J. F. WEBB, Jr.

TRAIN STOPPING MECHANISM.

APPLICATION FILED DEC. 12, 1908.

958,047.

Patented May 17, 1910.

4 SHEETS—SHEET 1.

Fig. 1.

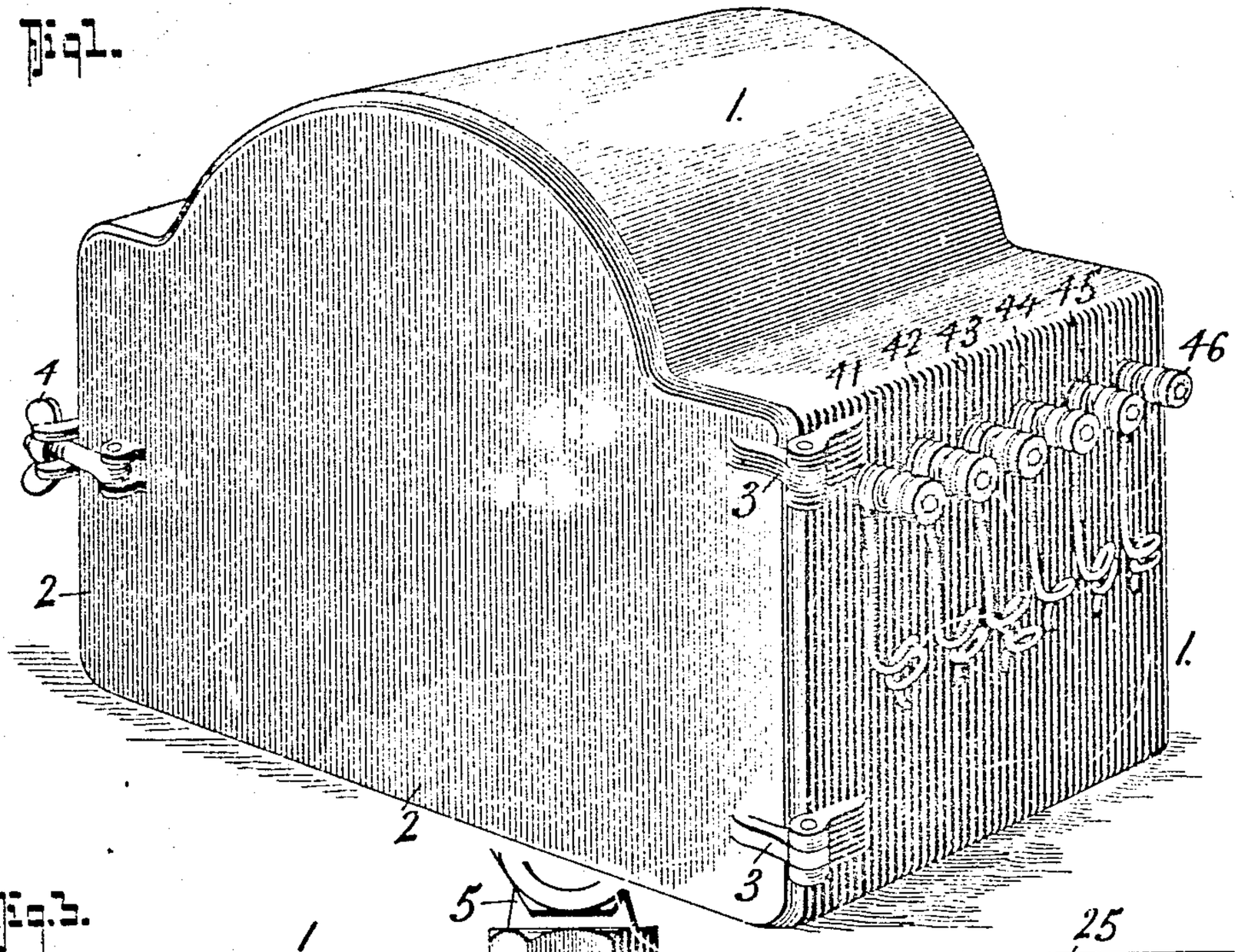
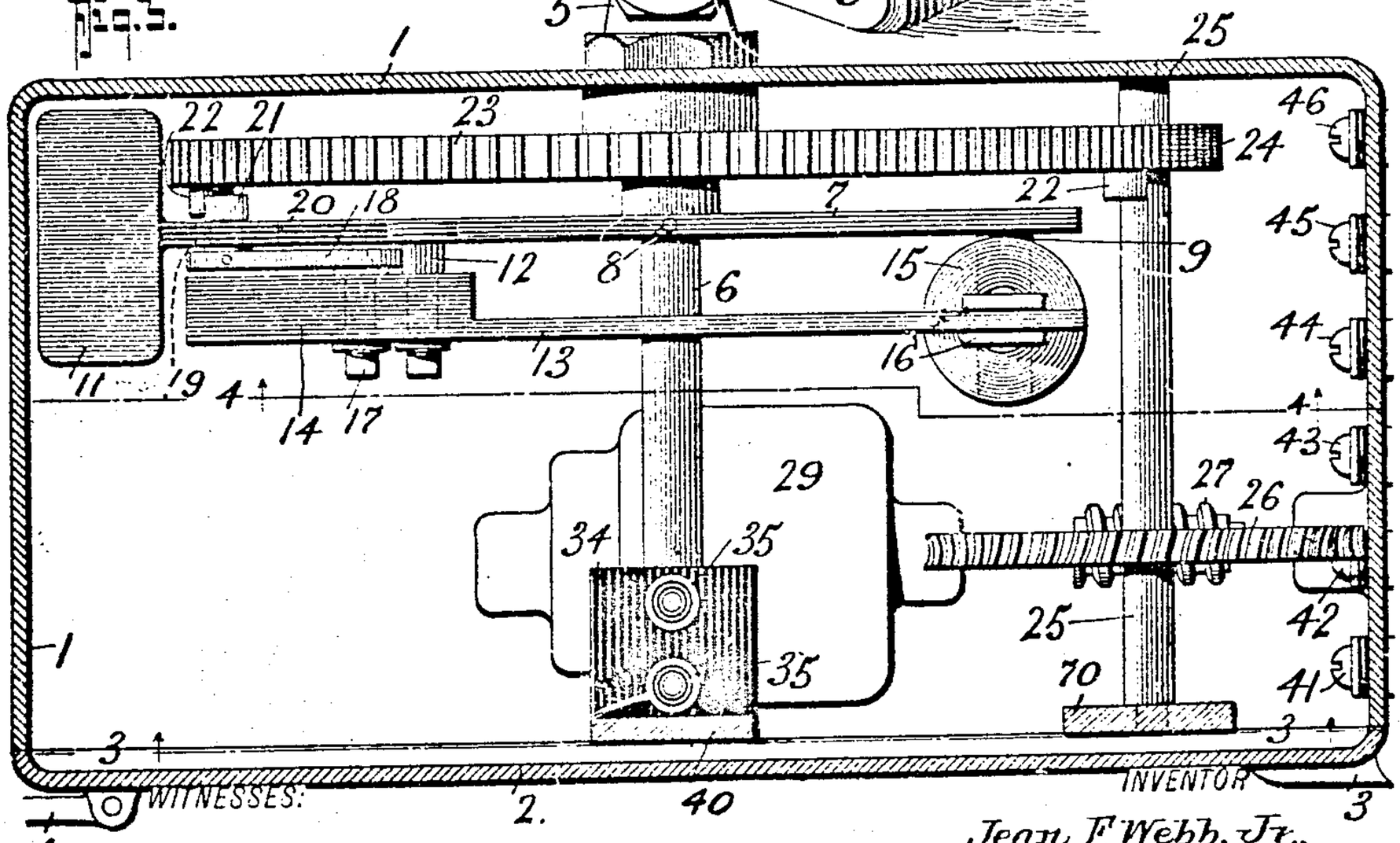


