No. 706,988. Patented Aug. 12, 1902.

W. W. MURCH.

EMERGENCY GEAR FOR LOCOMOTIVES.

(Application filed June 5, 1901. Renewed Jan. 16, 1902.)

(No Model.) 4 Sheets—Sheet 1.

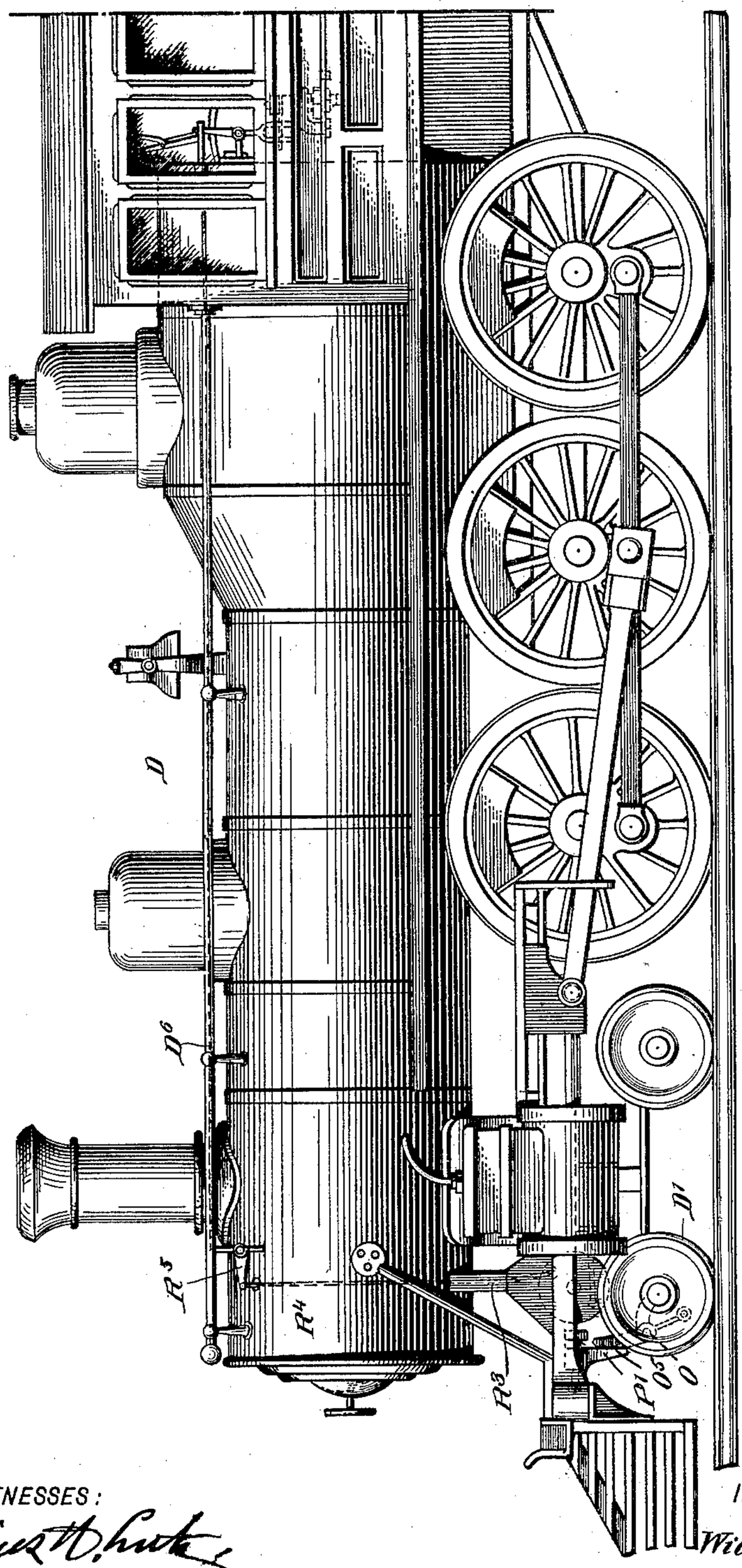

Fig. 1.

