Jan. 27, 1925. 1,524,607

H. J. WILLIAMS

COMPENSATING DEVICE FOR OIL PUMP COUNTERS, ETC

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Fig. 1.

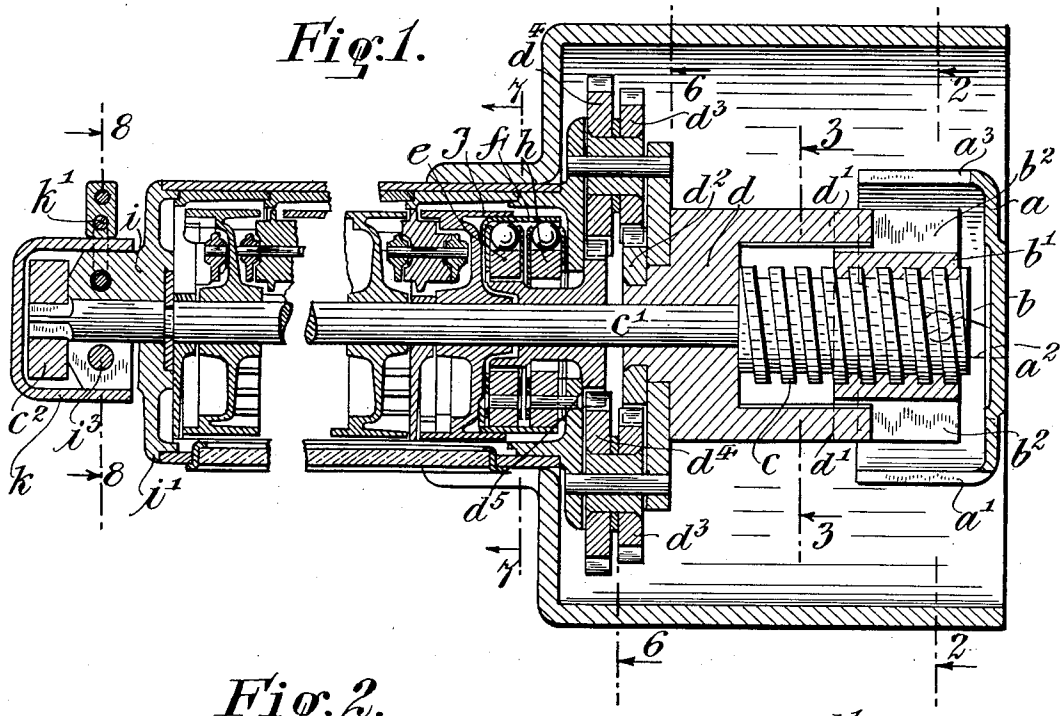


Fig. 2.

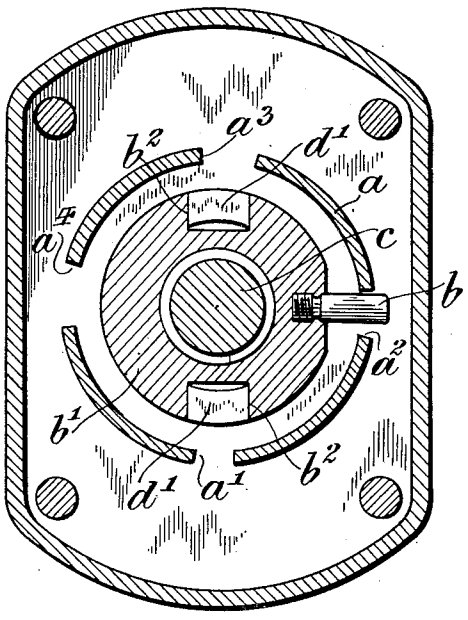
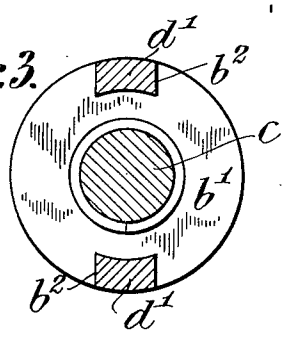


Fig. 3.



