No. 817,887. PATENTED APR. 17, 1906.

J. A. TILDEN.

METER.

APPLICATION FILED JULY 7, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

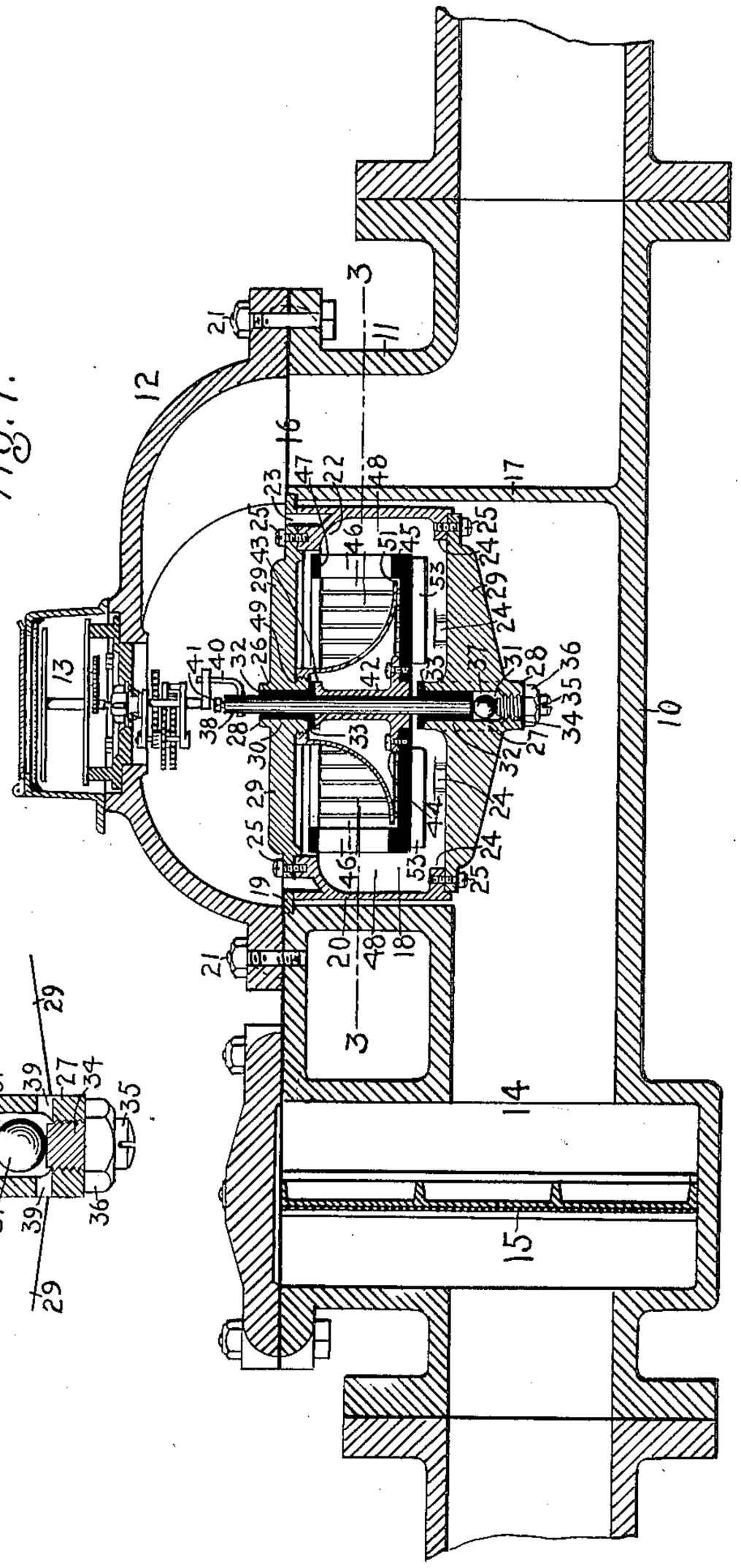
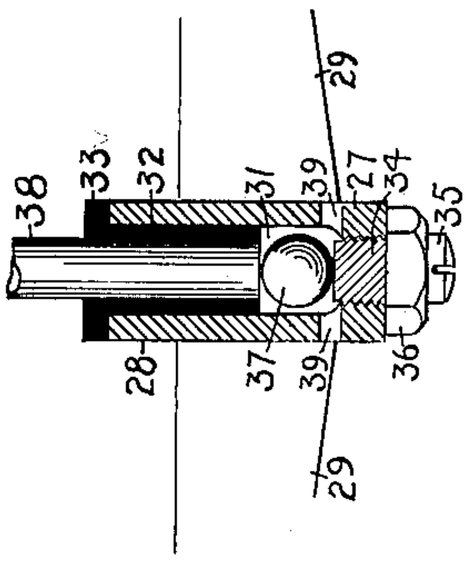


