

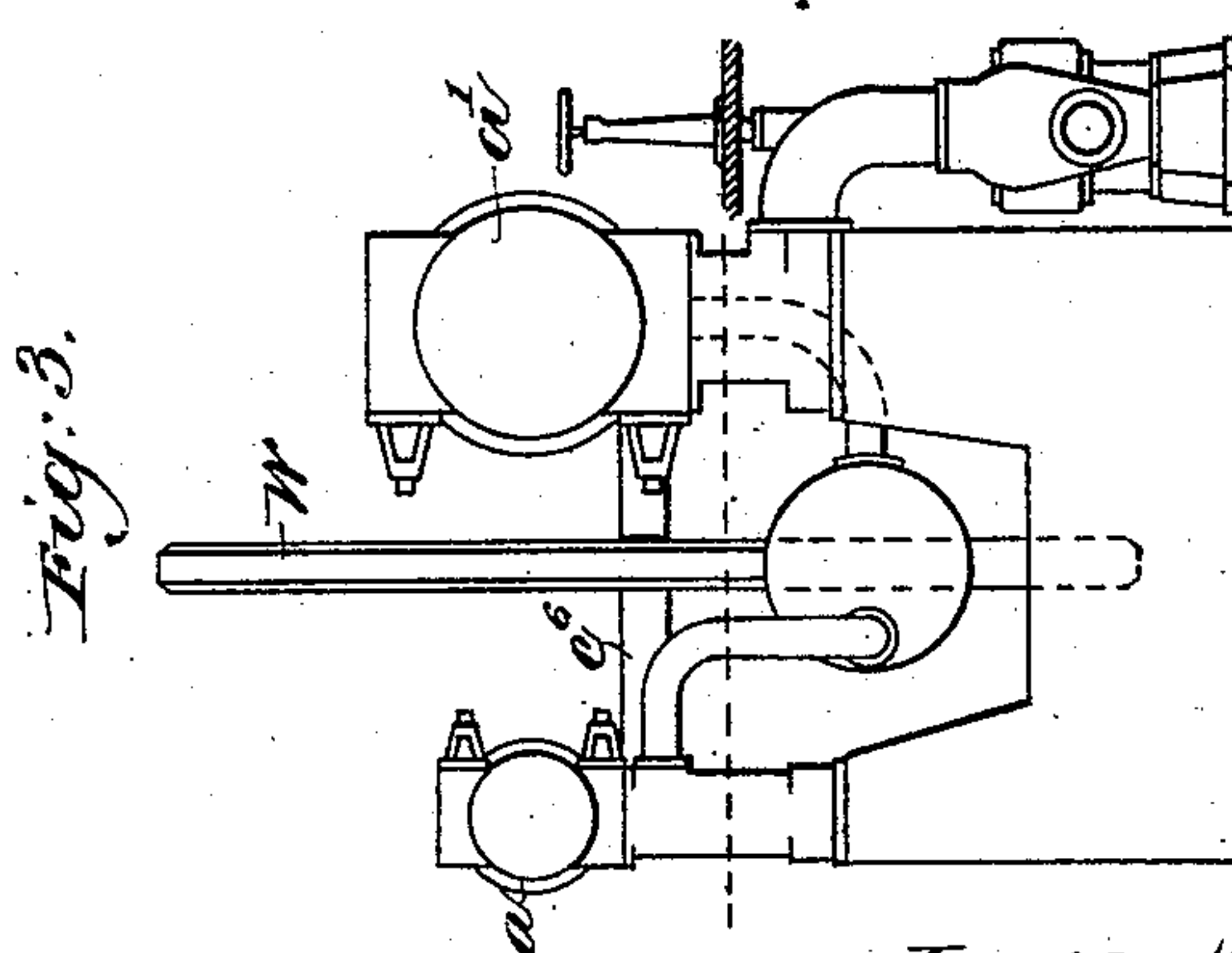
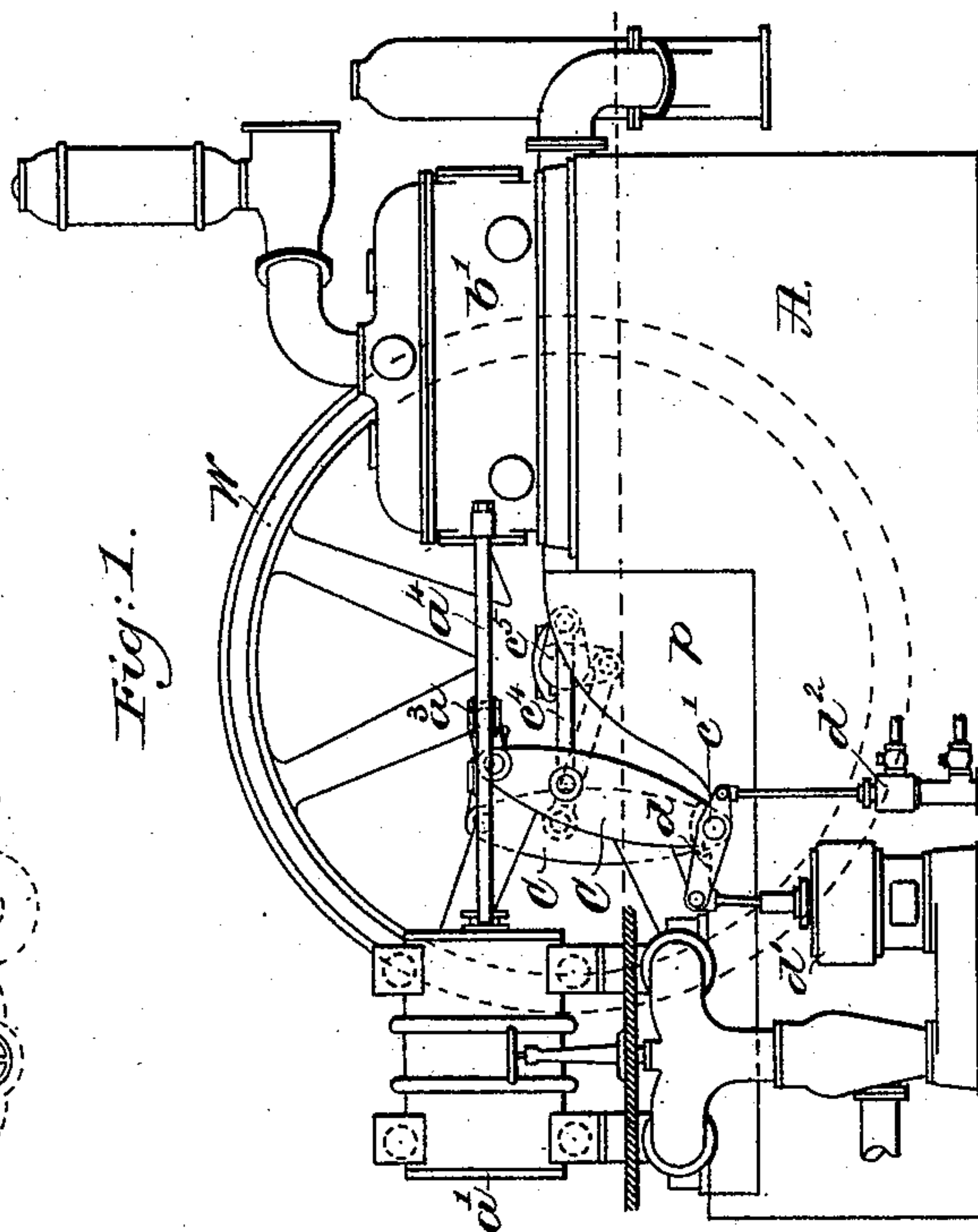
