

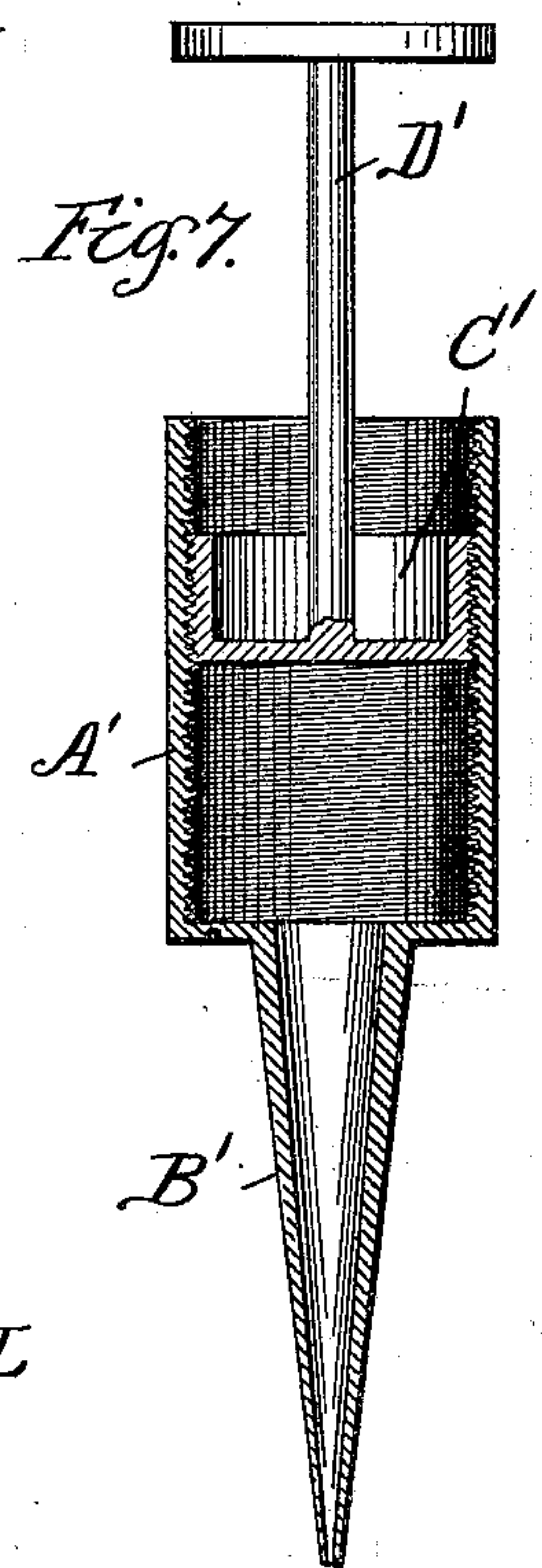
