

No. 819,842.

PATENTED MAY 8, 1906.

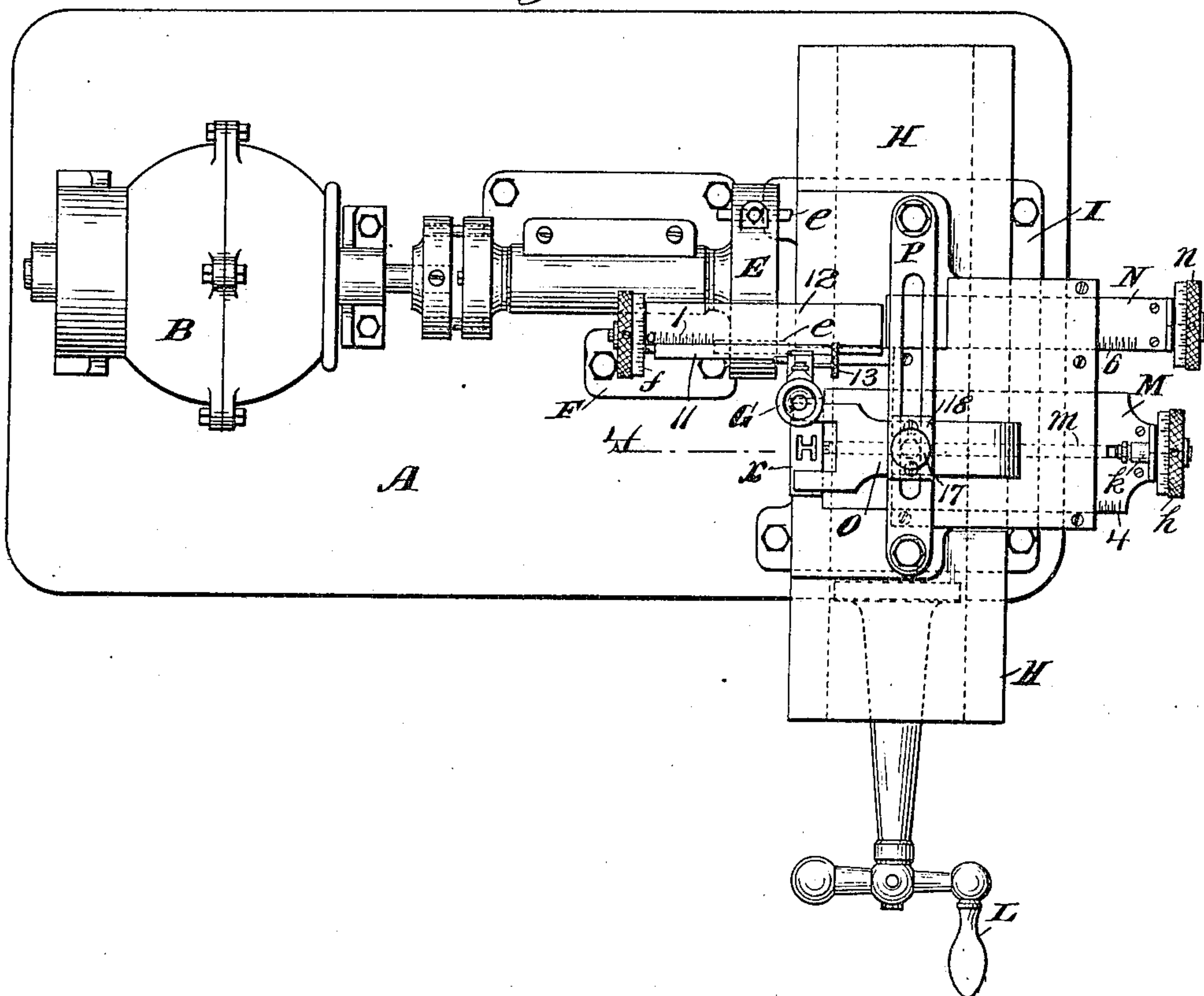
L. B. BENTON.

MATRIX TRIMMING AND SIMILAR MACHINE.

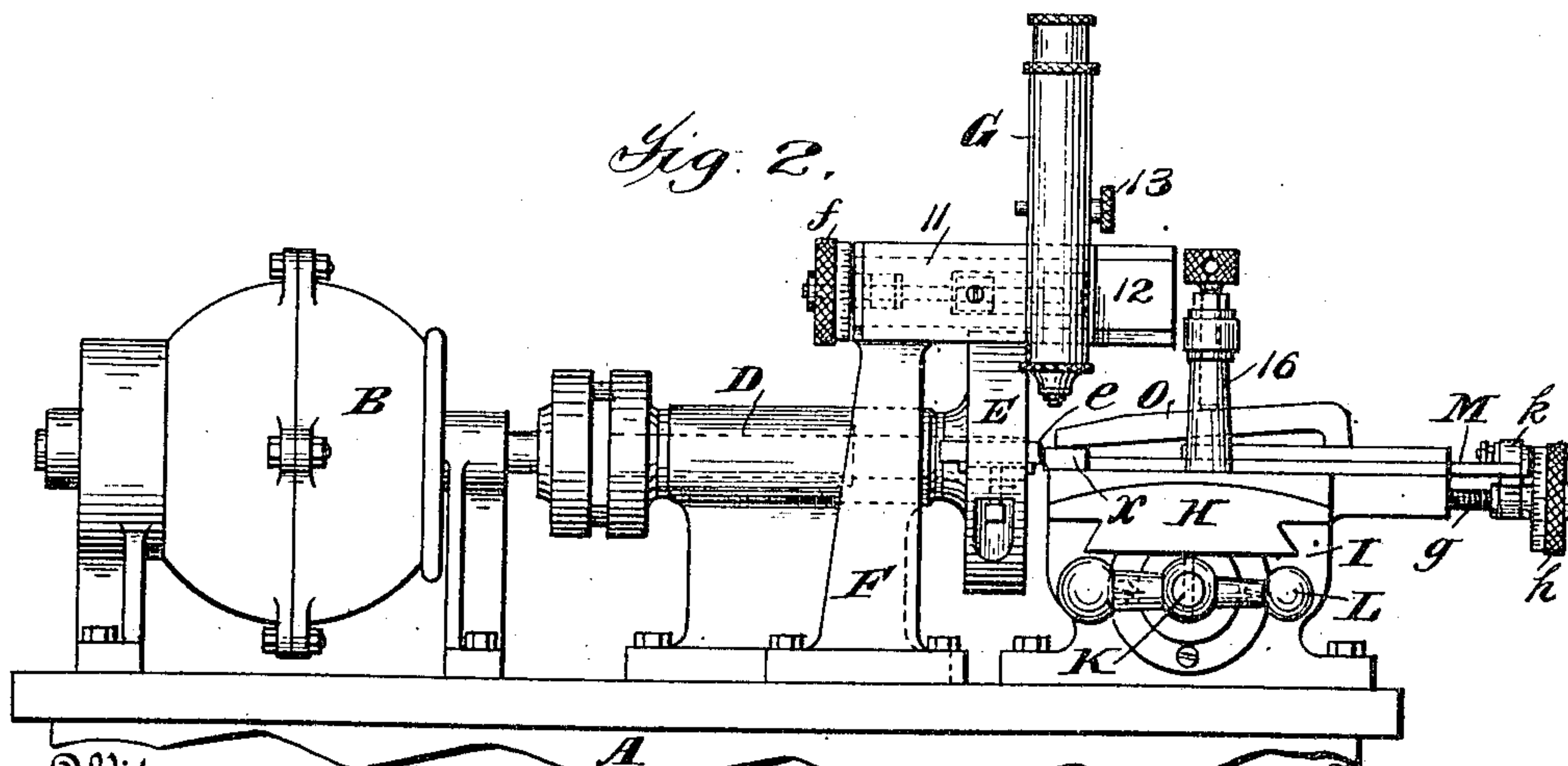
APPLICATION FILED JUNE 20, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