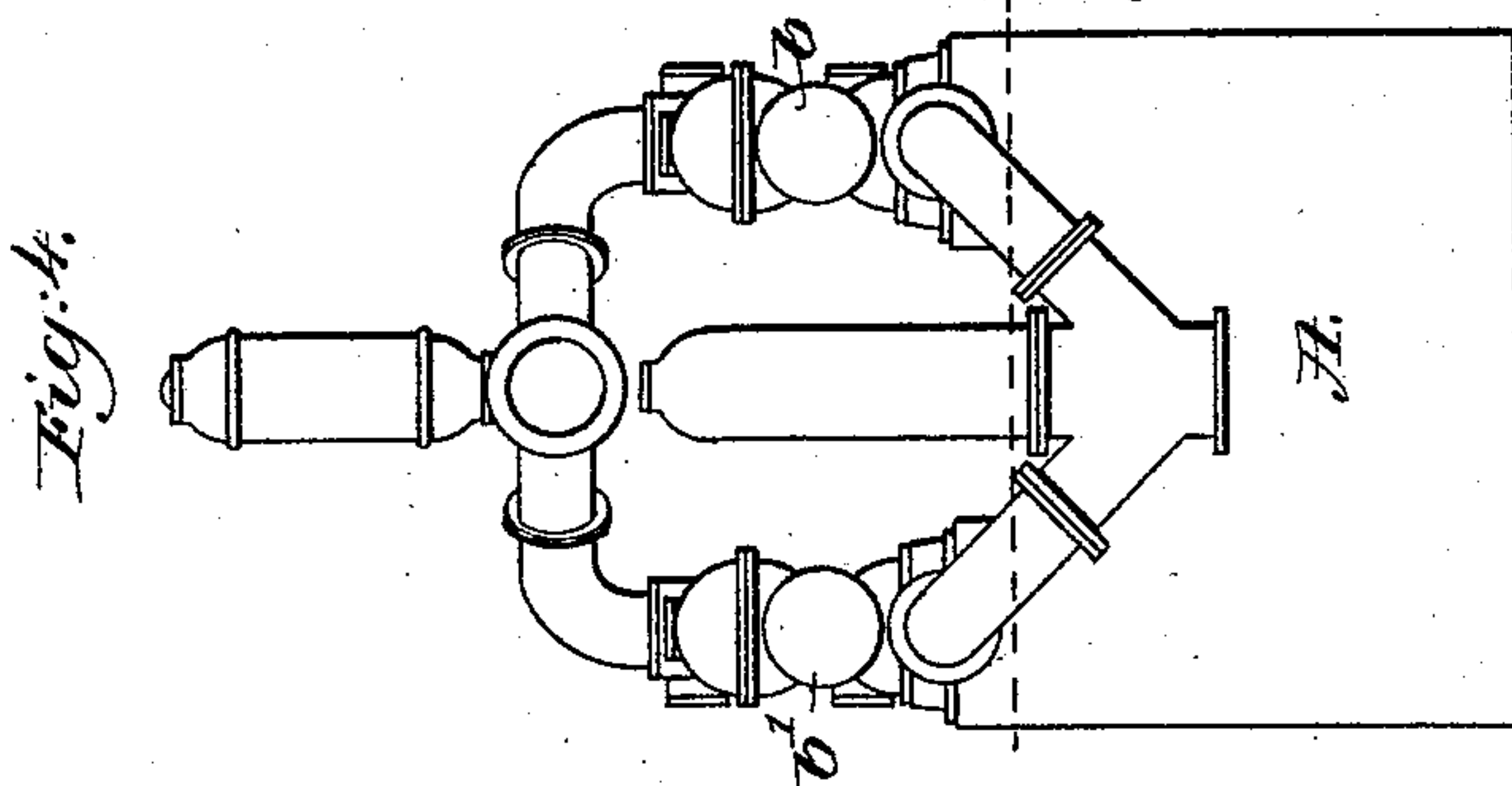
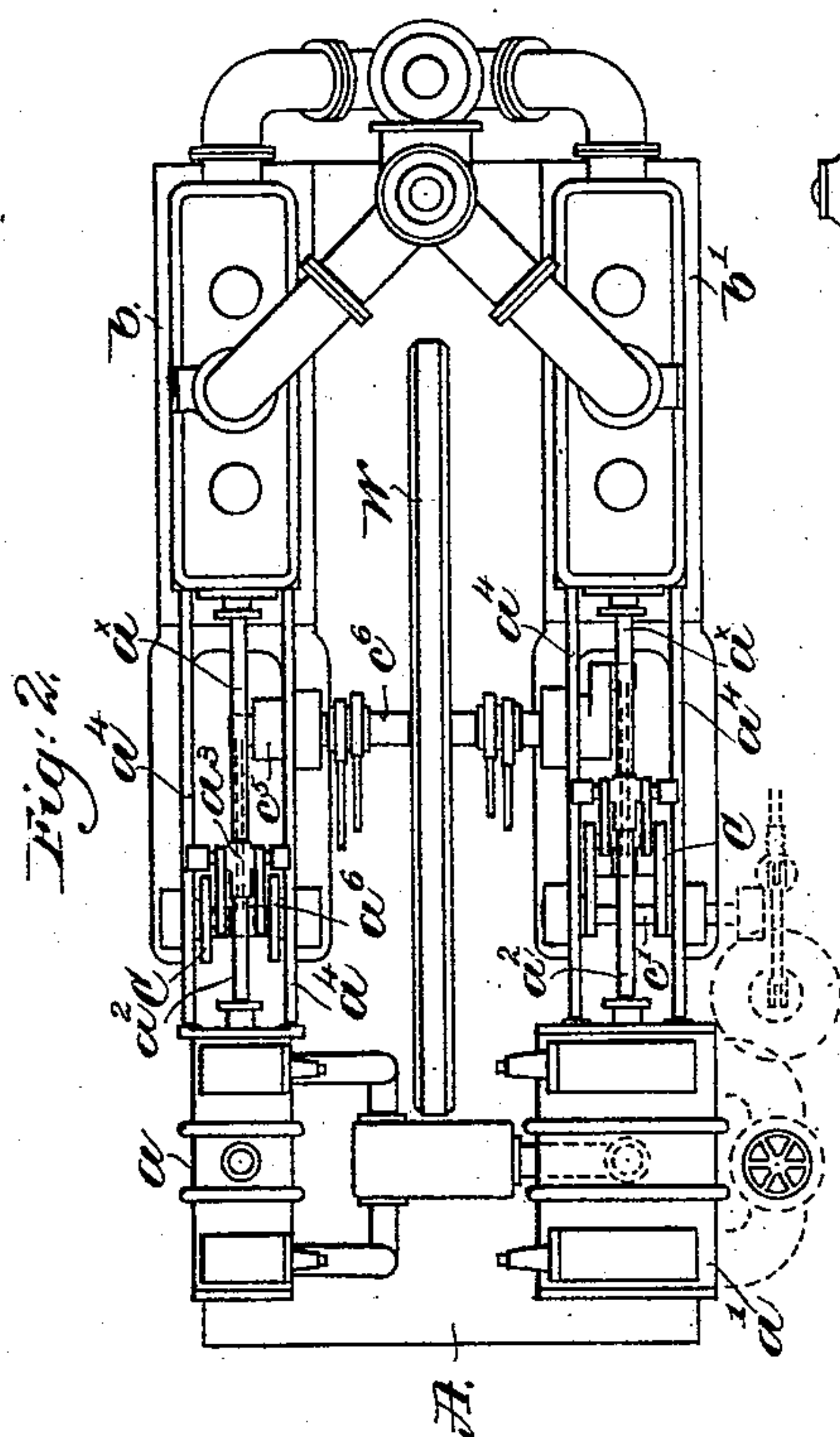
(No Model.)

