

(No Model.)

2 Sheets—Sheet 1.

H. J. LEWIS.
CONVERTER.

No. 537,838.

Patented Apr. 23, 1895.

Fig 1

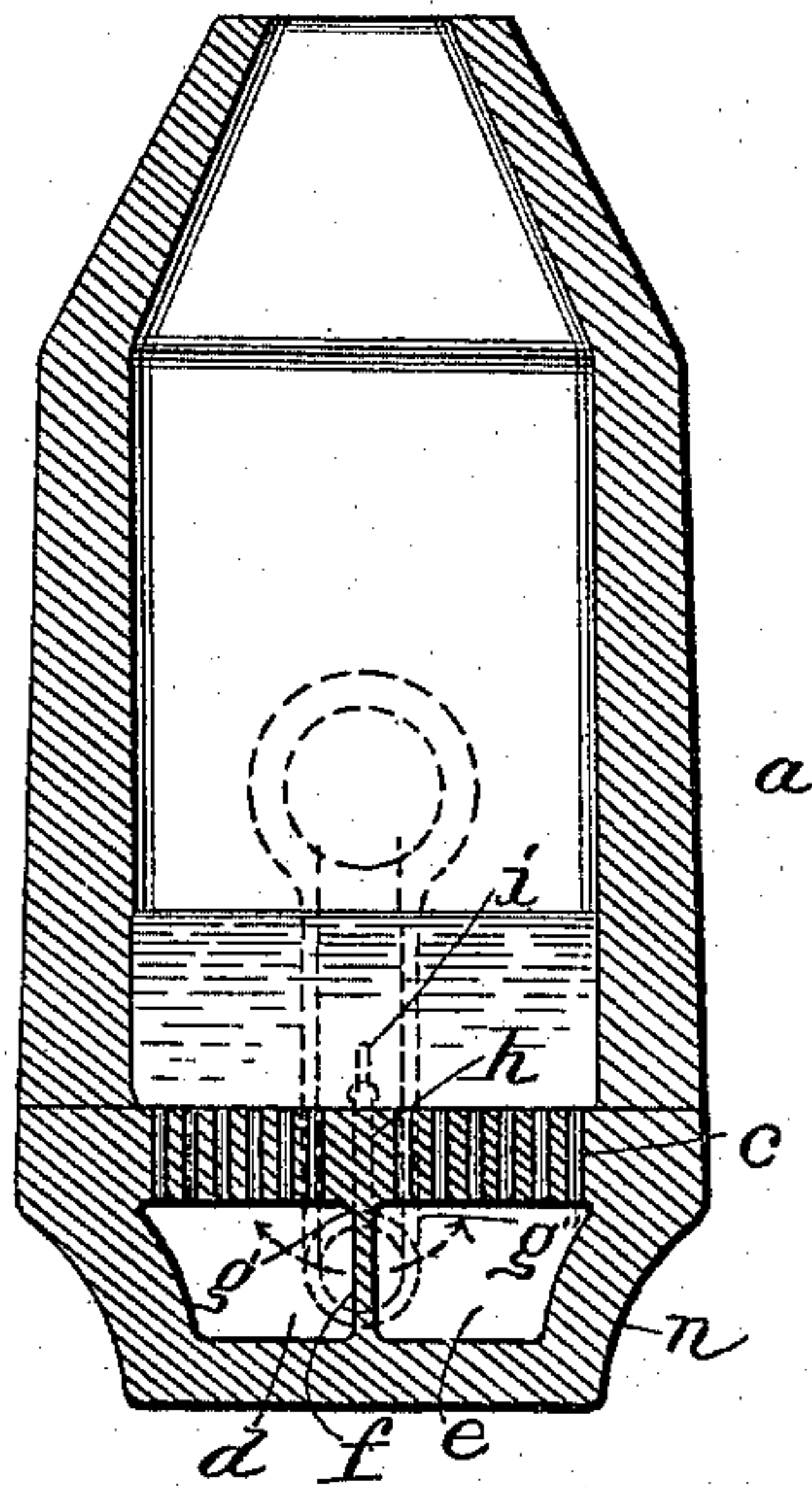


Fig 2