*Fig. 2.*



Witnesses

J. H. Graves.  
G. Galvani.

Inventor

By *Wm Boyd Benton*  
 his Attorneys  
*Philip Sawyer & Kennedy*

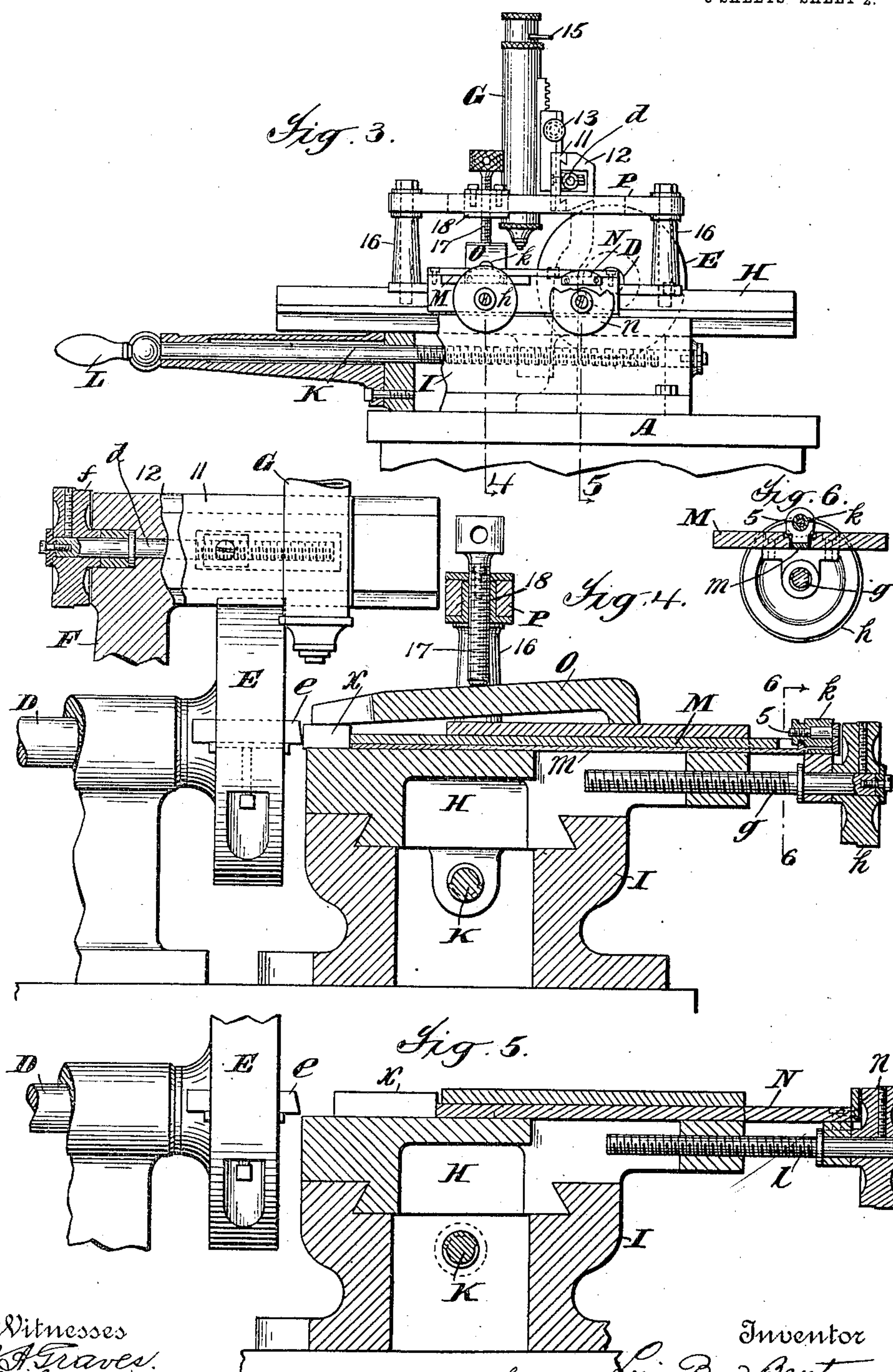
No. 819,842.

PATENTED MAY 8, 1906.

L. B. BENTON.  
MATRIX TRIMMING AND SIMILAR MACHINE.

APPLICATION FILED JUNE 20, 1905.