3 Sheets—Sheet 1

A. F. HALL.
STEAM PUMP.

No. 455,868.

Patented July 14, 1891.



Witnesses.

Fred S. Gamble,
Geo. C. Huntington.

Inventor:
Albert F. Hall,
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Attys

(No Model.)

3 Sheets—Sheet 2.

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STEAM PUMP.

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Patented July 14, 1891.

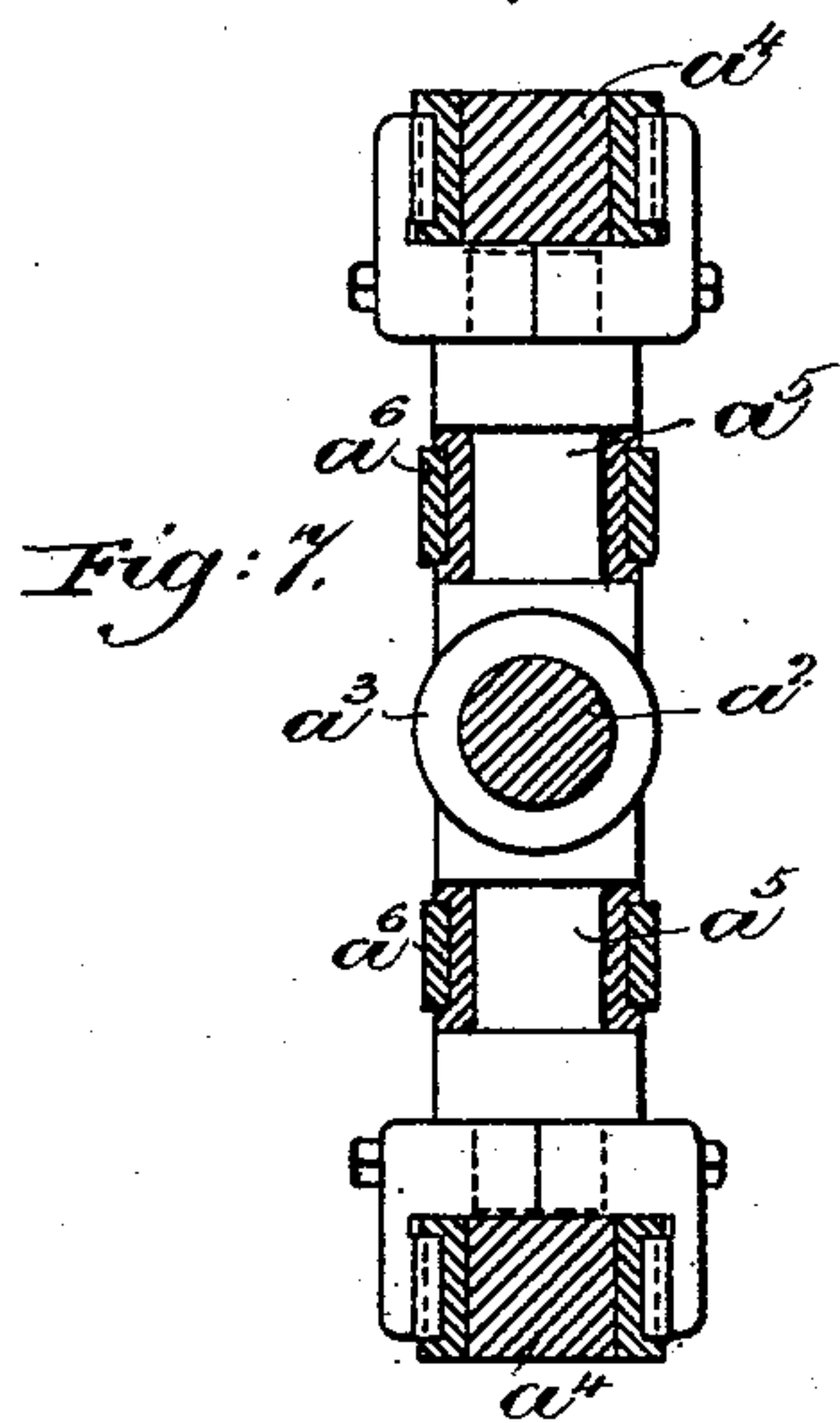


Fig: 7.

