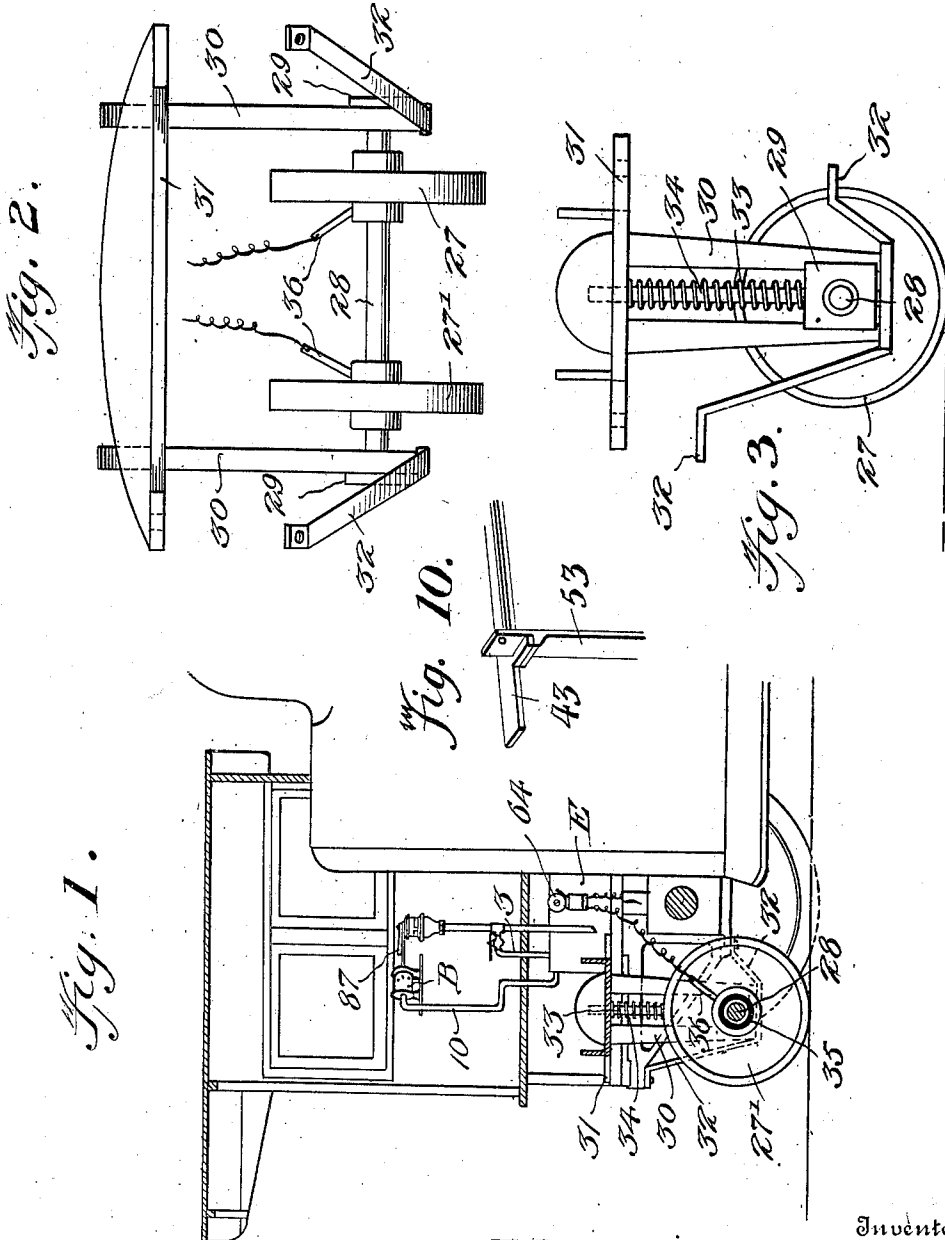


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 TRAIN EMERGENCY STOP.  
 APPLICATION FILED JAN. 26, 1911.

1,005,726.

Patented Oct. 10, 1911.

