

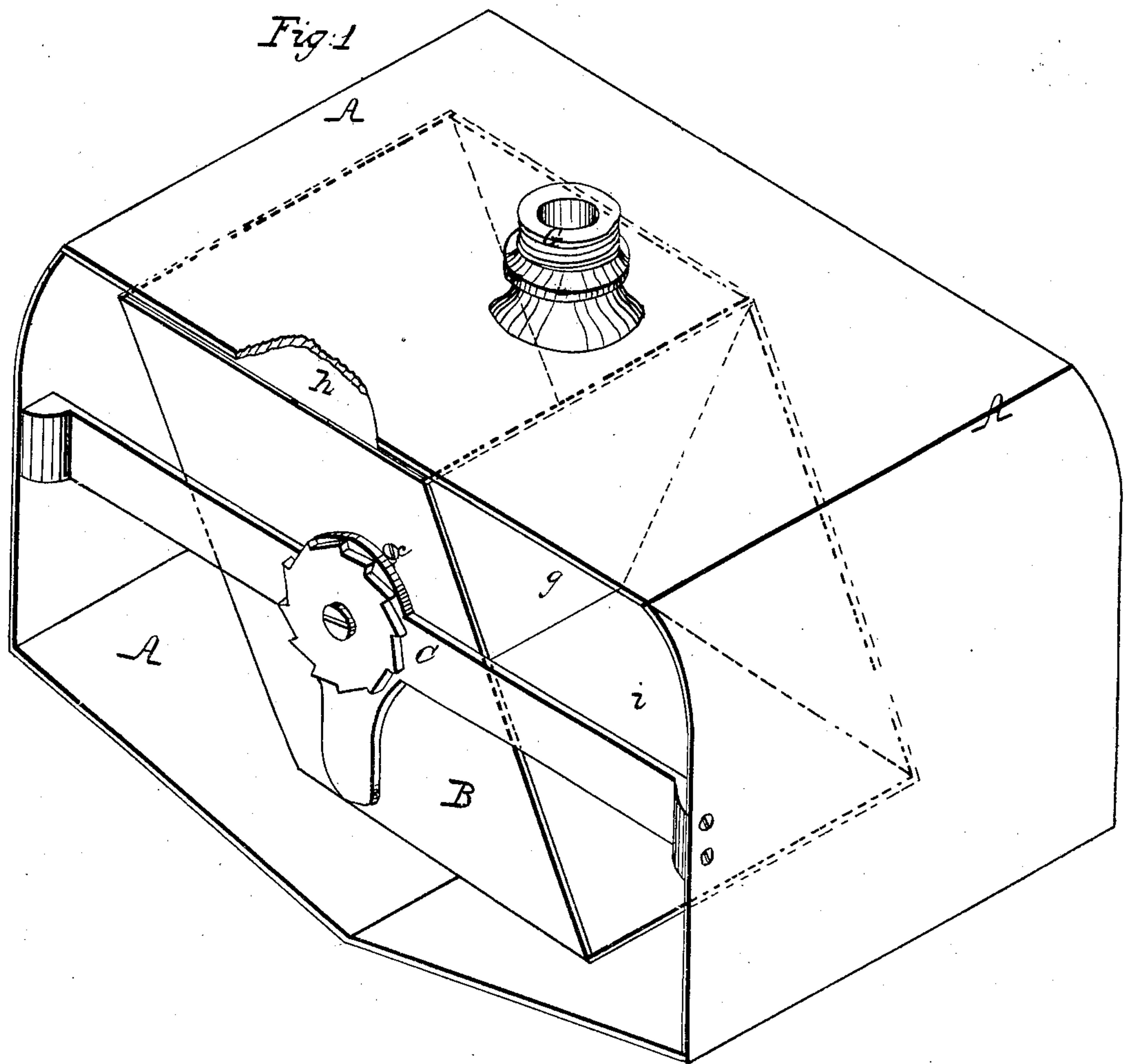
Sheet 1, 3 Sheets.

T. C. Hargrave.

Oscillating Meter.

N^o 101,125.

Patented Mar. 22, 1870.



Witnesses:

R. E. Schenck
H. J. Cambridge

Inventor:
T. C. Hargrave

T.C. Hargrave.

Oscillating Meter.

N^o 101,125.

Patented Mar. 22, 1870.

Fig. 2.

