W. E. PARR.

PASSENGER RECORDING SYSTEM FOR TRAINS.

APPLICATION FILED DEC. 6, 1906.

898,675.

Patented Sept. 15, 1908.

7 SHEETS—SHEET 1.

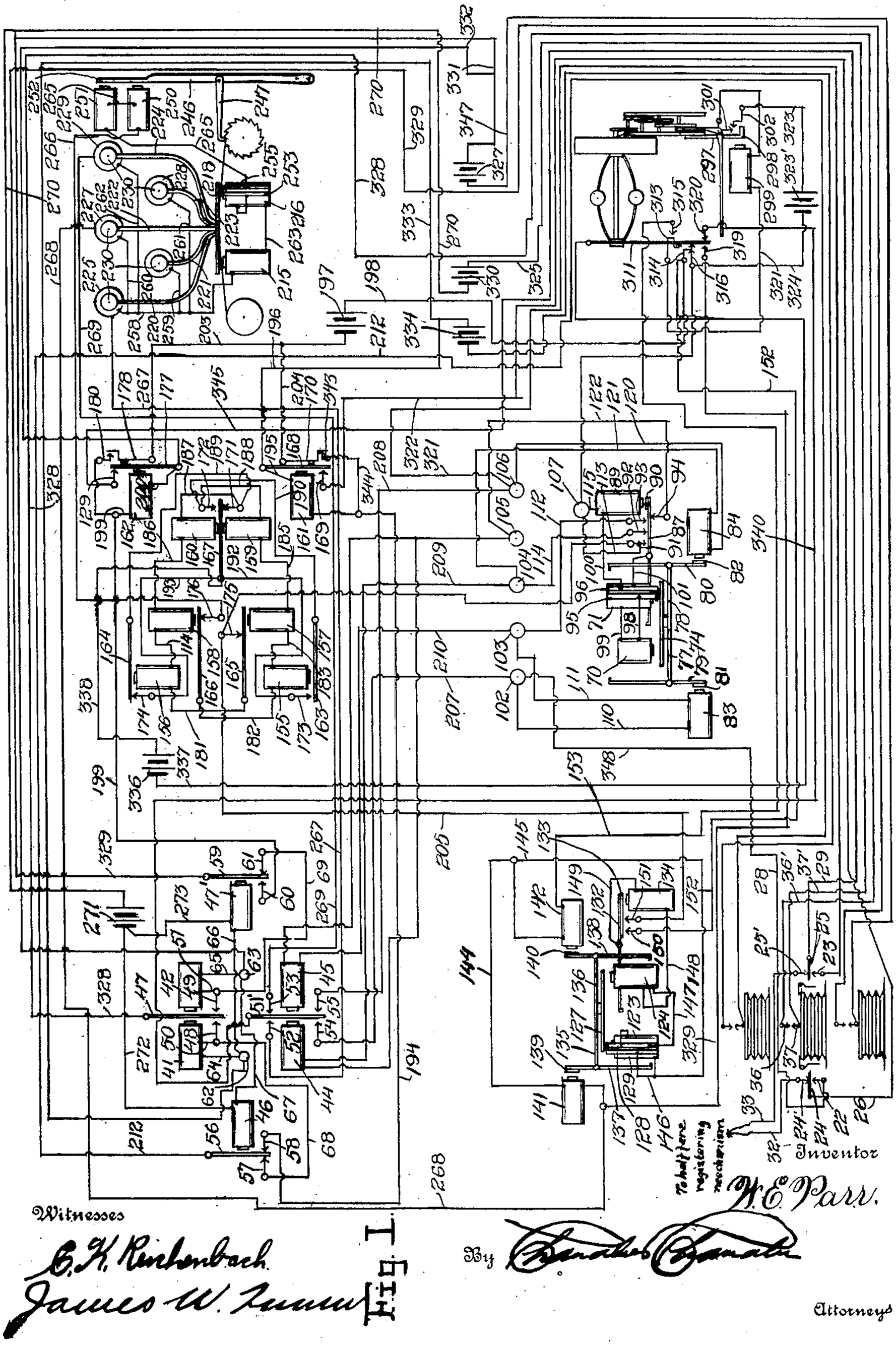

Fig. 1.

Witnesses

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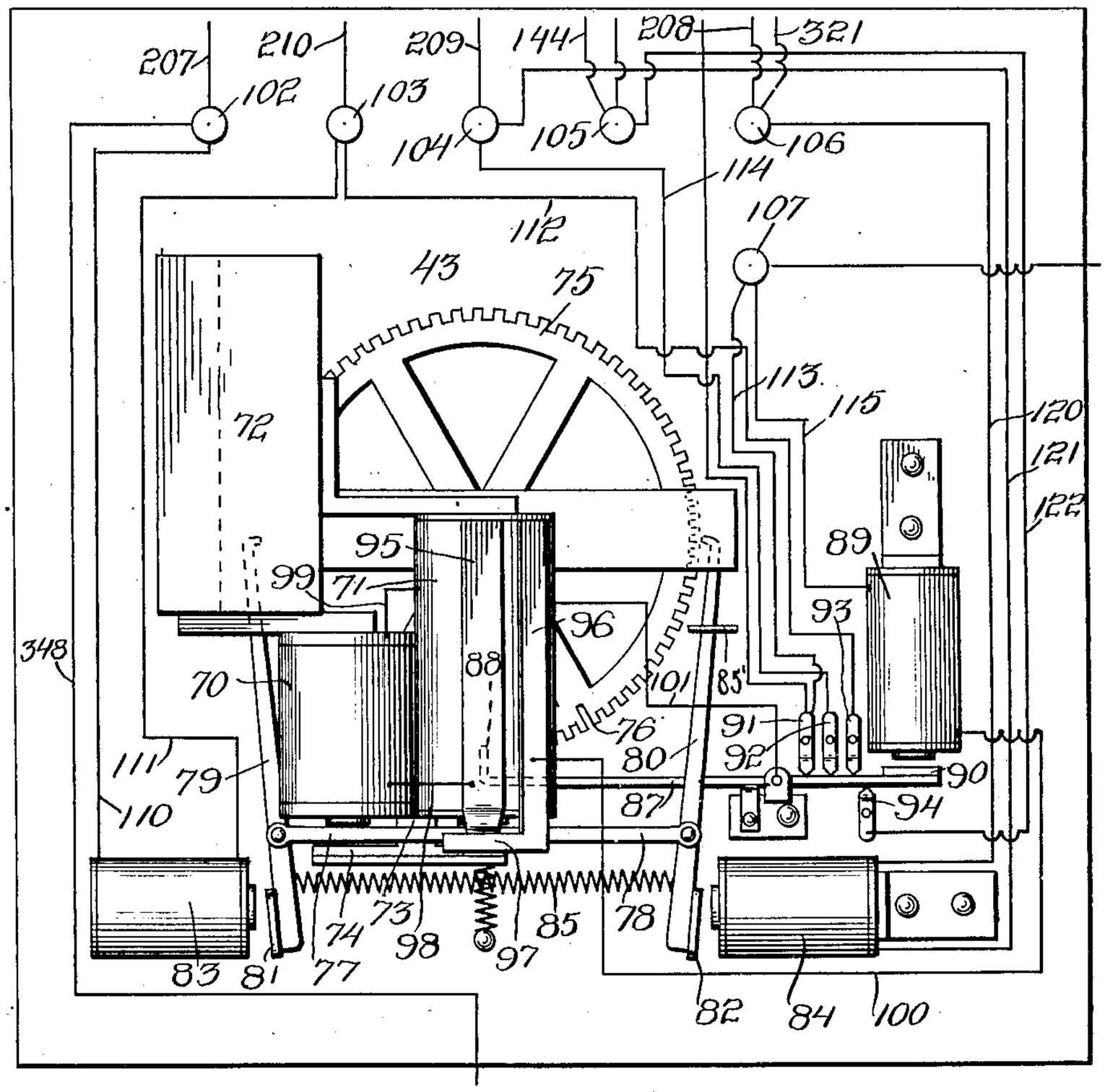
7 SHEETS—SHEET 2.

Fig. 2.



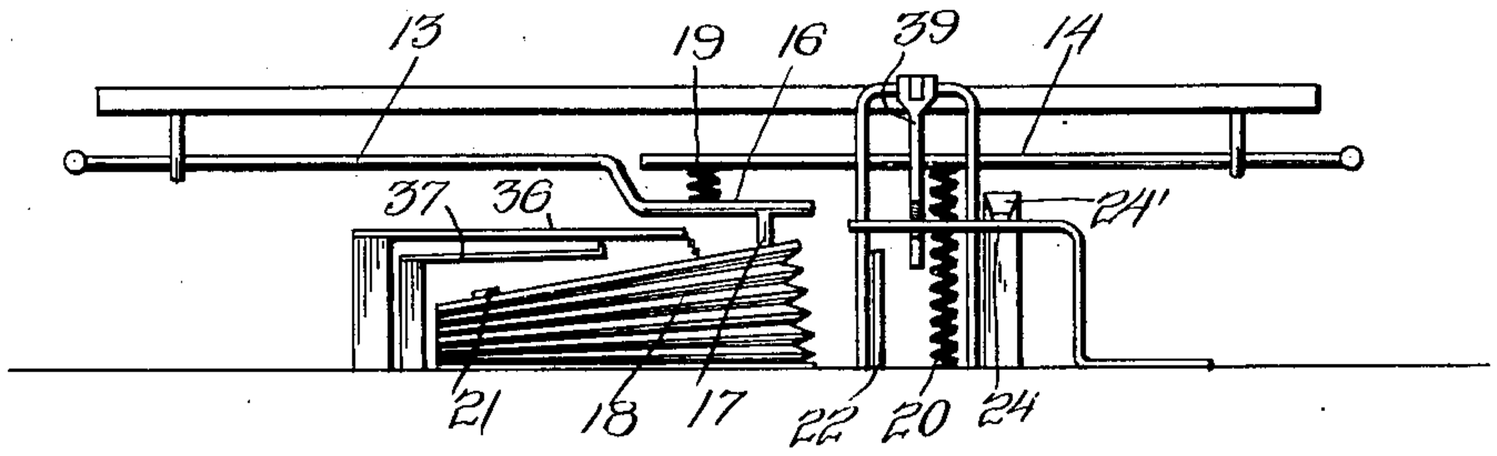


Fig. 9.

