

No. 766,135.

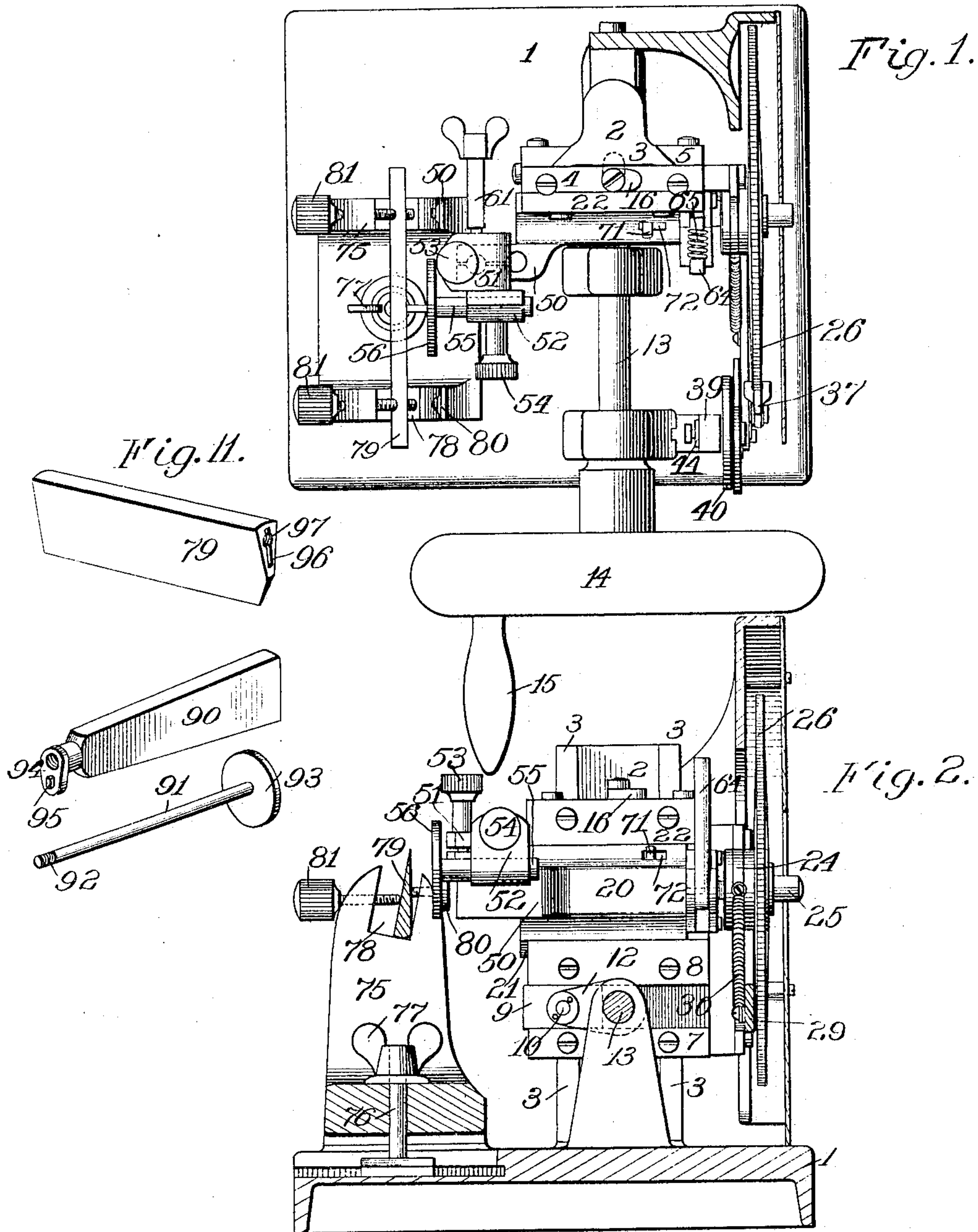
PATENTED JULY 26, 1904.

E. BAUSCH & G. HOMMEL.
MICROTOME.

APPLICATION FILED MAY 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.

