April 5, 1932. G. WILLENS 1,852,869

ADVERTISING CLOCK

Filed Dec. 7, 1931 2 Sheets-Sheet 1

Fig. 1

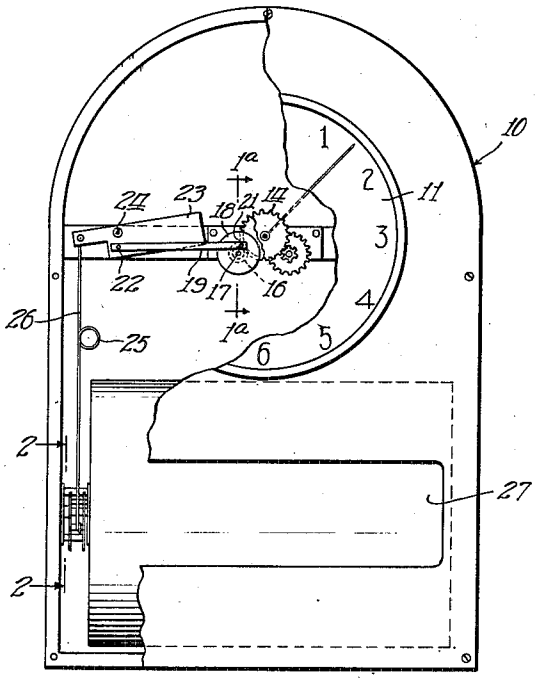

Fig. 1a

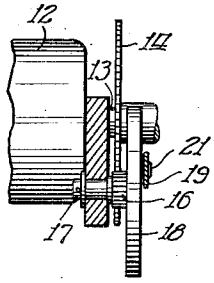

Fig. 3

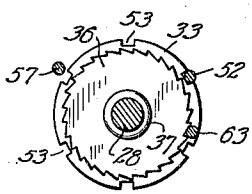

Fig. 2

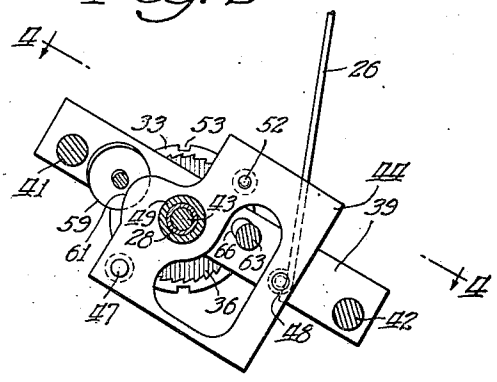

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Fig. 4

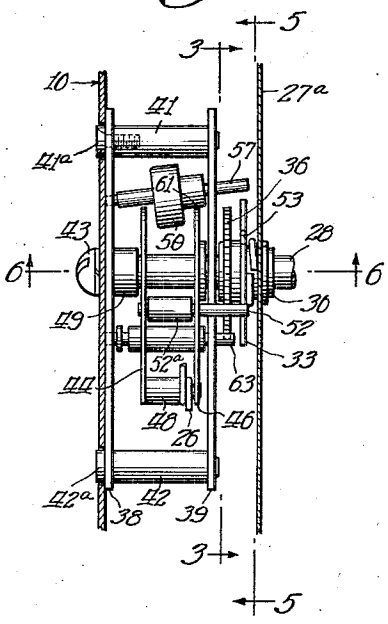


Fig. 5

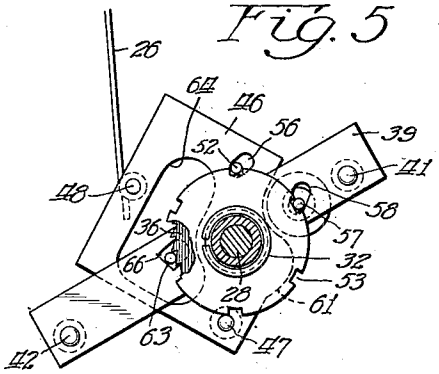
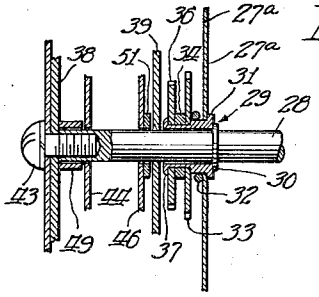


Fig. 6



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UNITED STATES PATENT OFFICE

GEORGE WILLENS, OF CHICAGO, ILLINOIS

ADVERTISING CLOCK

Application filed December 7, 1931. Serial No. 579,372.