3 SHEETS—SHEET 2.



Witnesses  
*J. P. Graves.*  
*G. Galiani.*

Inventor  
*L. B. Benton*  
By his Attorneys  
*Philip Sawyer, Rice & Kennedy*



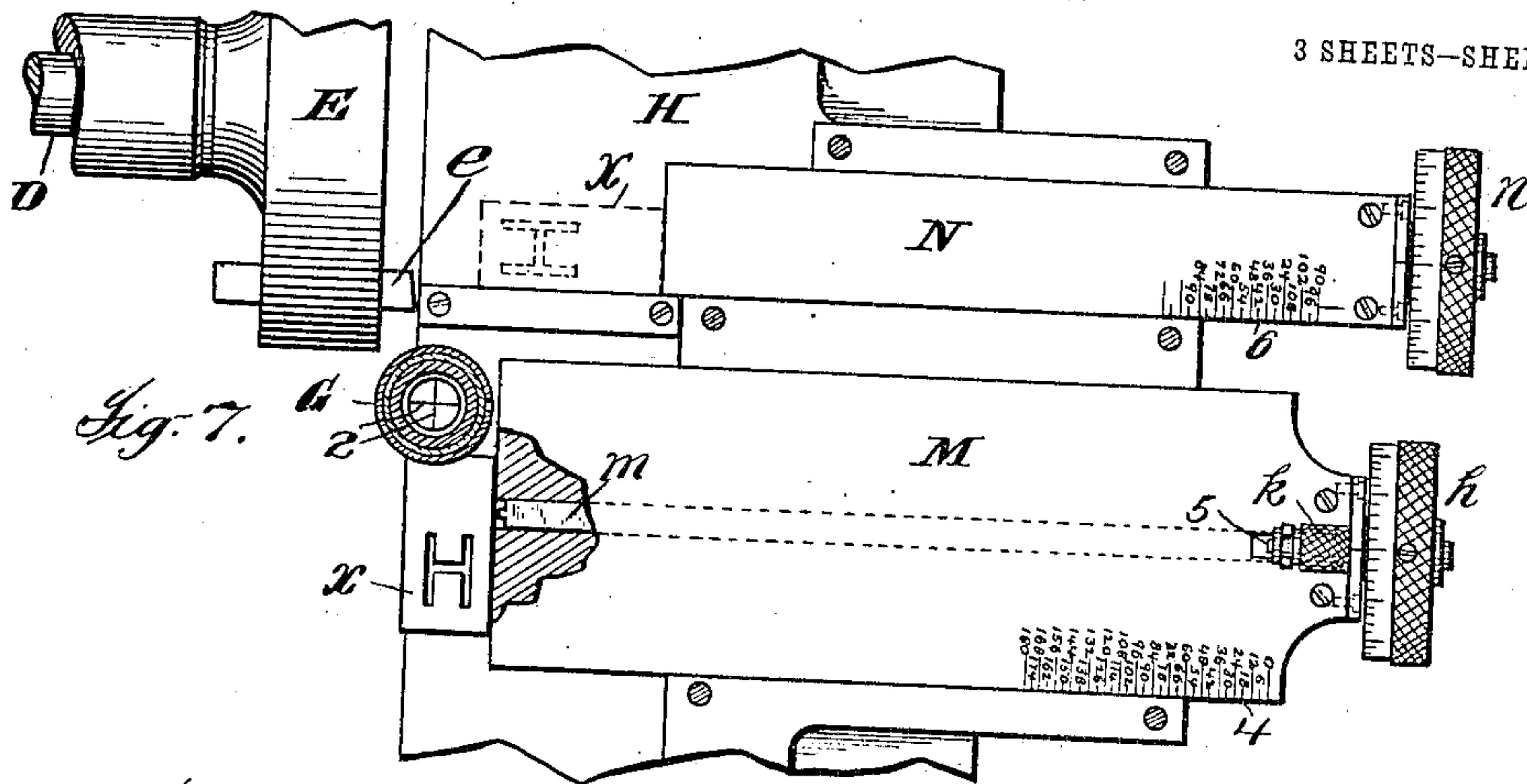
No. 819,842.

PATENTED MAY 8, 1906.

L. B. BENTON.  
 MATRIX TRIMMING AND SIMILAR MACHINE.  
 APPLICATION FILED JUNE 20, 1905.

APPLICATION FILED JUNE 20, 1905.

3 SHEETS—SHEET 3.



*Fig. 7.*

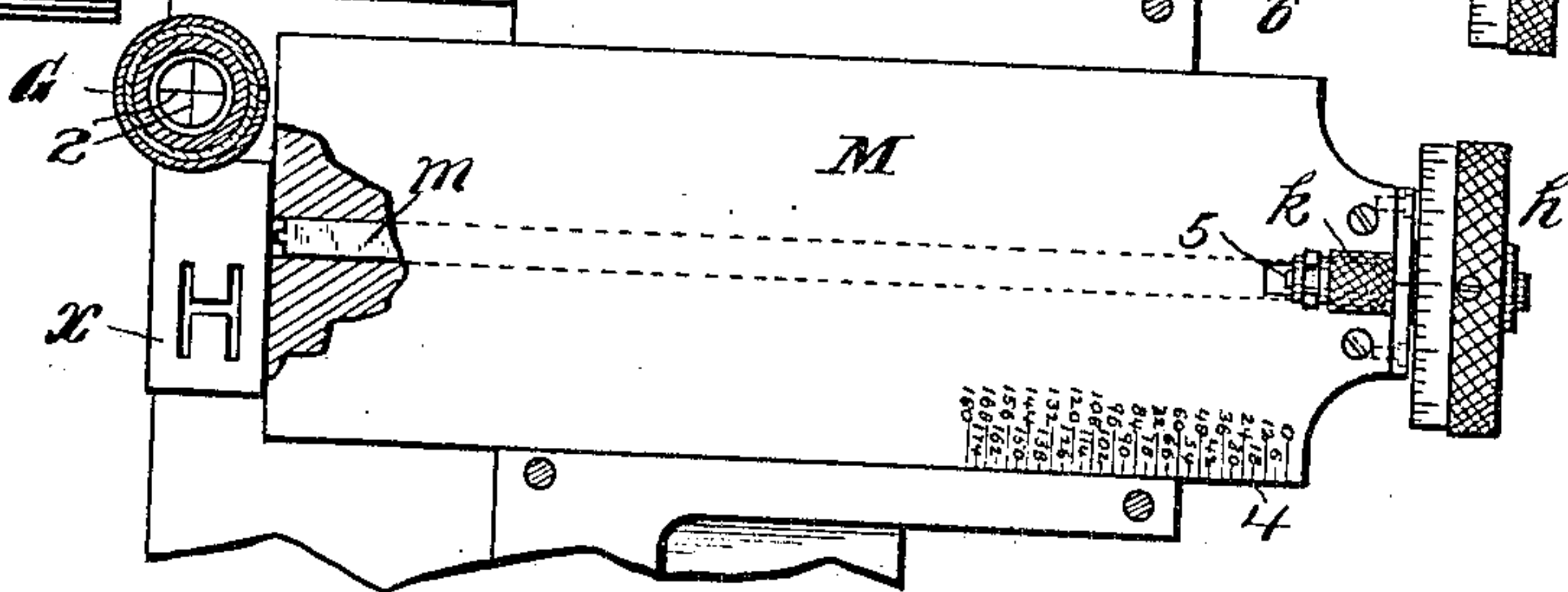


Fig. 8.

