W. B. HILL.

OPERATING DEVICE FOR STATION INDICATORS.

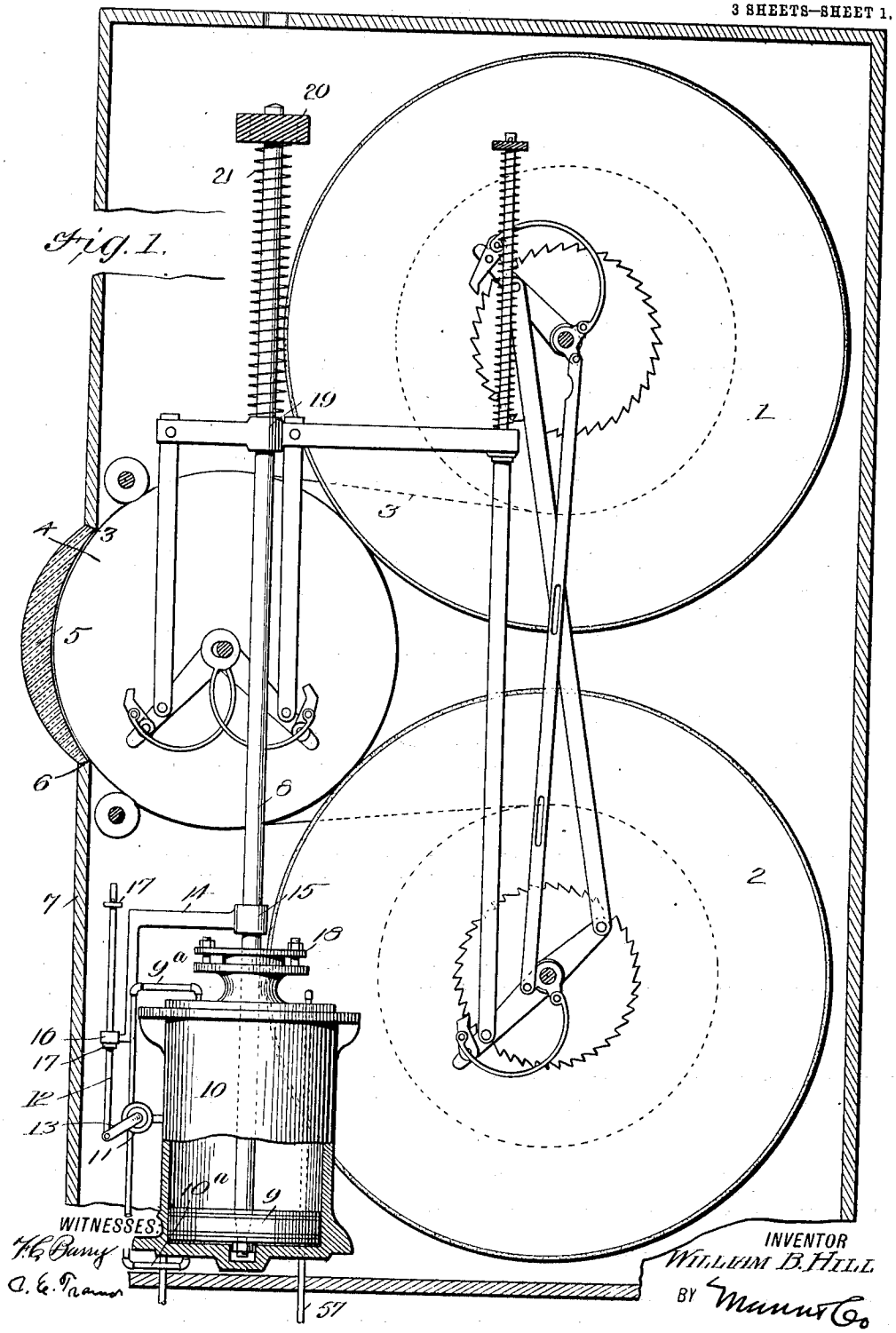
APPLICATION FILED JUNE 2, 1911.

1,053,813.

Patented Feb. 18, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

H. C. Bumy

C. E. Parmer

INVENTOR

WILLIAM B. HILL

BY Munn & Co

ATTORNEYS

W. B. HILL.

OPERATING DEVICE FOR STATION INDICATORS.

