Aug. 24, 1948. E. J. COURTNEY 2,447,739

PRESSURE GAUGE

Filed Nov. 22, 1944

FIG. 1

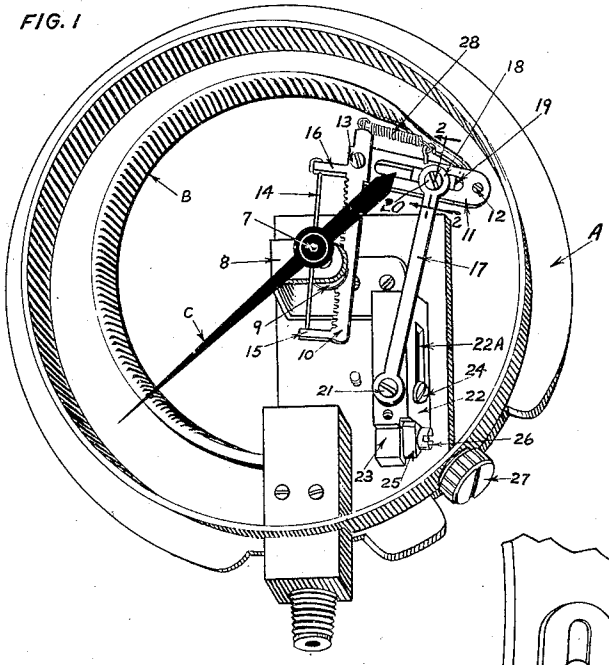
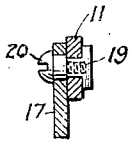


FIG. 2.



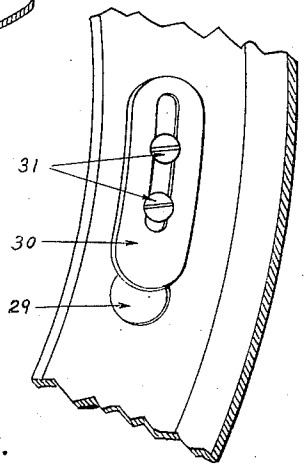


FIG. 3.

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PRESSURE GAUGE

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7 Claims. (Cl. 73—411)

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This invention relates to pressure gauges, and one of its primary objects is to provide a guage which will give an accurate indication of pressure throughout the range of the gauge. More particularly it is an object of the invention to provide a gauge, the movement of the pointer or hand of which is not characterized by the slow-down and the speed-up movements characteristic of practically all commercial forms of gauges.

Another object of the invention is to provide a simple form of gauge operating mechanism which can be readily adjusted without removal of the glass, hand and face, which is ordinarily necessary. More specifically, it is an object of the invention to provide an arrangement which is adjustable from the exterior.

Still another object of the invention is to provide operating mechanism for gauges, which is suitable either for positive pressure or vacuum gauges. How the foregoing, together with such other objects and advantages as are incident to the invention are realized, is illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of a gauge embodying my improvements, with the glass and face removed.

Figure 2 illustrates a detail of the invention, and

Figure 3 illustrates a modification.

Referring now to Figure 1, the reference character A indicates the housing or body portion of the gauge. The reference character B indicates the Bourdon tube, and the reference character C the hand or pointer of the gauge.

The pointer is carried by friction fit on the end of a shaft 7, suitably journaled in bracket 8 supported from the housing. The shaft, intermediate its ends, has a pinion 9 by means of which the hand is to be rotated in indicating pressure. The pinion is engaged by a straight rack bar 10.

Movement is transmitted from the Bourdon tube to the rack bar through the medium of a floating lever 11. One end of the floating lever is pivotally associated with the rack bar near one end of the latter, as indicated at 13. The rack is held in association with the pinion, against accidental displacement in shipping and the like, by means of a stiff wire 14 or the like, for which purpose the rack bar is provided with the fingers 15 and 16. The finger 15 is apertured to receive one end of the wire 14 and the finger 16 is also apertured to receive the wire. One end of the wire is bent over to engage the finger 16. Thus, the wire is readily assembled and is held

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in place. It performs no essential function in operation.

A link 17 has one end pivotally associated with the floating lever intermediate the ends of the latter, as indicated at 18. This pivotal point provides an axis for rocking movement of the floating lever. This pivotal association is provided by means of the block 19 and the screw 20, as more clearly illustrated in Figure 2. When the screw is turned home, the block is firmly engaged in the floating lever, and the parts are held against relative movement from any given selected position of adjustment. Link 17, however, is free to rock.

The other end of the link 17 is pivotally associated with the housing, as indicated at 21. The link rocks about this pivot point 21. In the arrangement of Figure 1, the link is pivoted to the member 22, which is slidably supported on the bar 23 carried by the housing. The member 22 is slotted at 22a, and it may be secured in any selected position of adjustment by means of the screw 24. The position of the member 22 may be shifted by means of the cam 25 which is non-rotatively associated with the screw 26. When the screw is turned, the cam is turned, engaging the member 22 and shifting it. A large screw 27 is threaded into the wall of the housing, which, when removed, provides access to screws 24 and 26 from the exterior of the casing.