Witnesses

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7 SHEETS—SHEET 3.

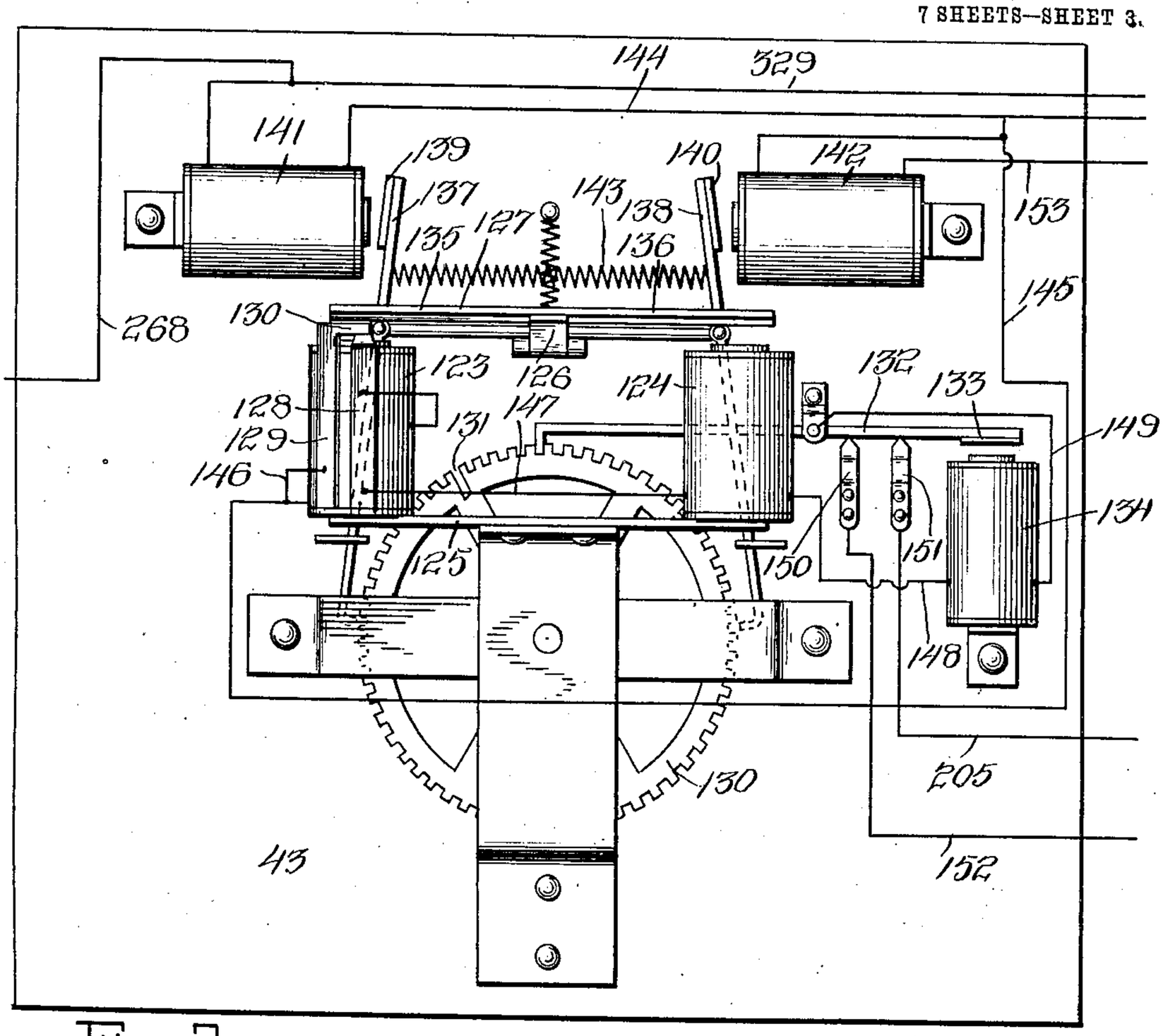

Fig. 3.

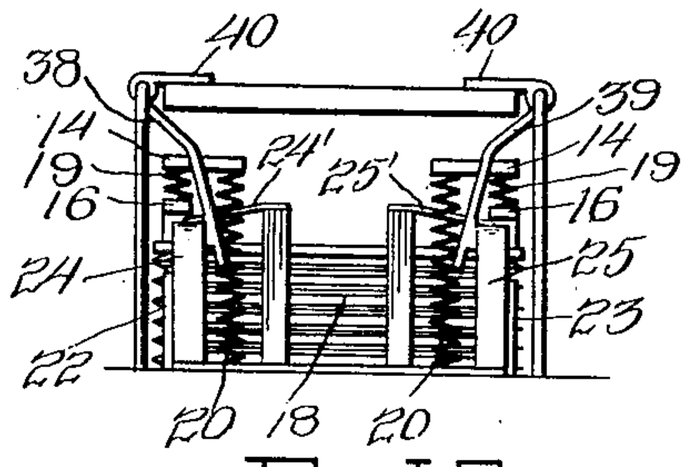

Fig. 10.

Witnesses

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7 SHEETS—SHEET 4.

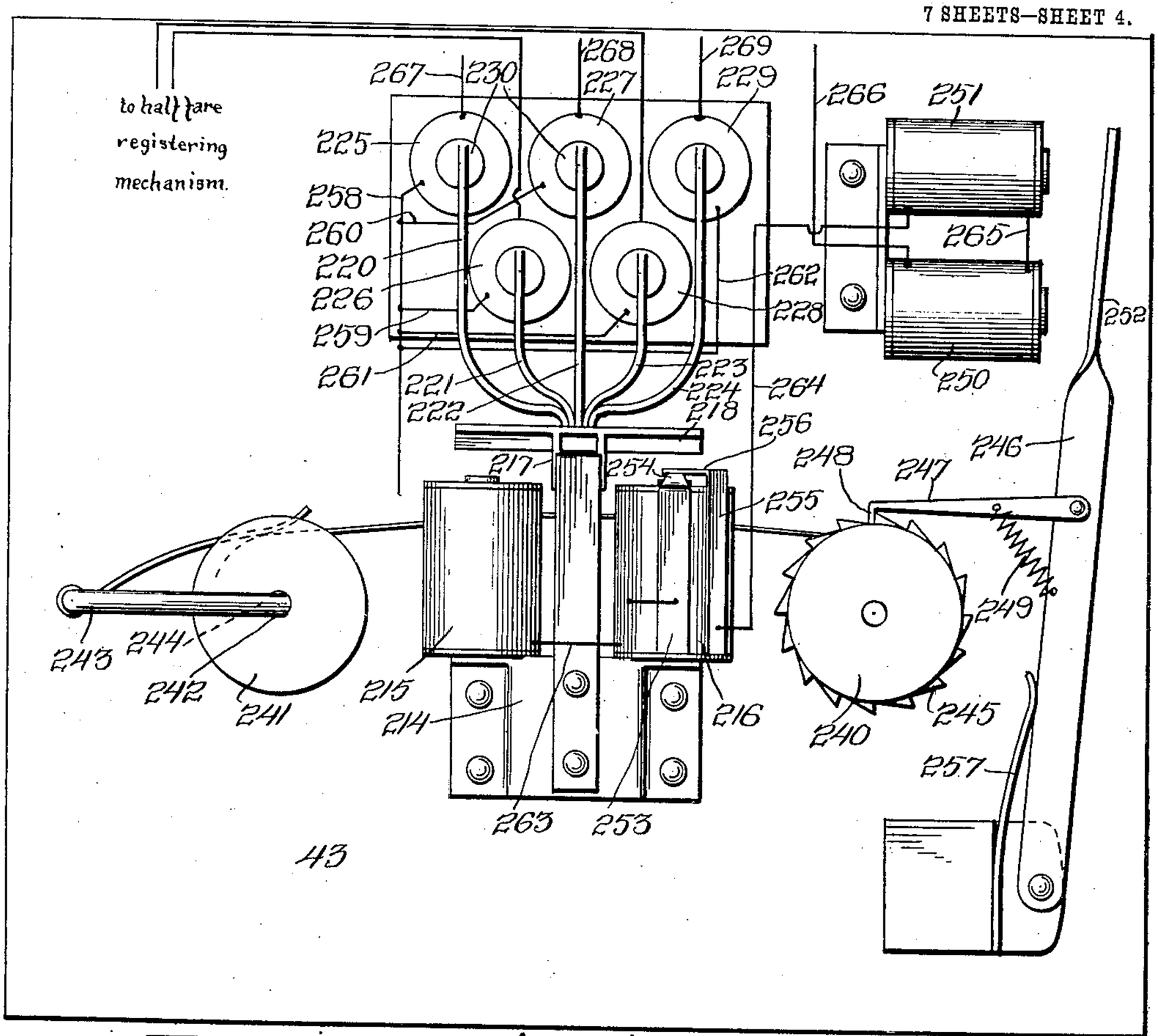

Fig. 4.

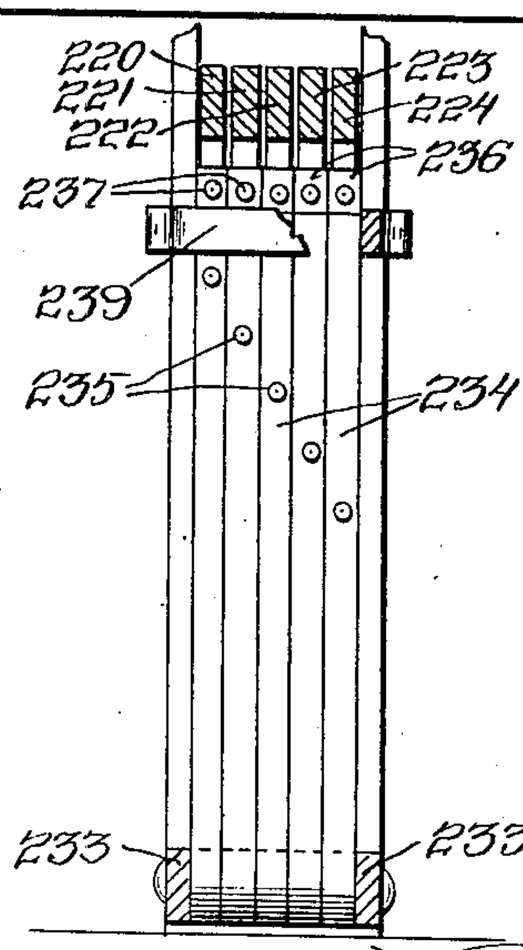

Fig. 5.

