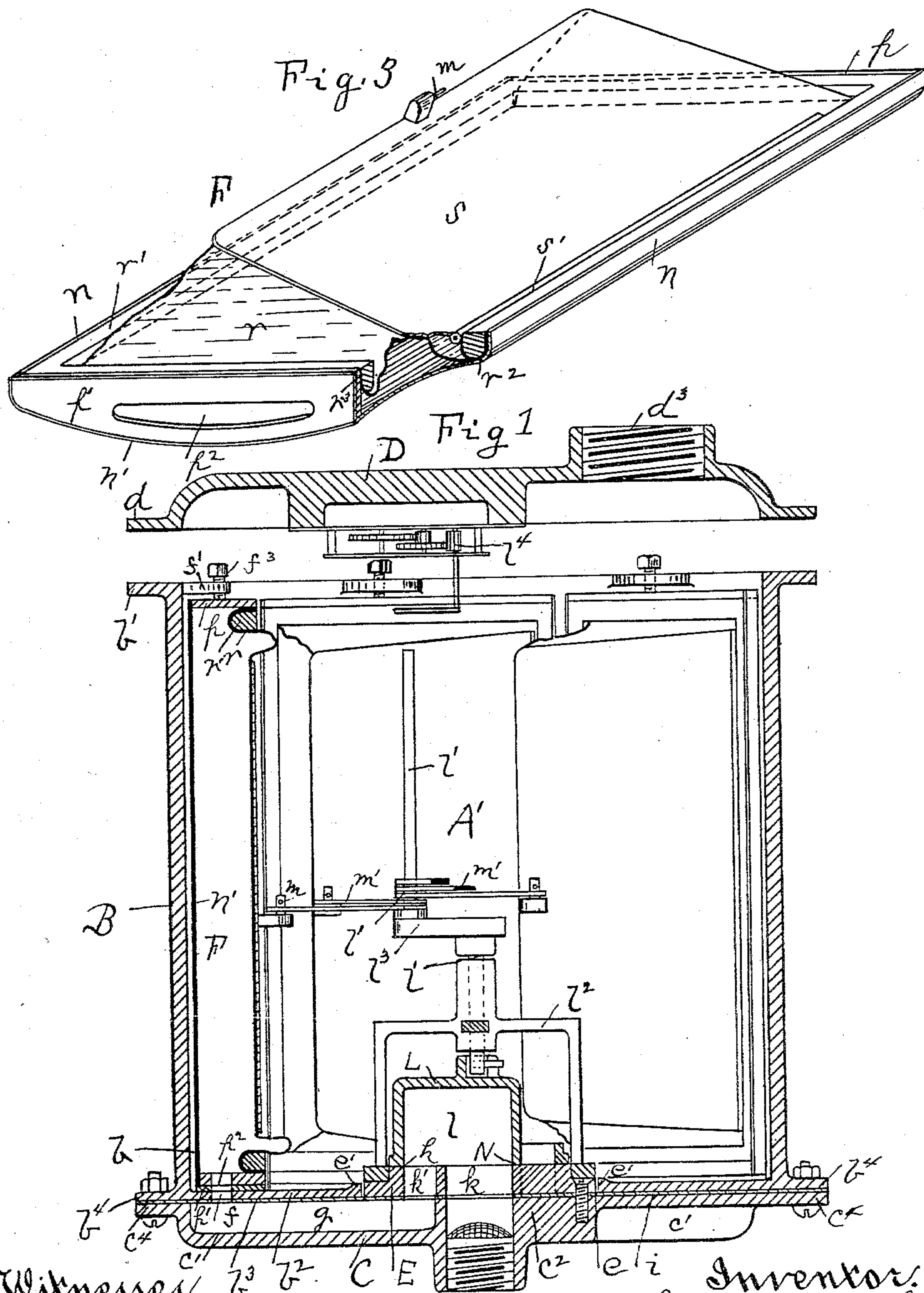


2 Sheets—Sheet 1.

No. 565,209.

Patented Aug. 4, 1896.



