

H. C. WILCOX.
 PHOTOGRAPHIC DEVELOPING APPARATUS.
 APPLICATION FILED OCT. 23, 1909.

1,016,924.

Patented Feb. 6, 1912.

3 SHEETS—SHEET 1.

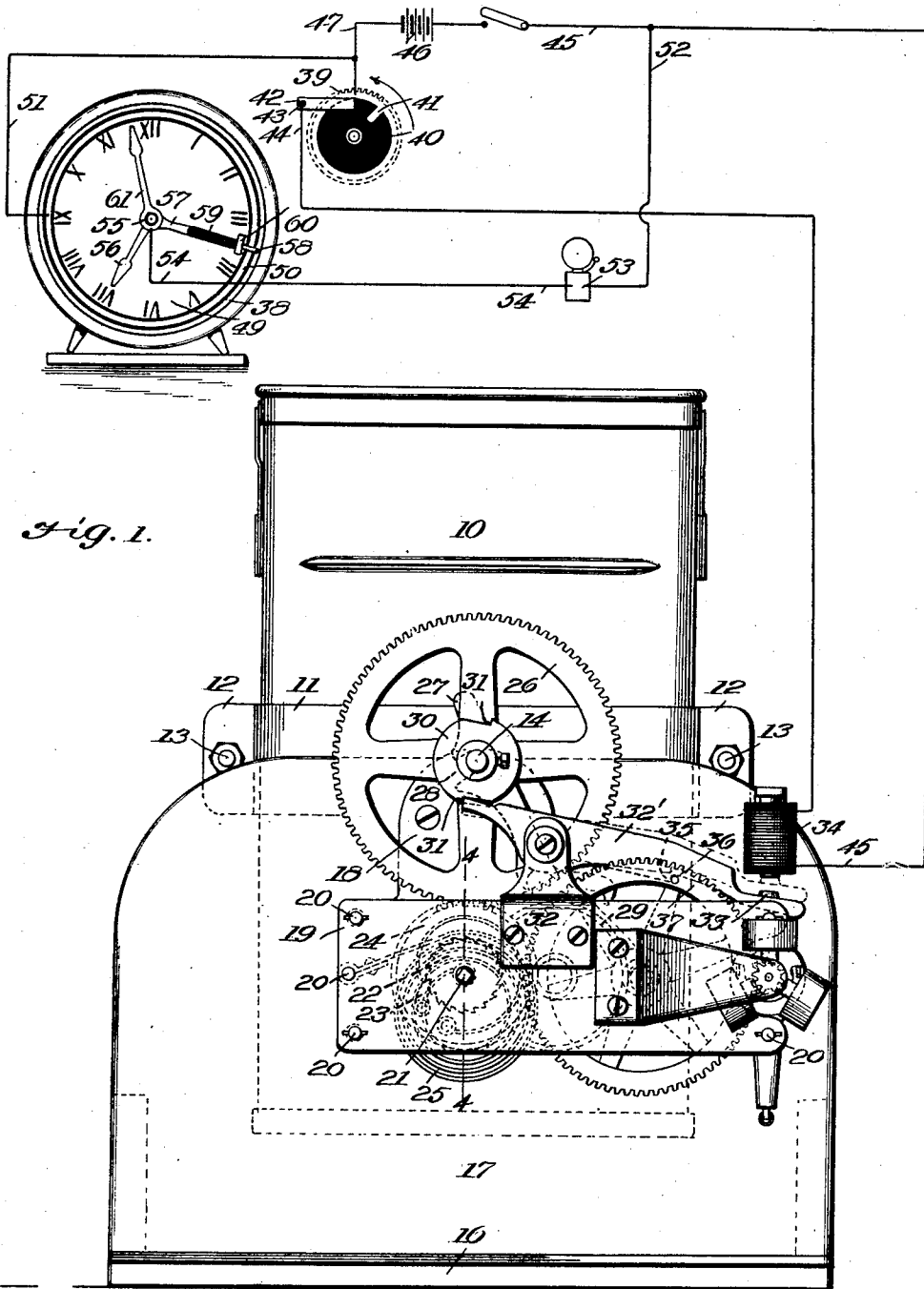


Fig. 1.