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 2.

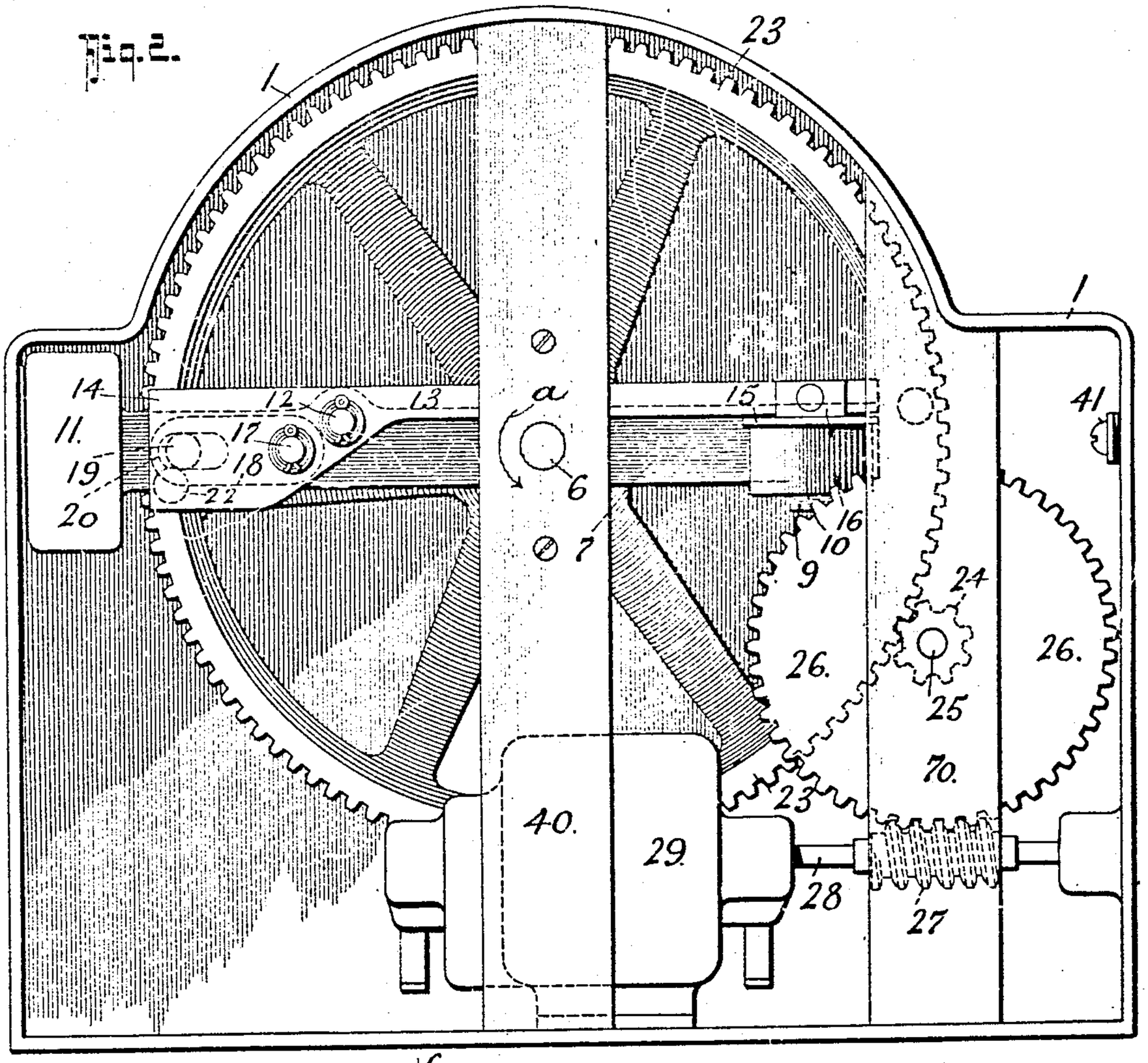


Fig. 5.

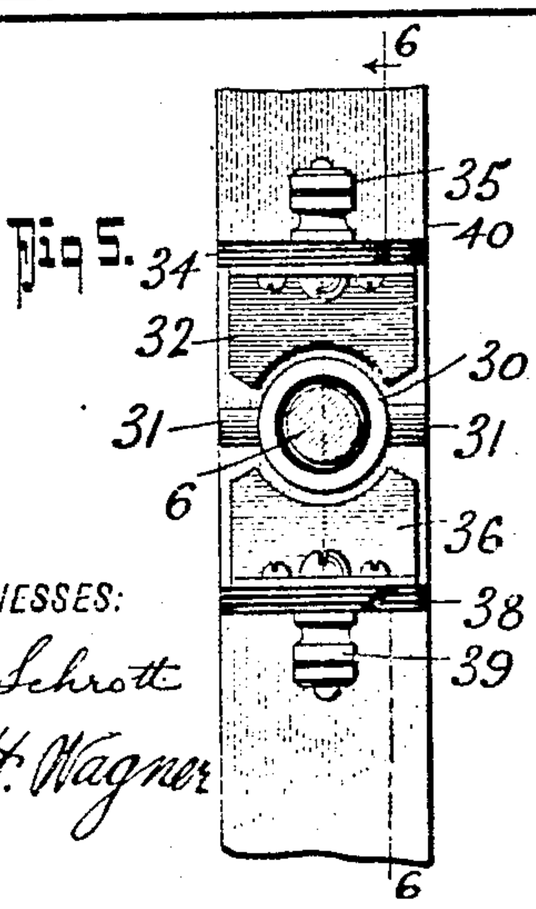
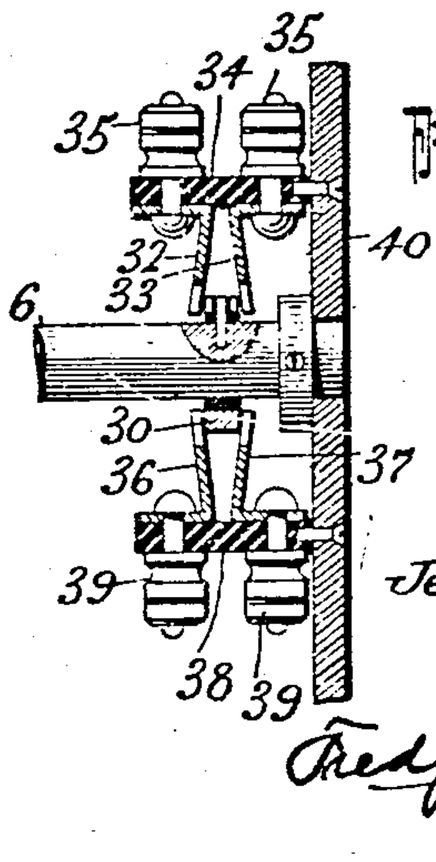


Fig. 6.



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4 SHEETS—SHEET 3.

Fig. 5.

