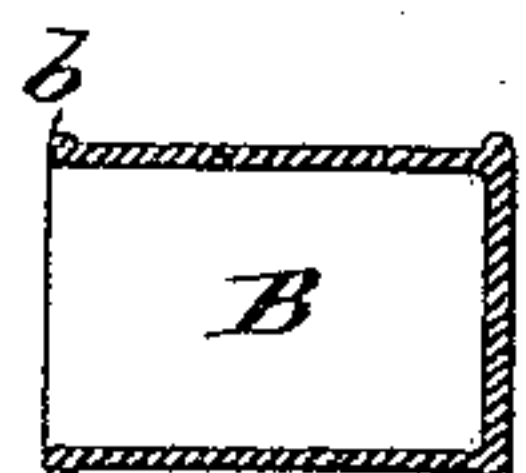
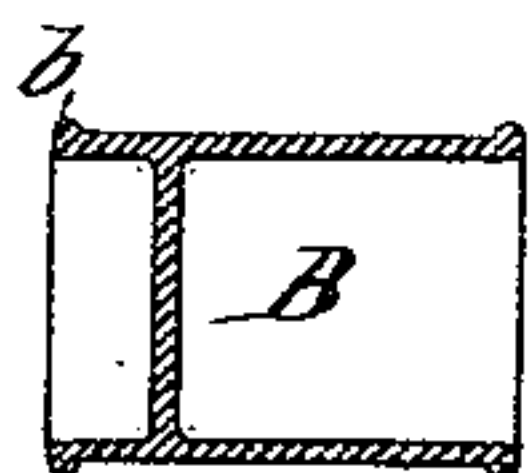
