

No. 755,873.

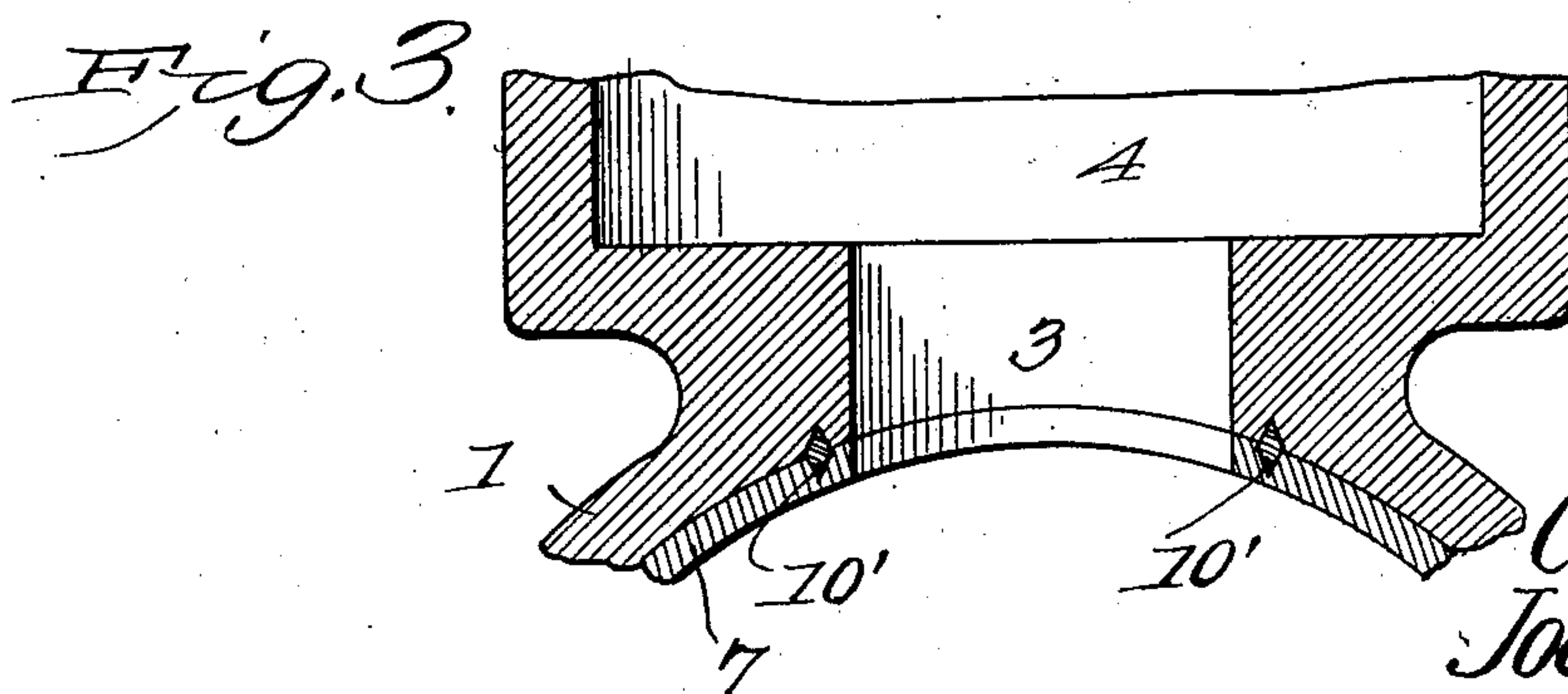