Fig: 8.

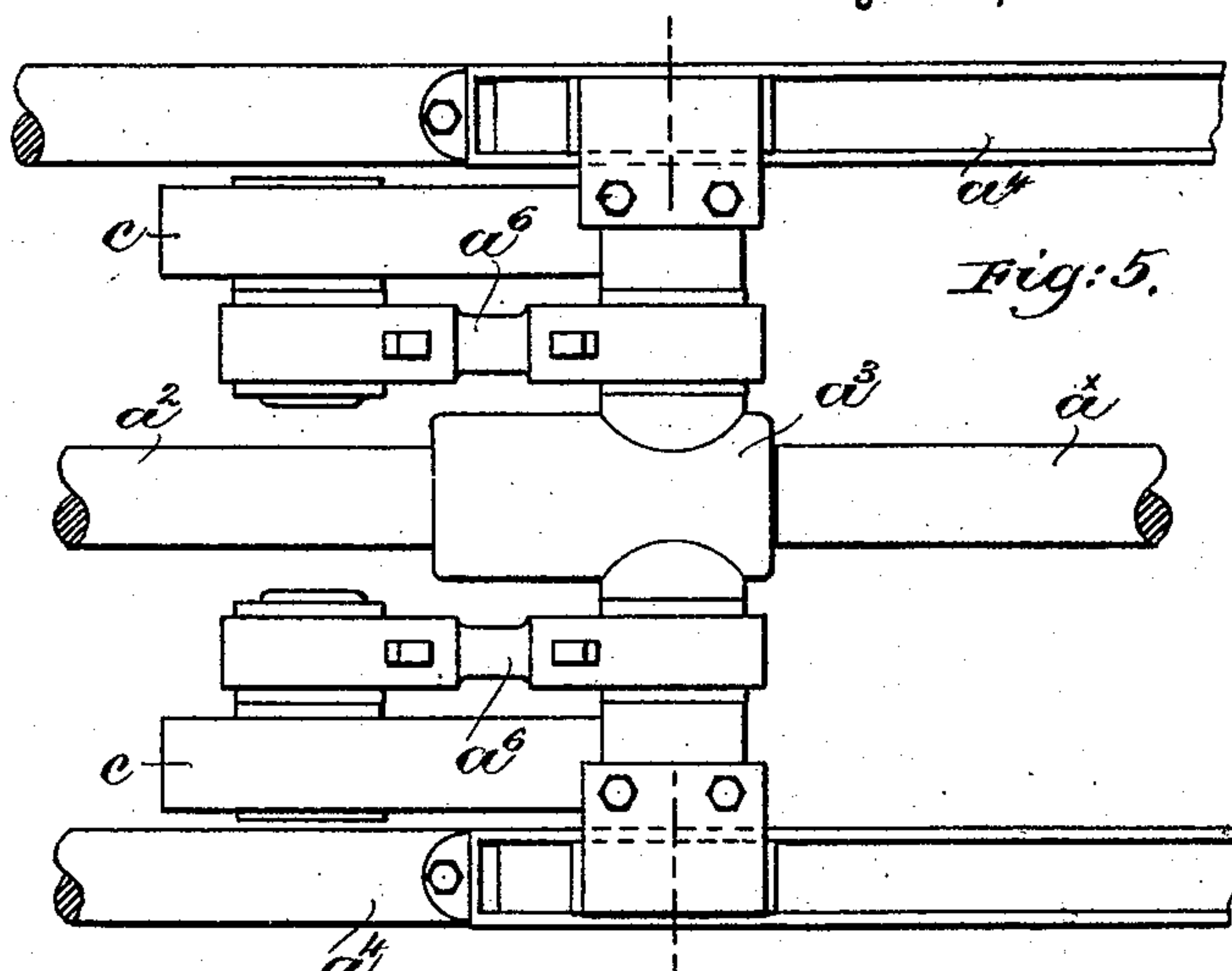
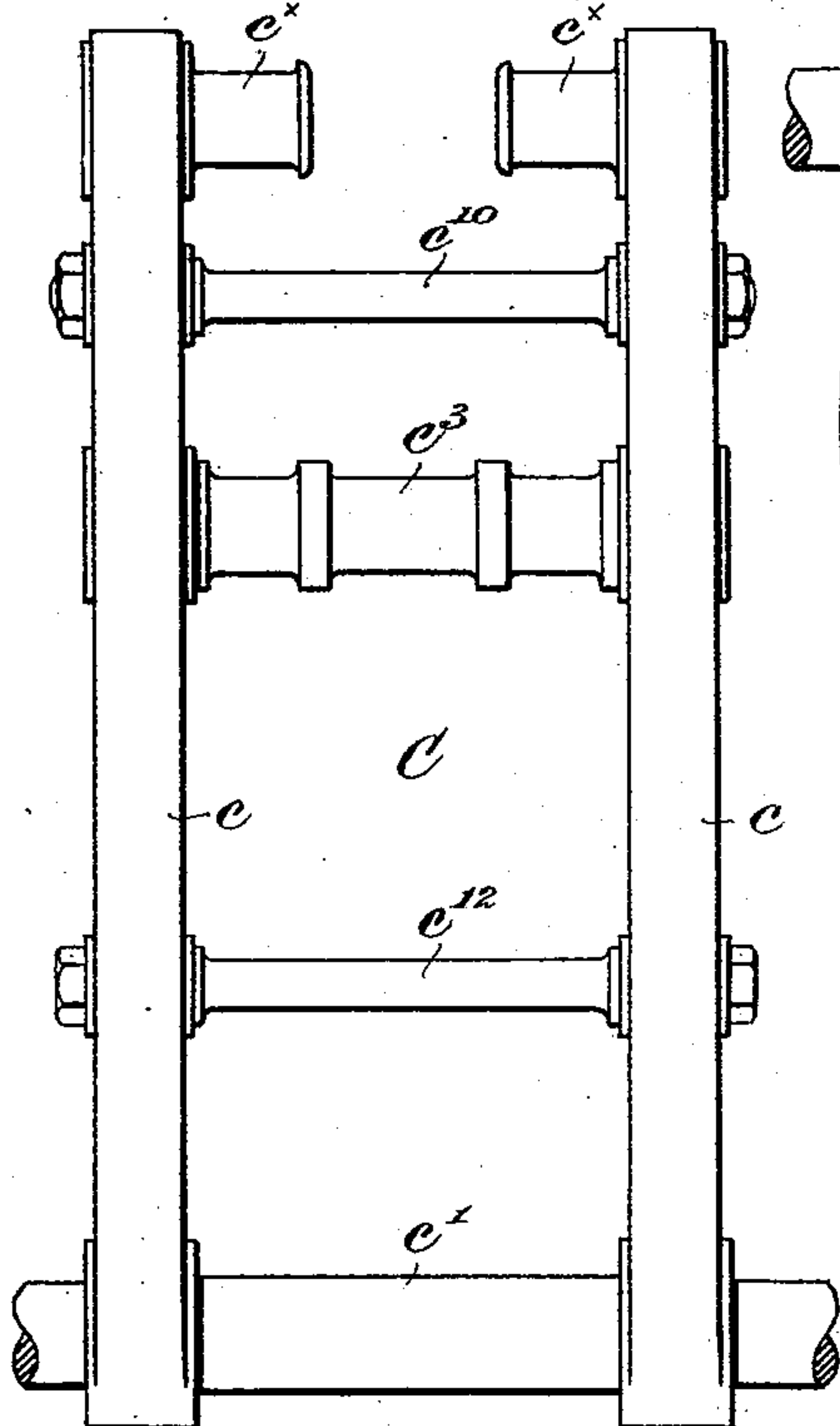