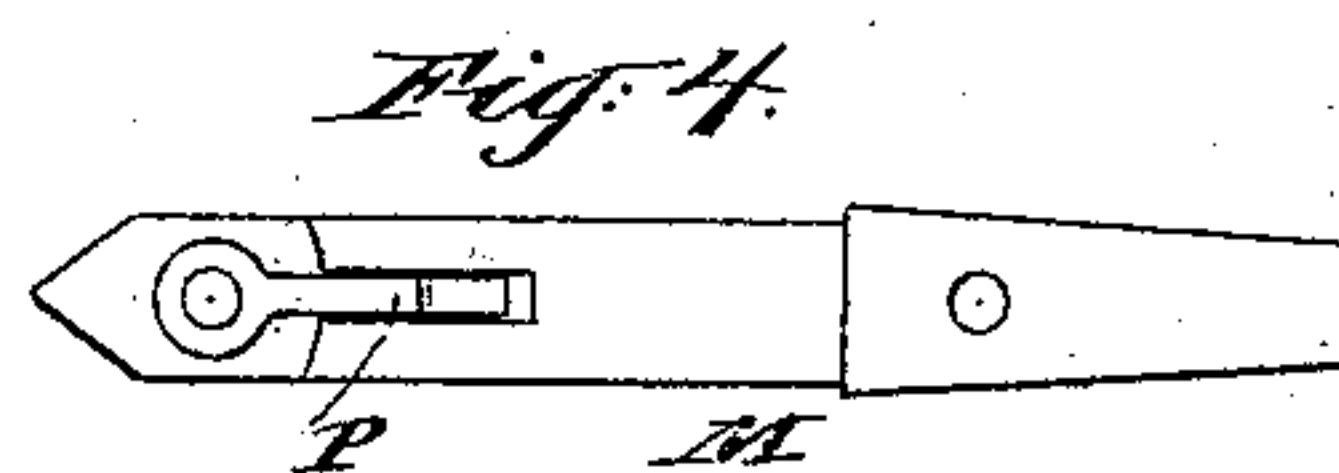
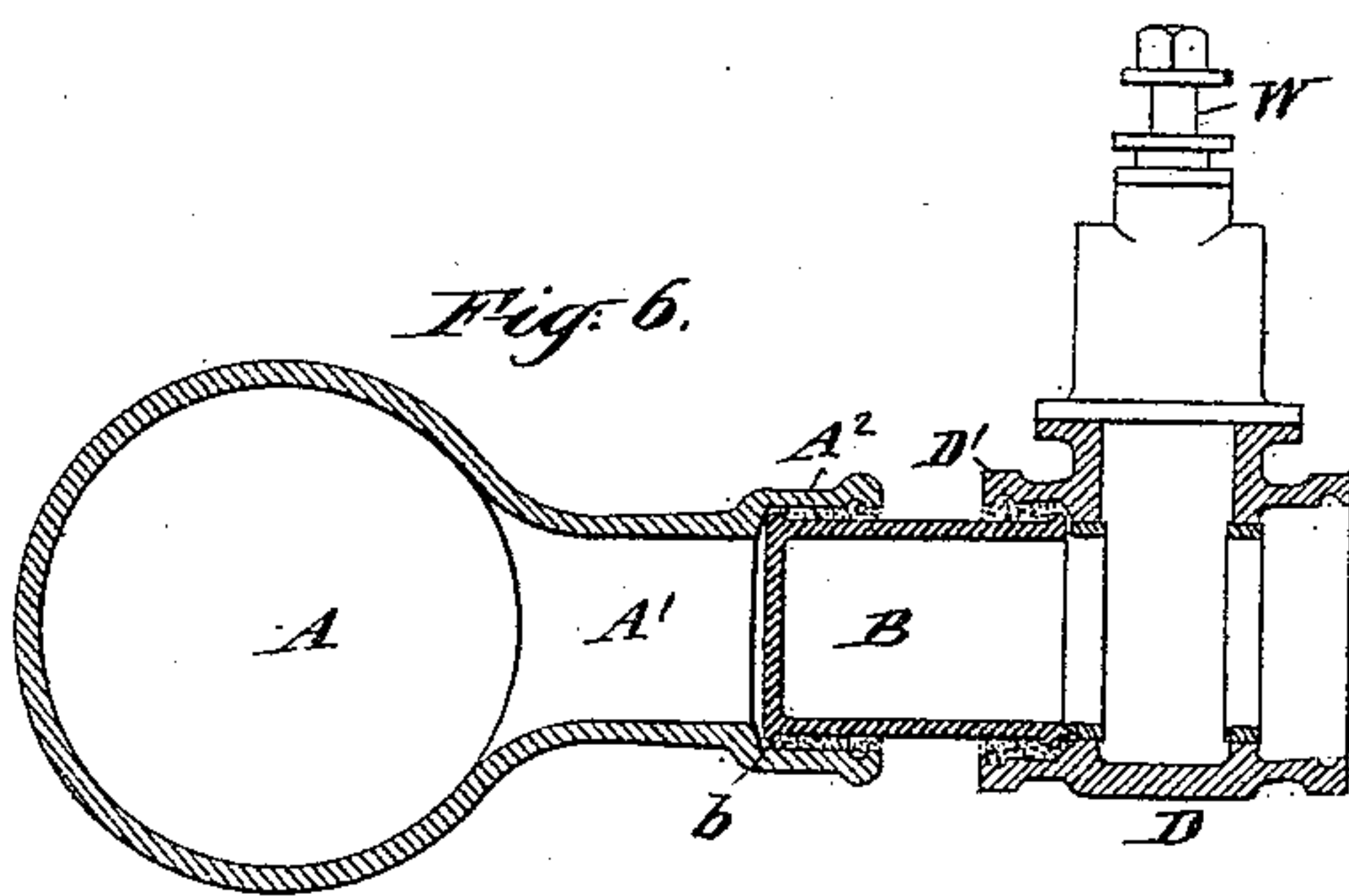
