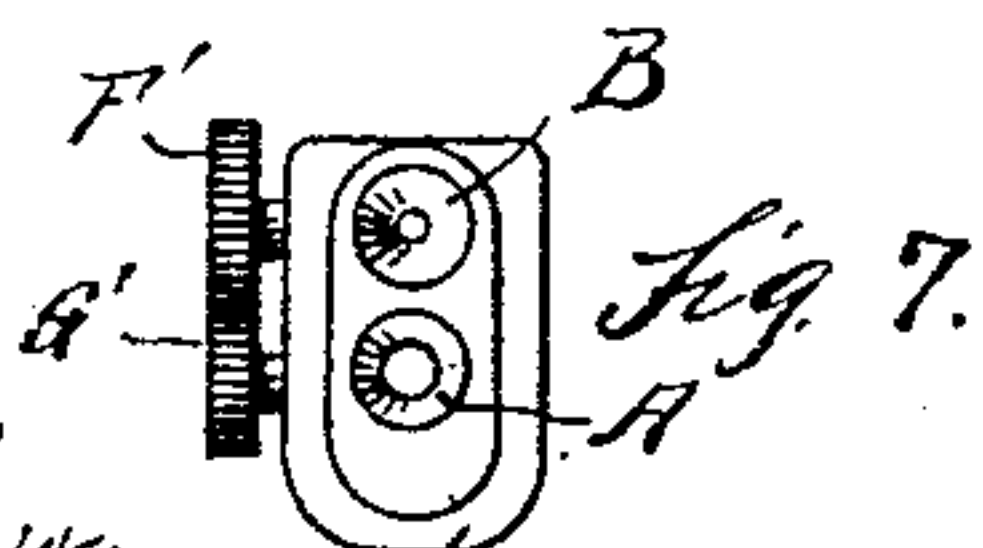