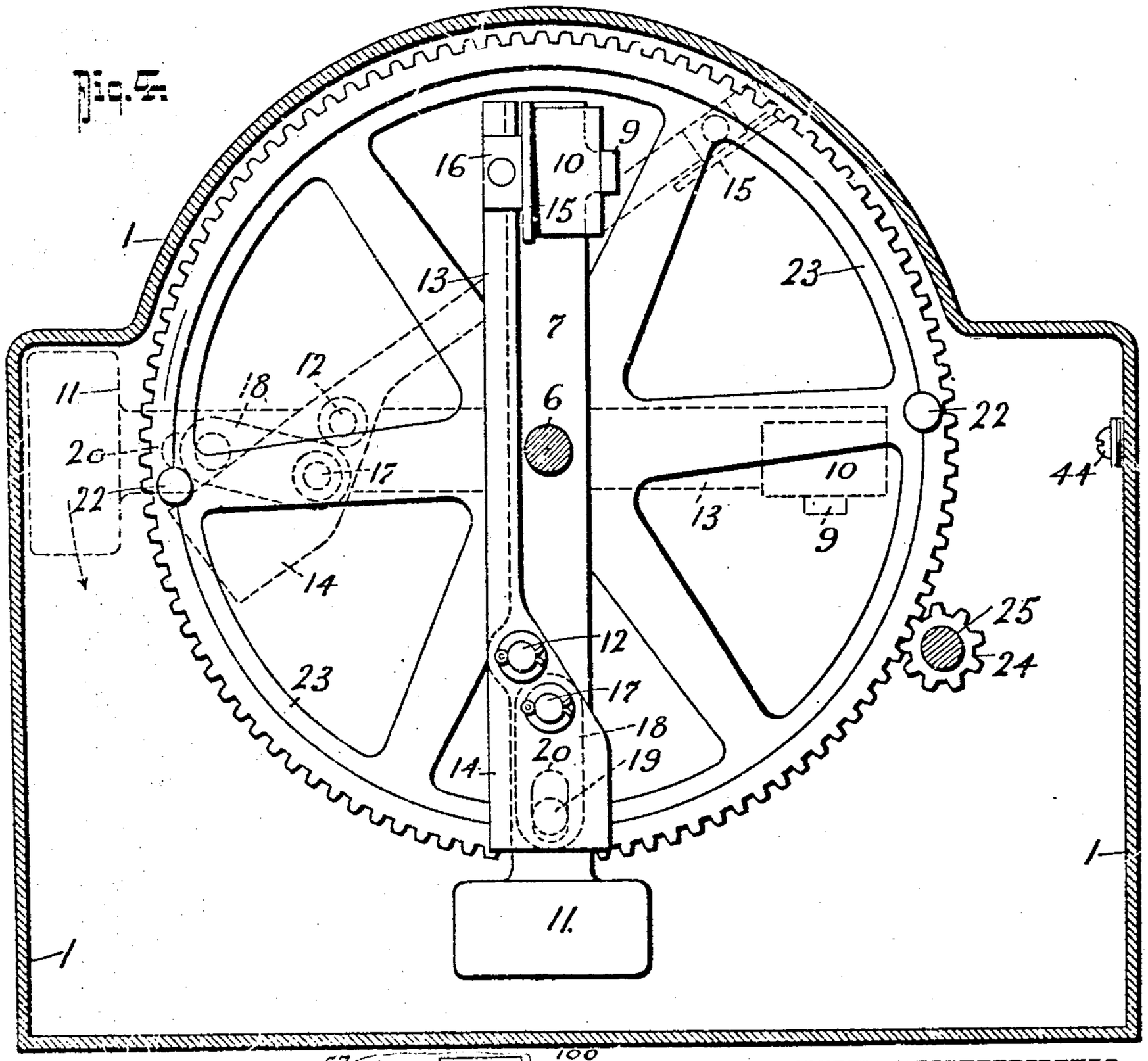
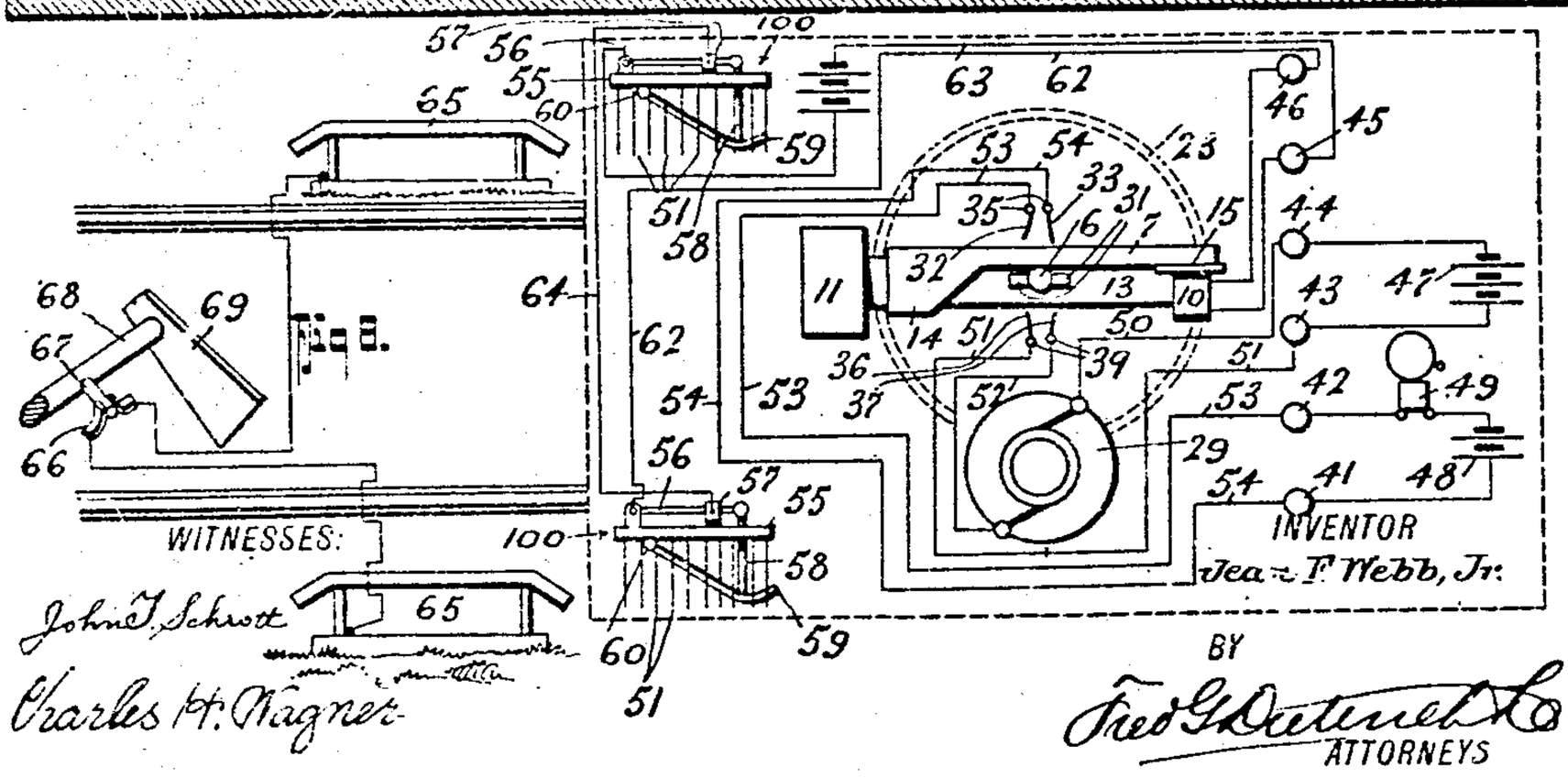