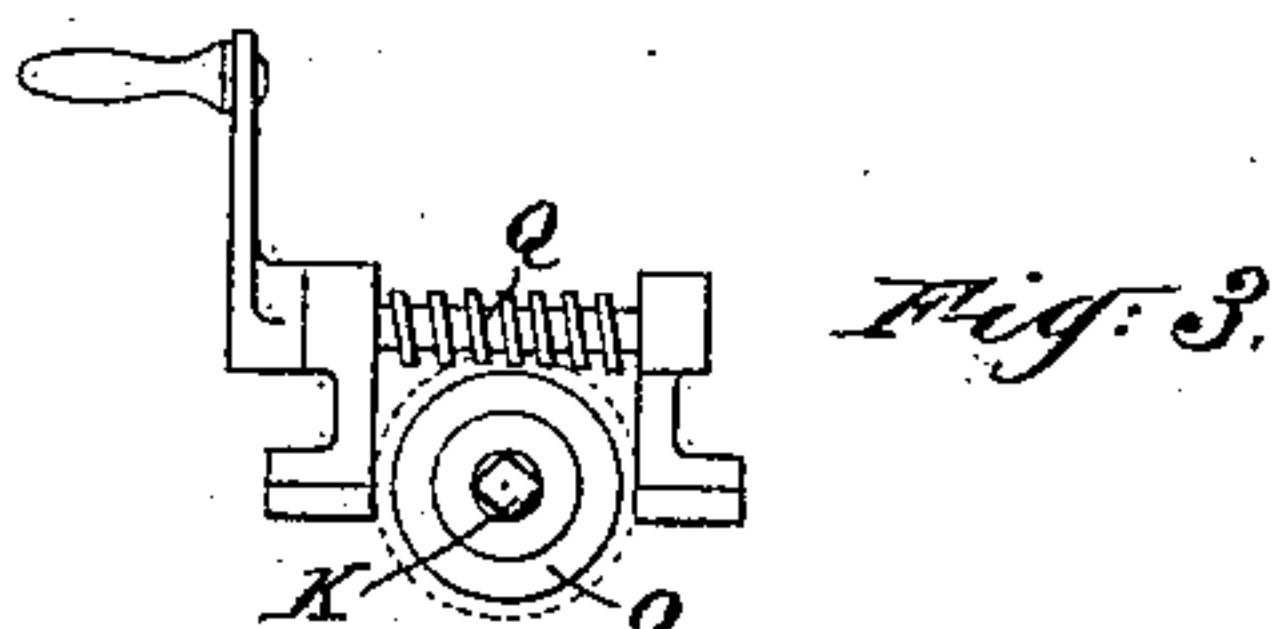