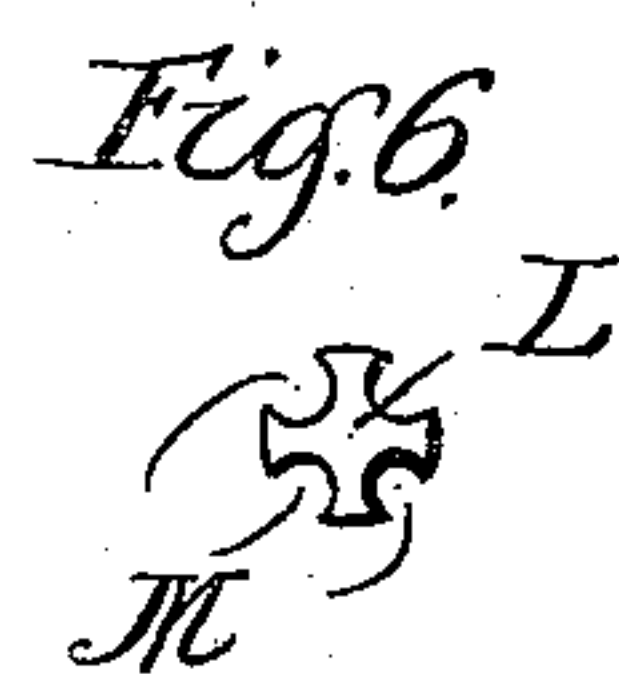
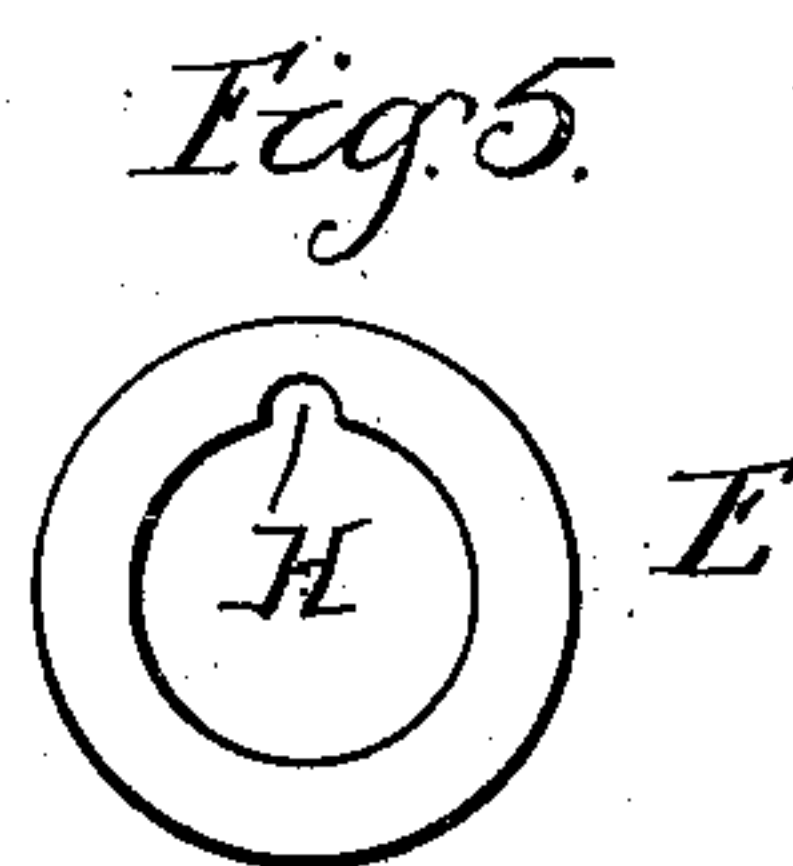
