July 24, 1923. 1,463,108

R. A. WILLISON ET AL

CHANGE SIGN DEVICE

Filed July 6, 1922 3 Sheets-Sheet 1

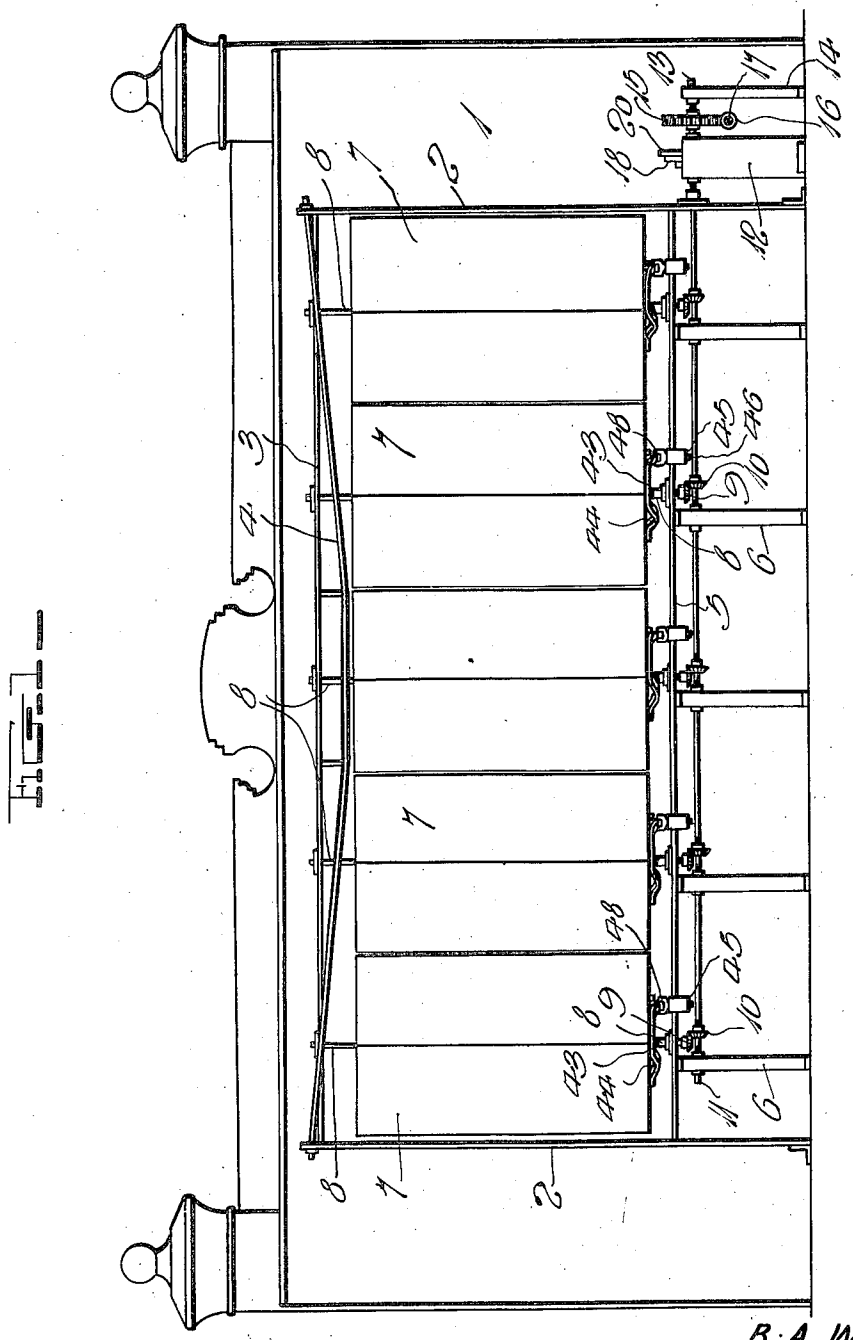


Fig. 1.

Witness
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FIG. 2.