Witnesses

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7 SHEETS—SHEET 5.

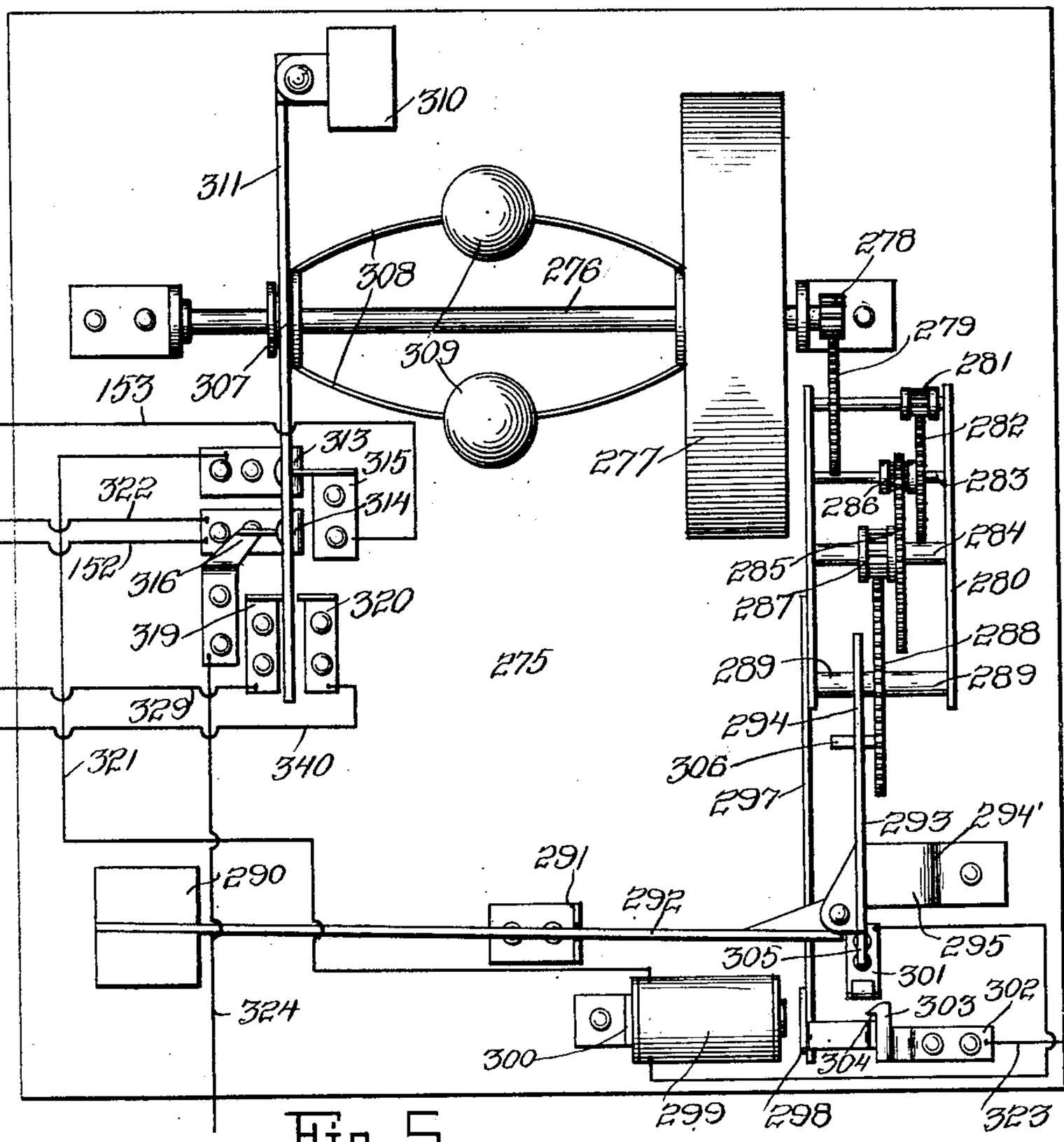

Fig. 5.

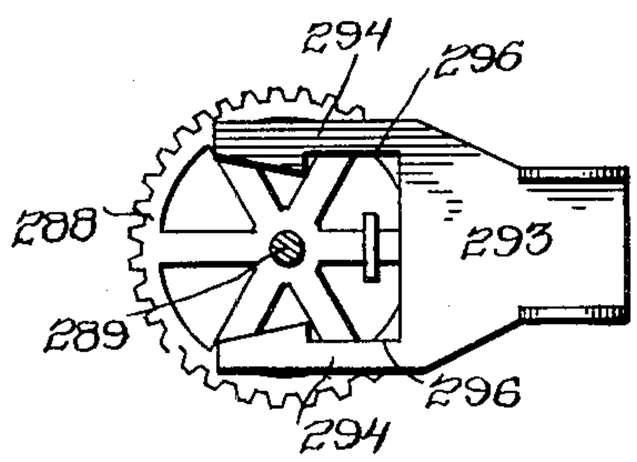

Fig. 11.

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7 SHEETS—SHEET 6.

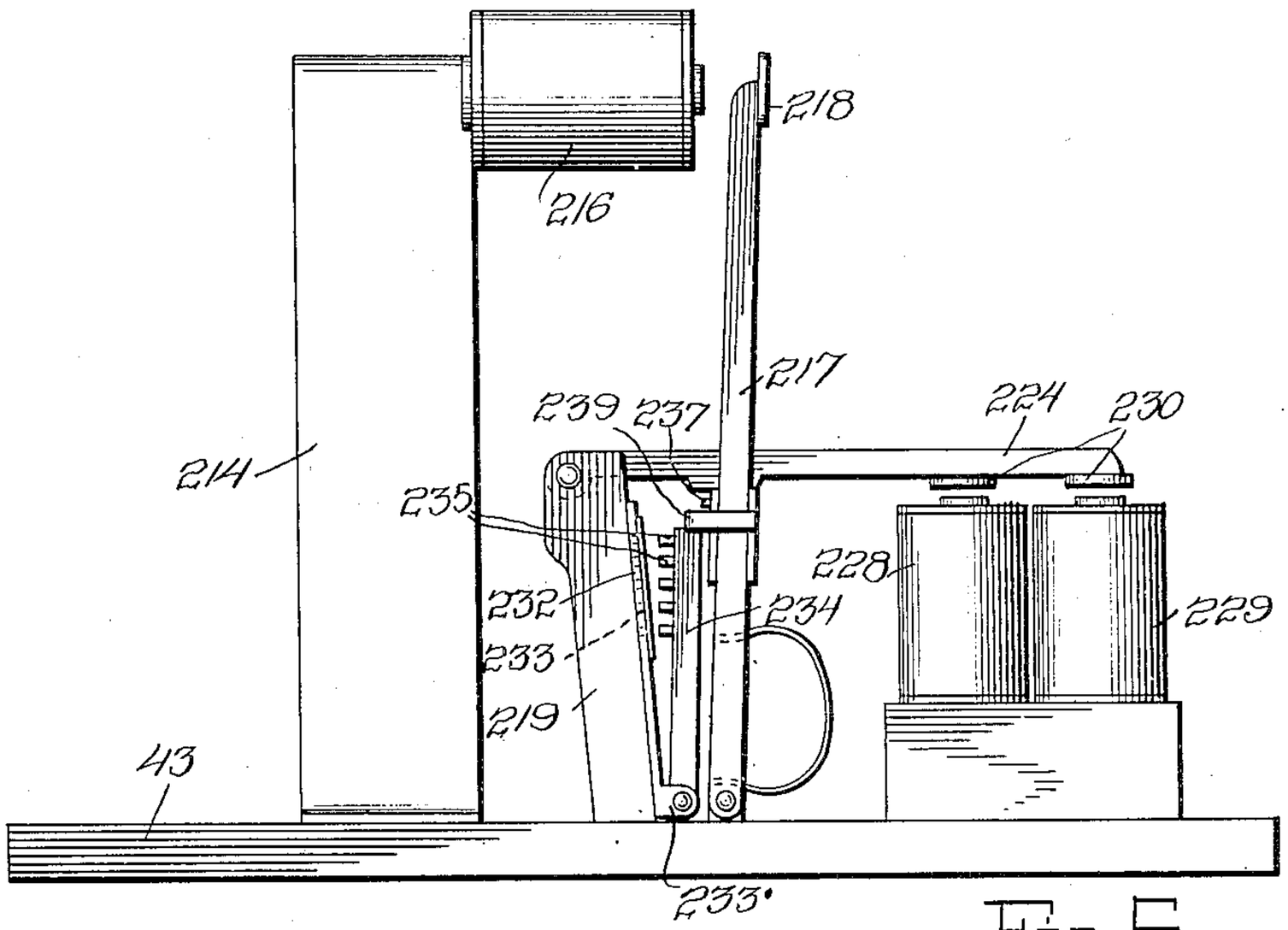

Fig. 6.

