Aug. 14, 1934. W. L. MARDEN 1,970,526

REGISTER

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Fig. 2.

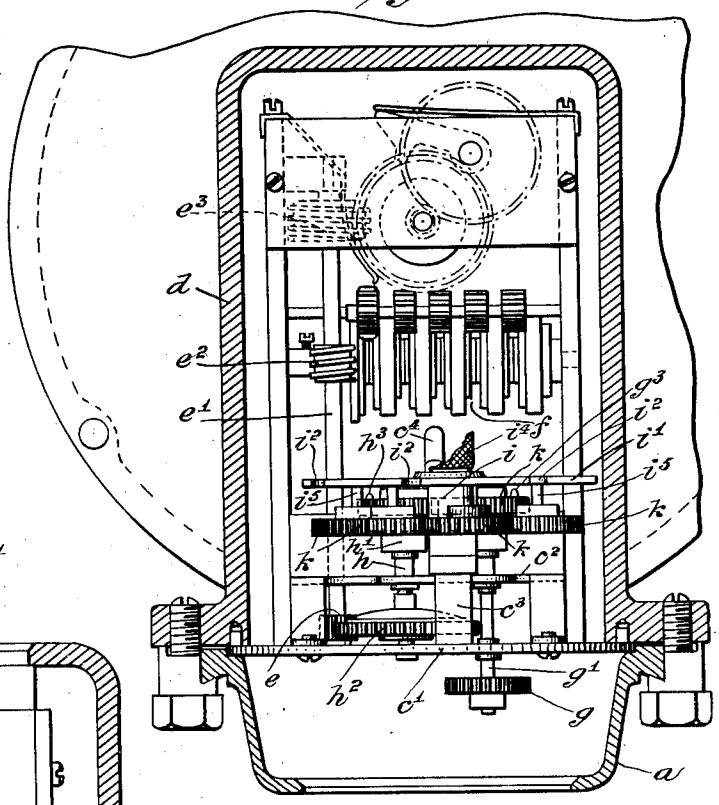
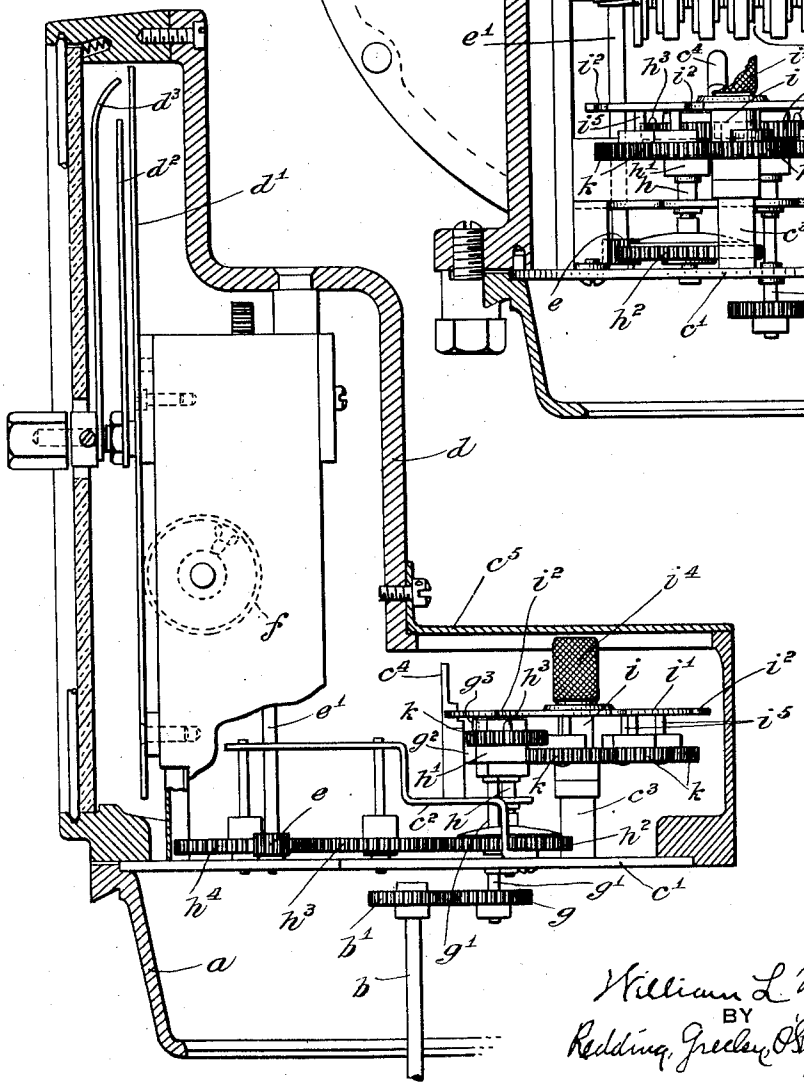