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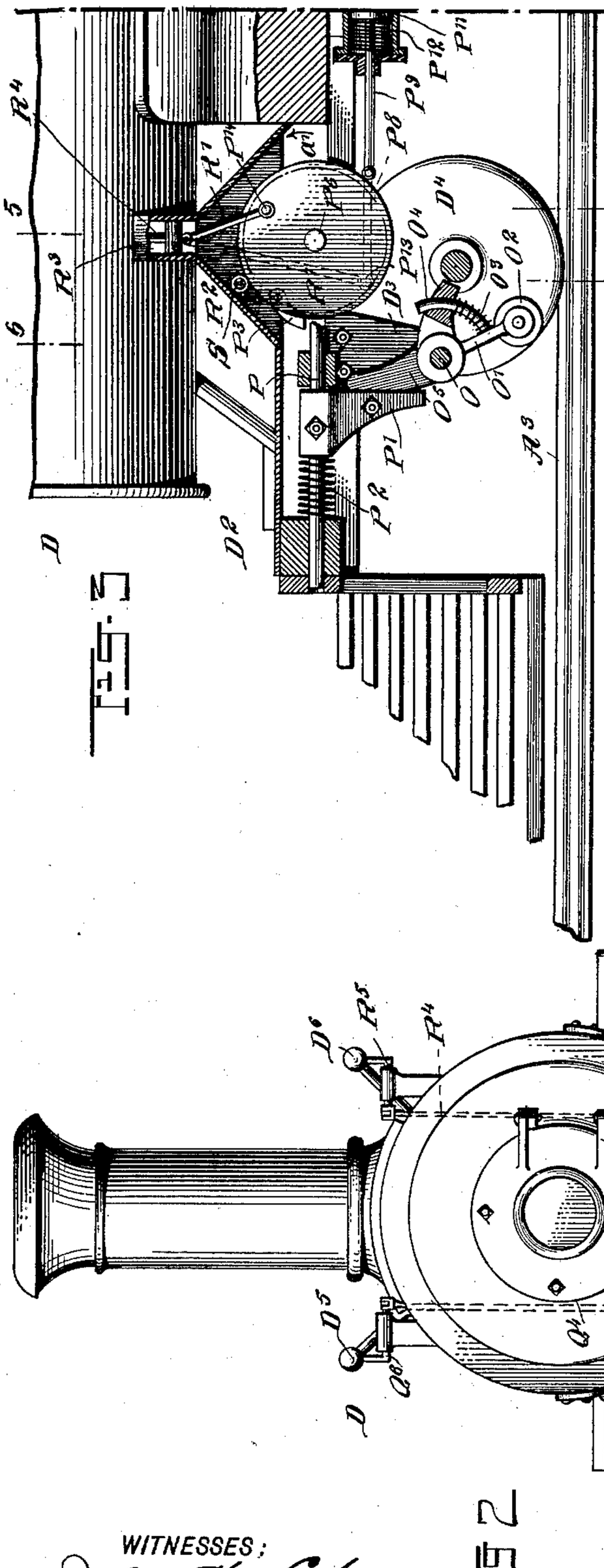