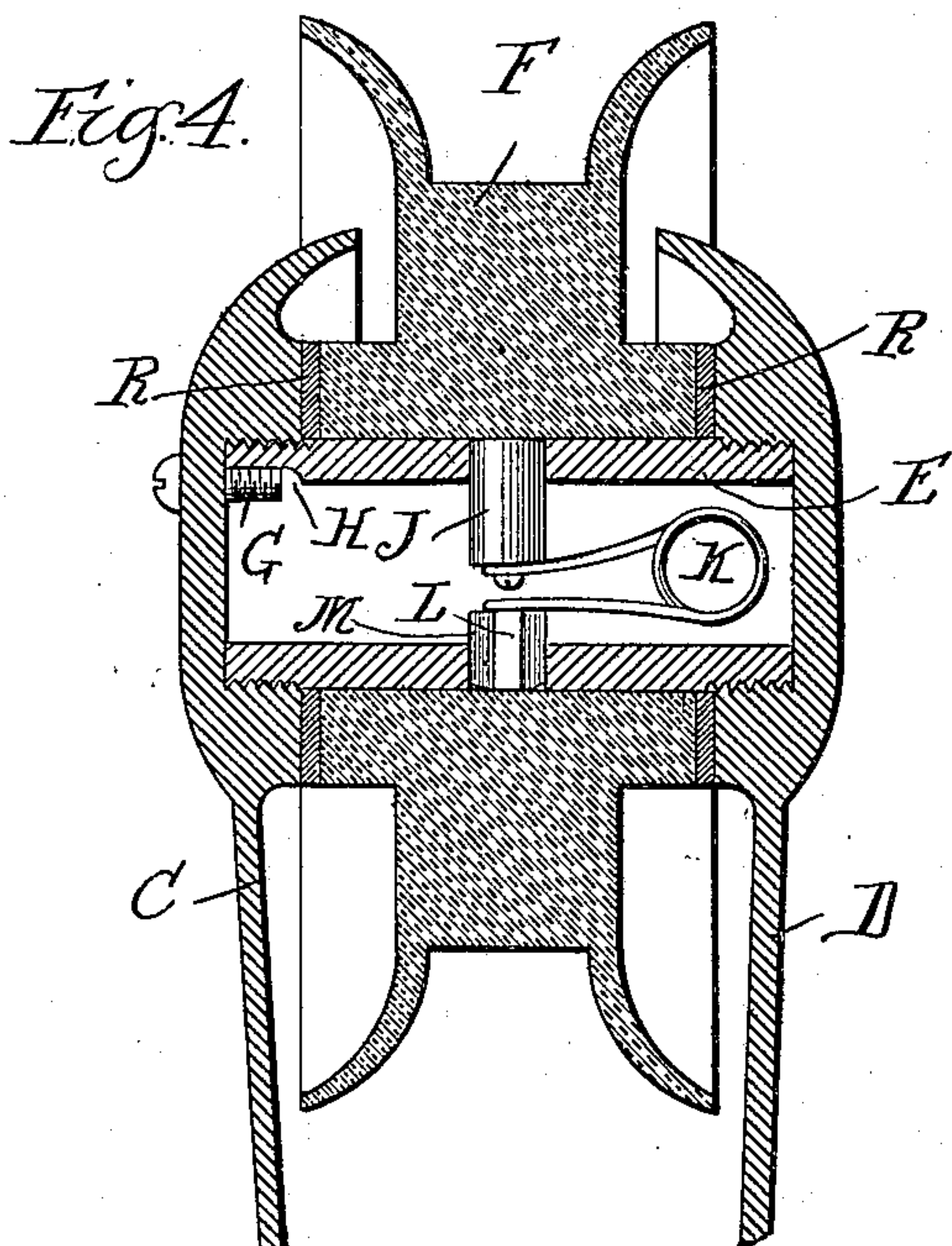