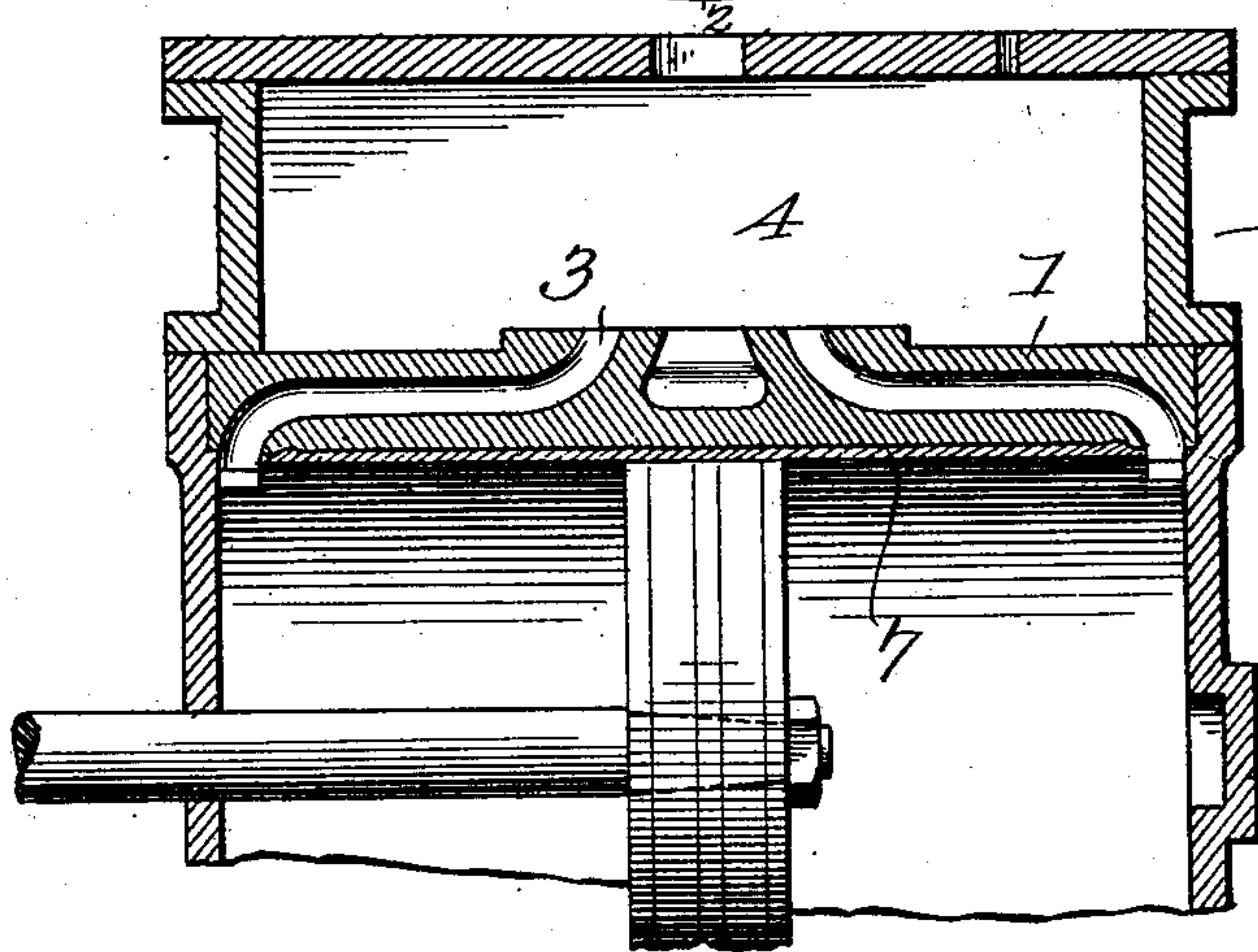