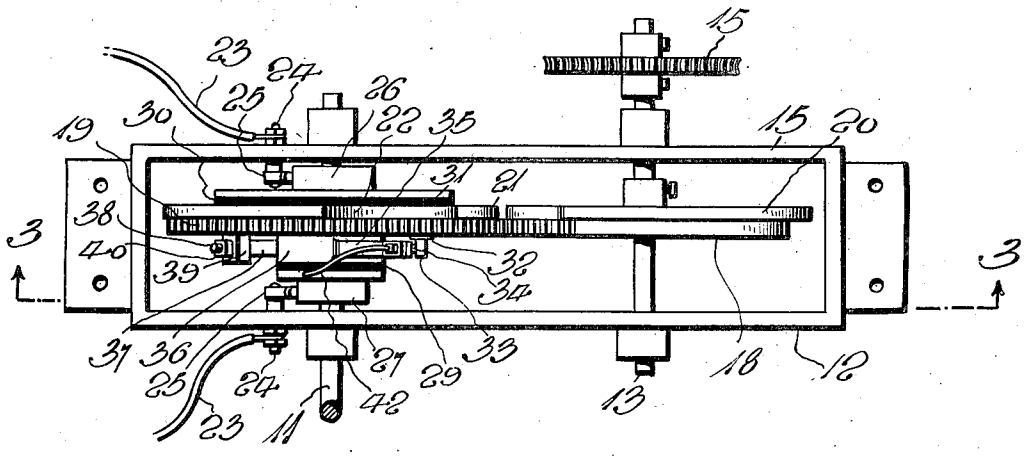
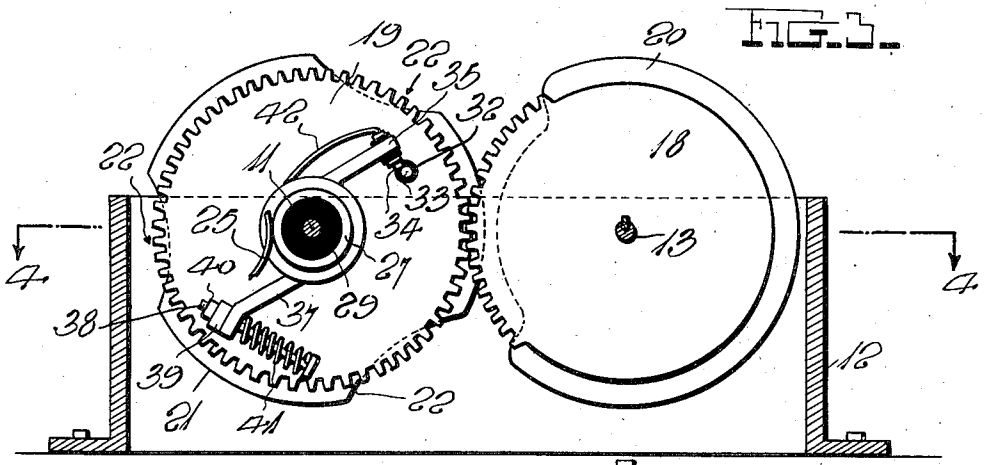


FIG. 3.



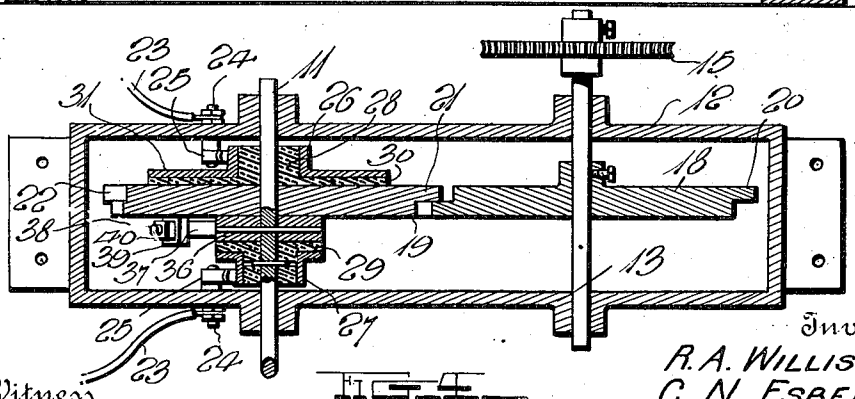


FIG. 4.

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FIG. 5.

