May 1, 1956 G. GERVAIS 2,743,867

INTEGRATING COUNTER MECHANISM

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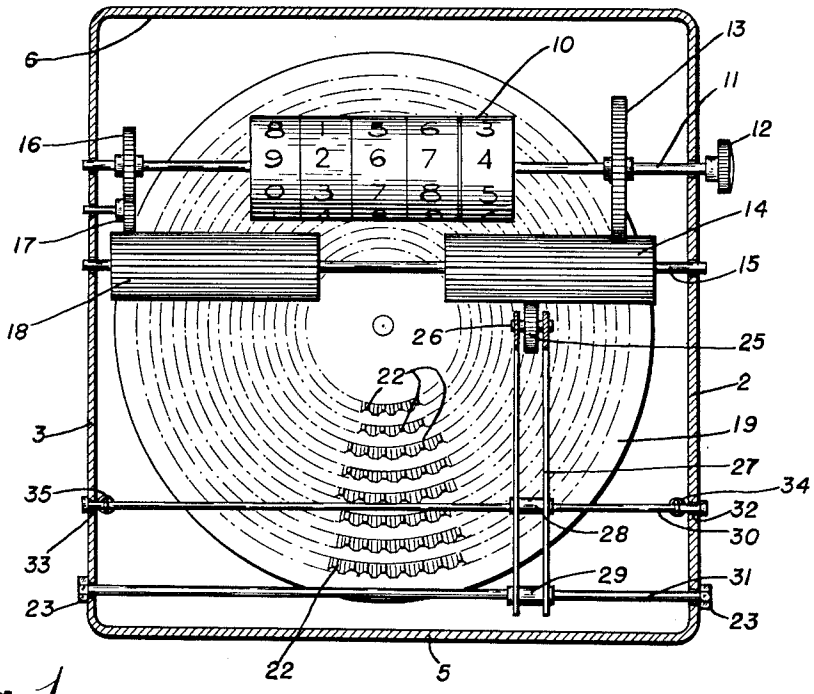


Fig. 1

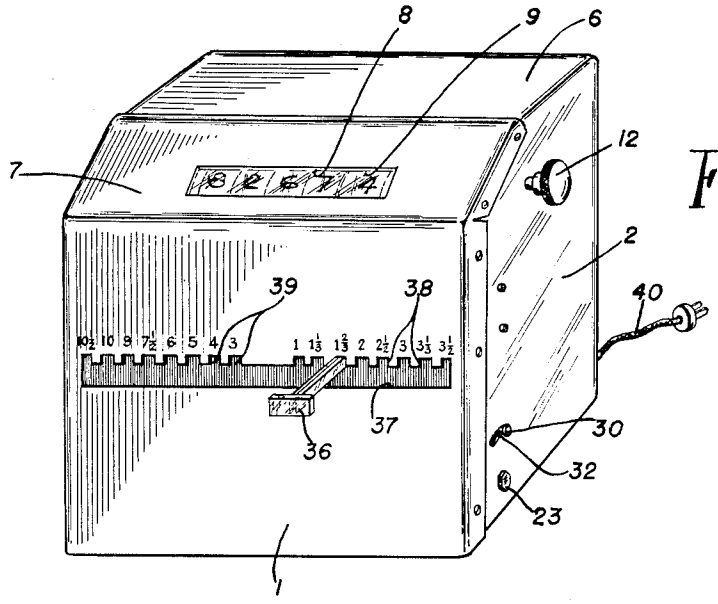


Fig. 2

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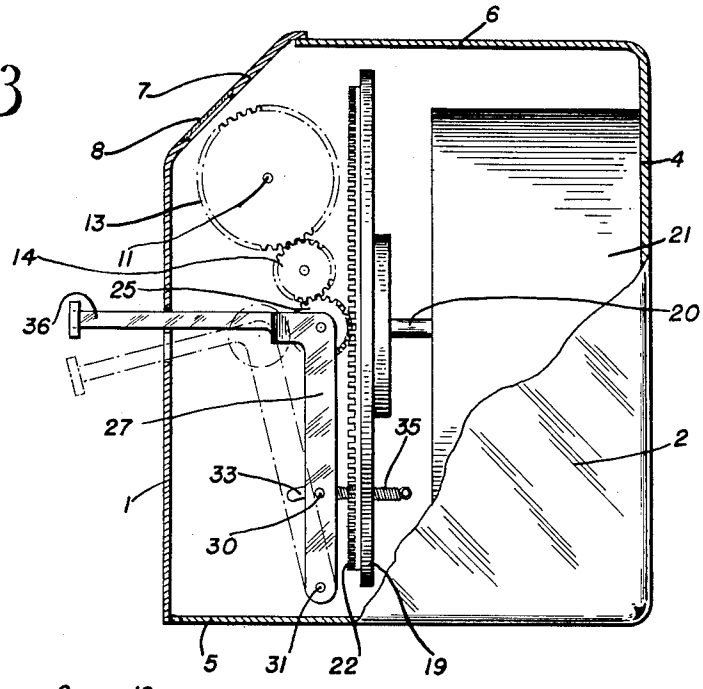
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Fig. 3