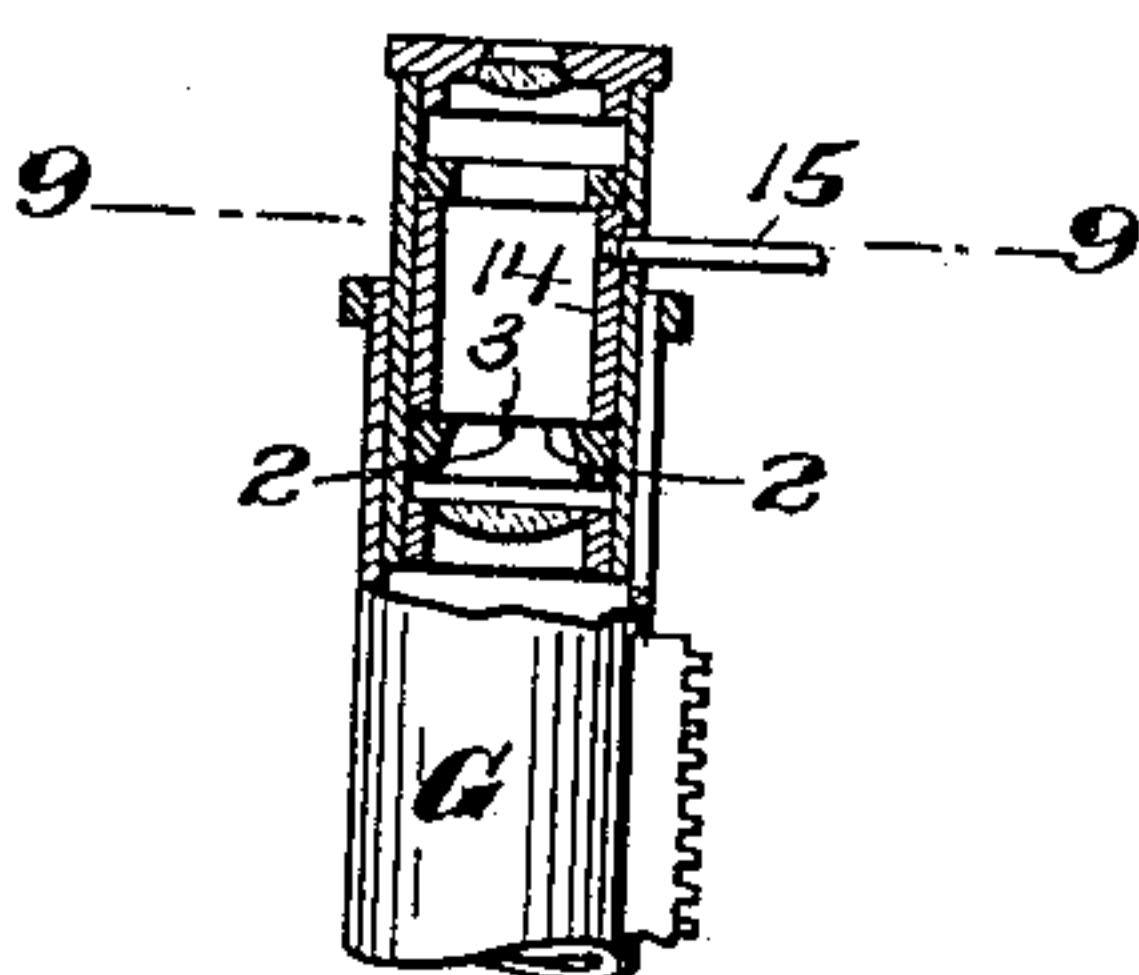


Fig. 10.