Fig. 1.



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Fig. 3.

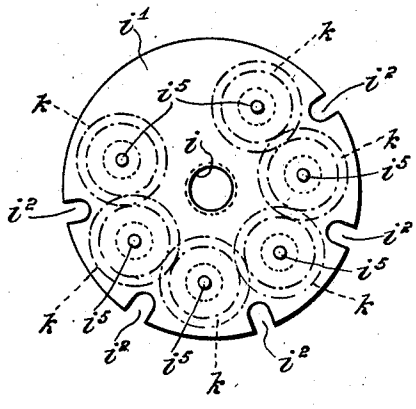


Fig. 4.

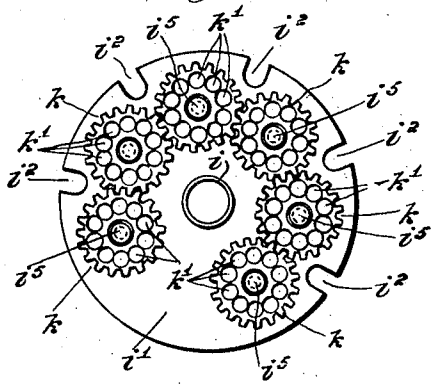


Fig. 5.

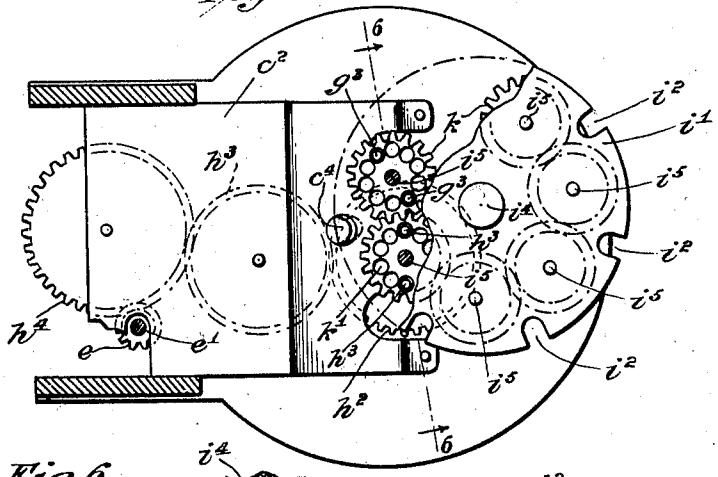
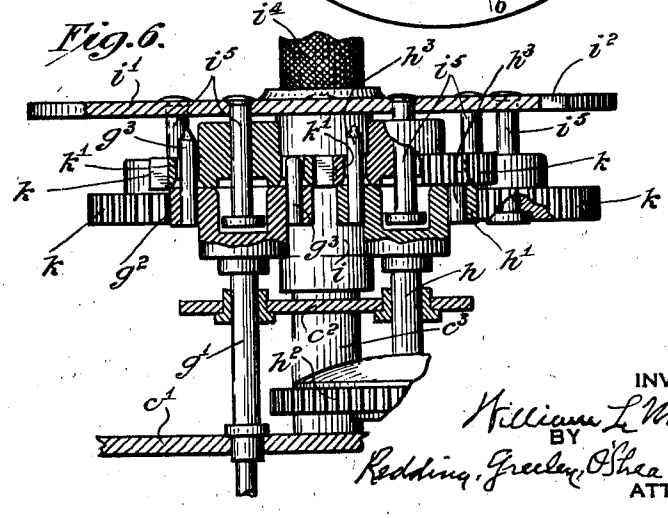


Fig. 6.