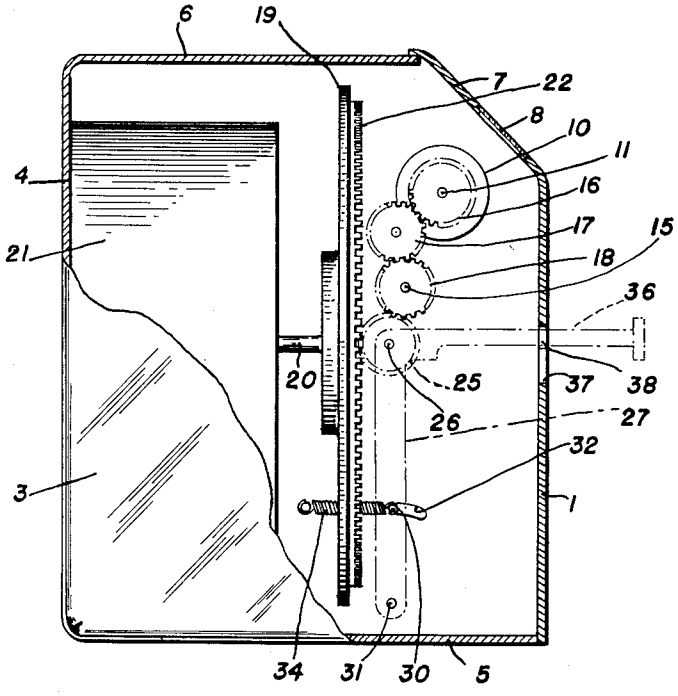


Fig. 4

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INTEGRATING COUNTER MECHANISM

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5 Claims. (Cl. 235—61)

The present invention relates to a counter mechanism and more particularly to a counter mechanism of the type adapted to be operated by a synchronous motor to total the operating time of an intermittently operating device or mechanism and to translate said operating time into another dimension by multiplying the total time by a predetermined factor.

The device, according to the present invention, is adaptable to energy consuming devices for indicating the total energy consumed during a certain time period. More particularly, the device of the present invention may be used for indicating the total number of fuel oil gallons burnt by a fuel oil burner during a certain time period.

An object of the present invention is the provision of a counter mechanism for fuel oil burners which will indicate the number of gallons of fuel oil consumed, said indication being the result of the multiplication of the total operating time of the fuel oil burner by a factor representing the rated capacity of the burner in gallons per hour.

Another important object of the present invention is the provision of a counter mechanism of the character described in which the counter mechanism may be set at any one of a plurality of adjusted positions depending on the rated capacity of the burner, in gallons per hour, with which the counter mechanism is used.

A further important object of the present invention is the provision of a mechanism of the character described which is relatively simple and inexpensive to manufacture and which will give a prolonged service.

The foregoing and other important objects of the present invention will become more apparent during the following disclosure and by referring to the drawings in which

Figure 1 is a cross-setion of the counter mechanism according to the invention;

Figure 2 is a perspective view of the same;

Figure 3 is a side cross-section taken from the left hand side of the mechanism; and

Figure 4 is a side cross-section taken from the right hand side of the mechanism.

Referring more particularly to the drawings, in which like reference characters indicates like elements throughout, the counter mechanism is enclosed in a casing consisting of front wall **1**, side walls **2** and **3**, back wall **4**, bottom **5**, top **6** and inclined upper front wall **7** which joins the front wall **1** and top **6** and is provided with a window **8** through which shows the reading **9** indicated by a counter **10**.

The counter **10** is mounted on a shaft **11** journalled in the side walls **2** and **3** of the casing and projecting from the side wall **2** to support a knob **12** for resetting the counter **10** to zero reading.

