

No. 684,431.

Patented Oct. 15, 1901.

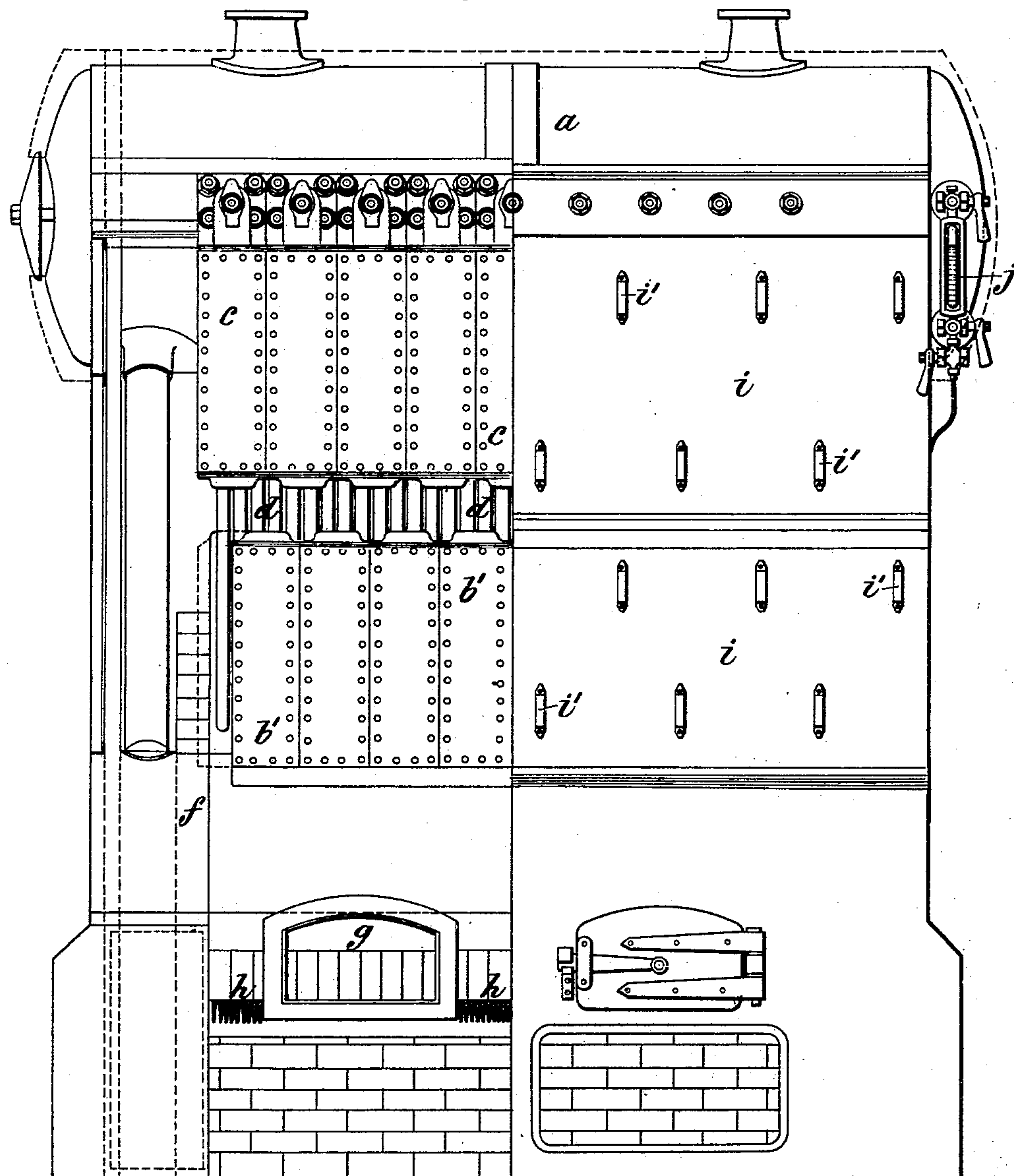
J. M. HURD.
WATER TUBE STEAM GENERATOR.

(Application filed July 18, 1901.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses.