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Fig. 2.

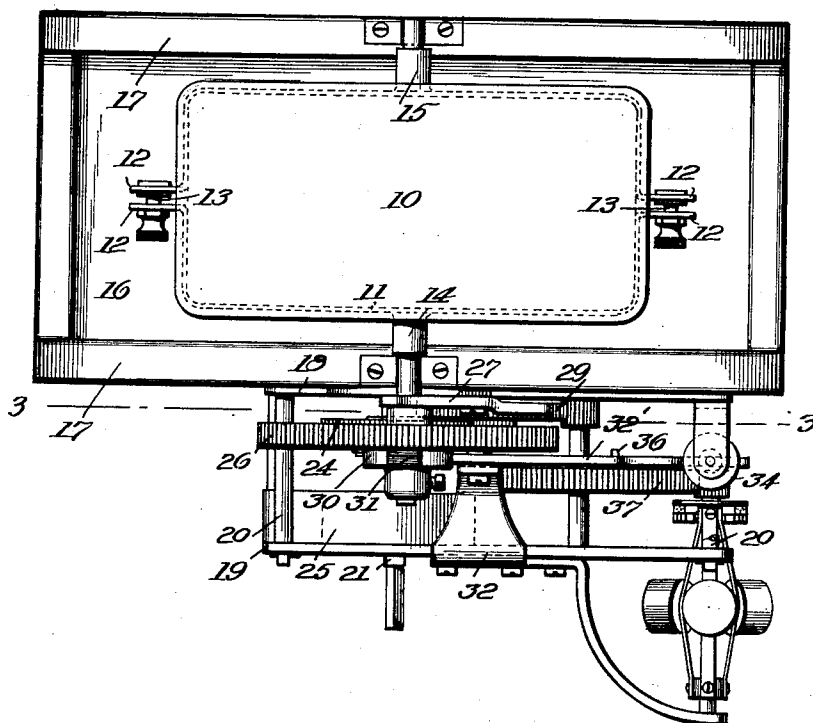
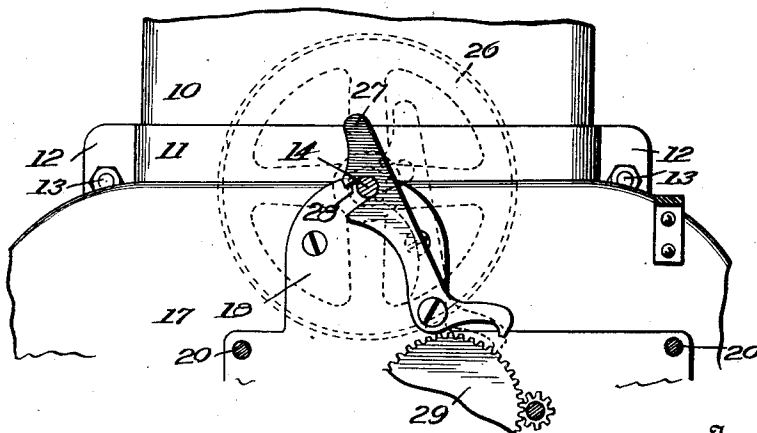


Fig. 3.



