

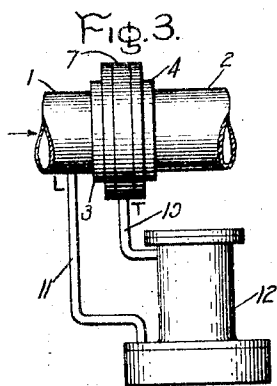
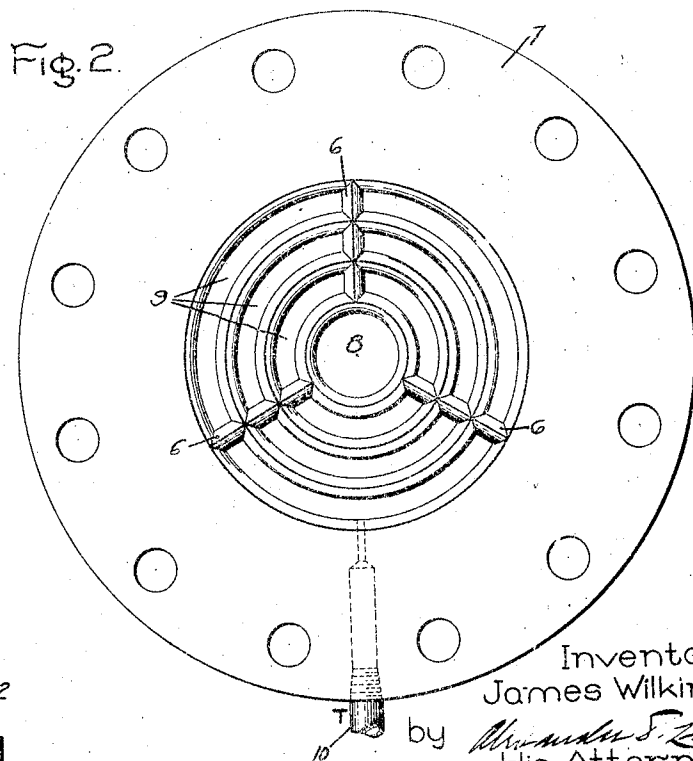
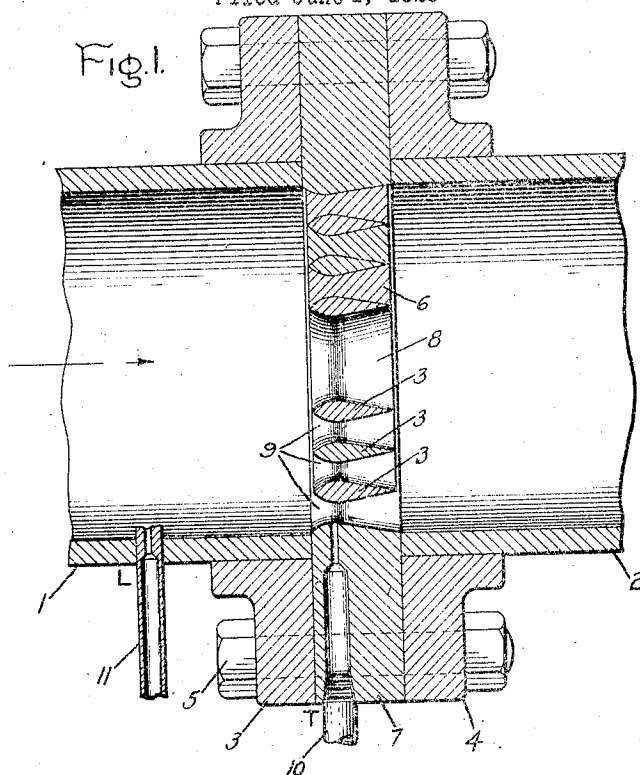
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J. WILKINSON

PRESSURE DIFFERENCE CREATING DEVICE

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UNITED STATES PATENT OFFICE.

JAMES WILKINSON, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO BAILEY METER COMPANY, A CORPORATION OF DELAWARE.

PRESSURE-DIFFERENCE-CREATING DEVICE.

Application filed June 1, 1925. Serial No. 34,263.

The present invention relates to pressure difference creating devices such as are used in connection with flow meters, for example, to create a pressure difference which bears a definite relation to the rate of flow, and especially a pressure difference creating device of the Venturi tube type.