Fig. 6.



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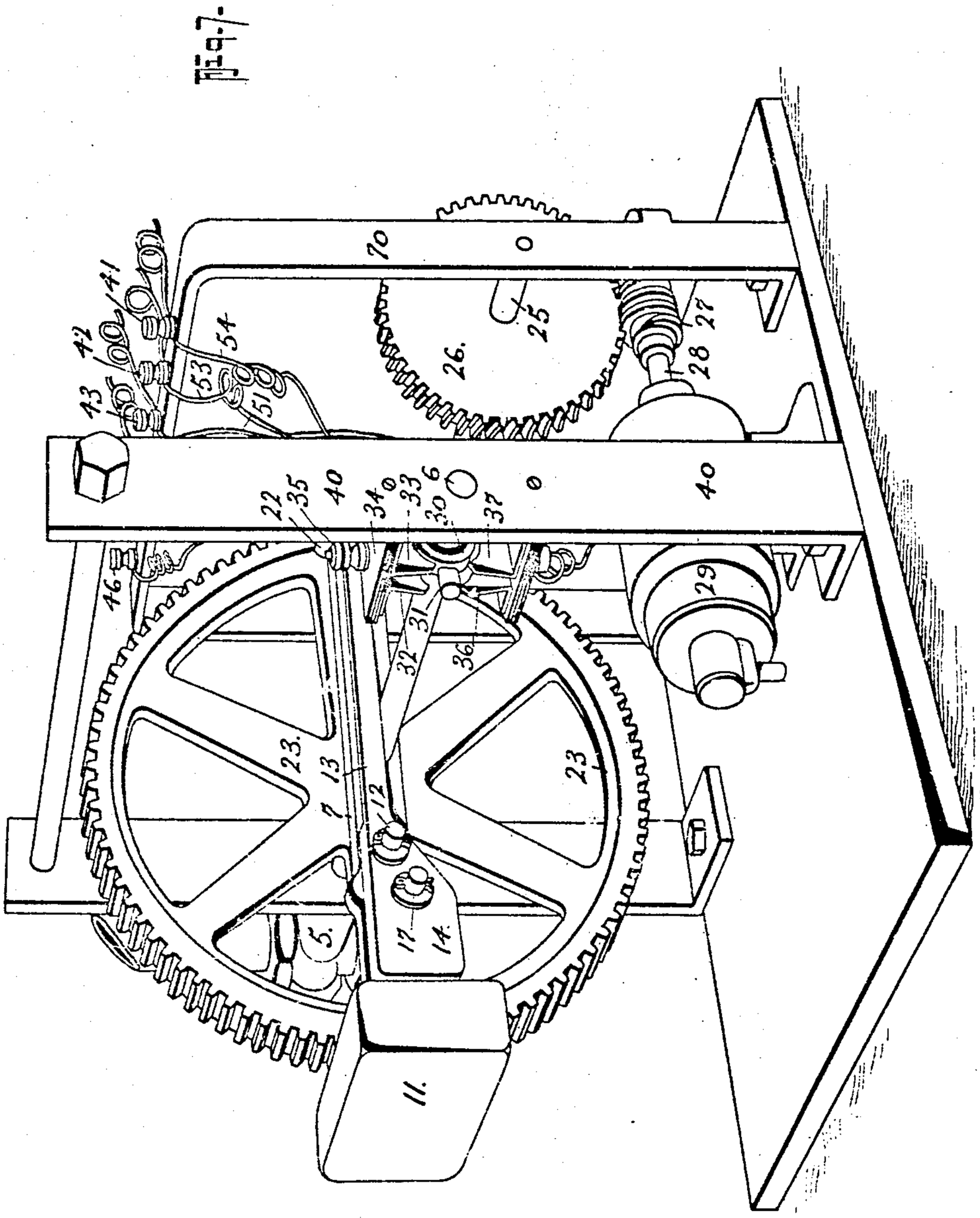
4 SHEETS—SHEET 4.

Fig 9.



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UNITED STATES PATENT OFFICE.

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TRAIN-STOPPING MECHANISM.