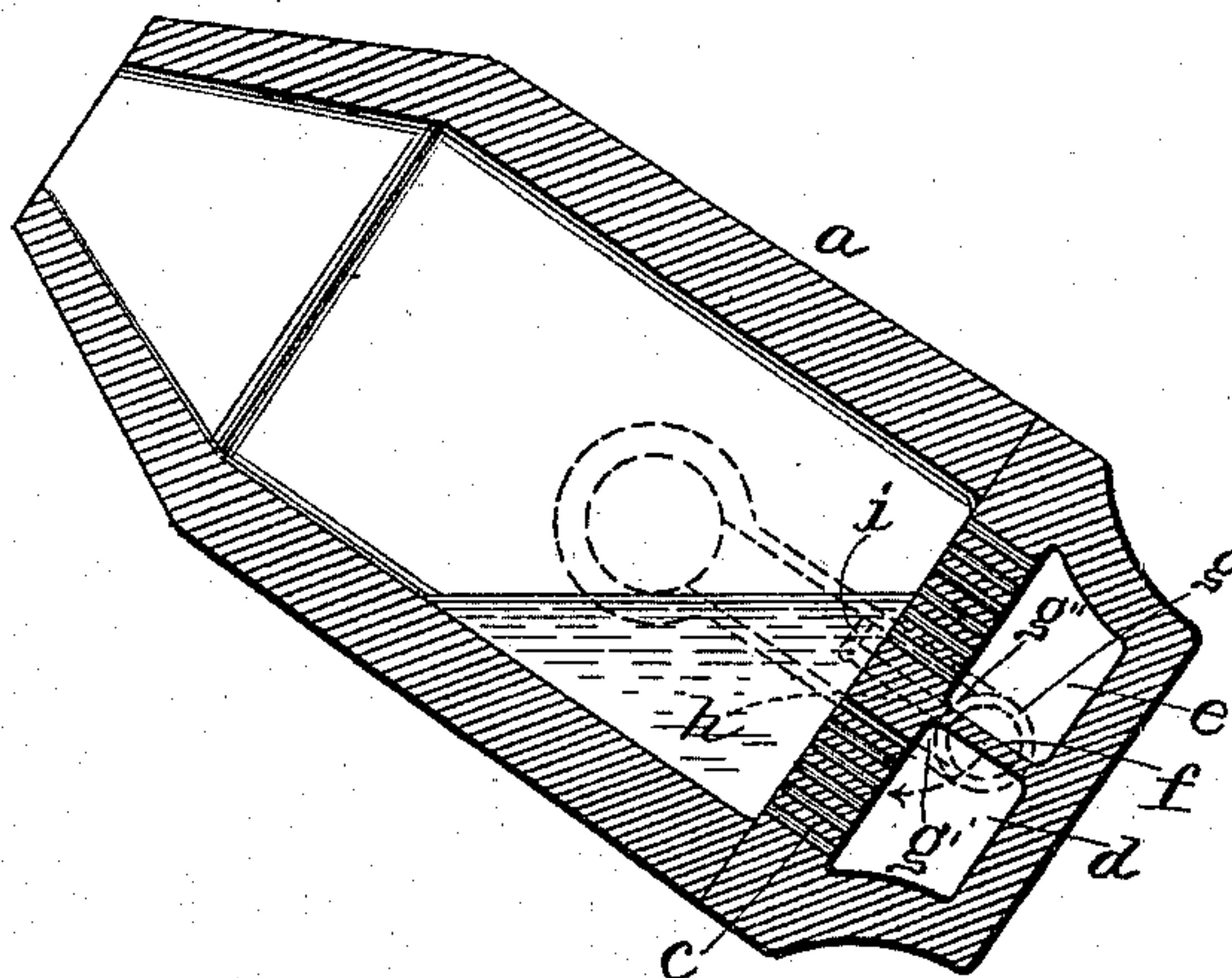
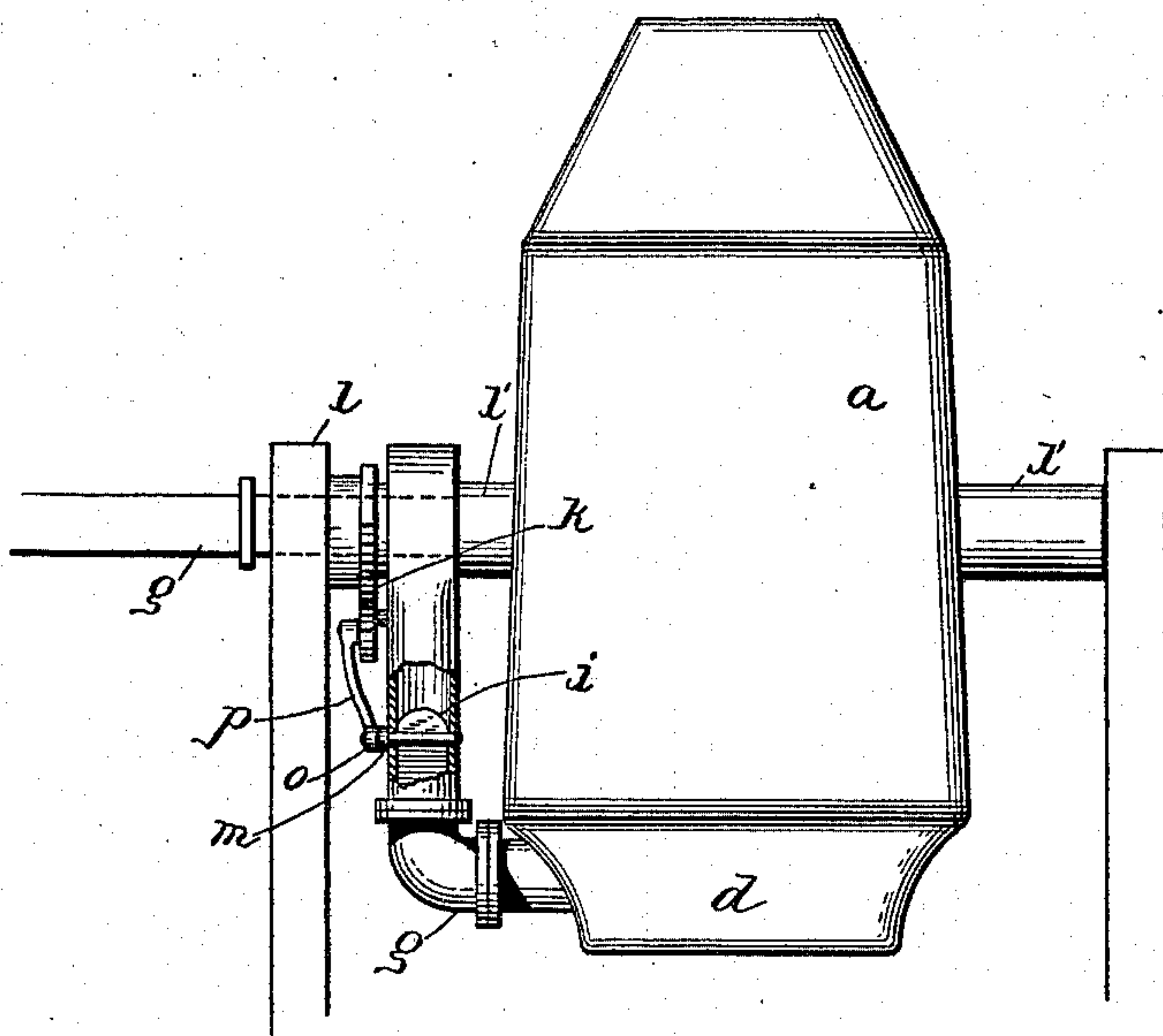