FIG. 7.



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2 SHEETS—SHEET 2.

Fig. 2.

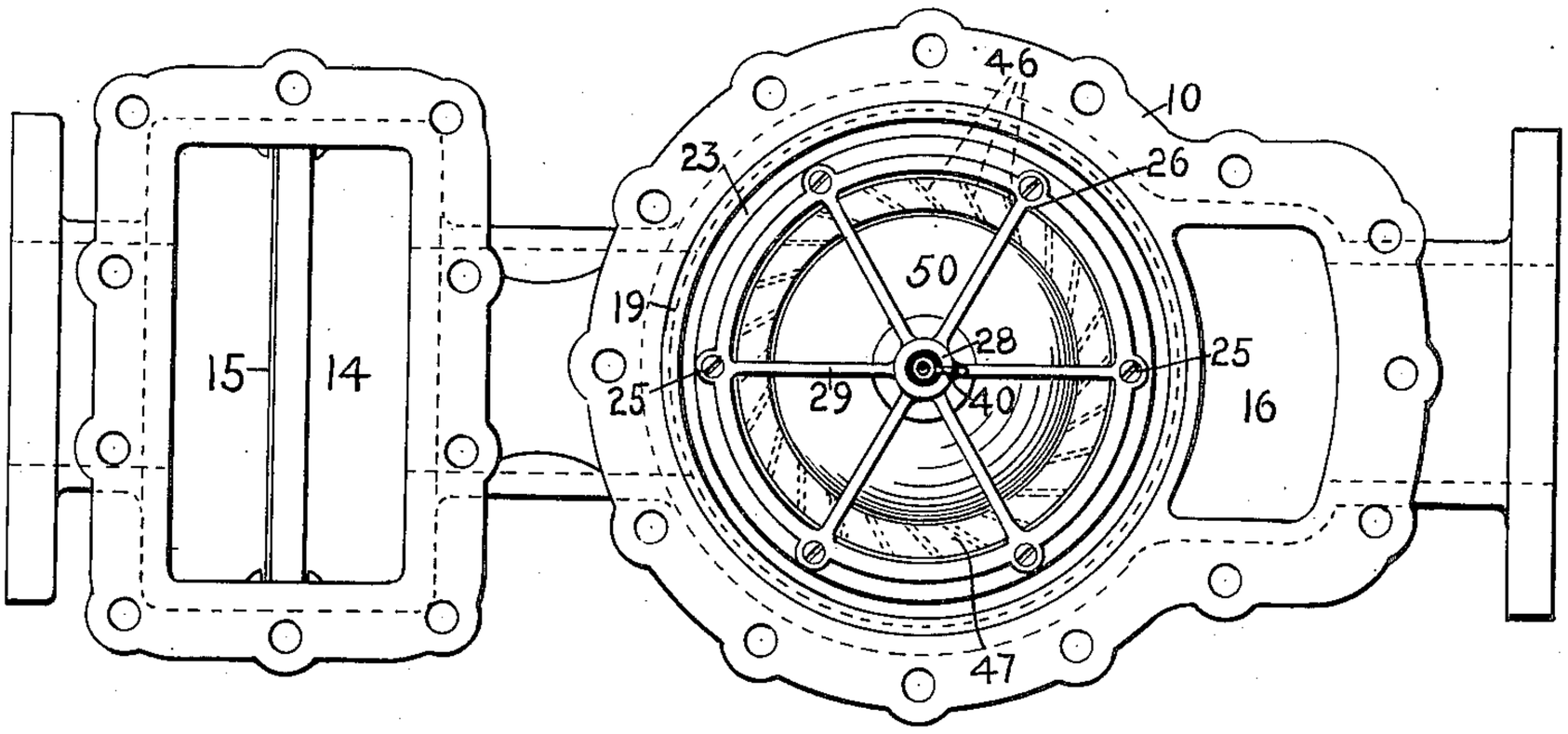


Fig. 4.