3 SHEETS—SHEET 1.



Witnesses

Frank B. Hoffman

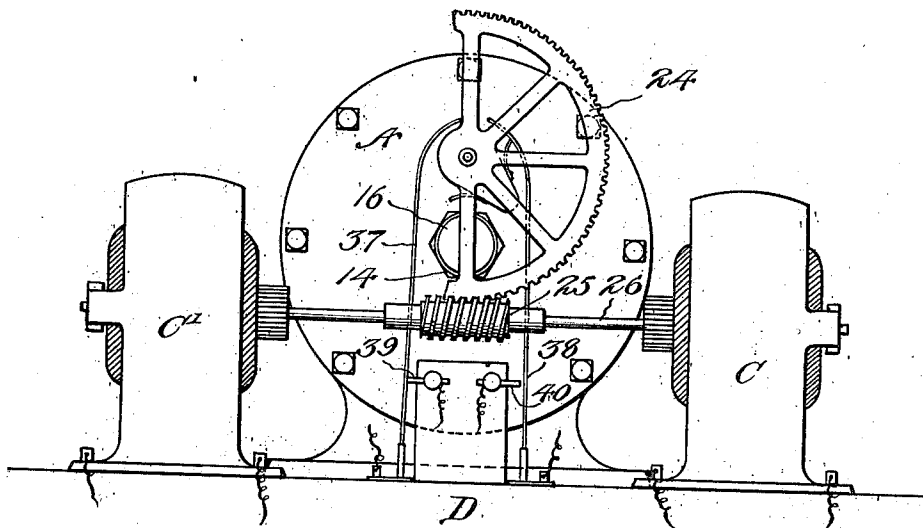
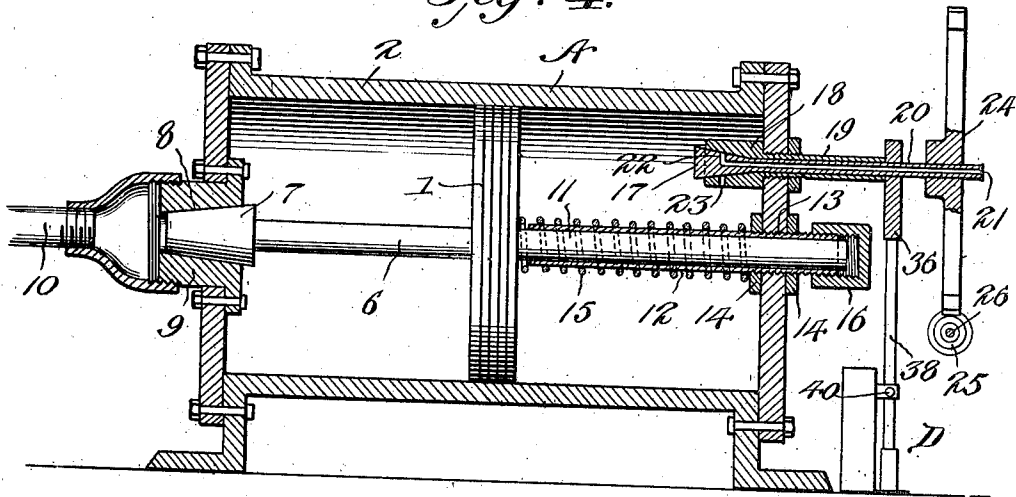
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3 SHEETS--SHEET 2.



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 TRAIN EMERGENCY STOP.  
 APPLICATION FILED JAN. 25, 1911.

1,005,726.

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3 SHEETS-SHEET 3.

Fig. 6.

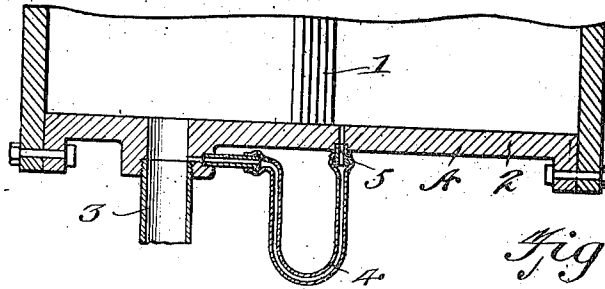


Fig. 8.