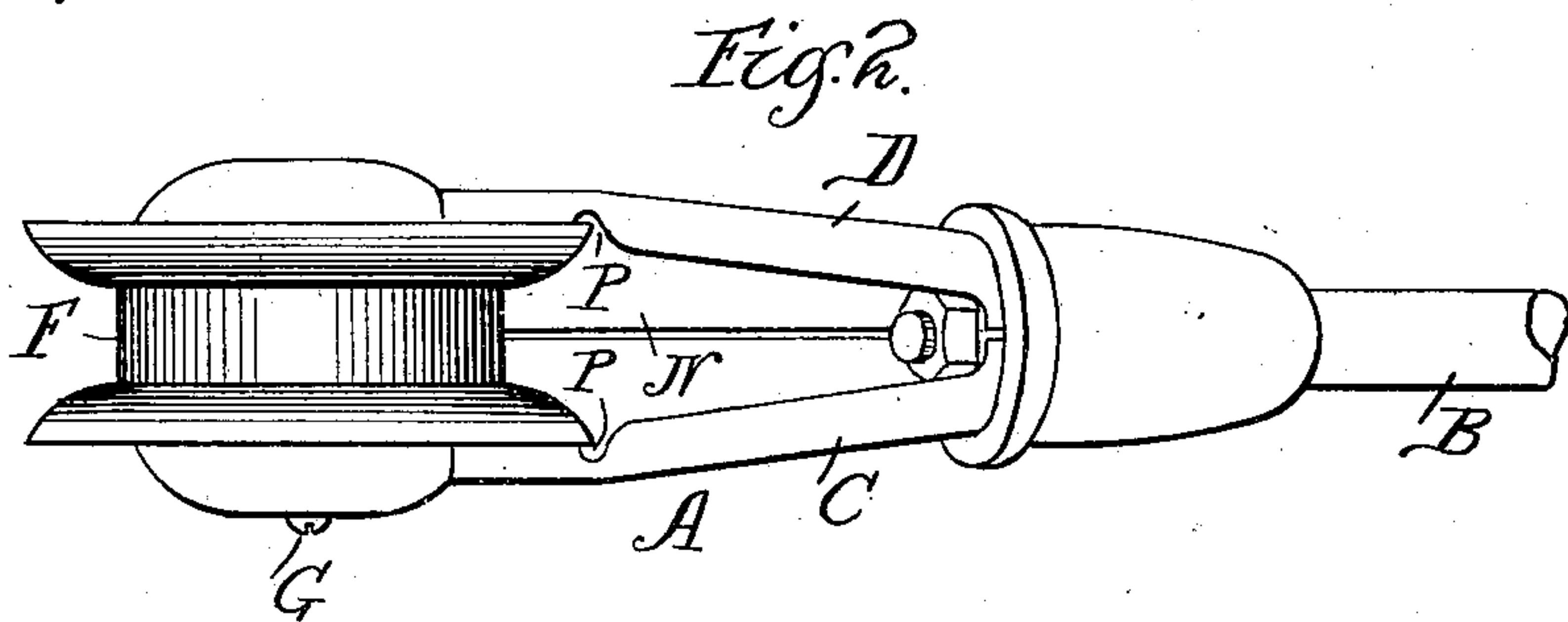
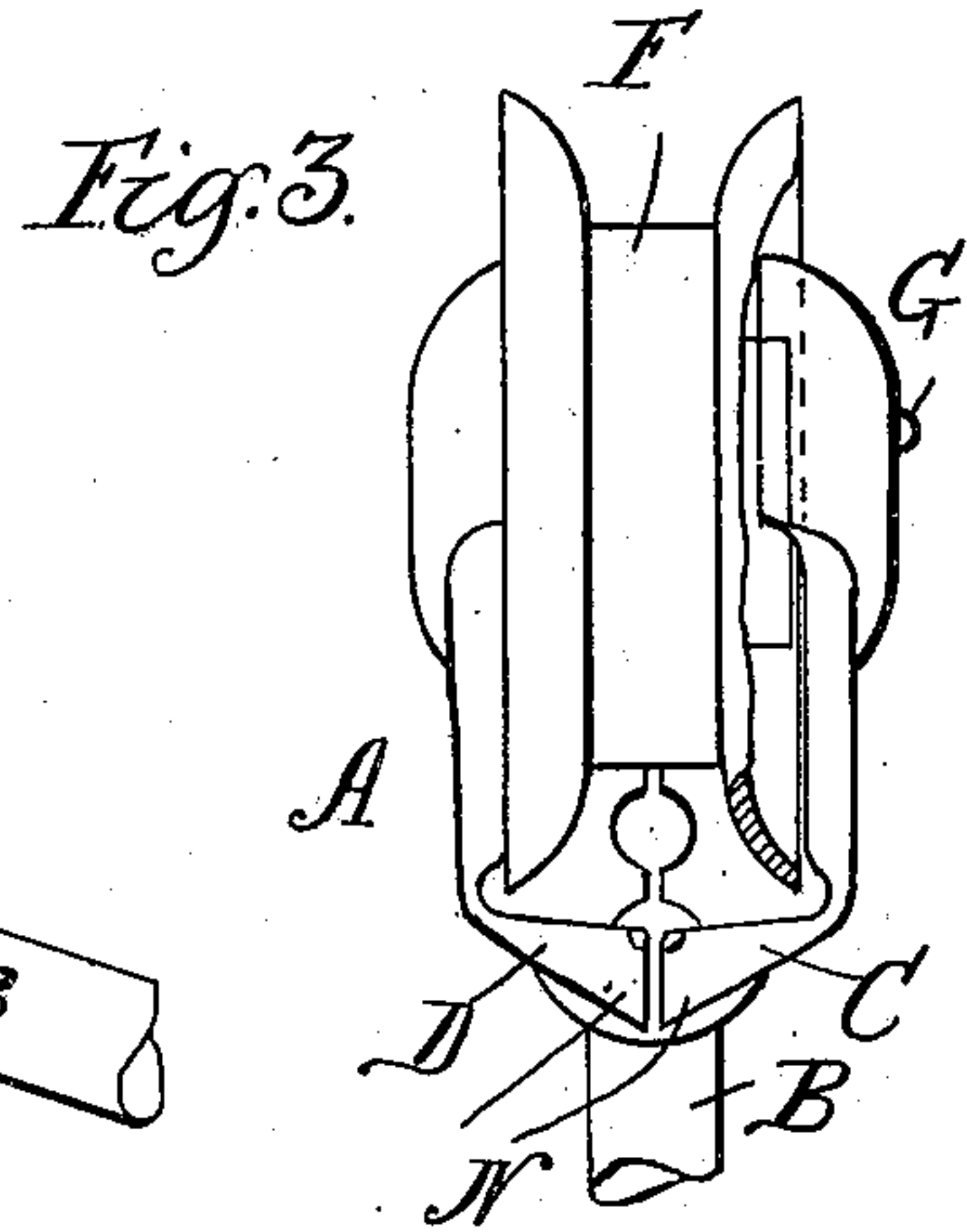
