

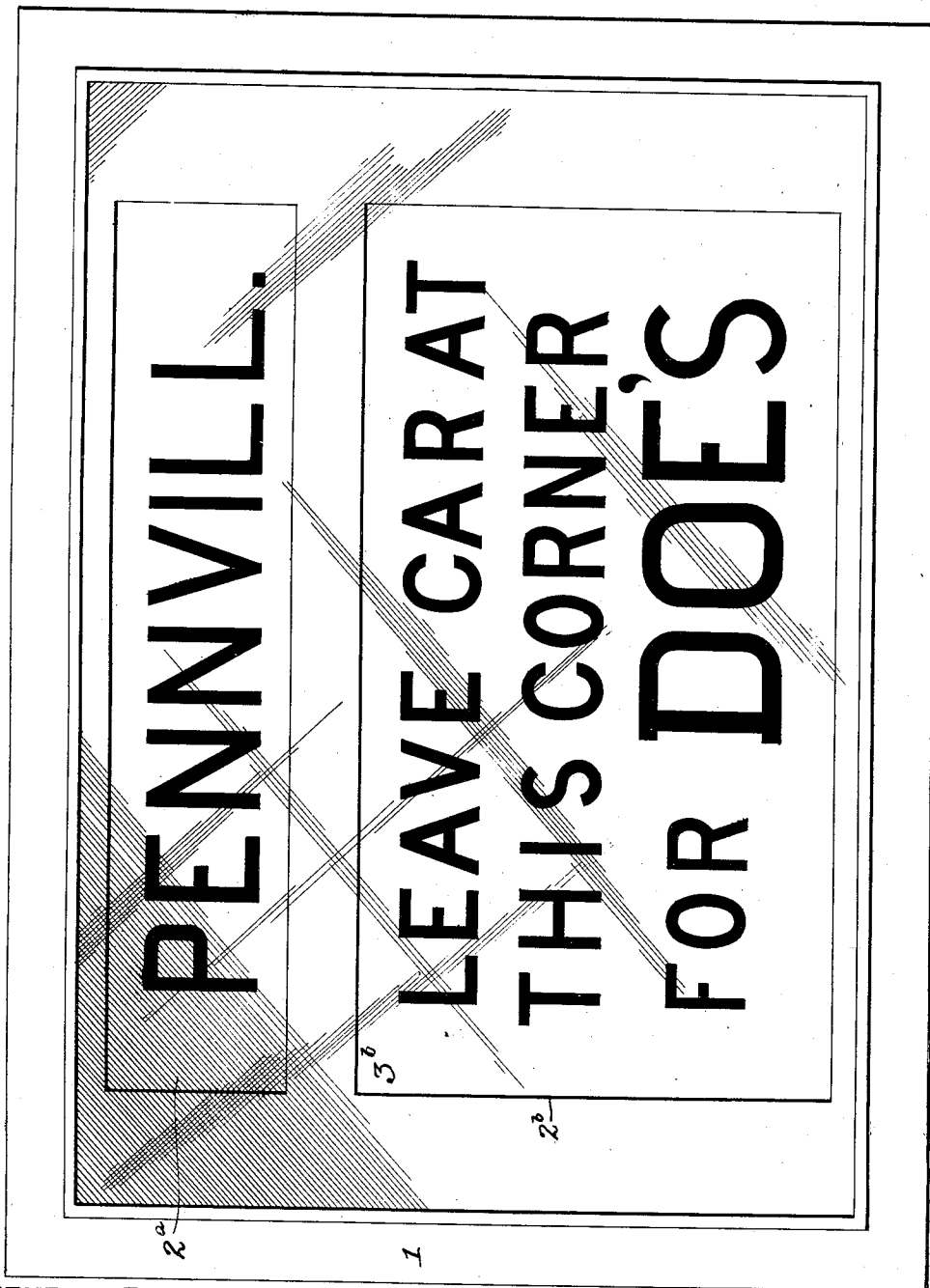
1,007,534.

T. R. CLARK.
DISPLAY APPARATUS.
APPLICATION FILED AUG. 9, 1909.

Patented Oct. 31, 1911.

