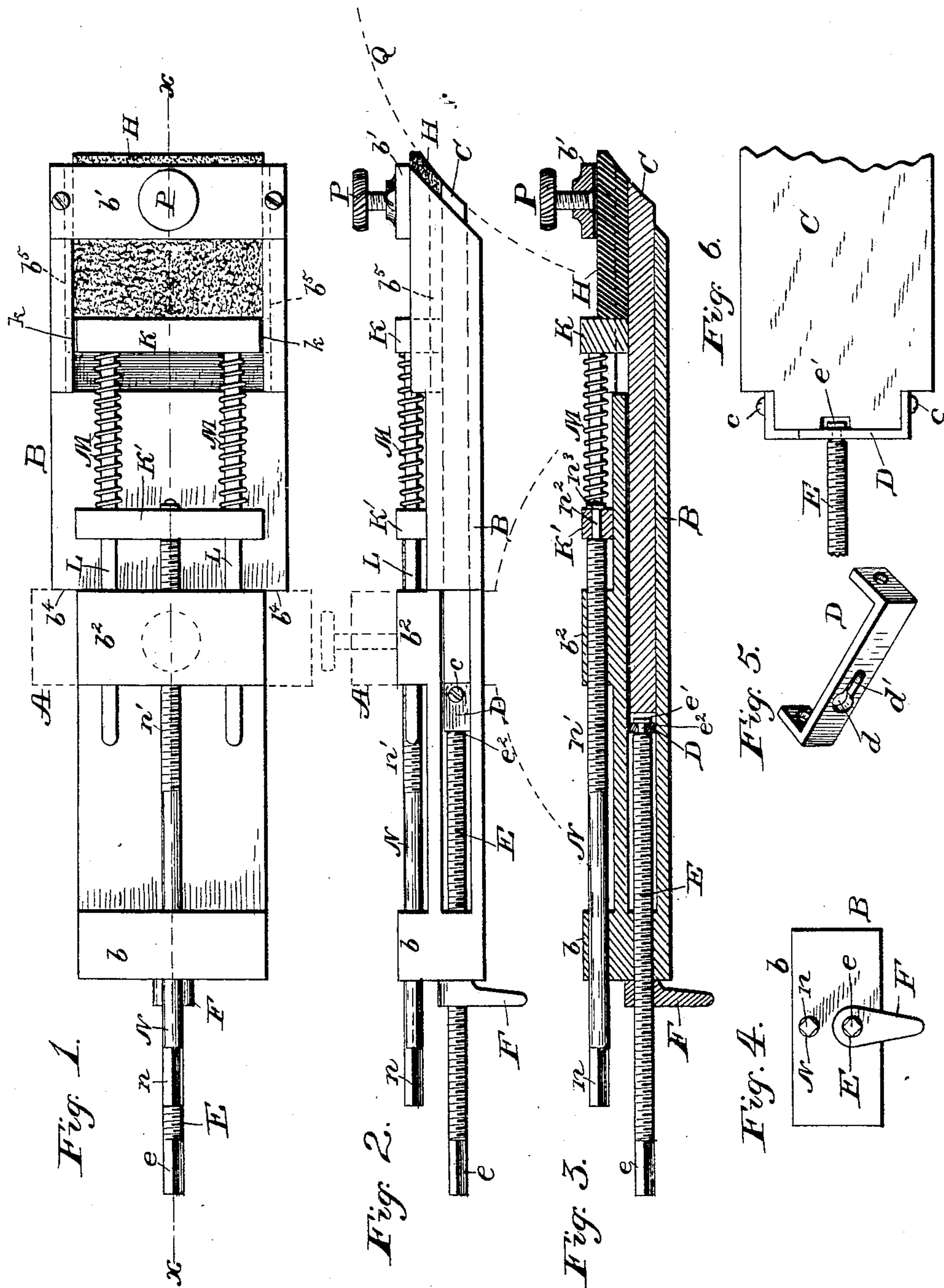


F. J. HAESELER.  
BRUSH HOLDER.

No. 479,802.

Patented Aug. 2, 1892.



Witnesses;  
*Percy C. Bowen.*  
*J. L. Wilson*

Inventor;  
*Francis J. Haeseler*  
By *Whitman & Wilkinson*  
Attorneys.

F. J. HAESELER.  
BRUSH HOLDER.

No. 479,802.

Patented Aug. 2, 1892.

Fig. 7.