APPLICATION FILED JUNE 2, 1911.

1,053,813.

Patented Feb. 18, 1913.

3 SHEETS—SHEET 2.

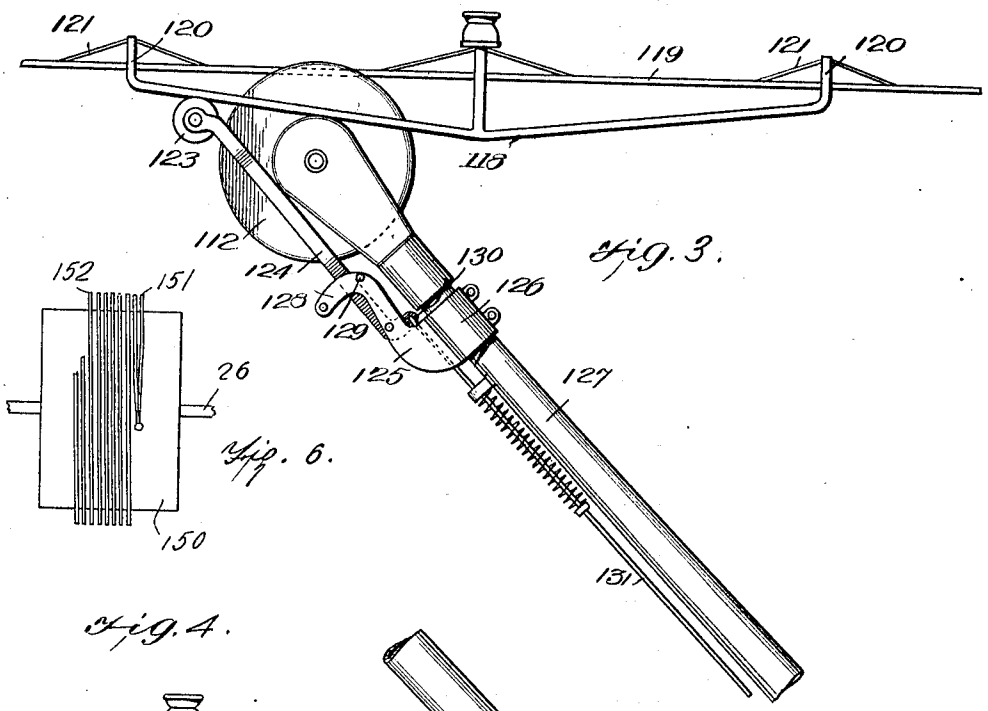
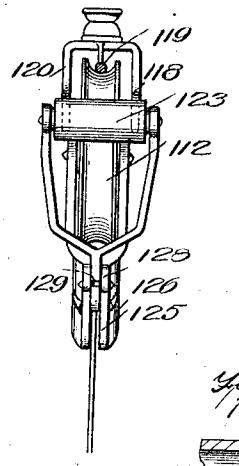


Fig. 3.

Fig. 6.

Fig. 4.



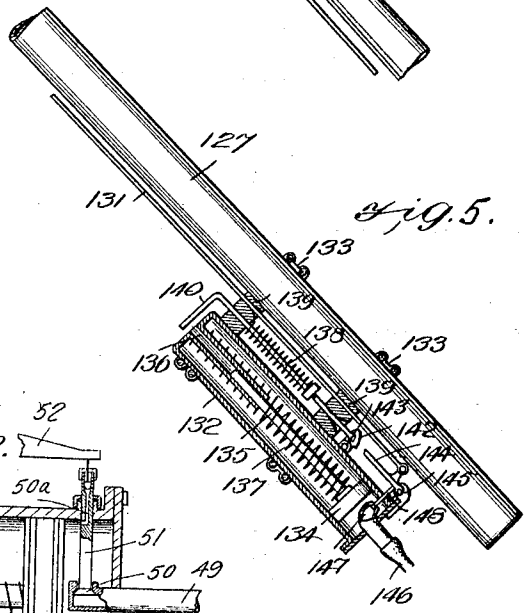


Fig. 5.