FIG. 3

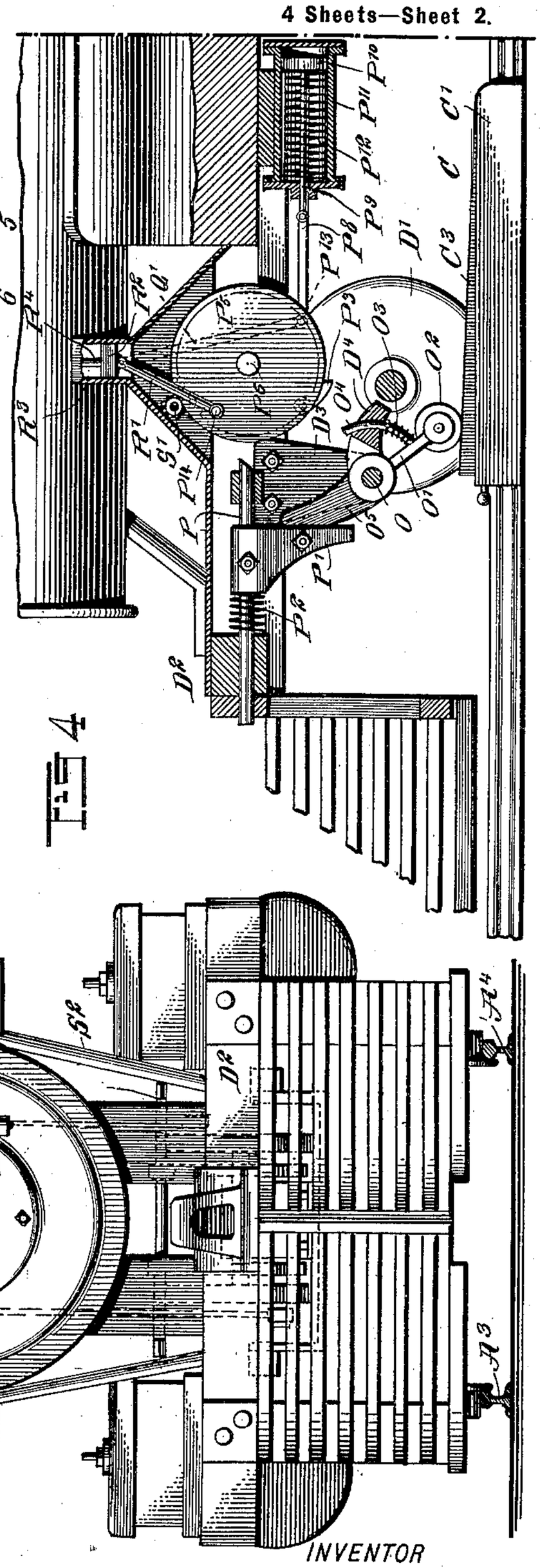

FIG. 4

FIG. 2

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FIG. 5

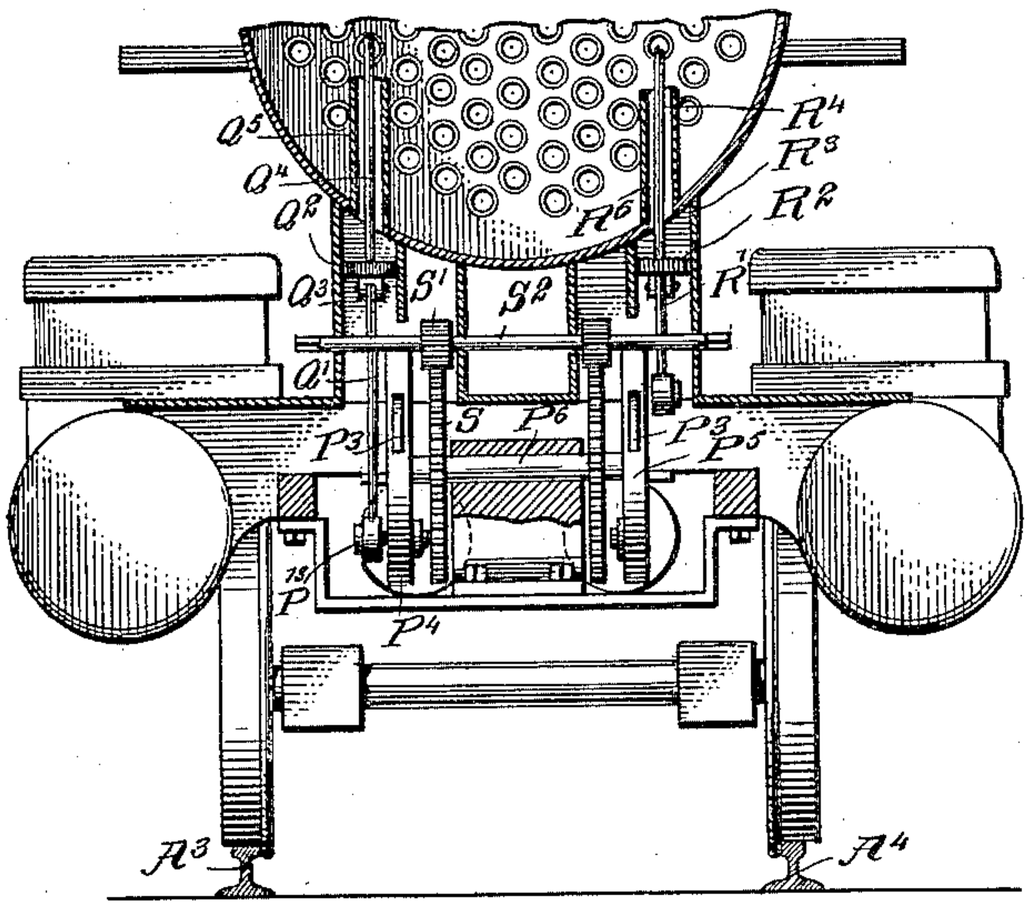