Fig 3



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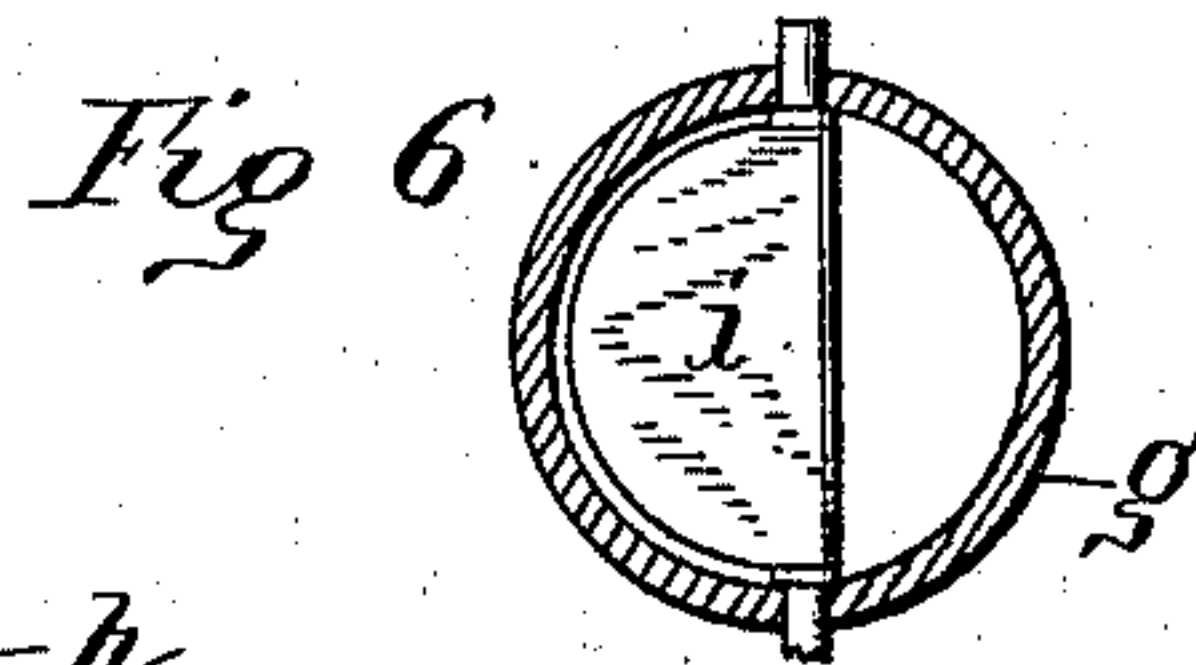