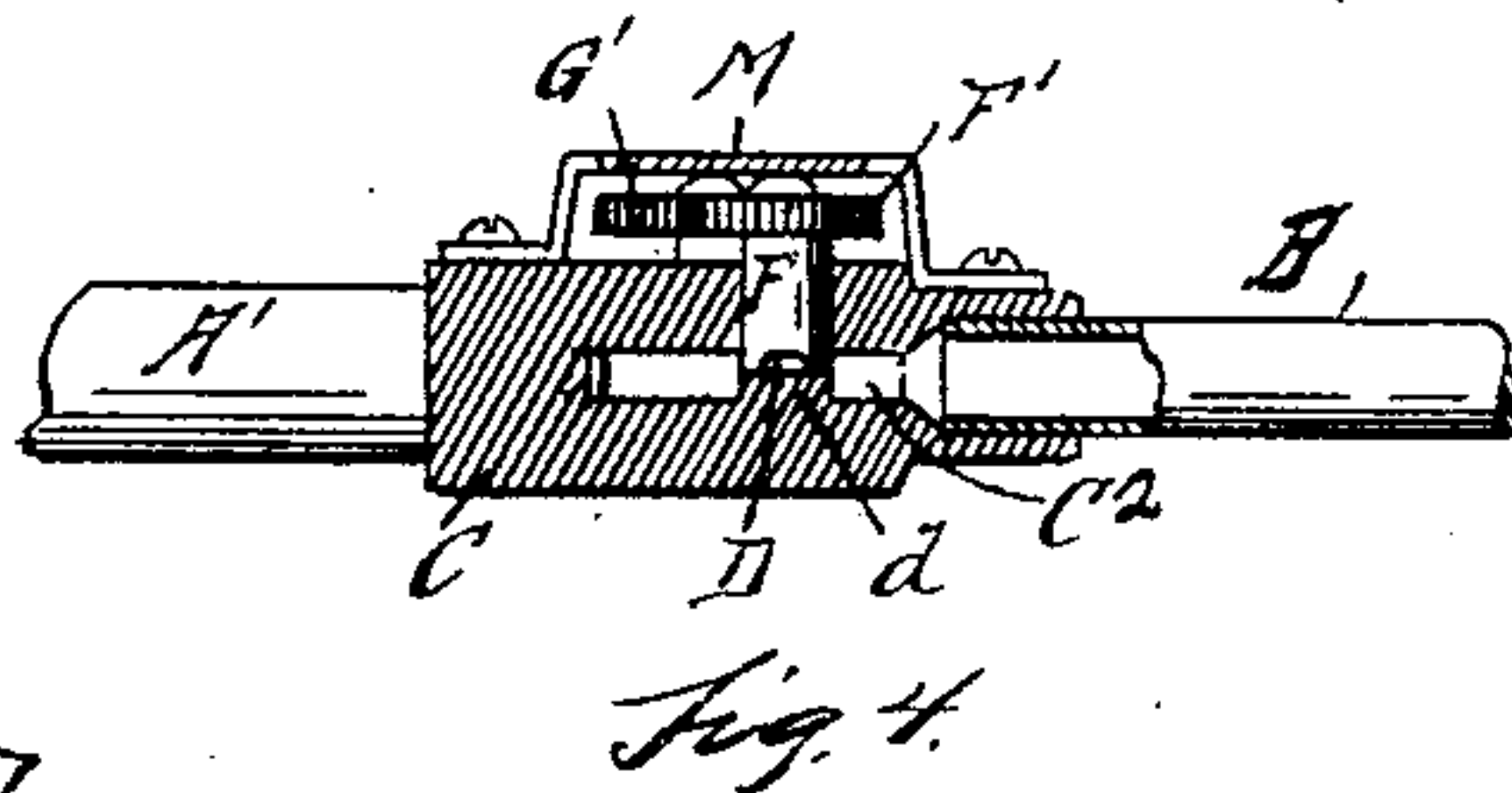
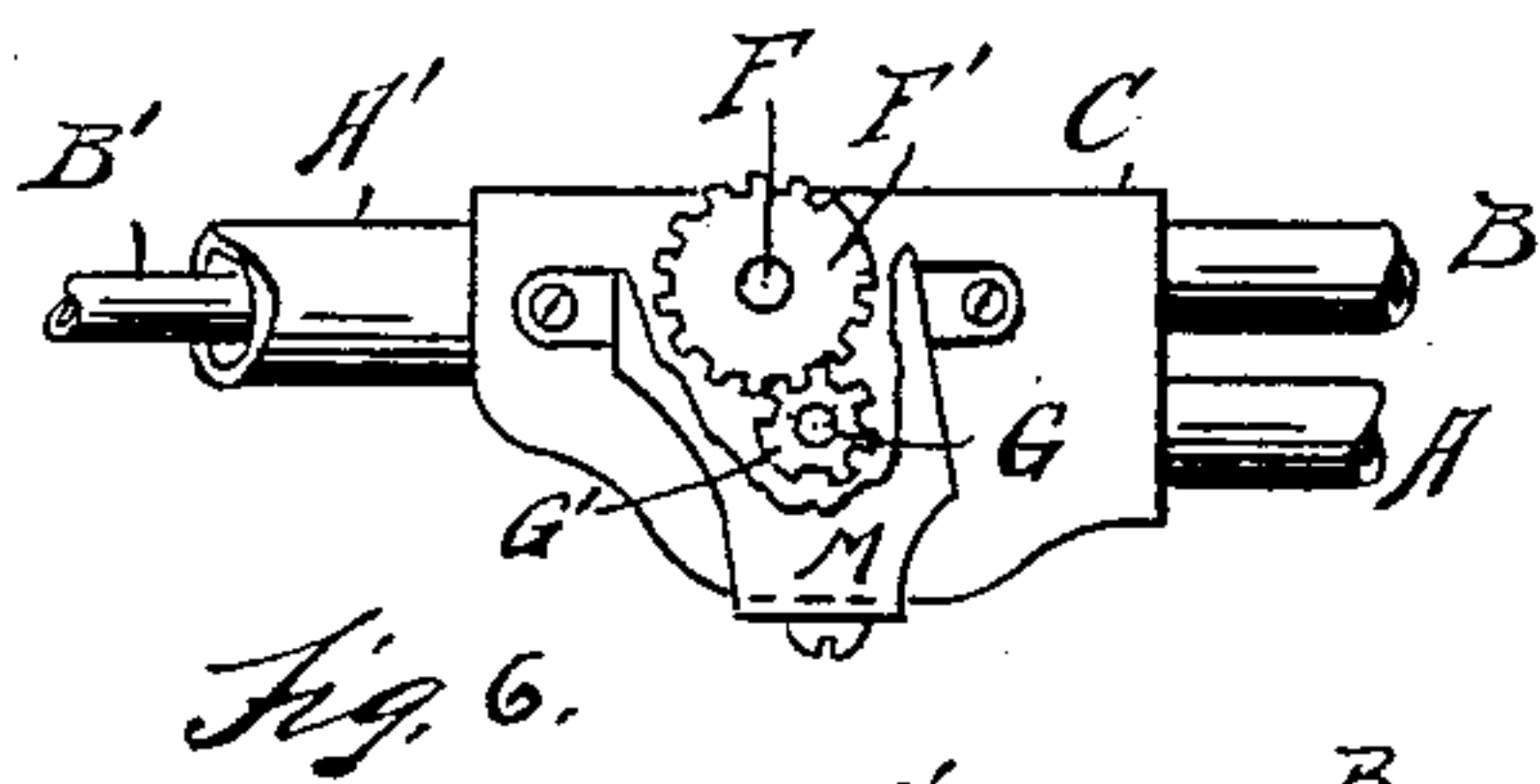