Walter B. Payne.
Elizabeth J. Perry

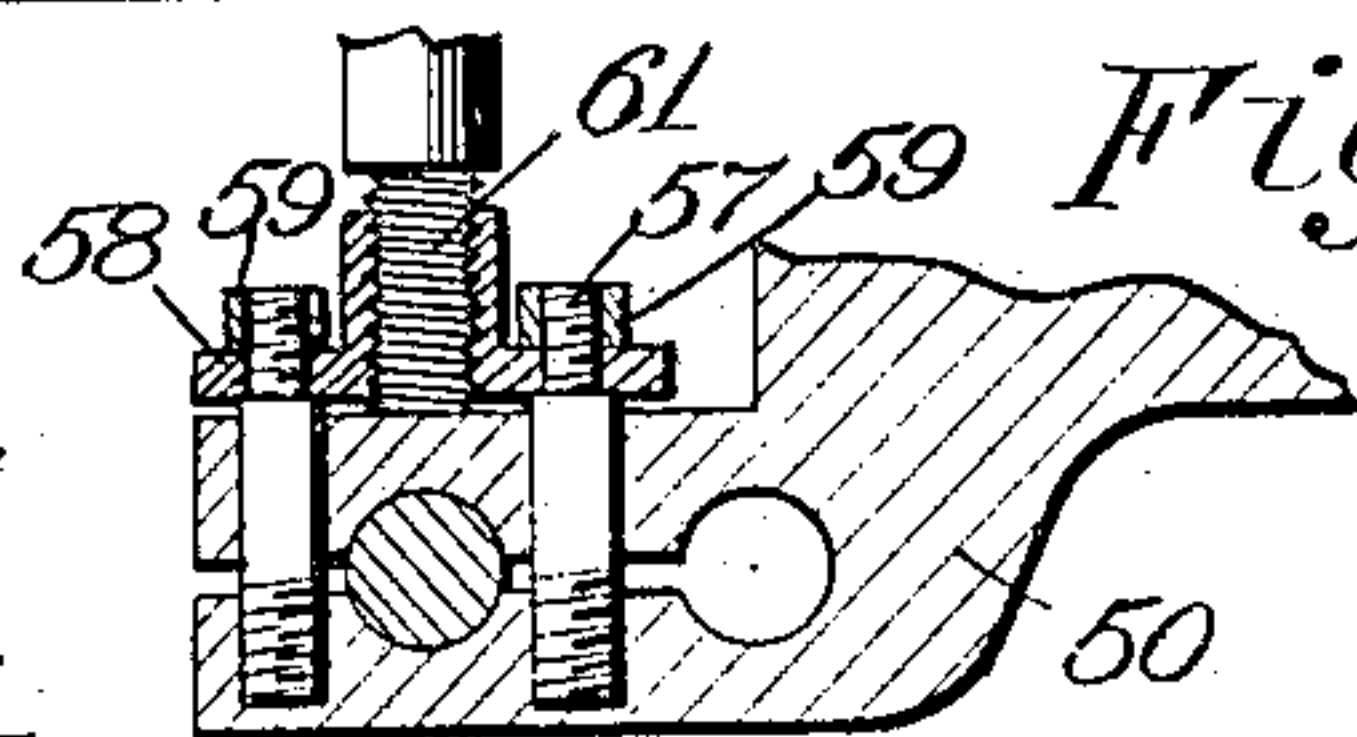


Fig. 9.