958,047. Specification of Letters Patent. Patented May 17, 1910.

Application filed December 12, 1908. Serial No. 467,206.

To all whom it may concern:

Be it known that I, JEAN F. WEBB, Jr., residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Train-Stopping Mechanism, of which the following is a specification.

My invention relates to that class of train stopping mechanisms in which means are provided for bringing a train to a stop or reducing its speed by an application of the air brakes through the medium of mechanism under control from a source not under the influence of the engineer.

Primarily, my invention has for its object to provide a mechanism for quickly setting the brakes at a predetermined time, leaving them set for a definite interval and then slowly allowing a release of the brakes to permit the train to proceed.

In its more detailed nature the invention embodies a separate air valve of the conductors' type, that is to be connected to the air brake system of a train in a manner to set the brakes when open; magnetically locked gravity actuated devices are provided to effect a quick opening of the valve at times, while a motor (mechanical or electrical) driven mechanism acts to relatively slowly close the valve after it has been opened; means are also provided for starting the motor and stopping it at proper times and setting a local signal when the valve is opened.

Another object of my invention is to provide a mechanism whereby the train when running at a great speed may be first slowed down upon reaching a given point, say at the distant signal, and stopped farther on, say at the home signal.

My invention also resides in those novel details of construction, combination and arrangement of parts, all of which will be first fully described, and then specifically pointed out in the appended claims, and illustrated in the accompanying drawings, in which:—

Figure 1, is a perspective view of my invention in its casing. Fig. 2, is a front view, the door being opened and the parts being in their normal position. Fig. 3, is a top plan view, the casing being shown in section. Fig. 4, is a section on the line 4—4 of Fig. 3, the parts being shown in dotted lines in the position they assume at the instant the magnetic lock is released, and in the valve opened position in full lines, the motor just having been started to rotate the restoring gear. Fig. 5, is a detail elevation of the motor and local signal switches. Fig. 6, is a section on the line 6—6 of Fig. 5. Fig. 7, is a perspective view of my apparatus without a casing. Fig. 8, is a diagrammatic view of the circuits used in connection with my apparatus.

Referring now to the accompanying drawings in which like numerals of reference indicate like parts in all of the figures 1 represents a casing to which a door 2 is hinged at 3 and secured at 4. Within the casing is a valve operating shaft 6 that connects with the rotary stem of the air valve 5, in any approved manner, the valve 5 being of the ordinary conductor's valve type. Secured to the shaft 6 by a pin 8, is a main or primary arm lever 7 that is weighted at one end by a weight 11, so as to normally tend to turn the shaft 6 in the direction of the arrow *a* in Fig. 2, to open the air valve. At the other end the lever 7 has a bracket 9 that carries an iron-clad magnet 10 which coöperates with the armature 15, that is mounted at 16 for limited universal movement on the end of a secondary arm 13 that is pivoted on a stud 12, which is carried by the primary arm 7 that is in turn weighted at 14, as shown.

18 designates a link having a pivot stud 17 at one end that projects through the weighted end of the secondary arm 13, and the link has a pin or lug 19 at its other end that projects through a slot 20 in the primary arm 7. The lug 19 has a head 21 that is adapted to be engaged by lugs 22 on a master gear 23 that is loosely mounted on the shaft 6 and is turned by a motor 29 through the medium of a countershaft 25, a pinion 24 that meshes with the gear 23, and a worm 27 on the motor shaft 28 that meshes with a worm gear 26 on the countershaft 25. The gear 23 is what I term the "restorer gear", as it actuates to restore the valve and valve opening mechanism to the normally closed position. The shaft 6 has bearings in a support 40 and in the rear wall of the casing while the shaft 25 has bearings in a support 70 and in the rear wall of the casing.

30 designates a collar on the shaft 6 which is insulated therefrom, as shown, and the collar 30 has radial lugs 31, one to cooperate with each pair of circuit controller switch terminals 32—33 and 36—37 of the local signal switch 34 and the motor switch 38, respectively. Each switch 34 and 38 comprises an insulating support on which the contact segments 32—33 and 36—37 are respectively mounted. Binding posts 35 and 39 connect with the switch contacts 32—33 and 36—37 respectively.

Circuits.—The circuit connections for actuating my improved mechanism are best understood by reference to Fig. 8 of the drawings, from which it will be seen that the binding posts 35 are connected by wires 53—54 to posts 41—42 on the outside of the casing 1 to which the local signal circuit containing the signal 49 and battery 48 is connected. One of the binding posts 39 connects with the motor 29 through a wire 52 while the other connects with the post 43, through a wire 51. The other motor terminal connects through a wire 50 with the binding post 44 on the casing, the motor battery 47 being connected to posts 43—44, as shown. The magnet 10 is electrically connected to the posts 45—46. On each side of the locomotive or car is a contact brush shoe 100 (which *per se* forms the subject-matter of a co-pending application) which is mounted to coöperate with track contacts 65 that are normally electrically connected in a circuit with one another by any approved circuit controlling means, such for instance as a semaphore control switch 66 that is controlled by the knife 67 on the shaft 68 of a semaphore 69. One post 46 connects through a line wire 62 to the brush shoe 100, at one side of the train while the other post 45 connects through a wire 63 to the other brush shoe at the other side of the train, a battery being interposed to furnish current, as shown in Fig. 8 of the drawings. Each brush shoe 100 has a knife switch 56 and contact bristles 51 electrically connected to one another, the switch knife 56 being operated by a shoe 59 pivoted at 60 beneath the shoe plate 55 and connected to the knife 56 of the switch by a rod 58. The insulated fixed contacts 57 of each brush shoe are electrically connected to one another by a wire 64 to keep the circuit through the magnet 10 normally closed, to hold the armature down and retain the secondary lever or arm 13 parallel to the primary arm 7 to project the lug 21 to be engaged by the lug 22 on the gear and hold the valve 5 normally closed. The gear 23 is held from backward movement by the worm and gear connection between the motor and countershaft.

