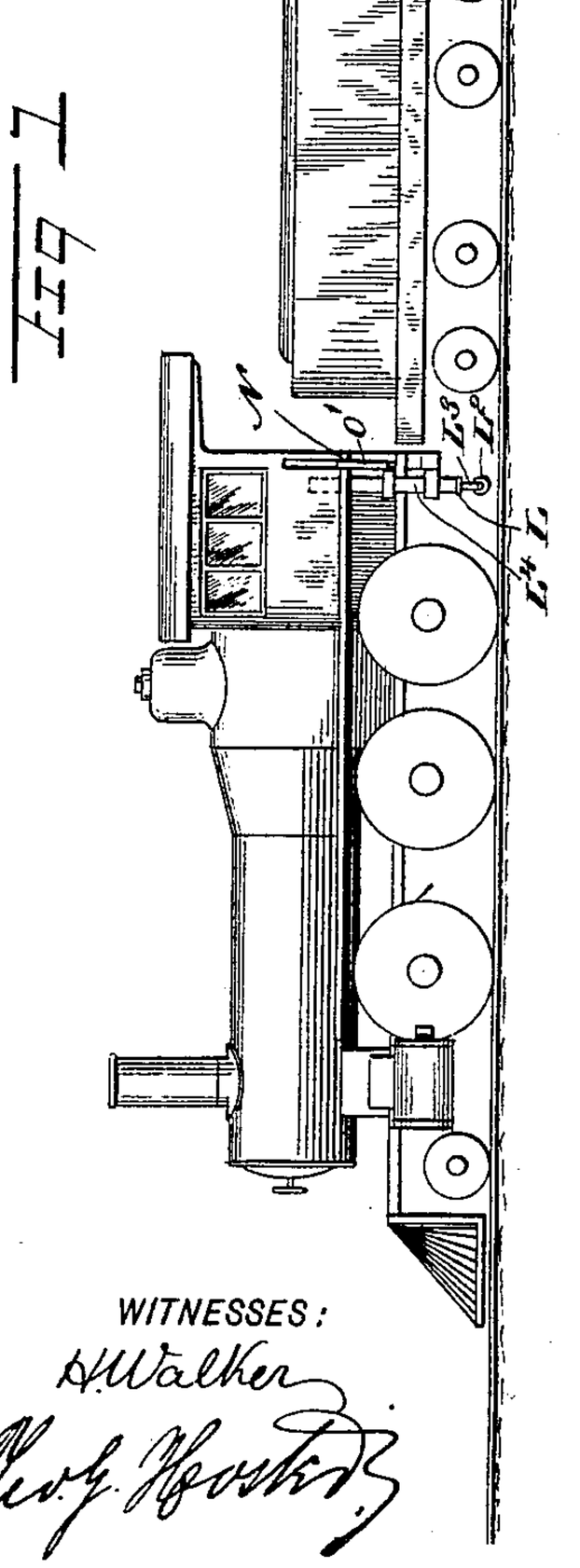
No. 680,537. Patented Aug. 13, 1901.

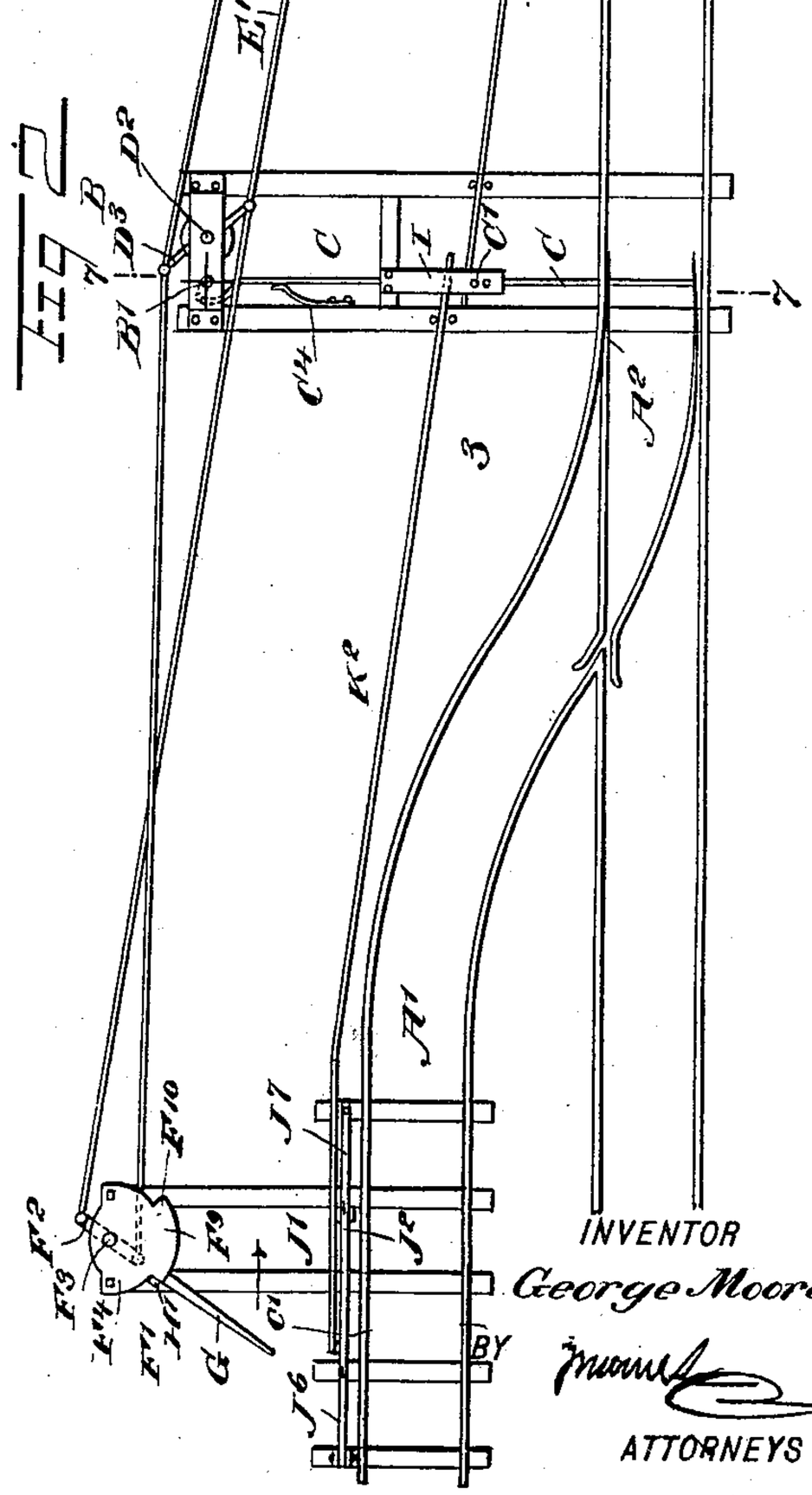
G. MOORE.