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UNITED STATES PATENT OFFICE

1,970,526

REGISTER

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Application May 18, 1933, Serial No. 671,608

5 Claims. (Cl. 74—353)

In an application of Charles S. Hazard, Serial No. 681,440, filed July 21, 1933, there is disclosed a compensating mechanism intended to be interposed between a measuring instrumentality such, for example, as a water meter or a gasoline meter, or a measuring instrumentality for some other commodity, and the register mechanism by which the operation of the measuring instrumentality is registered, for the purpose of effecting a change of rate of the register mechanism to compensate for a change such as a change in the operation of the measuring instrumentality or in the character or price of the commodity. In the form of compensating mechanism disclosed in said application several pairs of gears having different numbers of teeth are mounted upon a movable carrier so that one of such pairs, necessary to compensate for a change in operating conditions, such as a change in unit price, may be brought into operative relation with a gear actuated by the meter and a driving gear of the register mechanism. The invention now to be described has been designed to serve a similar purpose and is embodied in a different specific form of the compensating device sought to be covered in said application of Hazard comprising a movable carrier and a series of single gears supported thereby and having different numbers of teeth, the construction being such that any two of such gears, disengaged from the other gears of the series, but in mesh with each other, can be brought into operative relation, the one with a gear actuated by the measuring instrumentality and the other with a gear of the register mechanism, whereby a different speed ratio, suited to the conditions of operation, can be established at will between the driving instrumentality and the register mechanism.

The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated, and in which:

Figure 1 is a view in elevation, as seen from the left hand in Figure 2, showing a register mechanism, the indicating devices operated thereby, and the improved compensating mechanism, so much of a measuring instrumentality as is necessary to enable the application of the invention to be understood being shown in section.

Figure 2 is a view of the same in elevation, as seen from the right hand in Figure 1, with the casing in vertical section.

Figures 3 and 4 are respectively a top view and an underside view of the carrier with its gears.

Figure 5 is a top view showing particularly the devices by which the gears in operation are engaged with the gear of the measuring instrumentality and with the gear of the register mechanism and the device by which the carrier is retained in position.

Figure 6 is an enlarged detail view in section on the plane indicated by the broken line 6—6 of Figure 5.

In the embodiment of the invention illustrated in the drawings there is shown at a a portion of the casing of a disc meter of well known construction with which is associated the compensating mechanism to be described and a suitable form of register mechanism, such as that shown, for example, in Letters Patent of the United States No. 1,563,770, December 1, 1925. At b is indicated a shaft driven from the metering mechanism and mounted in bearings in a frame c which receives and supports the compensating mechanism and the register mechanism. A casing d encloses the compensating mechanism and the register mechanism and supports a dial d^1 for cooperation with the pointers or indicator hands d^2 and d^3 as usual.

The register mechanism may be of any suitable construction. In the register mechanism illustrated a gear e driven from the meter a through the compensating mechanism to be described actuates a shaft e^1 from which, through a worm gear indicated at e^2, is driven the totalizing register f and from which, through a worm gear indicated at e^3, is driven the mechanism by which the indicator hands are actuated, all as represented in said Patent No. 1,563,770.

The gear b^1, driven from the meter, meshes with a gear g on a shaft g^1, mounted in suitable bearings in the framework and provided with a driving head g^2. A shaft h, also mounted in bearings in the framework, is provided at its upper end with a driving head h^1 and at its lower end with a gear h^2 which, through gears h^3 and h^4, drives the gear e and shaft e^1. The plates c^1 and c^2 of the framework support respectively a stud c^3 and a stud c^4. Mounted to rotate on the stud c^3 is a carrier which, in the construction shown, comprises a sleeve i, a plate i^1, notched at its periphery, as at i^2, for engagement with the stud c^4, and provided with a knob i^4 by which it may be raised and rotated, and further provided with a series of headed pins i^5. On each of the pins i^5 is mounted, with capacity for rotation and also with ca-