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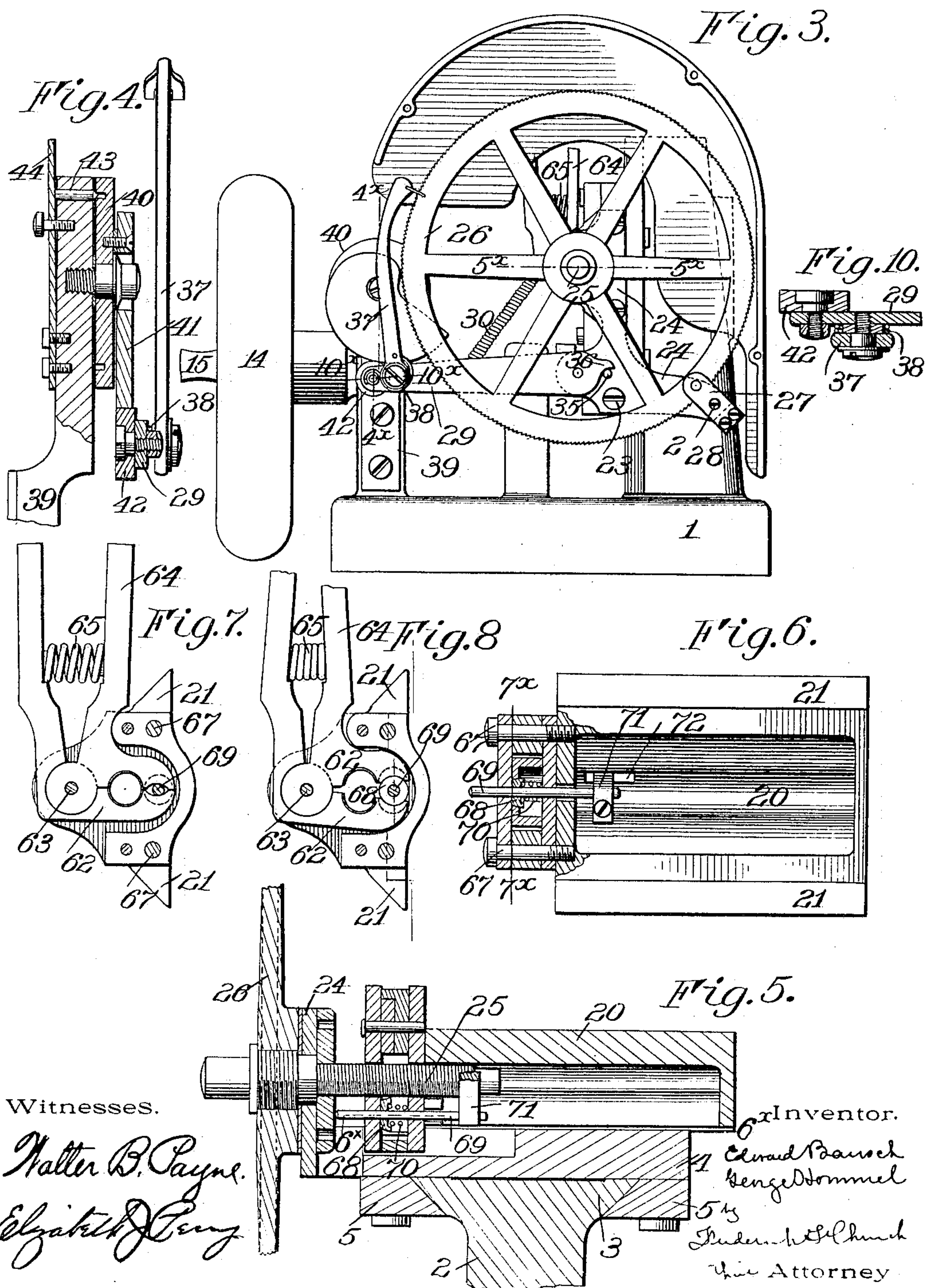
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

EDWARD BAUSCH AND GEORGE HOMMEL, OF ROCHESTER, NEW YORK.

MICROTOME.

SPECIFICATION forming part of Letters Patent No. 766,135, dated July 26, 1904.

Application filed May 12, 1903. Serial No. 156,841. (No model.)

To all whom it may concern:

Be it known that we, EDWARD BAUSCH and GEORGE HOMMEL, of the city of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Microtomes; and we do hereby declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

Our present invention relates to microtomes for cutting sections of materials for microscopical examination; and it has for its object to provide a machine in which sections of various thicknesses may be removed with the material held at any desired position or angle.