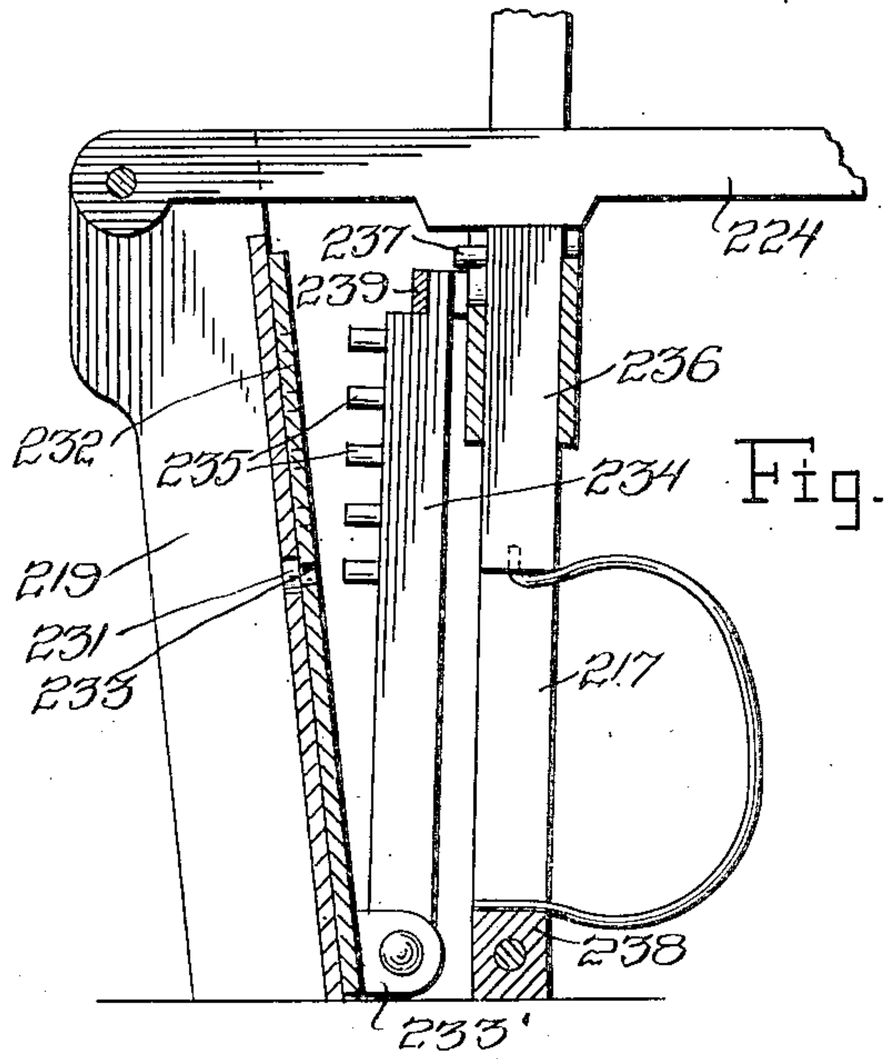

Fig. 7.

Witnesses

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APPLICATION FILED DEC. 6, 1906.

898,675.

Patented Sept. 15, 1908.

7 SHEETS—SHEET 7.

Fig. 12.

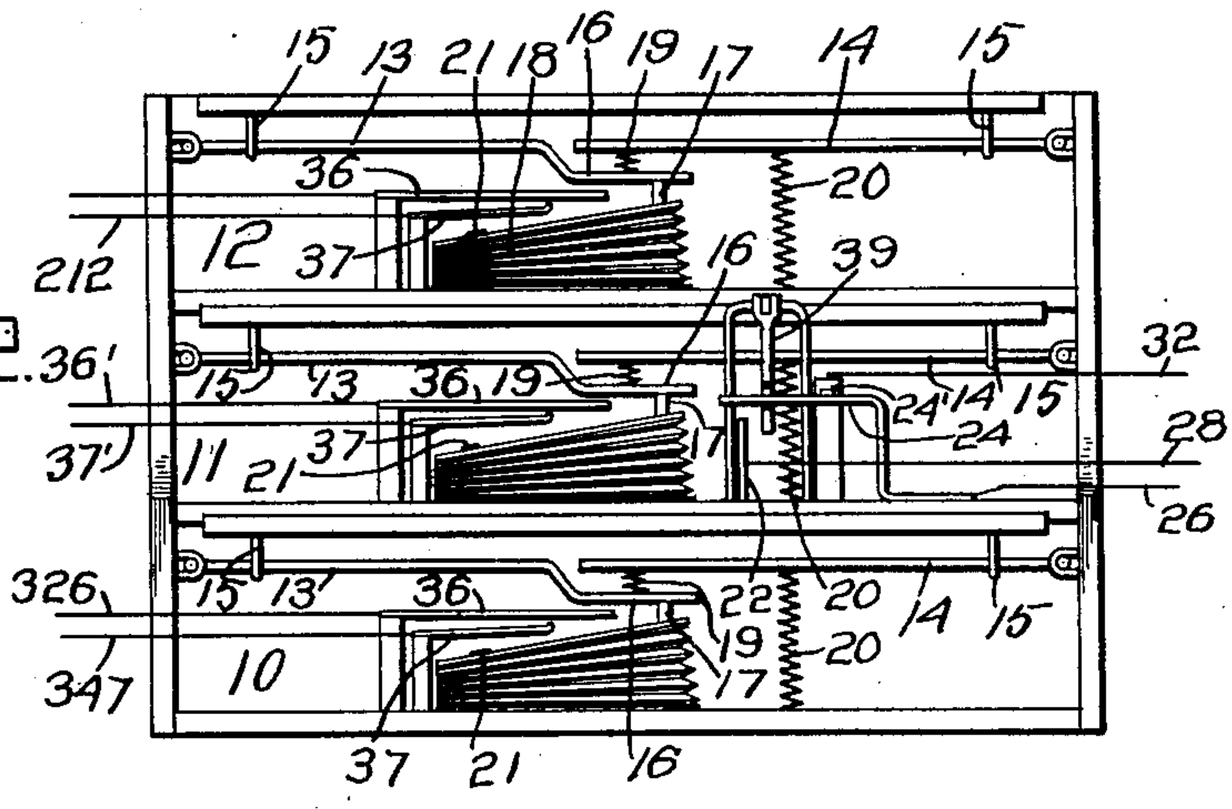


Fig. 13.

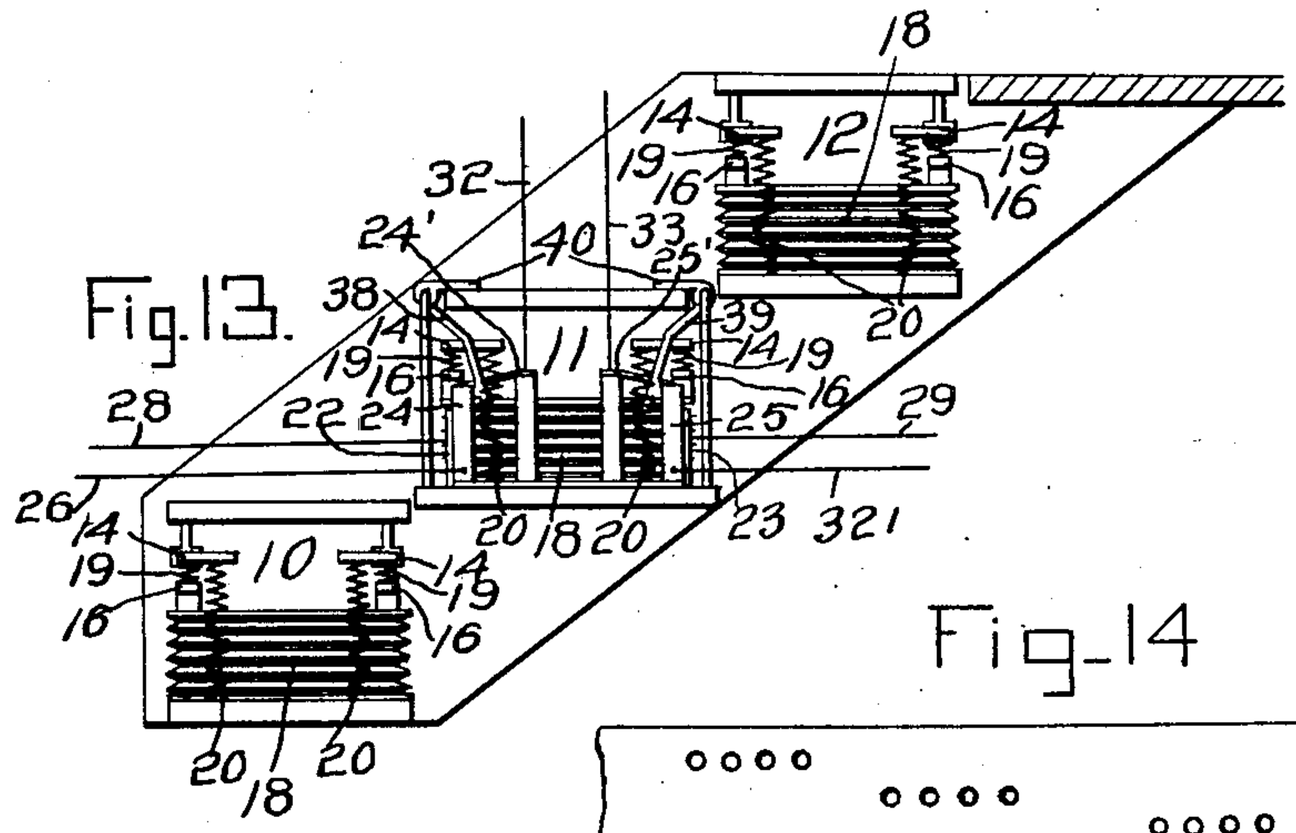
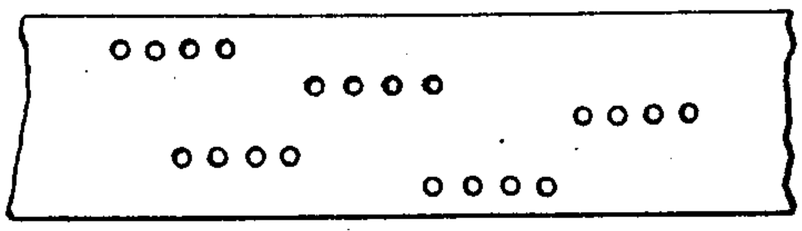


Fig. 14



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UNITED STATES PATENT OFFICE.

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PASSENGER-RECORDING SYSTEM FOR TRAINS.

No. 898,675. Specification of Letters Patent. Patented Sept. 15, 1908.

Application filed December 6, 1906. Serial No. 346,672.

To all whom it may concern:

Be it known that I, WALTER E. PARR, a citizen of the United States, residing at Sparta, in the county of Christian, State of Missouri, have invented certain new and useful Improvements in Passenger-Recording Systems for Trains; and I do hereby 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 electrically operated passenger recording system for railway trains and has for its object to provide a system of this character which will record the number of passengers who actually ride upon the train and the distance they ride and discount those who board the train and then leave it before it starts.

The system is furthermore adapted to indicate whether the passengers who board the train and actually ride therein are adults or children, there being a full and a half-fare recording mechanism provided for this purpose.

