E. HAAS.
Gas-Meter.

No. 217,093. Patented July 1, 1879.

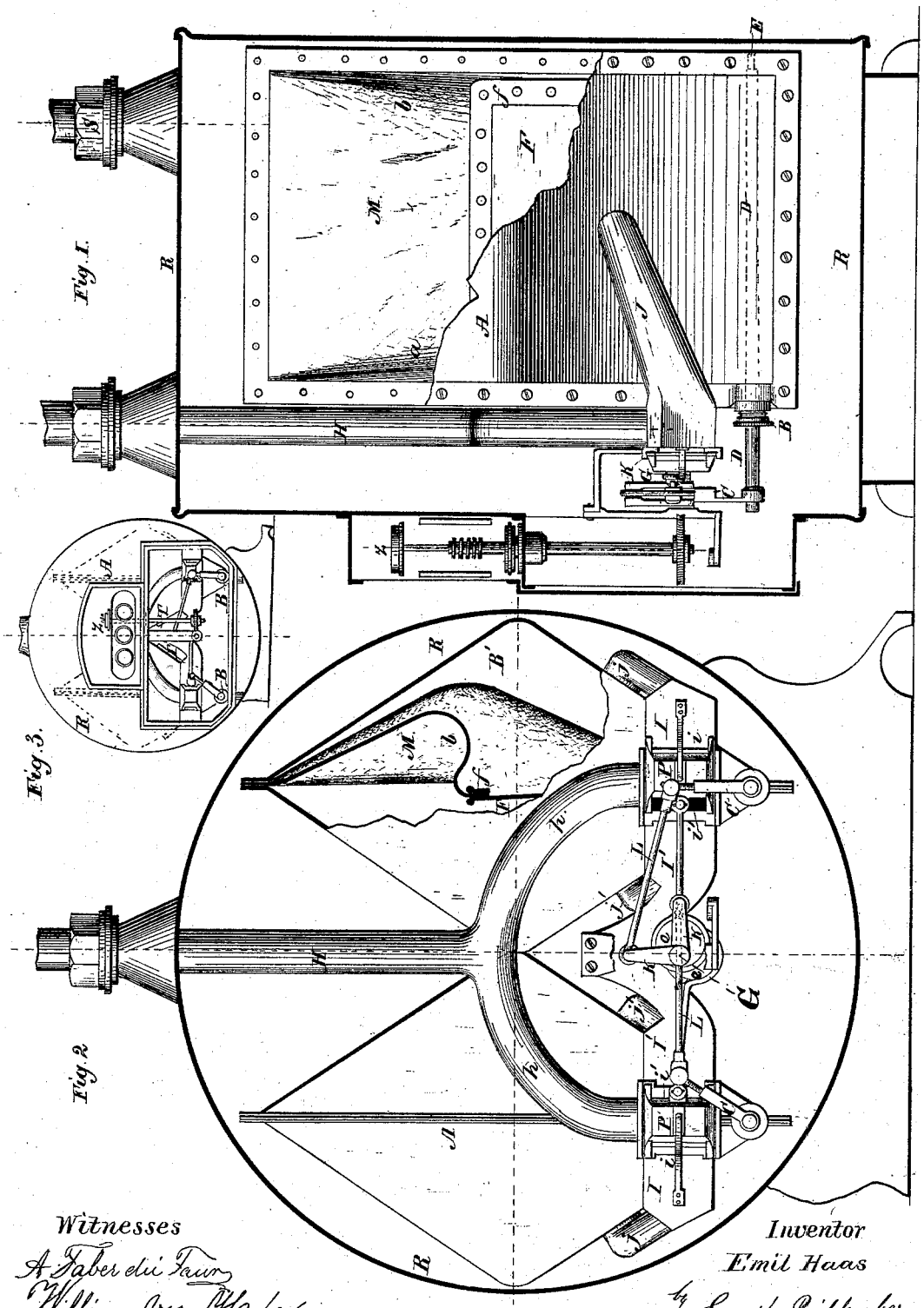

Fig. 1.

Fig. 3.

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

EMIL HAAS, OF MAINZ, GERMANY.

IMPROVEMENT IN GAS-METERS.

Specification forming part of Letters Patent No. **217,093**, dated July 1, 1879; application filed November 25, 1878.

To all whom it may concern:

Be it known that I, EMIL HAAS, of the city of Mainz, Germany, have invented a new and useful Improvement in Gas and Fluid Meters, which invention is fully set forth in the following specification.

This invention relates to a meter of that class in which the gas or water pressure gives motion to a membrane inclosed in a box or case.

My improved meter is designed to be used for gas, water, and other fluids. It is of novel construction, especially with regard to its measuring chamber or chambers.

The said invention and the manner in which I carry the same into effect may be fully understood by the aid of the accompanying drawings, which I will now proceed to describe, and in which—

Figure 1 is a sectional side elevation of a meter constructed according to this invention. Fig. 2 is a sectional front elevation, and Fig. 3 is a similar elevation on a smaller scale.

In carrying the said invention into practice the measuring-chamber A is inclosed in the box or drum R, which may be four-sided or of other suitable shape. It consists of two cup-like parts with flanges all around their edges, and connected firmly and tightly by screws or other means. The measuring-chamber thus formed is of a constant or unvarying capacity, and has sides of sufficient strength to sustain the pressure of the fluid.