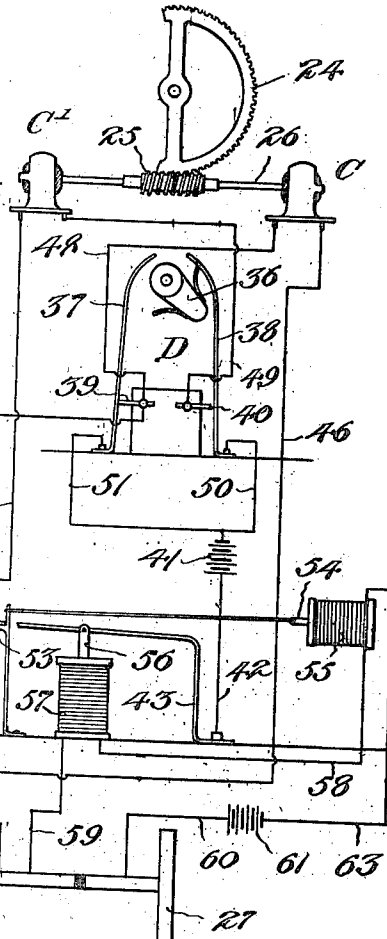


Fig. 7.

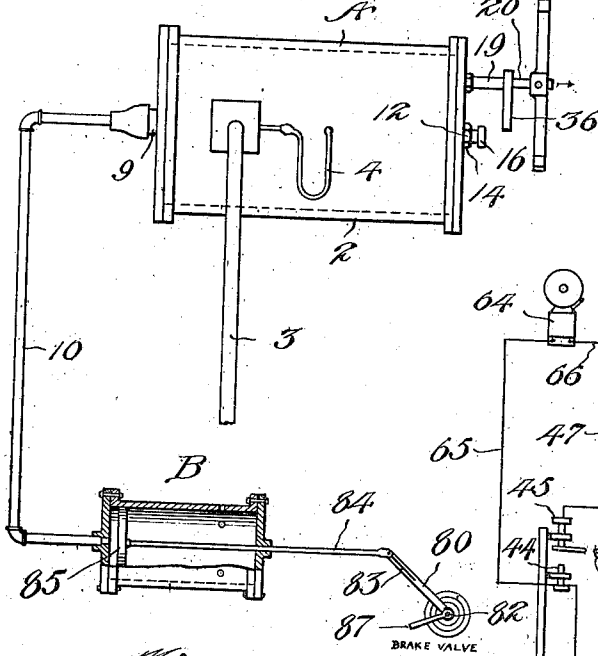
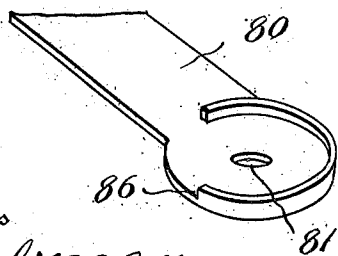


Fig. 9.



Witnesses

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# UNITED STATES PATENT OFFICE.

WINFIELD L. MATCHETT, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-FOURTH TO WILLIAM S. LINDLEY AND ONE-FOURTH TO JOSEPH W. POMRAINING, BOTH OF HARRISBURG, PENNSYLVANIA.

## TRAIN EMERGENCY-STOP.

1,005,726.

Specification of Letters Patent.

Patented Oct. 10, 1911.

Application filed January 25, 1911. Serial No. 604,618.

*To all whom it may concern:*

Be it known that I, WINFIELD L. MATCHETT, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented new and useful Improvements in Train Emergency-Stops, of which the following is a specification.

This invention relates to emergency apparatus for stopping a train automatically when it is within a predetermined distance from another train on the same track so as to prevent collisions, or whereby a train is automatically stopped when approaching an open switch or a crossing over which a train is passing.

The invention has for one of its objects to improve apparatus of this character so as to be reliable and efficient in use, automatic in its action, and so designed that it will operate the engineer's or brake valve so as to apply the brakes of the train under emergency conditions.

Another object of the invention is the provision of a fluid motor for operating the brake valve by fluid derived from the train pipe through a controller of the piston and cylinder type which includes a normally closed valve that is adapted to open when pressure on one side of the piston is lowered by an electro-mechanically operated valve brought into operation by the closing of the circuit through one of the electric switches located in the track.