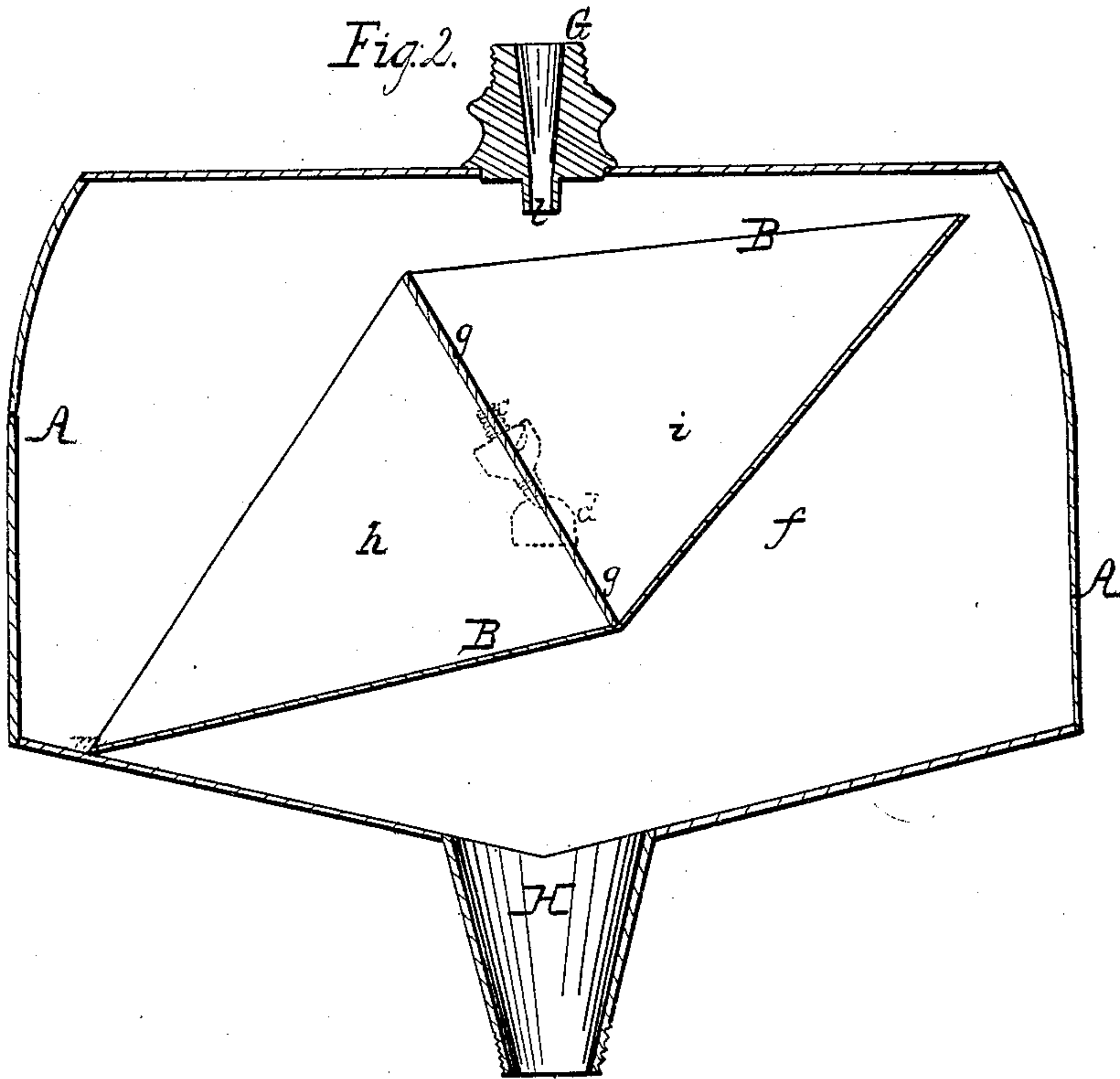