My invention relates in general to advertising clocks. It relates more in particular to an improved drive mechanism disposed between the clock mechanism and the advertising instrumentality of the clock.

In my prior patent application, Serial No. 543,330, filed June 10, 1931, I disclose an advertising clock comprising in general a clock mechanism preferably comprising a small synchronous motor with a train of gears disposed to rotate the hands of the clock at proper time speed in the usual manner. In the clock casing are disposed a rotatable drum adapted to bear advertising matter and means connected with both the clock mechanism and advertising drum for driving the drum from the synchronous motor. While the drive mechanism of my prior patent is fully satisfactory in many respects, I find that it requires somewhat more power than is advisable to take from the motor and requires, as well, very careful adjustment to secure satisfactory results.

The object of my present invention is to provide an improved drive means between the clock mechanism and the drum.

Another object is to provide an improved drive means in which the losses by friction are relatively very small.

Another object is the provision of an improved drive means which is simple to manufacture, assemble and adjust.

Other objects and features of the invention will be apparent from a consideration of the following detailed description taken with the accompanying drawings, wherein

Fig. 1 is a front elevational view partly broken away of an advertising clock of my invention;

Fig. 1*a* is a sectional view showing in elevation the connection for driving the drum directly from the clock mechanism;

Fig. 2 is an enlarged sectional view taken along the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 4;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2, looking in the direction of the arrows;

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 4, looking in the direction of the arrows; and

Fig. 6 is a transverse sectional view taken along the line 6—6 of Fig. 4.

Referring now to the drawings, I show in Fig. 1 a clock casing 10 having a clock face 11, a synchronous motor 12 having a shaft 13 driven at measured speed. Shaft 13 carries a spur gear 14 which meshes with a pinion 16 carried on a short shaft 17, the shaft 17 also carrying a relatively heavy wheel 18 to which a horizontal rod 19 is pivoted, the pivot point 21 being off-center so that a general reciprocating motion may be imparted to the rod as a whole. This rod is pivoted at 22 to a lever 23 which has its pivot at 24. This lever 23 has pivoted to one end thereof a vertical operating rod 26 which through suitable connections, which will be described, rotates a drum 27, a partial rotation at a time. This is the drum previously referred to which is adapted to carry advertising matter or other display matter.

The driving means which I provide between the rod 26 and the drum is of such a type that there is very little loss in friction, and moreover it is positive and cannot readily get out of adjustment. In general, it constitutes a ratchet mechanism in which the pawls, however, operate substantially entirely by gravity but with some mechanical aid.

The drum 27 is pivoted on a pivot rod 28 disposed transversely of the casing 10. At one end of the drum, there is a hub 29 having an annular flange 31, against which the end of the drum 27*a* is held by a small compression spring 32. At the other side of the spring is a driving ratchet wheel 33, a spacing ring 34, a holding ratchet wheel 36 and a spun flange 37 on the hub 29 which serves to hold the entire hub assembly together. A ring 30, secured on the shaft or rod 28 in any suitable way, aids in spacing the drum on the rod.

Between the hub and the adjacent portion of the casing 10 is a frame member comprising rectangular frame pieces 38 and 39, held together by studs 41 and 42, which studs are mounted to the rectangular frame members

preferably by riveting in such a way as to leave heads 41*a* and 42*a* which are adapted to extend through suitably provided openings in the clock casing to position this frame member properly. One end of the rod 28 projects through the frame member 39 and against the frame member 38. A machine screw 43, however, has its shank extending through its casing and through the frame member 39 into the threaded end of the rod 28. This holds the rod 28 stationary and maintains the drum driving mechanism in assembled position.