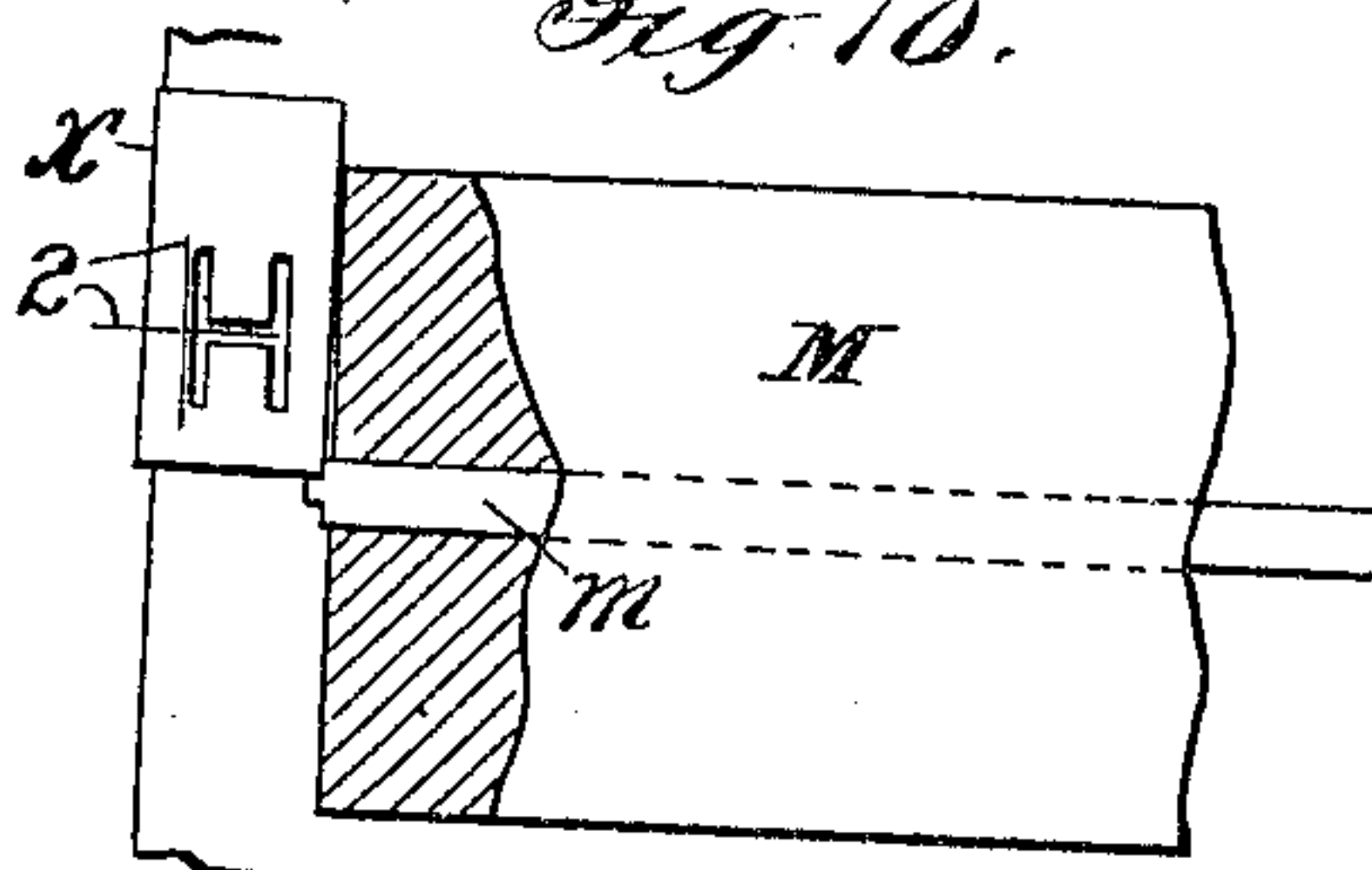


Fig. 9.

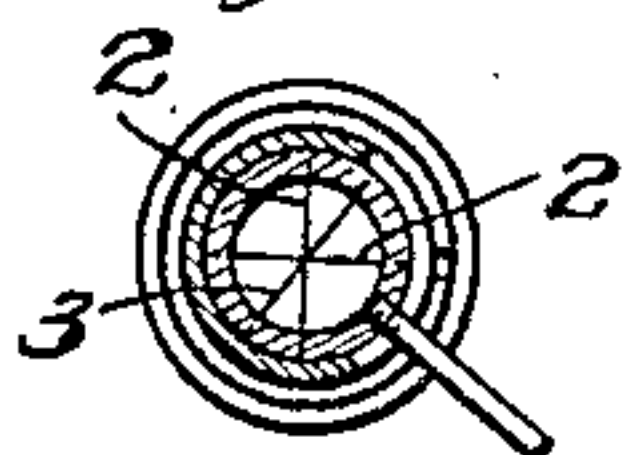
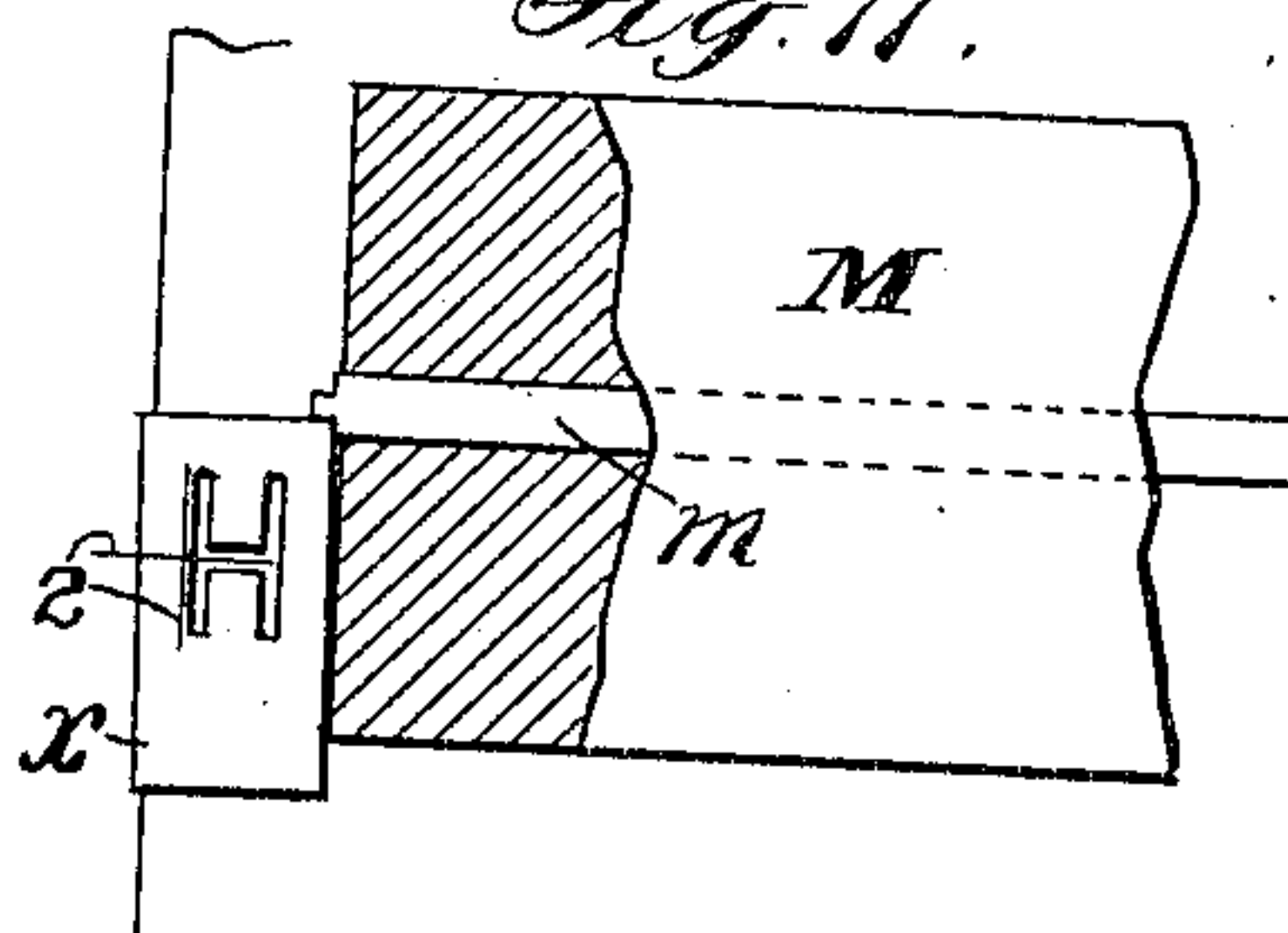
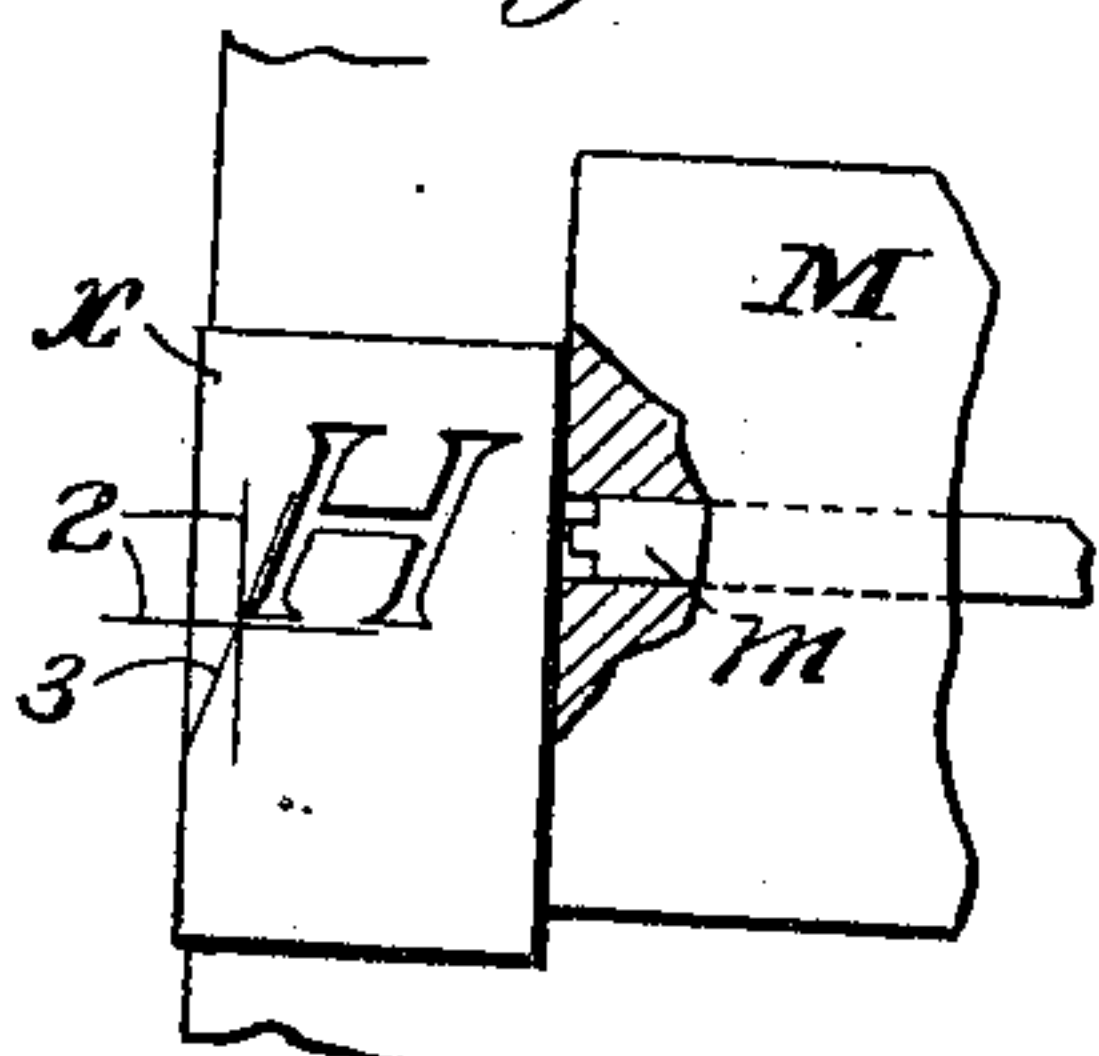