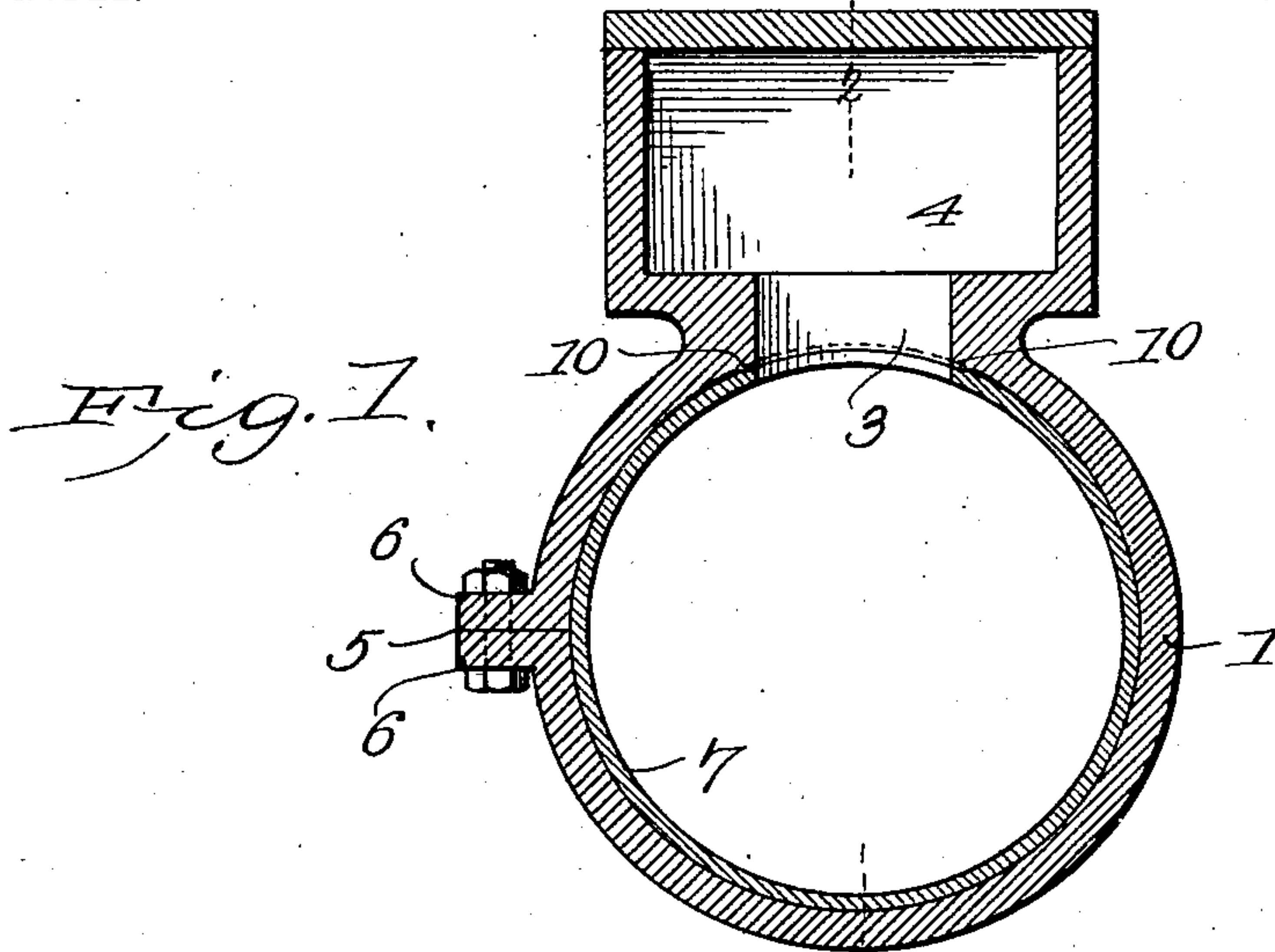
PATENTED MAR. 29, 1904.