5 SHEETS—SHEET 1.

Fig. 1



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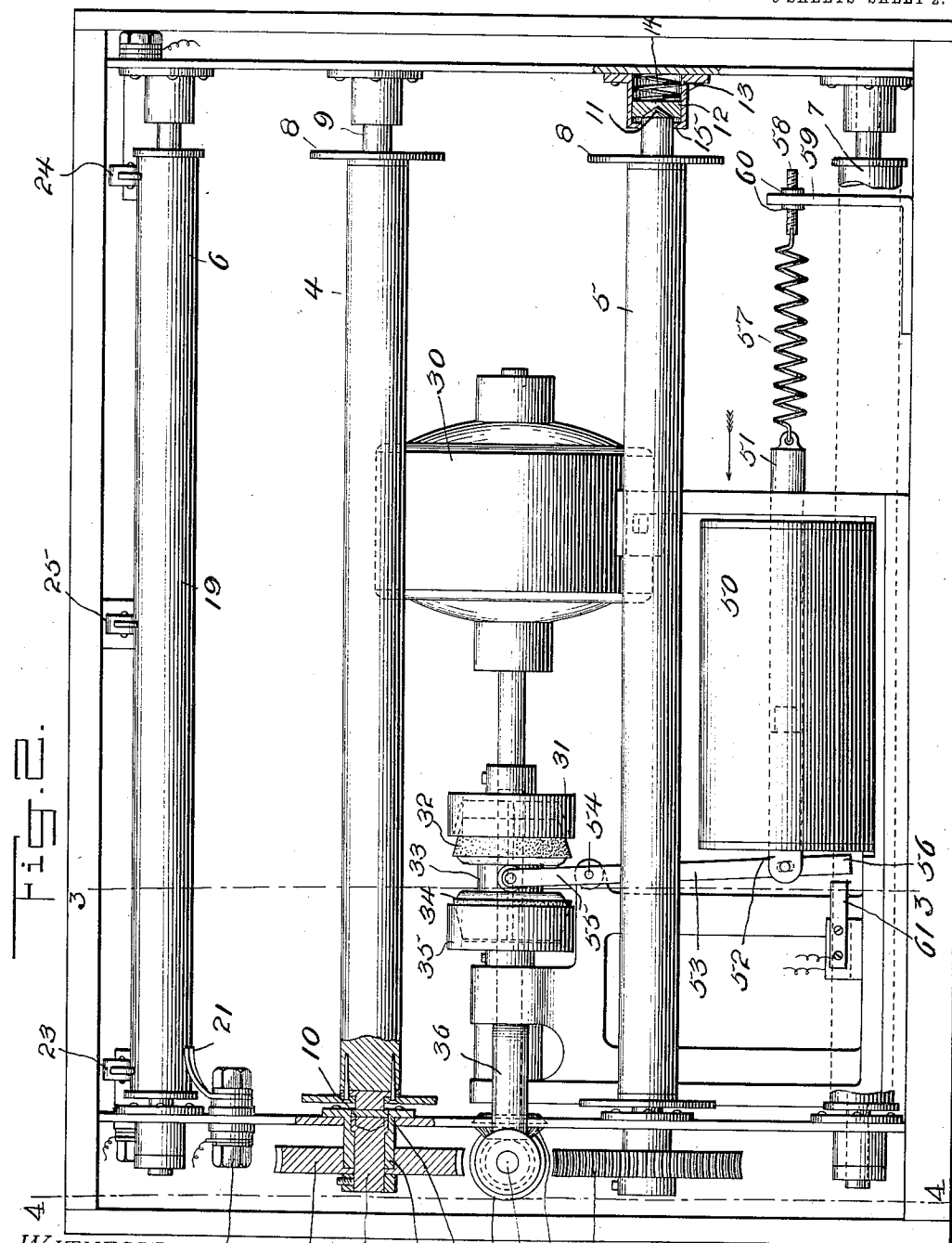
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5 SHEETS—SHEET 2.



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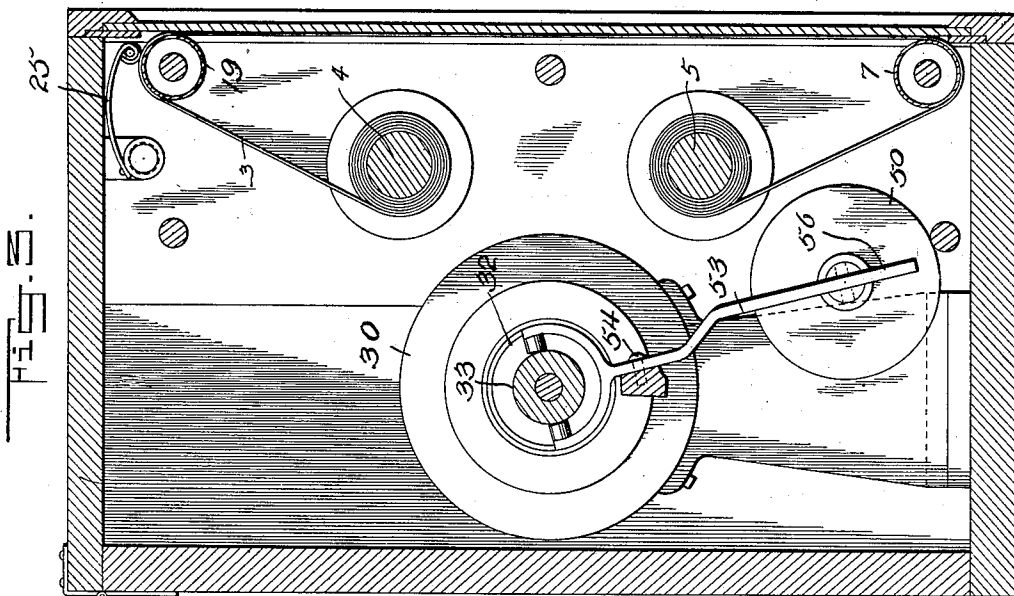
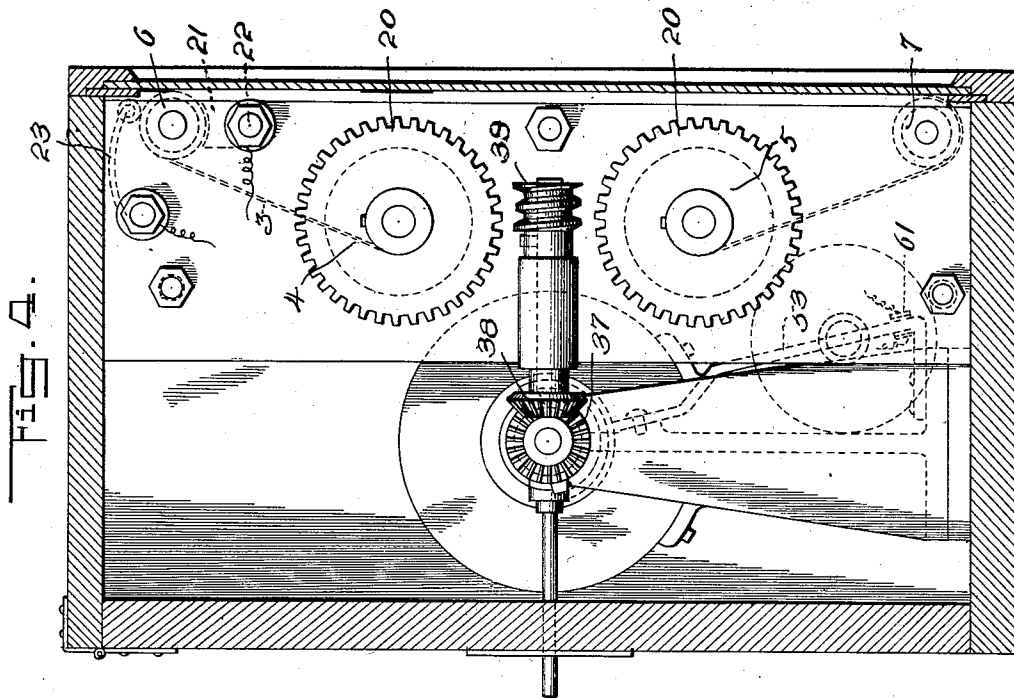
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5 SHEETS—SHEET 3.