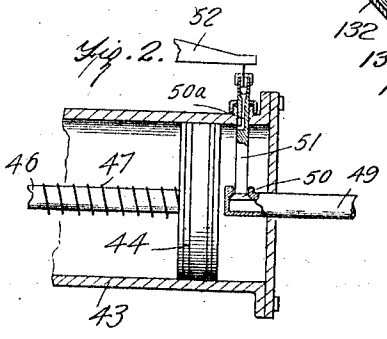


Fig. 2.

WITNESSES:

H. C. Barry

A. E. Trainor

INVENTOR

WILLIAM B. HILL

BY Munn & Co.

ATTORNEYS

W. B. HILL.

OPERATING DEVICE FOR STATION INDICATORS.

APPLICATION FILED JUNE 2, 1911.

1,053,813.

Patented Feb. 18, 1913.

3 SHEETS—SHEET 3.

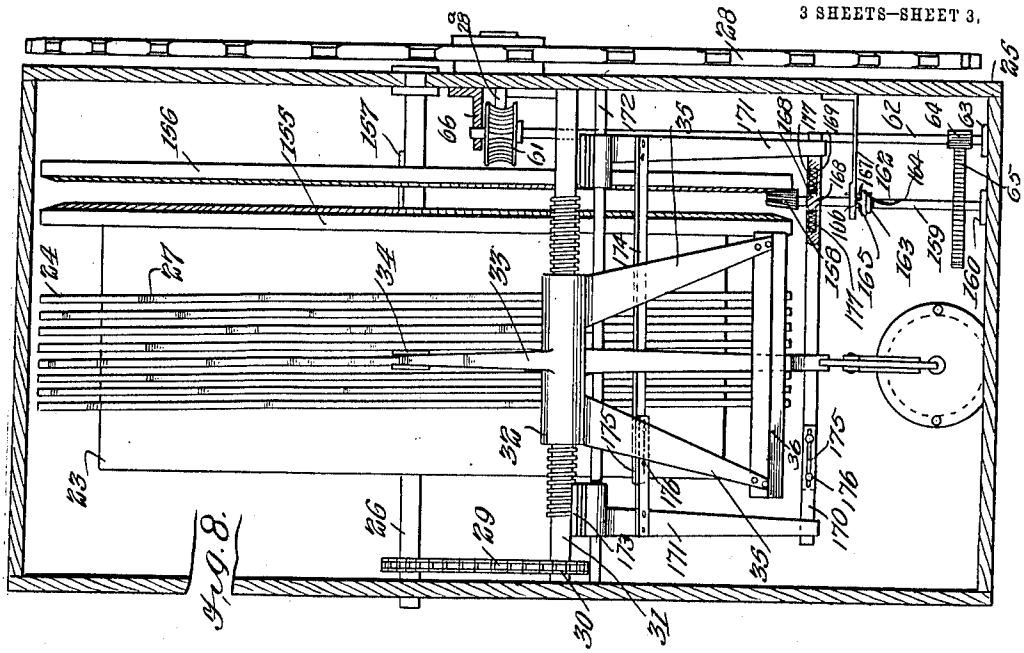


Fig. 8.