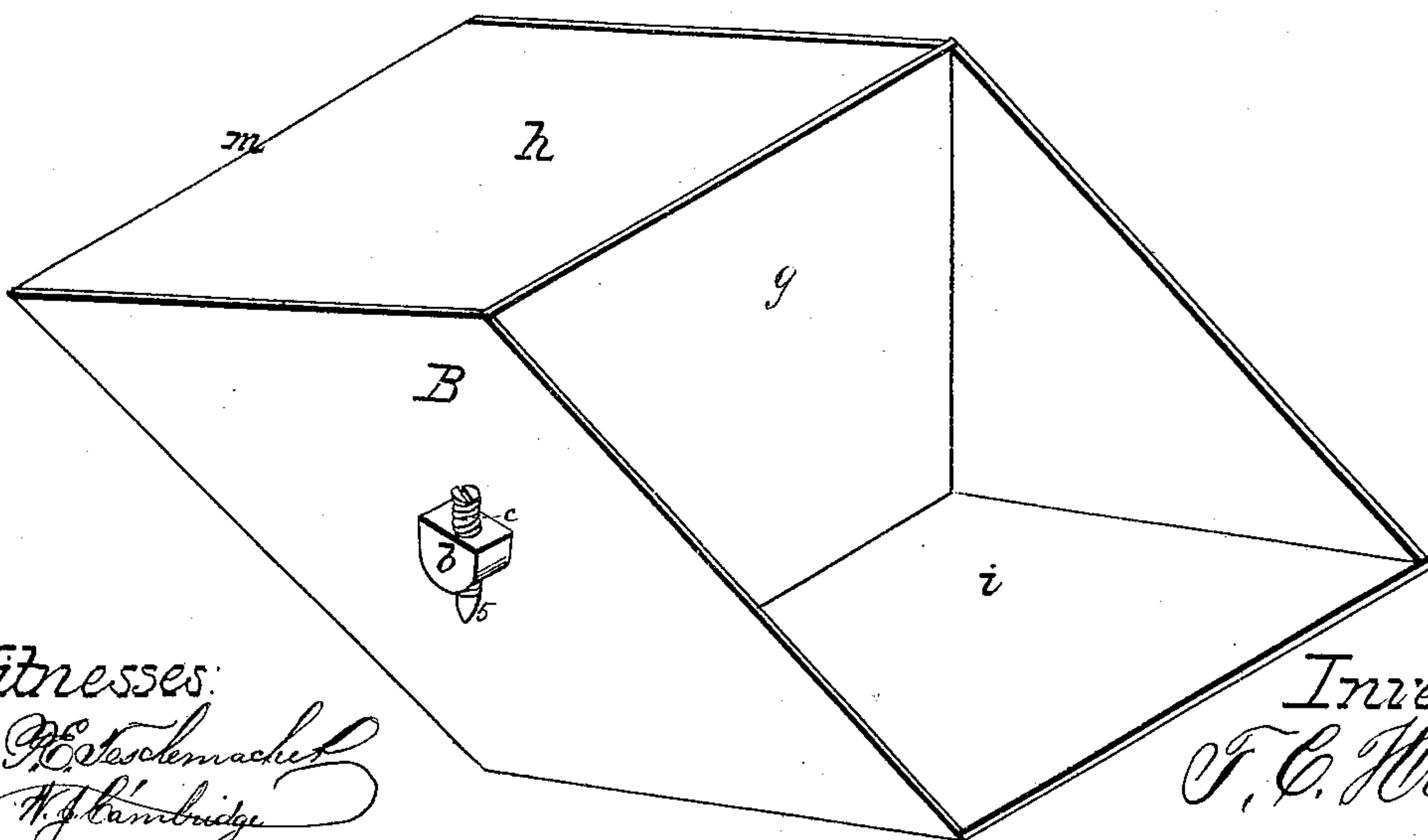