The system is so arranged that the total number of persons who board the train will be checked up while the train is at a standstill, the number of persons leaving the train being discounted by the checking mechanism and it will be seen that by this arrangement, the checking mechanism will indicate only the number of actual passengers who board the train at each stop.

The recording mechanism includes a mechanism which will be actuated only while the train is in motion, and which will cause the number of degrees or points indicated by the checking mechanism to be indicated upon the main record and the said mechanism above mentioned is also arranged to indicate the number of miles the train travels.

The steps of the car to which the recording mechanism is applied are so arranged that when a child enters the train, the half-fare checking mechanism will be thrown into circuit and when an adult enters the train the full fare checking mechanism will be put in circuit. Furthermore, the arrangement of the steps is such that should any of the child or adult passengers leave the train before it starts, their number will be deducted from the corresponding checking mechanisms and the number of those who remain in the train only will be registered by the recording mechanism when the train starts.

With the above and other objects in view, the present invention consists in the construction and arrangement of parts, shown in the accompanying drawings, in which:

Figure 1 is a diagrammatic view of the entire system embodied in my invention, Fig. 2 is a plan view of the full-fare checking mechanism, Fig. 3 is a similar view of the minor checking mechanism, Fig. 4 is a similar view of the recorder for the system, Fig. 5 is a plan view of the switching mechanism for the system, Fig. 6 is a view in side elevation of the recorder, Fig. 7 is a detail vertical sectional view through a portion of the recorder, Fig. 8 is a similar view, but taken in a plane at right angles to that in which Fig. 7 is taken, Fig. 9 is a front elevation of one of the steps for the car, Fig. 10 is an end view of one of the steps, and, Fig. 11 is a detail sectional view of a portion of the switching mechanism. Fig. 12 is a front elevation of the steps 10, 11 and 12, and, Fig. 13 is an end view thereof, and Fig. 14 is a detail view of a portion of the record strip.

Referring more specifically to the drawings, the numerals 10, 11 and 12 denote respectively the first, second and third steps of a car platform and the said steps are supported by means of rods 13 and 14 which are pivoted at one of their ends to the car platform at opposite sides of the steps and extend therebeneath and through bearing brackets 15 upon the under side of each step. The rod 13 is bent at a point adjacent the middle of the step to extend downwardly and thence laterally as at 16 and is provided with a lug 17 which rests upon a bellows 18, there being one of such bellows mounted beneath each of the steps. It will be seen from the above that the rod 13 is supported by the bellows in position to support the side of the step at which it is located, and secured to the rod and extending upwardly therefrom and beneath the adjacent end of the rod 14 is a helical spring 19 which serves to hold the last named rod in spaced relation to the first-named rod and which aids in supporting the said last-named rod 14, the major weight of the rod being borne by a spring 20 which is arranged beneath the same upon the support for the bellows 18. The bellows 18 is provided with the usual valve 21 and this valve is of such size that when the bellows is compressed by the weight of a person upon the step beneath which it is located, it will expand very slowly to prevent the circuit

formed being broken, until the person has reached the step above, in a manner to be hereinafter described.

Mounted beneath the middle step are contact arms 22 and 23 and spring contact arms 24 and 25 which are designed to contact with the arms 22 and 23 respectively when each step is depressed, and the contact arms 24 and 25 are normally in contact with contacts 24′ and 25′ respectively. The contact arms 22 are of less height than the arms 23 and hence it is necessary for a greater weight to be thrown upon the step to cause the arms 24 to contact with the arm 22 than is necessary to cause the arm 25 to contact with the arm 23. Leading from the arms 22, 23, 24 and 25 respectively are wires 26, 27, 28 and 29, and leading from the arms 24′ and 25′ respectively are conductor wires 32 and 33. In order that the contact arms 24 and 25 will be held in engagement with their arms 22 and 23, I provide a pair of detents 38 and 39 which are arranged, when the step is depressed to engage the proper contact arms 24 or 25, as the case may be, the said detents including each a pair of arms, one of which is notched for engagement with the corresponding contact arm as above stated, and the other of which rests at its free end upon the adjacent edge of the step, this last-named arm being indicated by the numeral 40. By reason of the location of the arm 40, the detents will be released from the contact arms as soon as the step has resumed its normal position.

Supported above the bellows beneath each step is a spring contact arm 36 and this arm is connected with the bellows in such a manner that when the bellows is compressed the arm will contact with a contact arm 37. Conductor wires 36′ and 37′ lead from these arms respectively.

The system embodying my invention includes a switch system which will now be described. The said system includes coils 41 and 42 which are placed upon a suitable base 43 and which have the ends of their cores opposing each other; coils 44 and 45 which are placed in similar relative position with respect to each other; and coils 46 and 47. Pivoted upon the base 43 and extending between the opposing ends of the coils 41 and 42 is an armature 47, the said armature having its end extended beyond the coils 41 and 42. Arranged upon the base 43 upon opposite sides of the end portion of said armature, are contact members 48 and 49, which are connected respectively with the coils 41 and 42 by means of wires 50 and 51. Pivoted to the base 43 and extending between the opposing ends of the cores for the coils 44 and 45, is an armature 51′ and arranged upon opposite sides of the said coils are contact members 52 and 53, and 54 and 55, the said members of each pair being located upon opposite sides of the armature 51′. For the coil 46 an armature 56 is provided and upon opposite sides of the armature and upon the base 43 are arranged contact members 57 and 58 and a similar armature 59 is provided for the coil 47′, the last-named armature being arranged for contact with contact members 60 and 61 and being normally in contact with the member 61. The armature 56 normally contacts with its contact member 57.

The numerals 62 and 63 denote a pair of binding posts which are located at a suitable point upon the base 43 and connected with the said posts respectively are wires 64 and 65 which lead from the coils 41 and 42. Leading from the post 62 to the coil 47 is a wire 66 and connecting the post 63 and the coil 46 is a wire 67. Leading from the contact members 48 and 49 to the contact members 57 and 61 respectively, are wires 68 and 69.

Before the operation and purpose of the switch mechanism above described can be stated, it will be necessary to describe the remaining mechanisms of the system. The system, as has been stated, includes whole and half-fare checking mechanisms and one of these mechanisms will now be described, it being understood that the mechanisms are identical in construction and that hence a description of one will suffice for both. The said mechanism comprises coils 70 and 71 which are mounted upon a suitable bracket 72 upon the base 43 and mounted upon the said base in position to contact with the coils is an arm 73 carrying at its upper end an armature 74 which contacts with the cores of the coils 70 and 71. Journaled between the brackets 72 and the base 43 is a toothed wheel 75, which, for a purpose to be hereinafter described is provided in its periphery with a notch 76. The arm 73 is provided intermediate its lower and upper ends with oppositely extending arms 77 and 78 to the ends of which are pivotally connected pawls 79 and 80 respectively which are designed for engagement with the teeth of the toothed wheel 75 to move the same when arm 73 is rocked. The ends of the pawls opposite to their ends for engagement with the toothed-wheel 75 are provided with armatures 81 and 82 respectively which are designed for contact at times with the cores of coils 83 and 84 respectively which are mounted at suitable points upon the base 43. A spring 85 is connected at each of its ends to the pawls 79 intermediate their pivot point and their armatures and serves to normally hold the said pawls with their armatures normally out of engagement with the respective cores of the coils 83 and 84 and also serve to hold the opposite ends of the pawls out of engagement with the toothed wheel 75 and in order to prevent the teeth engaging ends of the pawls from being spread to too great an extent, I

have provided upon the base and adjacent the said end of each pawl a bracket 85′ which serves to limit their movement.

Pivotally mounted between a bracket 86 and the base 43 is an arm 87 which is provided at one of its ends with a tooth 88 for engagement normally with the teeth of the wheel 75. A coil 89 is mounted upon the base in position for the arm 87 to contact therewith and the said arm is provided at its end adjacent which the coil is located, with an armature 90 which is designed to contact with the core of the coil. Mounted upon the base in position to contact with the armature upon the arm 87 when the armature is in contact with the core of the coil 89, are contact members 91, 92 and 93 and arranged upon the base in position to contact with the arm when the same is out of contact with the core of the coil above mentioned and in engagement with the toothed-wheel 75 is a contact member 94. Secured upon the coil 71 is a contact strip 95 which has one of its ends extended beyond the corresponding end of the coil and bent to extend downwardly and in position to contact with the core thereof, and secured to the said coil and extending therebeyond at one of its ends is a second contact strip 96 which has its end turned laterally as at 97 to extend transversely of the downturned end of the strip 95, the said end of the strip 95 being normally in contact with the laterally turned end 97 of the strip 96. Connecting the strip 95 and the coil 70 is a wire 98 and connecting the coil 70 and the coil 71 is a wire 99. A wire 100 is connected at one of its ends to the strip 96 and at its opposite end to the coil 89 and a wire 101 connects the arm 87 and the coil 71. As a matter of convenience binding posts 102, 103, 104, 105, 106 and 107 are provided upon the base board 43. A wire 110 leads from the coil 83 to the binding post 102 and from the said coil there is extended a wire 111 to the binding post 103. A wire 112 connects the binding post 103 and contact member 93 and connecting the contact member 91 and the binding post 107 is a wire 113, there being also a wire 114 connecting the contact member 92 with the binding post 104. A wire 115 connects the binding post 107 with the coil 89. A wire 120 connects the binding post 106 with the coil 84 and the said coil is also connected by means of a wire 121 with the binding post 104. Connecting the binding post 105 and the contact member 94 is a wire 122.