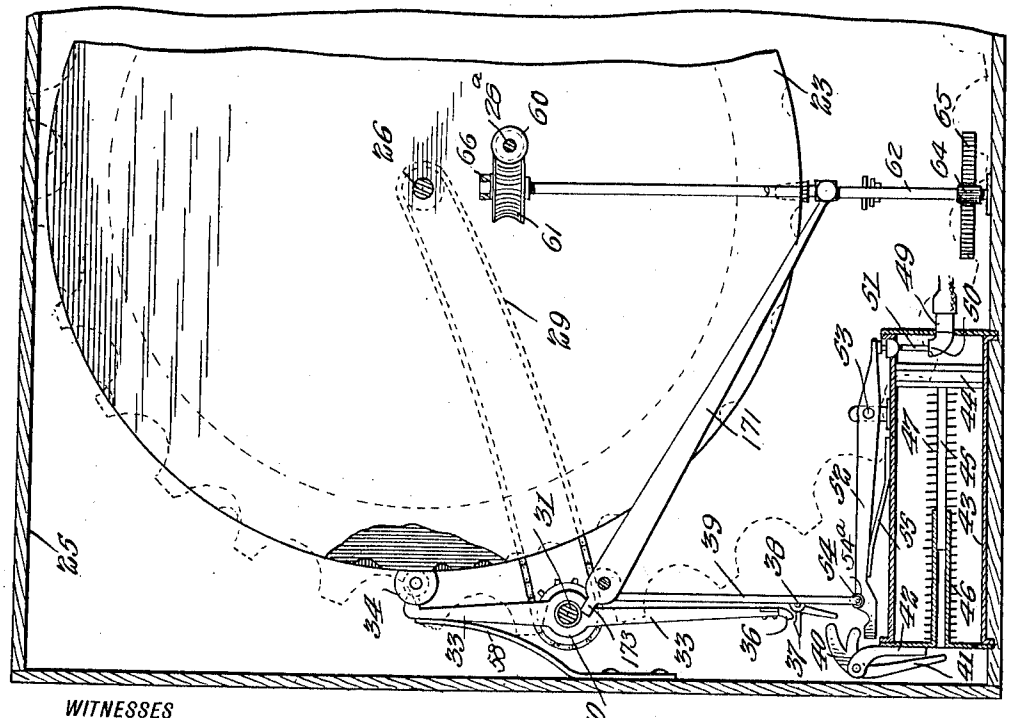


Fig. 7.

WITNESSES

H. C. Barry

C. E. Brainard

INVENTOR

William B. Hill

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM B. HILL, OF TUCUMCARI, NEW MEXICO.

OPERATING DEVICE FOR STATION-INDICATORS.

1,053,813. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed June 2, 1911. Serial No. 630,781.

To all whom it may concern:

Be it known that I, WILLIAM B. HILL, a citizen of the United States, and a resident of Tucumcari, county of Quay, and State of New Mexico, have invented certain new and useful Improvements in Operating Devices for Station-Indicators, of which the following is a specification.

My invention is an improvement in operating devices for station indicators, and consists in certain novel constructions and combinations of parts, hereinafter described and claimed.

The object of the invention is to provide a simple and efficient operating device for station indicators, especially adapted for use with the type of indicator shown and described in my copending application No. 566345, filed June 11, 1910.

Referring to the drawings forming a part hereof, Figure 1 is a vertical section of the indicating device with the operating mechanism therefor. Fig. 2 is a partial enlarged vertical longitudinal section of the cylinder that controls the exhaust from the upper end of the operating cylinder, Fig. 3 is a side view of the upper end of the trolley pole, Fig. 4 is a rear view of the upper end of the trolley pole, Fig. 5 is a side view of the lower portion of the trolley pole with the tripping mechanism in section, Fig. 6 is a plan view of a modified form of cam, Fig. 7 is a partial vertical section of the actuating mechanism, and Fig. 8 is a view at right angles to Fig. 7, the casing being in sections.

The indicating device above mentioned, consists of a plurality of rollers 1 and 2, which support a strip 3, preferably of fabric material, and provided with the station indications arranged in regular order. The said strip passes over a roller 4 arranged between and in front of the rollers 1 and 2, and the said roller 4 presses the strip closely against the rear face of a sheet 5 of transparent material arranged in an opening 6 of the case 7, which may be arranged within the car. The three rollers are moved intermittently by means of a rod 8 connected with a piston 9 movable in a cylinder 10 within the case 7 before mentioned.

The piston is moved by fluid under pressure, the said fluid being admitted to the ends of the cylinder in alternation through pipes 9^a and 10^a, the former admitting the fluid to the upper end of the cylinder, and the latter to the lower end. The admission of the fluid is controlled by a valve arranged within a casing 11, and operated by means of a rod 12 connected with the stem 13 of the valve. The rod 12 is operated by means of an arm 14 having a hub 15 at one end secured to the rod 8, and having at the other end a collar 16 slidable on the rod 12 between collars 17 on the said rod. It will be evident that when the piston moves upwardly, the rod 12 will be shifted when the collar 16 of the arm engages the uppermost collar 17 of the rod to admit the fluid to the upper end of the cylinder, and to permit the fluid to exhaust from the lower end. The said piston rod 8 extends through a stuffing box 18 into the cylinder, and near its upper end the rod is provided with a cross head 19, to which is connected the operating mechanism of the rolls 1, 2 and 4. The upper end of the rod 8 passes through a bearing 20 in the casing, and a spring is arranged between the bearing 20 and the cross head 19, the said spring acting to normally press the cross head downwardly.