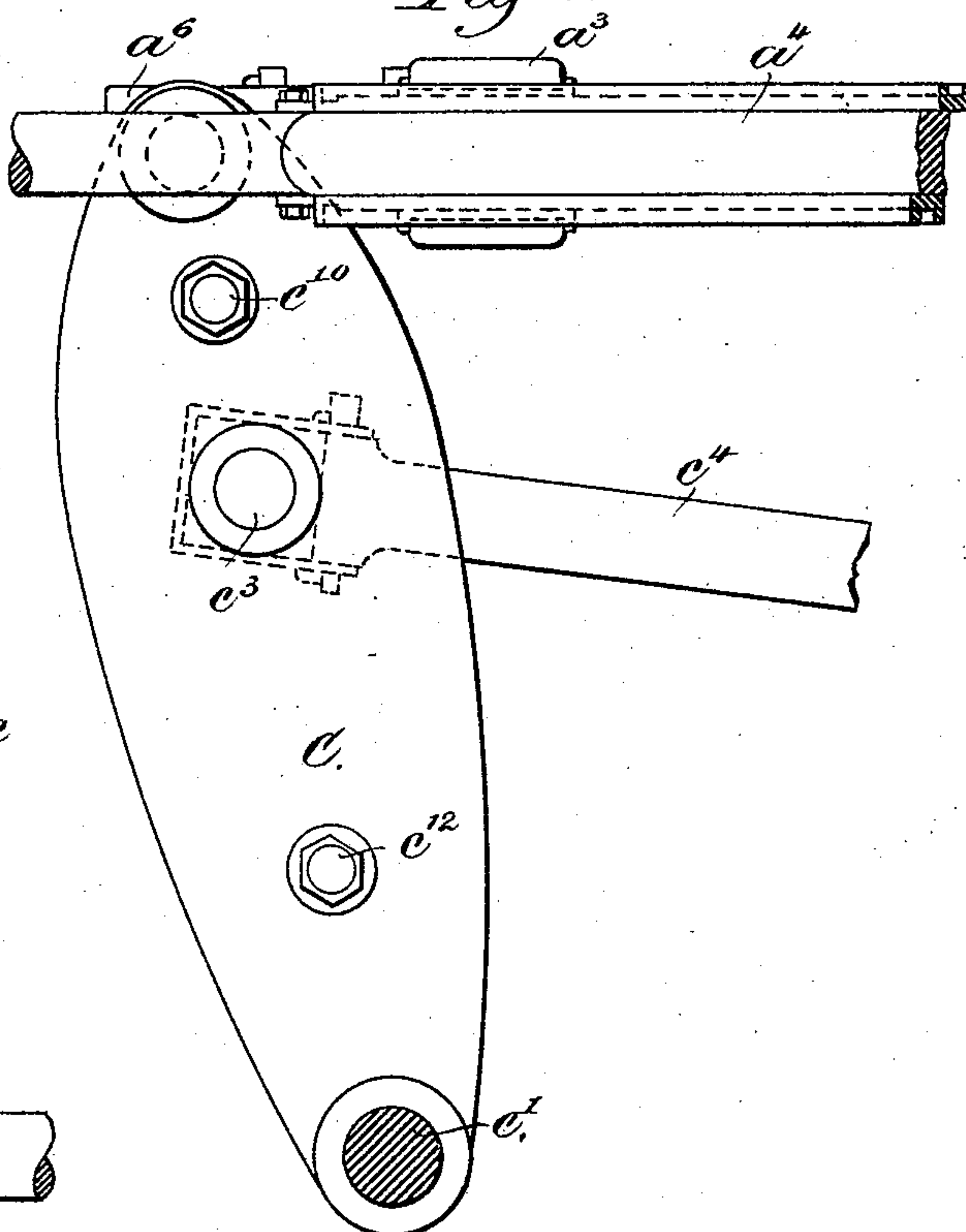


Fig: 5.

Fig: 6.



Witnesses.

Fred S. Gifford of
Geo. B. Huntington.

Inventor.