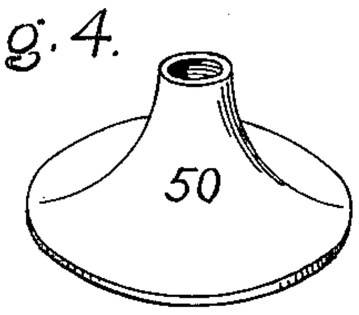


Fig. 3.

Fig 5

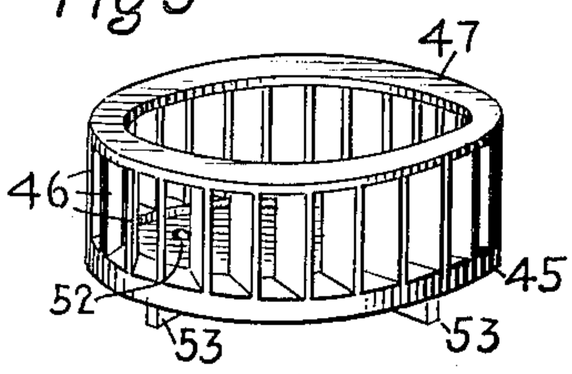
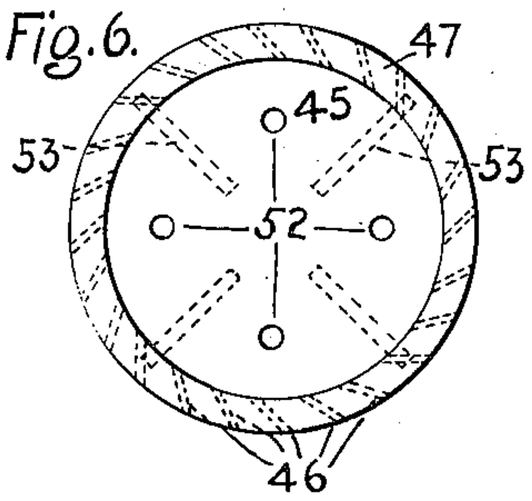
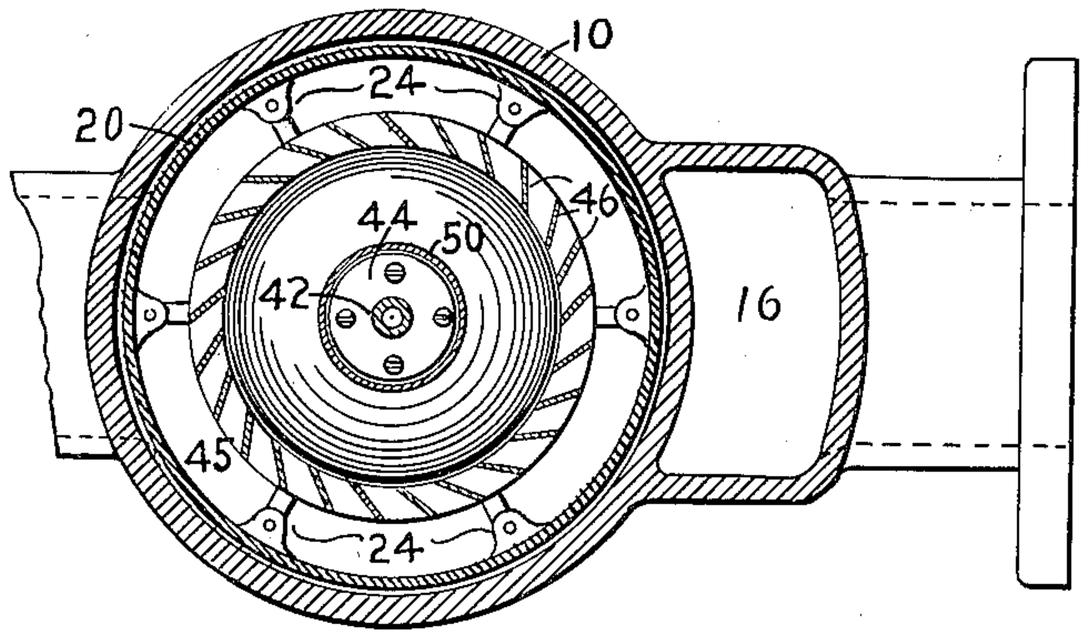