Fig. 3.



Witnesses:

W. C. Stearns
W. J. Lamb

Inventor:

T. C. Hargrave

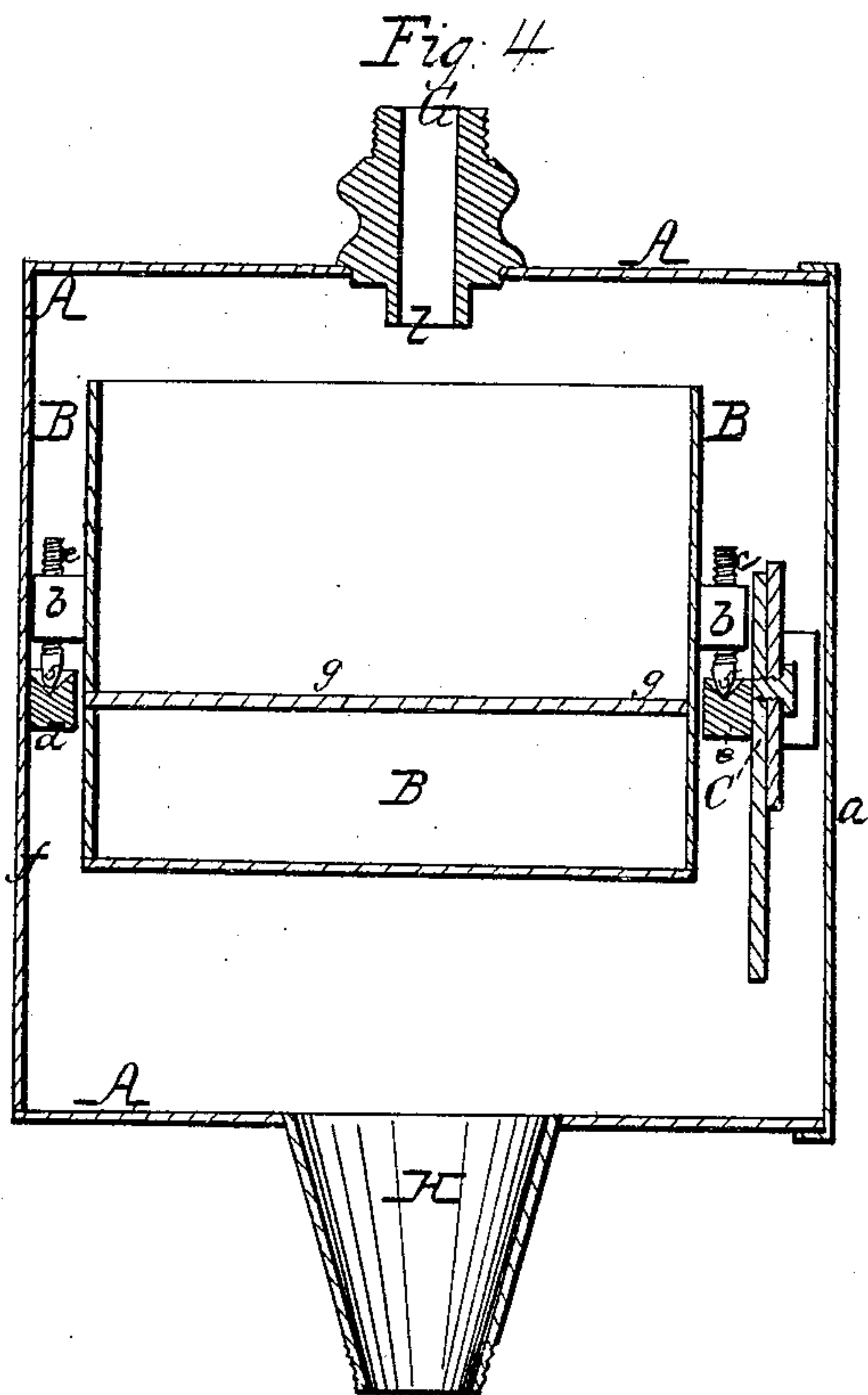
Sheet 3, 3 Sheets.

T. C. Hargrave.

Oscillating Meter.

N^o 101,125.

Patented Mar. 22, 1870.



Witnesses:

P. E. Teahmacker
W. J. Cambridge

Inventor:

T. C. Hargrave

United States Patent Office.

THOMAS C. HARGRAVE, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 101,125, dated March 22, 1870 ; antedated March 15, 1870.

IMPROVEMENT IN LIQUID METERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, THOMAS C. HARGRAVE, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Apparatus for Measuring the Flow of Liquids, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a perspective view of my improved apparatus, the front plate being removed, to show the interior.

Figure 2 is a longitudinal vertical section through the center of the apparatus.

Figure 3 is a perspective view of the oscillating pan.

Figure 4 is a transverse section through the center of the apparatus.