Our invention has for its further object to provide means for causing a relative reciprocatory movement between the cutting-knife and material and also means for adjusting said parts relatively, embodying a micrometer-screw and means for operating it by said reciprocatory movement.

To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully described and the novel features pointed out in the claims at the end of the specification.

In the drawings, Figure 1 is a top plan view of a microtome constructed in accordance with our invention. Fig. 2 is a side elevation thereof, partly in section. Fig. 3 is an end view in elevation. Fig. 4 is a sectional view on the line 4^x 4^x of Fig. 3. Fig. 5 is a sectional view of the feed-carriage on the line 5^x 5^x of Fig. 3. Fig. 6 is an inner face view thereof, taken on the line 6^x 6^x of Fig. 5, the parts being shown in section. Fig. 7 is a sectional view on the line 7^x 7^x of Fig. 6, showing the nut cooperating with the micrometer-screw. Fig. 8 is a similar view showing the clamping-nut in the open position. Fig. 9 is a detail sectional view illustrating the con-

struction of the clamping-jaw on the carriage. Fig. 10 is a detail sectional view on the line 10^x 10^x of Fig. 3. Fig. 11 is a perspective view of the knife blade and handle, showing the parts detached.

Similar reference-numerals in the several figures indicate similar parts.

A micrometer constructed in accordance with our invention embodies a frame consisting of a base 1, on which is provided the standard 2, having V-shaped edges forming ways 3. Mounted on the face of the standard is a slide-block 4, secured thereto by the gibs 5, which engage over the edges of the standard to hold the block thereon. Arranged on the forward side of the latter are guides 7 and 8, supporting a traveler-block 9, in which lies a wrist-pin 10 at the end of the crank 12, mounted on the driving-shaft 13, provided at its outer end with a wheel 14 and adapted to be rotated by means of a handle 15 or other suitable means, said wheel being properly weighted at one side of its center to counterbalance the block 4 and connected parts. It will be seen that when the shaft 13 is rotated the slide-block 4 will be reciprocated vertically on the standard, and to prevent the operation of any of the parts it is simply necessary to lock the block to the standard. This is accomplished in a simple manner by providing on the top of the block 4 a small finger or locking-piece 16, which is adapted to be rotated to extend over the top of the standard when the block is in the elevated position; but other locking devices may be employed and the same object accomplished by providing a lock between other relatively stationary and movable parts of the machine.

The object-carriage 20 is adapted to be moved across the face of the block 4 in a line extending at right angles to the movement of said block, and it is therefore provided with the beveled edges 21, which extend beneath the corresponding edge or gib on the block 8 and the gib 22, arranged at the top of the carriage. Mounted on the end of the block 4 and at-

attached thereto by screws 23 is a frame 24, on which is journaled a micrometer feed-screw 25, provided at its outer end with a feed-wheel 26. Also attached to said frame 24 are arms 27, projecting on opposite sides of the rim of the feed-wheel and adjustable relatively into engagement therewith by means of the screw 28 to afford a braking pressure upon the wheel. The periphery of the feed-wheel is provided with ratchet-teeth, as shown, and the size thereof bears such a relation to the pitch of the thread of the micrometer-screw 25 that when the feed-wheel is moved through the distance of one of the ratchet-teeth the object-carriage will be moved a distance of one micron. Pivoted on the frame below the center of the feed-wheel is a pawl-carrier 29, normally operated in one direction by a spring 30 and having its movement limited by means of a pin 35 and cooperating projection 36, as shown in Fig. 3. At the outer end of the carrier 29 is pivoted a pawl 37, operated toward and normally held in engagement with the feed-wheel by means of a torsional spring 38. On the base 1 is a pillar 39, on which is revolvably mounted a disk 40, and attached thereto is a spiral-shaped cam 41, adapted to cooperate with a roller 42 on the end of the pawl-carrier to arrest the movement of the outer end thereof and cause the feed-wheel to be rotated by the continued vertical movement of the object-carriage. To this end the cam is so formed as to cause the pawl to engage with one or more of the ratchet-teeth on the feed-wheel and the periphery of the disk 40 is provided with corresponding graduations, permitting the operator to adjust the cam and cause the operation of the feed-wheel as desired. A simple locking device consisting of the pin 43 on a leaf-spring 44 is employed, which is adapted to engage the notches or apertures formed at the rear side of the disk to hold the cam in the desired position of adjustment. At the outer end of the object-carriage is provided an extension 50, provided with perforations adapted to receive the post of an adjustable split head 51, provided with perforations adapted to receive the post of a similar head 52, which are respectively provided with clamping-screws 53 and 54. In the perforation in the head 52 is removably secured the post 55 on the face-plate or object-mounting 56. (Shown particularly in Figs. 1 and 2.) The extension 50 is split, as shown in Fig. 9, and one jaw or member thereof is provided with studs 57, which extend through the other member, having at their outer ends shoulders against which abuts a plate 58, secured by small nuts 59. In this plate is provided a threaded boss, and oper-