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By his Attorneys,*

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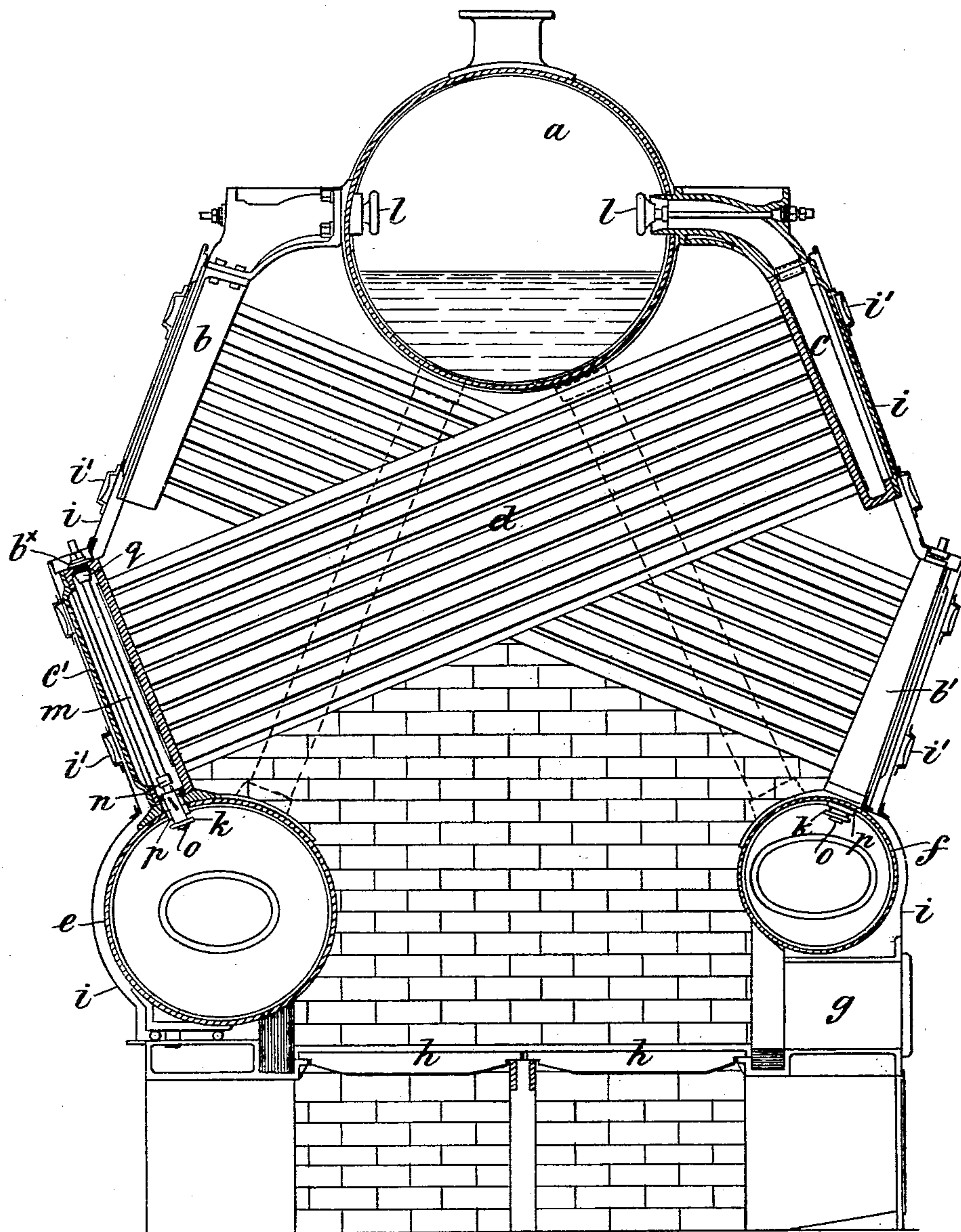
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Fig. 2.



Witnesses

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Fig. 5.