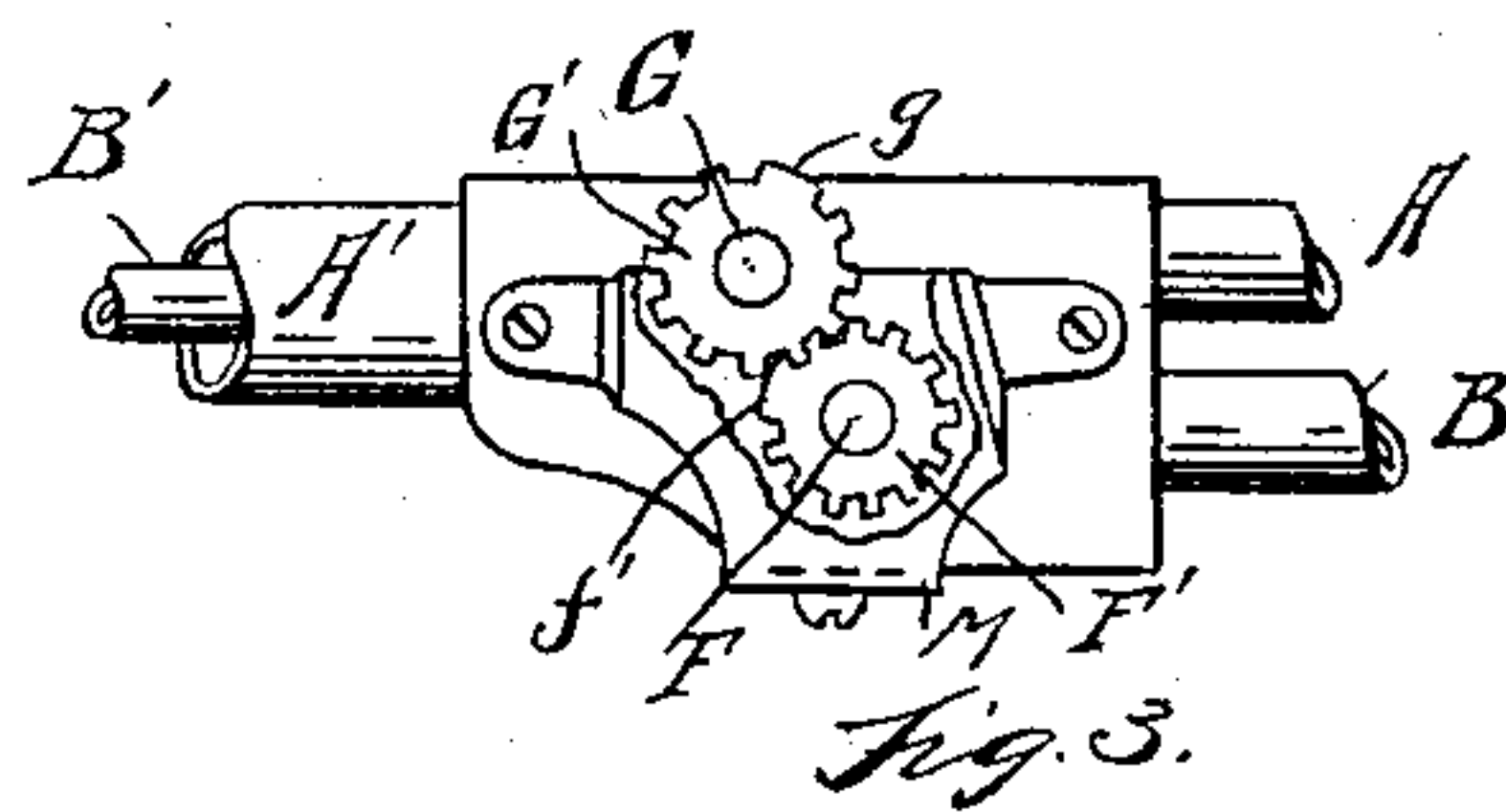