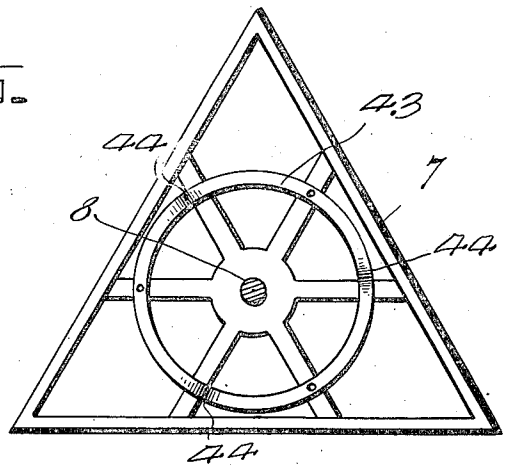


FIG. 6.

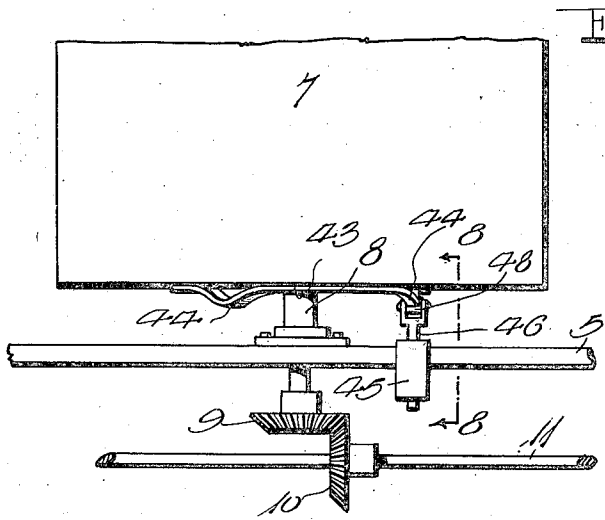
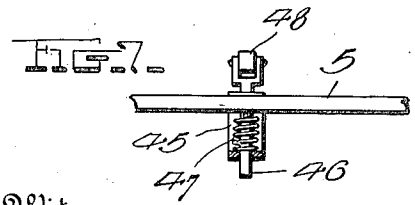


FIG. 7.



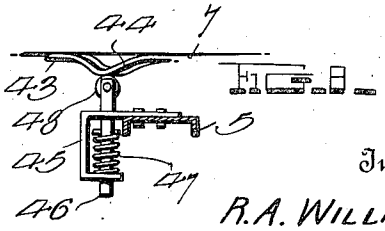


FIG. 8.

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UNITED STATES PATENT OFFICE.

RALPH A. WILLISON AND CLIFFORD N. ESBERG, OF PORTLAND, OREGON.

CHANGE-SIGN DEVICE.

Application filed July 6, 1922. Serial No. 573,096.

To all whom it may concern:

Be it known that we, RALPH A. WILLISON and CLIFFORD N. ESBERG, citizens of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Change-Sign Devices; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved sign of the general type disclosed in our prior patent issued January 25, 1921, No. 1,366,548. In the form now disclosed, the operating mechanism has been greatly simplified and further the means for breaking the circuit to prevent damage in case one or more of the rotary sign carriers should stick has been improved and simplified.

Another object of the invention is to so construct the circuit breaking mechanism and means for controlling rotation of the main shaft of the sign that a gear carried by this main shaft may serve as means for controlling operation of the circuit breaking mechanism.

Another object of the invention is to provide improved types of gears for controlling rotation of the main shaft from a driving shaft, the main shaft being provided with a complete gear and a locking disk and the drive shaft being provided with a segmental gear and a locking disk, the locking disk of the drive shaft being adapted to move into pockets of the disk carried by the main shaft so that the main shaft may be prevented from rotating when desired.

Another object of the invention is to provide the rotary sign carriers with improved means for controlling their rotation, said means serving to retard rotation of the carriers just prior to locking of the main shaft against further rotation and further serving to impart rotary movement to the carriers when the main shaft is to be rotated. This will cause easy starting and stopping of the rotation.

Another object of the invention is to provide a structure of the character described which will be very simple in its construction and comprise a comparatively few number of parts not liable to readily get out of order or become broken.

This invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a view showing the improved sign board in rear elevation.

Figure 2 is a top plan view of the gear box having the gearing and other mechanism mounted therein for controlling operation of the sign.

Figure 3 is a vertical sectional view through the gear box taken along the line 3—3 of Fig. 2.

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

Figure 5 is a bottom plan view of one of the rotatable sign carriers.

Figure 6 is an enlarged view in elevation showing the lower end portion of one of the sign carriers and the means for rotating the same.

Figure 7 is a detail view showing the roller device for engaging the track mounted upon the lower ends of the sign carriers.

Figure 8 is a fragmentary sectional view taken along the line 8—8 of Fig. 6.

This improved sign includes a sign board 1 which will have a construction similar to that shown in our prior Patent No. 1,366,548 and therefore has not been shown in detail. At the rear of this sign board, there has been provided a frame including vertically disposed end bars 2, an upper bar 3 braced by a longitudinally extending truss rod 4 and a lower bar 5 which is supported upon supporting standards or brackets 6. This frame has its upper and lower bars 3 and 5 provided with bearings of a conventional structure so that the rotatable sign carriers 7 which are preferably triangular in top plan or cross section may have their center shafts 8 journaled in the upper and lower bars 3 and 5. The lower ends of these shafts 8 extend beneath the lower bar 5 and are provided with gears or pinions 9 which mesh with co-operating gears or pinions 10 carried by the main shaft 11 which may also be termed a driven shaft. This shaft 11 is journaled in the upper end portions of the supports or brackets 6 and as will be seen from an inspection of Fig. 1 extends beyond the frame and through a gear housing 12 which is mounted adjacent one end of the frame. The drive shaft 13 is also journaled in the walls of the gear housing 12 and has its outer end portion supported by a support 14 similar to the supports 6. This shaft

13 carries a gear 15 so as to permit the drive shaft 13 to be rotated from a suitable source of energy. In the present illustration this consists of a worm gear 16 mounted upon a shaft 17 preferably forming an extension of the main shaft of an electric motor.

When the sign is in operation, rotary movement is to be transmitted from the shaft 13 to the shaft 11. The shaft 13 is a continuously rotating shaft but the shaft 11 is only to be rotated at intervals and therefore the shaft 13 has been provided with a segmental gear 18, the teeth of which mesh with a gear plate or disk 19 carried by the shaft 11. This segmental gear plate or disk 18 is rigidly secured upon the shaft 13 but the gear or disk 19 is loose upon the shaft 11. The gear 18 is provided with a radially disposed bordering flange 20 which extends from one end of the segmental gear to the other and the gear 19 is provided with radially disposed flange portions 21 which are spaced about the circumference of the gear 19. The pockets 22 which are provided between the flange portions 21 of the gear 19 are concaved so that when the shafts 13 and 11 have rotated a sufficient amount to move the teeth of the gear 18 out of engagement with the teeth of the gear 19, the flange 20 of the gear 18 may move into one of the pockets 22 and thus serve as means for locking the gear 19 against further rotation. It will thus be seen that the gear 18 serves not only as means for imparting movement to the gear 19 but also serves as means for locking the gear 19 against rotation during the interval when it is not desired to have the shaft 11 rotate. In the preferred form, the sign is to be operated by an electrically driven motor having a suitable circuit including wires 23 connected with the terminal pins 24 of the brushes 25. These brushes 25 engage drum elements 26 and 27 which are positioned about the shaft 11 and insulated from the shaft 11 by means of bushings 28 and 29. It should be noted that the bushing 28 is extended to provide an annular flange or disk portion 30 which extends between the gear 19 and flange or disk portion 31 of the drum 26 and that this disk portion 30 of the insulating bushing 28 is provided with a sleeve extension 32 which extends through an opening formed in the gear 19. This sleeve 32 provides insulation for a pin 33 which extends from the disk 31 through the gear 19 for contact with a contact point 34 carried by the arm 35 of a collar 36 which fits upon and is secured to the shaft 11 between the gear 19 and drum 27. A second arm 37 extends from this collar 36 and has its free end portion perforated to slidably receive a bolt 38 which in addition to passing through the arm 37 also passes through a lug 39 carried by the gear 19. A securing nut 40 is provided upon this bolt to engage the lug or block 39 and a spring 41 is placed upon the bolt between the arm 37 and the head of the bolt. It will thus be seen that when the gear 19 is rotated by the gear 18, the spring will serve to impart rotary movement to the collar 36 and keep the collar positioned with the arm 37 engaging the block 39 and the arm 35 in the position shown in Fig. 3 with the contact point 34 in engagement with the contact pin 33. If for any reason, rotation of the shaft 11 should be prevented, it is desired to shut off the motor so as to prevent any damage being done. From an inspection of Fig. 3, it will be readily seen that when rotation of the shaft 11 stops and gear 19 is being rotated, this rotation of the gear 19 will cause the contact pin 33 to move out of engagement with the contact pin or point 34. Therefore, the passage of the current from the drum 27 through the wire 42 to the contact point 34 and from this contact point 34 to the contact pin 33 will be interrupted and operation of the motor caused to be stopped. Under ordinary circumstances, the spring will be strong enough to retain the arm 37 in engagement with the block 39 and the pin 34 in engagement with the pin 33 and therefore the circuit will at all times be complete except when rotation of the shaft 11 is stopped for any reason and continued rotation of the gear 19 moves the contact 33 out of engagement with the contact 34.