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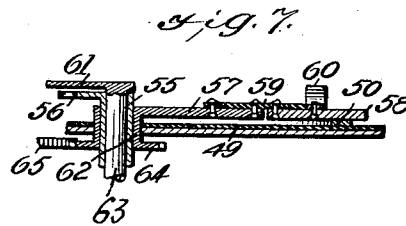
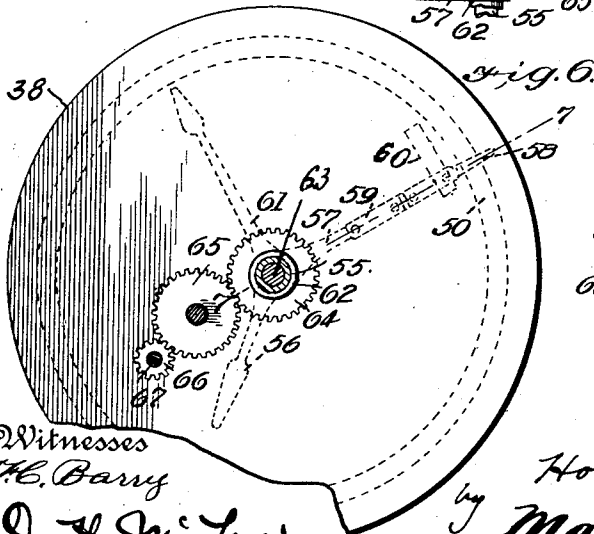
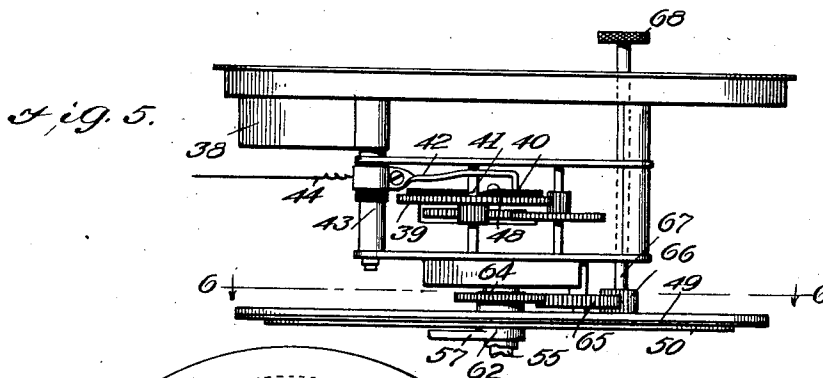
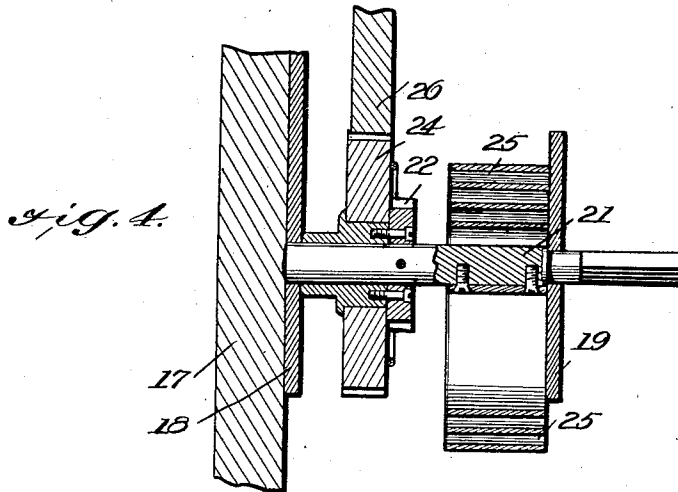
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PHOTOGRAPHIC DEVELOPING APPARATUS.

1,016,924.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed October 23, 1909. Serial No. 524,162.

To all whom it may concern:

Be it known that I, HORACE C. WILCOX, a citizen of the United States, residing at Hazleton, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Photographic Developing Apparatus, of which the following is a specification.

This invention relates to that class of photographic developing apparatus generally known as tank developers, the same comprising a tank in which the plates to be developed, and the developing fluid, are placed. To get the best results from a developer of this type, it is necessary to agitate the developing fluid a number of times during the development, which is usually done by reversing the tank at intervals, end for end. Such reversal of the ordinary tank is effected manually, and in order that it be done at the proper time, the constant attention of an operator is required. It is also necessary to remove the plates from the tank after they have been subjected to the action of the developing fluid for a certain length of time, in order to prevent spoiling of the plates. The operator, therefore, must carefully note the time he places the plates in the tank, and watch for the expiration of the period they are to remain therein, this taking up his entire time and attention, and leaving him unable to attend to other work.