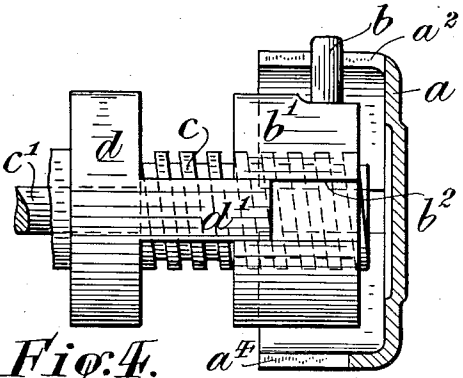


Fig. 4.

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Fig. 5.

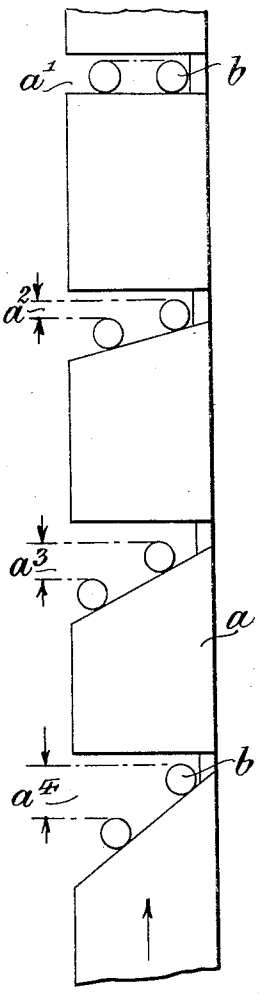


Fig. 6.

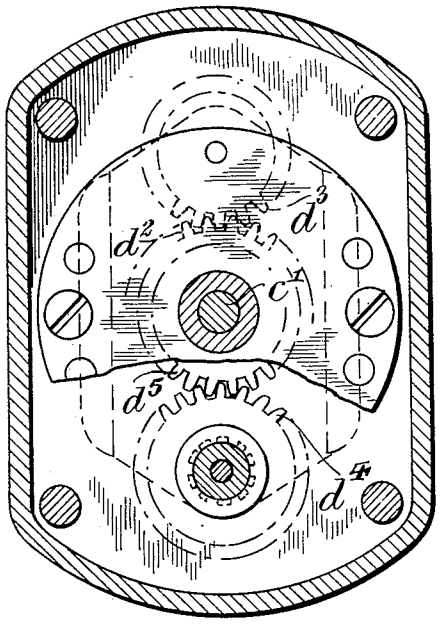
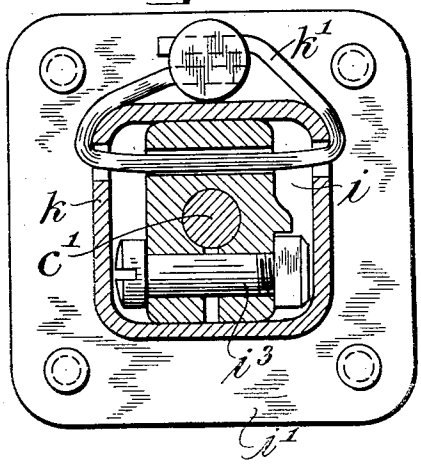


Fig. 8.



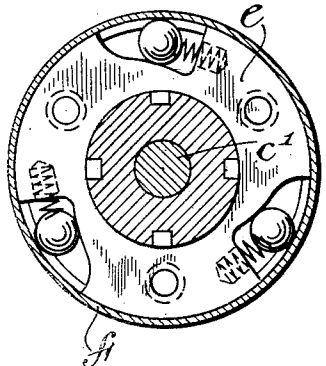


Fig. 7.

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UNITED STATES PATENT OFFICE.

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COMPENSATING DEVICE FOR OIL-PUMP COUNTERS, ETC.

Application filed December 11, 1923. Serial No. 679,918.