Witnesses. ⁶³
Chas. J. Farrar.
Robert C. Totten

212
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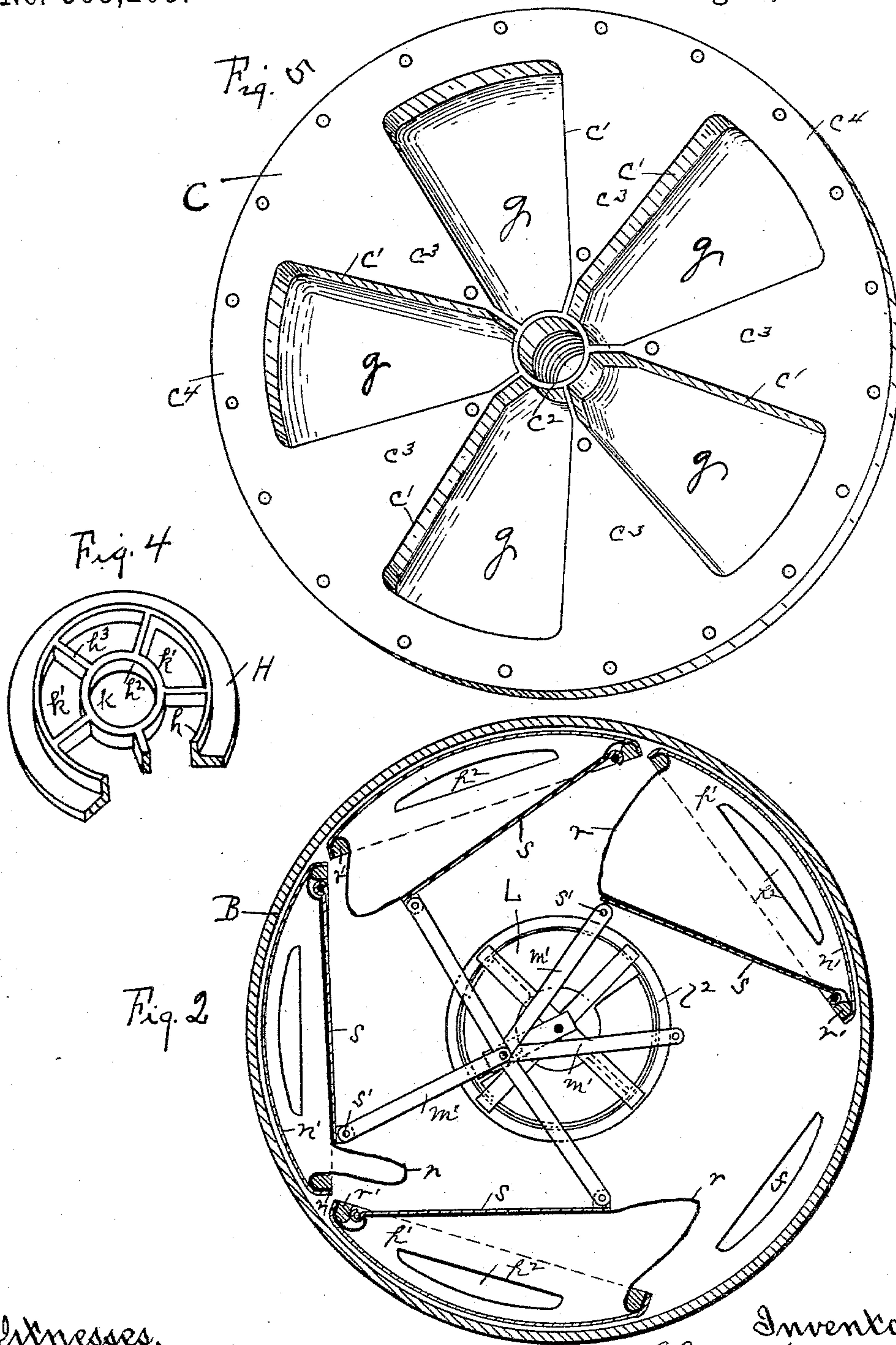
(No Model.)

2 Sheets—Sheet 2.

C. F. HOLDSHIP.
METER.

No. 565,209.

Patented Aug. 4, 1896.



Witnesses.

Chas. J. Trarar.
Robert. C. Totten

Inventor
Charles F. Holdship
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Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES F. HOLDSHIP, OF ALLEGHENY, PENNSYLVANIA.

METER.

SPECIFICATION forming part of Letters Patent No. 565,209, dated August 4, 1896.

Application filed August 21, 1895. Serial No. 560,065. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. HOLDSHIP, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Meters; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to meters and more particularly to what are known as "dry" meters; and it relates to the same class of meters as described in an application filed by me April 19, 1894, Serial No. 508,146.