It is the object of the present invention to provide a simple and efficient mechanism which automatically reverses the tank at regular intervals for any predetermined period, at the expiration of which an alarm is sounded to notify the operator that the developing process is completed, and that the plates are to be removed from the tank. This removes the necessity of the operator watching the time, and gives better results, and also leaves the operator free to engage in other work while the developing process is going on.

With the herein stated object in view, the invention consists in a novel combination of parts to be hereinafter described, and specifically pointed out in the claims, it being understood that various minor changes in the mechanism may be made without a departure from the invention.

In order that the invention may be better understood, reference is had to the accom-

panying drawings forming a part of this specification, in which—

Figure 1 is a front elevation of the apparatus, parts being shown diagrammatically. Fig. 2 is a plan view. Fig. 3 is a section on the line 3—3 of Fig. 2. Fig. 4 is a section on the line 4—4 of Fig. 1. Fig. 5 is a plan view of a portion of a clock showing the circuit closing mechanism actuated thereby. Fig. 6 is a section on the line 6—6 of Fig. 5. Fig. 7 is a sectional detail of the pointer hereinafter referred to.

Referring to the drawings, 10 denotes a developing tank of ordinary construction. This tank is encircled midway between its upper and lower ends by a metal band 11, which is in two parts, the ends of which have matching outstanding ears 12, provided with registering openings to receive screws 13, whereby the two parts are tightly clamped around the tank.

The band 11 carries trunnions 14 and 15, respectively, which are in axial alignment, and journaled in bearings formed on a support or stand comprising a base 16, and spaced plates 17 rising therefrom, the bearings being made in the upper edges of said plates.

The tank is adapted to be inverted at predetermined intervals for the purpose of agitating the developing fluid which it contains, the trunnions and the bearings affording a pivotal support to permit the tank to rotate. The plates 17 are sufficiently spaced apart to permit the tank to freely swing therebetween.

The mechanism for rotating the tank is a spring motor, constructed and operating in the following manner: To one of the plates 17, on the outer face thereof, is secured a plate 18, and held in spaced relation therewith, is a second plate 19, these two plates being connected and fastened together by posts 20, and forming the supporting frame of the motor. On the main shaft 21 of the motor is made fast a ratchet disk 22 which is engageable by a spring-pressed pawl 23, carried by a gear wheel 24 loose on the hub of said disk, whereby rotation of the shaft is imparted to the gear wheel. The shaft 21 is driven by a coiled spring 25, one end of which is made fast thereto, and the other end made fast to one of the posts 20. The shaft projects from the plate 19, and the

projecting end is squared for the reception of a key for winding up the spring. The gear wheel 24 is connected to a train of gears, and is also in mesh with a spur gear 26 made fast to the trunnion 14, whereby the motion of the shaft 21 is communicated to said spur gear, to rotate the tank 10. A mechanism is provided for locking the gear train, said mechanism being automatically released at predetermined intervals to permit the tank to be rotated. This mechanism will be presently described.

To the plate 18 is pivoted a lever 27 which swings transversely of the trunnion 14 and has a notch 28 in one of its edges with which the trunnion is engageable, whereby the tank 10 is locked in its bearings. Upon swinging the lever away from the trunnion to disengage it from the notch, the tank is released, and then may be removed from the stand. One end of the lever is so shaped that it may enter between the teeth of one of the gears 29 of the train, and thus lock the same. The motor is also provided with a governor for controlling its speed.