RAILROAD SWITCH.

(Application filed Feb. 20, 1901.)

(No Model.) 4 Sheets—Sheet 1.





WITNESSES:

H. Walker

Percy Hooker

INVENTOR

George Moore

BY

Munn & Co

ATTORNEYS

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(No Model.)

4 Sheets—Sheet 2.

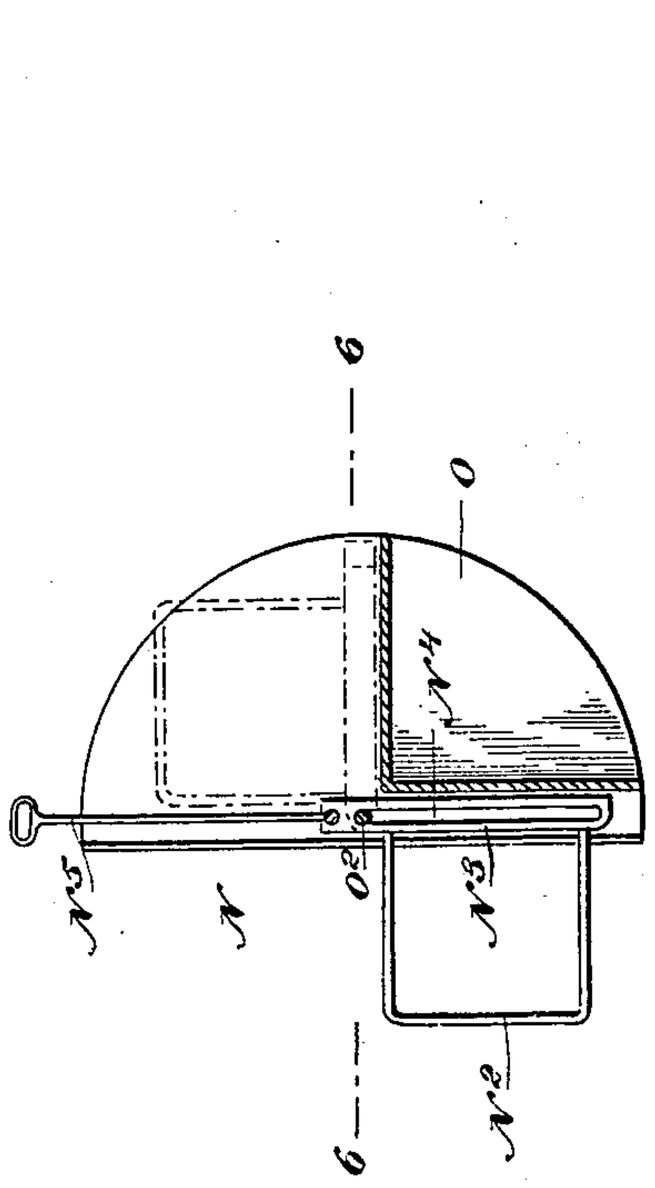


FIG 5

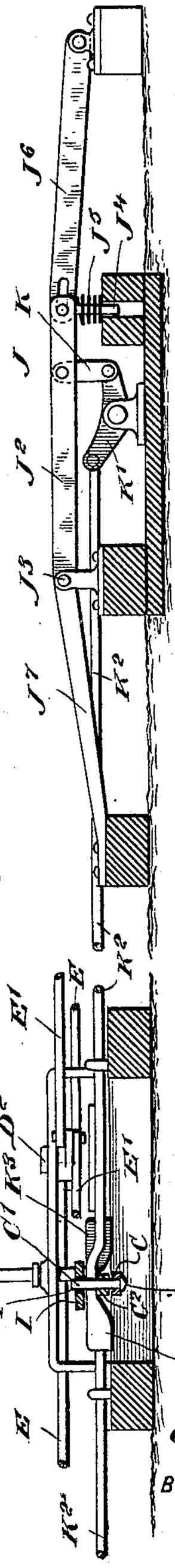


FIG 6

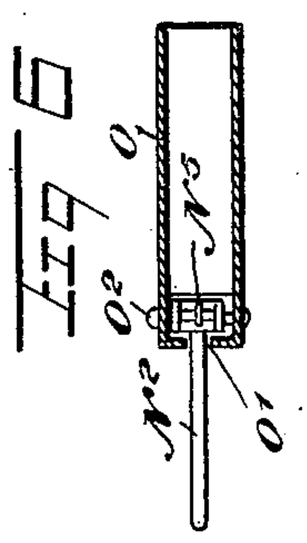


FIG 4

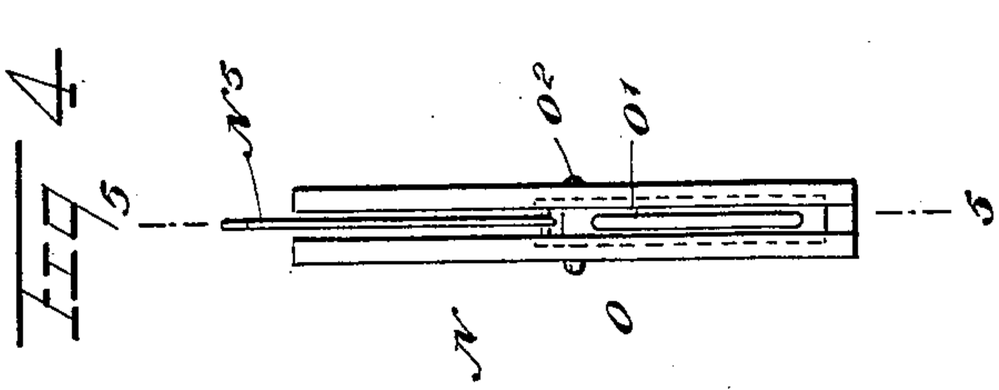
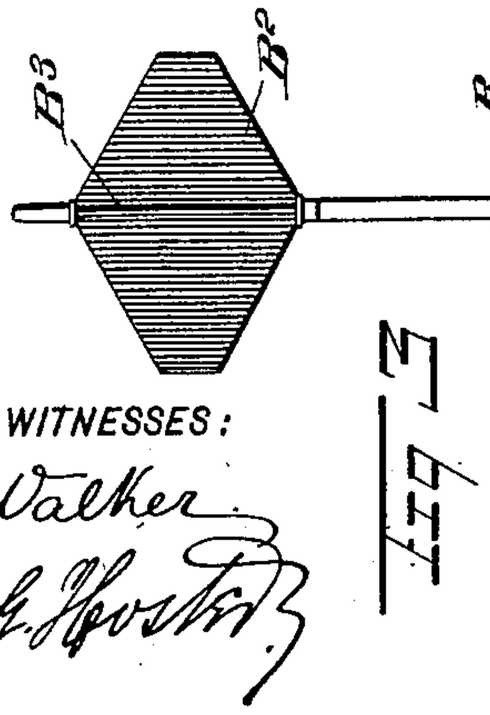


FIG 7



WITNESSES:

H. Walker

Geo. J. Houston

INVENTOR

George Moore

BY Munn & Co

ATTORNEYS

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G. MOORE.

RAILROAD SWITCH.

(Application filed Feb. 20, 1901.)

(No Model.) 4 Sheets—Sheet 3.