Ordinary pressure difference creating devices of the Venturi tube type have the disadvantage that they are always of comparatively great length due to the fact that the change in diameter between the ends and the throat must take place gradually in order to enable the fluid to follow the walls of the tube. This means then that with the Venturi tube there is first an upstream section which gradually converges until the throat is reached, followed by a downstream section which gradually diverges again. As a result Venturi tubes are quite large and costly and are often difficult to install in a pipe line because of their length.

The object of my invention is to provide an improved pressure difference creating device of the Venturi tube type which is short in length and easy to install in the pipe line, and which can be manufactured at comparatively low cost.

For a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and the claims appended thereto.

In the drawing, Fig. 1 is a sectional view of a pressure difference creating device embodying my invention, the same being shown installed in a pipe line; Fig. 2 is a face view of the pressure difference creating device shown in Fig. 1, and Fig. 3 shows the pressure difference creating device connected to a flow meter.

Referring to the drawing, 1 and 2 indicate adjacent ends of two sections of a pipe line through which a fluid to be metered flows, the ends being provided with flanges 3 and 4 which may be coupled together by bolts 5.

According to my invention, I provide a pressure difference creating device of the Venturi tube type, which, instead of comprising one long Venturi tube section, comprises a plurality of comparatively short Venturi tube sections 3 of different diameters and arranged concentrically with each other. The Venturi tube sections 3 are preferably equally spaced and may be held in this relation by suitable spacers 6, such spacers be-

ing rounded at their up stream ends and tapered to a point on their down stream ends so as to evenly direct the flow and obstruct it as little as possible. The tube sections 3 are carried by a ring 7 adapted to be bolted between the flanges of adjacent pipe sections as is shown in Figs. 1 and 3. Each Venturi tube section has curved outer and inner walls, the inner wall being first converging and then diverging and the outer wall being first diverging and then converging. In other words, the outer and inner walls of each section first diverge relatively to each other and then converge, coming together at a sharp angle. This is clearly shown in the sectional view in Fig. 1. The arrangement thus provides a central venturi shaped passage 8 surrounding which are a series of annular concentric venturi shaped passages 9, the outermost passage 9 being formed by the outer surfaces of the outside tube 3 and the adjacent surface of ring 7 which is shaped also to form a Venturi passage.

The direction of flow of the fluid to be metered is indicated by the arrow in Fig. 1 and in flowing through the series of concentric venturi shaped passages the same result is obtained as if it were flowing through a single venturi shaped passage having a throat equal to the area of the combined throats of the several venturi shaped passages shown. The pressure at the throat of each of the venturi shaped passages will be the same so that the trailing pressure connection may be made to the throat of any one of them or several of them, as desired. In the present instance, the trailing pressure connection, indicated at 10, is made with the outermost passage 9. The leading pressure connection indicated at 11 may be taken directly out of the pipe line a suitable distance in advance of the Venturi structure. In Fig. 3 the trailing and leading connections 10 and 11 are shown as being connected to a suitable flow meter indicated at 12.

By the above described arrangement I provide a pressure difference creating device of the Venturi tube type which may be comparatively short and which may be easily installed in a pipe line. In addition, it is simple in structure and capable of being manufactured at a low cost. At the same time it will give results equally as accurate as Venturi tubes of the usual type.

In accordance with the provisions of the

patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but

5 I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure
10 by Letters Patent of the United States, is:

1. A pressure difference creating device of the Venturi tube type, comprising a plurality of comparatively short annular concentric Venturi tube members spaced radially from
15 each other to provide a central venturi shaped passage surrounded by one or more annular venturi shaped passages, the throats of said tube members all lying in the same plane.

20 2. A pressure difference creating device of the Venturi tube type comprising annular walls which define a plurality of comparatively short, annular, concentric venturi shaped passages, the throats of said tube
25 members all lying in the same plane.

3. The combination with a conduit through which a fluid to be metered flows, of a pressure difference creating device in the conduit comprising walls which define a plurality of comparatively short, annular, concentric venturi shaped passages and means providing a conduit through which a pressure pipe may be connected with a throat of at least one of said passages.

4. A pressure difference creating device of the Venturi tube type comprising a ring adapted to be fastened between adjacent pipe ends, and spaced concentric annular walls located within and carried by the ring which walls define a plurality of concentric annular venturi shaped passages.

5. A pressure difference creating device of the Venturi tube type, comprising walls which define a plurality of comparatively short, annular, concentric venturi-shaped passages, the admission ends and the discharge ends of which lie in the same planes.

In witness whereof, I have hereunto set my hand this 27th day of May, 1925.

JAMES WILKINSON.