A tension spring 28 is connected to the extreme upper end of the rack 10 and to the floating lever. The function of this spring is to hold the rack in gear with the pinion at all times. It does not interfere with the action of the Bourdon tube. It eliminates the use of the hair spring necessary in standard forms which has always been a source of trouble.

By virtue of the employment of the straight rack bar and the floating lever and the link, the gauge will always give an accurate indication of pressure throughout the range of the gauge, and the movement of the hand will not be characterized by the slow-down and speed-up movements, which is characteristic of commercial gauges in intermediate regions of the movement of the hand. By the adjustability of the pivotal points at both ends of the link, the gauge can be initially accurately set; and by pivotally associating the link with the housing in an adjustable manner, the gauge can be readily adjusted without taking it apart in the event that the position of the pointer on its shaft is altered, as for example, by dropping the gauge or other sudden shock.

The operating mechanism is suitable not only for the positive pressure type of gauge shown but also for the vacuum type. All that is necessary to adapt the operating mechanism to the vacuum type gauge is to remove the pivot screw of the rack bar, invert the rack bar, and screw the pivot screw in place. The teeth of the rack bar will then lie on the opposite side of the pinion from the position shown in Figure 1.

The movement of this invention is much more simple than that customarily employed. In the usual construction, the movement comprises the pinion and its shaft and bearings, a hair spring and its shaft and bearings, upper and lower plates with supporting posts.

In still other types of gauges, a single pointer is used not only to indicate the normal range of pressures but also over pressures beyond the normal range. The movement of the present invention may be applied to such gauges, as, for example, by providing two pinion portions of different diameters, with two sets of teeth on the rack bar, one set of teeth engaging the smaller pinion portion for indicating the normal range of pressure. When this pressure is exceeded, the other set of teeth will come into engagement with the larger pinion and register the over pressure.

In the modification shown in Figure 3, instead of using a screw **27**, a slot **29** is provided in the housing wall and a slotted cover plate **30** is adapted to cover the same, the cover plate being adjustably held in place by the screws **31**.

What I claim is:

1. In a pressure gauge and its housing, a pointer having a pinion, a rack for rotating the pinion, a Bourdon tube, a floating operating lever one end of which is pivotally connected with the free end of the Bourdon tube and the other end of which is pivotally connected with an end of the rack, and a link one end of which is pivotally connected with the lever intermediate the ends of the latter and thus affords an axis for rocking movement of said lever and the other end of the link being pivotally connected for swinging movement of the link, with the housing of the gauge.

2. In a pressure gauge and its housing, a pointer having a pinion, a rack for rotating the pinion, a Bourdon tube, a floating operating lever one end of which is pivotally connected with the free end of the Bourdon tube and the other end of which is pivotally connected with an end of the rack, and a link one end of which is pivotally connected with the lever intermediate the ends of the latter and thus affords an axis for rocking movement of said lever and the other end of the link being pivotally connected for swinging movement of the link, with a member supported from the housing for positional adjustment, and means for adjusting said member.

3. In a pressure gauge and its housing, a pointer having a pinion, a rack for rotating the pinion, a Bourdon tube, a floating operating lever one end of which is pivotally connected with the free end of the Bourdon tube and the other end of which is pivotally connected with an end of the rack, and a link one end of which is pivotally connected with the lever intermediate the ends of the latter and thus affords an axis for rocking movement of said lever and the other end of the link being pivotally connected for swinging movement of the link, with a member supported from the housing for positional adjustment, and means for adjusting said member, together with means for affording access to said adjusting means through a wall of the housing.

4. In a pressure gauge and its housing, a pointer having a pinion, a rack for rotating the pinion, a Bourdon tube, a floating operating lever one end of which is pivotally connected with the free end of the Bourdon tube and the other end of which is pivotally connected near an end of the rack, and a link one end of which is pivotally connected with the lever intermediate the ends of the latter and thus affords an axis for rocking movement of said lever and the other end of the link being pivotally connected for swinging movement of the link, with the housing of the gauge, and a spring connected with the rack on the side of the pivot opposite from the pinion and with the floating lever.

5. The gauge of claim 1 in which the means providing pivotal connection of the link with the floating lever is adjustable lengthwise of the lever.

6. The gauge of claim 1 in which the means providing pivotal connection of the link with the floating lever is adjustable lengthwise of the lever and in which the means providing pivotal connection of the link with the housing is adjustable.

7. The gauge of claim 1 in which the rack is invertible whereby the operating mechanism can be applied to positive pressure or vacuum gauges.

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