During operation of the sign, it is desired to have the starting and stopping of the rotary carriers 7 accomplished without jolts being caused by sudden stops and sudden starts. Therefore each of the triangular carriers 7 is provided at its lower end with a circular track strip 43 which is bent at points spaced about its circumference to provide portions 44 forming cam elements corresponding in number to the pockets 22 and shaped as shown in Fig. 6 and also in Fig. 8. Brackets 45 are carried by the lower bar 5 of the frame in which the carriers have been mounted and each of these brackets 45 carries a plunger 46 which is yieldably held against downward movement by a spring 47 and is provided at its upper end with a roller 48 for engaging the track 43 beneath which it is mounted. Fron an inspection of Fig. 8, it will be readily seen that during rotation of a carrier 7, rotary movement will be retarded as a roller moves along the portion of the cam 44 which will cause the plunger to be forced downwardly against the action of the spring 47 and therefore when the carrier is about to come to a stop, rotation will be retarded and a sudden stop prevented. When rotation is again to be started, the roller will be positioned to move along that portion of the cam which will permit expanding of the spring 47 and this will cause a cam action which will tend to impart ro-

tary movement to the carrier. Therefore a sudden start will be prevented. It will thus be seen that the structure shown in Figs. 5 through 8 will cause the rotatably mounted carriers to start and stop easily.

We claim:

1. A sign including a movable sign element, means for causing intermittent movement of said sign element, cam elements spaced from each other a distance corresponding to the intermittent movement of said sign element and each having oppositely acting portions, and spring actuated means for engaging said cam elements and retarding movement of said sign element when movement thereof is about to cease and assisting movement of the sign element when movement thereof is again started.

2. A sign including a frame, a carrier rotatably mounted in said frame and including a shaft, a driven shaft for imparting rotary movement to said carrier through the medium of the shaft thereof, means for causing intermittent rotation of said driven shaft and means for retarding rotation of said carrier when rotation thereof is about to cease and assisting rotation of the carrier when rotation thereof is again started.

3. A sign including a frame, a carrier rotatably mounted in said frame and including a shaft, a driven shaft for imparting rotary movement to said carrier through the medium of the shaft thereof, means for causing intermittent rotation of said driven shaft, and means for retarding rotation of said carrier when rotation thereof is about to cease and assisting rotation of the carrier when rotation thereof is again started, said means comprising a track forming ring secured beneath said carrier and at points about its circumference, having cam elements disposed circumferentially thereof and having oppositely acting portions and a spring actuated element engaging said track and retarding rotation while moving over one portion of a cam element and assisting rotation while moving over the other portion thereof.

