecting pin it rocks the lever and withdraws the indexing-pin from the hole in the turret base-plate, and the pin is held down until the turret-slide completes its backward movement and the turret is turned to bring the next tool into line with the work. Just at this point the pin p' on the lever P reaches the rear end of the cam-shaped projection r,

and thereupon the spring which actuates the indexing-pin acts to move it up into the hole in the turret, thereby properly indexing the turret, and at the same time the pin p' on the lever moves down behind this cam-shaped projection. When the turret-slide now moves forward toward the work, the spring g' moves the sliding block backward upon the slide, whereupon the projecting pin on the lever passes under this cam-shaped projection r, the lever R, to which it is attached, being swung upon its pivot to permit it to so pass.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A lathe-turret, consisting of a base-plate capable of being rotatably supported on the turret-slide, and a plurality of connected plates which are fast to the outer face of said base-plate, and have parallel outer and inner faces, and are symmetrically arranged about the axis of the base-plate whereby to form an equilateral polygon both internally and externally, each of said sides being provided with a hole for the passage of the work, and with means whereby a tool may be attached as well to the inner as to the outer face thereof, substantially as and for the purpose specified.

2. In a turret-lathe, a base-plate capable of being rotatably mounted on the turret-slide, combined with a hollow polygonal turret whose sides are rigid with the base-plate and have parallel outer and inner faces, each side having a hole for the passage of the work, and other holes for the passage of screws for fastening the tools thereto, substantially as and for the purpose specified.

3. In a turret-lathe, the combination of a turret-slide, with a turret base-plate rotatably mounted thereon, and a hollow polygonal turret composed of a plurality of equal sides whose outer and inner faces are parallel, each side having a hole for the passage of the work and other holes for the passage of tool-fastening screws, substantially as and for the purpose specified.

4. In a turret-lathe, the combination of a turret-slide, and a turret base-plate rotatably mounted thereon and having a ratchet on its under side, with a sliding block mounted in the turret-slide, and adapted to slide lengthwise thereof, and having a stem which projects from the rear end of the slide, a spring-pawl pivoted to the slide and adapted for engagement with said ratchet and an adjustable abutment adapted to engage with the stem of the sliding block whereby said block is caused to come to rest during the rearward movement of the slide, substantially as and for the purpose specified.

5. In a turret-lathe, the combination of the turret-slide and a turret base-plate rotatably mounted thereon, and having on its under side a plurality of vertical pins, with a sliding block mounted on the turret-slide, a stem secured to said block and extending beyond the rear end of the slide, a spring-pawl mounted on the top of said block and having a concave front end for engagement with said pins, a lever engaging with said stem, and a spring for operating said lever, and an adjustable abutment for the stem of said block whereby the block will be brought to rest while the slide is moving rearward, substantially as and for the purpose specified.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

AMBROSE SWASEY.
H. M. LUCAS.

Witnesses:
WM. E. REID,
JOHN WEBER.