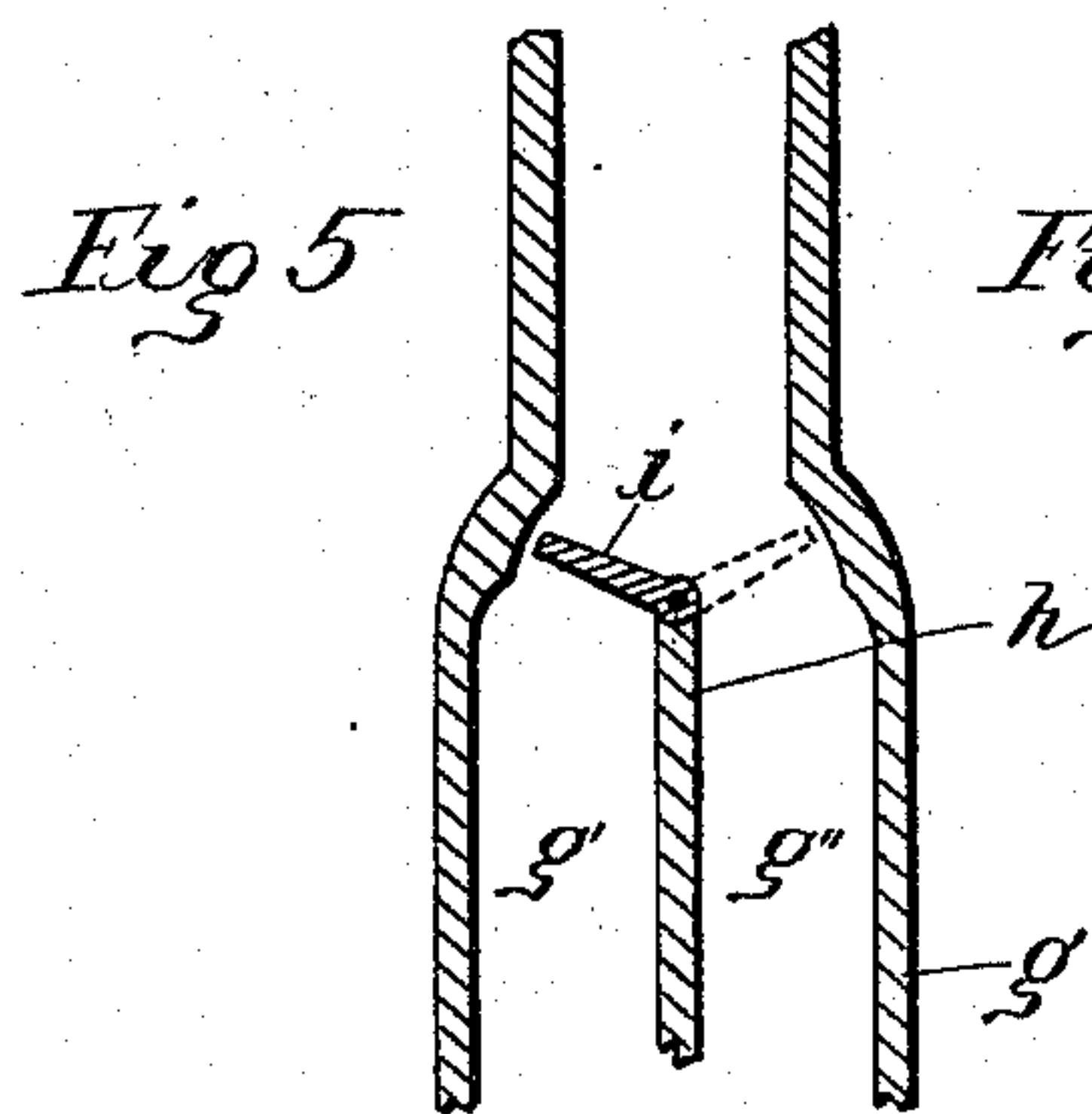
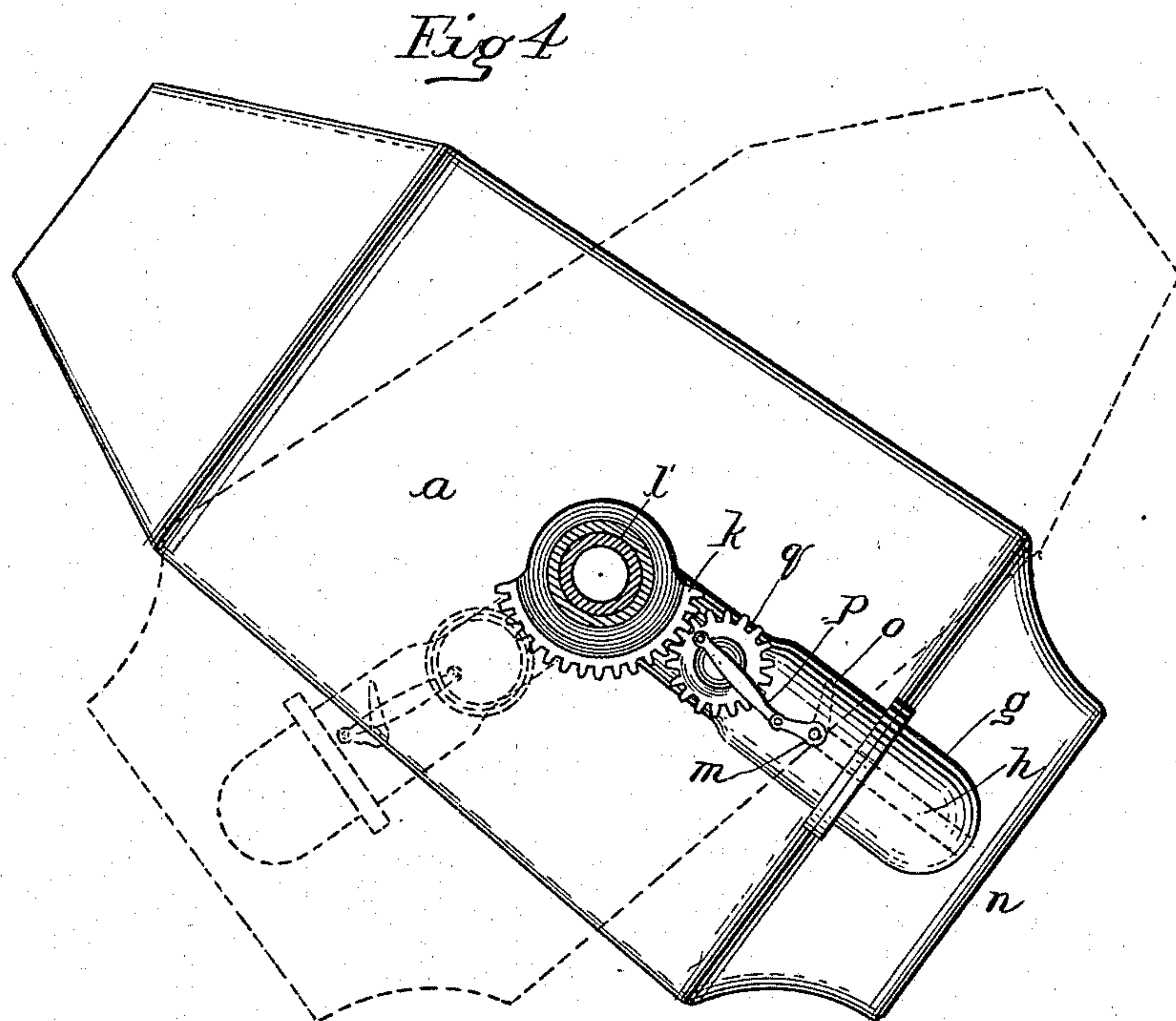
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