The connection between the piston rod and the rollers is such that when the car is moving in one direction, the upward movement of the piston rod will move the uppermost roller intermittently, and when the car is moving in the opposite direction, the said movement of the rod will move the lower roller, thus moving the strip in the opposite direction, and the roller 4 is moved in the same direction as the strip. The above mentioned mechanism is fully described in the before-mentioned application, and it is not believed necessary to further describe it in the present application.

The device is, as before stated, operated by fluid under pressure, and the display mechanism just described may be operated by trips preferably arranged on the trolley wire at places where announcements are to be made, or by mechanism driven by movement of the car, which mechanism will actuate the displaying device at the proper intervals. The latter device is shown in Figs. 2 and 3, and comprises a casing 25, in which is journaled a shaft 26 having secured thereto a drum 23 provided on its periphery with a spiral cam 24 having at irregular intervals notches 27, the position of the notches corresponding to the points where the announcements are to be made.

A sprocket wheel 28 is journaled on the outer side of the casing, and is connected

by suitable mechanism with the shaft 26 of the drum for operating the same. The said shaft 26 of the drum is connected by a chain 29 with a sprocket wheel 30 on a shaft 31 journaled in the casing. The rod 31 is a screw rod, and a sleeve nut 32 is movable thereon, the said nut carrying an arm 33 provided at its free end with a roller 34 running on the rib of the drum, and adapted to drop in the notches. The sleeve nut is also provided with connecting arms 35 provided with a cross plate 36, the lower end of said plate being curved outwardly as shown in Fig. 2. The curved edge is adapted for engagement by a catch 37 on one arm of an elbow lever pivoted at 38 on a link 39, and the other arm of the elbow lever extends into position for engagement by a nose 40 on a curved lever 41 pivoted to a bracket 42 on a cylinder 43 in the casing. The cylinder is provided with a piston 44, and the rod 45 of the piston extends into a tube 46 passing through the opposite end of the cylinder. A coil spring 47 encircles the tube and rod, and normally presses the piston toward the end of the cylinder remote from the curved lever.

The lower end of the curved lever 41 is in position for engagement by the rod 45 when the piston is moved against the resistance of the spring, and when so engaged, the nose 40 of the lever operates the elbow lever to release the plate 36.

The inlet 49 of the cylinder is at the end remote from the curved end 40, and is controlled by a valve 50. The stem 51 of the valve is pivoted to one end of the lever 52 pivoted at 53 on the cylinder, the opposite end thereof being in engagement with a roller 54 on the link 39 before mentioned. A spring 55 normally presses the said end of the lever upwardly, and the said lever is provided at the end adjacent the roller 54 with a notch 54ª for engagement by the roller and with a second notch below the first notch. The valve 51 closes the inlet by its upward movement and opens it by its downward movement, and when the rod 45 of the piston engages and swings the curved lever 41, the valve is closed by the engagement of a lug 56 on the curved lever before mentioned.