With such and other objects in view, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention, Figure 1 is a sectional view of the cab of a locomotive showing the emergency stopping apparatus. Fig. 2 is a view of the contact wheels mounted on the locomotive. Fig. 3 is a side view showing the manner of supporting the contact wheels. Fig. 4 is a longitudinal section of the controller for allowing air to pass from the train pipe to the brake valve operating motor under emergency conditions. Fig. 5 is a side view of the electric motor operated mechanism for

actuating the bleeding valve of the fluid controller. Fig. 6 is a detail sectional view of the fluid controller showing the by-pass for normally maintaining the same pressure on both sides of the piston of the controller. Fig. 7 is a plan view showing the relation of the controller to the operating motor for the brake valve. Fig. 8 is a diagrammatic view of the circuit connections and electric and mechanical devices on the locomotive for operating the bleeding or outlet valve of the controller. Fig. 9 is a detail perspective view of the lever connecting the stem of the brake valve of the air brake system with the operating motor for said valve. Fig. 10 is a detail view of a portion of the circuit-closing means for the motors shown in Fig. 9.

Similar reference characters are employed to designate corresponding parts throughout the views.

Referring more particularly to Figs. 4, 6 and 7 of the drawings, A designates a fluid controller which is in the form of a piston and cylinder 2 that is connected by a pipe 3 with the train pipe of the air brake system. A by-pass 4 leads from the pipe 3 to a port 5 in the cylinder, so that fluid under train pipe pressure will operate on both sides of the piston when the latter is in normal position to one side of the port 5. The piston is provided with a stem 6 which has a conical valve 7 that normally engages a conical seat 8 in a bushing 9 fastened in one head of the cylinder. When the valve 7 moves away from its seat, fluid passes out of the cylinder and is conducted by a pipe 10 connected with the outlet 9 to a motor B suitably located in the cab, as shown in Fig. 1, so as to cause the motor to operate the brake valve of the air brake system for setting the brakes of the train. Connected with the piston 1 and extending oppositely from the stem 6 is another stem 11 which slides in a sleeve or tube 12 that is threaded in an opening 13 in the other head of the cylinder, the sleeve being securely held in place by jam nuts 14. The inner end of the sleeve is spaced a slight distance from the piston 1 so that the latter can move toward the sleeve a distance sufficient to close the port 5. The movement of the piston to the right, Figs. 4 and 6, is opposed by a spring 15 which surrounds the sleeve 12 and presses against the piston. To effect a

proper adjustment for limiting the movement of the piston, a cap 16 is threaded on the outer end of the sleeve 12 so that by screwing the sleeve inwardly or outwardly, it will form a stop against which the outer end of the stem 11 strikes. Since the pressure in the chambers at opposite sides of the piston 1 are normally the same, it is merely necessary to allow the pressure in the right hand chamber to escape, when the valve 7 will open and allow fluid to pass out of the cylinder to the motor B and operate the brake valve. When the piston moves to the right, upon the opening of the right end of the cylinder to the atmosphere, it closes the port 5 and prevents air from the train pipe from passing to the atmosphere, and at the same time the valve 7 opens and admits air to the motor B. After the motor has been actuated, the pressure falls on the left side of the piston, with the result that the spring 15 returns the piston to normal position so as to permit air of the same pressure to be established on both sides of the latter.

The escape of the air from the right end of the cylinder 2 is effected by an electromechanically operated bleeding or escape valve 17 which is of conical form and is rotatable in a hollow conical seat 18 which has a tubular stem 19 passing out of the right head of the cylinder, Fig. 4. The valve 17 has a tubular stem 20 that rotates in the stem 19 and the bore 21 of the stem 20 has its outer end open to the atmosphere and its inner end terminating in a lateral port 22 which is adapted to register with a port 23 in the seat 18 by rotating the valve. Fastened to the valve stem 20 is a segmental gear 24 that meshes with a worm 25 so that as the worm is rotated, the gear 24 and valve 17 will turn to throw the port 22 into and out of register with the port 23. Normally the port 22 is in the position shown in Fig. 4, so that air at train pipe pressure will be retained in the cylinder, and as soon as the port 22 registers with the port 23, air will escape to the atmosphere and allow the piston 1 to move to the right and open the valve 7. As shown in Fig. 5, the worm 25 is mounted on the shaft 26 connected with the armatures or reversely operating motors C and C' that are connected in circuit alternately. When one motor is energized, the other is idle and vice versa, so that by the coaction of the motors, the valve 17 will be opened and closed.