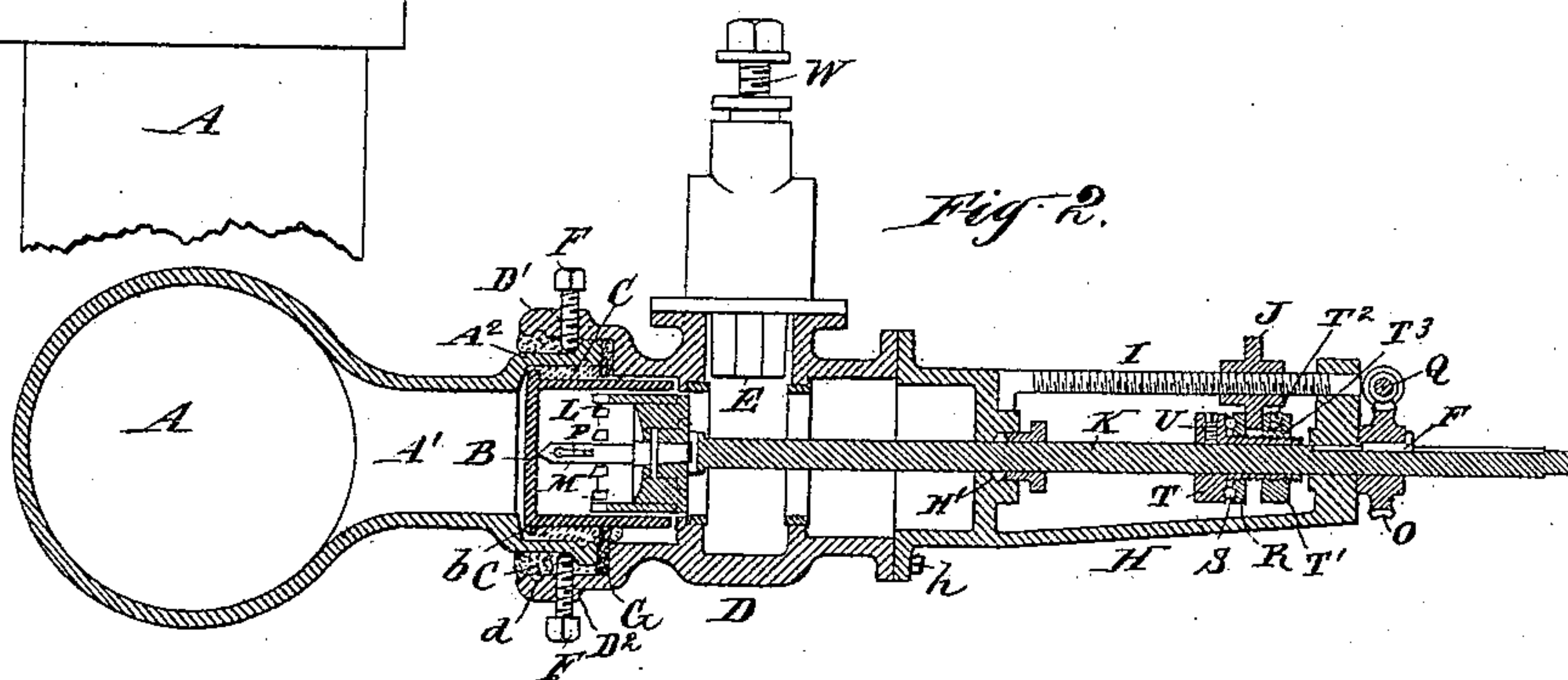
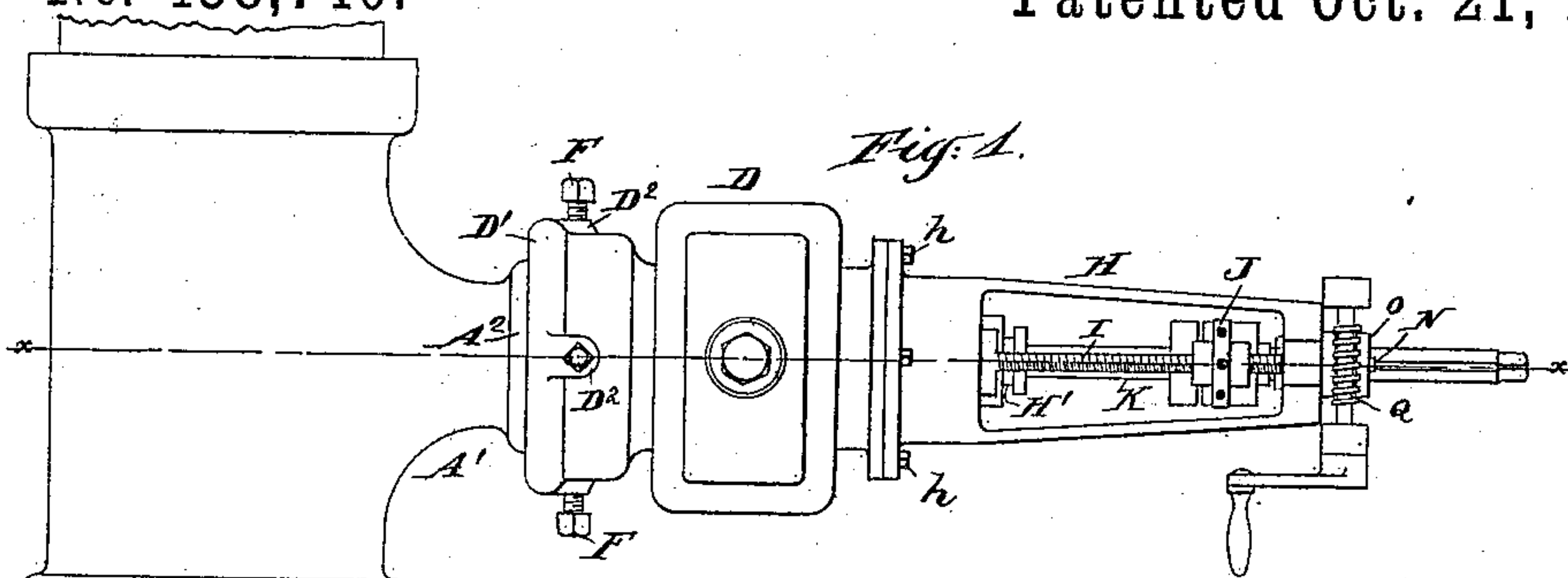


