May 4, 1926. 1,583,040

G. WÜNSCH

DRY GAS METER

Filed Dec. 6, 1920 2 Sheets-Sheet 1

Fig. 1

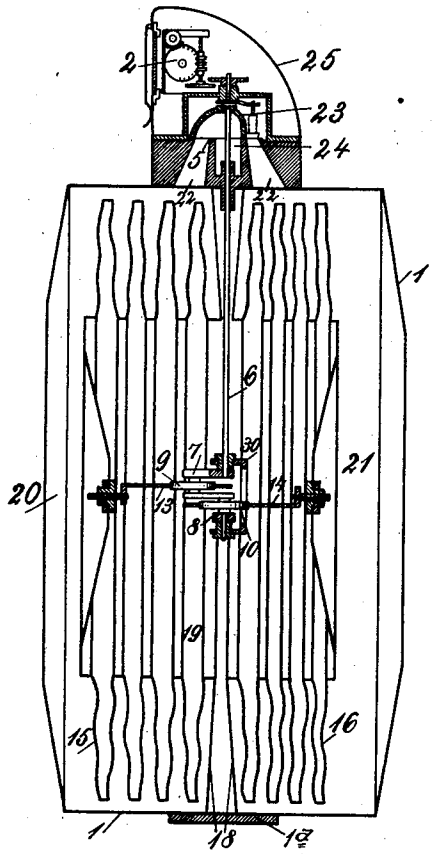
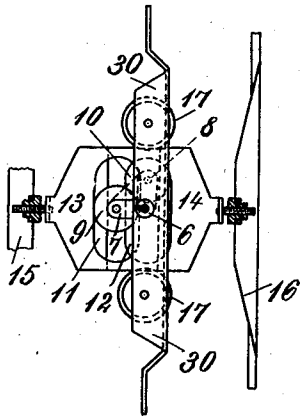


Fig. 3



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Fig. 2

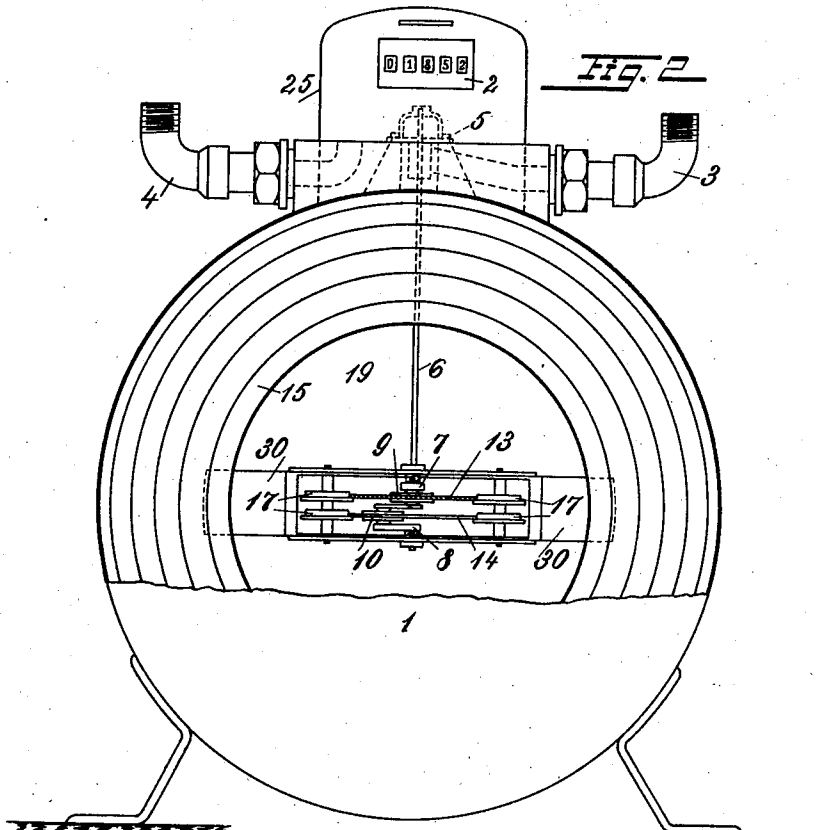
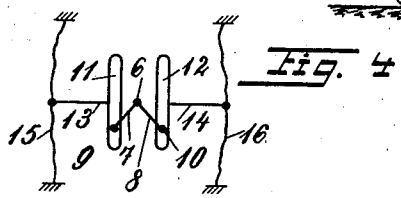


Fig. 4



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UNITED STATES PATENT OFFICE.

GUIDO WÜNSCH, OF FRIEDENAU, GERMANY, ASSIGNOR TO CARL BAMBERG, OF FRIEDENAU, NEAR BERLIN, GERMANY.

DRY GAS METER.

Application filed December 6, 1920. Serial No. 428,807.

To all whom it may concern:

Be it known that I, GUIDO WÜNSCH, a citizen of the German Empire, residing at Friedenau, near Berlin, Germany, have invented certain new and useful Improvements in Dry Gas Meters, of which the following is a specification.

To avoid the disadvantages known with dry gas meters provided with leather diaphragms it has already been proposed to use metallic diaphragms, but as such diaphragms have self tensions which had to be subdued by the gas pressure said gas meters gave rise to undesirable loss of pressure in the gas conduits leading to burners or other gas apparatus to be controlled by the meter. The object of the invention, therefore, is to construct a dry gas meter with metallic diaphragms the self tensions of which is compensated, so that any loss of gas pressure is eliminated. With this object in view the invention consists in a dry gas meter having three gas measuring chambers formed by the casing of the meter and two bellows therein constructed of metallic diaphragms, the gas inlet and gas outlet to said chambers being controlled by a suitable valve operated by the intermediary of a crank gear with link motion connected with the bellows to be inflated by the gas. The bellows are connected by means of said gearing in such a way that the self tensions of the diaphragms of the one bellows in its return stroke into its position of rest are used to subdue the self tensions of the other bellows in its forward stroke, the gas pressure, therefore, having only to surmount the friction of the gearing. Said gearing consists of a crank shaft having two cranks displaced to one another about 90° and two links carried by the bellows and in connection with the said crank. When the bellows are inflated they rotate the shaft of the gearing in a known manner so that the controlling valve for the gas distribution into the measuring chambers is set into operation and the counter is rotated.

