

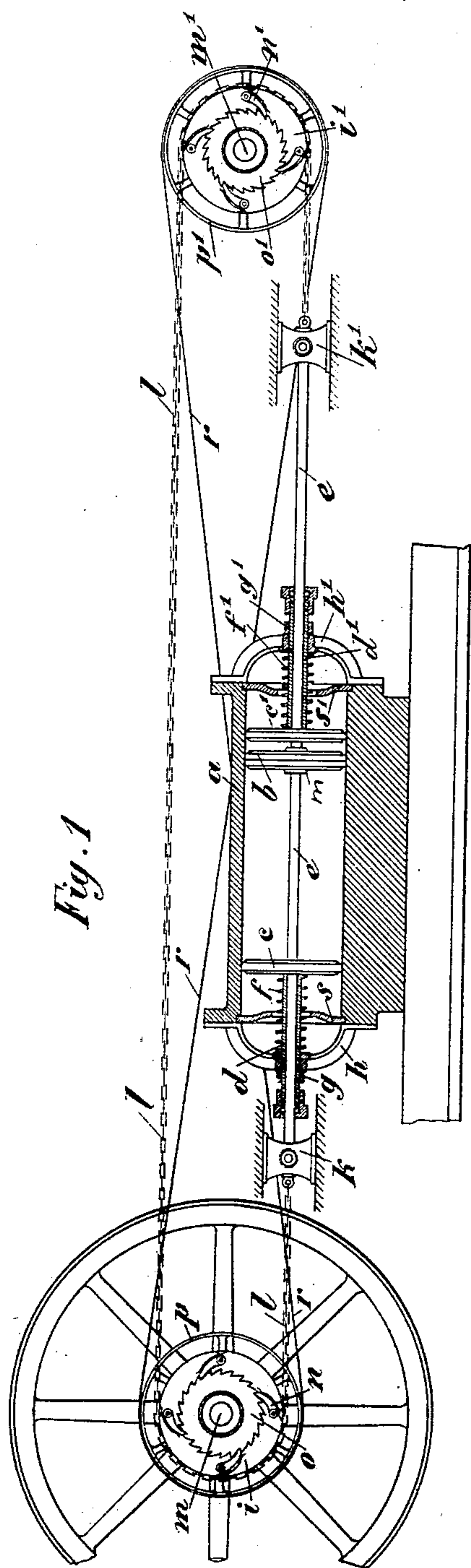
(No Model.)

O. ABRAHAM.
STEAM ENGINE.

2 Sheets—Sheet 1.

No. 602,418.

Patented Apr. 19, 1898.



Witnesses
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S. J. Williamson

Inventor
Otto Abraham
by Geo. H. Holgate
Attorney

(No Model.)

2 Sheets—Sheet 2.

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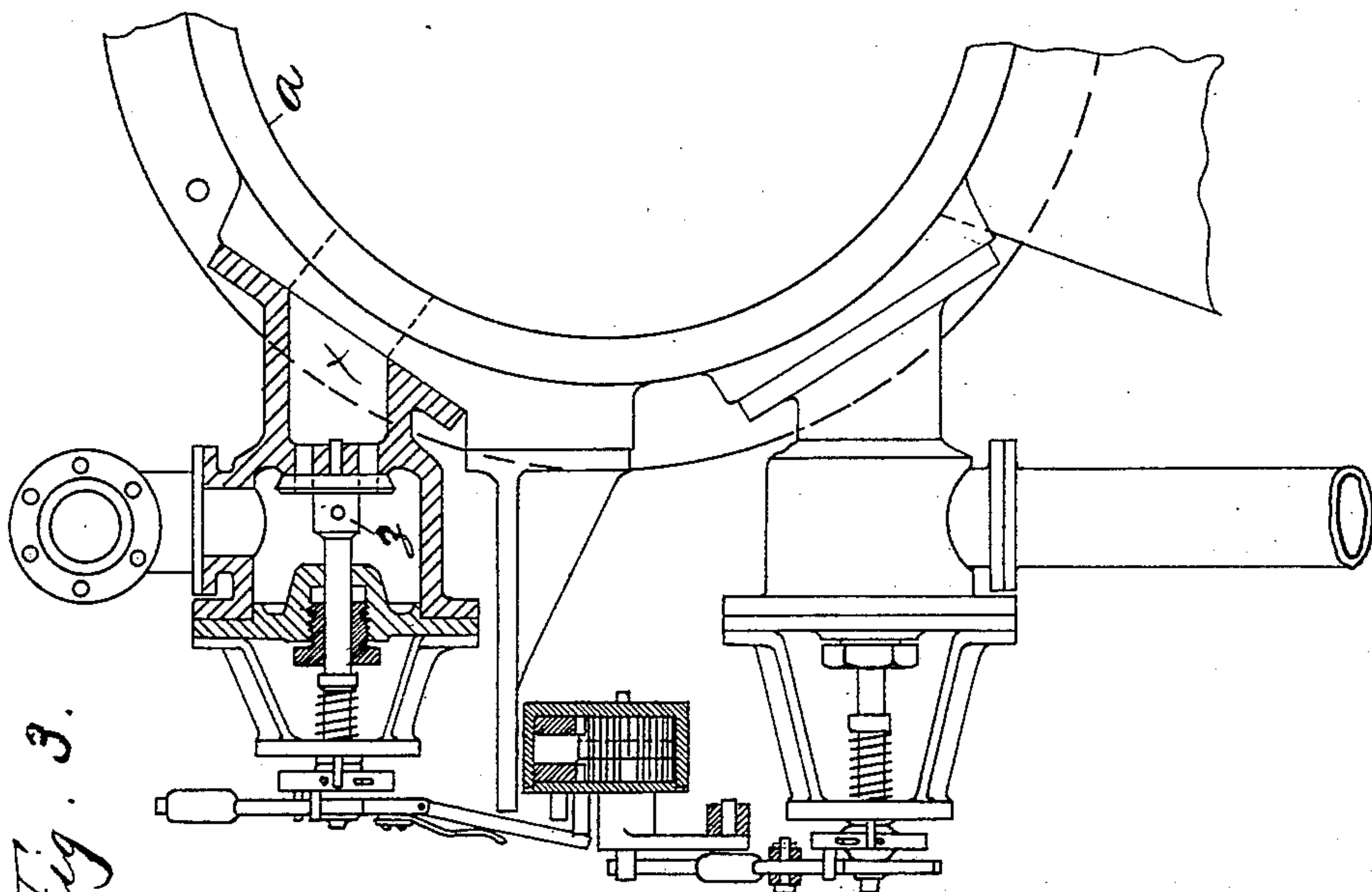