Fig. 11.



*Fig. 12.*



Witnesses  
J. A. Graves.  
G. Galiani.

Inventor  
By *Luin Boyd Beaton*  
Attorneys:  
*Phil. H. Sawyer, Rice & Kennedy*



# UNITED STATES PATENT OFFICE.

LINN BOYD BENTON, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN TYPE  
FOUNDERS COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION  
OF NEW JERSEY.

## MATRIX-TRIMMING AND SIMILAR MACHINE.

No. 819,842.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed June 20, 1905. Serial No. 266,168.

*To all whom it may concern:*

Be it known that I, LINN BOYD BENTON, a citizen of the United States, residing at New York city, county of Richmond, and State of New York, have invented certain new and useful Improvements in Matrix-Trimming and Similar Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to a machine which is especially adapted for trimming matrix-blocks to secure the proper relation of the sides and head of the matrix-block to the matrix formed in it, which is usually called "fitting" the matrix, but which may be used also for trimming other articles which require to be cut exactly to a line.

In trimming matrices great difficulty has been found in securing the trimming of the sides and head of matrix-blocks so as to position the matrix exactly in relation to these, and complicated and expensive methods have been used to secure this result.

The present invention provides a machine by which accurate trimming so as to correctly position the matrix relatively to the sides and head of the matrix-block may be conveniently secured.

In the accompanying drawings, forming a part of this specification, a matrix-trimming machine is shown embodying all the features of the invention in their preferred form, and this machine will now be described in detail and the features forming the invention specifically pointed out in the claims.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation of the machine. Fig. 3 is an end elevation looking to the left in Figs. 1 and 2 with parts broken away to show the construction. Fig. 4 is a section, on an enlarged scale, on the line 4 of Figs. 1 and 3. Fig. 5 is a section, on an enlarged scale, on line 5 of Fig. 3. Fig. 6 is a cross-section on the line 6 of Fig. 4. Fig. 7 is an enlarged detail plan of the matrix-adjusting devices and cross-section of the microscope with the matrix-slide partly broken away. Fig. 8 is a detail section of the microscope. Fig. 9 is a cross-section on the line 9 of Fig. 8. Figs. 10, 11, and 12 are diagrams illustrating the positioning of the matrix.

Referring to the drawings, A is the base-

plate of the machine, on which is mounted in suitable bearings the motor B, which drives the shaft D, carrying the cutter-head E, having the usual trimming-cutters *e*.

In front of the cutter-head E is mounted on standard F a microscope G, this microscope G being carried by a slide 11, mounted to move on block 12 on standard F and adjustable so as to position the microscope G relatively to the cutting-line of the cutters *e* by a micrometer-screw *d*, having the usual head *f*, and by which the slide 11 is positioned along the gage 1 on the block 12.