ating therein is an adjusting-screw 61, the end of which operates against the proximate face of one of the jaws to move it toward the other one to securely clamp the post in one of the apertures.

The nut cooperating with the micrometer-screw 25 is located at the rear end of the feed-carriage and in the present instance consists of the two members 62, journaled on a pin 63 and provided with the operating-handles 64, which are normally separated to hold the parts in their normal position in contact with the screw 65. These portions constitute a split nut, and for convenience in construction and operation they are secured between supports or plates 66, which are secured together and also attached to the end of the carriage 20 by means of the screws or bolts 67, as shown in Fig. 6. At their outer ends and at one side the members 62 are provided with small recesses in which is arranged a small disk or head 68, mounted on the rod 69 and operated between said members by a spring 70 when they are separated. At its rear end the rod 69 is adapted to cooperate with the hub of the feed-wheel or some other relatively stationary part when the carriage is moved rearwardly, automatically operating the nut into engagement with the feed-screw. It is, however, sometimes desirable to adjust the object-carriage to an intermediate position on the micrometer-screw without rotating the latter, and to this end we provide on the rod 69 a small finger or projection 71, extending through an aperture 72 to the exterior of the casing, which may be manually operated, as will be understood. This arrangement permits the carriage to be adjusted to bring the object thereon into proximity with the knife, thus facilitating the operation and preventing undue wear of the delicately-constructed parts.

The knife-holder consists of a frame or casting having vertically-extending supports 75, mounted on ways or guides secured to the base 1 by a headed bolt 76 and thumb-nut 77. At the upper ends of the extensions are provided open notches or recesses 78, in which is secured the knife-blade 79, and at the forward and rear sides, respectively, of the supports are provided adjusting-screws 80 and 81, arranged out of horizontal alinement and having their ends arranged in opposition to each other, as shown in Fig. 2. These screws permit the knife-blade to be tilted and secured at any desired angle relatively to the movement of the object-carrier, a feature which is desirable in machines of this description, as the operator is enabled to remove sections differing in thickness from different objects, as well as to position the knife-blade at such

an angle as to obtain the best cutting effect whether the knife is sharp or dull.

In Fig. 11 we have shown a detached perspective view of a form of knife which is particularly adapted for use in a machine of this description, together with a handle adapted to be used in connection therewith and employed particularly for holding the knife in such operations as sharpening when it is used outside of the machine. The handle 90 is provided with a longitudinally-extending aperture, through which extends a rod 91, having at its inner end a thread 92 and at its outer end a milled head 93. At the inner end of the handle is provided an offset plate 94, having a projection 95, adapted to engage a recess 96 in the end of the blade 79 to hold the handle in alinement therewith when the latter is secured by the screw-thread on the rod 91 engaging the threaded aperture 97, as will be understood.

We claim as our invention—

1. In a microtome, the combination with a standard, a slide movable thereon and provided with guides, and a carriage supported in the guides, of a knife-holder, operating devices for reciprocating the slide, devices for moving the knife-holder and carriage relatively and means for locking the operating devices.