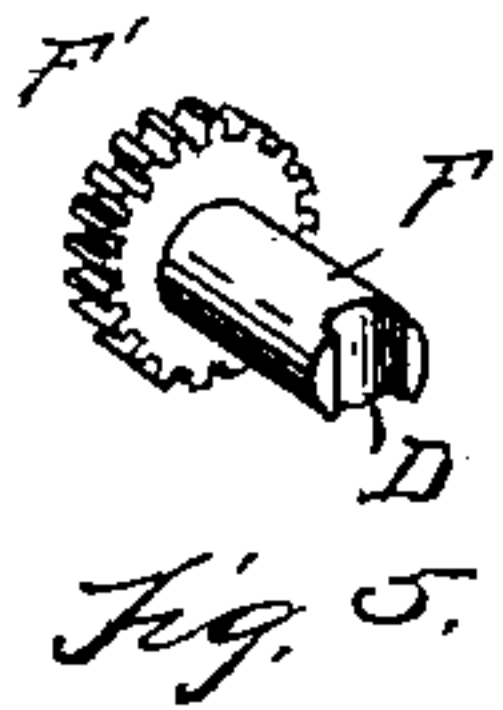
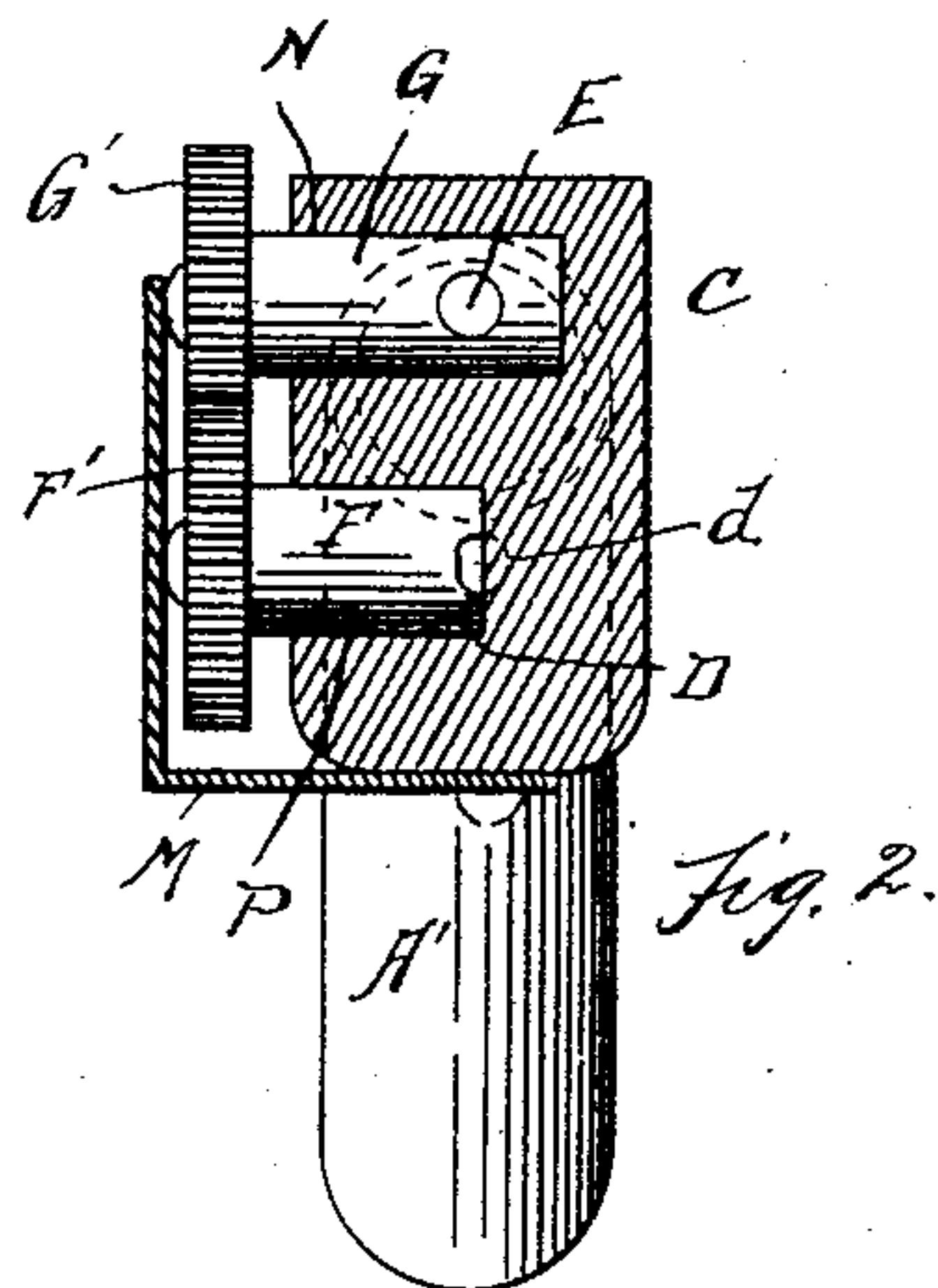