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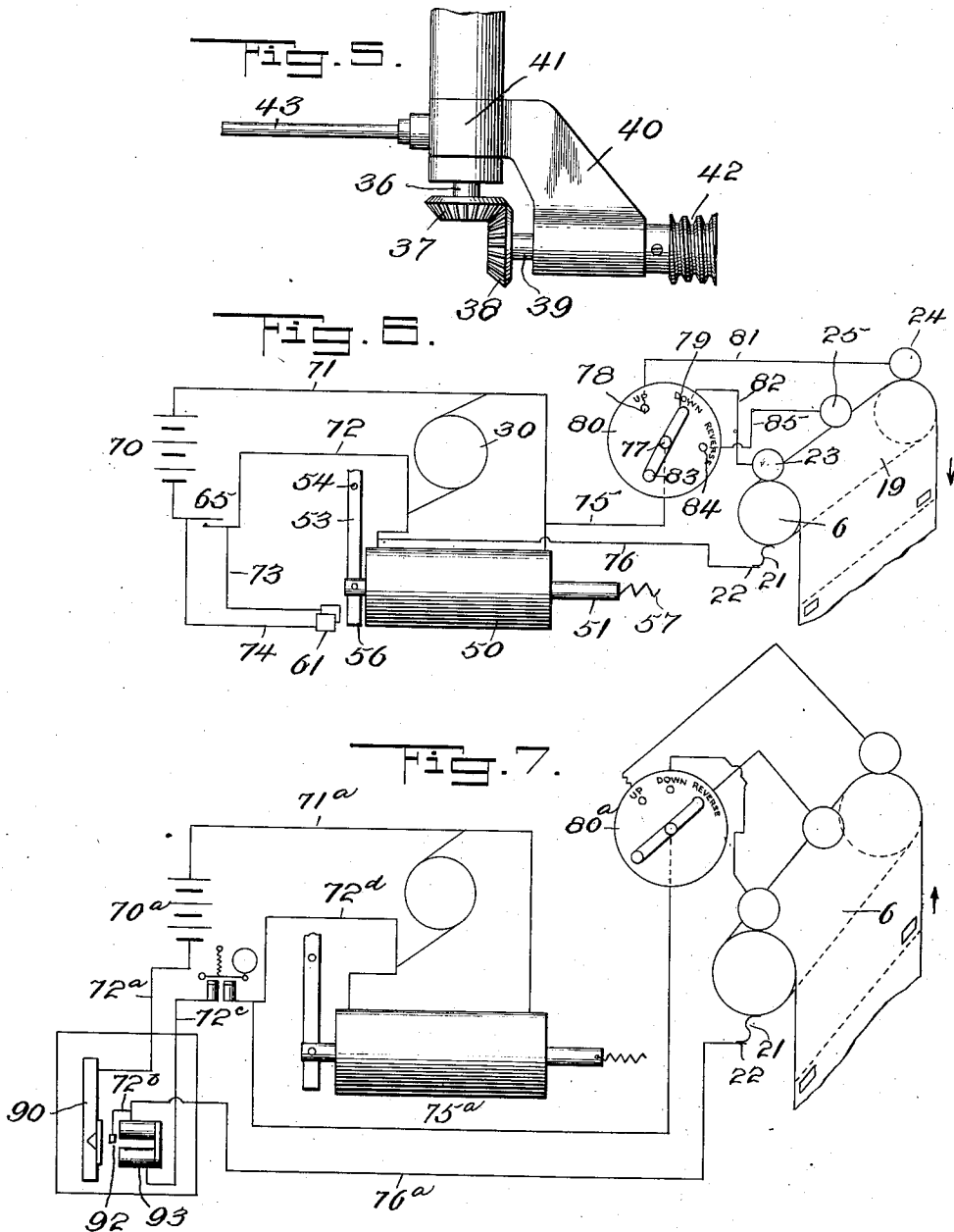
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5 SHEETS—SHEET 4.