On one of the edges of the rhombic receiver or chamber A is a stuffing-box, B, and opposite this stuffing-box there is a bearing, E, in which a spindle, D, (shown in dotted lines, Fig. 1,) is supported parallel with the lower edge of the said chamber.

On the spindle D is fixed a plate or vane, F, nearly of the same length as one of the sides of the rhombic chamber, and nearly as wide as the case.

M is a membrane or piece of flexible material, which is gas and water tight, and of a size and shape to allow of its edges being clamped between the flanged edges of the cup-like halves of the measuring-chamber, while its main portion is sufficiently loose or slack to lie against and cover the inner surfaces of the walls of one of said halves. The vane F has its edges firmly secured to this membrane or diaphragm by a suitable frame, *f*, and screws for holding the same to the vane, forming a gas and water tight joint, that portion of the diaphragm which would cover the vane being cut away. When the said vane, which oscillates in the measuring-chamber from one side to another, touches one of the lower inclined sides, the said flexible material and the vane must just cover the inner surfaces of one-half of the measuring-case and rest thereon. The said vane F and membrane M partially inclose, in this case, a space corresponding with the inside shape of the box.

When gas or water enters one of the measuring-chambers (in this case the one which is shown partly in section) from the left side, the vane F, with the membrane M therewith connected, will move to the right till at last the said vane will rest on the lower right inner surface, and the flexible piece or membrane M (which is shown bent up in Fig. 2 at this moment of the motion) will rest on the upper right inner surface. At the same time the said membrane also lies close to the back and front or end walls in the form of a lozenge—that is to say, the two sides *a b* of the membrane lie close to the front A and back B′, which also have a lozenge-shaped or triangular form.

By this movement from left to right the gas or water contained in the box in front of the said vane and membrane will be forced out by the gas or water pressure, and, furthermore, will be driven through a channel, J or *j*′, which discharges the same into ducts I I′, from which it alternately escapes through openings *i* and *i*′, controlled by valves P P′. The gas or water flows through these openings into the drum or case R, and thence through the discharge-pipe S into the service-pipe.

In order to effect the greatest possible regularity of discharge through this pipe S, I combine two or even more measuring-boxes in such a manner that the oscillation of their vanes F is communicated to a common revolving shaft by means of connecting-rods L and cranks K. The entrance of the gas or water from right to left, or from left to right, into the aforesaid boxes is regulated by the slide-valves P. These slides receive their movement by means of eccentrics *e* or other suitable mechanism from

the spindle G. The slide-valve face has three openings, *i i' i''*, the central one, *i''*, of which communicates with one of the branches *h* of pipe H.

The gas or water enters by the pipe H and the central opening in the slide-valve face into the slide-valve P, and, according to the position of the said slide-valve, the fluid passes either to the left or right into the measuring-chamber, and it is discharged into the drum or case R through the opening *i i''*, which is left uncovered and forms the outlet of one of the ducts, I or I'. The rods which connect the slide-valves P and P' to the eccentrics *e* for operating them are so adjusted that one of the ports for the escape of the contents of the measuring-chambers is always open, and thereby a continuous flow into the drum R is secured, and consequently a continuous flow from the escape-pipe S.

As shown in Fig. 2 the port *i'* of the right-hand chamber is fully uncovered by the valve P, and immediately it begins to close the port *i* of the left-hand chamber will begin to open. The inlet-ports, of course, open and close in a similar manner.

If desired, however, the entrance and exit of the fluid may be reversed by varying the arrangement of the slide-valve. The outside box, drum, or case is chiefly designed to protect the measuring-chambers and the gear from injury.

The transmission of the motion from the spindle G to the counting apparatus is effected in the usual manner.

To permit the accurate adjustment of the measuring-chambers the levers C on the first-named spindle D are so constructed that their length can be altered. By this contrivance the actual measuring-chamber may be made to hold a determined quantity, the cubic contents of the chamber not being affected by the membrane fitting closely to its firm non-yielding sides.

The said flexible membrane is produced by forming the same of any suitable material rendered gas or water tight by impregnation. Of the material thus prepared I cut such a shaped piece as will cover the inner surfaces of one-half of the aforesaid measuring-chamber, and the same is fixed between the flanges of the said measuring-chamber and to the four edges of the vane F, while the said vane lies on one of the sides of the chamber, as above described. By reason of the peculiar shape of the said measuring-chamber only a very narrow strip needs to be sewed, and thus securing of the parts without sewing is of very great importance with regard to the durability of the said membrane.

Although I have shown and described the measuring-chamber as having a rhombic form, yet I may vary the form of the said chamber and of the membrane to suit the requirements of any particular or special circumstances.

I claim—

The combination of the inlet-pipe H, having branches *h h*, the ducts I I', having openings flush with and on opposite sides of the openings or mouths of said branches, the measuring-chambers A, divided by vibrating diaphragms into compartments respectively connected with said ducts, the vanes F, secured to said diaphragms and to rock-shafts D, projecting outward through the walls of the measuring-chambers, the arms C C, attached to said shafts, the pitmen L, double crank K K on shaft G, the double eccentric *e e*, also on said shaft, the sliding valves P and P', arranged to move in front of the openings in ducts I I' and the mouths of the branch pipes *h h*, and suitable connections between said valves, respectively, and the double eccentric, all constructed and arranged as specified.

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Witnesses:

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