pacity for vertical movement between the plate i^1 and the headed end of the pin i^5, a gear k. Each of such gears is formed to mesh with the adjacent gear and the several gears have respectively different numbers of teeth as, for example, 21 teeth, 22 teeth, 23 teeth, 24 teeth, 25 teeth and 26 teeth. Each of the gears is formed for engagement with the driving head g^2 on the shaft g^1 and for engagement with the driving head h^1 of the shaft h. For this purpose each gear may be provided with properly formed and properly spaced holes k^1 to receive similarly placed pins g^3 of the head g^2 or pins h^3 of the head h^1. Ordinarily the plate i^1 and its knob i^4 are covered by a locked door c^5 of the casing. When compensation is to be made the door c^5 is opened and the knob i^4 is grasped to lift the plate i^1 above the end of the stud c^4, thereby releasing the gear carrier for rotation. Such lifting of the gear carrier raises such gears as were in engagement with the driving heads g^2 and h^1 out of such engagement. By manipulation of the knob i^4 the gear carrier is rotated to place other two of the gears k, as determined by the gear ratio to be established, in position above the driving heads g^2 and h^1 and the corresponding notch in alignment with the stud c^4. The gear carrier is then lowered and as the two gears are engaged by the two driving heads those two gears which, with all the others had dropped against the headed ends of the pins i^5, strike the hubs of the heads g^2 and h^1 and are raised thereby into the relative position represented in Figure 5, being thereby taken out of mesh with the gear at one side or the other or both, as the case may be, such gears still remaining in their lowest position as determined by the headed ends of the pins. In this manner the ratio between the measuring instrumentality and the register mechanism is determined by the ratio of the two gears then in operative relation with the meter and the register mechanism.

It will be understood that various changes in disposition of the parts may be made to suit conditions of use without departing from the spirit of the invention and as well that the compensating mechanism can be interposed in operative relation between measuring instrumentalities and register mechanisms of other kinds and adapted for other purposes than those which have been illustrated herein for explanation of the nature of the invention.

I claim as my invention:

1. The combination with a driving gear and a driven gear of a compensating mechanism including a movable gear carrier, a series of intermeshing gears having different numbers of teeth mounted on the carrier and normally in the same plane, and means for effecting operative engagement between any two contiguous gears of the series and said driving and driven gears respectively.

2. The combination with a driving gear and a driven gear of a compensating mechanism including a gear carrier movable in two different planes, a series of intermeshing gears having different numbers of teeth mounted on the carrier and normally in the same plane, and means for effecting operative engagement between any two contiguous gears of the series and said driving and driven gears respectively, all of said intermeshing gears being movable axially with reference to the carrier whereby when said intermeshing gears are moved to effect engagement between any two of them and said driving gear and said driven gear respectively such two gears are moved out of engagement with adjacent intermeshing gears.

3. The combination with a driving gear and a driven gear mounted to rotate on fixed axes, of a compensating mechanism including a plate movable in its own plane and in a direction at right angles thereto, a series of pins supported by said plate, a series of single intermeshing gears having different numbers of teeth mounted rotatably and axially movable on said pins, means for effecting operative engagement between any two contiguous gears of the series and said driving gear and said driven gear respectively, and means whereby when operative engagement between any two of said contiguous gears and said driving gear and said driven gear is effected, such two contiguous gears are moved out of engagement with adjacent gears of the series.

4. The combination with a driving gear and a driven gear mounted to rotate on fixed axes, of a compensating mechanism including a rotary plate notched at its periphery, a stud to engage in one or another of the notches to prevent rotation of the plate, a series of intermeshing gears mounted on the carrier and normally in the same plane, means for effecting operative engagement between any two of said intermeshing gears and said driving gear and said driven gear respectively, and means to disengage said plate from said stud and to rotate the plate.

5. The combination with a driving gear and a driven gear, of a compensating mechanism including a series of intermeshing gears having different numbers of teeth rotatable on and axially movable relative to the carrier, said gears being normally in the same plane, driving heads in operative engagement with said driving and driven gears respectively, and means to displace any meshed pair of said gears rotarily and axially to cause them to move out of engagement with adjacent gears and into engagement with said driving heads.

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