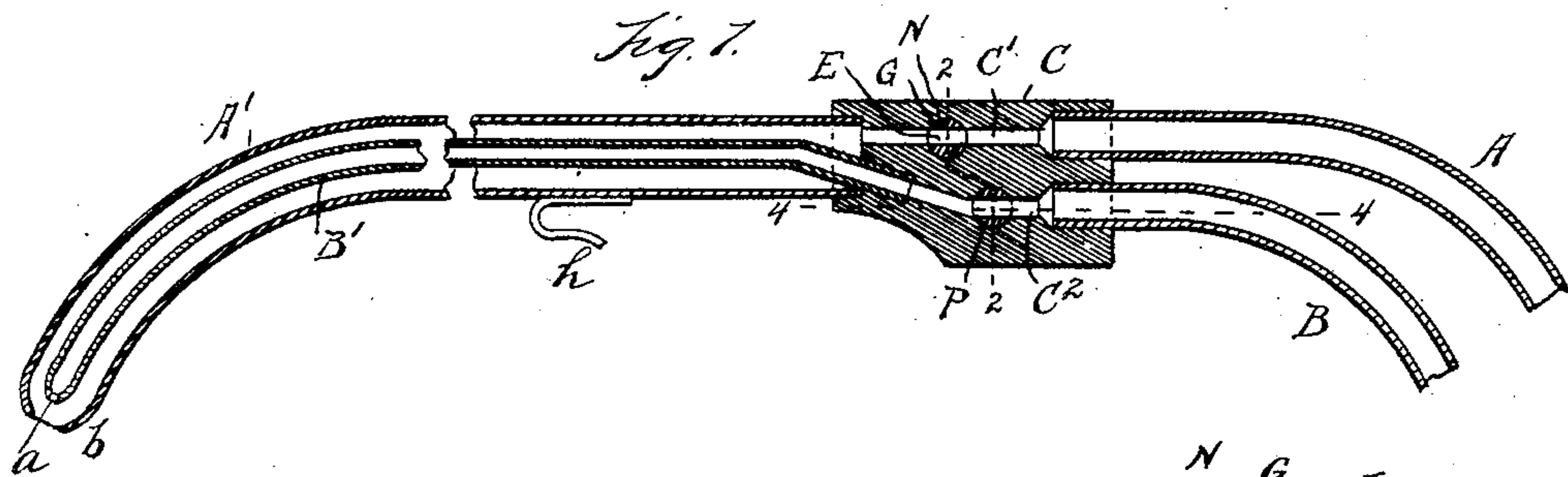