WITNESSES:
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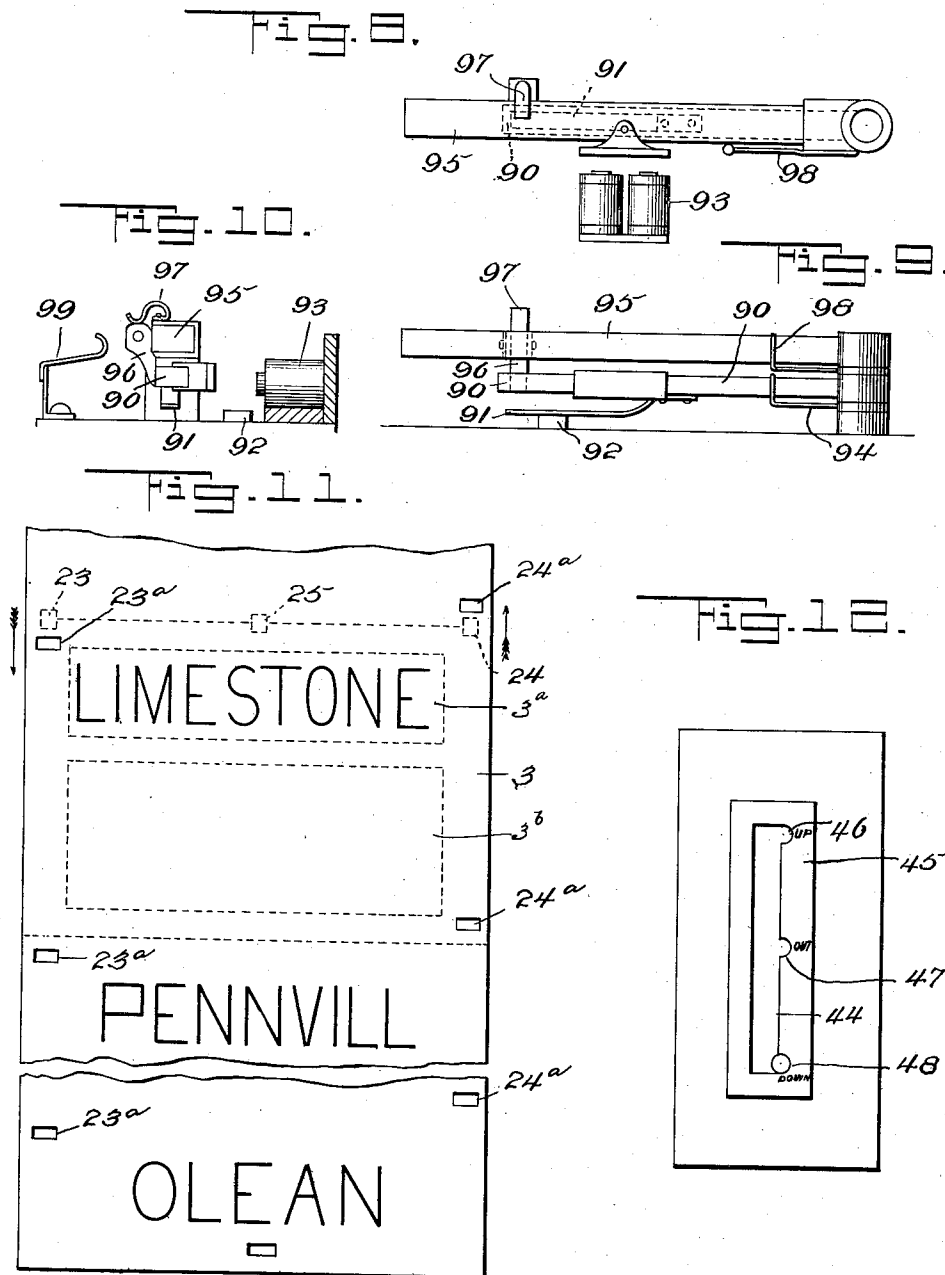
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1,007,534.

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APPLICATION FILED AUG. 9, 1909.

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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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DISPLAY APPARATUS.

1,007,534.

Specification of Letters Patent.

Patented Oct. 31, 1911.

Application filed August 9, 1909. Serial No. 512,021.

To all whom it may concern:

Be it known that I, THOMAS R. CLARK, citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Display Apparatus; 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.

My invention has for its object to provide a display apparatus for exhibiting certain signs or characters carried upon a movable web or sheet, and it has for its object provision of means whereby the web is correctly and accurately operated in a desired manner from a prime motor, without reference to the extent or speed of movement of the prime motor, or of the vehicle upon which the apparatus may be installed, and the provision of means whereby the desired actuation of the web is more certainly obtained when the device is employed as a station indicator, notwithstanding carelessness or inadvertence on the part of the operator, and of means whereby the device when used as a station indicator on a moving vehicle may be more readily adapted to the particular conditions under which the vehicle is operated.

In carrying out my invention I provide an actuating means for the web, which I term for convenience the prime motor, which is totally disconnected from the web at all times except during the actual movement of the web thereby, and I control the duration of actuation of the web by the web itself independently of the speed or extent of movement of the prime motor. The prime motor may be any suitable source of power, and may operate continuously or intermittently provided it is in operation at the time or times that the web is to be actuated. For example, I may employ as the prime motor a shaft, operatively connected with and driven from a suitable source of power and where the apparatus is carried on a moving vehicle this shaft may be driven from the axle of the vehicle or from the motor thereof, or from a motor operated by electricity, compressed air or other power, carried on the vehicle and located outside of the apparatus. The prime motor may

also consist of a motor located within the casing of the apparatus, and may be an electric motor, a spring actuated motor or other type of motor as preferred.

In the embodiment of my invention which I have selected for purposes of illustration, I have shown it applied to a station indicator to be carried on a moving car or other vehicle, and the prime motor here shown is an electric motor mounted within the casing of the apparatus, and arranged to receive current either from the same source as the motors of the vehicle, or from a storage or other battery carried on the same.

In the accompanying drawings which illustrate one form in which I have contemplated embodying my invention, Figure 1 represents a front view of the indicator. Fig. 2 is a front elevation with the front plate removed, and the indicating web also removed for greater clearness. Fig. 3 is a vertical transverse sectional view of the apparatus on line 3—3 of Fig. 2. Fig. 4 is a similar section on line 4—4 of Fig. 2. Fig. 5 is a detail of the reversing lever and its connected parts. Fig. 6 is a diagrammatic view illustrating one arrangement of electric circuits. Fig. 7 is a similar view showing a modified arrangement of circuits. Figs. 8, 9 and 10 are detail views of a switch illustrated in Fig. 7, for preventing an improper actuation of the apparatus. Fig. 11 is a detail partial view of the indicating web. Fig. 12 is a detail view of the locking plate for the reverse lever.