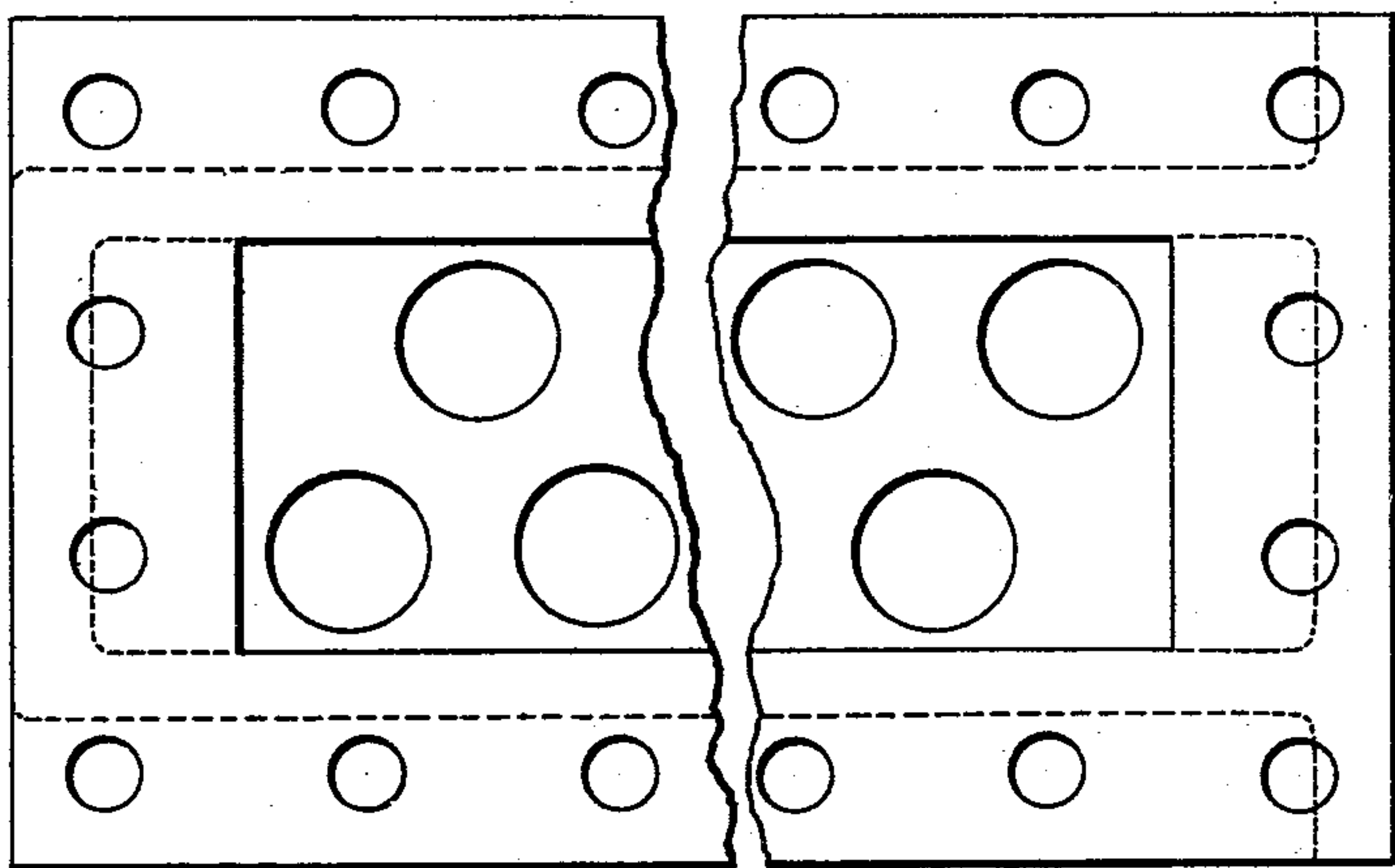