M. M. KERR.

BLOWPIPE.

(Application filed Jan. 18, 1902.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

MATHEW M. KERR, OF DETROIT, MICHIGAN.

## BLOWPIPE.

SPECIFICATION forming part of Letters Patent No. 713,451, dated November 11, 1902.

Application filed January 18, 1902. Serial No. 90,262. (No model.)

*To all whom it may concern:*

Be it known that I, MATHEW M. KERR, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Blowpipes; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to blowpipes; and the object of my improvement is to provide an improved blowpipe in which the size of the flame may be regulated and in which the proper relative quantities of air and gas shall be automatically maintained.

Referring to the accompanying drawings, Figure 1 is a longitudinal central section of a blowpipe embodying my invention. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 is a side elevation of a portion of the blowpipe, the casing adapted to cover the gear being broken away. Fig. 4 is a section on the line 4 4 of Fig. 1. Fig. 5 is a detail perspective view of one of the gear-wheels and the shaft thereof, which shaft when in place forms the spindle of a cock regulating the opening for the passage of the gas. Fig. 6 shows a modified form of the mechanism shown in Figs. 1 to 5, inclusive. Fig. 7 is an end view of the modification shown in Fig. 6.

A is a pipe through which the gas enters the blowpipe.

B is a pipe through which the air under pressure enters the same.

C is a casting having a passage  $C^2$  therein, through which the air passes, and a passage  $C'$ , through which the combustible gas passes.

The pipe A is fitted to the casting C, so as to communicate with the passage  $C'$ , and the pipe B is secured to said casting, so as to communicate with the passage  $C^2$ .

A' is the exit-pipe for the combustible gas. This pipe is fitted to the casting C and communicates with the passage  $C'$ .

B' is the discharge-pipe for the air, which pipe is surrounded by the pipe A' and is fixed

to the casting C and communicates with the passage  $C^2$ .

A cylindrical hole N is formed in the casting C, extending from the side of said casting, with its axis at right angles to the axis of the passage  $C'$ . The hole N extends beyond the passage  $C'$ , but not to the farther side of the casting C.

P is a second cylindrical hole formed in the casting C and having the same relative location with reference to the passage  $C^2$  as the hole N has to the passage  $C'$ . The hole P, however, extends into the casting C only to the center line of the passage  $C'$ .

$d$  is a lug extending from the wall of the passage  $C'$  and filling said passage to the center thereof and having its outer end formed into a plane surface.