In the drawings 1 represents an inclosing casing provided with a display front 2, provided with transparent portions 2^a, 2^b for displaying simultaneously the name of a street or station, and adjacent thereto an advertisement as indicated in Fig. 1. I prefer to form the display front of a sheet of glass having portions covered with opaque material leaving the display openings 2^a, 2^b but the result may be accomplished in other ways.

3 represents a flexible web of any suitable material carrying the characters or signs to be exhibited, in this instance, street or station names, as indicated at 3^a and advertising matter indicated at 3^b. The web has its opposite ends secured in any desired manner to winding rolls 4 and 5, which are removably mounted in the casing, in rear of the

display front, and the web is passed over guiding rollers 6 and 7, located adjacent to the top and bottom of the display front, and which are also detachably mounted in the casing. Each of the winding rolls is preferably provided with a guiding flange 8 at each end, and with gudgeons 9 and 10 projecting from opposite ends of the rollers. The gudgeon 9 of each roller is preferably provided with a conical end portion or center 11, which engages a corresponding conical recess in a yielding plate 12, contained within a bearing sleeve 13, secured to the side walls of the casing or other support, in any suitable manner, and having a spring 14 in rear of said yielding plate, the sleeve 13 having at its outer end an annular inturned retaining flange 15 to retain the plate 12 within the same when the roller gudgeon 10 is removed from engagement therewith.

The gudgeon 10 at the opposite end of each of the rollers 4 and 5 is adapted to enter a recess in a stub shaft 16 mounted in a bearing sleeve 17 secured to the side wall of the casing, or other support, and the gudgeon 10 and shaft 16 are also provided with interlocking driving devices, consisting in this instance of a transversely disposed pin 18, the ends of which project laterally from the gudgeon, and enter recesses in the stub shaft, when the roller is in operative position. Each of the stub shafts 16 is provided with driving mechanism, in this instance, a worm wheel 20, secured thereto, so that when the rollers 4 and 5 are in operative position, one or the other may be driven by applying power to its respective worm wheel 20.

The guide rollers 6 and 7 are mounted in the casing in a manner similar to the winding rollers, so as to be readily removable therefrom. One of these guide rollers (in this instance the guide roller 6) is constructed to form part of contact mechanism as hereinafter described, and to that end the said roller is provided with a metallic surface 19, consisting preferably of a brass tube which is placed in electric connection with the electric circuits by which the operation of the device is controlled, in any suitable manner. In this instance I have shown a spring brush or strip 21 of conducting material secured to the casing and provided with a binding post 22, to which a wire can be connected. In conjunction with the conducting and guiding roller 6 I employ one or more contacts which normally bear upon the surface of the web upon said roller and are adapted to establish an electric connection with the roller, at intervals, through certain means, with which the web is provided, said means consisting preferably of holes cut in the web, although I may employ a metallic device, such as a rivet or button extending through the web, or other means

for establishing an electric connection between the said contact or contacts and the roller. In this instance I employ two of such contacts 23 and 24 located adjacent to the opposite ends of the roller 6, and a central contact 25, said contacts being alike in construction and each consisting of a spring arm carrying a friction roller, for the purpose of reducing the friction on the web. The operation of these contacts will be hereinafter fully explained.

30 represents the prime motor, consisting in this instance, of an electric motor, the shaft of which is provided with the female member 31 of a cone clutch.

36 represents the driving shaft for the winding mechanism, which is mounted in a suitable bearing or bearings, in axial alignment with the motor shaft.

35 represents the female member of a cone clutch, which is stationary and is mounted upon or secured to the drive shaft bearing or other stationary part of the mechanism.

33 is a movable clutch sleeve mounted on a key or feather on the driving shaft 36, and provided at its opposite ends with male cone clutch members 32 and 34 respectively to engage the female members 31 and 35. When the clutch sleeve is shifted to cause the engagement of the clutch members 31 and 32, the prime motor will be coupled to the driving shaft, and when the clutch sleeve is shifted in the opposite direction the members 31 and 32 will be released and the members 34 and 35 engaged, thus acting as a brake to stop the driving shaft, and hold it locked against accidental rotation.

I do not limit myself to the exact construction of clutch mechanism shown and described, but I find this construction to be compact, and advantageous, and it forms a combined clutch and brake mechanism.

Mechanism is also provided for transmitting motion from the driving shaft to either of the worm wheels 20, for driving the winding rollers and causing the web to travel in either direction. The mechanism which I prefer to employ is illustrated in detail in Fig. 5 and is constructed as follows.

37 represents a driving miter gear on the driving shaft 36, which engages a miter gear 38 on a swinging shaft 39 mounted in a bracket 40, which is pivoted concentrically with the axis of the driving shaft and is preferably provided with a sleeve 41, engaging a portion of the drive shaft bearing or the drive shaft itself. The swinging shaft 39 is provided with a worm 42 which can be moved into engagement with either of the worm wheels 20, for driving the winding rollers, and the sleeve 41 of the bracket 40 is provided with a revolving arm 43, extending through a slot 44 in the casing (see Figs. 4 and 12) and provided with a locking plate 45, having a slot therein provided with lat-

eral notches 46, 47 and 48, into which the arm 43 will seat itself, said arm being preferably made of spring material, so as to lock said arm and hold the worm 42 in engagement with either of worm wheels 20, or in a neutral or "out" position, as desired.