Fig 7

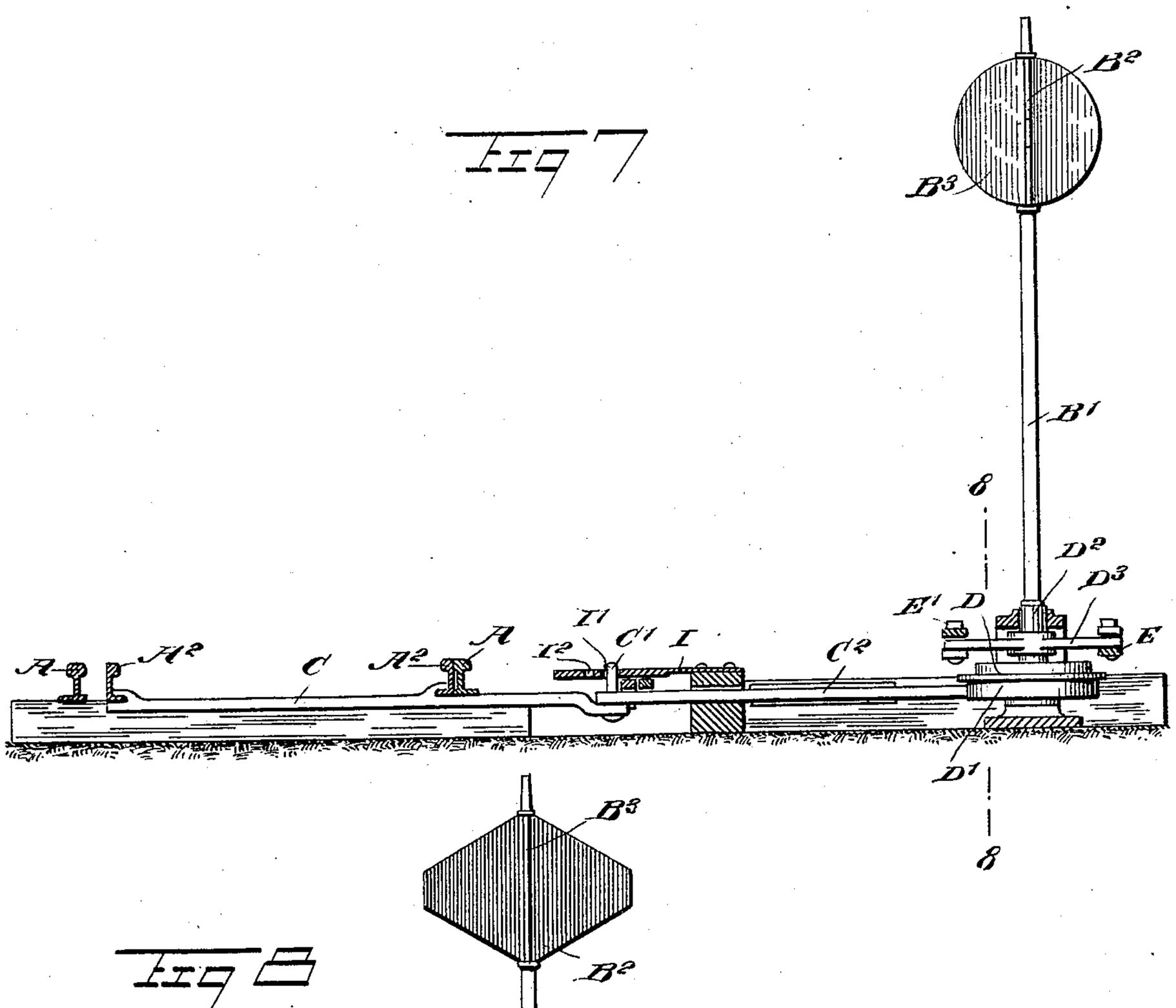
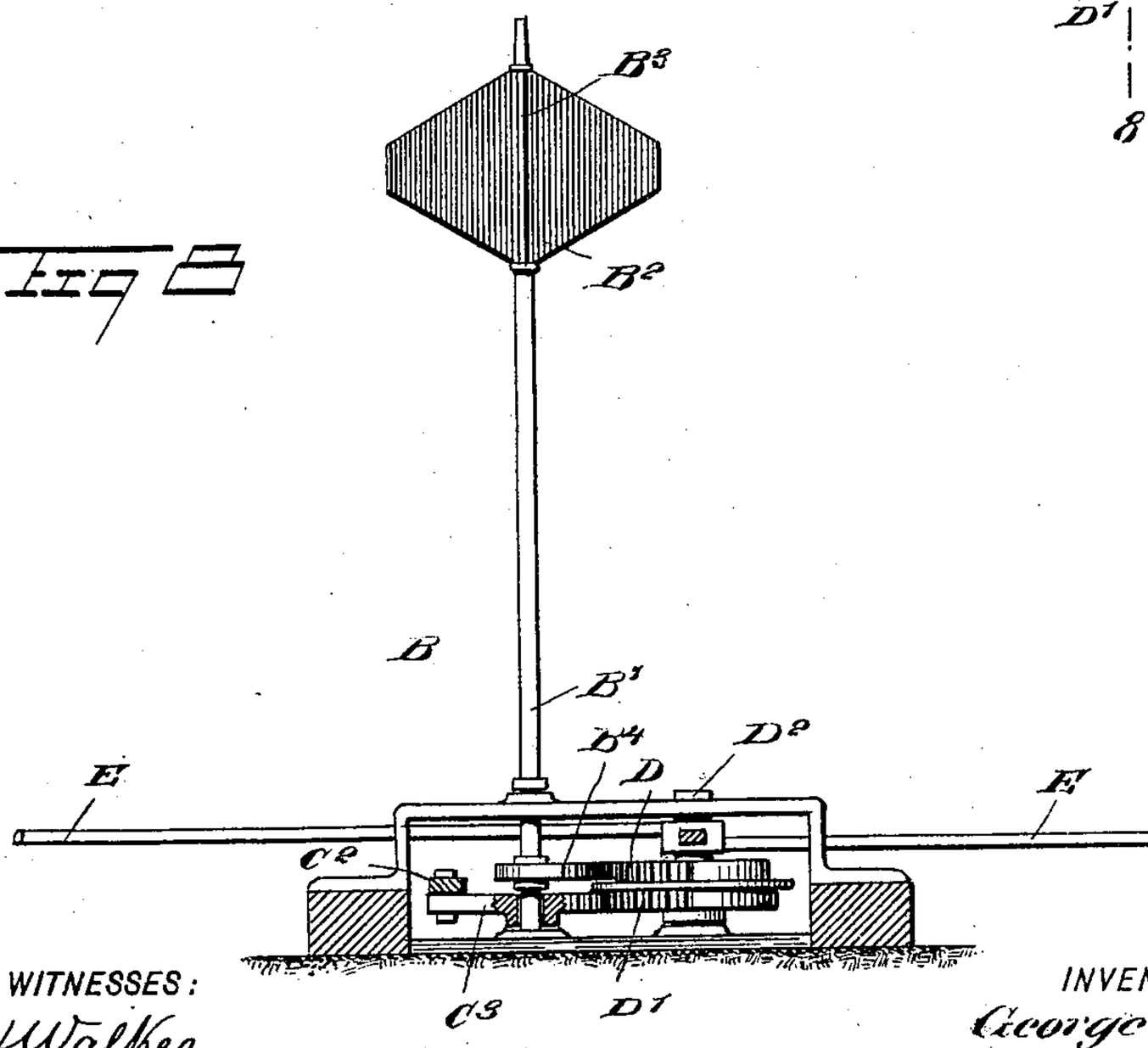


Fig 8



WITNESSES:

H. C. Walker

Percy J. Hoosteds

INVENTOR

George Moore

BY Munn & Co

ATTORNEYS

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G. MOORE.