F is a spindle adapted to fit into the hole P and having the toothed wheel F' on its outer end. A long and narrow groove D is formed diametrically across the end of the spindle F.

G is a spindle fitting into the hole N and having at its outer end the gear-wheel G'.

E is a diametral hole formed through the spindle G at that part of said spindle which is in line with the passage  $C'$ .

The gear-wheels F' G' have their teeth meshing with each other.

$g$  is a lug upon the gear-wheel G', which contacts the teeth of the gear-wheel F' to prevent a further rotation of the shafts F and G in one direction, and  $f'$  is a lug upon the gear-wheel F', adapted to contact the gear-wheel G' to prevent the further rotation of said shafts in the other direction.

M is a casing secured to the casting C and extending over the ends of the shafts F and G.

It will be noticed that the shaft G in the hole P forms a cock for regulating the passage-way through the passage  $C'$  and that the shaft F when in place forms a cock for regulating the passage-way through the passage  $C^2$ . It will also be noticed that the opening through the spindle of the cock for the passage of the air is long and quite narrow, that the passage through the spindle of the cock for the gas is circular in cross-section and considerably larger than the air-opening, and that



the gear-wheels upon the outer end of the two spindles F and G are geared together, so that the two spindles turn in unison. I have found that with these forms of the apertures through the cock-spindles a practically-correct proportion of air and gas is maintained at all degrees of opening.

The modification shown in Figs. 8 and 9 has the same construction as that above described except that the openings in the cock-spindles are both circular and of the proper relative areas, and the intermeshing gear-wheels on said spindles have diameters inversely proportional to the diameters of said openings when the spindles are of the same diameter, and when the spindles are of different diameters said gear-wheels should also have diameters proportional to the diameters of said spindles, so that the relative velocity of rotation of said shafts shall be proportional to the diameter of the passages they are designed to control.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a blowpipe, the combination of an air-tube, a gas-tube, a passage leading to the gas-tube, a passage leading to the air-tube, the bores of said passages having different heights of cross-section, a cock adapted to adjust the opening in each of said passages, and means for connecting the spindles of said cocks together so that they shall turn in unison at peripheral velocities proportional to the heights of cross-section of the passages which they control.

2. In a blowpipe, the combination of an air-tube, a gas-tube, a passage leading to the gas-tube, a passage leading to the air-tube, the bores of said passages having different heights of cross-section, gear-wheels upon the spindles of said cocks having their teeth intermeshing, the diameters of said gear-wheels having such relative diameters that the spin-

dles shall have relative peripheral velocities proportional to the heights of the passages which they control.

3. In a blowpipe, having an air and a gas passage, a cock regulating the passage of air, a cock regulating the passage of gas, a gear-wheel upon the spindle of each of said cocks, the teeth of said gear-wheels intermeshing, and one of said spindles being adapted to be turned by the finger of the person using the blowpipe.

4. In a blowpipe, the combination of a body portion having a passage therein, and having a cylindrical hole passing in from its side and passing into said passage, a surface forming a part of the wall of said passage, and a spindle having a diametral groove in its end, said spindle fitting into said hole and its groove end fitting against said surface.

5. In a blowpipe, the combination of a body portion having a passage therethrough, and provided with a cylindrical hole extending in from the side and passing into but not through said passage, a lug extending from the wall of said passage opposite said hole, and a spindle having a diametral groove in its end, said spindle fitting into said hole and its end against said lug.

6. In a blowpipe having a passage for air and a passage for gas and provided with cylindrical apertures extending from the outside and intersecting said passages, cock-spindles adapted to be inserted into said apertures, gear-wheels on the outer ends of said spindles, the teeth of said gear-wheels intermeshing, and a guard outside of said gear-wheels adapted to prevent the withdrawal of said spindles from said apertures.

In testimony whereof I sign this specification in the presence of two witnesses.

MATHEW M. KERR.

Witnesses:

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ELLIOTT J. STODDARD.