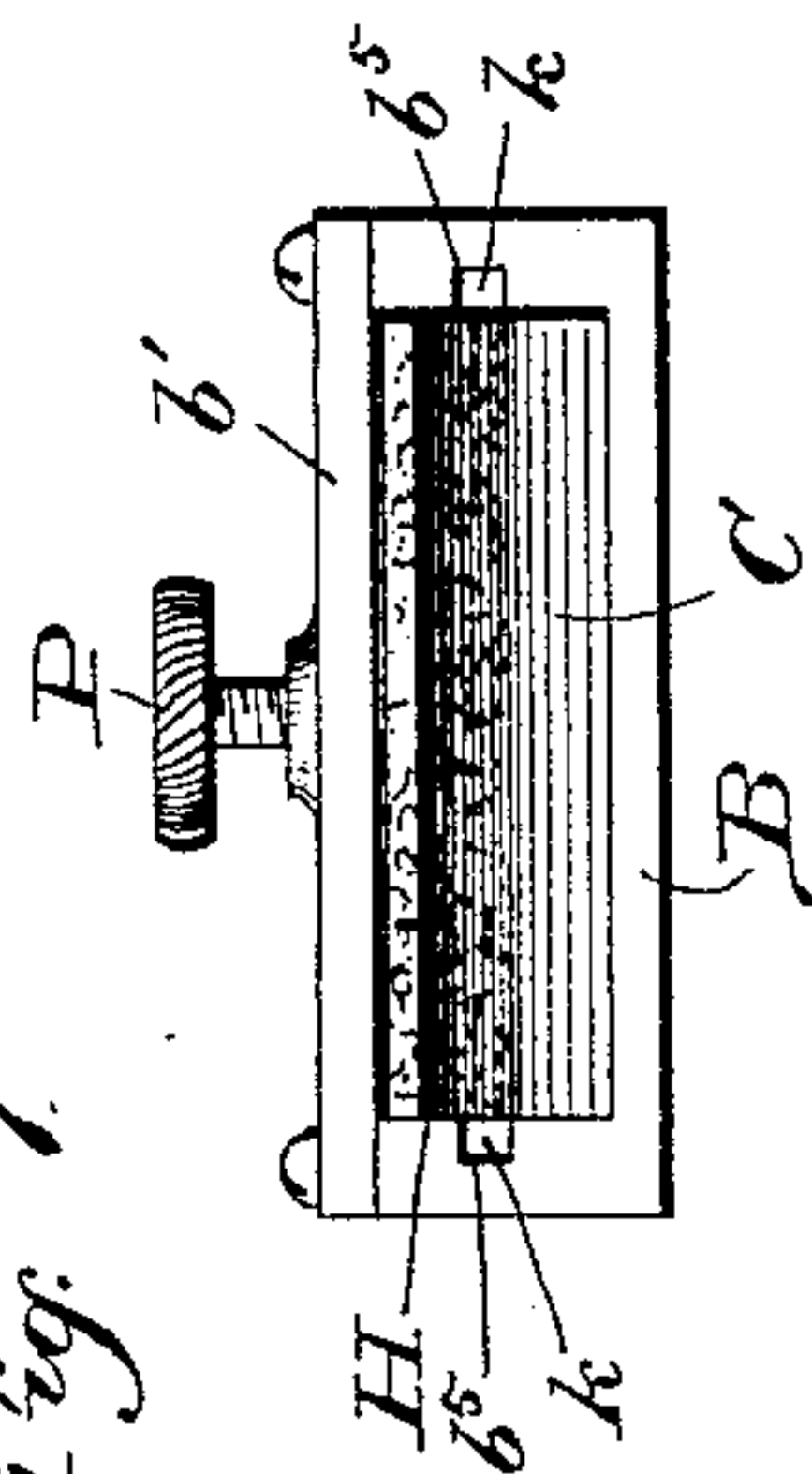


Fig. 8.