Mounted on the locomotive at any suitable point are contact wheels 27 and 27' that are adapted to ride on auxiliary rails located in each block of the track. The wheels 27 and 27' are fastened to an axle 28 that rides in bearing boxes 29, the said boxes being movable in guideways 30 depending from a frame 31 fastened to the locomotive frame and strengthened by

braces 32. The bearing boxes 29 are pressed downwardly by springs 33 that encircle vertical rods 34 fastened to the boxes and extending longitudinally of the guides 30. The wheels are insulated from the axle 28, as clearly shown in Fig. 1, by a sleeve of insulation 35 set into the hubs, and bearing on the hubs are brushes 36 or equivalent devices by which circuit connections are made between the electrically-operated devices on the locomotive and the circuit controlling switches of the track.

In Fig. 9, the devices for connecting the valve-operated motors C and C' in circuit are shown. The switch D for cutting the motors into and out of circuit consists of a cam 36 mounted on the stem 20 of the valve 17, as shown in Fig. 4, and this cam is disposed between and operates on spring contacts 37 and 38 which cooperate, respectively, with fixed contacts 39 and 40 for cutting out the motor C and cutting in the motor C', or vice versa. The current for the motors is supplied by a battery 41 which has one terminal connected by a wire 42 with a spring contact 43 which is adapted to engage either of a pair of spaced fixed contacts 44 and 45. The motor C is connected by a wire 46 with the fixed contact 44, while the motor C' is connected by a wire 47 with the fixed contact 45. Leading from the respective motors to the contacts 39 and 40 are wires 48 and 49. The motor circuits are completed by wires 50 and 51 leading from the spring contacts 38 and 39, respectively, to the battery 41. The contact 43 is normally in engagement with the contact 45 but current will not flow through the motor C' because the contacts 38 and 40 are separated. The spring contact 43 is held by a pawl or dog 53 so that it cannot vibrate under the jolting of the car into engagement with the contact 44, but this dog 43 is automatically released from the spring when the conditions are such that the emergency stop mechanism should come into play. For this purpose, the dog, which is a spring member, is connected with the core 54 of the solenoid 55 which, upon becoming energized, will disengage the pawl 53 from the spring contact 43. This spring contact 43 is connected with the core 56 of the solenoid 57 which, upon being energized, draws in the core 56 and engages the contact 43 with the contact 44 to close the circuit of the motor C.

The solenoids 55 and 57 are adapted to be energized when two trains are in dangerously close proximity and they are included in a circuit which is partly arranged on the locomotive and partly in the track. In the present instance, the solenoids are connected in series with each other by a wire 58 and between the solenoid 57 and contact wheel 27' is a wire 59. The other contact wheel 27

is connected by a wire 60 with a battery 61, there being a wire 63 leading from the battery to the solenoid 55. This much of the circuit is mounted on the locomotive, and when a short circuit is formed between the contact wheels 27 and 27', current will flow through the solenoids, the solenoids being so designed that the pawl-releasing solenoid will operate more quickly than the contact moving solenoid 57. The forming of the short circuit between the wheels 27 and 27' is effected by a switch located in the track and controlled by another train. As soon as the solenoids are energized, the contact 43 engages the contact 44 and current flows through a circuit consisting of the battery 41, wire 51, contacts 37 and 39, wire 48, motor C, wire 46, contacts 44, 43, wire 42 and battery 41. The motor C is thereby operated so that the valve 17, Fig. 4, will be turned to a position where air can escape from the cylinder 2 and permit fluid under pressure to pass to the brake valve operating motor B in the manner previously described, and during this opening of the valve 17, the cam 36 moves into engagement with the contact 37 so as to separate the latter from the fixed contact 39 when the port 22 of the valve 17 registers with the port 23. The circuit of the motor C is thus opened and the valve 17 is moved back to initial position by the closing of the circuit of the motor C'. By energizing the motor C', the valve 17 is reversed as is also the cam 36, until a point is reached where the cam will separate the contact 38 from the contact 40. The closing of the motor circuit C takes place when the solenoids 55 and 57 are de-energized by the opening of their circuit, and upon becoming deenergized, the solenoid 57 permits the spring contact 43 to move into engagement with the contact 45. The solenoids 55 and 57, batteries 41 and 61, motor reversing switch D, motors C and C', and controller A, are mounted on the locomotive, preferably, although not necessarily, in a box or casing E, Fig. 1, and if desired a bell 64 may be arranged on the locomotive so as to be energized when the emergency stop device is operated. This bell 64 is connected, by a wire 65, with the contact 44, and by a wire 66 with the contact 39 so that current will flow through the bell which is in parallel relation to the motor C'.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative,