The operation of the above described mechanism is as follows: The admission of fluid to the cylinder 10 is controlled by the three-way valve 11 before mentioned, and the upper end of the cylinder is connected by a pipe 57 with the inlet 49 of the cylinder 43. When the piston 9 moves upwardly, and reaches the end of its stroke, the valve 11 will be operated to connect the lower end of the cylinder 10 with the atmosphere, and the upper end with the source of fluid under pressure, while at the end of the downward stroke, the valve is operated to connect the lower end of the cylinder with the source of fluid under pressure, and the upper end with the exhaust. With the parts of the displaying mechanism in the position shown in Fig. 1, when a notch in the cam on the drum is engaged by the roller, the arm 33 is swung inwardly, the said arm being normally pressed inwardly by a spring 58. The movement of the said arm disengages the roller 54 from the upper notch, throwing it into the lower notch, thus permitting the spring 55 to swing the lever 52 to open the valve 50. The piston 54 is then forced to the left of the cylinder 43, exhausting the air from the upper end of the cylinder 10 into the cylinder 43. The piston 9 is thus moved upwardly, operating the display mechanism, and the piston 44 continues its movement until the rod 45 engages the tail of the lever 41 and swings it on its pivot. The lug 40 of the said lever engages the elbow lever, releasing the cross plate 36, and at the same time pushing the link 39 to the right, and replacing the roller 54 in the upper notch. The lug 56 of the curved lever assists in this operation by depressing the free end of the lever 52. As the roller 34 passes out of engagement with the notch in the cam, the cross plate is again engaged with the catch on the elbow lever, and held in this position. As soon as the valve 50 is closed, the air pressure reaches its maximum pressure above the piston 9, and the said piston is depressed to the bottom of the cylinder, the spring 21 assisting in this movement. The valve stem of the valve 50 is provided with a vent 58 to bleed the cylinder 43.

When it is desired to operate the displaying mechanism by a trip, arranged on the trolley wire, cam rods 118 are arranged in pairs at the points where announcements are to be made, one rod on each side of the trolley wire 119. The rods are connected by U shaped hangers 120 at each end and at the center of the rods, which extend above and over the wire, and are supported above the wire by braces 121. The cam rods are spaced apart sufficiently to permit the passage of the trolley wheel 112, and a long roller 123 is journaled in the arms of a fork 124 pivoted between a pair of arms 125 on a split collar 126 on the trolley pole 127. The arms 125 are provided at their upper ends with angular portions 128, between which the fork moves, and the angular portions are connected by rivets 129, which act as stops to limit the movement of the fork, and the lower end of the fork is provided with a lateral lug 130, which is connected to a tripping device, to be described, by a link 131.

A cylinder 132 is secured on the pole 127 by brackets 133, and a piston 134 is movable in the cylinder. The piston is provided with a rod 135 which moves in a tube 136

extending inwardly from the upper end of the cylinder, and the tube and rod are encircled by a coil spring 137, which normally retains the piston in the position shown in Fig. 6. A rod 138 is slidable in bearings 139 in the brackets, and the angular end 140 is in position for engagement by the piston rod as the piston moves upward. The lower end of the rod 139 is pivoted to a catch 142 pivoted on the cylinder at 143. A lever 144 is pivoted to a lug 145 on the cylinder, and the free end of the lever is adapted for engagement by the catch to hold the lever in a specified position.

An inlet pipe 146 is provided for the cylinder, and a valve 147 coöperates with a valve seat in the pipe, the valve being connected by a link 148 with the lever before mentioned. When the roller 123 engages the cam rods 118, the fork is swung on its pivot, and the free end of the lever 144 is swung toward the cylinder, opening the valve, the end of the lever engaging beneath the catch, which engages the lever and holds the valve open. The fluid under pressure now passes into the cylinder, moving the piston against the resistance of the spring until the piston rod engages the angular portion of the rod 139 and moves the same. The movement of the rod swings the catch and releases the lever, and the fluid operating against the valve closes it.

It will be observed that the tripping cylinder just described is substantially the same as that shown in Figs. 2 and 3, the former being operated from the trolley wire and the latter from a rotating part of the car, or by an independent wheel, and when one is used the other will be dispensed with.

The operation of the tripping mechanism shown in Figs. 4, 5 and 6 is substantially the same as that shown in Figs. 2 and 3, it being understood that the pipe 146 in this instance is connected with the pipe 57 of the cylinder 10 and that when the valve 147 is opened, the air exhausts from the upper end of the cylinder 10, to operate the shifting mechanism. As soon as the rod 135 engages the end 140 of the rod 139 the valve is released, and the spring 137 releases the piston 134, the stem of the valve having a bleeding vent.

The spring 21 assists in gradually depressing the piston and also eliminates any jar in its upward movement. The tripping mechanism shown in Figs. 2 and 3 operates in accordance with the mileage actually covered by the displaying apparatus, while that shown in Figs. 4, 5 and 6 is independent of the actual travel of the car.