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4 Sheets—Sheet 4.

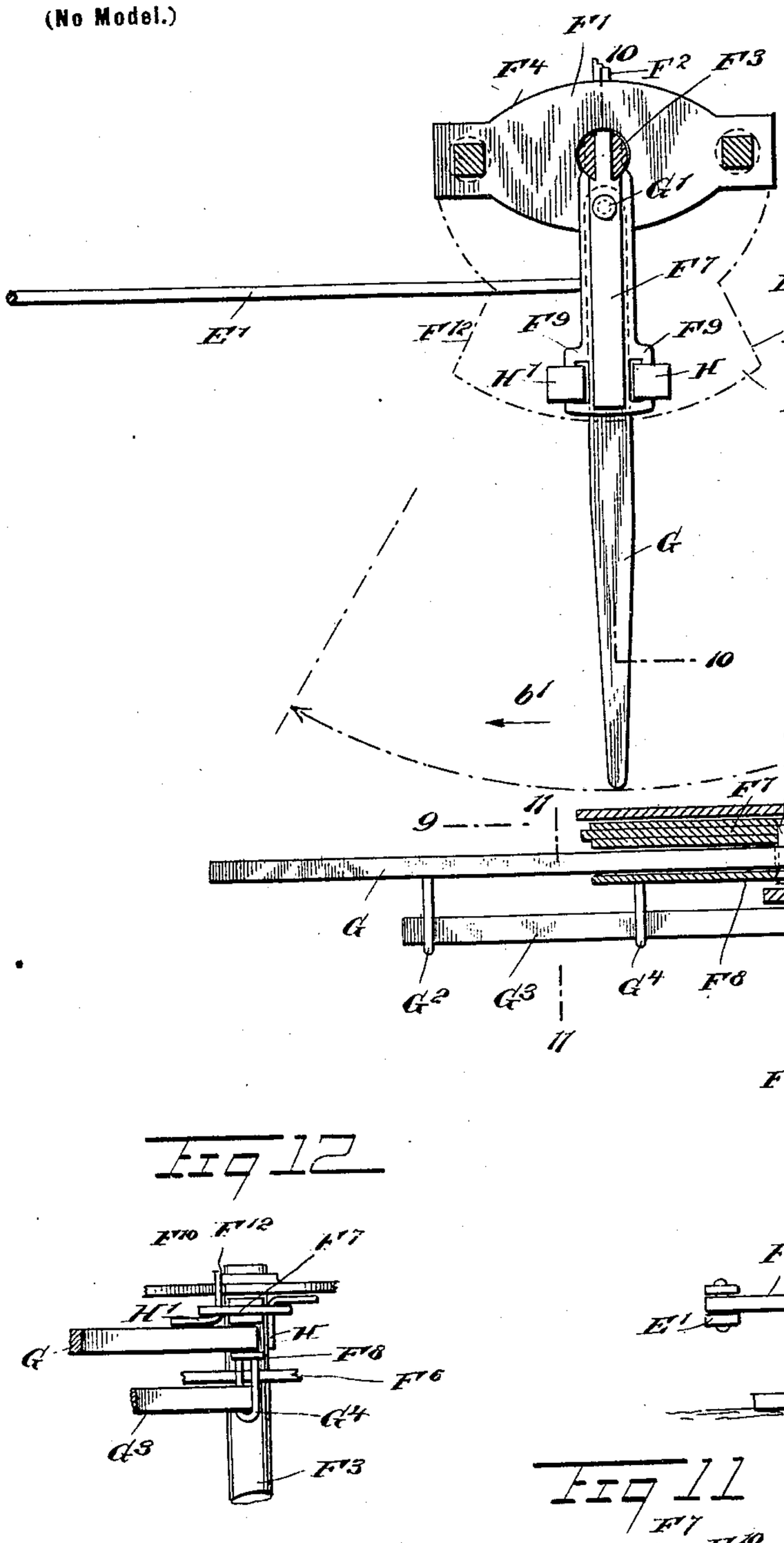

Fig 10

Fig 12

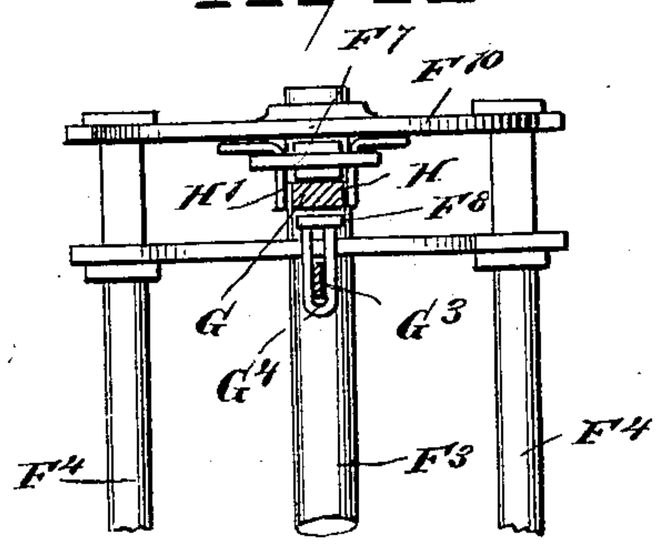

Fig 11

WITNESSES:

H. W. Walker

Henry J. Hoover

INVENTOR

George Moore

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE MOORE, OF ELLSWORTH, IOWA.

RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 680,537, dated August 13, 1901.

Application filed February 20, 1901. Serial No. 48,099. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MOORE, a citizen of the United States, and a resident of Ellsworth, in the county of Hamilton and State of Iowa, have invented a new and Improved Railroad-Switch, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved railroad-switch which is simple and durable in construction and arranged to permit the engineer of a train to unlock and open the switch to pass, for instance, from the main track upon a side track and to then lock the switch in the open position or to pass the train from the side track back to the main track and to again close the switch and lock it in a closed position, all without the assistance of switch-tenders and without stopping the train.

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 train provided with the means for opening and closing the switch. Fig. 2 is a plan view of the improvement. Fig. 3 is an enlarged sectional side elevation of the same on the line 3 3 in Fig. 2. Fig. 4 is an enlarged side elevation of the device on the train for actuating the switch mechanism. Fig. 5 is a transverse section of the same on the line 5 5 in Fig. 4. Fig. 6 is a sectional plan view of the same on the line 6 6 in Fig. 5. Fig. 7 is an enlarged transverse section of the improvement on the line 7 7 in Fig. 2. Fig. 8 is a sectional side elevation of the same on the line 8 8 in Fig. 7. Fig. 9 is an enlarged sectional plan view of one of the actuating devices for the switch-stand, the section being on the line 9 9 in Fig. 10. Fig. 10 is a cross-section of the same on the line 10 10 in Fig. 9. Fig. 11 is a sectional side elevation of part of the same, the section being taken on the line 11 11 in Fig. 10, and Fig. 12 is a like view of the same with parts in a different position.

As illustrated in Fig. 2, the main track is adapted to be connected with a side track A' by the switch-rails A^2, shifted by the mechanism of the switch-stand B, located at one side of the track, as indicated in the figure referred to. The switch-rails A^2 are carried by a transversely-extending rod C, connected by a pin C' with a rod C^2, pivotally connected with a segmental gear-wheel C^3, mounted to turn loosely on the lower end of the shaft B', carrying at its upper end a safety-signal B^2 and a danger-signal B^3, standing at a right angle to one another, as indicated in the drawings. On the shaft B' of the switch-stand is secured a segmental gear-wheel B^4, in mesh with a segmental gear-wheel D, somewhat less in diameter than the segmental gear-wheel D', secured with the gear-wheel D on the shaft D^2 and in mesh with the segmental gear-wheel C^3, previously mentioned. Thus when the shaft D^2 is rotated a simultaneous rotary motion is transmitted to the gear-wheels B^4 and C^3, whereby the gear-wheel B^4 turns the shaft B' to change the position of the signals B^2 B^3 from "safety" to "danger," or vice versa, according to the direction in which the shafts D^2 B' are turned. The turning motion given to the gear-wheel C^3 causes the rods C^2 and C to move transversely and shift the switch-rails A^2 from a closed position into an open position, or vice versa, according to the direction in which the shaft D^2 is turned, it being understood that the signals B^2 B^3 change their positions according to the change of position of the switch-rails.

The shaft D^2 is provided with a diametrically-extending bar D^3, connected at its outer ends by two rod-and-lever connections E E', with switch-stand-actuating devices F F', of which the device F is arranged alongside the main track at one side of the switch-rails A^2, while the other device F' is arranged alongside the side track A' on the other side of the switch-rails A^2. The two devices F F' are alike in construction, and each is provided with a cross-bar F^2, to which the ends of the connections E E' are attached, each cross-bar being secured on a vertically-disposed shaft F^3, mounted to turn in suitable bearings arranged on a framework F^4, as indicated in Figs. 2, 9, 10, 11, and 12.

Near the upper end of the shaft F^3 are secured arms F^7 F^8, carrying near their inner

ends a vertically-disposed pivot G′ for a lever G, extending toward the track A or A′ and provided with a depending loop G^2, engaged by the free end of a spring G^3, extending through a loop G^4, depending from the arm F^8. (See Fig. 10.) The end of the spring G^3 is secured in the shaft F^3, so that when a swinging motion is given to the lever G past a normal position and then released the spring returns the lever to a normal position. During the major portion of the swinging movement given to the lever G by devices on the train, as hereinafter more fully described, the lever is positively locked to the shaft F^3, and for this purpose said lever extends normally on opposite sides of two L-shaped dogs H H′, mounted to swing in eyes F^9, formed on the arm F^7. Normally the upper members of the dogs H H′ abut against the under side of a plate F^{10}, forming part of the framework F^4, said dogs being adapted to disengage the plate at shoulders F^{10} F^{11} whenever the lever G is moved to one side to bring the dogs past said shoulders. When this takes place, the swinging motion given to the lever causes the corresponding dog against which it passes to swing upward into the position shown in Fig. 12, so that the lever G becomes unlocked and is free to swing farther, but against the tension of the spring G^3, without, however, turning the shaft F^3. When a swinging motion is given to the lever G, the shaft F^3 is turned, and the connections E E′ impart a swinging motion to the shaft D^2, so that the switch-rails A^2 are opened or closed, according to which device F or F′ is actuated at the time.