HARRY J. LEWIS, OF PITTSBURG, PENNSYLVANIA.

CONVERTER.

SPECIFICATION forming part of Letters Patent No. 537,838, dated April 23, 1895.

Application filed August 29, 1892. Renewed March 22, 1895. Serial No. 542,860. (No model.)

To all whom it may concern:

Be it known that I, HARRY J. LEWIS, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Converters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention has special reference to the construction of Bessemer steel converters.

In converters of this class now commonly used, the air blast is allowed to escape over the top of the molten metal whenever the converter is tipped so as to cause the metal to flow away and uncover the upper portion of the tuyere. As a consequence of this action a large proportion of the blast goes to waste while the remaining portion becomes weakened and the metal which covers the lower openings in the tuyere is not effectually treated.

A further difficulty is that the metal often backflows, fills and clogs the covered portion of the tuyere openings on account of the reduced pressure caused by the liberation of the blast above.

The purpose of my invention is to provide superior means which will automatically cut off the blast from those tuyere openings left uncovered when the metal flows away from them in the tilting operation.

In the accompanying drawings: Figure 1 represents a longitudinal section through a converter standing in an upright position equipped with my improvements; Fig. 2, a similar section showing the converter tilted as in the act of discharging its contents; Fig. 3, a front elevation with part of the blast pipe cut away to show the valve within; Fig. 4, a side elevation showing the converter tilted, and the automatic mechanism for actuating the valve, dotted lines indicating the reversal of the converter. Fig. 5 represents a detail sectional view of the blast pipe or flue and the valve; Fig. 6, a transverse section of the same.