Fig. 3.

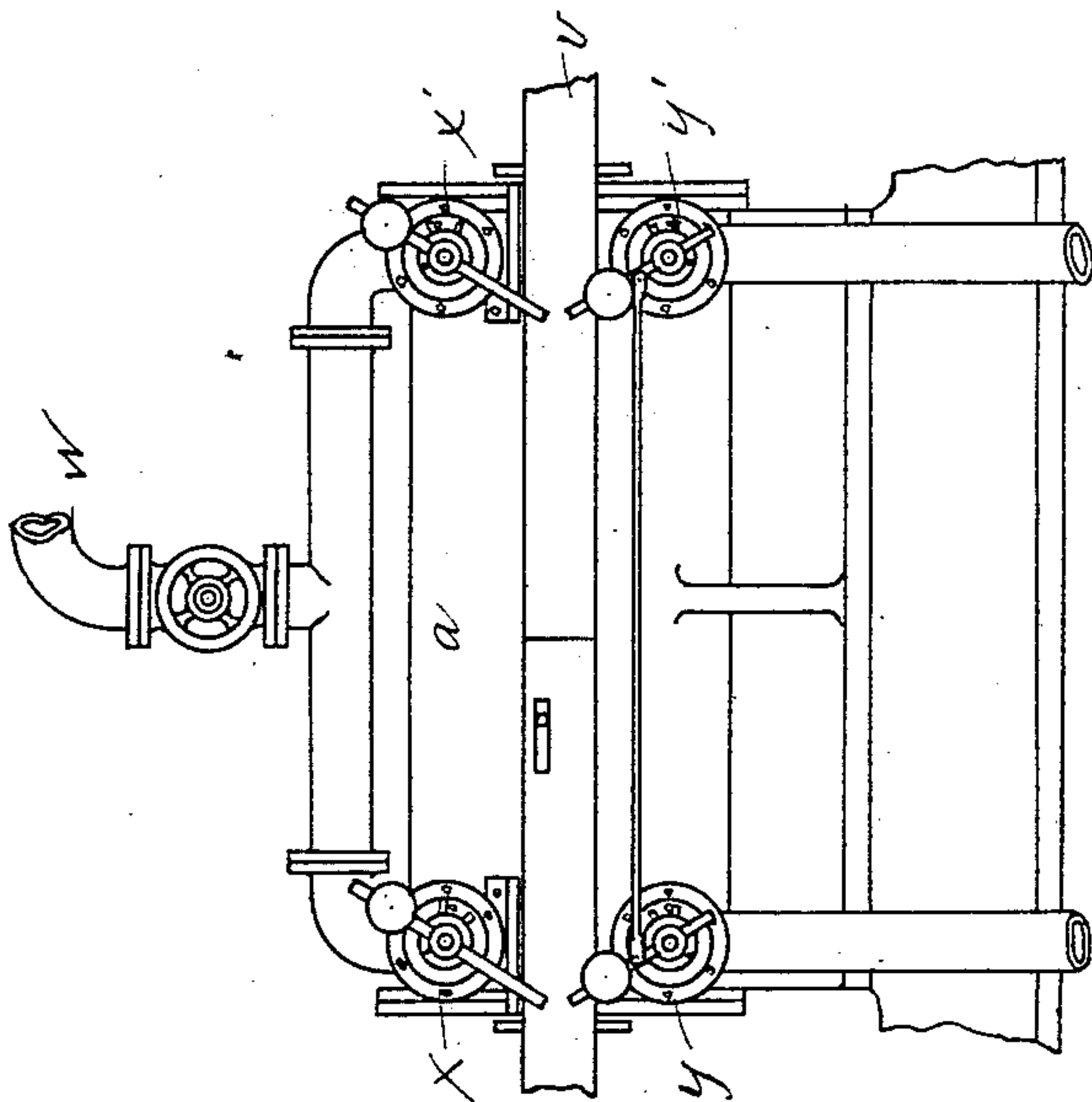


Fig. 2.

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UNITED STATES PATENT OFFICE.

OTTO ABRAHAM, OF PLATKOW, GERMANY.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 602,418, dated April 19, 1898.

Application filed July 30, 1896. Serial No. 601,047. (No model.) Patented in Germany March 25, 1896, No. 89,609; in France April 7, 1896, No. 255,386; in England June 17, 1896, No. 13,333, and in Belgium April 7, 1897, No. 120,751.

To all whom it may concern:

Be it known that I, OTTO ABRAHAM, a subject of the Emperor of Germany, residing at Platkow, near Gusow, Prussia, Germany, have invented new and useful Improvements in Steam-Engines, (for which I have obtained patents in the following countries, viz: Germany, No. 89,609, dated March 25, 1896; France, No. 255,386, dated April 7, 1896; Belgium, No. 120,751, dated April 7, 1897, and England, No. 13,333, dated June 17, 1896,) of which the following is a specification.

This invention relates to new and useful improvements in steam-engines, and has for its object to so construct the steam-cylinder that an even motion will be imparted to the piston.

With the above object in view the invention consists in the novel construction, combination, and arrangement of parts hereinafter described, and designated in the claim.

Referring to the drawings, Figure 1 is a side elevation, partly in section, to more clearly show the construction of the same. Fig. 2 is a view in elevation of the valve admission and exhaust mechanism, and Fig. 3 is a sectional view thereof.

In place of the usual heads in each end of the cylinder *a* I provide in this invention two pistons *c c'*, which are tightly fitted in each end of the cylinder. The piston-rod *e* of the steam-piston *b* is run through the guide-rods *d d'* and the pistons *c c'*, which are rigidly secured to said rods, and the piston-rod is connected at each end to the cross-heads *k k'*, which work in suitable guides. Coil-springs *f f'* encircle the guide-rods *d d'* and bear against the pistons *c c'* and the braces *h h'*, which are secured across each end of the cylinder.

