

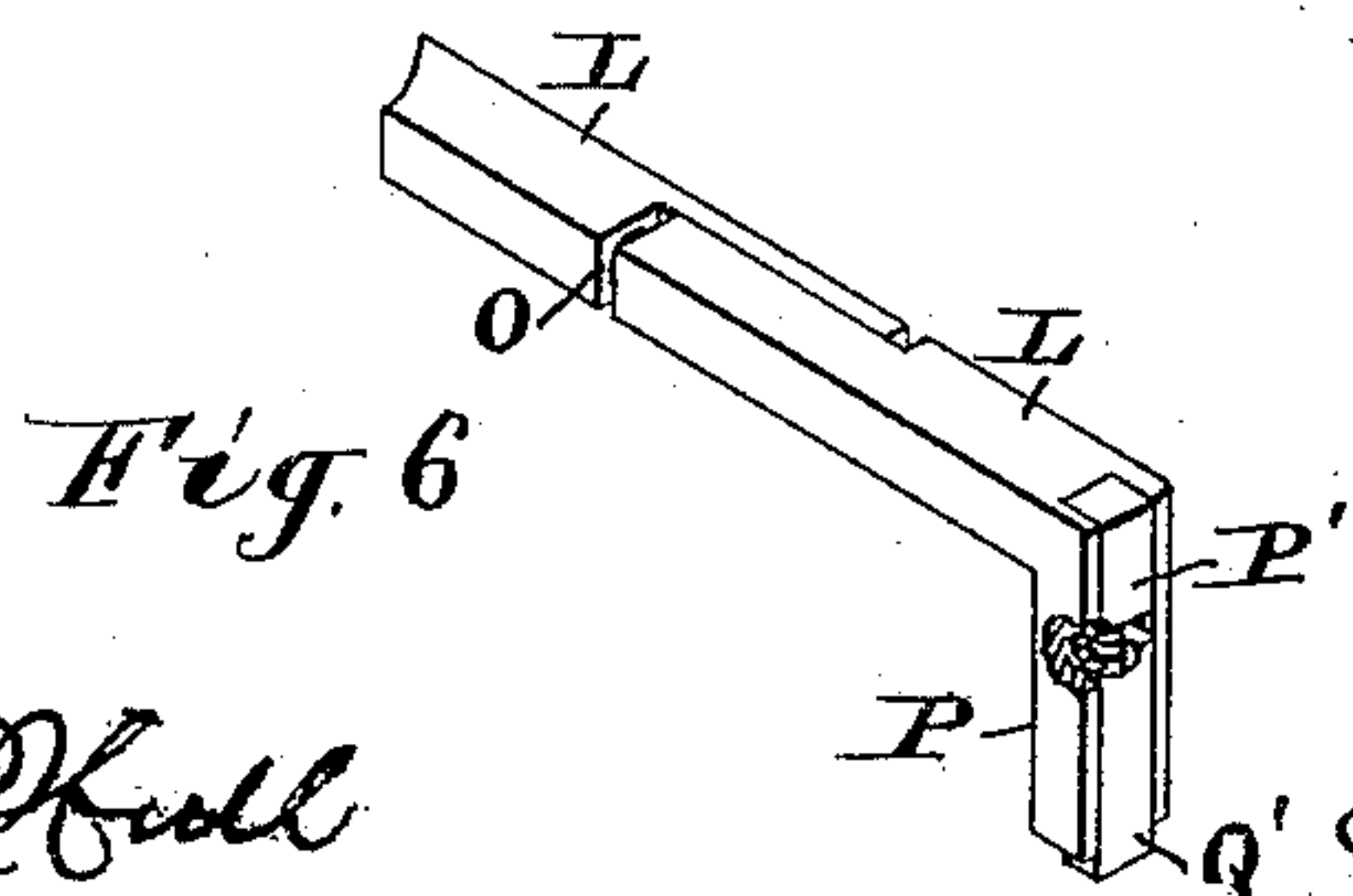
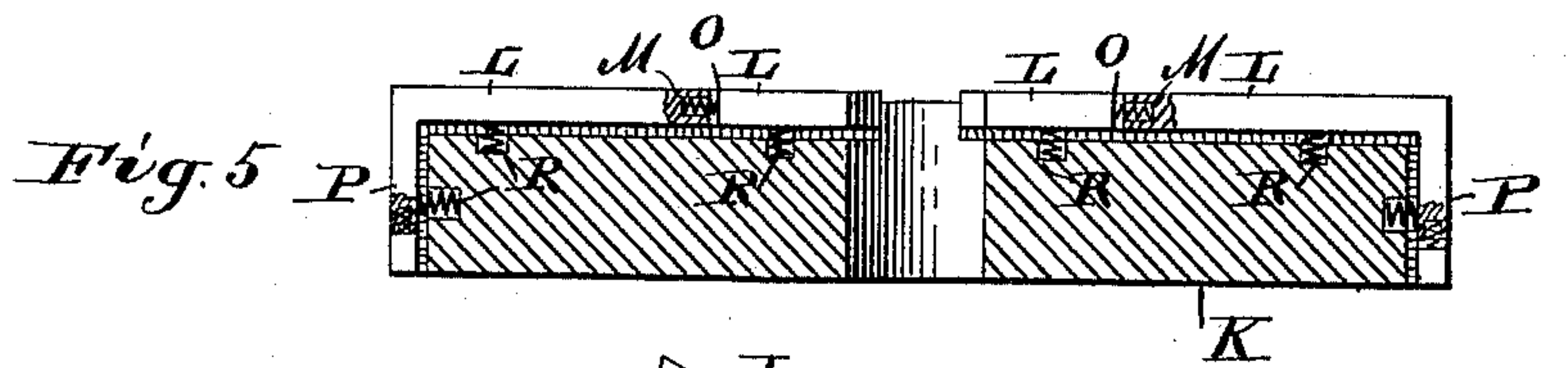