A mile indicating mechanism is included in the registering system and comprises coils 123 and 124 which are mounted upon a suitable bracket 125 upon the base-board 43 and mounted for rocking movement upon the base is an arm 126 carrying at its upper end an armature 127 which is designed to contact with the cores of the coils 123 and 124. Secured upon the coils 123 is a contact strip 128 which has its end downturned as in the case of the contact strip 95 and in position to contact at times with the core of the coil 123 upon which it is located and a second contact strip 129 is also secured upon this coil and has its end corresponding to the downturned end of the strip 128 turned laterally as at 130 and normally in engagement with the said end of the strip 128, it being understood that when the armature 127 is attracted to the cores of the coils 123 and 124, the downturned end of the strip 128 will be moved out of contact with the end 130 of the strip 129 and into contact with the end of the core of the coil 123. Journaled for rotation beneath the said coils is a toothed wheel 130 which as in the case of the wheel 75, is provided in its periphery with a notch 131, and pivotally mounted for rocking movement adjacent the said wheel and in position to engage the same is an arm 132, the said arm being provided at its end opposite to that which engages the wheel 130 with an armature 133 which is designed at times to contact with the core of a coil 134 supported upon the base 43. The arm 126 is provided with oppositely extended arms 135 and 136 and pivotally connected with each arm at its end is a pawl 137 and 138 respectively, the said pawls being designed for engagement at one of their ends with the toothed wheel 130 and provided at their opposite ends with armatures 139 and 140 which contact with the cores of coils 141 and 142 respectively which are mounted upon the base-board 43.

A spring 143 connects the pawls 137 and 138 at their ends at which the armatures 139 and 140 are located and serves to hold the said pawls with their armatures out of contact with the cores of the respective coils and their opposite ends out of engagement with the toothed wheel 130.

A wire 144 connects the coil 142 with the coil 141 and a wire 145 forms a junction with the wire 144 and extends to and is connected with the coil 123. This coil is also connected by means of a wire 146 with the contact strip 129 thereon and connecting the contact strip 128 upon the said coil and the coil 124 is a wire 147, this coil being connected by means of a wire 148 with the coil 134. A wire 149 leads from the coil 134 to the arm 132 and arranged upon the board in position to contact with the armature 133 upon the said arm when the armature is attracted to the core of the coil 134, are contact members 150 and 151. For a purpose to be presently explained, wires 152 and 153 lead respectively from the contact member 150 and the coil 142.

A transferring mechanism is included in the system and is designed to transfer the results of the checking mechanisms to the

recording mechanism of the system, which latter will hereinafter be described. The said transferring mechanism comprises a system of coils 155, 156, 157, 158, 159, 160, 161 and 162. Pivotally mounted upon the base 43 and in position to contact with the coils 155 and 156 are armatures 163 and 164 respectively and similar armatures 165 and 166 are provided for the coils 157 and 158. Mounted upon the base-board and extending between the coils 159 and 160 is an armature 167 which is designed for contact alternately with the cores of the said coils. An armature 168 is mounted upon the base-board 43 in position to contact with the core of the coil 161 and arranged to contact with the said armature when the same is attracted to the said core, is a contact member 169 and to contact therewith when the armature is out of engagement with its core is a contact member 170, there being a second contact member 170′ arranged to contact with the armature 170 when the same is attracted by the core. Upon the base-board and upon opposite sides of the armature 167 are arranged contact members 171 and 172 which are designed to contact with the said armature when it is in contact with the core of the coils 159 and 160 respectively. Contact members 173 and 174 and members 175 and 176 are positioned for contact respectively with the armatures 163 and 164 and the armatures 165 and 166, the contact members 173 and 174 being arranged for contact with their respective armatures only when the said armatures are against or in contact with their respective cores and the members 175 and 176 are designed to contact with their respective armatures when out of engagement with the cores of the coils 157 and 158. An armature 177 is arranged for contact with the core of the coil 162 and simultaneously with a contact member 178 and for contact with a contact member 179 when out of contact with the core of the said coil. A contact member 180 is arranged to contact with the member 178 when the armature 177 is in contact with the core of the coil. Wires 181 and 182 lead from the armature 165 and 166 respectively to the coils 155 and 156 and leading from the coils 157 and 158 are wires 183 and 184 and leading from the last-named coils are wires 185 and 186 which connect with the coils 159 and 160 respectively. A wire 187 leads from the primary winding of the coil 160 to the contact member 171, and a wire 188 leads from the secondary winding of the coil 159 to the contact member 172. The contact members 171 and 172 are connected respectively with the armatures 164 and 163 by means of wires 189 and 190.

The contact members 173 and 174 are connected with the armature 167 by means of wires 192 and 193 respectively. A wire 194 is connected at one of its ends with the contact member 58 and at its opposite end to the coil 161 and connecting this coil with its armature 168 is a wire 195. A wire 196 also leads from the said armature and is connected with one pole of a battery 197 and from the other pole of the battery leads a wire 198, the connection for which will be presently described. Leading from the contact member 60 to the contact member 180 is a wire 199, there being a branch wire 199′ leading from the wire to the coil 162 and connecting the armature 177 to the coil 162 is a wire 200. A wire 203 leads from the contact member 178 and forms a junction with a wire 204 which leads from the contact 170 to the battery 197. A wire 205 connects the contact members 151 and 175. The contact members 54 and 55 are connected respectively with binding posts 102 and 106 by means of wires 207 and 208 and connecting the coils 44 and 45 with the binding posts 104 and 103 respectively are wires 209 and 210. For a purpose to be presently explained a wire 212 leads from the armature 56.

The recorder for the device comprises a bracket 214 upon which is mounted coils 215 and 216 and in advance of the bracket and upon the base 43 is mounted a rocking arm 217 provided at its upper end with an armature 218 designed to contact with the cores of the coils 215 and 216. A bracket 219 is mounted upon the base 43 and intermediate the bracket 214 and the rocking arm 217 and pivotally connected at one of their ends to the bracket 219 at its upper end is a series of arms, the said arms being indicated by the numerals 220, 221, 222, 223, and 224. The arms extend through a slot formed in the rocking arm 217 for a purpose to be hereinafter described and mounted upon the base-board 43 of the system and beneath the ends of the said arms are coils 225, 226, 227, 228 and 229 respectively, each of the said arms being provided at its free end with an armature 230 for contact with the core of the respective coil above which it is arranged. The bracket 219 is provided with a diagonal slot 231 and secured to the face of the upstanding portion of the bracket is a plate 232 which is provided with a diagonal series of openings 233 which are in alinement and registration with the slot 231 in the said bracket. The plate 232 is provided at its lower end and at each side thereof with apertured ears 233′ and pivoted at their lower ends between the said ears is a series of punching-bars 234 and upon the edge of each bar opposing the plate 232 is formed a punching stud 235 which is designed to enter the corresponding opening in the plate 232 to perforate a strip of paper or other material which is fed across the said plate in a manner to be hereinafter described. Arranged for vertical

movement in the slot formed in the rocking arm 217 is a corresponding series of bars 236 which are provided at their upper ends each with a finger 237. A series of springs are secured at their lower ends to a cross-piece 238 and are thence bent to extend upwardly and inwardly beneath the corresponding bars 236 and with their ends in engagement with the punching-bars 234, the movement of these bars being limited by a yoke member 239 carried by the rocking arm 217. From the above it will be seen that when any one or combination of the arms 220, etc., is attracted by its respective coil, the corresponding bar 236 will be depressed to cause its finger to seat against the adjacent edge of the corresponding punching bar 234 and that when the armature 218 is attracted by the cores of the magnets of the coils 215 and 216, the arms 217 will be rocked and the said punching bar will have its stud forced through the corresponding opening in the plate 232, it being understood that the remainder of the punching bars 234 will not be forced with their studs through the openings in the plate for the reason that the fingers upon the bars 236 in rear of the said punching bars will remain above the upper end of the said bars.

The mechanism for moving a strip of paper or other material across the face of the plate 232 comprises a pair of spools indicated by the numerals 240 and 241 which are mounted one upon each side of the bracket carrying the said plate. The spool 241 is engaged upon a spindle 242 and is held in accidental disengagement therefrom by means of an arm 243 which extends upwardly from the base 43 and is bent laterally to engage at its end the upper end of the said spindle, the said spindle being beveled at its said end for engagement in a notch 244 formed at the end of the said arm. To maintain a tension upon the paper, a spring finger is connected at one of its ends to the arm 243 and bears at its opposite end against the rolled paper upon the spool 241. The spool 240 is also mounted upon a spindle and is provided at its lower end with a ratchet wheel 245. Mounted upon the base 43 for horizontal rocking movement is an arm 246 with which is pivotally connected one end of a pawl 247, the said pawl being provided at its opposite end with a tooth 248 for engagement with the teeth of the ratchet-wheel 245. A spring 249 serves to normally hold the pawl in engagement with the said teeth and for this purpose is connected at one of its ends to the pawl and at its opposite end to the arm. Coils 250 and 251 are mounted upon the base 43 in position for contact therewith of the end of the arm 246, the said arm being provided at its free end and for this purpose with an armature 252. Secured to the coil 216 and extending at one of its ends beyond the corresponding end of the coil is a contact strip 253 which has its said end turned downwardly as at 254 in position for contact at times with the core of the coil upon which it is engaged. A contact strip 255 is also secured upon the said coil and has a laterally extending end portion 256 with which the downturned end 54 of the strip 216 is normally in contact. The said end 254 of the contact strip 253 is however arranged to be moved at times into engagement with the core of the coil 216 when the armature for the said coil is attracted thereto as in the case of the similar contact strips heretofore described in connection with the checking mechanisms. In order that the rocking arm 217 will be normally held with its armature out of engagement with the cores of the coils 215 and 216, I have provided a spring 257 which is secured at one of its ends to the bracket to which the coils are attached and bears at its free end against the said arm.

Wires 258, 259, 260, 261 and 262 extend from the coils 225, 226, 227, 228 and 229 respectively and are connected with the coil 215, this coil being also connected by means of a wire 263 with the coil 216. The contact strip 253 is connected directly with the last-named coil and the contact strip 255 is connected by means of a wire 264 with the coil 251, the coils being mutually connected by means of a wire 265. A wire 266 leads from the coil 250 to the contact member 176 of the transferring mechanism.

Leading from the contact member 52 and connected with the coil 225 is a wire 267 and connecting the coil 227 and the coil 141 is a wire 268, and connecting the coil 229 and the contact member 53 is a wire 269. The numeral 271 denotes a battery and leading from one pole of the battery is a wire 270 and connected with the other pole of the battery are wires 272 and 273 which lead respectively from the coils 46 and 47′.