In order that the movement of the pistons *c c'* may be limited, I provide the buffers *s s'* between the braces *h h'* and the ends of the cylinder, thereby limiting their outward movement, and to limit their inward move-

ment secure the stops *g g'* on the guide-rods *d d'*, which when the pistons are moved inwardly abut against the braces *h h'*.

In Figs. 2 and 3 I have shown the valve admission and exhaust mechanism consisting of the admission-ports *x x'*, located at each end of the cylinder with the steam-supply pipe *w*, having branch pipes leading thereto. *y y'* indicate the exhaust-ports and are situated below the admission-ports. Controlling these ports are suitable valves *z*, of any suitable construction, and these valves are adapted to be operated by the valve-rod *v* in the usual manner.

From the foregoing description it will be seen that the device operates as follows: It being assumed that the piston *b* is in the position shown in Fig. 1, there is a space left between said piston and the piston *c'* on account of the hub *m*. The steam enters this space and acts against both pistons *b* and *c'*, compressing the spring *d'*, moving the piston *c'* outward and the piston *b* in the opposite direction. Said piston *c'* returns while the steam expands, and the steam-piston *b* is moved by the action of the spring *d'*, which was compressed by the steam first admitted. Thus a very even reciprocating movement is imparted to the piston-rod *e*.

Having thus fully described my invention, what I claim as new and useful is—

In combination with a cylinder, tight pistons operating in each end of the cylinder, a steam-piston working between the tight pistons, a piston-rod, cross-heads working in guides, guide-rods, stops on the guide-rods, and springs for controlling the action of the pistons, substantially as described.

In testimony whereof I hereunto set my hand in presence of two witnesses.

OTTO ABRAHAM.

Witnesses:

W. HAUPT,
CHARLES H. DAY.