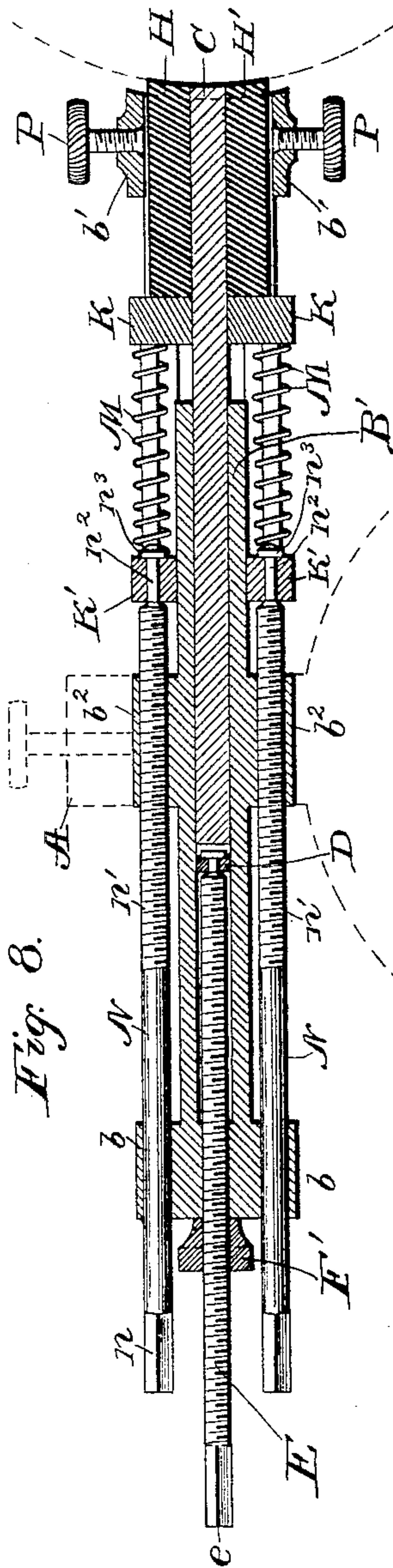
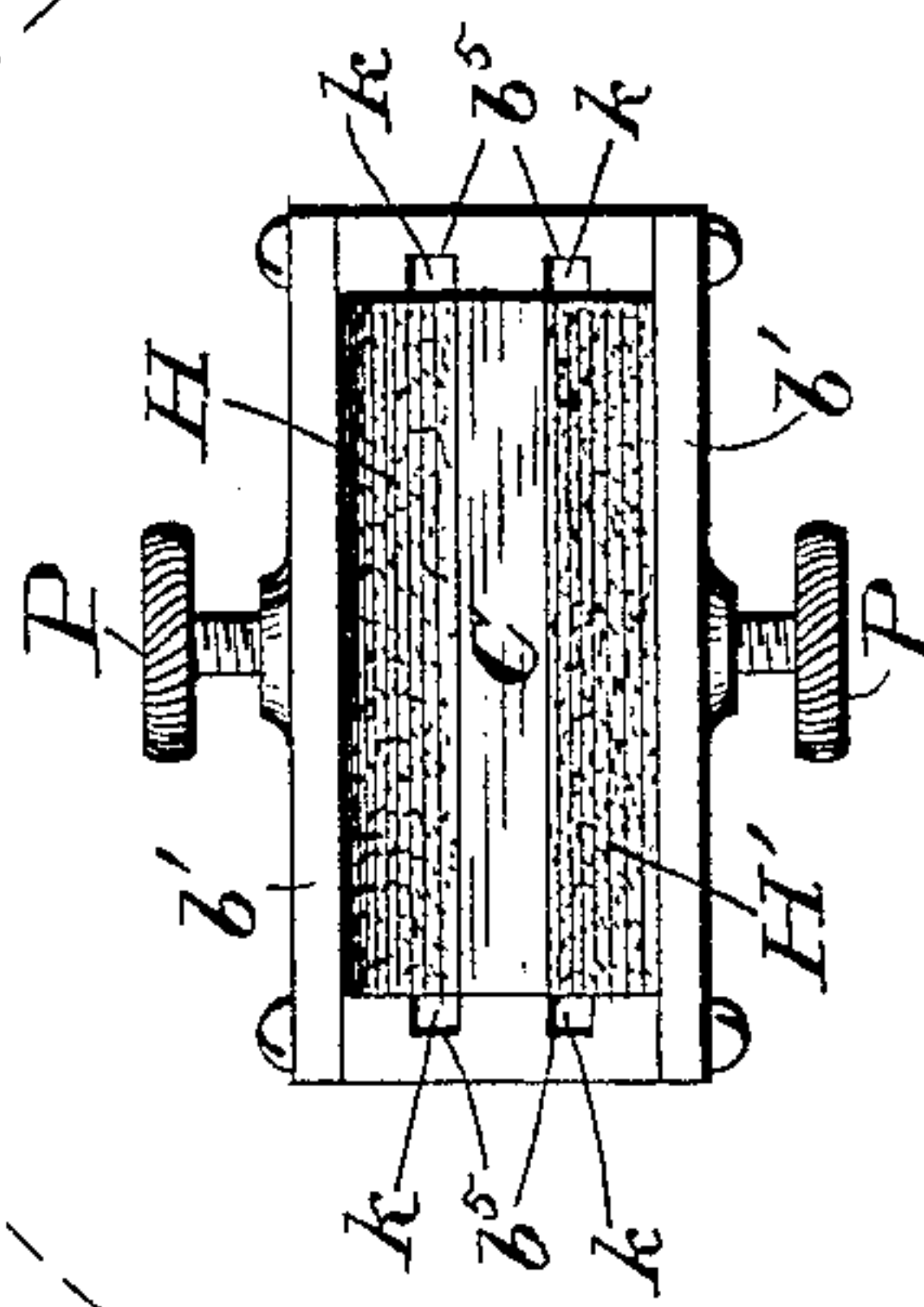


Fig. 9.