In Fig. 7 is shown a modified form of operating device comprising a disk or drum 150, provided on its peripheral surface with a double spirally arranged rib, consisting of two members, 151 and 152, arranged alongside each other and in spaced relation. Both ribs are provided with the notches as shown in Fig. 2, and one rib is intended for the trip in one direction and the other for the return trip. The method of operation is precisely the same as in the cam shown in Figs. 1 and 2.

The drum shaft 26 is rotated as before stated, by means of a sprocket wheel 28 secured to a shaft 28^a journaled in the side of the casing and provided at its inner end with a worm 60 which engages a worm wheel 61 on a vertically arranged shaft 62, journaled in a stepped bearing 63 and in a bracket 66 in the casing. The lower end of the shaft 62 is provided with a pinion 64, which meshes with a gear wheel 65 on a shaft 159 journaled in a stepped bearing 160 and provided at its upper end with a bevel pinion 158 adapted to mesh with either of the wheels 155 or 156. The said wheels 155, 156 are keyed to the shaft 26 by a key 157, and are arranged in spaced relation on the shaft, and on opposite sides of the pinion 158. The shaft 159 is moved laterally to cause the bevel gear wheel 158 to engage either of the gear wheels 155—156 to cause the drum to rotate in either direction. When the bevel gear is in engagement with the wheel 156, the drum is rotated in one direction and when the bevel gear is in engagement with the other wheel 155, the drum is rotated in the opposite direction. The means for moving the shaft 159 comprises a spring arm 162 secured to the side of the casing and having openings through which the shafts 62 and 159 pass. A collar 163 is secured rigidly to the shaft 159 and a collar 164 is journaled on the shaft above the collar 163. The collar 164 is provided with oppositely arranged upwardly extending beveled projections 165, one projection being arranged on each side of the shaft 159. The said projections are adapted for engagement with projections 166 of similar shape on the spring arm 162 before mentioned. The collar 163 is pinned to the shaft as shown and supports the collar 164. A pin 167 extends upwardly from the collar 164 and passes through a slot in the arm 162.

The shaft 159 is journaled at its upper end in a bearing 168, which is slidable in a slot 169 in a bar 170, which connects two spaced arms 171, each of which is journaled on a rod 172, extending transversely of the casing parallel with the shaft 31. The link 39 before mentioned is supported by the rod, being journaled at its upper end on the rod between the arms. Each arm is provided at its upper end with a lug 173, extending radially of the rod toward the shaft 31, and in position for engagement by the sleeve 32 as it nears the end of its travel in each direction. The arms 171 are connected adjacent

to the rod by means of a sectional plate 174, and the sections of the plate are adjustable, with respect to each other, to permit the arms 171 to be moved nearer together or farther apart. The bar 170 is also provided with adjusting means. The said means in each case consists of registering slots 175 in the lapping ends of the sections and set screws 176 in the respective sections, and passing through the slots for securing the sections in adjusted position. The bearing 168 before mentioned, is normally held in central position by means of springs 177, one of which is arranged upon each side of the bearing in the slot 169.

When the sleeve nut 32 nears the end of its travel in either direction, the end thereof will engage the lug 173 of the adjacent arm 171, and will move the frame consisting of the said arms, the bar 170 and the plate 174 longitudinally of the rod 172. The spring arm 162 holds the shaft 68 in position, by the interengagement of the lugs 165 and 166. As soon as sufficient pressure is brought to bear on the frame by the sleeve nut, the spring arm will be lifted to permit the shaft to swing laterally and the lugs 165 will engage the opposite sides of the lugs 166. The movement is sufficient to cause the bevel gear wheel 158 to engage the opposite gear wheel 155 or 156. The sleeve nut 32 will engage the lugs 173 as it reaches the end of the travel, and this will occur when the car reaches the end of the run. The shifting of the shaft 159 will reverse the direction of movement of the drum, so that on the return run the drum will move in the proper direction to operate the display roller at the proper time.