50 represents a solenoid provided with a longitudinally movable core piece 51, of soft iron to which is preferably secured an extension 52 of non-magnetic metal, such as brass, which is pivotally connected by a loose joint with a clutch and brake lever 53 pivoted at 54 and provided at its upper end with a yoke 55 engaging the movable clutch sleeve 33. The core piece 51 is provided with a retracting spring 57, the outer end is adjustably secured to a bracket 59 by means of a threaded rod 58 and nuts 60, 60 so that the tension of the spring can be adjusted, and said spring acting through the core piece 51 and lever 53 normally holds the clutch member 34 in engagement with stationary clutch member 35 and holds the driving shaft locked. As one of the winding rollers is ordinarily in engagement with the driving shaft the web is thus held normally locked against accidental movement and out of engagement with the prime motor. When the solenoid is energized, as hereinafter explained, the core piece 51 is moved in the direction of the arrow, Fig. 2, thus disengaging clutch members 34, 35 and engaging clutch members 31, 32, and connecting the driving shaft with the prime motor which may be continuously operated, or simultaneously energized, as before stated. In the present instance the motor 30 is energized simultaneously with the solenoid, by means of an actuating switch, operated manually or otherwise, and in order to cut out said switch immediately after its actuation, I prefer to provide a cut out switch, one member of which is the lower end 56 of the lever 53, and the other member of which comprises two normally separated contacts 61, 61, insulated from each other, between which the part 56 is forced by the actuation of the solenoid, thus cutting out the actuating switch as hereinafter explained.

Referring now to the diagram of the electric connections shown in Fig. 6, 70 represents the battery or other source of electricity for actuating the prime motor and the solenoid. The motor 30 and solenoid 50 are connected in parallel with the battery 70, by wires 71 and 72, the actuating switch 65 being in the circuit and here shown in wire 72, and normally open. Wires 73, 74 lead to the separated contacts 61, 61, from the wire 72 on opposite sides of the actuating switch 65 for cutting the same out of circuit immediately upon the actuation of the solenoid. A wire 76 connects the wire 72, (at a point between the motor and solenoid) to the contact 21, in engagement with the con-

ducting surface 19 of web guiding roller 6, and a wire 75 connects wire 71 (at a point between the motor and solenoid) with a switch 80, being connected to the central post 77. A wire 81, leads from one of the switch contacts 78 to the contact 24, and a wire 82 leads from the other switch contact to the contact 23. It is understood that the web normally intervenes between contacts 23 and 24 and the roller 6, preventing the closing of the circuit therethrough. Supposing the switch lever 83 to be in the position shown, on the contact 79, the operation will be as follows:

As the car or other vehicle approaches a station, the actuating switch 65 is operated in any desired way either automatically or manually. In this instance it is shown as designed to be operated manually. The operation of the switch closes the circuit through the motor and solenoid and actuates the solenoid core 51. The motor will instantly start, and the lever 53 will be shifted by the solenoid to connect the motor with the driving shaft, which has been previously placed in engagement with the proper winding roller as previously described by moving the reversing lever to the proper notch. As the lever 53 is moved the lower end 56 will engage the contacts 61, 61 and cut out or short circuit the actuating switch 65. The web will then be operated by the motor and driving mechanism until the next contact means (in this instance an aperture cut in the web, adjacent to its edge) permits the contact 23 to engage the contact surface of guide roller 6, when the solenoid is short circuited through wires 75 and 76 and the spring 57 retracting the core piece breaks the motor circuit by disengaging the part 56, of lever 53 from contacts 61. The return movement of the lever 53 shifts the clutch sleeve into engagement with the stationary clutch member, and simultaneously disconnects the driving shaft from the motor and also acts as a brake to stop the driving shaft and hold it locked, until the device is again operated.

In order to insure the proper operation of the device, the next time the actuating switch is operated, and to avoid a spark which might injure the web and destroy the apparatus, I adjust the spring 57 in such manner that the driving shaft is not stopped instantly, but is permitted to make a sufficient movement to carry the aperture in the web beyond the contact 23 (or 24) and separate said contacts from the roller 6, before being stopped. For this purpose the aperture (or other contact means) must be located a little in advance of the point at which the web is to be stopped, and when the film is moving in the other direction these holes would be a little behind the points at which it is desired to

stop the film to show accurately the characters thereon. It is for this reason that I prefer to employ the two contacts 23 and 24, each operating in conjunction with a separate set of holes (or other means for establishing an electrical connection with the roller). Thus in Fig. 11 I have shown a portion of the web 3 provided at one side with a row of apertures 23^a for use in conjunction with contact 23, and on the other side with a row of apertures 24^a for use in conjunction with the contact 24, and it will be seen that each pair of apertures 23^a, 24^a are on opposite sides of a line extending transversely of the film, and indicated at *x* in dotted lines, for greater clearness. The switch 80 can be operated to throw the contact 23 or 24 into circuit according to the direction in which the web is being moved. The adjustment of the spring 57 regulates the distance which the web "overruns" to carry the aperture in the web beyond the contacts 23, or 24 directly by carrying the pressure or force with which the contacting frictional surfaces 34 and 35 are brought into contact and held in contact, when the solenoid is deenergized and releases its core, so that the resulting braking action of said friction surfaces will stop the web more or less quickly. In practice the spring 57 is adjusted to secure just the amount of "over-running" of the web which is desired.

84 represents a third contact point on the switch 80 which is connected by a wire 85 to the central contact 25 engaging the roller 6. The web 3 is provided adjacent to each end with a single aperture (or other contact device) 25^a to pass between the contact 25 and roll 6. The object of this arrangement is to provide for the complete reversal of the web from one winding roller to the other. In some instances, as where an indicator is used at each end of the car, and for indicating the stations in one direction only, it is desirable to reverse the web at the end of a trip so that it will be ready for use on the next trip in the same direction. In such case it is only necessary for the operator to operate the reverse lever 43, and turn the switch 80 to the point 84 marked reverse, and operate the actuating switch when the web will be completely rewound on the roller from which it has just been unwound, until the aperture 25^a adjacent the end from which it is being wound permits the contact 25 to make contact with roller 6 and thus stops the film in position to be again intermittently operated as before, and thus avoiding the tedious rewinding of the web by hand.