For transmitting motion from the vertical rod 26 to the drum, through the ratchet members previously described, I employ a movable frame member. This movable frame member comprises plates 44 and 46 held together by short studs 47 and 48, so that a unitary frame member results. This frame member is pivoted on the rod 28 intermediate the stationary frame members 38 and 39, and spacing rings 49 and 51 are provided for spacing the movable frame away from the stationary frame. This movable frame member carries the pawls, both the locking pawls and driving pawls for controlling the operation of the drum in co-operation with the ratchet wheels.

The driving pawl 52 is loosely supported across the two driving frame members, and has a relatively thick center section 52*a*, so that although the pawl is merely loosely fitted in the two frame members, it cannot move far enough longitudinally in either direction to permit it to become displaced. This driving pawl extends over the holding ratchet 36 so as to contact with the periphery of the driving ratchet 33. It will be seen that there are a number of equally spaced recesses 53 in the driving ratchet. These recesses or teeth are equal in number to the advertising or display spaces on the drum 27, so that on reciprocal movement of the movable drive frame the pawl 52 may, if properly controlled, advance the drum one tooth position for each cycle of movement, thereby moving the drum from one display position to another. At the place where the pawl 52 extends through the plate 46, a cam slot 56 is provided (Fig. 5). When the pawl occupies the position shown in Fig. 5 it is in the slot and the movement of the plate 46 is in a direction to drive the ratchet wheel 33. On return movement, however, the edges of the slot 56 act as the cam to lift the pawl 52 out of the slot in the ratchet wheel and permit the return movement of the entire drive assembly.

Now, as to the drive for the movable frame, I form the stud 48 with a section of relatively small diameter so that the rod 26 is merely looped around this section of the stud 48 to form a driving connection for the movable pawl carrying frame. It will be seen from Fig. 4 that the rod is looped in such a way as to form a spacer to keep the rod out of close contact with the plate 46.

I also provide a locking pawl carried by the stationary frame and engaging the drive ratchet. This pawl 57 is loosely carried by the stationary frame and is adapted to engage in one of the openings 53 on the ratchet wheel. It engages, however, to prevent overrunning of the drum and to secure other advantages which will be apparent. It operates in the following manner:

One end of this pawl projects loosely into the stationary frame member 38 and the other end extends through a slot 58 in the stationary frame member 39. The pawl is provided with a weighted portion 59 so that it tends to drop very quickly by gravity. When the drum is being driven forwardly, the pawl rests upon the smooth edge of the ratchet wheel 33, but, as soon as it has reached its proper forward position, this pawl 57 drops down into the opening 53, which is now adjacent this stationary pawl, and prevents any further forward movement of the ratchet wheel which might occur otherwise due to a tendency for the drum to overrun by inertia. As the movable frame, however, returns and nears the position where the driving pawl is about to engage another driving opening 53, arcuate cam-like edges 61 of the movable frame engage the stationary pawl 57 and lift it out of the opening 53 which it is then in engagement with to the position shown in Fig. 4. At this time, the pawl 52 has engaged and is ready to start forward. The holding cams 61 are so positioned that they hold the pawl 57 until the driving movement of the driving ratchet has started, but when the pawl 57 is then released, there is no opening 53 in alignment and instead it engages on the smooth edge of the ratchet wheel and cannot effect the operation thereof until another opening 53 is presented thereto.

I also provide means for preventing any tendency of the drum to move backwards when the movable pawl carrying frame is making a reverse movement. The stationary frame has a locking pawl 63 loosely carried thereby and, to prevent interference between this locking pawl and the movable frame, are the cut out portions of the plates 44 and 46 as indicated at 64. This locking pawl 63 is adapted to engage the teeth of the holding ratchet 38. The frame member 39 is provided with a cam-like opening 66 through which the locking pawl 63 projects. When the movement is in a driving direction or in a clock-wise direction (looking at Fig. 5), the pawl 63 rides up into the wider portion of the slot 66 and the teeth of the holding ratchet pass readily. As soon as the movement ceases, however, the pawl 63 immediately drops back to substantially the position shown in Fig. 5 and then any tendency for

the holding ratchet to move in a reverse direction (that is, in a counter-crosswise direction, looking at Fig. 5) is absolutely prevented. Such a tendency might occur due to a slight imbalance in the drum itself or due to the fact that there might be some slight friction in the parts as the movable frame returns preparatory to making another driving movement.