FIG. 6

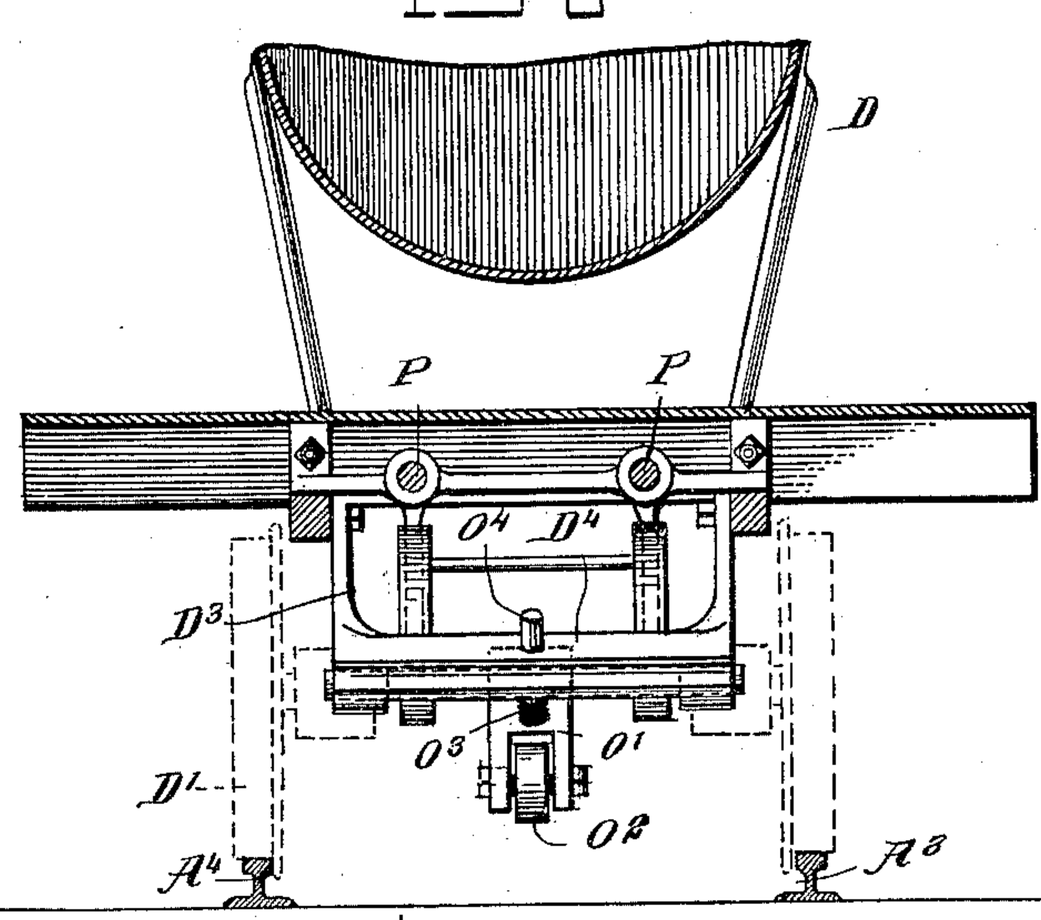
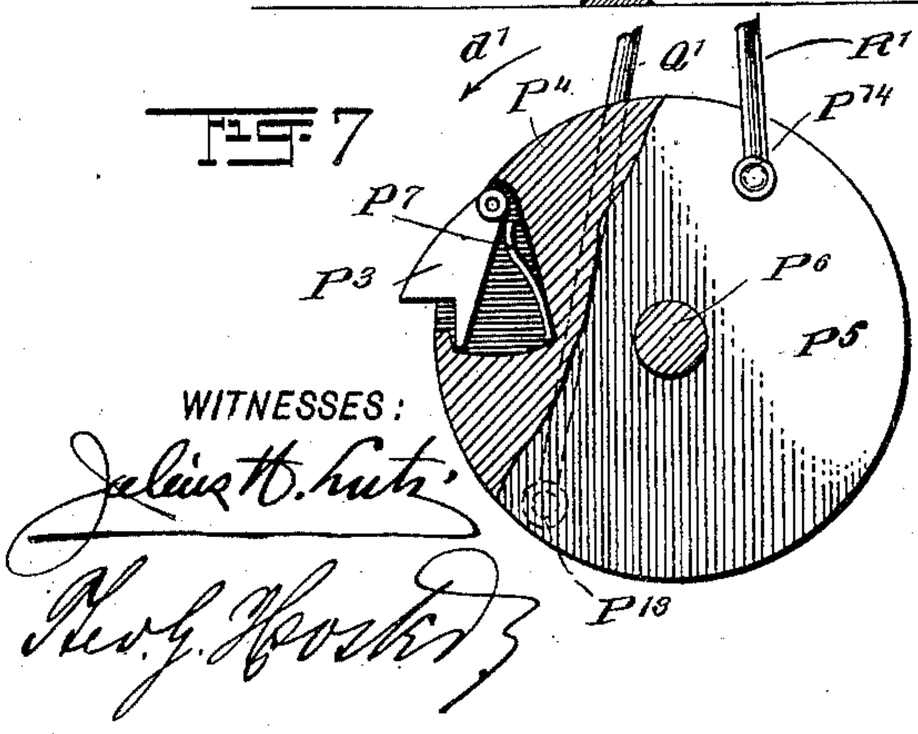
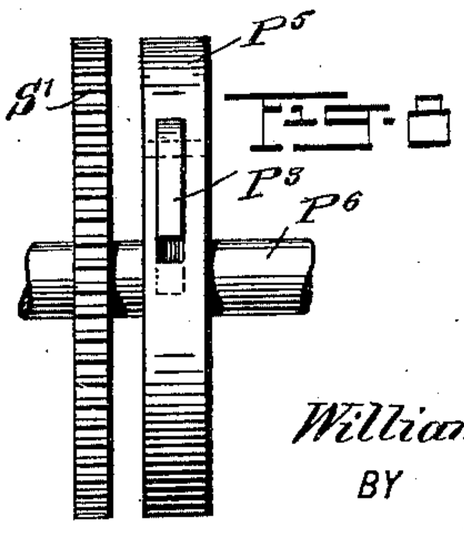