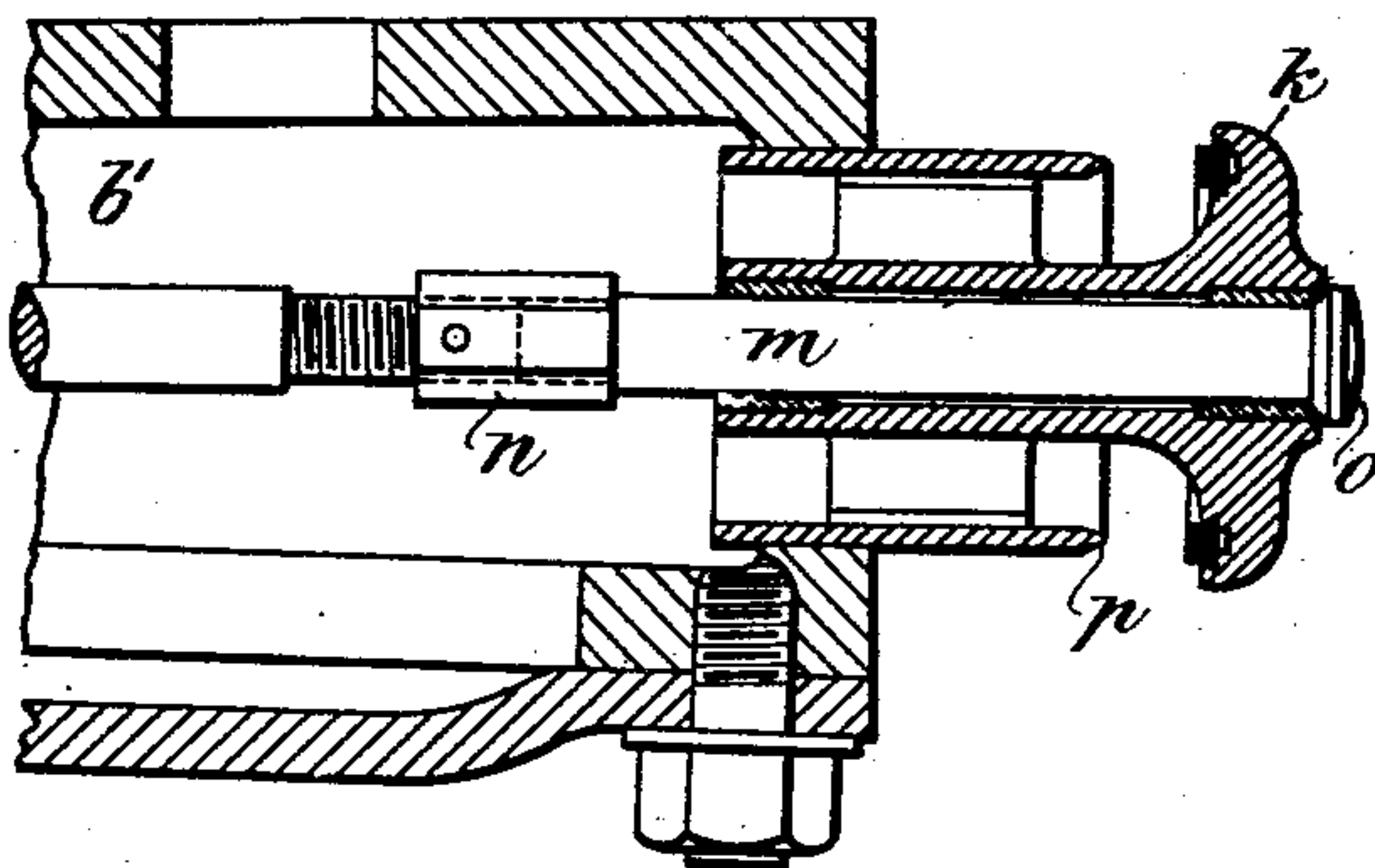