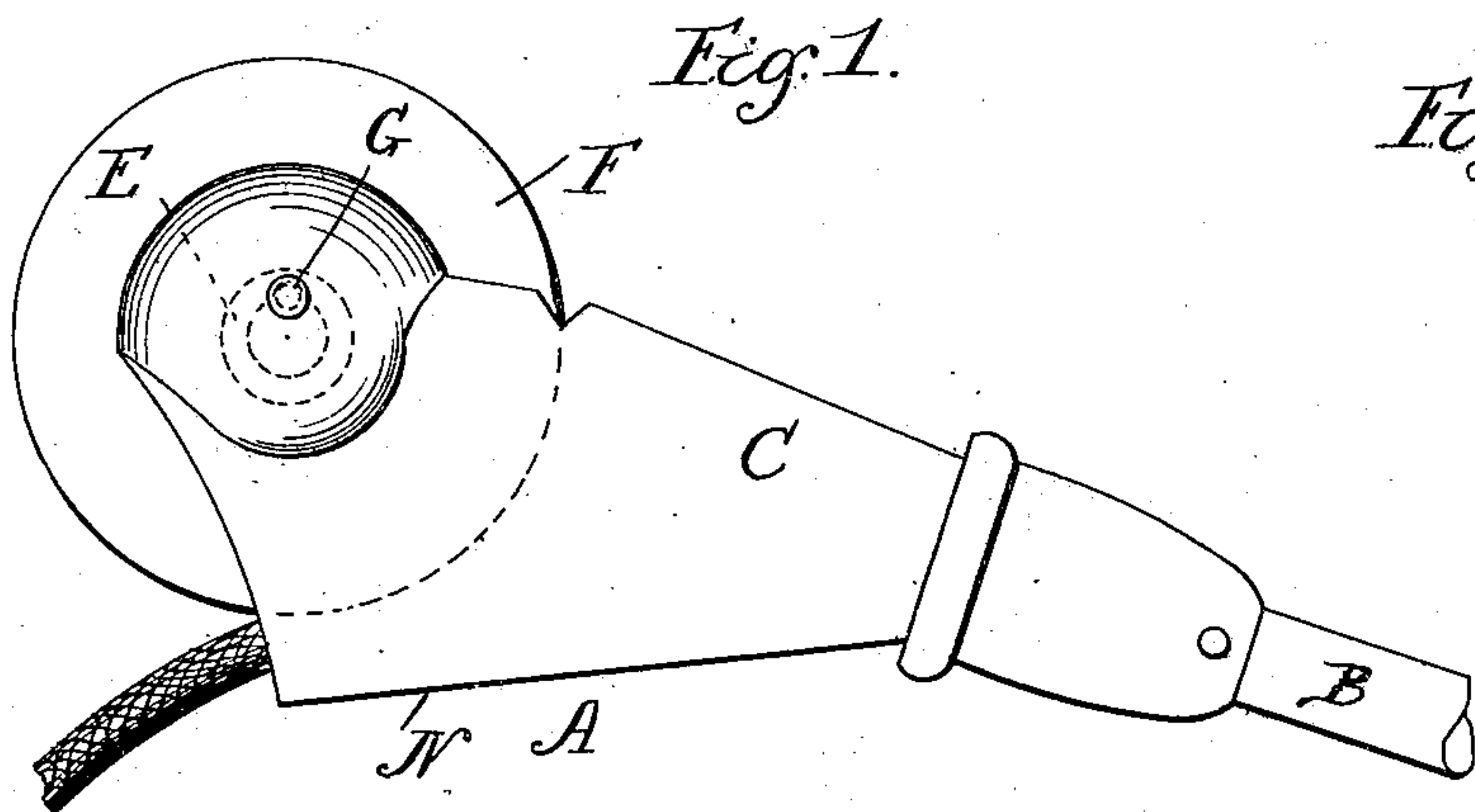
No. 606,711.