(No Model.)

P. ELEY.
METHOD OF AND MACHINE FOR TAPPING OR CONNECTING BRANCHES
TO PIPES.

No. 438,740.

Patented Oct. 21, 1890.



Witnesses:
Charles R. Searle.
Chas. S. Barber.

Inventor:

Philip Eley
By his attorney
James D. Brown

UNITED STATES PATENT OFFICE.

PHILIP ELEY, OF BAYONNE, NEW JERSEY.

METHOD OF AND MACHINE FOR TAPPING OR CONNECTING BRANCHES TO PIPES.

SPECIFICATION forming part of Letters Patent No. 438,740, dated October 21, 1890.

Application filed June 18, 1890. Serial No. 355,823. (No model.)

To all whom it may concern:

Be it known that I, PHILIP ELEY, of Bayonne, in the county of Hudson, in the State of New Jersey, have invented a certain new and useful Improvement in Method of and Machine for Connecting Branches to Pipes for Water, Gas, and other Fluids; and I do hereby declare that the following is a full and exact description thereof.

The object of the invention is to facilitate the connecting of branch pipes to mains. It is common to provide a certain proportion of the lengths of mains with spurs or blank branches ready for the attachment of branch pipes and to lay the mains with such branches or spurs at intersections of the streets and at such other places as are liable to require branches to be connected. Such blank branches are tightly stopped by the insertion in each of a short length of pipe with a web extending across, constituting a hollow metallic plug, tightly calked into place and ready to serve as a plug, stopping the branch entirely for as long a period as may be required. I connect the several lengths which are to constitute the branch to such blank branch without shutting off the water or other fluid from the main. I provide the proper number of cases, each having a stop-valve and equipped with provisions for conveniently and permanently securing it either directly to the exterior of one of the blank branches or to the metal plug fitted therein. The choice may turn on whether the plug is of sufficient length and properly constructed to afford a convenient hold. If the plug is long and suitable to form a short length of the branch, I adapt my valve-case to be attached thereto. If the plug is short, I adapt my valve-case to receive it idly and to engage strongly and tightly, not with the plug but with the exterior of the blank branch itself. I provide a set of drilling and milling mechanism with provisions for bolting it successively upon the several valve-cases. In conducting a large job I can have more than one set of the drilling and milling mechanism; but I will describe the work as performed by a single one.

One or more workmen go ahead and attach the several valve-cases to the blank branches. Then one or more workmen follow with the

mechanism and attach it to each in succession. The operating-shaft works through a stuffing-box. The drilling and milling mechanism acts not on the material of the main or of the blank branch, but on the plug. It first drills a small hole in the line of the axis of the plug, and the drill remains for a little period in the hole thus formed, serving as a center or steadiment for the milling-tool, which is carried on the same shaft, and, being strongly operated at a later period, cuts a circular groove until it has cut quite through the web of the plug, and the problem is then solved of producing a smoothly-milled hole of the proper size for the required water-way. I equip the drill with a spring-catch, which engages with the disk of metal thus partially liberated and insures its retention on the drill, so that when the mechanism is withdrawn it brings the iron disk with it.

The removal of the device is easy. First the shaft and milling-tool are withdrawn, bringing with them the disk of metal which has been cut out. Next the screw-shaft with which the valve-case is provided is operated to close the valve by moving it across the passage and tightly closing the branch. After this adjustment is completed the mechanism is detached and may be moved to the next blank branch and the operation repeated.