Operation.—Assume the parts to be positioned as shown in Figs. 2 and 3, with the circuit as shown in Fig. 8, and the circuit of magnet 10 closed while the circuits of the motor and local signals are opened at the switches 34 and 38. If, for any reason the circuit of the magnet 10 be broken, the arm 13 will be released and moved by the weight 14 into the position shown in dotted lines in Fig. 4, withdrawing the lug or pin 21 from alinement with the lug 22 to permit the weight 11 to drop and rapidly turn the shaft 6 in the direction of the dotted arrow in Fig. 4, to effect a quick opening of the valve and the simultaneous closing of the local signal circuit and the motor circuit at the switches 34—38 to set the local signal in operation and start the motor. The opening of the air valve will apply the air brakes. As the motor is started it will cause the gear 23 to turn through about one-quarter turn before lug 22 can engage the lug 21 to raise the weighted arm 7 and turn the shaft 6 back to thereby slowly close the valve 5 again, it being understood that unless the circuit of magnet 10 has again closed, the arms 7 and 13 will not be raised sufficient to close the valve as the weight 14 will withdraw the pin 21 from engagement with the pin 22 before the valve becomes closed. Should, however, the circuit of the magnet 10 have closed, then during the second fourth turn of the gear 23 the lug 22 engaging the lug 21 will raise the primary arm 7 and the secondary arm 13 to restore the parts to the position shown in Fig. 2, to again close the air valve. A certain definite interval of time elapses after the valve has been opened before it begins to close (the time it takes for the right hand lug in Fig. 4, to arrive at the bottom and engage the lug 21 on the arm 7, say the time it takes the gear 23 to make one-quarter turn) and then as the valve begins to close it will be slowly closed as the gear 23 moves through the second quarter of its revolution. Of course, the speed of movement of the gear 23 is regulated by its diameter or a train of reducing gears may be interposed between the countershaft of the gear 23, in any well known manner. Since the valve is slowly closed after it has been automatically opened, the engineer will have sufficient time to open his valve and set the brakes in the usual manner if it be desired by him to bring the train to a dead stop, the ringing of the local signal bell indicating that the valve 5 is opened. The contacts 65 are positioned at any desired place along the right of way, and as many sets thereof may be provided as desired, say one set at the distant signal and one set at the home signal, the set at the distant signal being controlled by the distant signal while that at the home signal being controlled by the home signal. Thus if a train is to be stopped at the home station and if it is traveling say 50 miles per hour, when it passes the distant signal then

the brakes will be immediately set by the quick opening of the valve as the train passes the distant signal (it being understood that the signal is raised and the switch 66 thereby opened) and may, after a short time, be slowly released, thereby slowing the train down to a speed of say 8 or 9 miles per hour by the time it reaches the home signal. Should it pass the home signal the mechanism will again be operated to effect a further opening of the valve 5 and a further application of the brakes which will cause the train to be brought to a dead stop. It will be noticed that if the train passes by contacts 65 when the semaphore is in the safety position the circuit through the magnet 10 will not be interrupted, although the switches 56 are opened since the brush will be short-circuited through the semaphore switch until the brush shoes leave the contacts 65 and the switches 56 again close. The air valve 5, it should be understood, is preferably connected in line with the engineer's valve.

From the foregoing description taken in connection with the accompanying drawings it is thought the complete construction, operation and arrangement of my invention will be readily understood by those skilled in the art to which this invention appertains.

What I claim is:

1. A valve having a rotary stem combined with means for effecting a quick opening of the valve and another electrically operated means for restoring the valve and the opening means to their original position.

2. A valve and a gravity actuated means for opening the valve together with electric motor driven means for closing the valve and restoring the gravity actuated means to its initial position.

3. A valve and means for effecting a quick opening of the valve, together with another means operating a definite interval after the valve has been opened to restore the valve to its closed position and restore the opening means to its original position.

4. A valve and means for effecting a quick opening of the valve, electro-magnetic means for locking the opening means from operation at times, and another means for restoring the opening means to its initial position and closing the valve, and means for automatically setting said restoring means into operation substantially immediately after the valve is open.

5. A valve, a normally locked gravity actuated means for opening the valve combined with an electric motor driven means for restoring the valve to its closed position and the opening means to its original position at times.

6. A valve, means for holding the valve normally closed, means for effecting a quick opening of the valve, and another means for automatically slowly closing the valve after it has been opened and restoring the opening means to its initial position.

7. A valve, magnetically locked gravity actuated means for opening the valve when the magnetic lock is released, combined with electric motor driven means for automatically restoring the valve and the valve opening means to their initial position.

8. A valve, magnetically locked gravity actuated means for opening the valve when the magnetic lock is released, combined with motor driven means for restoring the valve and the valve opening means to their initial position, a definite interval after the valve has been opened.