Witnesses;

*Rex C. Bowen*  
*J. C. Wilson*

Inventor;

*Francis J. Haeseler*

By *Whitman & Wilkinson*

*Attorneys.*



# UNITED STATES PATENT OFFICE.

FRANCIS J. HAESELER, OF THE UNITED STATES NAVY.

## BRUSH-HOLDER.

SPECIFICATION forming part of Letters Patent No. 479,802, dated August 2, 1892.

Application filed November 5, 1891. Serial No. 410,902. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS J. HAESELER, of the United States Navy, a citizen of the United States, stationed at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Brush-Holders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain improvements in brush-holders; and it consists of certain novel features hereinafter described and claimed.

Reference is had to the accompanying drawings, wherein the same parts are indicated by the same letters.

Figure 1 represents a plan view of the brush-holder shown in Figs. 2 and 3 or Fig. 8, the carrier-block being shown in dotted lines. Fig. 2 represents a side view of the same. Fig. 3 represents a section made by the plane  $x-x$  in Fig. 1. Fig. 4 represents a rear view of the frame. Fig. 5 represents a perspective view of the yoke for attaching the copper brush to its regulating-screw. Fig. 6 represents a detail view of the method of attaching the said copper brush to its regulating-screw. Fig. 7 represents a front view of the brush-holder shown in Figs. 1, 2, and 3. Fig. 8 represents a central longitudinal section of a modification of the brush-holder shown in Figs. 1, 2, and 3. Fig. 9 represents a front view of the brush-holder in section in Fig. 8.

A represents the carrier-block. (Shown only in dotted lines.) This may be of any known form of construction, but should have a flat face to engage the shoulders  $b^1$  of the frame B.

B represents the metallic framework, mounted in the carrier-block, with shoulders  $b^2$  abutting against the same, the said frame furnishing bearings for the various parts.

C represents the copper brush, which may be of any known construction and which is connected by means of the yoke D to the regulating-screw E, which engages in a female

screw in the rear end  $b$  of the frame B. Adjustment is given by unclamping the nut F and screwing up on the square end  $e$  with a wrench or key. The front end of the screw E has a head  $e'$  with a neck  $e^2$  in rear thereof. This head is made small enough to pass freely through the aperture in  $b$  in the rear end of the frame B, and also through the hole  $d$  in yoke D, but is caught by the slot  $d'$  in the center of said yoke. This yoke D is secured to the end of the copper brush with screws  $c$ , as shown in Fig. 6. Thus it will be seen that the copper brush is given positive adjustment by means of the regulating-screw E. Placed over the copper brush and in continuous connection therewith is the carbon brush H. This brush is normally held pressed against the commutator Q by the spiral springs M, which inclose the plungers L. These plungers are secured at their forward end to the cross-piece K and pass freely through the cross-piece K'. The latter is adapted to engage the neck  $n^2$  of the regulating-screw N, which is free to revolve in said cross-piece, but is prevented from pulling out by the washer  $n^3$ . The cross-piece K has guide-lugs  $k$ , adapted to slide in grooves  $b^5$  in the frame B. The said regulating-screw N has a squared end  $n$ , adapted for a wrench or key, while near its forward end the screw  $n'$  engages in the cross-piece  $b^2$  of the framework B. By turning the regulating-screw N the pressure on the springs M, and consequently on the carbon brush H, is regulated at will.

Two springs near the outer ends of the carbon brush are used, so that the carbon may be evenly pressed throughout its entire width against the commutator. While I have shown two springs, any even number more than two may be used, and these springs should be symmetrically disposed on either side of the median line of the cross-pieces K.

Before the brushes are moved from the commutator the clamp-screws P should be screwed down on the carbon, so that the springs M may not force it out too far. The lower end of the clamp-screw P is upset, so that the said screw may not be removed from the holder. By having the squared ends  $n$



and *e* of the same size the same wrench or key may be used for adjusting both regulating-screws.