In the accompanying drawings—

Fig. 1 is a vertical section through the gas meter,

Fig. 2 is a front view, partially in section,

Fig. 3 is a detail view showing the crank gearing on an enlarged scale.

Fig. 4 is a schematic view of the crank gearing with link motion.

The new meter consists of a casing 1 carrying the known counter 2, a gas inlet nipple 3, a gas outlet nipple 4 and a distributing valve 5 adapted to be operated by means of a shaft 6 having two cranks 7 and 8 displaced to one another about 90°. The cranks are provided with rollers 9 and 10, respectively, adapted to engage slots 11 and 12 of links 13 and 14, respectively attached to the bottoms of two bellows 15 and 16, respectively. To reduce friction the links may be guided between rollers 17 carried by the intermediary of a bridge 30 fastened to the casing 1. Each bellows consists of a series of ring shaped metallic diaphragms with flanges on the inner and the outer edges. The flanges of two adjoining diaphragms may be connected to one another in any suitable manner, for instance by soldering or rivetting. On the one end each bellows is closed by means of a bottom and on the other end it is fastened to a ring 18 fixed to the inner side of the casing 1. The rings 18 may also be integral with the casing constructed in two halves connected to one another by means of an outer ring 1^a, as shown in Fig. 1. The two bellows are placed with their open ends towards one another so that they form an expansible and collapsible chamber 19. The inner space of the casing 1 is divided by the bellows into two measuring chambers 20 and 21, while the third chamber (19) for the gas to be measured by the meter is formed by the two bellows.

The valve 5 is arranged in a casing 25, which is in open connection with the outlet nipple 4 of the meter. The inlet nipple communicates with a valve chamber 24 which is located in the inner part of the valve 5. Leading to the gas measuring chambers of the meter conduits 22 are arranged in the valve 5 having a cap 23 by means of which each measuring chamber may be put into communication with the valve chamber 24. In Fig. 1 the left measuring chamber 20 is connected with the valve chamber 24 by the intermediary of the cap 23 and the conduit 22, while the other chamber 21 communicates with the casing 25; the conduit connecting said casing with the inner gas chamber 19 is not shown on the drawing.

In the operation of the new meter the gas inlet nipple 3 is to be put into connection with the main gas pipe not shown in the

drawings, so that the gas may flow to the inner chamber 24 of the controlling valve 5. Corresponding to the position of the valve cap 23 the said inner valve chamber 24 is in open connection with one of the three gas measuring chambers in the casing, while the other two gas chambers are in connection with the valve casing 25, from which the gas may flow to the outlet nipple 4. The method of measuring the gas by means of a dry gas meter having three chambers is known, so that the operation of the crank shaft needs not to be described.

As to the movement of the bellows it may be presumed that they take the position shown in Fig. 1, in which the bellows 15 in the chamber 20 is at rest and in which the metallic diaphragms have no self tensions. When gas is admitted to the meter and the crank shaft 6 is rotated about 90° the bellows 15 in returning to its state of rest presses the bellows 16 together. In rotating the shaft further about 90° the bellows 15 is pressed together by the intermediary of the self tensions of the bellows 16 returning in its state of rest. By the next movement of the shaft of about 90° the self tensions of the bellows 15 are used to bring the bellows 16 in its inflated position, and after a further rotation of about 90° of the shaft the inflated bellows 16 returns to its state of rest whereby its self tensions cause the bellows 15 to take its inflated position. In the manner described the self tensions of the bellows are used to equalize one another, so that no loss of gas pressure may occur.

What I claim is:

1. In a dry gas meter, the combination with a casing, of two bellows within said casing, each of said bellows being open at one end and closed at its other end, the two bellows being arranged with their open ends opposite each other and attached to the casing so as to divide the space within the casing into three measuring chambers, inlet and outlet means for the chambers, one of said chambers being formed by the bellows and the portion of the casing walls comprised between said open ends, a crank and link mechanism operably associated with the bellows, a rod operably connected to said mechanism, and a gas distributing valve operably connected to the rod and movably to control the gas inlet and outlet means of said measuring chambers.

2. A dry gas meter as set forth in claim 1, the crank and link mechanism comprising two cranks arranged at an angle to each other of substantially ninety degrees, each crank being connected to the bellows by a slot and link connection.

3. A dry gas meter as set forth in claim 1, the crank and link mechanism comprising two cranks arranged at an angle to each other of substantially ninety degrees, slotted members fixed to the bellows, and rollers carried by the cranks and working in the slots, whereby to reduce the friction between the slotted members and the crank.

4. In a dry gas meter, the combination with a casing, of two metallic bellows within said casing, each of said bellows being open at one end and closed at its other end, the two bellows being arranged with their open ends opposite each other and attached to the casing so as to divide the space within the casing into three measuring chambers, one of said chambers being formed by the bellows and the portion of the casing walls comprised between said open ends, a crank and link mechanism operably interconnecting said bellows so as to transmit the tensions of one bellows to the other as the bellows are alternately expanded and contracted, a distributing valve, and means operably connecting the valve to the mechanism for permitting the mechanism to rotate the valve.

In testimony whereof I affix my signature.

GUIDO WÜNSCH.