A gear wheel **13** is secured to the shaft **11** on the right hand side of the counter **10** (looking at Figure 1). Said gear wheel **13** meshes with a longitudinally grooved cylinder **14** which is freely rotatable on a shaft **15**, parallel to shaft **11** and journalled in the side walls **2** and **3** of

the casing. On the left hand side of the shaft **11** (looking at Figure 1) is secured a gear wheel **16** of smaller diameter than the gear wheel **13** and meshing with an intermediary gear **17** journalled in the side wall **3** and meshing with a second longitudinally grooved cylinder **18** which is freely rotatable on shaft **15**.

A large diameter face wheel **19** is keyed on the shaft **20** of a synchronous motor **21** which rotates said face wheel **19** at a rate of one revolution per hour in a plane parallel to the plane containing shafts **11** and **15**. The face wheel **19** is provided with a plurality of concentric crowns of gear teeth **22**, said crowns being spaced from one another a predetermined distance. The gear teeth of said crowns can mesh with the gear teeth of a selector pinion **25**, the shaft **26** of which is journaled at the upper end of a forked support **27**.

The lower portion of support **27** is provided with spaced sleeves **28** and **29** respectively slidably mounted on rods **30** and **31** which are parallel to shafts **11** and **15**. The shaft **31** is secured to the side walls **2** and **3** of the casing by nuts **23**. The rod **30** is laterally displaceable in arcuate slots **32** and **33** made in the side walls **2** and **3** respectively. The center of curvature of the slots **32** and **33** coincide with the axis of rod **31**. The rod **30** is urged backwardly towards the face wheel **19** by means of tension springs **34** and **35** secured to rod **30** at one end and to the side walls **2** and **3** respectively at their other end.

Backward displacement of the rod **30** causes the forked support to pivot rearwardly about rod **31** to take a back limit position in which the selector pinion **25** comes in meshing engagement with one of the crowns **22** and with one of the grooved cylinders **14** and **18**.

Depending on the position of the support **27** transversely of the casing, the selector pinion **25** will selectively engage any one of the eight crowns **22** of the face wheel **19**. In order to adjustably position the selector pinion **25** so that it may mesh with the desired crown **22**, the forked support **27** is provided with a forwardly projecting handle **36** passing through a transverse slot **37** made in the front wall of the casing and engageable with any one of a plurality of spaced locking notches **38** and **39** made along the upper edge of the slot **37**, on the right hand and left hand portions of the casing respectively when looking at Figure 2.

When the selector pinion **25** is in the right hand side portion of the casing, looking at Figs. 1 and 2, it is in meshing engagement with the downwardly moving portion of a crown **22** and with the cylinder **14** which in turn rotates the counter **10** through the intermediary of gear wheel **13**. It will be understood that as the selector pinion **25** is moved from the center portion of the space wheel **19** to the outer portion thereof, the counter **10** will rotate at a greater speed which will depend on the particular crown **22** with which the selector pinion **25** is in engagement.

The inner crown **22** has such a diameter with respect to the respective diameters of the pinion **25**, cylinder **14** and gear **13** that the counter **10** will rotate at the same speed as the face wheel **19** when said selector pinion **25** is in engagement therewith, consequently the inner notch **38** on the right hand side of the casing will be marked with the numeral 1 indicating a capacity of one gallon per hour. The following notches **38** will be marked with increasing numbers up to for instance, 3½ gallon per hour.

The handle **36** will be set in notch **38** corresponding to the rated capacity of the particular fuel oil burner with which the counter mechanism is used. For fuel oil burners having a rated capacity greater than 3½ gallons per hour, the handle **36** is moved on the right hand side of the casing to engage one of the series of notches **39** which are rated up to 10½ gallons of oil per hour.

Then selector pinion 25 will engage cylinder 18 which will rotate the counter 10 at a greater speed than cylinder 14, due to the fact that the gear wheel 16 is not in direct meshing engagement with the cylinder 18 but is driven thereby through the intermediary pinion 17. The intermediary pinion 17 serves also to reverse the direction of rotation of gear wheel 16 because the cylinder 18 rotates in direction opposite to that of cylinder 14 when selector pinion 25 engages a crown 22 on the left hand side of the face wheel 19 looking at Figure 1.

In order to obtain proper meshing relationship between the pinion 25 and the crown gears 22 on one hand and the longitudinal teeth of the cylinders 14 and 18 on the other hand, the teeth of the crown gears 22 extend radially of the face wheel 19 and the shaft 26 of the selector pinion 25 is contained in a plane passing through a diameter of the face wheel 19 and perpendicular to said face wheel.