The switch-levers A^2 are locked in either a closed or open position, and for this purpose a locking-plate I is provided, preferably made of spring metal and formed with two apertures I′ I^2, adapted to be engaged by the pivot-pin C′, previously mentioned, so as to hold the rods C C^2 against transverse movement as long as the pin engages either of the said apertures. In order to move the locking-plate I out of engagement with the pin C′ prior to actuating the devices F or F′, I provide the lock-actuating devices J J′, of which the device J is located along the main track A in close proximity to the device F, so that the device J is actuated previous to actuating the lever G of the device F, and the rails A^2 are unlocked before the device F is actuated and the switch-rails are shifted. The other device J′ is arranged alongside the track A′ in close proximity to the device F′ and is likewise actuated previously to the device F′, so that the switch-rails A^2 are unlocked previously to actuating the lever G of the device F′.

The devices J J′ are alike in construction and each is arranged as follows: The lever J^2 extends to the outside of one of the track-rails and is pivoted at one end on a bracket J^3, carried by one of the railroad-ties, and the opposite end of the lever carries a depending pin J^4, (see Fig. 3,) on which is coiled a spring J^5, resting on one of the rail-ties and engaging the lower side of the lever J^2, so as to hold the latter normally in a horizontal position, as indicated in Fig. 3. The free end of the lever J^2 is connected with a link J^6, extending in an inclined direction, and the pivotal end of said lever is likewise connected with an inclined bar J^7. The lever J^2 near its free end is connected by a link K with a bell-crank lever K′, connected with a rod K^2 and extending to the locking-plate I, as is plainly indicated in Fig. 2.

On the inner ends of the rods K^2 are formed wedge-shaped blocks K^3, adapted to ride on the top of the rod C^2 to engage the under side of the locking-plate I, so as to swing the same upward at its free end and disengage the plate from the pin C′ whenever a lever J^2 of either device J or J′ is pressed in a downward direction. It is understood that when the lever J^2 is caused to swing downward against the tension of its spring J^5 by a device carried on the train, then the link K imparts a swinging motion to the bell-crank lever K′, and the latter pulls on the rod K^2, so as to cause the corresponding wedge-shaped block K^3 to move and impart an upward swinging motion to the locking-plate I to disengage the latter from the pin C′ and permit of opening or closing the switch-rails A^2.

In order to actuate the levers J^2 of the devices J J′, I provide the locomotive of a train with a device L, and a similar device L′ is arranged on the caboose or last car of the train. In order to actuate the levers G of the devices F F′, I provide the locomotive with a device N, and a similar device N′, but arranged at a different level, is located on the caboose or the last car of the train, it being understood that the devices N L and N′ L′ are duplicated on each side of the car or caboose, and the device N is on a level with the lever G of the device F, while the device N′ is on a level with the lever G′ of the device F′, so that the device N only actuates the device F, while the device N′ only actuates the device F′, as hereinafter more fully described.

Each of the devices L L′ consists, essentially, of a friction-roller L^2, journaled in the lower end of a rod L^3, mounted to slide in suitable bearings L^4, attached to the locomotive and caboose and containing a spring pressing on the rod L^3, so as to allow the latter to yield. The friction-roller L^3 normally stands sufficiently low to travel on the link J^6 or J^7 and finally move in engagement with the lever J, so as to depress the same, for the purpose previously mentioned.

Each of the devices N N′ is provided with a loop N^2, (see Figs. 4, 5, and 6,) projecting through a slot O′ in the front end of a casing O, secured to the locomotive-cab, a car, or a caboose, as is plainly indicated in Fig. 1. The loop N^2 is secured on a bar N^3, formed with an elongated slot N^4, through which extends a pin O^2, carried by the casing, and the

upper end of the bar N^3 is engaged by a handled rod N^5, under the control of the engineer or the conductor in the caboose. Normally the loop N^2 is folded in the casing O, as indicated in dotted lines in Fig. 5, so as not to project from the side of the train; but when the train nears the switch the engineer and the conductor impart a swinging motion to the bar N^3 by manipulating the rod N^5 correspondingly to swing the bar and the loop into the position shown in full lines in Figs. 5 and 6, so that the loop projects from the side of the train and engages the lever G of the device F or F′, it being expressly understood, however, that the loops N^2 of the locomotive and caboose are in different horizontal planes, so that one engages the lever G of the device F and the other only engages the lever G of the device F′. (Shown in Fig. 2.)

The operation is as follows: When the several parts are in the position shown in Fig. 2, the switch is closed, and in case a train coming on the main track A in the direction of the arrow *a′* desires to go upon the side track A′ then the engineer and conductor throw the loops N^2 into an outermost position, as above described. When the train nears a switch, the friction-roller L^2 of the device L on the locomotive engages the link J^6 and lever J^2, so as to impart a downward swinging motion to the lever and move the locking-plate I out of engagement with the pin C′, thereby unlocking the switch. Immediately after this has been accomplished the loop N^2 on the locomotive engages the lever G of the device F and imparts a swinging motion to the same in the direction of the arrow *b′*, whereby the switch-rails A^2 are moved into an open position to permit the train to pass from the main track A upon the side track A′. When the lever G is swung around in the direction of the arrow *b′*, a similar movement is given to the lever G of the device F′, only in a reverse direction—that is, in the direction of the arrow *c′*—so that the lever G when engaged by the loop N^2 of the device N′ on the caboose is swung in the inverse direction of the arrow *c′*, and consequently the switch-rails A^2 are moved back to their former positions and the switch is again closed. Thus after a train has completely passed upon the side track the switch is returned to its former position, thereby leaving the main track free and clear for a following train. During the time the train passes from the main track upon the side track the switch-rails A^2 are held in a locked position by the pin C′ engaging the other aperture I^2 of the locking-plate I, it being understood that as soon as the friction-roller L^2 of the device L leaves the lever J^2 of the device J then the said lever J^2 is returned to its previous position by the action of the spring J^5, and in the meantime the rods C C^2 have been shifted in a transverse direction, whereby it is evident that the locking-plate I in returning to its former position upon the withdrawal of the wedge K^3 engages with the aperture I^2, the pin C′ thus locking the switch-rails in an open position. Previous to the device N′ on the caboose actuating the device F′, as above described, the friction-roller L^2 of the device L′ engages the lever J^2 of the device J, so as to unlock the open switch previous to shifting the switch-rails back to the normal closed position by the action of the device N′ on the lever G of the device F′, as above described. Now in case the train desires to back from the side track upon the main track then the devices L′ N′ on the caboose successively unlock the closed switch-rails A^2 and shift the same into an open position, so that the train can pass upon the main track, and when the locomotive finally has passed upon the main track and beyond the devices J and F then the devices L and N on the locomotive successively unlock and receive the switch, whereby the switch-rails A^2 move back into a closed position for the train to proceed on the main track A, if desired.

