

(No Model.)

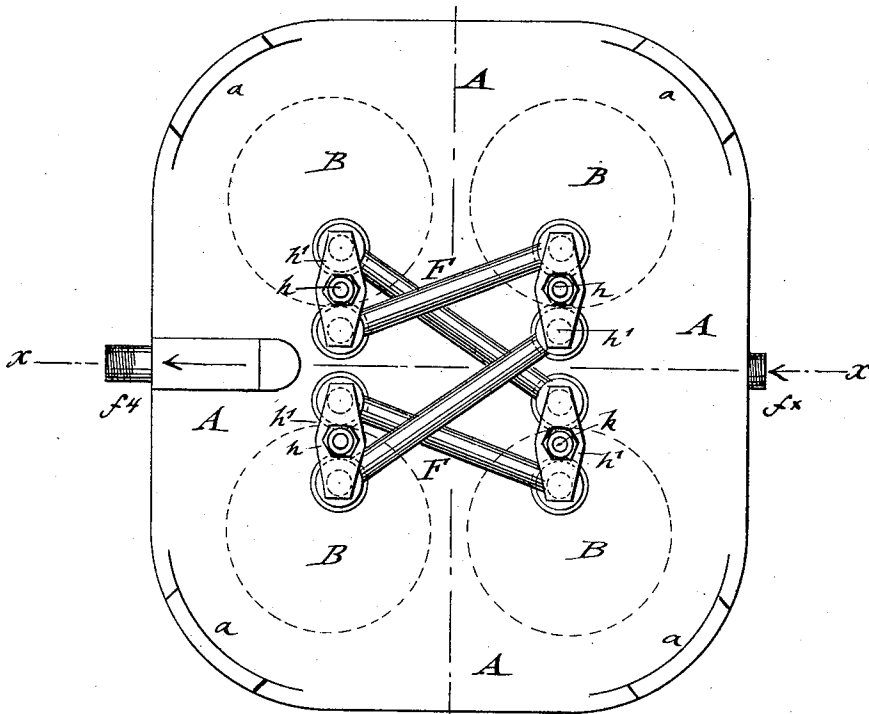
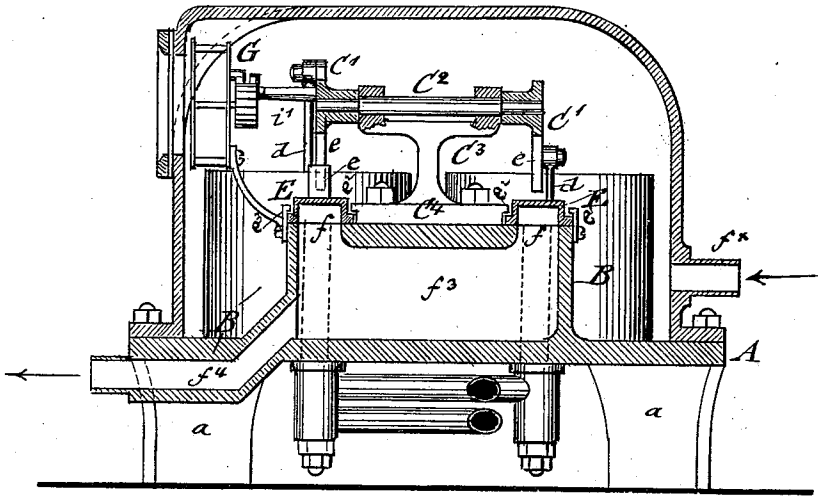
2 Sheets—Sheet 1.

A. C. CHRISTENSEN.
GAS PISTON METER.

No. 366,762.

Patented July 19, 1887.

Fig. 1.



WITNESSES:

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Henry Mann

Fig. 2.

INVENTOR

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(No Model.)

2 Sheets—Sheet 2.

A. C. CHRISTENSEN.
GAS PISTON METER.

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Fig. 3.