It is believed that operation of the ratchets and pawls, the manner in which they alternately hold and drive the drum is clear from the preceding description. The operation, therefore, will not be described in detail.

It will be noted that a loop 25 is provided in the rod 26. Since this rod is formed of spring material, this loop will take up the shock of any quick movement, that is, will act as an inertia device to prevent the resistance of the drum to insure movement from being carried back directly to the synchronous motor and either causing final injury thereto, a stoppage thereof, or a loss of time.

It will be noted that the lever 23 is counter-weighted. This counter-weight is so designed that the weight is falling by gravity at the time the drum is being driven, so that, instead of having an alternate load and no load condition on the motor, the actual effort required to drive the drum is substantially reduced in half by being spread out over the entire movement cycle. This counter-weight also prevents any tendency of the lever to fall by gravity on the down-stroke, which would cause a jump in the second hand of the clock. This feature, together with the substantially total absence of resistance and friction in the drum driving mechanism, enables me to secure an adequate operation of the advertising drum without applying an unusually heavy load or intermittent shock on the motor. The result is that the motor operates substantially as well and with substantially as long a life when employed in my advertising clock as when employed in merely the ordinary time clock alone.

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

1. In an advertising clock, a clock mechanism, a rotatably mounted drum adapted to bear advertising matter, and means for driving said drum from the clock mechanism, said driving means including a relatively heavy wheel, a drive connection between said wheel and clock mechanism, a pivoted lever, a rod having one end pivoted to the lever and the other end pivoted to the weighted wheel away from the center thereof, an operating rod pivoted to said lever, and ratchet mechanism operated by the rod for intermittently advancing and holding said drum.

2. In an advertising clock, a clock mechanism, a rotatably mounted drum adapted to bear advertising matter, and means for driving said drum from the clock mechanism, said driving means including a relatively heavy wheel, a drive connection between said wheel and clock mechanism, a pivoted counterweighted lever, a rod having one end pivoted to the lever and the other end pivoted to the weighed wheel away from the center thereof, an operating rod pivoted to said lever, and ratchet mechanism operated by the rod for intermittently advancing and holding said drum, the counterweight on the lever aiding in the movement of the drum.

3. In an advertising clock having a time telling means including a clock mechanism, and a rotatable drum bearing advertising matter, a drum driving ratchet, a stationary frame, a pivoted movable frame, a gravity controlled drive pawl carried by the movable frame and engaging said ratchet, a rod pivoted to said movable frame, means including said clock mechanism for reciprocating said rod, a gravity operated stop pawl carried by said stationary frame, and means for preventing engagement of the stop pawl with the ratchet wheel when the drive pawl is engaged.

4. In an advertising clock having a time telling means including a clock mechanism, and a rotatable drum bearing advertising matter, a drum driving ratchet, a stationary frame, a pivoted frame, a gravity controlled drive pawl carried by the movable frame, and engaging said ratchet, a rod pivoted to said movable frame, means including said clock mechanism for reciprocating said rod, a gravity operated stop pawl carried by said stationary frame, and means for preventing engagement of the stop pawl with the ratchet wheel when the drive pawl is engaged, said means, including means carried by the movable frame, for lifting the stop pawl out of engagement with the ratchet when the drive pawl is in position to re-engage the ratchet.

5. In an advertising clock having time telling means including a clock mechanism, and a drum adapted to bear advertising matter, a center shaft, means for rotatably supporting the drum on the shaft, a ratchet wheel having a plurality of spaced notches serving as teeth, a friction drive between the ratchet wheel and drum, a frame rotatably supported on the shaft adjacent said ratchet wheel, an operating rod having one end pivoted to said frame, means including the clock mechanism for reciprocating said rod and a relatively heavy drive pawl loosely supported on said frame and having one end loosely projecting through a slot in a portion of said frame, said slot shaped to force the projecting end of the pawl into a notch in the ratchet wheel when the frame is rotated in one direction and to withdraw the same from the notch when the frame is rotated in a reverse direction.