The mile checking mechanism of the recording system comprises a base 275 upon which is rotatably journaled a shaft 276 and upon which is mounted a pulley 277, the said pulley being designed to be geared to one of the axles of the car in connection with which the system is used. Upon the shaft 276 at one side of the pulley 277 is a pinion 278 which meshes with a pinion 279 journaled in a suitable frame 280. Upon the shaft which carries the pinion 279, there is also arranged a pinion 281 which is in mesh with a pinion 282 upon a shaft 283. Upon a shaft 284 which is journaled in the said frame 280 is located a pinion 285 which meshes with a pinion 286 upon the shaft 283. Upon the shaft 284 is located a pinion 287 and meshing with this pinion is a pinion 288 which is journaled upon a shaft 289, the latter being mounted in the said frame.

Secured at one of its ends to a bracket 290

and extending from the said bracket through a bifurcation formed in the upper end of a bracket 291 is a spring arm 292 and hingedly connected with the said arm at its free end is a plate 293. The said plate is cut away to form spaced portions 294 and is adapted to lie in parallel relation with the pinion 288 with one of its spaced portions above and the other below the shaft 289 upon which the pinion is mounted. The plate 293 is maintained in this relation with respect to the pinion 288 by means of a bracket 294′ which is secured upon the base 275 and has its upper end directed at right angles to its upstanding portion as at 295 and in engagement with the plate 293 at its point of hinged connection with the arm 292. Each of the spaced members of the plate 293 is recessed as at 296 at a corresponding point upon its edge opposing the other of the said spaced portions. A spring arm 297 is secured at one of its ends to the frame 280 and is provided at its free end with an armature 298 which is designed at times for contact with the core of a coil 299 which is mounted upon a suitable bracket 300 upon the base 275. Mounted upon the said base and in position to be engaged at times by the hinged end of the plate 273 is a spring contact member 301 and mounted adjacent the said member and upon the said base is a similar contact member 302. This last-named member has its upper end bent at right angles as at 303 and is notched as at 304 in the edge of its said bent portion, the spring contact member 301 being designed for engagement in the said notch in the member 302 when moved by the plate 293. After being so engaged, the coil 299 is energized to attract the armature 298, and as this energization of the coil is practically instantaneous, the armature will spring back to its normal position with sufficient force to cause disengagement of the member 301 from the member 303. The pinion 288 is provided on its side adjacent the plate 293 with a lug 306 which is designed, when the pinion is rotated, to move along the opposing edges of the spaced portions of the plate 293 and to engage in the notches formed therein and draw the said plate in a direction from the contact members above described. As soon as the lug becomes disengaged from the notch in the edge of the spaced member, the plate is moved by the spring arm 292 into engagement with the spring contact member 301 to move the same into engagement with the notch formed in the right angularly bent portion 303 of the spring contact member 302 and the said spring contact member 301 is held in this position until the contact member 302 is energized to cause the spring arm 297 to contact therewith and release the member 301.

A collar 307 is slidably engaged upon the shaft 276 and connecting the said collar and the pulley upon the shaft is a pair of spring arms 308 which are provided intermediate their ends with weights 309. Hinged to a standard 310 is an arm 311 which is slotted for the engagement therethrough of the shaft 276, and the said arm is designed to abut the collar 307 upon the said shaft and to be held in this position by means of spring contact members 313 and 314 which bear at their upper and free ends against the said arm intermediate its free end and shaft 276. Arranged upon the base for this portion of the system and in position to contact with the member 313 is a contact member 315 and a contact 316 is normally in contact with the member 314, it being obvious that when the train is in motion and the pulley 277 rotated, the arms will be spread by reason of the weights thereon and the above mentioned spring contact members 313 and 314 be permitted to move from their normal position, the member 315 being designed to be engaged by its respective contact member and the member 314 being released from contact with its respective member.

While in contact with the member 316, the free end of the arm 311 contacts with a contact arm 319 and when the arm 311 is moved, the arm breaks its contact with the member 319 and contacts with a similar member 320 upon the base and at the opposite side of the arm to the member 319. A wire 321 leads from the contact member 313 and connects with the coil 299, and a wire 322 leads from the contact 314 to one pole of the battery 197. The wire 152 is also connected with the contact 314 and a wire 323 leads from the contact member 302 and is connected with one binding post of a battery 323′ and connected also with the battery is a wire 324 which leads from the contact 316. The coil 299 is connected with the contact 301.

Wires 328 and 329 are connected respectively with the armatures 47 and 59 and leading from the batteries 330 and 327 respectively are wires 325 and 347. A wire 331 leads from the battery 327 and connects with the binding post 63 and a wire 332 forms a junction with this wire and is connected with the armature 177.

A wire 333 is joined with the wire 196 and is connected with the binding post 62 and also with a battery 334, from which battery leads a wire 335. A battery 336 has wires 337 and 338 leading therefrom and connected to the arm 311 and the armature 176 respectively. A wire 339 is joined with the wire 268 and leads to the contact 319 and a wire 340 connects the contact 320 and the armature 51. A wire 341 leads from the binding post 106 and a wire 342 leads from the contact 169. The wire 194 is connected with a contact 343 by means of a branch wire 344. A wire 345 leads from the contact 179.

A wire 347 leads from the battery 327 to-

gether with the wire 326, to the contact 36 and 37 for the bottom step and the wires 212 and 335 lead to and are connected with contacts 36 and 37 for the top step. The wires 26 and 27 which lead respectiveiy from the contacts 22 and 23 are connected with the wires 321 and 322 respectively, and the wires 28 and 29 which lead from the contact arms 24 and 25 respectively are connected, one with a wire 348 which leads to the binding post 102, and the other to the wire 345.

From the foregoing it will be observed that when a passenger, either a child or an adult, steps upon the bottom step a circuit will be formed through the switch system to bring into circuit the full and half-fare checking mechanisms, and when the middle step is stepped upon, one or the other of these checking mechanisms will be operated according to the amount of weight thrown upon the step, and when the top step is reached the circuit made by stepping upon the bottom step will be closed. For example, should an adult passenger board the train, the gear wheel of either the full or half-fare checking mechanism, as the case may be, will be rotated one notch or degree and if this passenger leaves the train before it starts, pressure upon the top step will close a circuit through the switch mechanism to bring into circuit the full and half-fare checking mechanism and when the second step is stepped upon the gear wheel of one or the other of these mechanisms will be rotated backwardly one notch, thereby discounting the passengers. In other words, should six passengers board the train and two of them leave the train before it starts, the gear wheel will first be turned in one direction six degrees and then in the opposite direction two degrees, leaving four degrees as the number of passengers remaining in the train out of the six. As soon as the train starts, however, the recording mechanism will be cut into circuit with the full and half-fare checking mechanisms as will a so the mile checking mechanisms so that the armatures included in the transfer mechanism and corresponding to the several checking mechanisms will be oscillated a number of times equal to the number of teeth the wheels of the several checking mechanisms have been moved beyond their notches and until the notch-engaging arm of each mechanism has seated itself in its respective notch, at which time the transfer mechanism will be cut out of circuit. The movement of the armature of the transfer mechanism serves to make and break the circuit in the registering mechanism to operate the punches included therein the proper number of times, as will be readily understood.

The operation of the system is as follows. When the first step is depressed, a circuit is formed from the battery 327 over a wire 326 to switch 59, from this switch 59 on line 69 to coil 42, from the coil 42 on wires 65 and 331 to battery. The energization of the coil 42 will serve to bring switch 47 in contact with contact point 49. When the second step is depressed circuit is formed from battery 330 over wires 325 and 328 to switch 47, from switch 47 through coil 42 over wires 65 and 67 to coil 46, thence from coil 46 over wire 272 to battery. Coil 42 holds circuit with the second step after first step has been released. Coil 46, when energized, brings switch 56 into contact with contact point 58. When the third step is depressed, the circuit is closed through the battery 334, over wire 212 to switch 56. This switch being in contact with pin 58, current will flow over wire 194 to coil 161, from coil 161 over wires 195 and 196, to battery. Coil 161 brings switch 168 into contact with point 169. Switch 168 releases spring 170 which permits it to come in contact with the point 343 thus forming a circuit through battery 197 through checking mechanism as will be presently explained. Should passengers be going the other way on the steps or in other words be descending the steps the above circuits will be reversed and the final circuit will flow over wire 199 to coil 162 working the same as it did at coil 161.

The checking mechanism is so constructed that it will check up the number of passengers that board or leave a train at each stop and will discount or subtract all even numbers. For example, we will suppose that two passengers board a train and one leaves the train before it starts; there will be only one point or degree to recheck the register. When switch 168, mentioned above, comes in contact with point 169, the circuit is closed through battery 197, wire 204, spring 170 on point 343, over wire 344, through coil 161, over wire 195, from switch 168 on point 169, thence from wire 322 to switch 24. If the weight exceeds a certain amount on the second step, the current will flow over wire 348, to post 102, thence over wire 110 to coil 83, wire 111 to post 103, and if the lever 87 is in the deep notch in the wheel with which it coöperates, current will flow over wire 210 to coil 45 and thence from this wire to post 105 over wire 122 to lever 87; from thence flowing to coils 70 and 71 which are connected by wires 98 and 99. The current will then flow over wire 100 to coil 89, thence to post 107, to contact members 314, and 316 and finally over wire 198 to battery. After the lever 87 moves from engagement in the deep notch, the current is broken with the contact member 94 and subsequently formed through contact members 91, 92 and 93 there being circuit through the coils 44 and 45 only while levers 87 is in the said notch, as will be presently explained. While lever 87 is in the shallow notches, the circuit is closed through wire 112 to lever 87 in the same man-

ner as when closed over wire 122 as heretofore described. Coil 89 when energized, withdraws lever 87 from engagement with the notch permitting wheel to turn and coil 83 bring lever 79 in contact with the notches. Coils 70 and 71, when energized, exert a pull upon lever 74 which serves to turn the wheel to the right.