Albert F. Hall,
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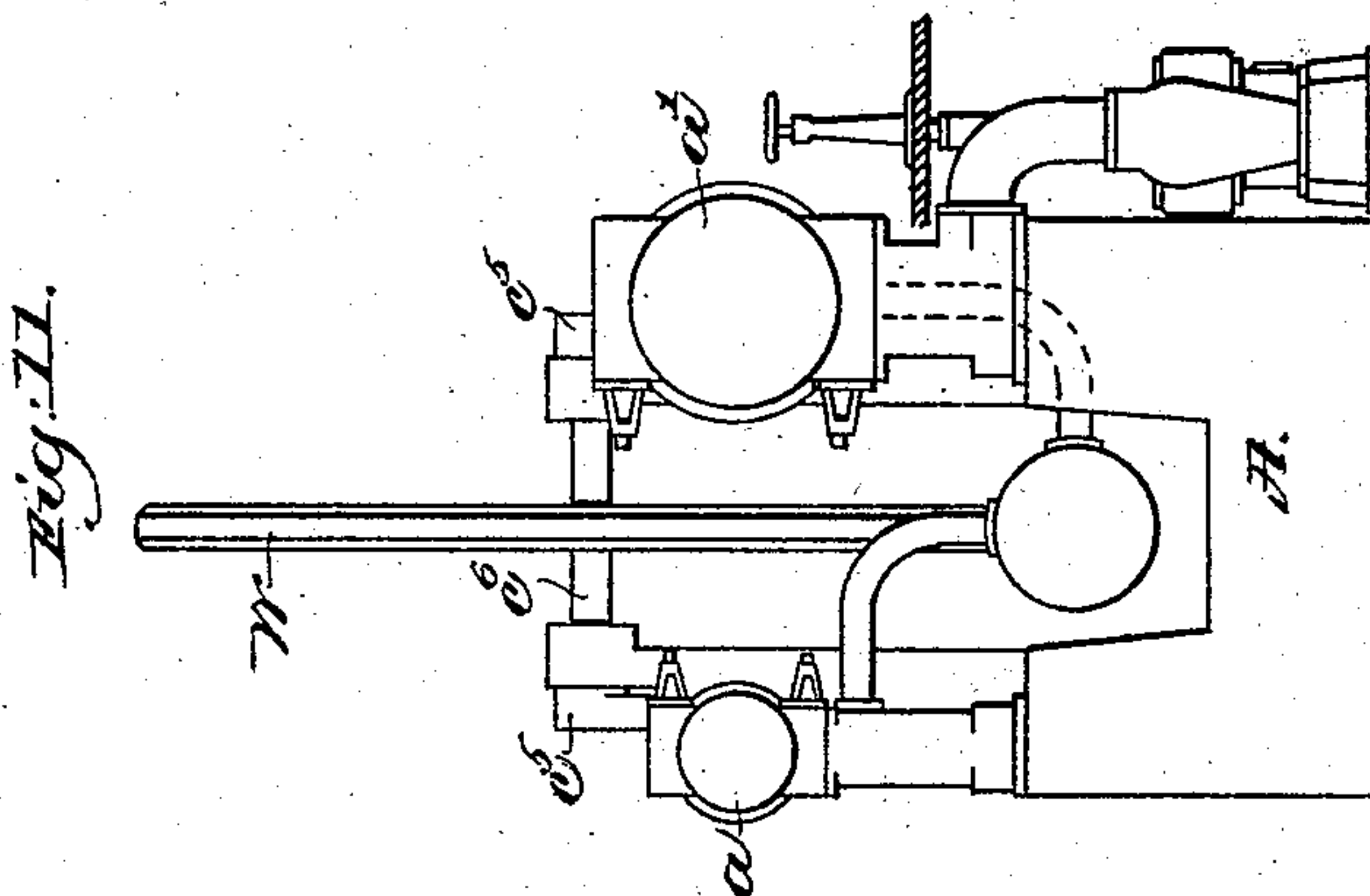
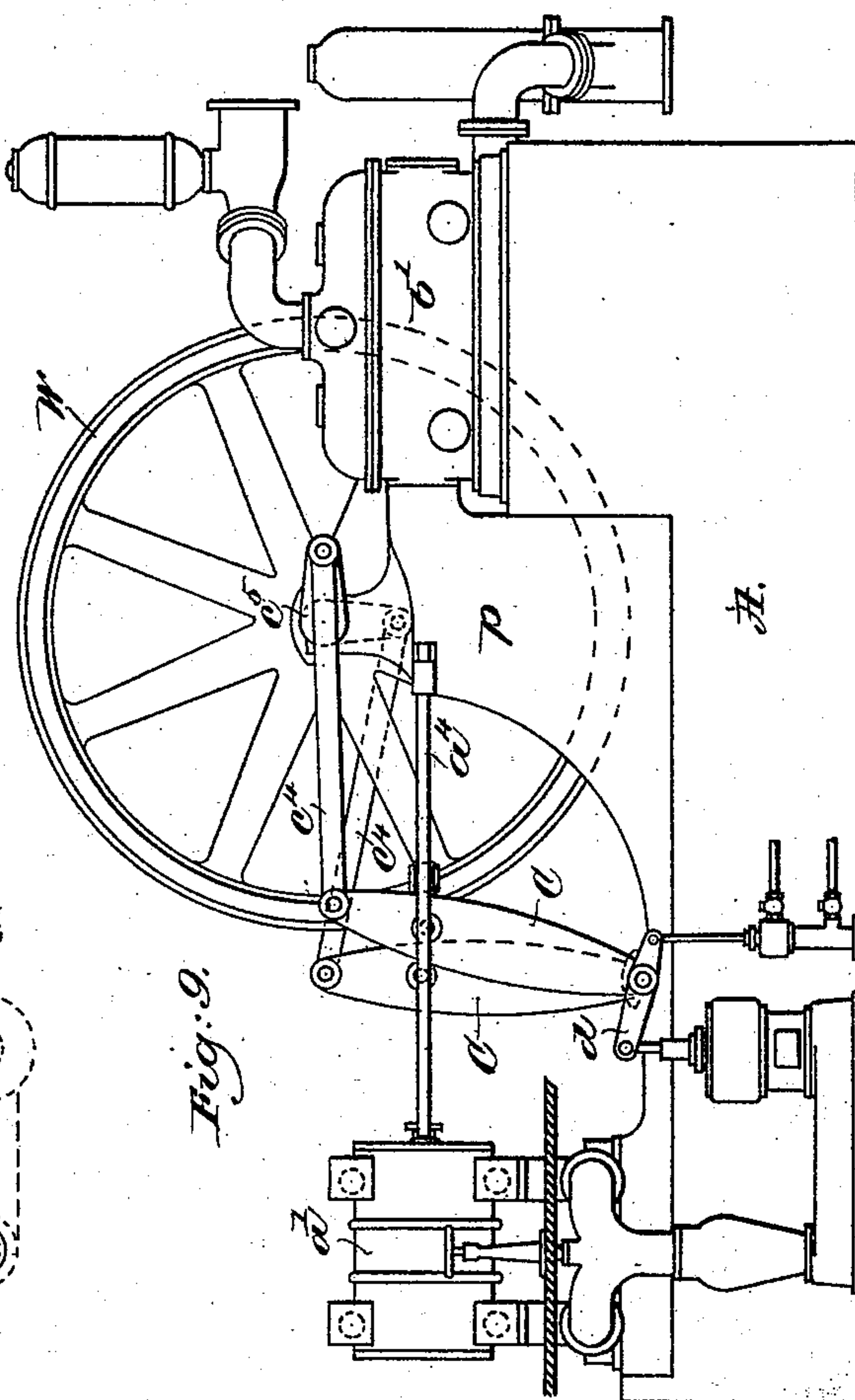
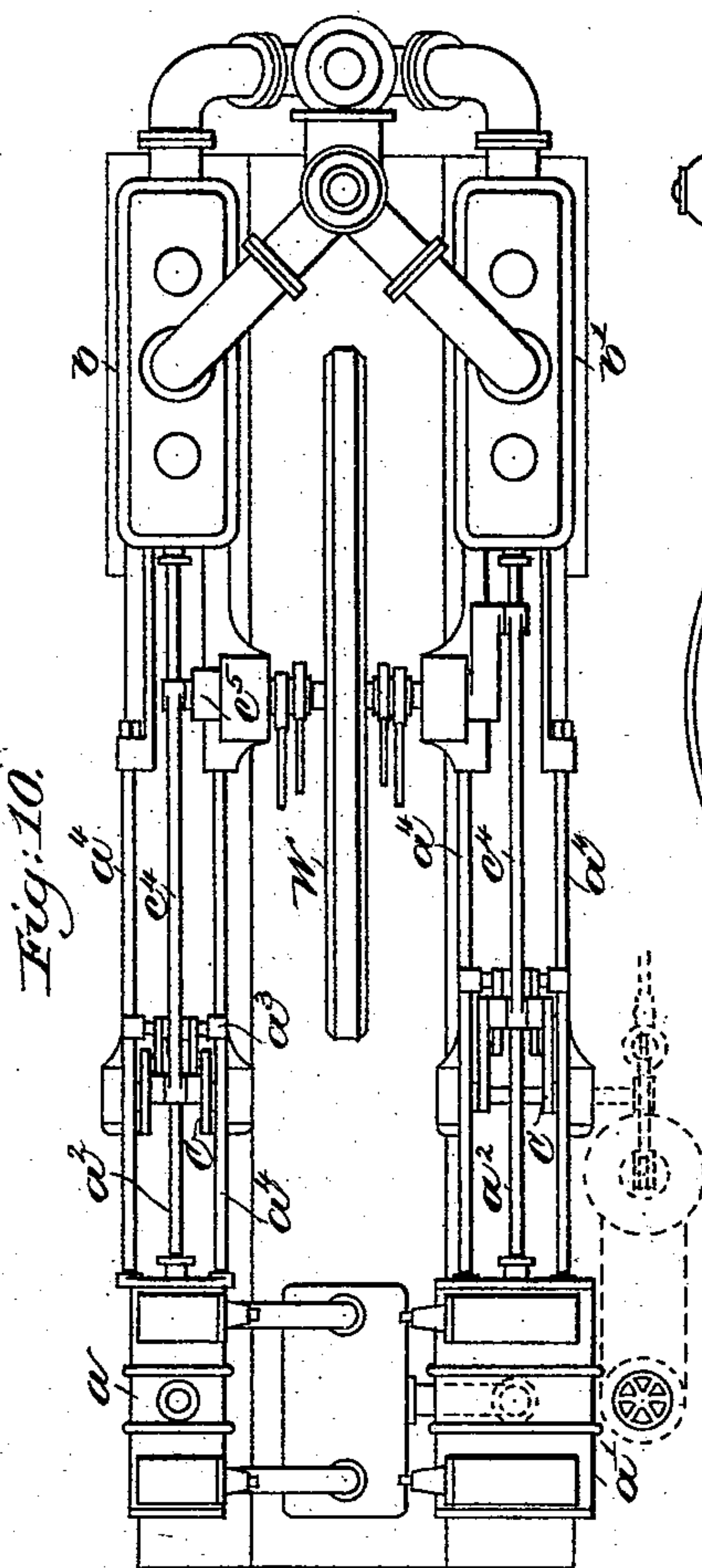
(No Model.)