To all whom it may concern:

Be it known that I, HAROLD J. WILLIAMS, a citizen of the United States, residing in Hartford, in the State of Connecticut, have invented certain new and useful Improvements in Compensating Devices for Oil-Pump Counters, Etc., of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

In the present-day operation of gasoline service stations, it is a practical requirement that the counters or registers which show the total quantity of gasoline delivered during a given period of time shall register with substantially perfect accuracy. To win this result would not be difficult if all pumps of a given make could be depended upon to deliver the gasoline with perfect uniformity under all conditions of use. It happens, however, that pumps of the same make rarely deliver at each stroke of the piston the same quantity of gasoline. This is due to several causes. The pump cylinders are commonly made of drawn brass tubing and are not reamed out, so that two pump cylinders may or may not be capable of delivering the same quantity at each stroke. Again, the valves of different pumps do not always function precisely alike and for this reason also there may be a difference in delivery as between different pumps. Moreover, the pumps are not always placed at the same height above the tank from which the gasoline is drawn, with the result that, because the gasoline is highly volatile, there may be developed within the pump cylinder, under the action of the partial vacuum, a greater or a smaller volume of vapor above the liquid gasoline. In order, therefore, that any particular pump counter or register may be depended upon to register with close accuracy the number of gallons of gasoline delivered by the pump during a given period of time, it is necessary that there be provided, in connection with each counter or register, devices by which the inability of the pump with which it is associated to deliver at each stroke the exact quantity of gasoline which it is supposed to deliver can be compensated for. The counter or register is actuated through the mechanism by which the pump itself is actuated and is supposed to show or indicate the number of strokes made by the piston and therefore the number of unit volumes of gasoline delivered. If no compensating devices were provided the counter or register might indicate, for example, the delivery of one hundred gallons of gasoline when, for any of the reasons above indicated, or for any other reason, the actual quantity of gasoline delivered might be less or more than that indicated. In accordance with the invention, therefore, devices are provided whereby, in each installation of a pump and counter, the operation of the counter or register can be regulated so as to compensate for the defective operation of the pump and indicate the true number of units of volume of gasoline delivered during a given period of time, whether the same be greater or smaller than the number of strokes of the pump. Provision is made, for example, whereby, if it should be necessary to increase or decrease the length of stroke of the pump in order to accomplish the delivery with accuracy of a predetermined unit of volume, the movement of the counter or register will not be increased or decreased but will be such as to indicate the volume of gasoline delivered. Provision is also made whereby the amount of backlash in the operating mechanism of the counter shall accord with the amount of backlash in the mechanism by which the pump piston is actuated. The invention will be described more fully hereinafter with reference to the accompanying drawings in which it is illustrated and in which—

Figure 1 is a view in longitudinal central section, partly broken out, showing a counter or register and the compensating devices through which the same is driven.

Figure 2 is a detail view in section on the plane indicated by the broken line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a detail view in section on the plane indicated by the broken line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a detail view of the compensating devices, partly in elevation and partly in section.

Figure 5 is a detail view of the driving

shell or cup and its several slots as if laid out, with the several positions of the driving pin indicated.

Figure 6 is a detail view in section on the plane indicated by the broken line 6—6 of Figure 1, looking in the direction of the arrows.

Figure 7 is a detail view of the friction clutch in section on the plane indicated by the broken line 7—7 of Figure 1, looking in the direction of the arrows.

Figure 8 is a detail view of the sealing device shown in Figure 1, in section on the plane indicated by the broken line 8—8 of Figure 1, but on a larger scale.