The following mechanism is employed for automatically releasing the gear train at predetermined intervals, and again locking the same after the tank has been inverted: On the trunnion 14 is made fast a cam disk 30 having its periphery formed into two cam surfaces terminating in diametrically opposite shoulders 31. To the plate 19 is secured a bracket 32 to which is fulcrumed, intermediate its ends, a lever 32', one end of which extends to, and is in contact with the cam periphery of the disk 30. On the other end of the lever is the armature 33 of an electro-magnet 34. The lever is pivoted to swing in a vertical plane, and that portion which carries the armature is the longer arm, so that this end will tend normally to swing downwardly. Between the armature and the pivot of the lever, the latter has a shoulder 35 in its lower edge. This shoulder is in the path of an outstanding pin 36 carried by one of the gears 37 of the train. When this pin engages the shoulder, the gear train is locked. The lever is swung upwardly to release the pin when the magnet 34 is energized, and it is held in this position by the cam periphery of the disk 30. After the tank has made one half a revolution, that end of the lever which engages the cam periphery reaches one of the shoulders 31 and rises in front thereof, the opposite end of the lever thereupon swinging downwardly and bringing the shoulder 35 into the path of the pin 36, which then engages the shoulder and locks the gear train. The magnet circuit is broken before the lever reaches the shoulder 31, so that the downward swing of the lever may take place.

A time-controlled closing device for the circuit of the magnet 34 is provided, as well as a signal device which is actuated after the plates have been in the tank for a predetermined period of time. The devices are shown diagrammatically in Fig. 1, and in detail in Figs. 5 to 7.

At 38 is shown an ordinary clock. To one of the faces of a gear wheel 39 of the clock train is secured a disk 40 of insulation. This disk has a notch 41 in its periphery to form a gap through which is adapted to pass so as to come into contact with the gear wheel 39, a brush 42 mounted on one of the posts 43 of the clock frame. The brush is insulated from the post, and is connected by a wire 44 to the magnet 34, and from the latter, a wire 45 extends to one pole of a battery or other source of electrical energy 46. From the other pole of the battery a wire 47 leads to and is connected to the casing of the clock so that the electric current may pass to the gear wheel 39. It will be evident, that the circuit is closed when the brush is in contact with the gear wheel, whereupon the magnet 34 is energized and its armature is attracted, and as the armature is fastened to the lever 32', the latter is swung on its pivot to release the gear train of the spring motor, the latter thereupon rotating the tank 10, and reversing it as already described.

The disk 40 is placed on a gear wheel of the clock train which makes one revolution every eight minutes. It will, therefore, be seen that the circuit is closed, and the tank reversed every eight minutes. If it is desired to lengthen or shorten the intervals between the reversals of the tank, some other gear wheel of the clock train may be selected to receive the insulating disk 40; or if the clock train does not contain a gear wheel which makes one revolution during the desired period, a gear wheel proportioned to make such a revolution may be connected to the train.

In order that the brush 42 may ride out of the gap 41 back onto the disk 40, the end of the notch up which said finger rides, is beveled down to the face of the gear wheel, as indicated at 48.

The signal device for indicating the end of the developing process is also actuated by the herein described clock. On the dial 49 of the clock is rigidly secured and insulated from the metal parts of the clock, a metal ring 50 which is located outside the path of the hands of the clock, so that the latter will not come in contact therewith. This ring is connected by a wire 51 to the wire 47. From the wire 45 on the other side of the battery, a wire 52 is run to a bell or other signal device 53, from which a wire 54 is run to and connected to the clock case. On the arbor 55 of the hour

hand 56 of the clock is mounted for independent rotation, a pointer which is in two parts 57 and 58, said parts being rigidly connected by a strip 59 of insulation. The outer section 58 of the pointer is in contact with the ring 50 and wipes over the same. This section of the pointer also carries brush 60, which is in the path of the minute hand 61, so that the latter may come in contact therewith, whereby the circuit of the signal device is closed. The circuit may be traced as follows: from one pole of battery 46, by wire 51 to ring 50, to section 58 of pointer, to brush 60, to minute hand 61, thence to clock case, and by wire 54 to signal 53, and from the latter by wire 52 to the other pole of the battery.

It will be evident from the foregoing, that by setting the pointer ahead of the minute hand any length of time desired, the circuit will be closed and the signal actuated at the expiration of this time, by the minute hand coming in contact with the brush 60.