2. In a microtome, the combination with a standard, a slide-block movable thereon and provided with guides and a carriage movably mounted on the face of the slide-block, of a knife-holder, means for reciprocating the slide-block, devices for moving the knife-holder and carriage relatively and a locking-piece on the slide-block engaging the standard.

3. In a microtome, the combination with a knife and a relatively movable object-carriage, of a feed-screw arranged within the carriage, a nut cooperating therewith to move the carriage in one direction, devices for moving said nut out of operative engagement with the screw and means for holding the parts separated, having an operating portion accessible from the exterior of the carriage whereby said holding means may be manually released.

4. In a microtome, the combination with a knife and a relatively movable object-carriage, of a feed-screw arranged within the carriage, a nut cooperating with the screw to cause the feed of the carriage in one direction, a device for holding the nut out of engagement therewith, a releasing member for said device adapted to be automatically operated and having a portion extending to the exterior of the carriage whereby said device may be manually operated.

5. In a microtome, the combination with a knife, a movable object-carriage and mechanism

for causing the relative feed of the knife and carriage embodying a ratchet-wheel, of a pawl-carrier mounted on the carriage, a pawl thereon cooperating with the ratchet-wheel and a relatively stationary cam controlling the movement of the pawl.

6. In a microtome, the combination with a knife, a movable carriage and mechanism for causing the relative feed of the knife and carriage embodying a ratchet-wheel, of a pawl-carrier mounted on the carriage, a pawl thereon and an adjustable cam with which the pawl-carrier engages and means for locking the cam in adjusted position to control the movement of the pawl.

7. In a microtome, the combination with a knife, a movable carriage and mechanism for causing the relative feed of the knife and carriage embodying a ratchet-wheel, of a pawl-carrier on the carriage, a pawl thereon and a relatively stationary disk having a graduation on its surface, a cam mounted on the disk cooperating with the carrier.

8. In a microtome, the combination with a knife, a movable carriage and mechanism for causing the relative feed of the knife and carriage embodying a ratchet-wheel, of a pawl-carrier on the carriage, a pawl thereon and a relatively stationary disk having graduations on its surface, means for locking it in adjusted position and a cam on the disk cooperating with the pawl-carrier to operate the ratchet-wheel through a relative distance corresponding to said graduations on the disk.

9. In a microtome, the combination with a frame a knife thereon and a standard on the frame, a block on the standard and means for reciprocating it, of ways on the face of the block, a carriage guided therein, a frame on the block and a micrometer-screw journaled on the frame and having a ratchet-wheel, a pawl-carrier journaled on the frame, a pawl thereon and stop devices cooperating with the outer end of the carrier.

10. In a microtome, the combination with a frame, a knife thereon and a standard on the frame, a block movably mounted on the standard and means for reciprocating it, of a carriage movably mounted on the face of the block, a frame on the side of the latter and a micrometer-screw journaled on the frame and having a ratchet-wheel, a pawl-carrier journaled on the frame and a pawl thereon, a stop and a roller on the carrier adapted to engage said stop.

11. A knife-holder for microtomes embodying a standard having opposing and relatively adjustable clamping devices adapted to engage opposite sides of a knife-blade.

12. A knife-holder for microtomes embodying a standard having a knife-rest and oppos-

ing and relatively adjustable clamping devices adapted to engage opposite sides of a knife-blade at different distances from the edge thereof.

5 13. A knife-holder for microtomes embodying a standard having a knife-rest and opposing clamping-screws arranged out of alignment to engage opposite sides of a knife-blade at different distances from its edge.

10 14. The combination with a knife-blade having an aperture, of a detachable handle therefor having a stud adapted to engage the aperture, an arm on the handle adapted to engage the blade at one side thereof and means
15 for holding the handle in engagement with the blade.

15. The combination with a knife-blade having a threaded aperture, of a handle having a revoluble bolt thereon adapted to cooperate with said aperture and a projection on the handle adapted to engage the knife-blade at one side of the aperture therein.

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