13 is the usual adjusting-screw for focusing the microscope, and the microscope is preferably a compound microscope of the construction shown in detail in Figs. 8 and 9, having the usual cross-lines 2. One of these lines is preferably parallel with the cutting-line and is the line by which the matrix is located relatively to the cutter, so that the matrix will be trimmed with the amount of side bearing for which the microscope has been set by the screw *d*, this line thus forming the locating-line of the microscope. The other line 2 is preferably at right angles thereto, as shown. If the cross-lines are positioned otherwise, the point of crossing of the lines may form the locator of the microscope by which the matrix is positioned for trimming.

For the purpose of positioning matrices with italicized or back sloped letters the microscope is preferably provided also with a third cross-line or locating-line 3, which cross-line is carried by a sleeve 14 in the microscope, which sleeve 14 is adjustable by a handle 15, projecting outside the microscope, so that by adjusting the sleeve 14 this cross-line 3 may be positioned at any angle desired to the other lines, according to the slope of the letter, as fully explained hereinafter.

Mounted to move transversely to the shaft D and below the microscope G is a carriage H, moving on a way I on the base-plate A, the carriage being moved parallel with the cutting-line by screw K, having handle L. On this carriage H is mounted the matrix-slide M; by which the matrix-block is positioned for trimming the side edges, matrix-slide N, by which the matrix-block is positioned for trimming the head, and the clamp O, by which the matrix-block is held in position for



trimming, this clamp O being preferably a loose piece.

The matrix-slide M is adjusted to position the matrix-block by micrometer-screw *g*, 5 having the usual head *h*, this slide preferably carrying a scale 4 and acting to advance the matrix bodily toward the cutters. Within the slide M is a narrow slide *m*, which is used for adjusting the matrix angularly under the microscope, as explained hereinafter, 10 this slide *m* being actuated by the small knurled head *k*, running on a fixed screw 5 with a slow spiral, so that a fine adjustment of the matrix is secured by the head *k*. The 15 slide N which positions the matrix-blocks for trimming the head is not provided with the small slide, as this is not necessary, but is actuated to adjust the matrix-blocks relatively to the cutters *e* by the micrometer- 20 screw *l*, having the usual head *n*, the slide being shown as provided with the scale 6.

The clamp O is forked at the end, so as to bear upon the opposite ends of the matrix-block *x* outside the letter, and is pressed 25 down to lock the matrix-block *x* in position for trimming the sides by clamp-screw 17. The screw 17 is carried by a two-part block 18, adjustable in a slot in the bar P. The slot in bar P is of such length as to permit the 30 clamp to be used with matrix-blocks and letters of widely different lengths. An important detail feature of this clamp is its inclined form, so that the clamp-screw 17 bearing upon the inclined portion will tend to 35 force the clamp O to the right in Fig. 4, thus assuring the matrix-block being pressed firmly against the matrix-slide M during cutting and securing the proper position and 40 trimming of the matrix-block.

The operation of the machine will be understood from a brief description. In trimming the sides of the matrix-block the matrix-block *x* is first placed in position below the clamp O, as shown, and then before being 45 locked in position by the clamp, the matrix-carriage being moved into position with the letter under the microscope, the matrix-block *x* is adjusted by the matrix-slide M until the side line of the letter (shown as the letter "H") is exactly under and parallel with 50 the cross-line 2, which extends lengthwise of the matrix-block, this line 2 thus forming the locating-line in this operation. If the side edge of the matrix-block against which the 55 matrix-slide M presses is exactly parallel with the side line of the letter, the matrix-block may be positioned solely by the adjustment of the matrix-slide M. There is liability, however, that the matrix-block cannot 60 thus be properly positioned, and for this purpose the small slide *m*, adjustable by the knurled head *k*, is used, the matrix-block being held at one corner against the matrix-slide M and the other corner in the angle of 65 the shoulder on the end of slide *m*, and thus

tipped by the adjustment of the slide *m* until the side line of the letter is exactly under the microscope cross-line 2. When this position of the matrix-block is secured, the clamping- 70 screw 17 is run down to clamp the matrix-block tightly by the clamp O, and thus lock the matrix-block in position for trimming. The shoulder on the end of the slide *m* is provided so that the end of the matrix-block may be set into the angle and pressed up 75 against the shoulder, so as to assure the block being held in position longitudinally of the side edges.

The use of the line 2 as the locating-line enables the parallelism of the side line of the 80 letter with the cutting-line to be determined, at least for small matrices, without moving the matrix-carriage to move the side line of the letter along under the locating-line of the microscope. If the point where the lines 2 85 cross be used as the locator, parallelism will be determined by moving the carriage, so as to move the side line of the letter along under this locating-point. This positioning of the matrix-block takes place while the car- 90 riage H is in position with the matrix-block beneath the microscope, and the block may or may not project into the path of the cutters *e*, the cutter-head being stationary. If 95 the block projects into the path of the cutters, the carriage must be moved to withdraw it. The motor being now started, the cutter-head E, with the cutters *e*, is rotated and the carriage H fed by the screw K to move the matrix-block past the cutters and 100 trim one side edge of the matrix-block, which obviously will be trimmed exactly parallel with the side line of the letter and on the line of the cross-line 2 of the microscope. One 105 side edge of the matrix-block having been thus trimmed the carriage is withdrawn, the matrix-block reversed and positioned with the other side edge opposite the cutters, and the operation repeated for the other side 110 edge. The width of the matrix-block is determined by the adjustment of the slide M and position of the scale 4 carried thereby. It will be understood that some matrices require trimming of their blocks to different 115 depths on opposite sides of the matrix and that in such cases the matrix-slide M must be reset when the matrix-block is reversed.

In Figs. 10 and 11 there is shown diagrammatically the tipping of the matrix-block *x* 120 by the slide *m*, so as to swing either one end or the other outward from the slide M, and thus properly position the matrix-block in case the inner side edge is not exactly parallel with the side edge of the letter.

If the matrix character is italicized or 125 back-sloped, the matrix-block will be positioned for trimming in exactly the same manner, except that the cross-line 3 of the microscope will be adjusted at the angle of the slope of the letter and used as the locating- 130



line, while the cross-line 2 is parallel with the bottom of the letter, and the matrix-block  $x$  will be positioned by the line 3 and the bottom line by the line 2, as illustrated in Fig. 12, the adjustment of the matrix-block by the slide M or slide  $m$  being the same as previously described.