FIG. 7





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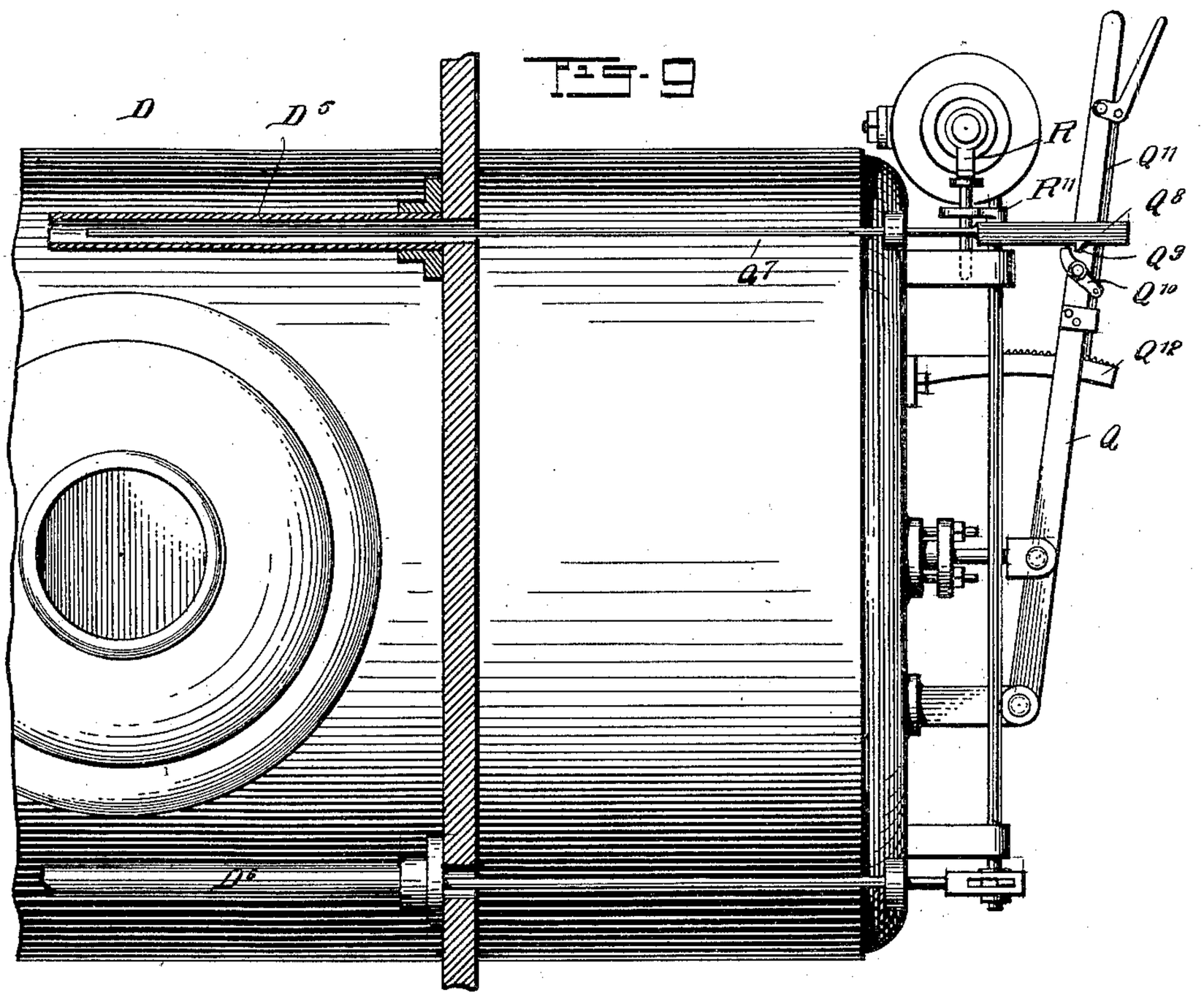