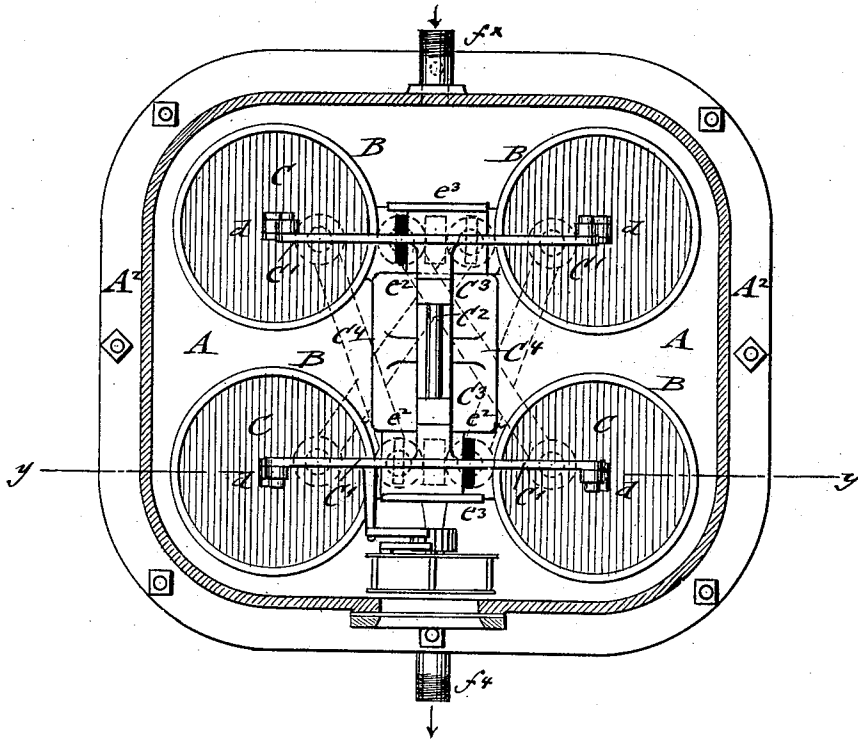
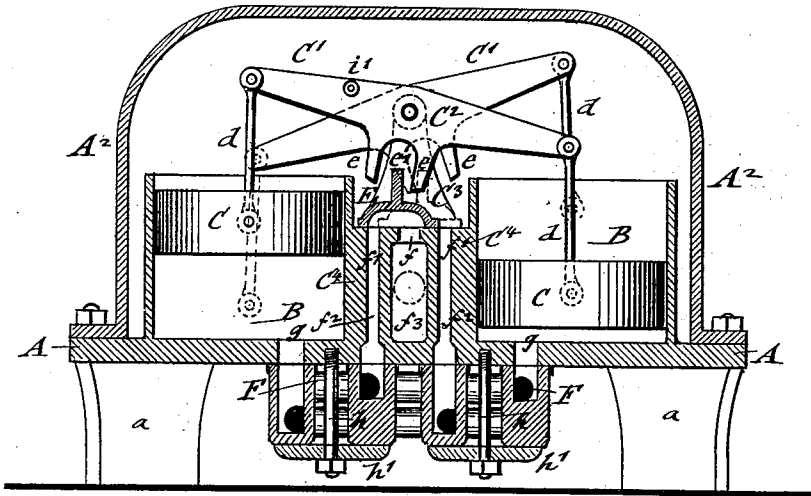


Fig. 4.

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UNITED STATES PATENT OFFICE.

AUGUST C. CHRISTENSEN, OF BROOKLYN, NEW YORK.

GAS PISTON-METER.

SPECIFICATION forming part of Letters Patent No. 366,762, dated July 19, 1887.

Application filed March 3, 1887. Serial No. 229,500. (No model.)

To all whom it may concern:

Be it known that I, AUGUST C. CHRISTENSEN, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas Piston-Meters, of which the following is a specification.

This invention has reference to an improved piston-meter for measuring natural gas, the meter being so constructed that the same is very sensitive and of a comparatively simple and cheap construction; and the invention consists of a gas piston-meter the casing of which is provided with upright cylinders and four reciprocating pistons, the pistons being connected in pairs by oscillating levers that work slide-valves and establish by ports, connecting-channels, and cross-pipes at the bottom of the casing communication between the casing and the space in the cylinders below the pistons, whereby the pistons are alternately raised and lowered and the quantity of gas passing through the meter registered by counting the strokes of said pistons, as will more fully appear hereinafter, and finally be pointed out in the claims.

In the accompanying drawings, Figure 1 represents a vertical transverse section of my improved gas piston-meter, taken on line $x x$, Fig. 2. Fig. 2 is a bottom view of the same. Fig. 3 is a vertical longitudinal section on line $y y$, Fig. 4; and Fig. 4, a top view of the meter, partly in horizontal section, through the casing.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the bed-plate of my improved gas piston-meter, which bed-plate is supported on legs $a a$. The bed-plate A is cast integral with four upright cylinders, B B, in which four pistons, C C, are working. The pistons C C are made of sheet metal or other suitable light material, and suspended in pairs, by pivot-rods $d d$, from the ends of two oscillating levers, C', which are centrally journaled to the ends of a fixed pivot-shaft, C², that is supported by a forked standard, C³, on a central casting, C⁴, said casting connecting the cylinders B B.