I claim:

1. In a device of the character specified, the combination with the display mechanism, and fluid operated means for operating the same, of means for actuating the operating means at predetermined intervals, said means comprising a drum provided on its peripheral surface with a continuous spiral rib, said rib having notches corresponding in number and relative position to the number and position of the stations, means for rotating the drum, a screw rod journaled parallel with the axis of the drum, a sleeve nut on the rod, a driving connection between the drum and the rod, a lever secured to the nut, a roller on one end of the lever engaging the rib, and a connection between the fluid operated means and the other end of the lever for actuating the said means when the lever is oscillated.

2. In a device of the character specified, the combination with the display mechanism, and the fluid pressure means for operating the same, of a tripping device for actuating the said means, comprising a drum, having a spiral rib provided with notches corresponding in number and relative position to the number and position of the stations, means for rotating the drum, a lever pivoted intermediate its ends, a roller on one end of the lever engaging the drum, means operated by the drum for moving said lever longitudinally thereof to retain the lever in front of the rib, and a connection between the lever and the fluid pressure means for actuating said means when the lever is oscillated.

3. In a device of the character specified, a display mechanism, means for operating said mechanism, comprising a cylinder, a piston therein, a yielding connection between the piston and the display mechanism to operate said mechanism on the outward stroke of the piston, a spring for returning the piston, a valve for admitting fluid under pressure to either end of the cylinder, a connection between the valve and the piston for operating said valve near the end of each stroke of the piston, a cylinder connected with the outer end of the first named cylinder, a valve controlling the connection, a tripping device for the valve, and means operated by the movement of the car for operating the tripping device at predetermined intervals, said means comprising a cam, a lever operated by the cam, and a connection between the lever and the tripping device.

4. In a device of the character specified, a display mechanism, and means for operating said mechanism, said means comprising a cylinder, a piston therein, a yielding connection between the piston and the display mechanism to operate said mechanism on the outward stroke of the piston, a spring for returning the piston, a valve for admitting fluid under pressure to either end of the cylinder, a connection between the valve and the piston for operating said valve near the end of each stroke of the piston, a cylinder connected with the outer end of the first named cylinder, a valve controlling the connection, a tripping device for the valve, and means operated by the movement of the car for operating the tripping device at predetermined intervals.

5. In a device of the character specified, a display mechanism, and means for operating said mechanism, said means comprising a cylinder, a piston therein, a yielding connection between the piston and the display mechanism to operate said mechanism on the outward stroke of the piston, a spring for returning the piston, means for exhausting the fluid from the outer end of the cylinder, comprising a cylinder connected with the end of the first cylinder, a valve controlling the connection, a tripping device for the valve, comprising a spiral cam having notches corresponding in relative arrangement to the arrangement of the stations,

means for rotating the cam, a lever operated by the cam, means operated by the movement of the cam for bodily moving said lever longitudinally of the axis of the cam, means for reversing the movement of the cam, and means operated by the bodily movement of the lever for operating the reversing means.

6. In a device of the character specified, a display mechanism, and means for operating said mechanism, said means comprising a cylinder, a piston therein, a yielding connection between the piston and the display mechanism to operate said mechanism on the outward stroke of the piston, a spring for returning the piston, means for exhausting the fluid from the outer end of the cylinder, comprising a cylinder connected with the end of the first cylinder, a valve controlling the connection, a tripping device for the valve, a rotatable cam for operating the tripping device, means for reversing the movement of the cam, a lever engaging the cam and connected with the tripping device for operating the same, and means whereby the lever will operate the reversing means.

7. In a device of the character specified, a display mechanism, and means for operating said mechanism, said means comprising a cylinder, a piston therein, a yielding connection between the piston and the display mechanism to operate said mechanism on the outward stroke of the piston, a spring for returning the piston, means for exhausting the fluid from the outer end of the cylinder, comprising a cylinder connected with the end of the first cylinder, a valve controlling the connection, a tripping device for the valve, and a cam for operating said device at predetermined intervals.

8. In a device of the character specified, a drum having a spiral rib provided with notches corresponding in relative arrangement to the arrangement of the stations, a lever coöperating with the rib, means operated by the drum for displacing the lever laterally to follow the pitch of the rib, and means operated by the lever at the end of the lateral movement in each direction for reversing the movement of the drum.

WILLIAM B. HILL.

Witnesses:
MARION LETCHER,
M. BABER.