Displacement of the selector pinion 25 transversely of the casing will maintain said selector pinion in the same relationship with the face wheel 19 and with the cylinders 14 and 18 due to the fact that rods 30 and 31 are parallel to shaft 15.

The counter mechanism, according to the invention, will be used as follows: the synchronous motor 21 will be connected in parallel with the fuel burner by electric cord 40 so as to operate simultaneously therewith, and the handle 36 will be displaced transversely of the casing to engage a notch 38 or 39 selected according to the rated capacity of the oil burner with which the counter mechanism is used. The counter mechanism will give a reading 9 in gallons of oil consumed by the burner from the time of zero reading of the counter 10.

The counter 10 can be reset to zero by simply depressing the handle 36 so as to move the selector pinion 25 out of engagement with the face wheel 19, and then turning the knob 12 to reset the counter to zero reading.

The counter mechanism, according to the invention, will give a reading of the total number of gallons of fuel oil consumed at any particular moment and from this reading a number of other indications may be obtained. For instance, it would be a simple matter to know how many gallons are left in the reservoir of the fuel oil burner by simply substracting the counter reading from the tank capacity in gallons. Also at each filling of the tank, a check may be made on the operation of the burner: if there is a large difference between the number of gallons actually burnt and the number of gallons which should have been burnt as indicated by the counter mechanism, it means that either the burner is deficient or that the tank is leaking.

While a preferred embodiment according to the present invention has been illustrated and described, it is understood that various modifications may be resorted to without departing from the spirit and scope of the appended claims.

What I claim is:

1. In a counter mechanism, a constant speed drive having a shaft, a counter driven thereby, a face wheel secured to the shaft of said drive and having a plurality of concentric crowns of gear teeth of increasing diameter, a pinion displaceable along its axis to selectively engage said crowns on either half of said face wheel, and two sets of gear means for interconnecting said pinion and said counter to rotate the latter at two predetermined speed ratios with respect to said pinion, one of said sets of gear means including a direction reversing gear so that said counter will be rotated in the same direction irrespective of the side of said face wheel on which said pinion engages one of said crowns, the axis of said pinion lying in a plane containing the shaft and a diameter of said face wheel, and said axis being in a plane parallel to said face wheel.

2. A counter mechanism comprising a constant speed drive having a shaft, a face wheel secured to the shaft of said drive having a plurality of spaced concentric crowns of gear teeth of increasing diameter, a selector pinion displaceable along its axis transversely of said face wheel to selectively engage said crowns on either half of said face wheel, means to pivot said pinion out of engagement with said crowns and to move said pinion transversely of said face wheel, two longitudinally grooved cylinders with which said pinion is adapted to come in meshing engagement independently of the transverse position of said pinion relatively to said face wheel, a counter device and two sets of gear means for driving said counter device by said cylinders, one of said sets of gear means including a direction reversing gear so that said counter will be rotated in the same direction irrespective of the side of said face wheel on which said pinion engages one of said crowns.

3. A counter mechanism as claimed in claim 2, further including a support mounting said selector pinion, a rod on which said support is pivotally and slidably mounted extending in a plane parallel to and transversely of said face wheel, a handle depending from said support for moving said support from a position in which said pinion is in engagement with either one of a selected crown and with said cylinders to a position in which said pinion is out of engagement with said crown and cylinder.

4. A counter mechanism as claimed in claim 3 further including spring means urging said support and pinion in said first named position.

5. A counter mechanism comprising a synchronous electric motor, a face wheel secured to the shaft of said motor and having a plurality of concentric spaced crowns of gear teeth of increasing diameter, a counter, a first shaft mounting said counter parallel to said face wheel, a small diameter and a large diameter gears secured to said counter shaft on each side of said counter, a second shaft parallel to said first shaft, spaced longitudinally grooved cylinders freely rotatable on said second shaft, one of said cylinders directly meshing with said large diameter gear wheel, and intermediate pinion meshing with the other of said cylinders and with said small diameter gear wheel, said cylinders extending respectively in front of and substantially opposite each half of said face wheel, and a selector pinion transversely displaceable respectively to said face wheel and adapted to come in meshing engagement with either one of said cylinders and with a selected one of said crowns whereby the speed ratio of said counter to said motor may be adjustably varied depending on the selected position of said selector pinion with respect to the crowns of said face wheel and depending also on which one of said cylinders, said selector pinion is engaging.

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