The reference letter *a* denotes an ordinary Bessemer steel converter having the usual

tuyere *c*. The hood *n*, back of the tuyere is divided into two chambers *d* and *e* formed by the partition *f*, so that the incoming air blast is equally divided at this point. The blast pipe *g*, leading to these chambers is divided into two separate passages *g'*, *g''*, by a longitudinal partition *h*. The passage *g'*, leads to the chamber *d*, and the passage *g''*, to the chamber *e*. The throats of both passages are commanded by a flap valve or damper *i*, centrally pivoted so as to close first one duct and then the other, and at the same time maintain a constant pressure or blast of air in the tuyere. This valve is controlled automatically by the mechanism now to be described. A sector *k*, is fixed to the standards or housing *l*, or any other suitable fixed support, in which the trunnions *l'* are mounted. The valve stem *m* is connected to a crank-arm *o*, which is connected to a link *p*, and the opposite end of the link is eccentrically pin-jointed to a gear *q*. This gear revolves on a pin on the blast pipe *g*, and meshes with the fixed sector *k*, which causes it to revolve when the converter is tipped.

When the converter *a* is tilted to an angle of about forty-five degrees, as shown in Figs. 2 and 4, the molten metal recedes from and uncovers the upper portion of the tuyere. Simultaneously with this movement, the gear *q*, is made to revolve and carry with it the link *p*, which moving backward actuates the crank arm *o*, and the valve stem, causing the valve to close or partly close the throat of the upper passage *g'*. In the present instance the valve, when closed, leaves a small space *g''*, through which a small part of the blast is permitted to pass. This action prevents the idle escape of air and directs the force, which has hitherto been lost, through the lower portion of the tuyere, and hence through the metal. Now when the converter is righted, or moved back to a vertical position, the movement of the gear is reversed and the valve or damper is opened to permit the blast to pass equally through both passages. If the converter is tilted in an opposite direction (as shown in dotted lines) to that just described, then the valve is turned across the throat of the passage leading to the upper portion of the tuyere, and the blast is made to pass through the other passage to the

lower portion of the tuyere. Hence it will be seen that a constant pressure of air-blast is maintained in the tuyere, for either one or the other of the air passages is always open and neither is completely closed, at any time.

This automatic mechanism more perfectly utilizes all of the blast and effects a saving of time and power. It also results in a superior quality of metal by continuing the blast until the last moment, for it is evident that the mechanism can be so finely timed that it will operate with the greatest precision.

The number of air passages and air compartments could be increased to cause a greater division of the blast, but in the present instance two are deemed sufficient to illustrate the principle of my invention; and it is also evident that the particular form of mechanism herein described could be infinitely varied without departing from the scope and spirit of my invention.

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

1. A converter provided with an air-blast-pipe having two or more separate passages, in combination with a valve adapted to control the passages, and tuyeres having adjacent to or below them two or more separate and independent air-chambers severally communicating with the separate air-passages, whereby the blast is diverted from the uncovered to the covered portion of the tuyeres during the tilting operation, in the manner and for the purpose set forth.

2. A converter bottom provided with a plurality of air-chambers adjacent to and com-

municating with the tuyeres, in combination with a divided blast pipe the passages of which separately communicate with the several air-chambers, and a valve in said pipe adapted to arrest the admission of the blast to one chamber, substantially as described.

3. In combination with a converter bottom and its tuyeres, a divided blast-pipe the several passages of which lead independently to the upper and lower tuyeres, a valve located to command either of the passages, and valve connections adapted to automatically actuate the valve in the tilting operation.

4. In combination with a converter bottom and tuyeres, a divided blast-pipe the several passages of which lead independently to the upper and lower portions respectively of the tuyeres, a valve located to command either of the passages, and valve connections arranged to arrest the admission of the blast to one passage while permitting it to enter the other, as and for the purpose specified.

5. In combination with the tuyeres of a converter, a divided blast-pipe the several passages of which lead independently to the upper and lower portions respectively of the tuyeres, said pipe being provided with a valve located to command either of the passages, and valve connections arranged to alternately open one passage and close the other when the converter is tilted.

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

HARRY J. LEWIS.

Witnesses:

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LUCIUS O. FRAZIER.