3 Sheets—Sheet 3.

A. F. HALL.
STEAM PUMP.

No. 455,868.

Patented July 14, 1891.



Witnesses.

Frederick Greenleaf
Geo. C. Huntington.

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UNITED STATES PATENT OFFICE.

ALBERT F. HALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE GEO. F. BLAKE MANUFACTURING COMPANY, OF NEW JERSEY.

STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 455,868, dated July 14, 1891.

Application filed September 19, 1890. Serial No. 365,528. (No model.)

To all whom it may concern:

Be it known that I, ALBERT F. HALL, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Steam-Pumps, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to pumping-engines of the beam and fly-wheel type, and has for its object to improve and simplify the construction of the same, whereby economy in space is effected and a machine is produced in which the stresses are properly distributed for a smooth-running and serviceable engine.

The prime feature of this improved engine is a pair of steam and pump cylinders whose axes are coincident and whose pistons are connected practically with the same piston-rod, and between which steam and pump cylinders are placed in accordance with this invention a pivoted oscillating beam and crank-shaft, the pivot of said beam and axis of said crank-shaft being either on the same or opposite sides of the aforesaid piston-rod, one end of said beam being pivoted and the other end being connected either with the cross-head attached to the piston-rod or with the crank-shaft, the beam between its ends being connected either with the crank-shaft or cross-head, as will be described.

Air, feed, or other auxiliary pumps may be attached to the shaft to which the pivoted end of the beam is secured.