In Fig. 7 I have shown a slightly modified diagram of the circuits introducing a modified form of actuating switch which I may employ to render the operation of my

apparatus more certain. In the arrangement shown in Fig. 6, the operator might carelessly keep the actuating switch 65 closed until after the device had been operated and thus produce a second operation of the device immediately thereafter. In order to prevent the possibility of such happening, I may employ the arrangement of circuits shown in Fig. 7 in which 70^a represents the source of electricity, 71^a the lead wire connecting the motor 30, and solenoid 50 in parallel, 72^a the other lead wire connected to the movable contact arm 90 of the modified form of actuating switch illustrated in detail in Figs. 8, 9 and 10.

The arm 90 is provided with a contact 91 adapted to engage a contact 92, connected by wire 72^b with a magnet 93, thence by wire 72^c to a signal bell, which may or may not be employed, thence by wire 72^d to the solenoid and motor. The switch arm 90 is provided with an armature which is attracted and held by magnet 93, when the circuit is closed. Wires 75^a and 76^a are connected to the switch 80^a, and contact 21, as in Fig. 6, but in this instance the contact of any one of the contacts 24, 25 or 26 with roller 6 serves to short circuit the magnet 93 and release the switch arm 90, which is retracted to normal position by a spring 94, thereby breaking the main circuit through the motor and solenoid.

The actuating switch is provided with an actuating arm 95, pivoted on the same stud as, and above the switch arm 90 and provided with a pivoted detent 96, for engaging and actuating arm 90. This detent is held in operative or inoperative positions by a spring 97 which engages flat faces on the portions of the detent adjacent to the pivotal connection, so that when the actuating arm 95 has moved the switch arm 90 until the armature carried thereby engages the magnet poles, the further movement of arm 95 will disengage the detent from the actuating arm, leaving it free to return at the proper time. As the actuating arm 95 returns under the influence of a separate retracting spring 98, the detent will strike a spring arm 99, and be restored to its normal position.

In some instances I may employ one of the contacts as 23 in connection with contact holes (or other devices) for each station and contact 24 in connection with contact holes arranged for certain of said stations only as "express stops" and use the switch 80 to switch in one or other of said contacts according as the vehicle is used for local or express service. I may also use the device for the display of advertising matter only, in which case the device may be stationary, or mounted on a vehicle as preferred and the actuating switch may be operated by hand, or in any other desired manner.

What I claim and desire to secure by Letters Patent is:—

1. The combination with the movable web, means for imparting motion to the web, an electrically controlled means for stopping said web including contacts located on opposite sides of the web said means being constructed to permit a slight over-running of the web after said stopping device is called into action, said web being provided at intervals with means cooperating with said contacts, the over-running of the web carrying said means out of engagement with said contacts before the web is brought to rest.

2. The combination with the movable web, means for imparting motion thereto, an electrically controlled stopping mechanism for stopping said web, constructed to permit a slight over-running of the web, after it is called into action, a circuit for controlling the stopping mechanism, contacts in said circuit located on opposite sides of the web, said web being provided at intervals with a series of apertures in line with said contacts, said apertures being located in advance of the parts of the web engaged by the said contacts, when the web is at rest, whereby one of said apertures will be carried past said contacts, each time the stopping mechanism is operated and means for adjusting the stopping mechanism to secure the desired amount of over-running of the web.

3. The combination with the web, of winding mechanism therefor, driving mechanism for said winding mechanism, a clutch for connecting said driving mechanism and said winding mechanism, a friction brake for the winding mechanism, for stopping the web, constructed to permit a slight over-running of the web after the brake is called into action, an electric device for controlling said brake, a controlling circuit for said electric device including contacts on opposite sides of the web, said web being provided at intervals with means cooperating with said contacts to close said controlling circuit, the over-running of the web carrying said means out of engagement with said contacts before the web is brought to rest.

4. The combination with the web, of means for imparting motion thereto, a brake for stopping the web, constructed to permit a slight over-running of the web after the brake is called into action, an electric device for controlling the time when said brake is called into action, a circuit for controlling said electric device, including a contact engaging the web, the web having apertures located at intervals in said web, in line with said contact, the over-running of said web carrying the apertures engaged by said contact out of engagement therewith before the web is brought to rest, at each stopping of the web.

5. The combination with the web, of winding mechanism therefor, driving mechanism, a clutch for connecting the driving mechanism with the winding mechanism, a friction brake for the winding mechanism, said brake and clutch being connected for joint movement, an electric device for moving the clutch into operative position and releasing the brake, a spring for applying the brake, and releasing the clutch, means for adjusting the spring to secure the desired over-running of the web, after the brake is called into action, a controlling circuit for said electric device, including normally separated contacts engaging the web, said web being provided with apertures located in line with the said contacts, the over-running of said web carrying the aperture engaged by said contacts out of engagement with the same, at each stopping of the web.

6. The combination with the web, winding mechanism therefor, driving mechanism, a clutch for connecting said driving and winding mechanisms, a brake for the winding mechanism operatively connected with said clutch and constructed to be moved into operative position when the clutch members are disengaged, a solenoid, a movable core piece therein connected with said clutch mechanism for throwing the same into operative position, a retracting spring for said core piece, means for adjusting said spring to permit a slight over-running of the web, when the brake is called into action, before the web is stopped, a circuit for said solenoid, a separate circuit for cutting out said solenoid to stop the web, including contacts on opposite sides of the web, said web having at intervals devices cooperating with said contacts to close the circuit therethrough.

7. The combination with the movable web, means for imparting motion thereto, an electrically controlled stopping mechanism constructed to permit a slight over-running of the web after it is called into operation, a controlling circuit for said stopping mechanism, controlling contacts engaging the web at different points transversely thereof, and a switch for placing one or other of said contacts in said controlling circuit, said web being provided with a longitudinal series of apertures for cooperating with each of said contacts, the corresponding apertures of said two series being out of alinement with each other in a direction transversely of the web.