The principal objects of the invention are to reduce the cost thereof by providing a form of shell or body which can be formed by what is termed "green-sand molding" and in which the necessity for special corework is overcome, as well as to simplify certain parts of the castings in large meters, to provide for the dressing of the castings at small cost, and to provide removable measuring-pockets complete in themselves which can be constructed entirely separate from the meter shell or casing and can be held therein by simple means, and which can be quickly changed, in case of any defect found in one of such bellows-pockets, while by building up the bellows-pockets separate from the shell the cost of the meter can be materially reduced.

The special improvements desired to be covered will be hereinafter fully set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same, referring to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of the meter embodying my invention. Fig. 2 is a cross-section of the same on the line 2 2, Fig. 1, one of the measuring-pockets being removed. Fig. 3 is a perspective view, partially broken away, of one of the removable bellows-pockets. Fig. 4 is a view of the valve-seat casting, and Fig. 5 is a view of the bottom casting.

Like letters indicate like parts in each.

The casing or shell of the meter is formed of three different parts, the main body B, the

base C, in which are formed the passages to the measuring-pockets in the main body or shell, and the cover D.

The cover is of the usual construction and requires no description further than to state that its flange *d* can be surfaced for forming a joint with the top flange *b'* of the shell B by milling, which is the cheapest and most rapid way of finishing castings, and that the bolts connecting same extend directly through both flanges *d* and *b'*, so that no special packing of bolt-holes is required.

The main shell B has the cylindrical body *b* with the base-plate *b²* cast therewith, through which base-plate is the central opening *e* for the valve-seat E, while at intervals around said opening and near the cylindrical body portion are the longitudinal slots *f*, through which communication is obtained with the bellows-pockets F.

It will be noticed that the inner and outer walls of the shell are plain and concentric, so that it is a simple casting to form, and so that the inner portion or core with the projections for forming the central opening *e* and slots *f* can be molded in green sand, around which will fit the main mold-section, so that this main body portion or shell can be molded at low cost.

The projecting lugs *f'*, through which bolts pass to secure in place the bellows or measuring pockets F, can be molded within the core and by pattern parts which can be withdrawn radially therefrom, so that they do not interfere with the regular green-sand molding above described. Another peculiarity to be noticed in connection with this main shell B is that the bottom face *b³* of the base-plate *b²* of the casting, including the flange *b³* around the cylindrical body portion *b*, and the top face of the flange *b'*, including the lugs *f'*, can be finished by milling, the whole surfaces being finished at one time by the simple milling cut, because said faces are plain and perfectly flat, there being no projections thereon which would necessitate lathe-turning. The bottom casting C is also simple to mold, being a simple flat body with the radial wings *c'* thereon, which are hollow, so as to form the passages from the valve-

seat to the several measuring-pockets, and with the boss c^2 , which is interiorly threaded to receive the inlet-pipe of the meter.

It will be noticed that the upper face of the casting is perfectly flat, so that it may be finished by the straight milling cut above described, the central boss c^2 extending up to the same level as the top face, while the walls c^3 between the wings c' and between the hollow cavities g in the wings, forming passages to the bellows-pockets, also extend out to said central boss on the same level with the top face, the milling cut above described providing all the finishing work required on the casting, finishing at the same time the top face of the flange c^4 , by which this casting is secured to the main shell B. Communicating with one of these cavities g is a threaded opening closed by a plug g' , which provides for introducing oil into that cavity, sufficient of which will be taken up by the gas in passing over the same to lubricate the valve and valve-seat. To provide the valve-seat, I employ a separate casting H, such as shown in Fig. 4, which has a flat under surface, so as to provide for the milling of the same. This valve-seat casting H has an annular body, above which is raised the valve-seat proper h' , and within which is the central ring h^2 , corresponding to the boss c^2 of the bottom casting C, and from which the wings h^3 extend radially out to the outer body, said wings corresponding in position to the walls c^3 of the bottom casting. This valve-seat casting is secured to the bottom casting by suitable screws, as shown. In securing the same in place and to provide for the packing of the bottom of the base-plate b^2 of the shell B, I first place a piece of sheet-packing i of any suitable material, such as paper or rubber, over the entire upper face of the bottom casting C. The valve-seat casting H is then placed thereon and is secured in place by screws passing through such packing-sheet i into suitable screw-holes formed therefor in the bottom casting. The operator by means of a sharp knife or other tool cuts out the sheet-packing, so as to expose the several passages g and to expose the valve-passages k' , and the central boss or inlet-passage k thereof, leaving the sheet-packing forming a tight joint between the valve-seat casting and the bottom casting, and covering the surfaces which are to be packed between the bottom casting C and the main shell B. This main shell B is then passed over the bottom casting, the valve-seat casting passing up through the central opening e thereof, and a practically tight joint between the base-plate b^2 and the upper face of the bottom casting is formed by means of the packing-sheet i , compressed by means of the bolts passing through the flanges c' and b^3 . A tight joint between the base-plate b' and the valve-seat casting H can be easily formed by shellac or like material, and to receive the same it is to be noticed that around the central opening e is an annular projection e' , the

inner face of which is slightly rounded, and which holds the packing for such joint within the valve-seat casting.