It will be understood that the invention is capable of application for other specific purposes than that particularly referred to herein and in connection with counters or registers of other forms than that chosen for illustration and that the drawings illustrate only a convenient and practical embodiment of the invention. It is not necessary to illustrate the pump or any part of its actuating mechanism, because the invention is not concerned therewith. It is assumed that the shell or cup a, shown particularly in Figures 1, 2, 4 and 5, is in operative relation with some part of the pump operating mechanism so that it receives therewith a rotary oscillating movement and becomes the driver for the counter through the devices to be described. The cup or shell a, in the present instance, is shown as formed in its peripheral wall with four slots a^1, a^2, a^3, a^4, each of which has one side parallel with the axis of the cup while the other side may be parallel with the first side, as in the case of the slot a' (see Figure 5), while the second side of each of the other slots a^2, a^3, a^4, is inclined with respect to the first side at successively increasing angles. With one or another of the slots a', a^2, a^3, a^4, to be selected in accordance with a test performance of the pump, there is engaged a pin b which is carried by a sleeve nut b', the latter being mounted on the threaded portion c of a shaft c', which may be the supporting shaft for the number wheels of the counter or register, being itself held from rotation. It will be observed that if the pin b is in engagement with the slot a', the sides of which are parallel, the sleeve b' will have the same angular movement as the cup or shell a, although it moves at the same time longitudinally with respect to the shaft c'. If, however, the pin b is engaged with one of the slots a^2 a^3 or a^4, of which the driving side is inclined with respect to the other side, the pin b, moving longitudinally with respect to the shaft c', by reason of the threaded engagement of the nut b' with the shaft, will have an axial movement less than that of the driver a. Therefore, it being assumed that the pump delivers at each stroke a quantity of gasoline less than the unit volume theoretically delivered, it will be seen that the pin b will have an angular movement less in a corresponding degree than that of the driver and furthermore that as the stroke of the pump and the movement of the driver a progresses, the pin will fall behind the motion of the driver. Through such devices as those to be described the movement of the pin is transmitted to the counter mechanism and the extent of the movement of the counter mechanism will be governed in such manner as to compensate for failure of the pump to deliver a unit of volume at each stroke. Furthermore, if it is necessary, as sometimes happens, to increase the length of stroke of the pump in order to deliver the unit volume of the liquid, the extent of movement of the counter will not be increased correspondingly but the counter mechanism will be operated to the correct extent.

In the embodiment of the invention illustrated the angular movement of the pin b is transmitted to the counter mechanism by the devices now to be described. Mounted loosely on the shaft c' is a sleeve d which has longitudinal fingers d' in engagement with longitudinal slots b^2 of the nut b', so that the sleeve d receives the same angular movement as the nut b' while the longitudinal movement of the nut is not interfered with. The sleeve d carries a pinion d^2 in engagement with the gear d^3 of an ordinary train of differential reducing gears d^3, d^4 through which movement is imparted to a gear d^5. The latter, through a suitable clutch e, preferably a ball clutch, as shown in detail in Figure 7, and a sleeve f, drives the first number wheel g of the counter or register, the successive number wheels being driven in the usual manner. A ball clutch detent h, similar in construction to the driving clutch e, is provided for the purpose of preventing backward movement of the sleeve f and first number wheel in the rotary oscillations of the driving mechanism.

So far as concerns the operations already described, the shaft c' may be fixed, but to facilitate the shifting of the pin b from one notch to another of the driver a without dismounting the counter, the shaft c' is made rotatable so as to permit the nut b' to be moved longitudinally far enough to withdraw the pin b from the slot in engagement with which it may be. When this has been done the driver is rotated in one direction or the other, as may be required, to place the desired slot opposite the pin and the shaft c' is then rotated in the opposite direction to move the pin into engagement with the desired slot of the driver. It is obvious, also, that the amount of backlash between the pin b and the sides of the slot in which it is engaged depends upon the position of

the pin in the slot, being at a minimum when the pin is at the extreme right hand end of the slot and increasing, in each of the slots a^2, a^3, a^4, as the pin moves toward the left. It is desirable in some instances to vary the amount of backlash between the pin and the sides of the slot in which it is engaged and to accomplish this the pin may be moved in one direction or the other by a slight rotation of the shaft c'. In order that the shaft c' may be held stationary during the ordinary operation of the devices and yet may be rotated when required, the bearing hub i, at the left hand end of the casing i' of the counter, is split and provided with a clamp screw i^3 so that the bearing can be tightened upon the shaft c' to hold it from rotation. The shaft may be provided with a knurled wheel c^2 for convenience in manipulation and both the clamp screw i^3 and the knurled wheel c^2 may be protected from unauthorized manipulation by a cap k which can be held in position by a sealed wire k'.