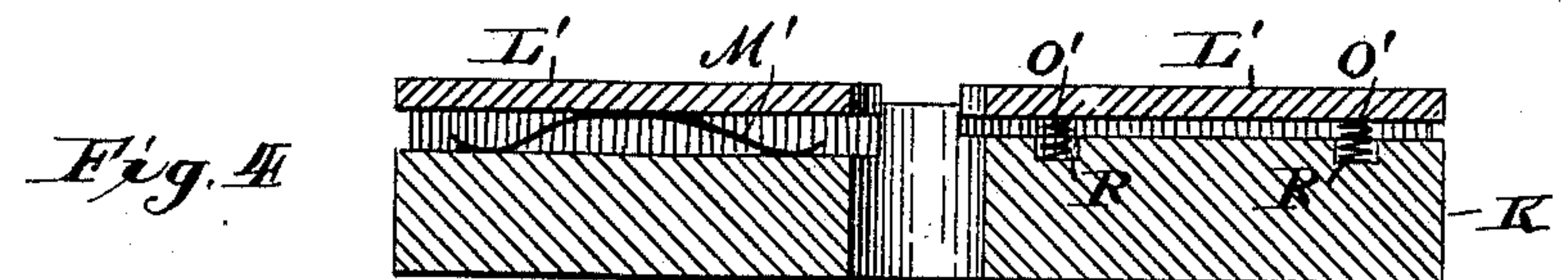