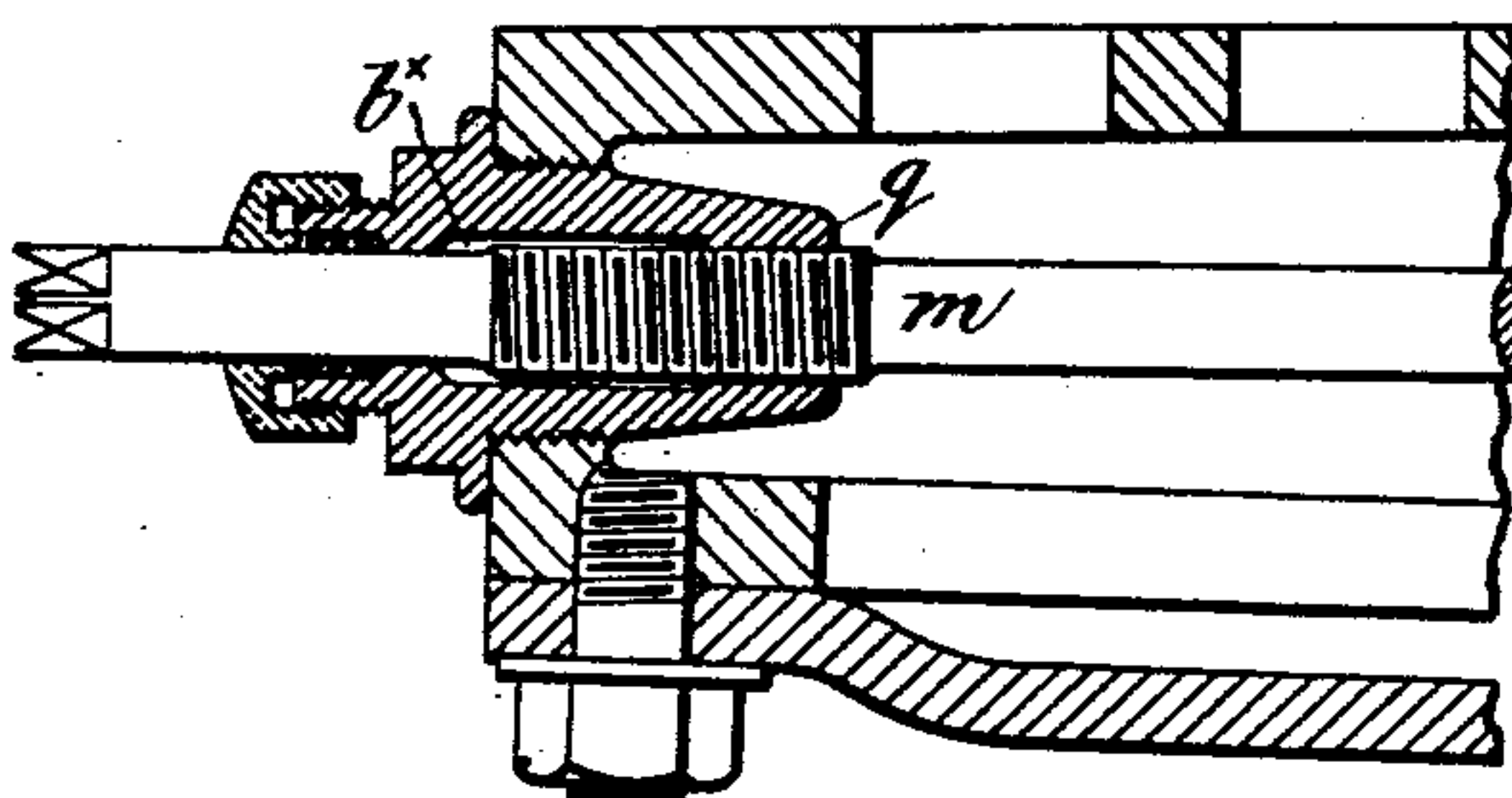