Patented July 5, 1898.

C. GROVER.
TROLLEY HEAD.

(Application filed Nov 13, 1897.)

(No Model.)



Witnesses.
J. M. Rheem.
S. C. Jones.

Inventor
Charles Grover
by *Proctor & Co.* Attys

UNITED STATES PATENT OFFICE.

CHARLES GROVER, OF KANSAS CITY, MISSOURI.

TROLLEY-HEAD.

SPECIFICATION forming part of Letters Patent No. 606,711, dated July 5, 1898.

Application filed November 13, 1897. Serial No. 658,373. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GROVER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Trolley-Head, of which the following is a specification.

This invention relates to trolley-heads.

The object of the invention is to provide a trolley-head of simple and improved construction and arrangement of parts wherein arcing between the contact-wheel and its supporting-axle is prevented, wherein the trolley-wheel is efficiently lubricated, wherein danger of the trolley-head engaging or catching the upper side of the trolley-wire is avoided, which is exceedingly simple, economical in construction, and efficient in operation.

Further objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally specifically pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference signs appearing thereon, Figure 1 is a view in side elevation of a trolley-head embodying the principles of my invention. Fig. 2 is a plan view of same. Fig. 3 is an end view of same, a part of one flange of the trolley-wheel being broken away. Fig. 4 is a central longitudinal section through the trolley-head. Fig. 5 is a detached detail view, in end elevation, of the axle or support for the trolley-wheel. Fig. 6 is a detached detail view and plan of the lubricating-plunger. Fig. 7 is a longitudinal central section of the compression-cup employed in lubricating the trolley-head.

The same part is designated by the same reference sign wherever it occurs throughout the several views.

In the drawings, reference sign A designates generally the trolley-head, which is suitably mounted upon or attached or otherwise secured to the upper end of a trolley pole or arm, a portion of which is designated by reference sign B. In the particular form shown the trolley-head comprises the side pieces C

D, constituting the fork. These side pieces are provided with threaded sockets in the opposed faces thereof, the threaded socket in one piece being juxtaposed with respect to the threaded socket in the opposite piece. These threaded sockets are arranged to receive the threaded ends of a supporting-spindle E for the trolley or contact wheel F. The spindle E is preferably tubular and is held against rotation by a screw G, arranged to be passed through the wall of one of the side pieces of the fork and into a seat or recess H, formed in the inner surface of said spindle, as clearly shown in Figs. 4 and 5. In practice I prefer to make the supporting-spindle E of case-hardened steel accurately turned to a cylindrical exterior surface to afford an efficient bearing for the trolley-wheel F. The trolley-wheel F, I prefer to make of phosphor-bronze; but it is evident that other suitable material may be employed—such, for instance, as copper—phosphor-bronze being preferred because of its durability and strength. The hub of trolley-wheel F is truly and accurately bored to a diameter adapting it to snugly receive therethrough the supporting-spindle E.

In order to avoid arcing between the contact-wheel and its supporting-spindle, I provide a suitable opening through the supporting-spindle, and through such opening I arrange a plug J, of suitable conducting material—such, for instance, as copper—to project from the interior of said spindle and into efficient contact with the surface of the bore of the trolley-wheel, as clearly shown in Fig. 4. In order that this contact may be efficiently maintained notwithstanding the natural and usual wear of rubbing-surfaces, I provide means for maintaining the contact between plug J and the surface of the bore of wheel F yieldingly. To this end I suitably mount the contact-plug J upon a spring K, the tension of which is constantly exerted in a direction to project contact-plug J through the opening in spindle E and into contact with contact-wheel F. Thus I avoid the objections and evils resulting from arcing between the contact-wheel and its supporting-spindle, and hence also provide a construction which will not wear out rapidly by

reason of the friction of the trolley-wheel rotating upon a surface blistered or roughened by reason of such arcing.