The pointer has a tubular arbor 62 to receive the arbor 55 of the hour hand 56, and the latter arbor is tubular to receive the arbor 63 of the minute hand 61. On the arbor 62 is fast a pinion 64 which is geared by an intermediate pinion 65 to a pinion 66 on a shaft 67, which is provided for setting the pointer. This shaft is mounted for rotation in the clock casing, and projects from the back thereof, the projecting end being fitted with a knob 68 for rotating it. The clock also contains a mechanism for sounding the signal on the hour and half-hour, as an ordinary alarm clock. This mechanism is described in detail and claimed in another application, filed June 17, 1909, under Serial No. 502,708.

By the use of the apparatus herein described, the developing process does not require the attention of an operator after the plates are placed in the tank and the indicator is set. The tank reverses automatically by making a half revolution every eight minutes, and at the end of the period for which the indicator is set, the signal is sounded, thus notifying the operator that the time for the removal of the plates from the tank has arrived.

I claim:

1. The combination of a tank mounted for rotation, a motor operatively connected to the tank, means for locking the motor, means for releasing the locking means, a time-controlled device for intermittently actuating the releasing means, and means for holding the locking means in release position until the tank has been inverted, said holding means thereupon permitting the locking means to return to locking position.

2. The combination of a tank mounted for rotation, a motor operatively connected

to the tank, means for locking the motor, an electro-magnet for releasing the locking means, a time-controlled device for intermittently closing the magnet circuit, and means for holding the locking means in release position until the tank has been inverted, said holding means thereupon permitting the locking means to return to locking position.

3. The combination of a tank mounted for rotation, a motor operatively connected to the tank, a projection on a movable part of the motor, a lever having a shoulder located in the path of the projection, time-controlled means for swinging the lever in a direction to release the projection, and means for holding the lever in release position until the tank has been inverted, said means thereupon permitting the lever to return to locking position.

4. The combination of a tank mounted for rotation, a motor operatively connected to the tank, a projection on a movable part of the motor, a lever having a shoulder located in the path of the projection, an electro-magnet for swinging the lever in a direction to release the projection, time-controlled means for closing the magnet circuit at intervals, and means for holding the lever in release position until the tank has been inverted, said means thereupon permitting the lever to return to locking position.

5. The combination of a support, a tank having trunnions journaled in the support, a disk fast on one of the trunnions, and having diametrically opposite cam surfaces, a motor operatively connected to the trunnion, a projection on a movable part of the motor, a lever having a shoulder located in the path of the projection, one end of the lever engaging the cam surfaces of the disk, and time-controlled means for swinging the other end of the lever in a direction to release the projection.

6. The combination of a support, a tank having trunnions journaled in the support, a disk fast on one of the trunnions, and having diametrically opposite cam surfaces, a motor operatively connected to the trunnion, a projection on a movable part of the motor, a lever having a shoulder located in the path of the projection, one end of the lever engaging the cam surfaces of the disk, an electro-magnet for swinging the other end of the lever in a direction to release the projection, and time-controlled means for intermittently closing the magnet circuit.

7. The combination of a support, a tank having trunnions journaled in the support, a motor operatively connected to one of the trunnions, and including a train of gears, a lever having a notch in one of its edges to receive one of the trunnions, and shaped at one end to engage one of the gears to lock the motor when swung in a direction to dis-

engage the notch from the trunnion, a second means for locking the motor, and time-controlled means for releasing the last-mentioned locking means.

- 5 8. The combination of a support, a tank having trunnions journaled in the support, a motor operatively connected to one of the trunnions, a lever having a notch in one of its edges to receive one of the trunnions,
10 and engageable with a movable part of the motor to lock the same when swung in a

direction to disengage the notch from the trunnion, a second means for locking the motor, and time-controlled means for releasing the last-mentioned locking means. 15

In testimony whereof I affix my signature in presence of two witnesses.

HORACE C. WILCOX.

Witnesses:

SADIE E. WILCOX,
HENRY PIPPERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."