Fig. 3.

Fig. 4.



Witnesses.

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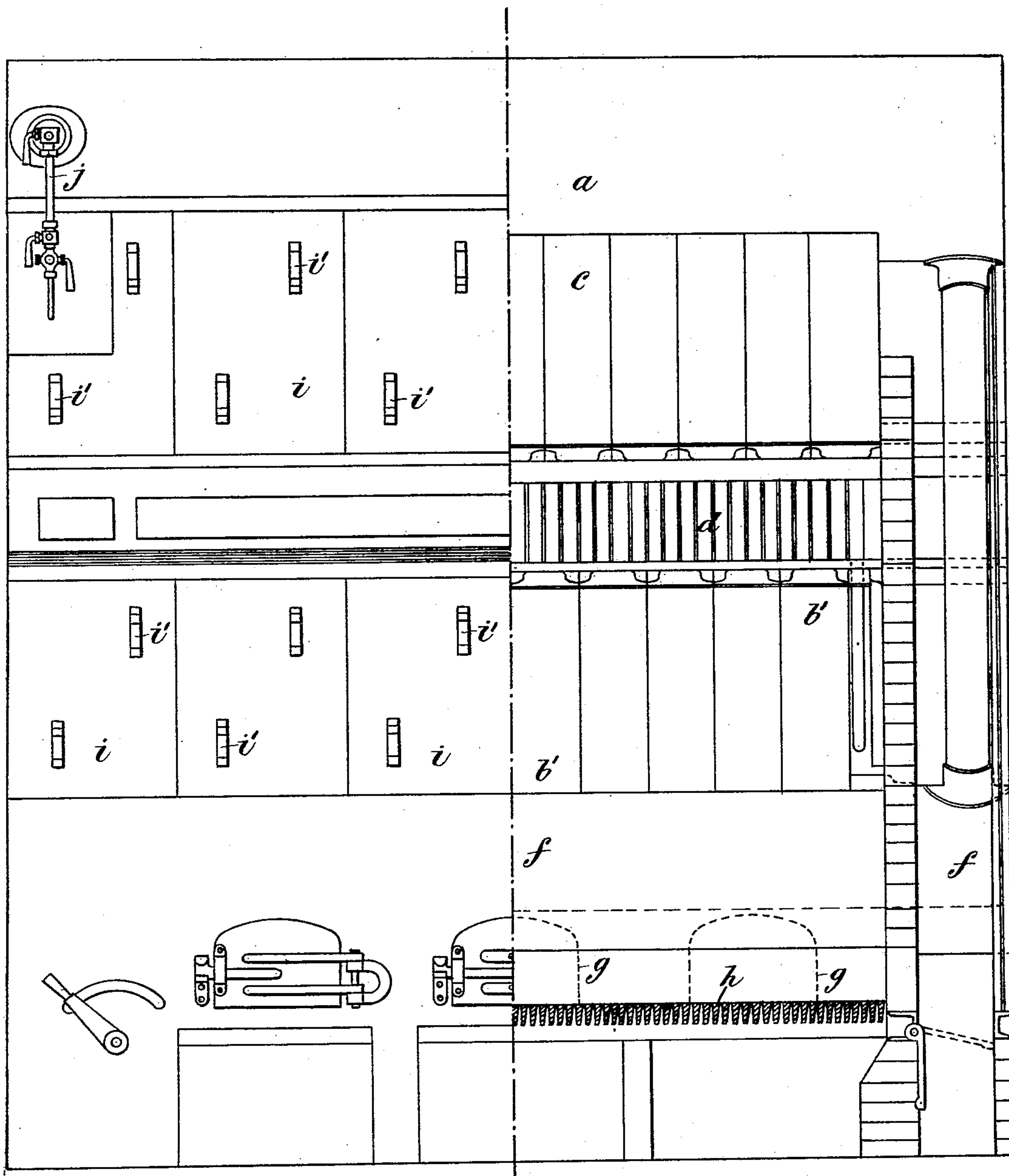
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Fig. 6.