FIG. 9

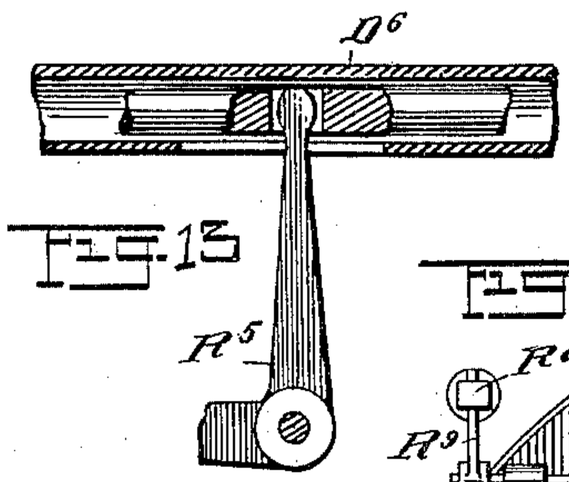

FIG. 13

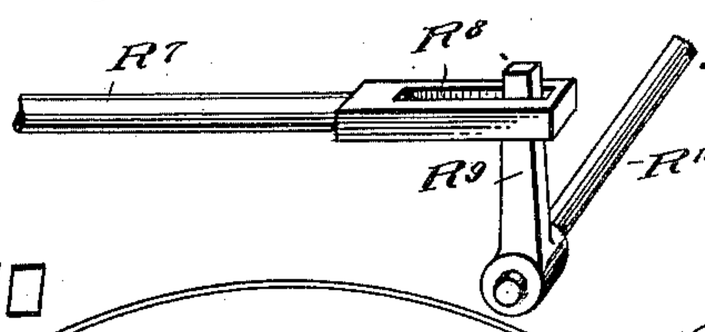

FIG. 11

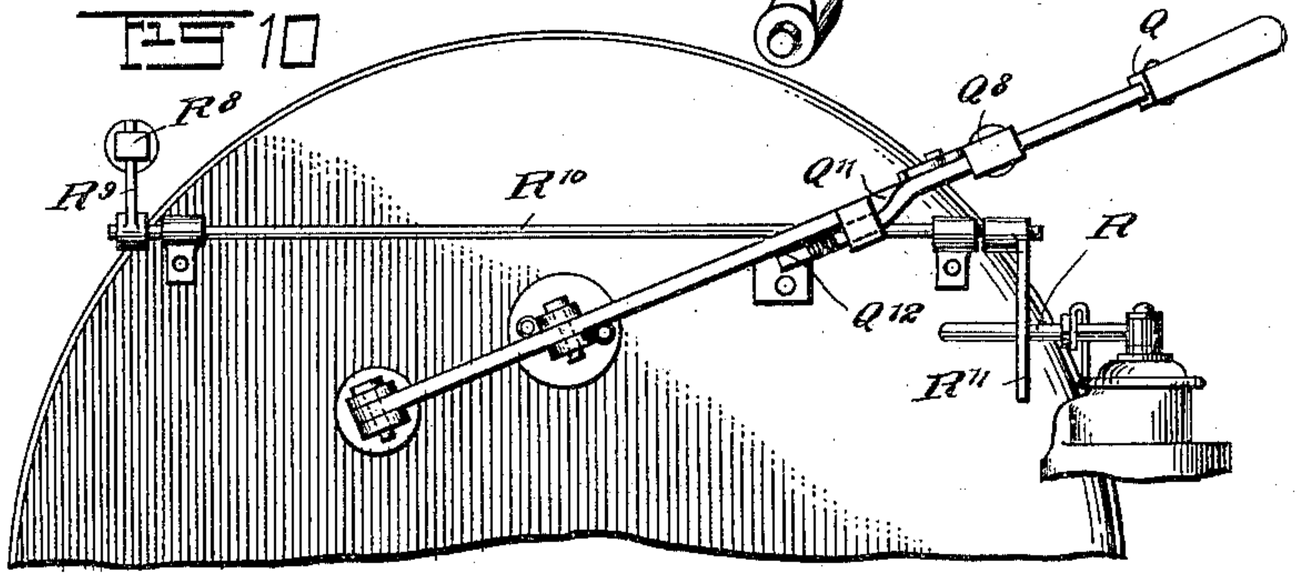

FIG. 10

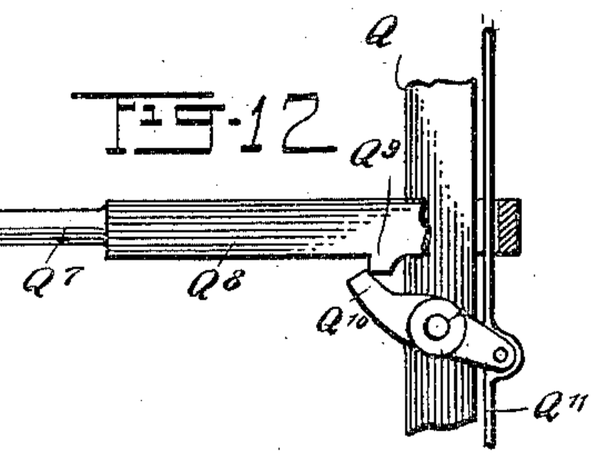

FIG. 12

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UNITED STATES PATENT OFFICE.

WILLIAM WARNER MURCH, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO JOHN R. PARKER, OF BROOKLYN, NEW YORK.

EMERGENCY-GEAR FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 706,988, dated August 12, 1902.

Original application filed November 9, 1900, Serial No. 50,460. Divided and this application filed June 5, 1901. Renewed January 16, 1902. Serial No. 90,059. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WARNER MURCH, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Emergency-Gear for Locomotives, of which the following is a full, clear, and exact description, this being a division of the application for Letters Patent of the United States for an Automatic Safety Gear and Signal System, No. 50,460, filed by me on November 9, 1900.

The invention relates to block systems for railroads; and its object is to provide a new and improved emergency-gear for locomotives for preventing collisions by automatically shutting off the steam and applying the brakes to bring the train to a standstill without any action on the part of the engineer in case the latter has disregarded a danger-signal and is about to pass upon a section of the road occupied by another train or into an open draw.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a locomotive with the mechanism for automatically operating the throttle-lever and the air-brake mechanism. Fig. 2 is a front end elevation of the same. Fig. 3 is a sectional side elevation of part of the same with parts in a locked dormant position. Fig. 4 is a similar view of the same with parts in a released position. Fig. 5 is a transvere section of the same on the line 5 5 in Fig. 3. Fig. 6 is a similar view of the same on the line 6 6 in Fig. 3. Fig. 7 is an enlarged side elevation of the locking-wheel, part being in section. Fig. 8 is a front elevation of the same. Fig. 9 is an enlarged sectional plan view of the cab end of the locomotive, showing the connection with the throttle-lever and the connection with the engineer's valve-handle. Fig. 10 is a rear end elevation of the same. Fig. 11 is an enlarged perspective view of part of the mechanism for operating the engineer's valve-handle. Fig. 12 is an enlarged sectional side elevation, with part broken out, of the connection with the throttle-lever; and Fig. 13 is an enlarged sectional side elevation of part of the mechanism for operating the throttle valve-lever and the engineer's valve-handle.

In the application above referred to I make use of a track device and a controller C, of which the former is actuated by a wheel D′ of a locomotive or other motor D at the head of a train, and said track device in one block controls the setting to "danger" of the controller C in the preceding block and also controls the resetting of the track device in this block, and thereby brings the controller C in the second preceding block back into a normal inactive position, as more fully shown and described in the application referred to, so that further description of the track device and its workings and the detail construction of the controller is not deemed necessary, it being, however, understood that when the controller is in a danger or active position, as shown in Fig. 4, it serves to actuate the mechanism on the locomotive or motor D to automatically shut off the motive-agent supply and to apply the brakes, and thereby bring the train to a standstill in case the engineer has disregarded the danger-signal at the entrance of a block or an open draw. When the controller is in a danger position it has its lever C^3 standing in an inclined position, as shown in Fig. 4, and when the locomotive or motor D passes over this controller then the lever C^3 actuates the following mechanism to shut off the throttle-valve and apply the brakes.