4. A sign including a frame, a carrier rotatably mounted in said frame, and including a shaft, a driven shaft for imparting rotary movement to said carrier through the medium of the shaft thereof, means for causing intermittent rotation of said driven shaft and means for retarding rotation of said carrier when rotation thereof is about to cease and assisting rotation of the carrier when rotation thereof is again started, said means comprising a track forming ring secured beneath said carrier and at points about its circumference, offset to provide V-shaped cam portions, and plungers slidably mounted and yieldably held in engagement with said track ring and retarding rotation of the carrier while passing over one side of a V-shaped portion and assisting rotation of the carrier while passing over the other side of the V-shaped portion.

5. In a sign, a movable sign element and means for intermittently imparting movement to said sign element, said means including a driven shaft rotatably mounted, a drive shaft rotatably mounted, gear disks carried by said shafts, one of said disks being a complete gear and the other of said disks being a segmental gear and imparting rotary movement to the first gear disk while its teeth are in engagement with the teeth of the first gear disk, the second gear being provided with means for engaging the first gear and holding the same against rotation while the teeth of the second gear are out of engagement with the teeth of the first gear.

6. In a sign, a movable sign element, and means for intermittently imparting movement to said sign element, said means including a driven shaft rotatably mounted, a drive shaft rotatably mounted, gear disks carried by said shafts, one of said disks being a complete gear and the other of said disks being a segmental gear and imparting rotary movement to the first gear disk while its teeth are in engagement with the teeth of the first gear disk, the first gear having a flange portion to one side of teeth cut away at points about the circumference of the gear to provide pockets, the second gear having a circumferentially extending flange terminating adjacent the ends of its teeth and moving into the pockets of the first gear to hold the first gear stationary while the teeth of the second gear are out of engagement with the teeth of the first gear.

7. The combination with the structure of claim 5, of a circuit for supplying current to a motor for rotating said drive shaft, and means for completing and breaking the circuit, said means including a contact insulated from and movable with the gear disk of the driven shaft, said gear being loose upon the driven shaft, a contact carrier rigid upon said driven shaft and having a contact engageable with the first contact, and means for causing rotation of the driven shaft and contact carrier with the gear of the driven shaft and permitting independent movement of the gear to move the first mentioned contact out of engagement with the contact of said carrier and break the circuit of the source of power when rotation of the driven shaft is prevented.

8. The combination with the structure of claim 5, of a circuit for supplying current to a motor for rotating said drive shaft, and means for completing and breaking the circuit, said means including a contact insulated from and movable with the gear disk of the driven shaft, said gear being

loose upon the driven shaft, a contact carrier rigid upon said driven shaft and having a contact engageable with the first contact, a pin carried by the gear of said driven shaft and slidably engaged with said carrier, and a spring carried by said pin and engaging said carrier to yieldably hold the contact thereof in engagement with the contact moving with the gear, said spring permitting said gear to have limited independent movement to move the first mentioned contact out of engagement with the contact of said carrier and break the circuit of the source of power when rotation of the driven shaft is prevented.

9. The combination with the structure of claim 5, of a circuit for supplying current to a motor for rotating said drive shaft, the gear disk of the driven shaft being loose upon the same, an insulated contact moving with said gear, means for causing rotation of the driven shaft with said gear and permitting limited rotation of the gear independent of said driven shaft, and a contact carried by said means and engageable with the first mentioned contact to close the circuit, movement of said gear independent of said driven shaft moving the contacts apart to open the circuit and prevent rotation of the drive shaft when rotation of the driven shaft is stopped.

10. The structure of claim 5 having the gear of the driven shaft loose upon the same, drums positioned about said shaft upon opposite sides of said gear and insulated from the shaft, one drum having its insulation provided with a sleeve extending through an opening in said gear, a contact extending from said drum through said sleeve, a collar rigid upon said shaft between said gear and the second drum and insulated from the second drum, arms extending from said collar, a contact carried by and insulated from one arm and engageable with said contact pin, a lead connecting the contact of said arm with the second drum, a second arm extending from said collar, a block carried by said gear, a bolt carried by said block and passing through the second arm of said collar, a spring upon said bolt engaging the last mentioned arm to yieldably hold the collar and arms in a set position with the contacts in engagement, and brushes engaging said drums.

In testimony whereof we have hereunto affixed our signatures.

RALPH A. WILLISON.
CLIFFORD N. ESBERG.