Witnesses

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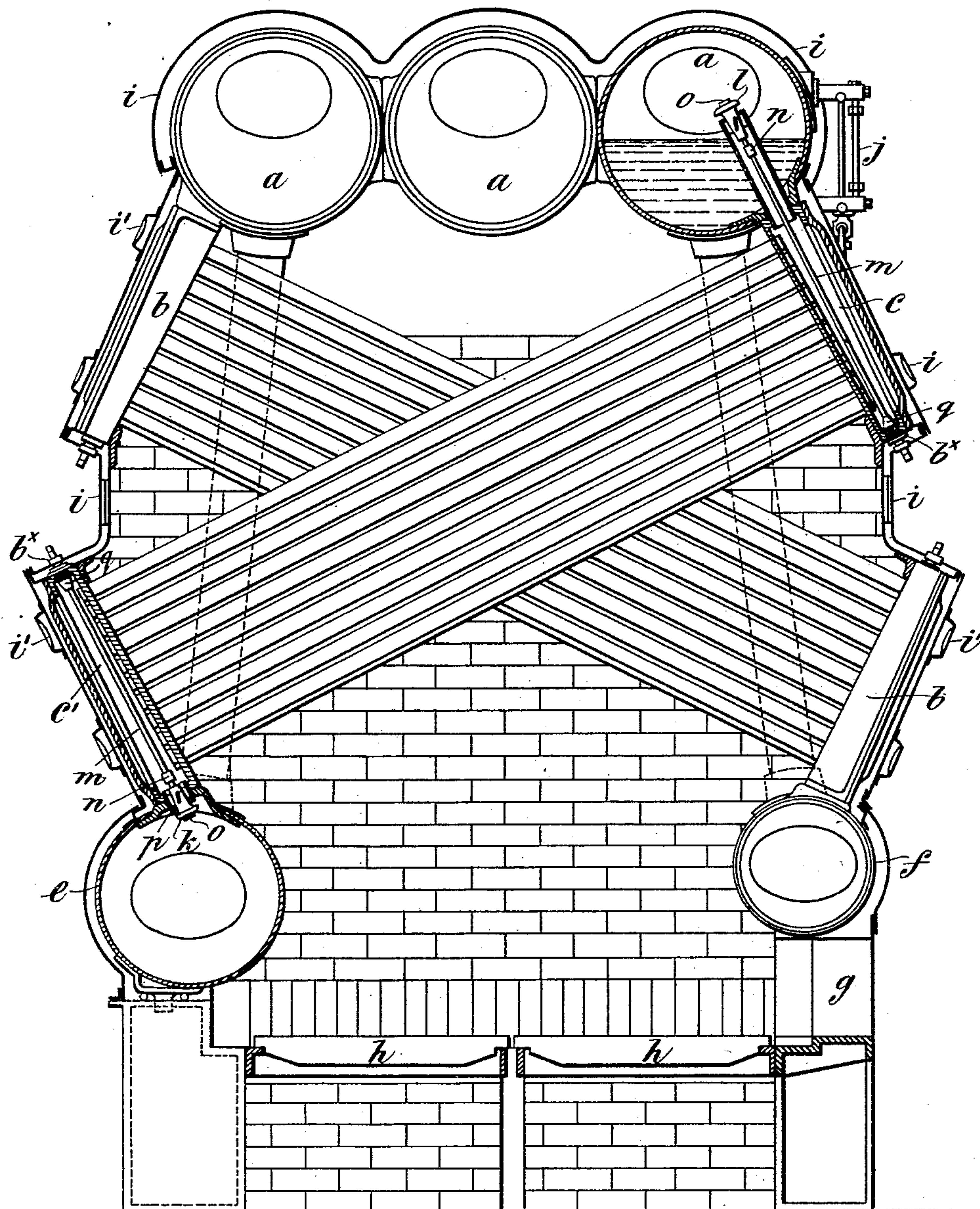
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Fig. 7.*Witnesses.*

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UNITED STATES PATENT OFFICE.

JAMES MILNER HURD, OF STOKE-UPON-TRENT, ENGLAND.

WATER-TUBE STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 684,431, dated October 15, 1901.

Original application filed May 4, 1901, Serial No. 58,749. Divided and this application filed July 18, 1901. Serial No. 68,830. (No model.)

To all whom it may concern:

Be it known that I, JAMES MILNER HURD, civil engineer, a subject of the King of Great Britain, residing at 6 Church View Villas, Wolstanton, Stoke-upon-Trent, in the county of Stafford, England, have invented certain new and useful Improvements in Water-Tube Steam-Generators, of which the following is a specification.

My improvements relate to the class of steam-generators commonly known as "water-tube boilers." I so construct boilers of this kind that if a tube or one or more of a group of tubes is damaged or ruptured while working such tube or group of tubes is at once shut off or isolated from the rest of the boiler by self-acting valves, so that the boiler can still be worked under full steam-pressure until such time as it is convenient to repair or replace the damaged tube or group of tubes. I also provide for moving any of these valves onto or off their seats by hand-gear worked from the exterior of the casing with which the boiler is inclosed, so that it can always be insured that the valves shall be in proper working order. This I effect by carrying each self-closing valve on one end of a spindle which at its other end passes out from the header through a stuffing-box, so that by acting upon this end of the spindle it may be moved to or fro endwise. The valve fits loosely on its spindle, so that it may be self-closing, but can be held up to its seat or moved away from it by collars on the spindle when the spindle is moved endwise in one or other direction.

My improvements are shown in the drawings annexed as applied to a water-tube boiler constructed as described in another application for patent lodged by me.

Figure 1 is a front view of the boiler with the front cover removed from the left-hand half, and Fig. 2 is a transverse section of the same. Figs. 3 and 4 show the valve mechanism. Fig. 3 is a longitudinal section, on a larger scale, of one end of the header; and Fig. 4, a similar section of the opposite end. Fig. 5 is a front view of one of the headers with its front cover removed. Fig. 6 is a front view of the boiler with the left-hand half of the front cover removed, and Fig. 7 is

a transverse section showing my valve mechanism applied to a modified form of the boiler.