The proper lengths of the pipe for forming the branch may be connected to the valve-case either immediately or at any subsequent period, and on opening the valve the water from the main fills the branch, and thenceforward it serves as a permanent connection, the perforated lug remaining in position and the water flowing through the liberal passage milled through it.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a plan view. Fig. 2 is a vertical section on the line *xx* in Fig. 1. Figs. 3 to 5, inclusive, represent portions detached. Fig. 3 is an elevation showing one end of the apparatus, the right end in Fig. 2. Figs. 4 and 5 are on a larger scale and represent the drill with its attached spring-catch. Fig. 4

is a plan view. Fig. 5 is a central vertical section, partly in elevation. Fig. 6 is a vertical section corresponding to Fig. 2, but showing a modification. Figs. 7 and 8 are central longitudinal sections of different forms of plug.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

10 A is the street-main, and A' a blank branch cast thereon and provided with a bell A², internally grooved and adapted to be strongly, tightly, and permanently secured to any properly-formed part introduced in its interior.

15 B is a hollow plug composed of a hollow cylindrical rim and a web extending across such plug, being equipped with a circular bead or slight flange b, and C is a calking of lead or analogous material uniting these parts, making a strong, tight, rigid, and permanent union.

D is my valve-casing, of cast-iron or other suitable material, provided with a packed shaft W, by which a valve is operated in the 25 long-approved manner. This case D is equipped with a rim or bell D', adapted to engage on the exterior of the blank branch A' and to be united by the calking C, as shown. This calking engages in a groove d, 30 formed in the interior of the bell D'. The drawings show also screws F and packing G, aiding to hold the parts reliably in position before the calking is set. The rim D' is thickened at the points where the screws F 35 are tapped through, as indicated by D².

H is a detachable framing adapted to be secured temporarily to the valve-casing D by bolts h. It is provided with a feed-screw I, on 40 which is applied a correspondingly-screw-threaded wheel J, which may be conveniently turned by hand to feed axially the shaft K of the drill and cutter. This shaft works through a stuffing-box H' in the detachable framing H, and carries on its inner end an annular 45 milling-tool L and a drill M, which extends beyond the milling-tool, and is provided with a spring-catch P, which serves the important purpose of engaging with the disk of metal which is cut out by the milling-tool and insur- 50 ing that it is drawn out by the withdrawal of the drill.

The outer end of the shaft K is splined and receives a feather N, which engages the shaft 55 with the worm-wheel O, which is operated by a worm Q, which may be turned by a crank on one end or both ends, operated by the attendants. The feed is controlled by the engagement of the wheel J with a ring R, which can revolve freely and acts through loose 60 balls S, against a stout flange on a sleeve T, which latter is engaged with the shaft K by a screw which is set strongly into a recess in the shaft, as indicated by U. The sleeve T is screw-threaded and receives a collar T', 65 which when adjusted in position is firmly held by a pinching-screw T², which acts on a shoe T³. The splined end of the shaft K is

sufficiently long to allow of the axial movement required. The outer end is square to receive a crank, (not shown,) by which the 70 shaft may be operated when only the drill M is to be worked, the worm-wheel O being disconnected at such period by the temporary withdrawal of the feather N or by other convenient means.