Particular description of the valve-seat itself or the valve mechanism does not seem necessary, the same having been fully described in said application, Serial No. 508,146, and it is only necessary to state that the valve L rests upon the valve-seat N, and has a cavity l adapted to form communication between the central inlet-port k and the several passages k' , and to uncover such passages to permit the passage of the measured gas into the main inner chamber A' of the meter. This valve is turned by the crank-shaft l' , which is mounted in a frame l^2 , the upper end having the crank-arm l^3 , which engages with the registering mechanism l^4 , which mechanism does not require to be described. The frame l^2 is secured to the valve-seat casting H around the valve-seat h thereof.

The measuring-pockets employed with the meter are made entirely separate from the casting, so that they can be removed and re-inserted at will. There are five of these measuring-pockets F, the inner measuring-spaces of which are numbered 1 2 3 4 5, corresponding to like recesses or passages g and the wings of the bottom casting and like passages k' of the valve-seat. These removable measuring-pockets are preferably constructed in the following way: The backing or main body of each pocket is formed of a sheet-metal shell, curved, as at n' , so as to fit within the curved body of the meter and thence extending forward at the sides to form what might be termed the "side walls" n' , while the top and bottom parts are preferably formed of castings $p p'$, to which the sheet-metal back and sides are soldered, as shown, the bottom casting having the port p^2 corresponding to the slot f in the base-plate b^2 of the shell B. If desired, this sheet-metal shell may be stamped from one piece of metal.

The flexible bellows-body r may be secured in the body of the removable pocket in any suitable way, the simplest way known to me being the employment of the angular frame r' , to the back of which the flexible bellows-body is first secured by shellac or other cement, as at r^2 , while the end portions of the bellows-body are carried around the outer edges of the frame and shellacked thereto, as at r^3 . The outer faces of these end portions are then covered with shellac and the frame is forced within the side walls n' and the end walls $p p'$, it being found that this forms a secure and gas-tight joint. At the ends of the rear edge of the top wall p are slight projections p^3 to hold the pockets in vertical position, compensating for the necessary clearance in the casting.

Each removable bellows-pocket is secured in place within the shell by suitable packing on its bottom face p' and surrounding the opening p^2 therein, forming a packing between the bottom face thereof and the upper

face of the base-plate b^2 of the shell B, a bolt f^3 passing through the lug f^2 and forcing the pocket down upon the bottom face, so as to form a gas-tight joint.

5 To operate the bellows-pocket, I employ the sheets or leaves s , which, as shown, are each secured to a hinged bar s' , mounted in the frame and to which the bellows-pockets are glued or otherwise secured to provide for the movement of the same, and the arms m' extend from the crank-shaft l' and engage with bearings m on the leaves s .

15 In the building up of the meter the bottom casting C is secured to the shell B in the manner above described. The several bellows-pockets F are then secured in place within the shell. The valve is placed over the valve-seat, the frame l^2 being secured to the main valve-seat casting, as above described. The arms m' are then connected to the several bellows-leaves s , and the cover b is secured in place, suitable packing being employed between it and the shell when the meter is finished and ready for use.

25 In the use of the meter the gas enters through the boss c^2 , entering the central port k of the valve-seat and passing therefrom into one or more of the measuring-pockets through the ports k' , and by filling such pockets and pressing upon the flexible bellows thereof through the leaves s and the arms m' , connecting the same to the crank-shaft, causing the turning of the same and the rotation of the valve L over its valve-seat h , the valve uncovering certain of the ports k' , permitting the measured gas to pass into the central space A' of the meter, and the measured gas to pass from the same through the outlet-port d^3 . The rotation of the crank-shaft operates the registering mechanism in the usual way. As the gas passes into and out of the cavity g , which serves as an oil-pocket, as above described, it serves to carry sufficient thereof to the valve-seat N to lubricate the same and overcome friction between the valve and valve-seat, it being found in practice that such recess or oil-pocket will hold sufficient oil to lubricate a meter for a considerable period, such as for a year or more.