It will be observed that compensation proportional to the extent of movement of the driver, that is, proportional to the length of stroke of the pump, is accomplished by imparting to the pin or driven member of the compensating devices a helical motion, which in turn is accomplished by moving the pin longitudinally with respect to the inclined side of the coacting slot. It is such helical motion which is a characteristic of the improvements herein described.

The mode of operation of the compensating devices has already been explained in detail and need not be further described herein. It will be obvious that various changes in details of construction and operation of the devices herein described can be varied to suit different conditions of use and that the invention, except as pointed out in the claims, is not limited to the particular construction shown and described herein.

I claim as my invention:

1. In a device of the character described the combination of a counting mechanism, a driver, a driven member in operative relation with the counting mechanism, and means whereby the driven member receives from the driver a helical motion and the compensation in the movement of the counting mechanism is proportional to the extent of movement of the driver.

2. In a device of the character described the combination of a counting mechanism, a driver therefor having a slot with one side inclined and a driven member in operative relation with the counting mechanism, said driven member being adapted for engagement with said slot.

3. In a device of the character described the combination of a counting mechanism, a driver therefor having a series of differently shaped slots, and a driven member adapted for engagament with one or another of the slots of the driver said driven member being in operative relation with the counting mechanism.

4. In a device of the character described the combination of a counting mechanism, a driver therefor having a slot with one side inclined, and a driven member in operative relation with the counter and adapted for engagament with said slot, said driven member being movable longitudinally with respect to the slot whereby the relative extent of movement of the counter varies during the movement of the driver.

5. In a device of the character described the combination of a counting mechanism, a cup-like driver, the driver having in its peripheral wall a slot with one side inclined, a screw threaded member in axial alinement with the driver, a nut mounted on the screw threaded member and having a pin for engagement with the slot of the driver to be rotated thereby and to move longitudinally with respect thereto, and means for transmitting the rotary movement of the nut to the counting mechanism.

6. In a device of the character described the combination of a counting mechanism, a cup-like driver having in its peripheral wall a series of differently shaped slots, a screw threaded member in axial alinement with the driver, a nut mounted on the screw threaded member and having a pin for engagament with one or another of the slots of the driver to be rotated thereby and to move longitudinally with respect thereto, and means for transmitting the rotary movement of the nut to the counting mechanism.

7. In a device of the character described the combination of a counting mechanism, a cup-like driver, the driver having in its peripheral wall a slot with one side inclined, a screw threaded member in axial alinement with the driver, a nut mounted on the screw threaded member and having a pin for engagement with one or another of the slots of the driver to be rotated thereby and to move longitudinally with respect thereto, a rotatable member engaged with the nut for rotation therewith, and means for transmitting the movement of said rotatable member to the counting mechanism.

8. In a device of the character described the combination of a counting mechanism, a cup-like driver and having in its peripheral wall a series of differently shaped slots, a screw threaded member in axial alinement with the driver, a nut mounted on the screw threaded member and having a pin for engagement with one or another of the slots of the driver to be rotated thereby and to move longitudinally with respect thereto, a rotatable member engaged with the nut for rotation therewith, and means for transmitting

the movement of said rotatable member to the counting mechanism.

9. In a device of the character described the combination of a counting mechanism, a cup-shaped driver therefor and having in its peripheral wall a slot with one side inclined, a screw threaded member in axial alinement with the driver, a nut mounted on the screw threaded member and having a pin in engagement with the slot of the driver, means for transmitting the rotary movement of the nut to the counting mechanism and means to hold the screw threaded member against rotation and to permit the same to be rotated to move the nut and pin longitudinally with respect to the driver.

This specification signed this 6th day of December, A. D. 1923.

HAROLD J. WILLIAMS.