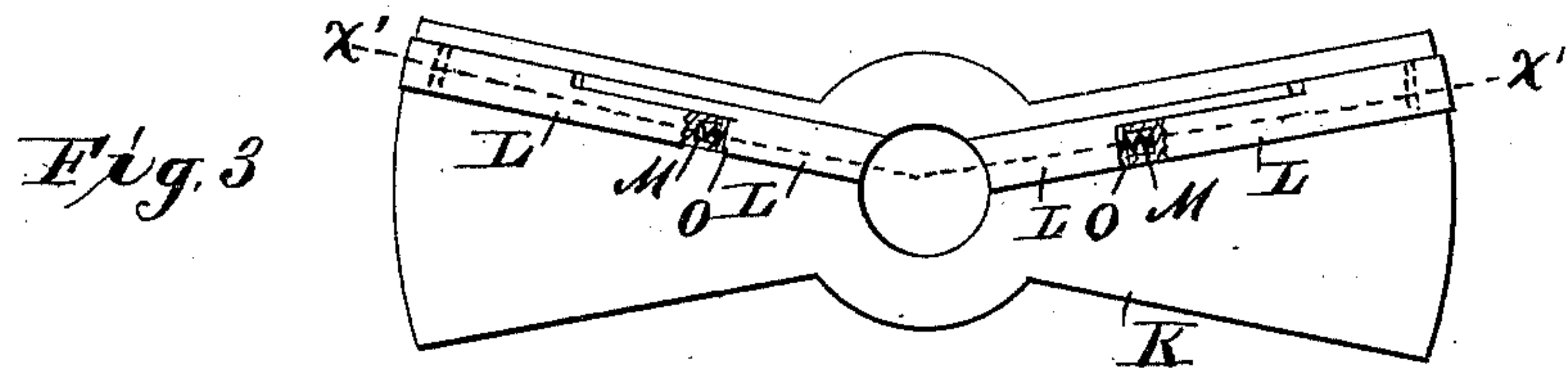
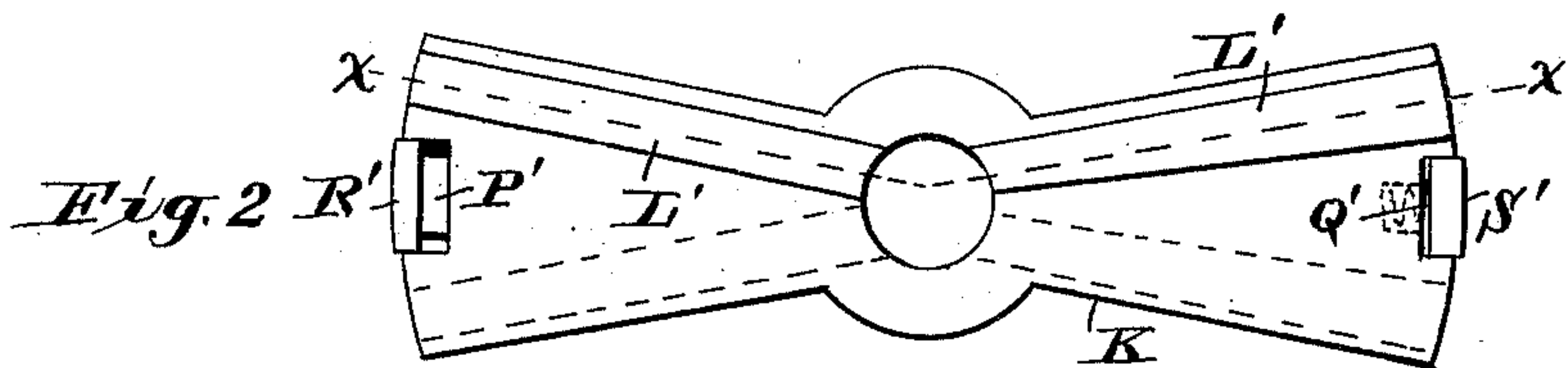