C. F. HINRICHS & J. C. BARKER.

ENGINE CYLINDER.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.



Witnesses

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by

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## UNITED STATES PATENT OFFICE.

CHARLES F. HINRICHS AND JOEL C. BARKER, OF POPLARBLUFF,  
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## ENGINE-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 755,873, dated March 29, 1904.

Application filed October 1, 1903. Serial No. 175,388. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES F. HINRICHS and JOEL C. BARKER, citizens of the United States, residing at Poplarbluff, in the county of Butler and State of Missouri, have invented a new and useful Engine-Cylinder, of which the following is a specification.

This invention relates to certain improvements in engines of that class in which the cylinder is provided with a movable sleeve or lining which may be readily taken out of the cylinder when worn and replaced by a fresh lining, so that it becomes unnecessary to dismantle the engine and remove the cylinder to a boring-machine. Engines of this class are found highly advantageous where large machine-shops are scarce and where the reboring of a cylinder necessitates the shutting down of a plant and results in loss to both the proprietor and the workmen.

One of the principal objects of the invention is to provide a cylinder of this class with a means for preventing the entrance of steam or other actuating fluid between the lining and the shell of the cylinder.

A further object of the invention is to provide for the firm clamping and locking of the lining in position, so as to prevent all danger of independent rotative movement of the lining and consequent disarrangement of the steam-ports.

With these and other objects in view, as will hereinafter more fully appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a transverse sectional elevation of a steam-engine cylinder constructed in accordance with the invention. Fig. 2 is a partial longitudinal sectional elevation of the same on the line 2 2

of Fig. 1. Fig. 3 is a view in transverse section illustrating a slight modification of the invention.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, 1 indicates the shell or outer casing of the cylinder, provided at its opposite ends with the usual bolting-flanges for the reception of the cylinder-heads. The cylinder is provided with the usual steam inlet and escape ports 3 and is surmounted by a steam-chest 4 of any ordinary construction.

The cylinder-shell is slit longitudinally, as indicated at 5, and provided with parallel flanges 6, which may be bolted or otherwise secured together. Within the cylinder-shell is placed a cylinder-lining 7, formed of any suitable material and clamped in position when the flanges 6 are drawn together. This lining is of such character as to permit its ready removal should it become worn from constant use, and by unbolting the flanges 6 the cylinder-shell may be opened or spread sufficiently to permit the withdrawal of the worn lining and the substitution of a fresh lining without the exercise of any particular skill on the part of the workmen and without the necessity of employing expensive machinery. In using engines provided with cylinders of this character it has been found that there is a tendency of leakage of steam between the lining and the shell proper, and this frequently causes trouble, owing to condensation of the steam between the lining and the shell, and during the running of the engine the lining becomes highly heated and has an injurious effect on the packing of the piston. To overcome this and other difficulties, packing or clamping strips or ribs are arranged between the shell and the lining and disposed one on each side of the steam-ports, so as to prevent access of steam between the lining and the shell. In Fig. 1 the ribs 10 are shown as formed integral with the shell of the cylinder and said ribs are spaced apart for a dis-



tance somewhat greater than the width of the steam-ports and extend from end to end of the cylinder, so that when the shell is tightly clamped by means of the bolting-flanges the ribs will be pressed firmly against the periphery of the lining and will form a steam-tight joint, so that there will be little or no danger of the entrance of steam between the packing and the lining. Aside from this, the engagement of the ribs with the periphery of the lining will prevent any independent rotative movement of such lining, and thus avoid all danger of moving the steam-ports of the shell and lining out of proper alinement.

The construction may be modified by arranging the ribs on the lining or, as shown in Fig. 3, both the peripheral surface of the lining and the inner wall of the shell may be provided with longitudinal grooves for the reception of packing strips or bars 10', forming separate members and serving to positively interlock the parts.

With a cylinder constructed in the manner described it will be impossible for any of the steam or other actuating fluid to leak around

the lining and thus interfere with the proper working of the engine.

Having thus described the invention, what is claimed is—

1. In combination, a split cylinder-shell, a removable lining, both the shell and the lining having ports, and longitudinally-disposed packing members between the shell and the lining on opposite sides of the ports, substantially as specified.

2. In combination, a split cylinder-shell, a detachable lining, both the shell and the lining having steam-ports, and ribs formed integral with the shell at points on opposite sides of the steam-ports, said ribs being pressed firmly into engagement with the outer surface of the lining, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CHARLES F. HINRICHS.

JOEL C. BARKER.

Witnesses:

BESSIE FLANIGAN,

JOHN H. SANDERS.