Fig. 6.





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UNITED STATES PATENT OFFICE.

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METER.

No. 817,887. Specification of Letters Patent. Patented April 17, 1906.

Application filed July 7, 1905. Serial No. 268,622.

To all whom it may concern:

Be it known that I, JAMES A. TILDEN, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Meters, of which the following is a specification.

My invention relates to meters, and more particularly to those of the current type. Its principal objects are to provide an effective apparatus of this character.

It consists in the various features and combinations hereinafter described and more particularly claimed.

In the accompanying drawings, Figure 1 is a central vertical longitudinal section through one embodiment of my invention. Fig. 2 is a top plan view with the cover removed. Fig. 3 is a broken horizontal section on the line 3 3 of Fig. 1. Figs. 4 and 5 are perspective views of the deflector and wheel, respectively. Fig. 6 is a top plan view of said wheel, and Fig. 7 is an enlarged sectional detail of the step or thrust-bearing taken in a plane between the arms of the supporting-spider.

Similar characters indicate like parts throughout the several figures of the drawings.

10 designates an outer casing having an upward extension 11, which is open at the top and which may be closed by a cover 12. This cover carries the usual register mechanism 13. In the casing is formed an inlet-passage 14, in which is shown a strainer 15, while in the cover and casing is an outlet-passage 16. Between the passages and separated from the outlet by a transverse wall 17 is a chamber 18.

About the top of the chamber in the inner edge of the extension and the wall is a recess adapted to receive a flange 19, projecting from the upper extremity of a sleeve or inner casing 20, which as illustrated is cylindrical in form and extends downwardly through the chamber toward the inlet-passage. The cover 12 projects over the flange 19, where it rests in the extension recess and, being held in place by bolts 21, serves to normally maintain the sleeve in position in the chamber. The upper edge of the sleeve extends inwardly at 22 and may have a portion cored out at 23 to effect reduction in weight. From the opposite end of the sleeve lugs 24 project toward the center. To the extension and lugs are secured by screws 25 or other convenient means spiders or supports 26 and 27, respectively, each of these spiders having a central boss 28, from which radiate arms 29. In the boss of the upper spider is an opening 30, while that of the lower spider has an alined opening or recess 31. Within these openings are preferably inserted bushings 32, which may be of hard rubber and which have upon their adjacent ends flanges 33 extending over the bosses. At the lower portion of the recess 31 is a threaded opening 34, which receives a screw 35, having its inner end lying within the recess and which is preferably held against accidental rotation by a lock-nut 36. Supported upon the upper end of the screw within the recess is a ball or freely-movable member 37, furnishing a step or thrust-bearing for a spindle 38, which bears laterally upon the bushings. Between the arms of the spider 27 are shown openings 39 into the recess adjacent to the end of the screw, these permitting a free flow of fluid through the bearing, thus keeping it washed clean of particles which might produce wear. The upper end of the spindle is connected with the register-gearing by an arm 40, extending through a lateral opening in the spindle and held in place therein by a set-screw 41.