In trimming the head the matrix-block will be adjusted to the locating-line 2 of the microscope by slide N and the head trimmed in the same way as the side. The scale 6 is not necessary unless the matrix-foot is to be trimmed to a given length, which is not usual. The slide M may be used for trimming the head of short matrices or may be given such a movement as to be used for trimming the head of any matrix; but in the machine shown a separate slide N for trimming the head is used to reduce the required movement of the slide M, especially for long matrix-blocks. The separate slide N is convenient also to avoid frequent resetting of the slide M by a long movement. The forked clamp O is not used with the slide N, but a single-arm clamp.

It will be understood that the invention is not limited to the exact form or arrangement of the machine illustrated, but that the features of the invention as defined by the claims may be embodied in machines of other form.

What I claim is—

1. In a machine for trimming matrices and the like, the combination with a cutter, of a microscope provided with a locator, means for adjusting the microscope to position the locator relatively to the cutting-line, and a matrix-holder by which the matrix is held in position when adjusted by the locator, said cutter and matrix-holder being relatively movable in a fixed path for trimming.

2. In a machine for trimming matrices and the like, the combination with a cutter, of a microscope provided with a locating-line, means for adjusting the microscope to position the locating-line relatively to the cutting-line, and a matrix-holder by which the matrix is held in position when adjusted by the locating-line, said cutter and matrix-holder being relatively movable in a fixed path for trimming.

3. In a machine for trimming matrices and the like, the combination with a cutter, of a microscope provided with a locating-line parallel with the cutting-line, means for adjusting the microscope to position the locating-line relatively to the cutting-line, a screw matrix-slide for positioning the matrix-block by the locating-line for trimming, and a matrix-holder by which the matrix-block is held in adjusted position, said cutter and matrix-holder being relatively movable in a fixed path for trimming.

4. In a machine for trimming matrices and the like, the combination with a cutter, of a

microscope provided with a locating-line parallel with the cutting-line, means for adjusting the microscope to position the locating-line relatively to the cutting-line, a screw matrix-slide for positioning the matrix-block by the microscope locating-line for trimming, a screw-slide carried by the matrix-slide for adjusting the matrix-block at an angle to the matrix-slide, and a matrix-holder by which the matrix-block is held in adjusted position, said cutter and matrix-holder being relatively movable in a fixed path for trimming.

5. In a machine for trimming matrices and the like, the combination with a cutter, of a microscope provided with a locator, means for adjusting the microscope to position the locator relatively to the cutting-line, a screw matrix-slide for positioning the matrix-block by the microscope-locator for trimming, and a carriage for the matrix-slide and matrix-block movable transversely to the cutter and microscope and parallel with the cutting-line.

6. In a machine for trimming matrices and the like, the combination with a cutter, of a microscope provided with a locator, means for adjusting the microscope to position the locator relatively to the cutting-line, a screw matrix-slide for positioning the matrix-block by the microscope-locator for trimming, a carriage for the matrix-slide and matrix-block movable transversely to the cutter and microscope and parallel with the cutting-line, and a clamp for holding the matrix-block in position during trimming.

7. In a machine for trimming matrices and the like, the combination with a cutter, of a microscope provided with a locator, a micrometer-screw for adjusting the microscope to position the locator relatively to the cutting-line, a screw-slide for positioning the matrix-block by the microscope-locator for trimming, and a matrix-holder by which the matrix-block is held in adjusted position, said cutter and matrix-holder being relatively movable in a fixed path for trimming.

8. The combination with cutter-head E, of microscope G having cross-lines 2, means for adjusting the microscope to position the cross-lines relatively to the cutting-line, a carriage H for moving the matrix-block parallel with the cutting-line, and a clamp for clamping the matrix-block on the carriage.

9. The combination with cutter-head E, of the microscope G provided with a locator, means for adjusting the microscope to position the locator relatively to the cutting-line, carriage H for moving the matrix-block parallel with the cutting-line, a clamp for clamping the matrix on the carriage, matrix-slide M, and matrix-slide N for positioning the matrix-block for end trimming.

10. The combination with cutter-head E, of microscope G provided with a locator,



means for positioning the microscope relatively to the cutter, matrix-slide M, and a screw-slide in the slide M for adjusting the matrix-block at an angle to the slide M, and  
 5 a matrix-holder, said cutter-head and matrix-holder having relative movement in a fixed path for trimming the matrix-block.

11. The combination with cutter-head E, of microscope G provided with a locator,  
 10 means for positioning the microscope relatively to the cutter, matrix-slide M, and a screw-slide in the slide M having a shoulder adapted to hold the corner of a matrix-block for adjusting the matrix-block at an angle to  
 15 the slide M, and a matrix-holder, said cutter-head and matrix-holder having relative movement in a fixed path for trimming the matrix-block.

12. The combination with the microscope  
 20 G provided with a locator, a cutter, and means for adjusting the microscope relatively to the cutter of a forked matrix-clamp, clamping-bar P, and clamping-screw  
 17 adjustable along said bar, and a matrix-  
 25 holder, said cutter-head and matrix-holder having relative movement in a fixed path for trimming the matrix-block.

13. In a matrix-trimming machine, the combination with matrix-adjusting slide M,  
 30 of small slide *m* carried by said matrix-adjusting slide, and having a shoulder adapted to receive the corner of a matrix-block for adjusting the matrix-block at an angle to the matrix-adjusting slide.

35 14. In a matrix-trimming machine, the

combination with matrix-adjusting slide M, of small slide *m* carried by said matrix-adjusting slide, and having two shoulders adapted to receive the corner of a block on either  
 40 side of the slide *m* for adjusting the matrix-block at an angle to the matrix-adjusting slide.

15. In a machine for trimming matrices and the like, the combination with a cutter,  
 45 of a microscope having a cross-line 3 adjustable angularly for positioning a matrix-block with inclined design, means for adjusting said microscope to position the cross-line 3  
 relatively to the cutting-line, and a matrix-  
 holder, said cutter and matrix-holder having  
 50 relative movement in a fixed path for trimming the matrix-block.

16. In a machine for trimming matrices and the like, the combination with the cutter,  
 55 of the microscope G having the fixed cross-lines 2 and the rotatable sleeve 14 carrying cross-line 3 for positioning the matrix-block, means for adjusting the microscope to position the cross-line relatively to the cutting-  
 line, and a matrix-holder, said cutter and ma-  
 60 trix-holder having relative movement in a fixed path for trimming the matrix-block.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LINN BOYD BENTON.

Witnesses:

C. J. SAWYER,  
 J. A. GRAVES.