It is understood that the loops N^2 are of such size as to impart a swinging motion to the levers G, more than is required for operating the mechanism of the switch-stand B, and after the desired throw has been given to the switch-rail the lever G is moved farther by the loop and becomes unlocked relatively to the dogs H H′ and the shaft F^3, and consequently the lever swings farther by the action of the loop until the loop finally leaves the free end of the lever, after which the latter by the action of the spring G^3 is returned to such position that a loop moving in the reverse direction again engages the lever, so as to shift the same for the purpose above described. Thus the levers G are always left in active positions after a train has passed.

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

1. A railroad-switch provided with a switch-stand having mechanism for opening and closing the switch, a locking device comprising a spring-plate having apertures for engaging a pin on said mechanism for locking the switch in position, means actuated by a device on the train for moving said plate out of engagement with the pin to unlock the switch, and a device carried on the train for operating the switch-stand mechanism to open or close the switch, as set forth.

2. A railroad-switch provided with a switch-stand having a mechanism for operating the switch and for giving danger or safety signals, a lock for locking the switch-rails in position, an operating device for the lock to unlock it and arranged for engagement by a device on the train, shafts located on opposite sides of the switch-rails and connected with the switch-stand mechanism for actuating the switch-rails, a lever on each of said shafts, means for locking the lever to the shaft during a part of its movement, and de-

vices on the train and arranged to actuate said levers after the switch is unlocked, as set forth.

3. A railroad-switch having a shaft connected with the switch-stand for actuating the switch-rails, a lever fulcrumed thereon and standing at a right angle to the shaft, a locking device for locking the lever to the shaft during part of the movement of the latter, and a spring for returning the lever to an active position, as set forth.

4. A railroad-switch having a shaft connected with the switch-stand mechanism for actuating the switch-rails, a lever fulcrumed on said shaft, a spring pressing said lever, and dogs engaging the lever on opposite sides and arranged to unlock during part of the movement of the lever, to permit the lever to swing freely, as set forth.

5. A switch-stand having a shaft adapted to be oscillated and carrying segmental gear-wheels of different diameters, a signal and switch-rail shaft having a fixed and a loose gear-wheel in mesh with said segmental gear-wheels, and a signal and switch controlled by said fixed and loose gear-wheels, as set forth.

6. A switch-stand having a shaft adapted to be turned and carrying segmental gear-wheels of different diameters, a signal and switch-rail shaft having a fixed and a loose gear-wheel in mesh with said segmental gear-wheels, a signal on said signal and switch-rail shaft, and a connection between said loose gear-wheel and the switch-rails, as set forth.

7. A switch-stand having a shaft adapted to be turned and carrying segmental gear-wheels of different diameters, a signal and switch-rail shaft having a fixed and loose gear-wheel in mesh with said segmental gear-wheels, a signal on said signal and switch-rail shaft, a connection between said loose gear-wheel and the switch-rails, and a lock on said connection for locking the switch-rails in either an open or closed position, as set forth.

8. A railroad-switch having a locking device for the switch-rail-operating mechanism, said locking device comprising a spring-plate having apertures for engaging a pin on said mechanism, a wedge-shaped block for engaging said plate and moving the latter out of engagement with said pin, and a spring-pressed lever arranged alongside the rails and adapted to be engaged by a device on the train, to impart movement to the lever, said lever having connection with said wedge-shaped block, as set forth.

9. A railroad-switch having a locking device for the switch-rail-operating mechanism, and means for actuating the locking device, the said means comprising a lever arranged alongside the rails and adapted to be engaged by a device on the train, the said lever being pivoted at one end and having a depending pin at the other end, a spring coiled on said pin and resting on a fixed support and engaging the lower side of said lever, inclined bars connected with the ends of the lever, a bell-crank lever connected by a link with the said lever, and means connected with the bell-crank lever for actuating the locking device, as set forth.

10. A railroad-switch provided with a switch-stand having mechanism for opening and closing the switch, a locking device for locking the switch in position, a device on the train for operating said locking device to unlock the switch, a lever connected with the switch opening and closing mechanism, and a device on the train for engaging the lever to operate the said mechanism, the said device comprising a loop mounted to swing and adapted to be projected from the side of the train to engage the said lever, as set forth.

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

GEORGE MOORE.

Witnesses:
G. W. MILLER,
M. H. BRINTON.