On the forward end of the locomotive-frame D^2 is secured a hanger-frame D^3, in which is journaled a transversely-extending shaft O, having a downwardly and rearwardly extending arm O′, in which is journaled a friction-roller O^2, adapted to travel on the inclined top of the controller-lever C^3, as is plainly indicated in Fig. 4. A spring O^3 holds the arm

O′ normally in a lowermost position, as shown in Fig. 3, and this spring O^3 is actuated by a segmental arm O^4, mounted to slide in a cross-bar D^4 of the hanger-frame D^3. When the friction-roller O^2 travels over the lever C^3, then a rearward and upward swinging motion is given to the arm O′ to turn the shaft O against the tension of the spring O^3, and when the friction-roller O^2 leaves the controller-lever C^3 then the spring O^3 returns the arm O′ and shaft O to the normal position. (Shown in Fig. 3.) On the shaft O is secured an upwardly-extending wiper O^5, adapted to push a cross-head P′ forward, said cross-head being secured on two bolts P, mounted to slide longitudinally in suitable bearings arranged on the locomotive-frame. A spring P^2 presses the cross-head P′, so as to normally hold the latter and the bolts P in a rearmost position—that is, with the bolts in engagement with teeth P^3, pivoted in the periphery of crank-disks P^4 P^5, secured on a shaft P^6, extending transversely and journaled in suitable bearings on the locomotive-frame D^2. Each tooth P^3 is held in an outermost position by a spring P^7, (see Fig. 7,) so that the bolts P lock the crank-disks P^4 P^5 and the shaft P^6 against rotation in the direction of the arrow d'. (See Figs. 3 and 7.) Each of the crank-disks P^4 P^5 is pivotally connected by a link P^8 with the piston-rod P^9 of a piston P^{10}, mounted to reciprocate in a cylinder P^{11}, secured to the locomotive-frame, as indicated in Figs. 3 and 4. A spring P^{12}, coiled on the piston-rod P^9, rests with one end against one of the cylinder-heads and presses with the other end the piston P^{10}, so as to force the latter rearward when the bolts P move out of engagement with the teeth P^3 upon the wiper O^5, pushing the cross-head P′ forward at the time the friction-roller O^2 travels on the top surface of the lever C^3. (See Fig. 4.) The bolts P normally lock the crank-disks P^4 P^5 against rotation, as described, the spring P^{12} then being compressed, as indicated in Fig. 2; but as soon as the bolts P move out of engagement with the teeth P^3 then the spring P^{12} forces the piston P^{10} rearward, and the piston-rod P^9 and link P^8 impart a rotary motion to the crank-disks in the direction of the arrow d' to bring the disks to the position shown in Fig. 4. The crank-disk P^4 is connected with a throttle-lever Q, and the other crank-disk P^5 is connected with the engineer's brake-lever R, and the connecting mechanisms are arranged in such a manner that the throttle-lever Q is actuated to shut off the steam, and then the engineer's lever R is actuated to apply the brakes.

The intermediate mechanism between the disk P^4 and the throttle-lever Q is arranged as follows: A wrist-pin P^{13} on the crank-disk P^4 is connected by a pitman Q′ with a piston Q^2, mounted to slide in a vertically-disposed open-ended cylinder Q^3, extending on the under side of the smoke-box of the boiler, as is plainly shown in Figs. 4 and 5. The piston Q^2 has its piston-rod Q^4 extending upwardly through a tube Q^5, reaching through the smoke-box, and the upper end of said piston-rod Q^4 is pivotally connected with a bell-crank lever Q^6, engaging a rod Q^7, mounted to slide longitudinally in the hollow hand-rail D^5 of the locomotive, as is plainly indicated in Fig. 9. The rear end of the rod Q^7 extends into the cab of the locomotive and is provided with a loop Q^8, through which extends the throttle-lever Q, as is plainly illustrated in Figs. 9, 10, and 12. On the loop Q^8 is a lug Q^9, adapted to engage a lever Q^{10}, connected with a pawl Q^{11} on the throttle-lever Q and serving to lock the hand-lever in position on a segment Q^{12} in the usual manner. When the crank-disk P^4 is released and is caused to turn in the direction of the arrow d', as previously mentioned, then the pitman Q′ first imparts a downward sliding motion to the piston Q^2, so that the piston-rod Q^4 actuates the bell-crank lever Q^6 to move the rod Q^7 forward, so that the lug Q^9 first unlocks the pawl Q^{11}, and then the loop Q^8 imparts a forward swinging motion to the lever Q to close the throttle-valve, and thereby shut off the steam from the locomotive-engine.

The connection between the crank-disk P^5 and the engineer's valve is arranged as follows: On the crank-disk P^5 is a wrist-pin P^{14}, connected by a pitman R′ with a piston R^2, mounted to slide vertically in a cylinder R^3, depending from the smoke-box of the locomotive, and said piston R^2 has its piston-rod R^4 extending upwardly through a pipe R^6, reaching vertically through the smoke-box. The upper end of the piston-rod R^4 is connected with a bell-crank lever R^5, engaging a rearwardly-extending rod R^7, (see Figs. 9, 10, 11, and 13,) extending in the hollow hand-rail D^6 of the locomotive. On the rear end of the rod R^7 is arranged a loop R^8, engaging an arm R^9, secured on one end of a shaft R^{10}, extending transversely at the rear end of the locomotive-boiler and journaled in suitable bearings attached thereto. The other end of the shaft R^{10} carries a fork R^{11}, straddling the engineer's lever R, so that when a turning motion is given to the crank-disk P^5, as above explained, then the pitman R′ imparts a downward motion to the piston R^2, and the latter, by the piston-rod R^4, the bell-crank lever R^6, and the rod R^7, imparts a swinging motion to the arm R^9, whereby the shaft R^{10} is turned, and the fork R^{11} imparts a swinging motion to the engineer's brake-lever R to turn the latter from the running position to a position for application of brakes, so that the brakes are applied. It is expressly understood that the crank-disks P^4 P^5 are simultaneously released when the friction-roller O^2 travels over the controller-lever C^3, so that the mechanisms above mentioned are simultaneously actuated. By reference to Figs. 3 and 4 it will be seen that the wrist-pins P^{13} and P^{14} are so arranged that during the first part of the turning motion of the crank-disks the wrist-pin P^{13} moves downward, and thus