In order to efficiently lubricate the wheel, I provide another opening through the wall of spindle E and opening communication from the interior of said spindle to the bearing-surface of the contact-wheel F. In this opening I arrange another plug L, having suitable passages M formed therein, as clearly indicated in Fig. 6, for the passage of the lubricant from the interior of the spindle to the bearing-surface of the wheel. This plug is preferably made of iron or other suitable hard material, although I do not desire to be limited in this respect. Iron is preferred, because if said plunger is made of a softer material or metal than iron the constant rubbing of the internal surface of the bore of wheel F against such plug will cause the end thereof to wear and to fill up the passages M, thereby preventing a proper lubrication. In order to constantly and yieldingly maintain the plunger or plug L projected into engagement with the inner wall of the bore of wheel F, said plunger is suitably engaged by spring K, the tension of which spring is exerted to normally project or press said plunger into efficient contact with the wheel F.

In Fig. 7 I have shown a compression-cup for supplying lubricant to the interior of spindle E. This compression-cup comprises an internally-threaded cylinder A', open at one end and provided at the opposite end with a conical spout B'. An exteriorly-threaded plunger or piston C', having operating handle or stem D', is arranged to be screwed into the open end of cylinder A'. The extremity of spout B' is of a size enabling the same to be inserted through the opening in the side piece C of the fork formed by removing the locking-plug G. When it is desired to supply the trolley-head with a lubricant, the compression-cup cylinder A' is filled with a lubricant of the desired composition, the follower or piston-plunger C' is screwed into the open end thereof, the locking-plug G is removed, the end of spout B' is then inserted through the opening formed by the removal of locking-plug G from the side piece C of the head, and the handle D' of the compression-cup is rotated, thereby forcing the lubricating material out of cup A' through the spout B' and into the interior of spindle E until the tubular spindle E is entirely filled. The passages through plunger L permit the lubricant to pass readily through the wall of spindle E and into contact with the surface of the bore of wheel F.

Annoyance and damage frequently result by reason of the trolley-head catching on the top surface of the trolley-wire during the efforts of the trainmen to pull the trolley-head down into underrunning contact with the wire, thereby incurring the danger of detaching the trolley-wire from its supports. In order to avoid this objection, the side pieces C

D of the fork are provided on the under edges thereof with flanges which are arranged to inclose the wheel on the under side thereof, as shown at N, and in order to avoid the danger of the trolley-wire catching or engaging between the fork and the sides of the trolley-wheel the wheel is preferably formed with dish-shaped sides, the wheel-flanges flaring outwardly, as clearly shown in the several views of the drawings, and the extremities of the side pieces C D of the fork are curved inwardly into the space inclosed by said outwardly-flaring flanges of the wheel, the inner faces of the side pieces of the fork being provided with notches P in order to prevent the edge of the flanges of the wheel from rubbing against the inside edges of the side pieces C D.

In order to avoid wearing between the revolving contact-wheel F and the side pieces C D of the fork and to suitably offset the side pieces of the fork from the trolley-wheel, I interpose washers R, of brass or other suitable material, between the hub of the trolley-wheel and the faces of side pieces C and D. These washers should be renewed when it is observed that the flanges of the wheel rub against the sides of the fork-arms in order to prevent the wheel-flanges from damaging the fork.

From the foregoing description it will be readily seen that I provide a construction of trolley-head wherein is avoided the danger of the head catching in the overhead-trolley-wire construction or becoming entangled with the wire or its hangers, and hence avoiding the danger of pulling the trolley-line down or injuring or destroying the same. It will also be seen that arcing of the current between the wheel and its supporting-spindle is overcome, and therefore the contacting surfaces of the wheel or spindle are not roughened by blistering or arcing, and hence the wear on the parts is greatly reduced. It will also be seen that a perfect lubrication is provided. The expense of manufacturing is reduced to a minimum, as no special bearings or bushings are required, and the life of the fork, the wheel, and its spindle is greatly increased, the only parts requiring renewal being the washers R, contact-plunger J, and lubricating-plunger L, and these are cheap and inexpensive.

While I have shown and described a specific construction and arrangement embodying the principles of my invention, I desire it to be understood that many variations therefrom and changes therein will readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact and specific details shown and described.

Having now set forth the object and nature of my invention and a form of apparatus embodying the same and having explained the construction, function, and mode of operation

of such apparatus, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States, is—

5 1. In a trolley-head, the combination with a fork of a tubular spindle mounted therein, a trolley-wheel mounted to rotate upon said spindle, said spindle provided with an opening through the wall thereof, and a contact-
10 plug arranged within said tubular spindle and projecting through said opening and into contact with said wheel, as and for the purpose set forth.