75 The screw U may be withdrawn to allow the shaft K to be rapidly moved axially, when required, at any stage.

In operating, the valve-case D, with its valve and operating means properly conditioned for long service, is applied in the 80 required position upon the blank branch A', with the packing G in place, and the screws F are turned to engage it. Next, the lead C is applied to fill the considerable space and is 85 calked home, so as to engage reliably and tightly in the groove. In working in the large way, one or more workmen may attach these casings to the several blank branches in advance. Next the frame H is brought in posi- 90 tion. The shaft K, with its drill M and milling-tool L, is introduced properly into the valve-casing, and the bolts h or other strong fastening means, as suitable clamps or clips, are applied to hold the parts firmly together. A thin 95 gasket may be applied between the framing H and the valve-case D. The shaft K is turned rapidly, and the feed-wheel J is rotated slowly, and the drill M thereby operated until it has produced the required small hole in the center 100 of the web of the plug B. Now the feed-wheel may be turned rapidly and the shaft K moved endwise until the milling-tool L is brought into contact with the end of the plug B. Now the crank being removed from the 105 end of the shaft K and the worm-wheel O being engaged, the worm-shaft Q is revolved and the cutter or milling-tool L operated with the proper partial turning of the feed-wheel J until the milling-tool has cut a circular 110 groove in the end of the plug B and sunk it quite through so as to cut out a disk. Now it is necessary simply to withdraw the shaft by rapidly turning the feed-wheel J in the proper 115 direction. When it is completely withdrawn the shaft K is operated to bring the stop-valve E into position to close the passage. There may be any degree of refinement of the construction of this valve. I have shown it as a 120 simple block, rectangular or very slightly tapered, which is by the action of the screw-shaft drawn into the liberal recess provided to open the valve, and afterward moved downward to press against the seats and to close 125 the passage. When this valve is closed, the bolts or other fastenings h holding the frame H may be detached, and the frame H, with its shaft K and milling-tool L and drill M, may be transported to the next valve-casing D and the operation repeated.

130 The outer end of my valve-case D is equipped to form a proper connection with the first length (not shown) of the branch pipe, and the succeeding lengths may be connected at

any time, and on opening the valve the branch will be brought into use. It will serve for an indefinite period, the plug B remaining in its original position with its web removed.

5 Modifications may be made by any good mechanic without departing from the principle or sacrificing the advantages of the invention. Fig. 6 shows a construction in which the plug B is of sufficient length to allow my
10 casing D to be connected thereto instead of being connected to the bell on the end of the blank branch. In this modification, Fig. 6, the plug having its web bored out as before remains permanently in position and per-
15 forms a duty by serving as a short length of pipe connecting my valve-case D with the blank branch A'. I make a corresponding modification in the size of the rim or bell D' to adapt it to be thus engaged with the plug.
20 In this form of the invention the plug is cast with a slight flange on the outer end, as shown, to aid in strongly engaging with the bell D' of the case D. There may be the packing G and the pinching-screws F in this
25 form as in the other.

It is not essential that the plug shall have its disk or web which stops the passage at the inner end, by which I mean that nearest the main. The disk may be mid-length of
30 the plug, or even at the outer end. Figs. 7 and 8 show such modifications in the plug.

Parts of the invention may be used without the whole.

I can dispense with the worm-wheel O and
35 its attachments and provide other means of turning the shaft K with sufficient force to produce the large circular cut made by the milling-tool L.

I claim as my invention—

40 1. In the art of connecting branches to mains, plugging the short blank branch pre-

viously formed on the main with a hollow cylindrical metal plug having a web extending transversely therethrough, and whenever it is desired to extend the branch cutting a suf- 45
ficiently large hole through the web or removing the web entirely, while leaving the cylindrical hollow portion or rim of the plug attached to the short blank branch and attaching the continuation of the branch thereto, 50
while leaving the rim of the plug permanently in place, substantially as herein specified.

2. In an apparatus for opening mains for water, gas, &c., the casing D, having a bell D', adapted for embracing and engaging by a 55
suitable packing with a short plugged branch A' on the main A, in combination therewith and with the valve E and operating means therefor carried in the casing, controlling the flow through the branch, and with provisions, 60
as the shaft K, drill M, and milling-tool L, for operating such casing and opening the plugged branch, substantially as herein specified.

3. In an apparatus for connecting branches 65
to mains for water, gas, &c., the drill M, milling-tool L, and shaft K, in combination with each other and with a spring-catch P, arranged to enter the hole produced by the drill and to expand by its elasticity on the inner 70
side, and thus secure the disk which is cut loose by the milling-tool and insure its withdrawal with the shaft, all substantially as herein specified.

In testimony whereof I have hereunto set 75
my hand at New York city, this 16th day of June, 1890, in the presence of two subscribing witnesses.

PHILIP ELEY.

Witnesses:

CHAS. S. BARBER,
H. A. JOHNSTONE.