In the modification shown in Figs. 8 and 9 a second carbon brush *H'* is placed on the opposite side of the copper brush *C* and the copper brush is arranged perpendicularly to the circumference of the commutator. In all other respects the carbon brush *H'* and its attachments are precisely similar to those shown with the carbon brush *H*, except that the frame *B'* is modified somewhat to receive the second carbon brush and the clamp-nut *F'* is preferably a thumb-screw.

The brush-holder shown in Fig. 8 may be arranged horizontally, vertically, or at an inclined angle, and may be used with any known form of brush-holder, but preferably with one having a flat face adapted to engage the shoulders *b<sup>4</sup>* of the frame *B*, as shown in Fig. 1. With this form of device it will be obvious that it is immaterial in which direction the commutator is revolving. It will also be seen that should it be desired to run the armature in one direction only, by easing up the tension on the carbon brush first reached by the segments of the commutator the effect of having a carbon brush behind and in contact with a copper brush is obtained.

While I have shown independent clamp-screws *P* for use on either side, it will be obvious that one screw would bind the three brushes together and effectually clamp all three.

It will be seen that I provide for positive contact between the carbon and copper brushes for the entire length of the former, that the brush-holder is firmly held in the carrier-block and the shoulders *b<sup>4</sup>* prevent any slipping backward and enable the holder to be removed and replaced in exactly the same position, that the parallel motion of the block *K* causes an even firm bearing of the carbon brush on the commutator, that the copper brush may be moved to any desired position by means of its regulating-screw and clamped there by the clamp-nut on the said screw, that by making the screw *E* sufficiently long the copper brush may be used until entirely worn away, that the tension on the carbon brush may be conveniently adjusted at any time, and that finally both the carbon and the copper brushes may be adjusted while the dynamo is running without removing either from the face of the commutator.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a brush-holder, the combination, with a frame, of a copper brush fitted in said frame, a carbon brush in contact with said copper brush and normally pressed forward by a plurality of springs, and a regulating-screw passing through the rear end of said frame and adapted to adjust the tension uni-

formly on all of said springs, substantially as described.

2. In a brush-holder, the combination, with a frame, of a copper brush fitted in said frame, a carbon brush in contact with said copper brush and normally pressed forward by a plurality of springs, and a regulating-screw passing through the rear end of said frame and adapted to adjust the tension uniformly on all of said springs, and a clamp-screw set in said frame and adapted to clamp said carbon brush when desired, substantially as described.

3. In a brush-holder, the combination, with a carrier-block, of a frame having shoulders adapted to bear against said carrier-block, a copper brush fitted in said frame, a carbon brush in contact with said copper brush and normally pressed forward by a plurality of springs, and a regulating-screw passing through the rear end of said frame and adapted to adjust the tension uniformly on all of said springs, substantially as described.

4. In a brush-holder, the combination, with a carrier-block, of a frame having shoulders adapted to bear against said carrier-block, a copper brush sliding in said frame, a regulating-screw revolvably attached to the rear end of said copper brush and screwing into the rear end of said frame, a carbon brush sliding in said frame and normally pushed forward by a plurality of springs, and a regulating-screw fitted in said frame and adapted to increase simultaneously and uniformly the tension on all of said springs, substantially as described.

5. In a brush-holder, the combination, with the carrier-block, of a frame having shoulders adapted to bear against said carrier-block, a copper brush adapted to slide in said frame, with means of regulating the said brush, a carbon brush adapted to slide in said frame above and in contact with said copper brush, springs for pressing said carbon brush forward in said frame, and means for regulating said springs, substantially as described.

6. In a brush-holder, a device for regulating the tension upon a brush, consisting of a cross-piece at the rear of said brush, a plurality of guide rods or plungers rigidly attached to said cross-piece and moving in suitable guides, spiral springs inclosing the said guide rods or plungers, a cross-piece in rear of said springs and sliding on said plungers, and a regulating-screw for moving said rear cross-piece backward or forward and so adjusting the tension of said springs, substantially as and for the purposes described.

7. In a brush-holder, a device for regulating the tension upon a brush, consisting of a suitable frame, a cross-piece at the rear of said brush, having two guide-lugs sliding in grooves in said frame, two guide rods or plungers rigidly attached to said cross-piece and moving in guides in said frame, spiral

springs inclosing the said guide rods or plungers, a cross-piece in rear of said springs and sliding on said plungers, and a regulating-screw for moving said rear sliding cross-piece  
5 backward or forward and so adjusting the tension of said springs, substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS J. HAESELER.

Witnesses:

PERCY C. BOWEN,  
JOHN C. WILSON.