9. A valve actuated mechanism for air brake systems comprising a rotatable shaft connectible to the valve, means mounted on the shaft and normally tending to open the valve, a stop, means mounted on the opening means to engage said stop and hold the opening means inoperative at times, means for moving said holding means to release the valve opening means at times to open the valve and another means for automatically restoring the valve and the opening and holding means to their initial position.

10. A valve actuating mechanism for air brake systems comprising a rotatable shaft connectible to the valve stem, gravity actuated devices for turning said shaft to open the valve, locking means for normally holding the gravity actuated devices inoperative, means for releasing said locking means at times to permit the gravity actuated devices to operate and open the valve, and another electro operative means for restoring said opening and locking means to their initial position and simultaneously closing the valve.

11. A valve actuating mechanism for air brake systems comprising a rotatable shaft connectible to the valve stem, gravity actuated devices for turning said shaft to open the valve, locking means for normally holding the gravity actuated devices inoperative, means for releasing said locking means at times to permit the gravity actuated devices to operate and open the valve, and electro operative motor actuated devices for restoring the valve and the opening and locking means to their initial position.

12. A valve actuating mechanism for air brake systems comprising a rotatable shaft connectible to the valve stem, gravity actuated devices for turning said shaft to open the valve, locking means for normally holding the gravity actuated devices inoperative, means for releasing said locking means at times to permit the gravity actuated devices to operate and open the valve, and motor actuated devices for restoring the valve and the opening and locking means to their initial position, together with means con-

trolled by the movement of said shaft for automatically starting and stopping the motor at predetermined times.

13. In a train stopping means, the combination with an air brake system, of an air valve, means for effecting a quick opening of the valve, and means controlled by the opening of the valve for restoring it to its closed position.

14. In a train stopping means, the combination with an air brake system, of an air valve, means for effecting a quick opening of the valve, and means controlled by the opening of the valve for restoring it to its closed position after a predetermined interval.

15. A valve actuating mechanism comprising a rotary shaft connectible to the valve stem, a primary lever mounted on the shaft to turn therewith, means for turning said lever in one direction by gravity, a stop, a gravity actuated locking mechanism mounted on said primary lever to coöperate with said stop and a magnetic lock for said locking mechanism, and means for restoring said primary lever to its initial position after it is actuated to open the valve.

16. A valve actuating mechanism comprising a rotary shaft connectible to the valve stem, a primary lever mounted on the shaft to turn therewith, means for turning said lever in one direction by gravity, a stop, a gravity actuated locking mechanism mounted on said primary lever to coöperate with said stop, and a magnetic lock for said locking mechanism, means for restoring said primary lever to its initial position after it is actuated to open the valve, said last named means comprising a master gear on which said stop is mounted and means for driving said master gear to bring the stop into operative engagement with the locking means after the valve has been opened.

17. A valve actuating means for train stopping systems comprising a rotatable shaft, a primary lever mounted thereon having a weight at one end to turn the lever in one direction by gravity and open the valve, a secondary lever pivoted to said primary lever and gravity actuated in one direction, a pin projecting through a slot in said primary lever and connected with said secondary lever, a rotatable member loosely mounted on said shaft, stops carried by said rotatable member to be engaged by said pin when in one position, means for holding said levers in one position to project the pin into engagement with the stop to hold the levers in a normal position, and means for releasing said last named means to permit the gravity actuated primary lever to turn the shaft at times.

18. A valve actuating means for train stopping systems comprising a rotatable shaft, a primary lever mounted thereon having a weight at one end to turn the lever in one direction by gravity and open the valve, a secondary lever pivoted to said primary lever and gravity actuated in one direction, a pin projecting through a slot in said primary lever and connected with said secondary lever, a rotatable member loosely mounted on said shaft, stops carried by said rotatable member to be engaged by said pin when in one position, means for holding said levers in one position to project the pin into engagement with the stop to hold the levers in a normal position, means for releasing said last named means to permit the gravity actuated primary lever to turn the shaft at times, a drive motor, means controlled by the movement of said shaft for bringing the drive motor into and out of operative relation, and transmission gear connections between the drive motor and the rotatable member to rotate the same when the drive motor is operated.

19. A valve actuating mechanism for air brake systems comprising a rotatable shaft connectible to the valve, a primary lever secured thereto to turn the shaft in one direction, means for turning the lever in such direction, a secondary lever pivoted to the primary lever, means for holding the secondary lever normally in one position, a rotatable gear having stops, a movable stop carried by said primary and secondary levers and normally projected into engagement with said gear stop to normally hold the primary lever in one position, a drive motor, gear connections between the drive motor and the first mentioned gear whereby when the drive motor is operated the first mentioned gear will be turned, and means for controlling the operation of the drive motor.

20. A valve actuating mechanism for air brake systems, comprising a rotatable shaft connectible to the valve, a primary lever secured thereto to turn the shaft in one direction, means for turning the lever in said direction, a secondary lever pivoted to the primary lever, means for holding the secondary lever normally in one position, a rotatable gear having stops, a movable stop carried by said primary and secondary levers and normally projected into engagement with said gear stop to normally hold the primary lever in one position, a drive motor, gear connections between the drive motor and the first mentioned gear whereby when the drive motor is operated the first mentioned gear will be turned, and means for controlling the operation of the drive motor through the movement of said first mentioned shaft.

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Witnesses:
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