The spindle carries a wheel or measuring device. This as illustrated comprises a sleeve 42, fixed to the spindle and provided with a flange 43, which may contact with the upper bushing and at its opposite extremity with a flange 44 of greater diameter than its companion and to which is attached a head 45. Projecting upwardly from the head near its periphery is a circumferential series of vanes 46, lying substantially parallel to the spindle and inclined with respect to radii from the axis of the wheel. Connecting the vanes at their upper ends is shown a ring 47, and this, together with the vanes and head, are preferably of hard rubber. The diameter of the wheel is such that a considerable space is left at 48 between it and the inclosing sleeve, this being substantially closed near its upper end by the portion 22, which extends into proximity with the ring 47.

The boss of the spider 26 may be threaded

externally at 49, thus serving to receive and support the central portion or hub of a curved deflector 50, the sides of which diverge downwardly and extend into proximity with the inner face of the head, but leaving a space 51 between them. Through the head beneath the deflector are one or more contracted openings, they being in the present instance four in number. Between the openings are ribs or wings 53, which depend from the head at its side toward the inlet.

In use the fluid to be measured enters the inlet-passage and rises between the arms of the spider 27 into the space 48, surrounding the wheel. The current now passes through the spaces between the vanes in directions substantially radial to the axis, it being directed by the portion 22 of the casing, exerting a force against their inclined faces which causes the wheel to rotate in its bearings. This movement is communicated to the register by the spindle and arm to indicate the quantity of fluid flowing. After its passage between the vanes the fluid continues its radial travel until it strikes the deflector, which causes it to move substantially parallel to the axis between the arms of the spider 26 into the outlet-passage. Upon a cessation of the fluid-flow the rotation of the wheel is promptly stopped to prevent "racing" or over-registration through the resistance exerted by the vanes and the wings 53 against the fluid. The efficiency of the wings is increased by their position at the inlet side of the wheel. Here the fluid enters the chamber in a direction parallel to the axis and is practically uneffected by the movement of the wheel, which causes the fluid at the outlet side to rotate with it and to tend to continue in motion after flow has stopped. Consequently these wings act in a substantially immobile body, furnishing a maximum resistance. It should be noted, however, that by dispensing with the customary fixed and inclined directing or reaction vanes and allowing the fluid upon both sides of the wheel-vanes to move in right lines such swirling or rotary currents are largely eliminated, they arising only from the travel of the wheel itself. Moreover, the omission of these elements and the providing instead of ample spaces at both sides of the vanes renders it impossible for entering solids to clog or break the wheel.

As the fluid rises against the under side of the head it tends to lift the wheel, and thus relieve the ball from the weight of the rotating parts. The fluid which exerts this lifting force transmits its pressure through the openings 52 to the upper side of the head, practically balancing it, and this allows the upward pressure to be reduced to the desired extent, preventing a transference of the thrust to the upper bearing.

It will be seen that my improved arrangement of separable sleeve supporting the measuring device and being held in place in the casing by the cover renders it possible upon the removal of the latter element to withdraw the sleeve and measuring device together. This having been done all parts may be readily seen and may be disassembled without the danger of injury which exists when unskilled persons attempt to take out elements independently secured within the casing and to a greater or less extent concealed.