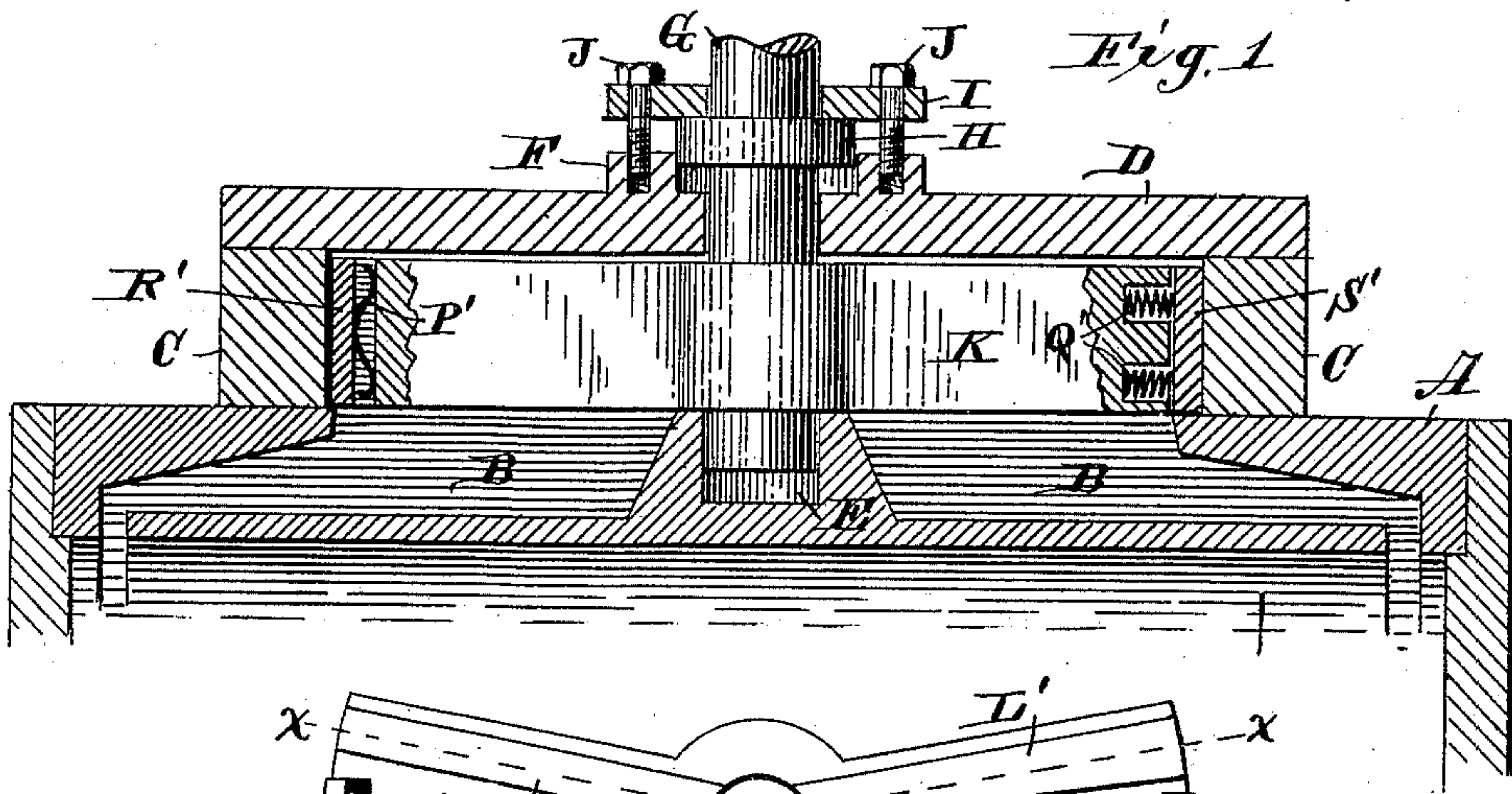
(No Model.)