8. The combination with the movable web, means for imparting motion thereto, an electrically controlled stopping mechanism constructed to permit a slight over-running of the web after it is called into operation, a controlling circuit for said stopping mechanism, two independent sets of contact devices, and a switch for throwing one or other of said sets of contacts into the controlling circuit, said web being provided at inter-

vals with means coöperating with one set of contacts when the web is moved in one direction, and a second series of means coöperating with the other set of contacts, when the web is moved in the opposite direction, the over-running of the web in either direction carrying the said means coöperating with the contact devices, out of engagement therewith.

9. The combination with the movable web provided with a longitudinal row of separated apertures and having an aperture adjacent to each end of the web, out of line longitudinally with said row of apertures, winding mechanism, means for reversing the winding mechanism, starting mechanism for the winding mechanism, an electrically controlled stopping mechanism for the web, an electric circuit therefor, an electric contact in line with said row of apertures, a separate contact in line with said terminal apertures, a switch for placing either of said contacts in said circuit, whereby said web can be operated step by step in one direction and can be made to travel continuously in the other direction between said terminal apertures.

10. The combination with the movable web, and winding mechanism therefor, starting mechanism for the winding mechanism, stopping mechanism for the winding mechanism, means for operating the stopping mechanism at intervals, during the winding of the web in one direction, to effect a plurality of short movements of the web, a reversing mechanism for the winding mechanism, and means for holding the stopping mechanism out of operation when desired, to permit substantially the entire length of the web to be wound.

11. The combination with the movable web and winding mechanism therefor, starting mechanism for the winding mechanism, stopping mechanism for the winding mechanism, means carried by the web and located at intervals thereon, for calling the stopping mechanism into operation, a reversing mechanism for the winding mechanism, and independent means carried by the web adjacent to each end of the same, for calling the stopping mechanism into operation, whereby the entire length of the web may be wound without intermediate stopping.

12. The combination with the movable web provided with two separate longitudinal rows of apertures, and an aperture out of line with said rows adjacent to each end of the web, winding mechanism for the web, means for reversing said winding mechanism, an electrically controlled stopping mechanism for the winding mechanism, an electric circuit therefor, an electric contact in line with each of said rows of apertures, a separate contact in line with said terminal apertures, a switch for placing one or another

of said contacts in said circuit and a contact in said circuit on the other side of the web from the previously mentioned contacts and adapted to be engaged by the latter through the apertures in said web.

13. The combination with the movable web, winding mechanism therefor, stopping mechanism for the winding mechanism, a motor normally disconnected with the winding mechanism, clutch mechanism for connecting the motor with the winding mechanism, electric controlling mechanism for the said clutch mechanism and stopping mechanism, an electric circuit therefor, an actuating switch for closing said circuit and starting the web winding mechanism, an electric device for maintaining the circuit closed, a circuit for short circuiting said electric device and contacts in said short circuiting circuit, engaging the web, said web being provided at intervals longitudinally with means for permitting said contacts to close their circuit.

14. The combination with the movable web, winding mechanism therefor, a prime motor normally disconnected from said winding mechanism, a clutch mechanism for connecting the motor and winding mechanism, a friction brake for stopping the winding mechanism and holding it locked when at rest, a lever for operating said clutch and brake, a spring operatively connected with said lever for moving it in a direction to apply the brake, an electromagnetic device for moving said lever in the opposite direction, a switch for closing a circuit through said electromagnetic device an electric device for maintaining said circuit closed and contact devices engaging the web for cutting out said electric device said web being provided at intervals, longitudinally, with means for permitting said contacts to close their circuit.

15. The combination with the movable web, winding mechanism therefor, an electromagnetic controlling device for said winding mechanism, a circuit therefor, an electric switch for closing said circuit, an electromagnetic device in said circuit for holding said switch in closed position, contacts for short circuiting said switch controlling magnet normally separated by said web, the said web being provided at intervals with apertures therethrough in line with said contacts.

16. The combination with the movable web, winding mechanism therefor, an electromagnetic controlling device for said winding mechanism, a circuit therefor, an electric switch for closing said circuit, an electromagnetic device in said circuit for holding said switch in closed position, contacts for short circuiting said switch controlling magnet normally separated by said web, the said web being provided at inter-

vals with apertures therethrough in line with said contacts, an operating arm for said switch disconnected therefrom and a movable detent on said arm for engaging said switch for moving it in one direction.

17. The combination with the movable web, winding mechanism therefor, an electric motor normally disconnected from said winding mechanism, clutch mechanism for connecting the motor to the winding mechanism, a solenoid controlling said clutch, an electric circuit connecting the motor and solenoid in parallel, a switch in said circuit, and controlling devices brought into operation by the web, for effecting the breaking of said circuit, to release said clutch.

18. An indicator of the character described, embodying a display web, spools from and on which said web is adapted to wind, an electric motor for driving said spools, an operative connection between the motor and one of said spools, such connection embodying two separate shafts, one of which is the motor shaft, a clutch spool mounted on said shafts, means operated by and upon the movements of said clutch spool for opening and closing the circuit of the motor, means for holding the clutch spool in

a position to operatively connect the two shafts and at the same time maintain the circuit of the motor closed, and means for automatically and intermittently moving the clutch spool in a direction to disconnect the two shafts and to open the motor circuit.

19. An indicator of the character described, embodying a display web, spools from and on which said web is adapted to wind, an electric motor for driving said spools, an operative connection between the motor and one of said spools, said connection including a clutch and the clutch being arranged to make and break said connection, and a switch for the circuit of the motor including an arm movable with the clutch, whereby the clutch will automatically close the motor circuit as the connection between the motor and spool is established and will open the circuit as said connection is broken.

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

THOMAS R. CLARK.

Witnesses:

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H. H. BLACK.