Having thus described my invention, I claim—

1. A meter comprising a movable measuring member having vanes surrounded by an unimpeded space, a bearing for supporting the weight of the measuring member, and means situated at the opposite end of said member from the bearing for directing the fluid to be measured through the space against the vanes and in the direction of the axis of the member.

2. A meter comprising a measuring device having a head provided with an opening through which the fluid to be measured may flow and vanes projecting from the head, means for delivering the fluid against the outer side of the head, and a deflector situated within the vanes, there being a space between said deflector and the head.

3. In a meter, the combination with a thrust-bearing, of a spindle rotatable therein, a head carried by the spindle, vanes projecting from the head, and means for delivering the fluid to be measured against the side of the head toward the bearing.

4. In a meter, the combination with a thrust-bearing, of a spindle rotatable therein, a head carried by the spindle and being provided with a contracted opening through which the fluid to be measured may flow, vanes projecting from the head, and means for delivering the fluid against the side of the head toward the bearing.

5. The combination with a casing, of a sleeve supported therein, a measuring device mounted to rotate within the sleeve and having vanes spaced from said sleeve, and means for delivering the fluid to be measured through said space and radially with respect to the axis of the measuring device.

6. The combination with a casing, of a sleeve supported therein, a measuring device mounted to rotate within the sleeve and having vanes spaced from said sleeve, and a closure between the sleeve and measuring device near one end of the space.

7. The combination with a casing, of a sleeve supported therein, and a wheel mounted to rotate within the sleeve and having a head situated near one end of the sleeve and vanes projecting from the head toward the opposite end of the sleeve and being spaced from said sleeve.

8. The combination with a casing, of a sleeve supported therein, a wheel mounted to rotate within the sleeve and having a head and vanes projecting from the head and being spaced from the sleeve, and a closure between the sleeve and measuring device near the opposite end from the head.

9. The combination with a casing, of a sleeve supported therein, and a wheel rotatable within the sleeve and having a head, vanes projecting from the head and being spaced from the sleeve and a ring connecting the vanes at the ends opposite the head.

10. The combination with a casing furnishing a chamber, of separated spiders situated in the chamber and being provided with alined openings, bushings for the openings having flanges upon their adjacent ends extending over the spiders, a spindle rotatable in the bushing, and a measuring device fixed to the spindle and which may contact with the bushing-flanges.

11. The combination with a casing, of separated supports, a measuring device rotatable upon the supports, and a deflector mounted upon one of these supports and extending within the measuring device.

12. The combination with a casing furnishing a chamber, of a spider extending across the chamber and being provided with a recess into which are lateral openings between its arms, a spindle bearing in the recess, and a measuring device fixed to the spindle.

13. The combination with a main casing having a chamber and a flow-passage separated from one another, both chamber and passage opening at the top of the casing, of an inner casing situated in the chamber and being supported about a portion of the edge of the main casing-opening, and a cover for said opening coöperating with the inner casing.

14. The combination with a casing, of a separable sleeve mounted therein, supports extending across the opposite end of the sleeve, a measuring device rotatable upon the supports, and a deflector mounted upon one of the supports.

15. A meter comprising a casing, a measuring device rotatable therein, there being a rotary current produced in the casing during the movement of the measuring device, and fluid-engaging means for resisting the rotation of the measuring device, said means being within the casing and out of the rotary current flowing from the measuring device.

16. A meter comprising a casing having inlet and outlet passages, a measuring device movable between the passages, and a resistance member situated upon the inlet side of the measuring device.

17. A meter comprising a casing having inlet and outlet passages, a wheel provided with a head at the side toward the inlet, and resistance-arms projecting from the head.

18. A meter comprising a measuring device, an inclosure extending into proximity with the measuring device near one extremity and being spaced from the remainder thereof, and means for delivering the fluid to be measured at the opposite extremity of the wheel.

Signed at Boston, in the county of Suffolk and State of Massachusetts, this 30th day of June, 1905.

JAMES A. TILDEN.

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