If a number of passengers ascend the steps and a greater number descend, the wheel will turn in the opposite direction or to the left and to a degree past the deep notch therein. After lever 87 seats in the said deep notch coil 44 will be energized and will bring switch 51′ into contact with points 52 and 54 where it remains as long as lever 87 is in shallow notches. This switch 51′ will keep the rechecking circuit in the opposite side of the checking machine. After the train starts lever 311 at mile register comes in contact with point 320 which closes the circuit from battery 336, rechecking to main register the number of passengers that got on or off the train at last stop. The current will flow over wire 337 on lever 311 to point 320, over wire 340 to switch 51′ and from switch 51′ on point 54 or 55 as either case may be. If switch 51′ is in contact with point 54, the current will flow over the wires 207 and 110 to coil 83, from coil 83 over wires 111 and 112 to lever 87 and thence through coils 70 and 71 to coil 89. From coil 89 the current will flow to contact member 91 and from this contact member to contact member 175 over the switch 165, the current then flowing to coils 156, 158 and 160 and thence over wire 187 to switch 167, over wire 338 to battery. When energized, coil 156 retracts the switch 164 and brings it into contact with point 174. Coil 160 brings switch 157 in contact with point 172 where it remains until the circuit has been maintained through the register a sufficient length of time to produce the proper results. Circuit being broken at the point 171 and formed at the point 174, the current will flow through switch 165, coils 156, 158 and 160, over wires 187 and 189 to switch 164 and thence over wires 193 and 338 to battery. When coil 158 is energized it disconnects switch 166 from contact point 176 which prevents any circuit being closed to register until the checking mechanism has made one stroke. After the checking of the mechanism has made one stroke, the circuit is broken by lever 74 which falls into contact with members 95 and 96 which releases switches 164 and 166. The circuit is in this manner closed through the switch 51′ in the same manner as while working through the checking mechanism. Currents will flow over switch 51′ on either point 52 or point 53 which ever may be the case and if on point 52, circuit is formed over wire 267, coil 225 thence to coils 215 and 216, coils 260 and 261. Coil 225, when energized, attracts the lever 220 and brings it into contact with a slide which moves over a punch which is forced through a strip of paper by a lever 218 which is attracted by coils 215 and 216. When coils 250 and 251 are energized lever 246 is brought into contact with a toothed roller which draws paper across the register plate after lever 218 has made one stroke. At this time the circuit is broken between contact members 253 and 255 and before lever 218 makes its stroke the current flows over wire 266 to point 176 through switch 166 to coils 155, 157 and 159, working the same as in the case of the coils 156, 158 and 160. After the circuit has been broken at the register, switch 167 is left in contact with point 171 thereby closing a circuit through the checking machine and after the checking machine has rechecked all the numbers to register and lever 87 seats in deep notch, circuit is broken with the contact member 91. The half-fare checking mechanism has the same circuits as the one which has been described.

While the train is standing still the number of passengers are checked up on the whole or half fare checking mechanisms and the one for the miles rechecked to register. The mile registering mechanism is operated under the car and is so constructed that it will open and close the circuits for the checking mechanism. While the train is in motion lever 311 is held in contact with point 320 which closes the rechecking circuit with the passenger checking mechanisms. The circuit is also closed through the contact members 313 and 135. Each mile traveled by the train results in the closing of the circuit through the contact members 301 and 302 by means of a spring which forms circuit from battery 323 over wire 324 to contact members 314 and 316, over wire 152 to checking mechanism which checks up the entire number of miles. After the train stops, this mechanism will recheck to register the total number of miles traveled. The current flows from contact point 150 which is at all times in contact with lever 132, to coil 134, to coils 123 and 124 over wire 145 to coil 142, over wire 151 to coil 299, over wire 299 to battery. Coil 144, when energized, will raise lever 132 out of notch in its related toothed wheel and coil 142 when energized brings lever 138 in contact with notch. Coils 123 and 124, when energized, draw lever 127 in such manner as to turn wheel to the right while lever 127 breaks circuit between the contact members 128 and 129. Coil 299, when energized, draws and holds spring 298 until circuit is broken at checking mechanism after which spring 298 breaks circuit with contact members 301 and 302 until another mile is made.

After the train stops lever 311 comes in contact with contact point 319 which closes

the rechecking circuit from battery 336 which circuit has heretofore been described. Circuit is closed over wire 337 to lever 311, thence by way of contact point 319 to coil 141, thence over wires 144 and 145 to coils 123 and 124. The current then passes to coil 134, by way of lever 132 to contact point 151 over wire 205 to circuit switch working the same as that explained in the description of the other checking mechanisms. After the lever 127 makes one stroke the circuit is broken between contact members 128 and 129. The switch 167 being in contact with point 172 circuit is now formed through the register over wires 337, 329 and 268 to coil 227. This circuit works through the register and circuit switch the same as heretofore explained except in working the punch.

When lever 132 of the checking mechanism seats in the deep notch, the circuit is broken between lever 132 and contact point 151. The number of miles is then rechecked to register while the train is standing. The number of passengers thereon is rechecked to register while the train is in motion.

It is to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

What is claimed is:

1. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and half fare checking mechanisms being designed to check the number of whole and half fare passengers respectively who board the car, a switch system interposed in the circuit, means operable by pressure upon the steps to close the circuit through the switch system and bring into circuit either the whole or the half fare mechanisms, a transfer mechanism interposed in the circuit and adapted while the car is in motion, to check up the results of the whole and the half fare mechanisms, and a recorder operable through the medium of the transfer mechanism.

2. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and half fare checking mechanisms being designed to check the number of whole and half fare passengers respectively who board the car, a switch system interposed in the circuit, means operable by pressure upon the steps in ascending succession to close the circuit through the switch system and bring into circuit either the whole or the half fare mechanisms and thereby check up the whole or the half fare passengers ascending the steps, said means being operable by pressure upon the steps in descending succession to close the circuit through the switch system and bring into circuit either the whole or the half fare checking mechanism whereby the person descending the steps will be discounted from the number previously checked up, a transfer mechanism interposed in the circuit and adapted while the car is in motion to check up the final results of the whole and the half fare mechanisms, and a recorder operable through the medium of the transfer mechanism.

3. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and the half fare checking mechanisms being designed to check the whole and half fare passengers respectively who board the car, a switch system interposed in the circuit, means operable by pressure upon the lowermost step to close the circuit through the switch system and bring into circuit either the whole or the half fare checking mechanism, means operable by pressure upon the next step above to operate either the whole or the half fare checking mechanism, means operable by pressure upon the next step above to open the circuit and cut the whole or the half fare checking mechanisms out of circuit, a transfer mechanism interposed in the circuit and adapted while the car is in motion to check up the final results of the whole and the half fare checking mechanisms, and a recorder operable through the medium of the transfer mechanism.

4. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and half fare checking mechanisms being designed to check the number of whole and half fare passengers respectively who board the car, a switch system interposed in the circuit, means operable by pressure upon the lowermost step to close the circuit through the switch system and bring into circuit either the whole or the half fare checking mechanism, means operable by pressure upon the next step above to operate either the whole or the half fare checking mechanism, means operable by pressure upon the uppermost step to open the circuit first formed and to open a discounting circuit through either the whole or the half fare checking mechanisms, means operable by pressure upon the next step below, when the last mentioned circuit has been formed, to operate either the whole or the half fare mechanisms to discount the passenger descending the steps, pressure upon the lowermost step resulting in the closing of the circuit last formed, a transfer mechanism interposed in the circuit and

adapted, while the car is in motion, to check up the final results of the whole and the half fare checking mechanisms, and a recorder operable through the medium of the transfer mechanism.

5. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and half fare checking mechanisms being designed to check the number of whole and half fare passengers who board the car and to discount the passengers leaving the car, a switch system interposed in the circuit, means operable by pressure upon the steps to close the circuit through the switch system and bring into circuit and operate either the whole or the half fare checking mechanism, a mile checking mechanism, a transfer mechanism interposed in the circuit and adapted, while the car is in motion, to check up the results of the whole, the half fare, and the mile mechanisms, and a recorder operable through the medium of the transfer mechanism.

6. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and half fare checking mechanisms being designed to check the number of whole and half fare passengers respectively who board the car, a switch system interposed in the circuit, means operable by pressure upon the steps in ascending succession to close the circuit through the switch system and bring into circuit and operate either the whole or the half fare checking mechanism to check up the passenger ascending the steps, said means being operable by pressure upon the steps in descending succession to close the circuit through the switch mechanism and bring into circuit and operate either the whole or the half fare mechanisms to discount the passenger descending the steps, a mile checking mechanism interposed in the circuit, and a transfer mechanism also interposed in the circuit and adapted, while the car is in motion, to check up the final results of the whole, the half fare, and mile checking mechanisms, and a recorder operable through the medium of the mechanisms to record the final results of the several mechanisms.

7. In a system of the class described, the combination with a car including steps, of an electric circuit, a whole fare checking mechanism and a half fare checking mechanism interposed in the circuit, the whole and half fare checking mechanisms being designed to check the number of whole and half fare passengers respectively who board the car, a switch system interposed in the circuit, means operable by pressure upon the steps in a certain order to close the circuit through the switch system and bring into circuit and operate either the whole or the half fare checking mechanism to check a passenger ascending the steps, means operable by pressure upon the steps in a reverse order to close the switch system and bring into circuit either the whole or the half fare checking mechanism and to operate the same to discount a passenger descending the steps, a transfer mechanism interposed in the circuit and adapted, while the car is in motion, to check up the final results of the whole and the half fare checking mechanisms, and a recorder operable through the medium of the transfer mechanisms to record the said final results.

8. In a system of the class described, the combination with a car including steps, of an electric circuit, a passenger checking mechanism interposed in the circuit, a switch system interposed in the circuit, means operable by pressure upon the steps to close the circuit through the switch system and bring into circuit and operate the passenger checking mechanism, a transfer mechanism interposed in the circuit and adapted, while the car is in motion, to check up the final results of the passenger checking mechanism, and a recorder operable through the medium of the transfer mechanism.

9. A system of the class described comprising a recording mechanism, a full and a half-fare checking mechanism arranged to indicate respectively the number of full and half-fare passengers boarding a train, and subtract the number leaving the train, and means for transferring the final records of the checking mechanisms to the recording mechanism.

10. A system of the class described comprising a recording mechanism, a full and a half-fare checking mechanism arranged to indicate respectively the number of full and half-fare passengers boarding a train and to subtract the number leaving the train, and means for transferring the final records of the checking mechanisms to the recording mechanism, the said recording mechanism being arranged to indicate the number of full and half-fare passengers leaving the train after having ridden therein.

11. A system of the class described comprising a recording mechanism, a passenger checking mechanism arranged to indicate the number of passengers boarding a train, a mile checking mechanism, and means for transferring the final records of the checking mechanisms to the recording mechanism.

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

WALTER E. PARR.

Witnesses:
R. R. FARTHING,
ANNA BARNES.