The particular features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 shows in side elevation a pump embodying this invention; Fig. 2, a top or plan view of the same; Figs. 3 and 4, left and right hand end views, respectively, of Fig. 1; Figs. 5, 6, 7, and 8, details to be referred to; and Figs. 9, 10, and 11, views of modified forms of pump embodying my invention.

Referring to the drawings, Figs. 1 to 8, inclusive, the bed or foundation A, of suitable form and construction, supports one form of pump with which to practice this invention, it consisting of the steam-cylinders $a a'$, located side by side near one end of the bed or foundation, and the pump or water cylinders

$b b'$, located side by side near the opposite end of the said bed or foundation.

The usual pistons in the steam and water cylinders are directly connected, respectively, by the piston-rods $a^2 a^x$ to a cross-head a^3 , fitted to and adapted to slide on suitable guide-bars a^4 , secured, as herein represented, to the said cylinders.

Each cross-head a^3 is provided, as herein shown, with wrist-pins a^5 , (see Figs. 5 and 7,) to which are loosely connected one end of links a^6 , having their opposite ends connected with a beam, preferably composed of two like members c , united together by tie bars or rods c^{10} , said members being provided, as shown, with studs or pins c^x , to which the links a^6 are secured. The members c of the beam C are fast on a shaft c' , having bearings in a pedestal P, located between the steam and pump cylinders and secured to the bed or foundation, the said pedestal being preferably made separate therefrom. The shaft c' constitutes the fulcrum for the beam.

The members c of each beam between their ends have secured to them a stud or rod c^3 , with which is joined a connecting-rod or pitman c^4 , having its other end fastened to a crank c^5 on the crank-shaft c^6 , having bearings in the pedestal P, and provided with a fly or balance wheel W, located between the two sets of piston-rods.

The cranks c^5 on the crank-shaft c^6 are herein shown as placed at right angles with each other.

The pivotal shafts c' of the beams C may be provided, as herein shown, with levers or arms d , by which to operate the usual air-pump d' and force-pump d^2 , which are and may be of any well-known construction such as now commonly employed.

As shown in Fig. 1, the crank-shaft c^6 is located on the same side of the piston-rods $a^2 a^x$ as the fulcrum-shaft c' , the connecting-rod c^4 being connected to the beam at a point intermediate of its ends, and while this construction is preferred it is not desired to limit the invention in this respect, as the crank-shaft c^6 may be located above or on the opposite side of the piston-rods $a^2 a^x$, as shown in Figs. 9, 10, and 11.

In the construction shown in Fig. 9 the pins

or studs c^x are secured to the members c of the beam intermediate of their ends at a point substantially on a line with the axis of the piston-rod a^2 , the said pins being joined to the cross-head by the links a^6 .

This invention thus far described is applied to a compound pump wherein the steam-cylinders are placed side by side, and the crank-shaft is provided with two cranks set on the quarter and with which two beams C are used; but it is not intended to limit the construction in this respect, as the invention is equally well adapted to be used with other forms of pumps wherein the crank-shaft is provided with a single crank and but a single beam C is connected thereto.

In the construction shown and described the beams C are of considerable length, and the pins or studs c^x , to which the links a^6 are connected, are substantially on a line with the axis of the piston-rods, and the arcs described by the pins or studs c^x are of such radii that their movement either side of the axis of the piston-rods is slight, thereby enabling short links a^6 to be used without causing excessive pressure on the guide-bars a^4 , due to the angularity of the said links, and by operating the connecting-rod c^4 and crank c^5 from the rocking beam C the pressure usually borne by the cross-heads and their guides is in this instance transferred to the fulcrum-shaft c' of the beam, the bearings of which shaft may be of any desirable size.

The arrangement described makes it possible to construct an engine more compact than where the piston of the pump-cylinder is connected with the piston-rod extended through the back head of the steam-cylinder or where the connecting-rod is connected with the piston-rod extended through the back head of the pump-cylinder. It relieves the pump-cylinder from the weight of the fly-wheel, which in some engines is mounted upon a shaft supported in pedestals upon the top of said pump-cylinder, and consequently reduces the vibration of the engine by supporting the crank or fly-wheel shaft and the shaft of the rocking beam in bearings secured to or forming part of the pedestal or foundation. The greater part of the steam-pressure being transmitted directly in a straight line from the steam-cylinder to the water-cylinder and the energy absorbed and given out by the fly-wheel being transferred in such a favorable manner tends to make the engine durable and smooth in its action.

By bringing the crank-shaft nearer the cen-

ter of the pump the steam-cylinder valves can be operated more conveniently therefrom and with fewer parts.

It is not desired to limit this invention to the particular construction and arrangement of the various parts shown, nor is it desired to confine the novel features of this invention to any particular kind of pump.

The invention is shown as applied to a horizontal pump; but it is evident that it may be applied equally well to a vertically-operating pump.

I claim—

1. In a pump of the class described, the combination of the following instrumentalities, viz: a bed, two steam-cylinders arranged side by side, pistons therein, two pump-cylinders arranged side by side and in line, respectively, with said steam-cylinders, plungers therein, piston-rods connecting the opposite pistons and plungers, pedestals between the said steam and pump cylinders, rocking beams pivoted at their lower ends in said pedestals and actuated by links from cross-heads on said piston-rods, a crank-shaft placed between said rocking beams and supported at its ends in bearings in the said pedestals and having outside said bearings cranks actuated by connecting-rods jointed to said beams, and a fly-wheel on said crank-shaft and between said pedestals, all substantially as described.

2. In a pump of the class described, the combination of the following instrumentalities, viz: a bed, two cylinders arranged side by side, pistons therein, two pump-cylinders arranged side by side and in line, respectively, with said steam-cylinders, plungers therein, piston-rods connecting said pistons and plungers, pedestals P between the said steam and pump cylinders, rocking beams C , pivoted at their lower ends in the said pedestals and actuated at their upper ends by links a^6 from cross-heads on the said piston-rods, a crank-shaft c^6 , placed between said rocking beams and supported at its ends in bearings in the said pedestals, and having outside of said bearings cranks actuated by connecting-rods c^4 , jointed to said beams between their ends, and a fly-wheel W on said crank-shaft between said pedestals, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT F. HALL.

Witnesses:

GEO. W. GREGORY,
JAS. H. CHURCHILL.