My invention has for its object to dispense with the use of valves in apparatus for measuring the flow of liquids, and thereby not only greatly simplify their construction, increase their durability, and reduce the cost of manufacture, but also entirely avoid leakage, thus rendering them more accurate and reliable than heretofore; and

My invention consists in an oscillating pan or receptacle of peculiar form, which is accurately balanced upon adjustable points or centers within a suitable casing provided with inlet and outlet-openings, the pan being divided, by a central partition, into two measuring-chambers of equal capacity, which are alternately brought into a position to receive and retain the desired quantity of liquid, which is discharged from and over the outer ends of the chambers as the latter are alternately carried down by the oscillations of the pan.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings—

A represents the outer casing of the apparatus, which is of the form shown in fig. 1, the front being closed by a removable plate, *a*, fig. 4, which, when fitted into its place, renders the casing air-tight.

Within the casing A is an oscillating pan, B, of a diamond form in longitudinal section, to the front and rear plates of which are secured blocks *b*, through which pass the screws *c*, the lower ends of which terminate in points 5, which rest in conical recesses in supporting-blocks *d* *e*, attached, the former, *d*, to the inside of the rear plate *f* of the casing A, and the latter, *e*, to the inner side of a cross-bar, C, which extends across the casing, from one side to the other, as seen in fig. 1, the pan being thus balanced so that it will rock or oscillate freely from side to side without creating any appreciable friction; and, by turning the

screws *c*, the points 5 may be adjusted so that the distance of the oscillating point of the pan B below its centre of gravity may be varied as desired.

g is a partition-plate which extends across the pan B, and divides it into two compartments or measuring-chambers, *h* *i*, of equal capacity, which are entirely open at the top, as seen in figs. 1 and 3.

G is the inlet or supply-pipe which passes through the top of the casing A, and is flattened at its lower end, so as to form a long narrow discharge-opening, *l*, and, when the pan B is in the position seen in fig. 1, the liquid flows from the pipe G into the chamber *h* until the weight of the liquid contained therein is sufficient to oscillate the pan B, which will then assume the position seen in fig. 2. This movement of the pan brings the chamber *i* beneath the inlet-pipe G, the contents of the chamber *h* being, at the same time, discharged from its outer end over the edge *m* into the lower portion of the casing A, which is inclined down from both ends toward the outlet-pipe H, through which the liquid passes out of the meter. The pan is again oscillated as soon as a quantity of liquid of sufficient weight has entered the chamber *i*, this movement bringing the chamber *h* beneath the inlet-pipe, and causing the liquid to be discharged from the outer end of the chamber *i* into the lower portion of the casing, and the measuring-chambers are thus alternately filled and emptied, as required.

The quantity of liquid which must enter each chamber in order to oscillate the pan will vary in proportion to the distance of the center of oscillation of the pan below its center of gravity, and, by making the center of oscillation adjustable, the amount of liquid allowed to enter each chamber may be regulated with great nicety, as required.

The number of oscillations of the pan B, and, consequently, the quantity of liquid passing through the meter, may be recorded by means of any of the well-known contrivances in use for this purpose, and the registering apparatus may be secured, if desired, to the cross-bar C, and be viewed through a glass plate inserted in the front plate *a* of the casing A.

It will be seen that, as no valves of any description are employed in my improved apparatus, its construction is greatly simplified, and the cost of manufacture proportionately reduced, while its durability is increased, and the liability of leakage incident to meters provided with valves, which frequently get out of order, is entirely avoided, thus causing the apparatus to measure with the greatest accuracy the quantity of liquid passing through it, which renders it particularly adapted for measuring spirits, where it is desirable to avoid even the smallest percentage of waste.

Instead of the pan B being balanced upon points,

as above described, it may be made to oscillate upon axles, knife-edges, or centers, without departing from the spirit of my invention.

If desired, the pan B may be provided with a counterbalance-weight, so arranged as to roll or slide freely from one side to the other of a suitable guide-way as the pan oscillates.

Although the above-described apparatus is designed particularly for measuring liquids, yet it might be employed to advantage for weighing solids of some descriptions—for instance, shot or grain, which could thus be accurately weighed, and delivered into bags in a more convenient and expeditious manner than heretofore.

Claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

The oscillating pan B, divided into compartments or measuring-chambers, *h i*, so formed as to allow of their being emptied without the employment of valves, in combination with a casing provided with inlet and outlet-pipes, all substantially as described.

Also, the points or center of oscillation of the pan B, made adjustable toward or from its center of gravity, substantially as and for the purpose set forth.

Witnesses:

T. C. HARGRAVE.

P. E. TESCHEMACHER,

W. J. CAMBRIDGE.