J. H. WILLIAMS.

STEAM VALVE.

No. 405,641.

Patented June 18, 1889.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN H. WILLIAMS, OF URBANA, OHIO.

STEAM-VALVE.

SPECIFICATION forming part of Letters Patent No. 405,641, dated June 18, 1889.

Application filed March 2, 1889. Serial No. 301,799. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. WILLIAMS, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Ohio, have invented certain new and useful Improvements in Steam-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to valves for steam-engines, and has special reference to improving the valve upon which I filed application for a patent on the 9th day of January, 1888, Serial No. 260,236.

15 My present improvements consist in means to maintain a close and uniform fit between the valve and all those parts of the valve-chest with which it is in contact, so as to prevent leakage and communication from one side of the valve to the other, as will hereinafter be more fully pointed out.

20 In the accompanying drawings, forming a part of this specification, and on which like reference - letters indicate corresponding parts, Figure 1 represents a vertical sectional view of a portion of a steam-cylinder and a valve-chest with my improved valve applied thereto; Fig. 2, a detail plan view of the valve proper; Fig. 3, also a detail plan view of the valve proper; Fig. 4, a sectional view on the line $x x$ of Fig. 2; Fig. 5, a sectional view on the line $x' x'$ of Fig. 3, and Fig. 6 a detached view of the packing.

25 The letter A designates a steam-cylinder of the ordinary or any approved type, save as regards the steam-ports B, which are of the form illustrated, described, and claimed in my application filed the 1st day of October, 1888, Serial No. 286,903, wherein the said ports are set forth as increasing in area as they near the ends which open into the valve-chest for the purpose of allowing a perfectly free exhaust.

30 The letter C designates an annular wall constituting the valve-chamber proper, and having a cap D secured thereon. The cylinder has a bearing E for the valve, and the cap has an opening at the center and an encircling flange F. The arbor or shaft G of the valve passes through the opening in the cap and extends

into the bearing E, but not to the bottom of the bearing. The shaft is provided with a collar H, which fits within the flange F and constitutes a shoulder for the engagement of the adjusting plate or bar I, which has an opening to receive the shaft, and is drawn toward the cap D by adjusting-screws J, which pass through it and screw into the threaded holes formed in the flange F.

35 The letter K designates the valve proper, the same consisting of a bar, preferably constructed with a central hub and fashioned to constitute two arms which gradually widen toward their outer ends, as seen in Fig. 2. This valve is secured upon the shaft G, and is recessed longitudinally on its upper side to receive the two or more packing-bars. These bars may be of two forms, that shown in Figs. 3, 5, 6, and 7 being preferred. These bars consist of sections L snugly fitted within said recesses and overlapping each other, as seen in Fig. 3. It is preferred to place these bars on that side of the valve nearest the inlet-port of the chest and to place the narrower of said parts toward the said side, so that when the sections separate, as will hereinafter be explained, only a very small space will be formed between the end of such narrower portion and outer section in which the steam might enter. This will prevent the steam from pressing the outer section against the annular wall of the casing to any extent. The outer section L is recessed, as shown at M, and a spiral spring placed therein and expanding against the shoulder O of the inner section, so as to normally tend to move the outer section against the wall C of the chest and cause the vertical part P of the section to constitute the end packing. In the sockets R are placed other spiral springs, which tend to lift the sections L up against the under surface of the cap D, and thus constitute a packing for the upper side of the valve. The ends of the valve K are recessed to receive the parts P, as suggested by dotted lines in Fig. 3.

40 Another form of packing-bars is seen in Figs. 2 and 4, in which the bars L' are normally supported and removed from the valve proper by means of a suitable spring inter-

posed between them and the valve, as seen at M' and O' in Fig. 4. When the form of spring shown at M' is used, the recess needs to be deeper throughout its entire length, so as to accommodate such spring, than when the form shown at O' is used—that is to say, spiral springs—in which instance the recesses have sockets similar to those already described to receive the springs O'. From Fig. 2 it will be seen that the ends of the valve proper are correspondingly recessed and provided with similar springs P' and Q' and with packing-bars R' and S'. These bars L', R', and S' are projected against the under side of the cap D and the interior of the wall C, respectively, and constitute a convenient and effective packing. In both forms of packing-bars the springs force the bars firmly against the cap and annular wall of the chest, and as the valve wears by usage it can be adjusted down from time to time upon the face of the chest without causing an opening or space above it through which the steam could escape from one side of the valve to the other.