2. In a trolley-head, the combination of a
15 fork, a tubular spindle mounted therein, a contact-wheel mounted to revolve on said spindle, said spindle provided with an opening through the wall thereof, a contact-plug arranged within said tubular spindle to pro-
20 ject through the opening therein and into contact with said wheel, and a spring arranged to press upon said contact-plug to maintain efficient electrical contact with said wheel, as and for the purpose set forth.

25 3. In a trolley-head, a fork, a tubular spindle mounted therein, a contact-wheel mounted to rotate upon said spindle, said spindle provided with an opening through the wall thereof, and a lubricating-plunger mounted
30 in said spindle to project through said opening and into contact with the bearing-surface of said wheel, whereby a lubricant introduced to said tubular spindle may be supplied to said wheel, as and for the purpose set forth.

35 4. In a trolley-head, a fork, a tubular spindle mounted therein, a contact-wheel mounted to rotate upon said spindle, said spindle provided with an opening through the wall thereof, a plunger having passages and ar-
40 ranged to project through said opening and into contact with the bearing-surface of said wheel, whereby a lubricant admitted to said tubular spindle is applied to the bearing-sur-
45 face of said wheel, as and for the purpose set forth.

5. In a trolley-head, a fork, a tubular spindle mounted therein, a trolley-wheel mounted to rotate upon said spindle, said spindle pro-
50 vided with an opening through the wall thereof, a plunger provided with channels and arranged to project through said opening and into contact with the bearing-surface of said wheel, a spring arranged to press said plun-
55 ger into contact with said wheel, whereby a lubricant introduced into said spindle is applied to said wheel, as and for the purpose set forth.

6. In a trolley-head, a fork having juxtaposed screw-threaded recesses in the op-
60 posed faces of the arms thereof, a spindle having threaded ends arranged to be received in said threaded recesses, a contact-wheel mounted to rotate upon said spindle, and a plunger

of conducting material arranged to project through said spindle into contact with said
65 wheel for preventing arcing between said wheel and spindle, as and for the purpose set forth.

7. In a trolley-head, a fork having juxtaposed screw-threaded sockets or recesses in
70 the opposed faces of the arms thereof, a tubular spindle having exterior screw-threads upon the ends thereof arranged to be received in said sockets or recesses, a contact-
75 wheel mounted to revolve upon said spindle, said spindle provided with an opening through the wall thereof, whereby a lubricant introduced to said tubular spindle may be ap-
80 plied to the bearing-surface of said wheel, and a conducting-plunger arranged to project through the wall of said spindle into contact with said wheel for preventing arcing between
said wheel and spindle, as and for the purpose set forth.

8. In a trolley-head, a fork comprising op-
85 positively-arranged arms, a spindle mounted in said arms, a trolley-wheel mounted to rotate upon said spindle, said arms provided with converging flanges on the under side thereof, said flanges extending to a point opposite the
90 axis of rotation of said wheel, whereby said trolley-wheel is inclosed on the under side thereof, as and for the purpose set forth.

9. In a trolley-head, a fork comprising
95 arms having converging flanges on the under side thereof, a spindle mounted in said arms, a contact-wheel mounted to rotate upon said spindle, said flanges extending to a point opposite the axis of rotation of said wheel,
100 whereby the under side of said wheel is inclosed thereby, said contact-wheel provided with outwardly-flaring flanges, thereby forming a dish in the faces of said wheel, the ex-
105 tremities of said fork-arms being curved inwardly into the dish of said faces, as and for the purpose set forth.

10. In a trolley-head, a fork having screw-
threaded sockets or recesses in the opposed
110 faces of the arms thereof, a spindle having threaded ends arranged to be received in said threaded sockets or recesses, a trolley-wheel mounted to rotate upon said spindle, a con-
115 tact plug or plunger projecting through said spindle into contact with said wheel, and washers interposed between said wheel and the arms of said fork to offset said wheel from said arms, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 10th day of November, 1897, in the
120 presence of the subscribing witnesses.

CHARLES GROVER.

Witnesses:

G. M. MACKENZIE,
THOS. WORTHINGTON.