50 The meter can be constructed at comparatively small cost on account of the simplicity of the castings and the possibility of dressing or finishing of the same by milling instead of turning, as above described, while the measuring-pockets can be constructed at but small comparative cost, as they are removable from the meter-shell and are built up separate therefrom and are easily secured therein, and in case any meter-pocket is imperfect it can easily be changed by the simple removal of the meter-cover D and the loosening of the bolt, and another such pocket replaced therefor. In case of leakage of any gas from the meter-pockets or their joints within the bottom of the meter such gas will enter the central chamber of the meter, and leakage into the atmosphere is thus prevented; and as

the difference in pressure between the un-measured and the measured gas is very slight liability of leakage is extremely small, and even where the meter is employed for measuring high-pressure gas there is practically no pressure on the joints of the measuring-pockets or between the measuring-pockets and casing.

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

1. A meter-body formed of three castings, a cover, a main casting formed of a cylindrical shell having a base-plate with ports extending through the same, and a bottom casting secured to the main casting and having radial recesses therein forming the passages from the valve-seat to the measuring-pockets, the meeting faces of the base-plate of the shell and of the bottom casting around and between the radial recesses being plain and flat, and having a packing-sheet between them, substantially as set forth.

2. A meter-body formed of three castings, a cover, a main casting formed of a cylindrical shell to which the cover is secured and having a base-plate with a central opening and ports extending through the same, and a bottom casting secured to the main body and having recesses therein forming passages from the valve-seat to the measuring-pockets, the meeting faces of such castings being plain and flat, and a valve-seat casting having a flat lower face secured to the bottom casting and extending up through the central opening in the bottom plate of the main body or shell, and a packing-sheet between the bottom casting and the base-plate of the main casting substantially as and for the purposes set forth.

3. A meter-body formed of three castings, a cover, a main casting formed of a cylindrical shell to which the cover is secured, and having a base-plate with a central opening and ports extending through the same and a bottom casting secured to the main body and having recesses therein forming passages from the valve-seat to the measuring-pockets, the meeting faces of such castings being plain and flat, and a valve-seat casting having a flat lower face secured to the bottom casting and extending up through the central opening in the bottom plate of the main body or shell, said bottom casting having a central boss and wings extending to the same, and said valve-seat casting having a central boss with wings extending out therefrom corresponding to those of the bottom casting, and a packing-sheet between the bottom casting and the base-plate of the main casting and the valve-seat casting, substantially as and for the purposes set forth.

4. A removable bellows-pocket for meters having a metal body, a skeleton frame fitting in the said body, and a flexible bellows secured in the front thereof and held between such body and frame, substantially as set forth.

5. A removable measuring-pocket for meters having metal back and side walls, and metal end walls, a frame fitting within said side and end walls, and a flexible bellows secured to the inner face of the frame and clamped between the outer edge of the frame and the metal body of the pocket and united to the pocket and frame by suitable cement, substantially as set forth.
6. In combination with a meter-body having an outer shell and having a base-plate with a port extending through the same and communicating with a passage leading to the valve-seat, a removable bellows-pocket adapted to fit within the meter-body and having a port at one end thereof corresponding to the port in the base-plate, and means for clamping the bellows-pocket against said base-plate, substantially as set forth.
7. A meter having an inclosing cylindrical shell and a series of removable measuring-pockets having metallic back walls corresponding to the inner face of the shell and having the front walls formed of flexible bellows, the pockets being adapted to be secured within the shell, substantially as set forth.
8. A meter having an inclosing cylindrical shell and a series of removable measuring-pockets having metallic back walls corresponding to the inner face of the shell and having the front walls formed of flexible bellows, said pockets being adapted to be secured within the shell, the inner walls of the shell being slightly tapering and the rear face of the pocket having lugs at the ends of the top edges adapted to contact with said inner shell, substantially as set forth.
9. The combination of an inclosing shell having a base-plate provided with ports communicating with the passages leading to the valve-seat, and having at the other end of the shell inwardly-projecting lugs, removable measuring-pockets having ports in one end corresponding to the ports in the base-plate of the shell, said pockets fitting under said lugs, and bolts passing through the lugs and securing the pockets within the shell, substantially as set forth.
- In testimony whereof I, the said CHARLES F. HOLDSHIP, have hereunto set my hand.
- CHARLES F. HOLDSHIP.
- Witnesses:
ROBT. D. TOTTEN,
ROBERT C. TOTTEN.