The levers C' are provided below their centers with downwardly-extending forked portions $e e$, which engage the upwardly-extending shanks e' of two D-shaped slide-valves, E

E, which are guided on the casting C⁴ in ways ², formed by the base of the standard C³ and guide-rails e^3 , attached to the ends of the casting C⁴, as shown in Fig. 1. Below the slide-valves E E are arranged in the casting C⁴ the valve-faces, ports, and channels for the passage of the gas. Each valve-face is provided with a central outlet-port, f , and two inlet-ports, f' , one at each side of said outlet-port, the ports f' communicating by vertical channels f^2 and diagonal cross-pipes F F, supported below the bed-plate of the meter, with the spaces below the pistons, while the outlet-port f communicates with a central transverse channel, f^3 , of the casting C⁴ and an outlet-pipe f^4 , as shown in Fig. 1. The cylinders, pistons, and their connecting-levers are inclosed by a casing or shell, A², that is tightly screwed to the bed-plate A and connected with the gas-supply pipe f^x , through which the gas or other medium to be measured is conducted to the interior of the meter.

The bed-plate A is provided within each cylinder B B with an opening, g , which openings are connected by the cross-pipes F F with the vertical channels $f^2 f^2$ and the inlet-ports $f' f'$. Four cross-pipes, F F, are arranged at the under side of the bed-plate A, and retained in tight connection with the same, the openings g , and vertical channels f^2 by screw-posts h and transverse bails or yokes h' , as shown clearly in Figs. 2 and 3. The outlet-channel f^3 is located intermediately between the inlet-channels f^2 , and communicates with the outlet-port. The slide-valves C are arranged at right angles to the inlet and outlet channels, as shown in Figs. 1 and 3, and the outlet-pipe f^4 located below the bed-plate and made by preference integral with the casting C⁴ and bed-plate A. One of the oscillating levers C' is connected by a pin, i' , with any approved counter, G, used in gas-meters, said counter and its connection with the oscillating lever being well known, and forming no part of this invention.

The operation of my improved gas piston-meter is as follows: The gas entering through the supply-pipe f^x fills up entirely the interior of the meter and passes through two open inlet-ports, f' , their communicating-channels f^2 , and connecting bottom cross-pipes F into the

lower part of two cylinders, B B, so as to cause the raising of two pistons, C, and the corresponding lowering of the other pistons, by which latter the gas is exhausted from their cylinders through two of the cross-pipes, the connecting vertical channels, and the slide-valves to the outlet channel and pipe. When the pistons arrive nearly at the ends of their stroke, they shift the slide-valves, so as to connect the outlet-ports with the inlet-ports that were before uncovered and open the inlet-ports that were covered before, so that the gas can pass through the inlet-ports, vertical channels, and bottom cross-pipes to the cylinders, and produce thereby the play of the pistons in the same manner as before, and the exhausting of the gas of the same through the inlet channel and pipe. One pair of cross-pipes is arranged below the other, so that they do not interfere with each other. The connecting ends of the lower pair of cross-pipes are correspondingly larger than the connecting ends of the upper pair of cross-pipes, as appears readily by reference to Fig. 3. One pair of pistons moves alternately with the other pair of pistons, whereby the alternating working of the slide-valves and the regular and effective functioning of the meter is obtained.

The advantages of my improved gas piston-meter are, first, the pistons balance each other and require consequently no extra pressure to work the same; secondly, all the parts of the meter can be readily cleaned by detaching the bottom cross-pipes and the covering

casing or shell, and, thirdly, the construction is simple, and therefore comparatively inexpensive.

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

1. The combination of a casing or shell having inlet and outlet pipes, two pairs of cylinders, vertically-reciprocating pistons in said cylinders, centrally-pivoted levers connected to said pistons, slide-valves operated by said levers, inlet and outlet channels below said slide-valves, and cross-channels connecting the inlet-channels with openings in the bottoms of the cylinders, substantially as shown and described.

2. The combination of a casing or shell having inlet and outlet pipes, two pairs of cylinders, vertically-reciprocating pistons in said cylinders, centrally-pivoted levers connected to said pistons, a standard supporting the pivot-shaft of said levers, a central casting for the standard, slide-valves operated by said levers, inlet and outlet channels in said central casting, and cross-channels connecting the lower ends of the inlet-channels with openings in the bottoms of the cylinders, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

A. C. CHRISTENSEN.

Witnesses:

MARTIN PETRY,
PAUL GOEPEL.