6. In an advertising clock having time telling means including a clock mechanism, and

a drum adapted to bear advertising matter, a center shaft, means for rotatably supporting the drum on the shaft, a ratchet wheel having a plurality of spaced notches serving as teeth, a friction drive between the ratchet wheel and drum, a frame rotatably supported on the shaft adjacent said ratchet wheel, an operating rod having one end pivoted to said frame, means including the clock mechanism for reciprocating said rod and a relatively heavy drive pawl loosely supported on said frame and having one end loosely projecting through a slot in a portion of said frame, said slot shaped to force the projecting end of the pawl into a notch in the ratchet wheel when the frame is rotated in one direction and to withdraw the same from the notch when the frame is rotated in a reverse direction, a stationary stop pawl for limiting the movement of the drum, and means carried by the movable frame for holding said stop pawl out of engagement with the ratchet wheel when the drive pawl initially engages the ratchet wheel.

7. In an advertising clock having a clock mechanism and a rotatable drum adapted to bear advertising matter, a drive ratchet with a driving connection to said drum, a stationary frame, a movable rotatably supported frame, a gravity operated drive pawl on the rotatable frame adapted to engage said ratchet, means including said clock mechanism for oscillating said movable frame, and a stop pawl weighted to engage said ratchet to prevent overrunning of the drum, and means on the movable frame to hold said stop pawl out of engagement with the ratchet during a portion of its movement.

8. In an advertising clock having a clock mechanism and a rotatable drum adapted to bear advertising matter, a drive ratchet with a drive connection to said drum, a stationary frame, a holding ratchet mounted to turn with the driving ratchet, a movably rotated supported frame, a gravity operated drive pawl on the rotatable frame adapted to engage said drive ratchet, means including said clock mechanism for oscillating said movable frame, a stop pawl weighted to engage said driving ratchet to prevent over-running of the drum, means on the movable frame to hold said stop pawl out of engagement with the drive ratchet during a portion of the movement of the movable frame, and a third gravity operated pawl engaging the holding ratchet on reverse movement of the movable frame and releasing said stop ratchet when the movable frame is operating to drive the drive ratchet.

9. The combination described in claim 8, wherein said third pawl is loosely supported in the stationary frame and has its ratchet engaging end projecting loosely through a cam-like slot in a portion of said stationary frame whereby movement in one direction is permitted by the pawl riding toward a relatively wider portion of the slot and movement in the opposite direction is prevented by said pawl wedging in a narrow portion of the slot against the ratchet teeth.

10. The combination described in claim 8, wherein said driving pawl projects through a cam-like slot in a portion of the movable frame, movement in one direction causing said drive pawl to ride up along the edge of said slot to withdraw the cam from contact with the ratchet, and movement in a reverse direction assisting gravity to wedge the pawl against the driving ratchet.

11. In an advertising clock having a clock mechanism and a rotatable drum adapted to bear advertising matter, a driving ratchet having a drive connection to said drum, a bipart stationary frame having projections adapted to extend into openings provided in a casing to position the stationary frame, a rotatable frame pivoted between the members of the stationary frame, said rotatable frame including a pair of spaced plates, a driving pawl loosely mounted across the plates and having one end projecting to form a contact with the drum driving ratchet, a stop pawl loosely supported across the stationary frame members and having one end projecting and adapted to contact with the drum driving pawl, means including a clock mechanism for oscillating the rotatably mounted frame to intermittently advance the drum driving ratchet through said driving pawl, and means carried by the rotatable frame for lifting the stop pawl out of engagement with the ratchet as the driving pawl initially engages the drum driving ratchet.

12. The combination described in claim 11, including a second ratchet wheel mounted to move with said drum driving ratchet and a reverse movement preventing pawl carried by the stationary frame and adapted to engage the second ratchet wheel to prevent reverse movement of the drum.

In witness whereof, I hereunto subscribe my name this 2nd day of November, 1931.

GEORGE WILLENS.