and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention, what I claim as new, is:—

1. In an emergency train stopping apparatus, the combination of an engineer's brake valve, a fluid-actuated motor connected therewith, and a controller for supplying fluid to the motor, said controller comprising a piston and cylinder, a valve connected with the piston for supplying or cutting off the supply of fluid to the motor, a pipe for admitting fluid from the train pipe to the cylinder at one side of the piston, a by-pass for admitting fluid from the pipe to the opposite side of the piston, said by-pass being arranged to be closed by the piston when the valve is opened, a spring acting on the piston and tending to hold the valve closed, and a valve automatically operated to reduce the pressure on that side of the piston on which the spring acts to permit the first-mentioned valve to open.

2. In an emergency train stopping apparatus, the combination of an engineer's brake valve, a fluid-actuated motor connected therewith, and a controller for supplying fluid to the motor, said controller comprising a piston and cylinder, a valve connected with the piston for supplying or cutting off the supply of fluid to the motor, a pipe for admitting fluid from the train pipe to the cylinder at one side of the piston, a by-pass for admitting fluid from the pipe to the opposite side of the piston, said by-pass being arranged to be closed by the piston when the valve is opened, a spring acting on the piston and tending to hold the valve closed, a valve automatically operated to reduce the pressure on that side of the piston on which the spring acts to permit the first-mentioned valve to open, and a reversible electric motor mechanism connected with the last-mentioned valve to open and close the same.

3. The combination of an engineer's brake valve, a motor for controlling the same, a pipe for supplying fluid to the motor, a cylinder connected with the pipe, a valve controlling communication between the pipe and cylinder, a piston in the cylinder and connected with the valve, a spring acting on the piston to move the same in a direction to close the valve, a stop for limiting the movement of the piston in a direction to open the valve, means for establishing train pipe pressure on opposite sides of the piston, and means for permitting air to escape from the side of the piston opposite from the valve whereby the greater pressure on the other side of the piston will open the valve, said piston serving when the valve is open to cut off communication between the train pipe and the end of the cylinder of lower pressure.

4. The combination of an engineer's brake valve, a fluid-actuated motor therefor, a controller for admitting fluid from the train pipe to the motor, said controller including  
5 a valve, a gearing connected with the valve, separate electric motors for operating through the gearing to open and close the valve, a switch controlling the motor circuits and including a movable element connected with the valve, a second switch co-  
10 operating with said switch for connecting the motors alternately in circuit, and electrical means for controlling the last-mentioned switch.
- 15 5. The combination of an emergency train stopping apparatus including a valve controlling the air brake system, a gearing for operating the valve, reversely-rotating motors operating through the gearing to open  
and close the valve, a source of current for  
20 the motors, a switch device including an element movable with the valve for connecting one motor with the source and after a given time to dis-connect the other motor  
25 from the source, a switch cooperating with the said switch device for alternately closing the motor circuits, a lock for holding the movable element of the last-mentioned  
30 switch in a given position, a solenoid controlling the lock, and a solenoid for operating the movable element of the last-mentioned switch when the lock is released.
- In testimony whereof I affix my signature in presence of two witnesses,  
WINFIELD L. MATCHETT.
- Witnesses:  
SCOTT S. LEIBY,  
HENRY E. FOX.