The first-above-described packing I regard as new; but I am aware that the construction of this last-described type of packing is, in a broad sense, old, and do not wish to be understood as laying claim to it separately. I prefer the first form; but also do not wish to limit myself to the use of either type in connection with my improved valve and devices to adjust it against face of the valve-casing as wear may require. I have illustrated one form and arrangement of devices for effecting this adjustment of the valve, and that is the form and arrangement I prefer, though they may be varied without departing from the essential feature—namely, the adaptability of the valve to be adjusted to take up the wear at the place designated, and means to effect such adjustment. The valve operates well in practice, and with the present improvements can be kept perfectly tight, and is practically a balanced valve, for its constant close fit between the face and the cap of the valve-chamber prevents the steam from entering between it and such face or cap and causing it to be pressed against one or the other. This overcomes the common objection and difficulty in the way of the excessive frictional contact between the valves and their chests. The dotted lines on the lower part of the valve proper, as seen in Fig. 2, indicate that other packing-strips may be used, if desired.

I have described the vertical part P of the packing-strip L as of one piece. In Figs. 7 and 8 I show the vertical part P longitudinally grooved and the packing-bar fitted in the said recess and composed of two sections P' and Q'. One of these sections Q' is recessed in Fig. 6, and a spiral spring is placed therein with a tendency to spread the sections P' and Q'. By this action the packing action of the

vertical part of the valve-strips is rendered more perfect.

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

1. The combination, with a circular valve-chest, of a valve and its adjustable central arbor, means to adjust said arbor inward and preserve contact between the valve and the face of the chamber, and suitable packing between the ends of the valve and the upper side of the valve and the casing.

2. The combination, with a circular valve-chest, of an oscillating valve fitted therein, and suitable packing interposed between its ends and upper side and the said chamber, and the valve-arbor centrally mounted in said chamber, and devices to adjust it inward to keep the valve in constant contact with the surface of the chamber.

3. The combination, with a steam-cylinder and its circular valve-chest, a bearing in the cylinder, and a central opening in the chamber-cap, of a valve fitted to oscillate within said chamber and having spring-actuated packing-strips between its ends and its upper edge and the valve-chamber, the valve-arbor mounted in said bearing and opening and having a shoulder, a plate fitted on the arbor against said shoulder, and adjusting-screws connecting the plate with the cap.

4. The combination, with a circular valve-chamber, a flanged cap, and a central opening in the cap, and a recess within the flange, of a valve mounted in the chamber, and its arbor fitted to the central opening in the cap and having a shoulder which fits said recess, an adjusting-plate embracing the shaft and fitted against the shoulder, and screws which connect said plate with said flange.

5. The combination, with a circular valve-chest, of a valve mounted therein and recessed on its upper side and at its ends, and extensible packing-strips mounted in said recesses, and springs between said strips and said valve to project the strips upward and outward.

6. The combination, with the valve consisting of an oscillating bar grooved on its upper side and at its ends, of packing-strips fitted in said grooves and composed of overlapping sections, the outer section of which having a vertical part which fits the end recesses, and springs which press the sections upward, and other springs which respectively press the outer sections upward, and the vertical part of such sections outward.

7. The combination, with a circular valve-chest, of a valve mounted therein and recessed on its upper side and at its ends, of packing-strips mounted in said upper and end recesses, and springs between the upper and end sections or portions of the extensible strips, and other springs to project said strips upward and outward.

8. The combination, with a valve, of exten-
sible packing-strips consisting of upper hori-
zontal sections, a grooved vertical part, and
the strip divided into two sections and fitted
5 into said groove, and springs between the
horizontal sections and the sections in said
groove, whereby the parts are distended from
each other.

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

JOHN H. WILLIAMS.

Witnesses:

W. F. RING,
JAMES D. LUCE.