causes a forward swinging movement of the throttle-lever Q, while during the same period the other wrist-pin P^{14} moves upward, and hence the loop R^8 moves rearward and does not turn the arm R^9, and hence the brakes are not applied until after the steam is shut off. Thus the action is successive—that is, the steam is shut off—and then the brakes are applied to bring the train to a standstill in a comparatively short time. Thus the train is automatically brought to a standstill without any action on the part of the engineer, so that collision with the train ahead is completely avoided.

By having the loops Q^8 R^8 the engineer is enabled to work the throttle-lever Q and the engineer's brake-lever R in the usual manner during the ordinary running of the train. When, however, the throttle-lever Q and the engineer's brake-lever R are automatically actuated as described, then it is necessary for the engineer to reset the entire device on the front of the locomotive to bring the rods R^7 and Q^7 back to their former position before the engineer can again actuate the levers Q and R. For the purpose described the shaft P^6 is provided with gear-wheels S, in mesh with pinions S′ on a transverse shaft S^2, journaled in suitable bearings on the front end of the locomotive, the outer ends of the shaft being polygonal for the application of a wrench, crank-arm, or like tool to permit the engineer to turn the shaft S^2, pinions S′, and gear-wheels S to rotate the shaft P^6 in the reverse direction and bring the crank-disks back to their forward position, the released bolts P again engaging the teeth P^3, as previously explained.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A safety gear and signal system for railroads, comprising a track device and a controller for controlling signals and for controlling mechanism on a locomotive, to automatically shut off the motive agent and to apply the brakes, said device having a lever adapted to be depressed by a train-wheel, a cross-head, a connection between the lever and the cross-head to move the latter forward on the downward movement of the lever, and a rod attached to the cross-head and extending rearwardly, said rod carrying means for actuating said controller, to set the latter to danger position, as set forth.

2. A safety gear and signal system for railroads, comprising a track device and a controller for controlling signals and for controlling mechanism on a locomotive, to automatically shut off the motive agent and to apply the brakes, said device having a lever adapted to be depressed by a train-wheel, a cross-head, a connection between the lever and the cross-head to move the latter forward on the downward movement of the lever, a rod attached to the cross-head and extending rearwardly, said rod carrying means for actuating said controller, to set the latter to danger position, and a spring device for said connection, to move the latter and the lever back to a normal position after the cross-head is moved and the lever is relieved of pressure of the wheel, as set forth.

3. A safety gear and signal system for railroads, comprising a track device and a controller for controlling signals and for controlling mechanism on a locomotive, to automatically shut off the motive agent and to apply the brakes, said device having a lever adapted to be depressed by a train-wheel, a cross-head, a connection between the lever and the cross-head to move the latter forward on the downward movement of the lever, a rod attached to the cross-head and extending rearwardly, said rod carrying means for actuating said controller, to set the latter to danger position, and means connected with the rear end of said rod for moving the cross-head of the preceding track device into a normal position, as set forth.

4. A safety gear and signal system for railroads, comprising a track device and a controller for controlling signals and for controlling mechanism on a locomotive, to automatically shut off the motive agent and to apply the brakes, said device having a lever adapted to be depressed by a train-wheel, a cross-head, a connection between the lever and the cross-head to move the latter forward on the downward movement of the lever, a rod attached to the cross-head and extending rearwardly, said rod carrying means for actuating said controller, to set the latter to danger position, and signals connected with and set by said rod, as set forth.

5. A safety gear and signal system for railroads, having a track device, comprising a lever adapted to be engaged by a train-wheel, a link-lever engaging with one end the said wheel-lever and traveling freely at its outer end on a fixed incline, a spring-pressed piston, and a link connection between said lever and the piston-rod of said piston, as set forth.

6. A safety gear and signal system for railroads, having a track device provided with a track-lever adapted to be engaged by a train-wheel, a second lever hung on links and having a friction-roller engaged by the under side of said track-lever, an adjustable block having an incline engaged by another friction-roller on said link-lever, a cylinder, a spring-pressed piston therein, and a connection between said piston and said link, as set forth.

7. A safety gear and signal system for railroads, having a track device provided with a casing having an opening in the top, a lever fulcrumed within the casing and having a portion extending through said opening, and a packing in the walls of said opening, for engaging the portion of said lever extending in the opening, as set forth.

8. A safety gear and signal system, provided with a track device having a track-lever adapted to be engaged by a train-wheel,

a shaft connected with and adapted to be turned by said lever, wipers on said shaft, and a cross-head mounted to slide longitudinally and having a rod extending rearwardly from the cross-head to actuate a controller and the signals, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM WARNER MURCH.

Witnesses:
THEO. G. HOSTER,
JNO. M. RITTER.