In Figs. 1 and 2, *a* is the steam-cylinder which forms the top of the boiler. 55

b and *c* are the upper headers. At the top they are, as shown, bent over into a horizontal position and connected to the two opposite sides of the cylinder *a* above the water-level. 60

b' and *c'* are the lower headers, and *d* represents the straight tubes connecting the upper and lower headers.

e is the back horizontal water-cylinder, to which the lower ends of the lower headers *c'* are connected, and *f* is the front horizontal water-cylinder, to which the lower ends of the lower headers *b'* are connected. 65

g represents the fire-door openings.

h represents the furnace-bars. 70

i is an outer casing inclosing the heated portions of the boiler. The casing is in sections, each provided with handles *i'*, by which it can readily be lifted away.

j is a water-gage. 75

k is a self-closing valve at the lower end of each lower header, where it opens into one of the lower water-cylinders, and *l* a self-closing valve at the upper end of each upper header, where it enters the steam-cylinder. In Figs. 3 and 4 I have shown how I provide not only for allowing these valves to close freely should there be any sudden rush of fluid past them, but also for enabling them to be closed or held open, as may be desired, by hand-gear. 80 The ends of the header shown in these figures are the ends of one of the lower headers *b'*. Its valve *k* can slide freely to and fro for a distance along the end of a rod *m* between a collar *n* upon it and another collar *o* at its end. Normally the valve remains open, as shown in Fig. 4. Should, however, there be a sudden leakage of steam from one of the pipes connected with this header the sudden rush of water from the cylinder *f* past the valve *k* and into the header which would thereby be caused would instantly move the valve along the rod *m* and cause it to close against its seat *p*, which is fixed in the end of the header. This header and all tubes opening into it would thus be at once put out of action. Similarly the corresponding upper 85 90 95 100

header *b* would be simultaneously put out of
 action by the closing of the valve *l* by the
 rush of steam past it. Thus this section
 would be entirely cut off from the rest of the
 5 boiler, so that the boiler could still be worked
 under full steam-pressure until such time as
 might be convenient to repair or replace the
 damaged section. As will be seen from Fig.
 3, the opposite end of the rod *m* to that on
 10 which the valve *k* is mounted extends through
 a stuffing-box *b*^x on the upper end of the
 header. It also has a screw-thread cut upon
 it which screws through a screw-nut *q*, fixed
 to this end of the header. By turning the rod
 15 *m* in one or other direction either the collar *n*
 or the collar *o* on the rod can be brought
 against the valve, and thus either hold it
 open or closed, as may be desired. By from
 time to time moving the valve onto and off
 20 its seat in this way the valve can readily be
 kept always in proper working order. In
 Figs. 5 and 6 the parts are marked with the
 same letters of reference as in Figs. 1 and 2.

This application is a division of my applica-
 25 tion for patent, Serial No. 58,749, filed May 4,
 1901. In the original application claims are
 made to the general construction of the fur-
 nace, while the claims in the present case re-
 late particularly to a special arrangement of

valves different in details of construction 30
 from those claimed in the former application.

What I claim is—

1. The combination of a header, a valve-
 seat at one end of the header, a rod extend-
 ing through it and through the header, a stuff- 35
 ing-box on the header through which the other
 end of the rod extends, a valve opposite the
 valve-seat free to slide for a distance along
 that end of the rod which extends through
 the seat, collars on the rod on opposite sides 40
 of the valve and means for moving the rod
 endwise to bring one or other of the collars
 against the valve and hold it onto or off its
 seat.

2. The combination of a header, a valve- 45
 seat at one end of the header, a rod extend-
 ing through it, and through the header, a stuff-
 ing-box on the header through which the other
 end of the rod extends, a valve opposite the
 valve-seat free to slide for a distance along 50
 that end of the rod which extends through
 the seat, collars on the rod on opposite sides
 of the valve and a screw-thread on the rod,
 screwing through a nut carried by the header.

JAMES MILNER HURD.

Witnesses:

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 HENRY HUSON.