No. 830,522. PATENTED SEPT. 11, 1906.

F. P. J. PATENALL.

APPARATUS FOR MOVING RAILWAY SWITCHES AND SIGNALS.

APPLICATION FILED NOV. 25, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

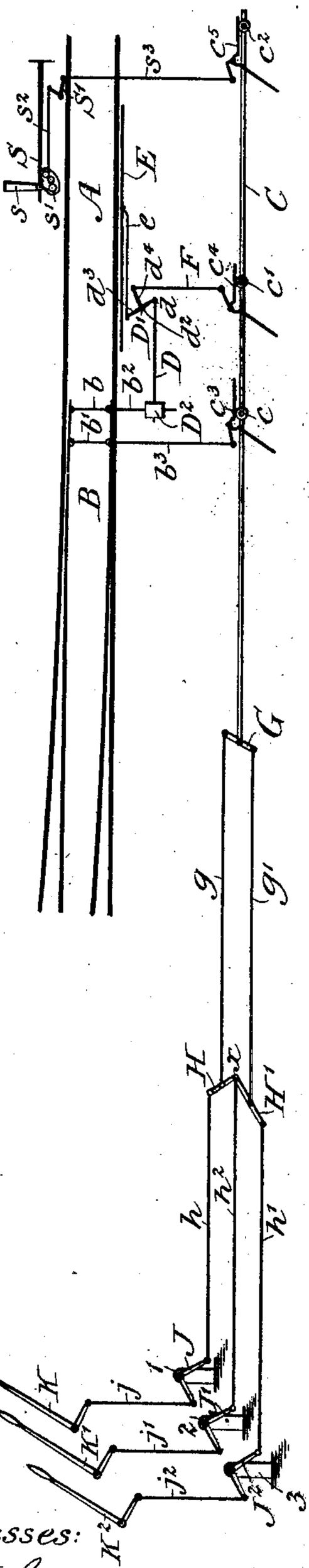
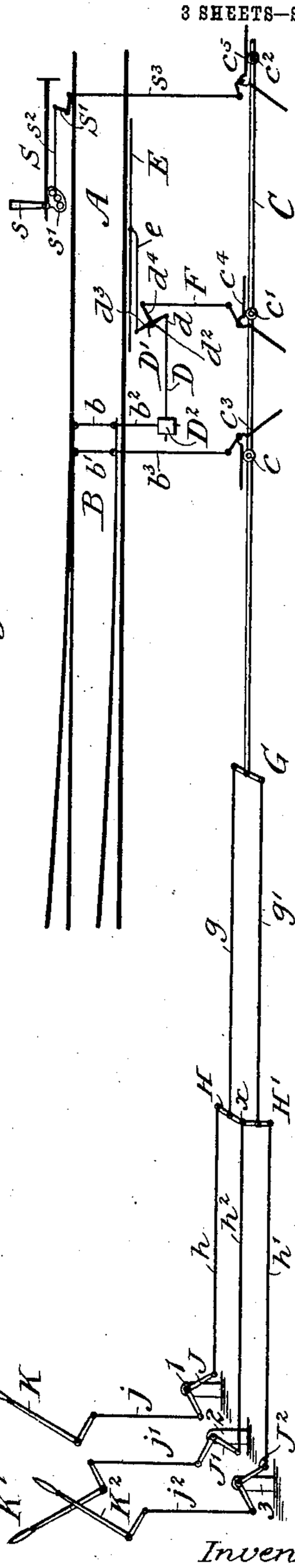


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

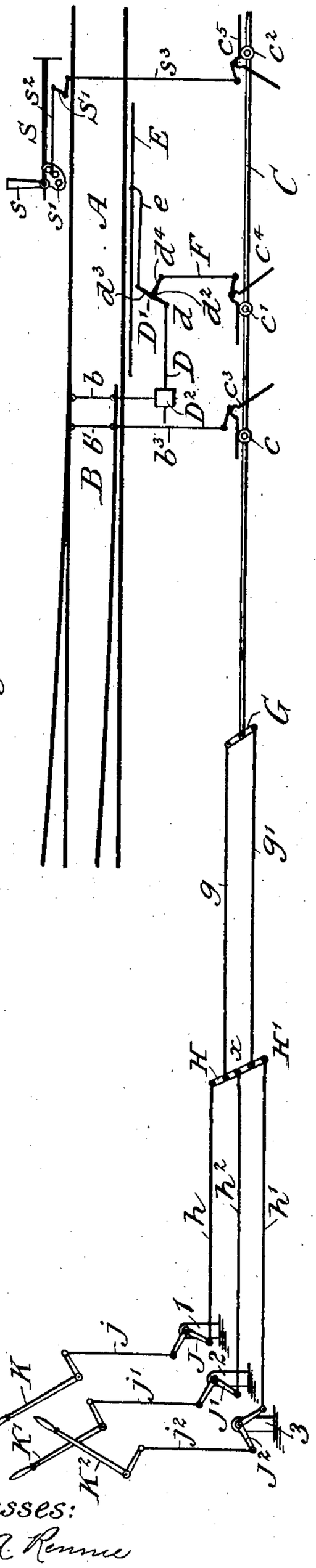
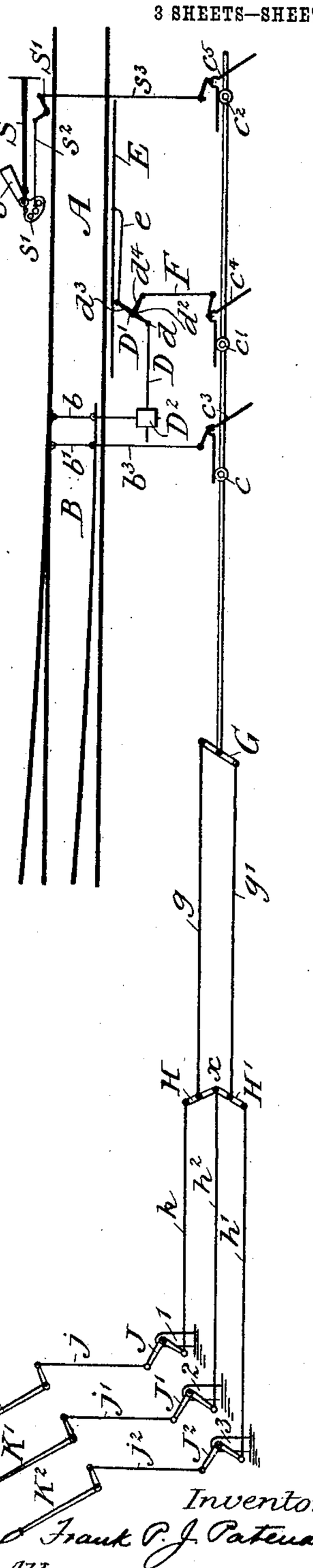


Fig. 4.



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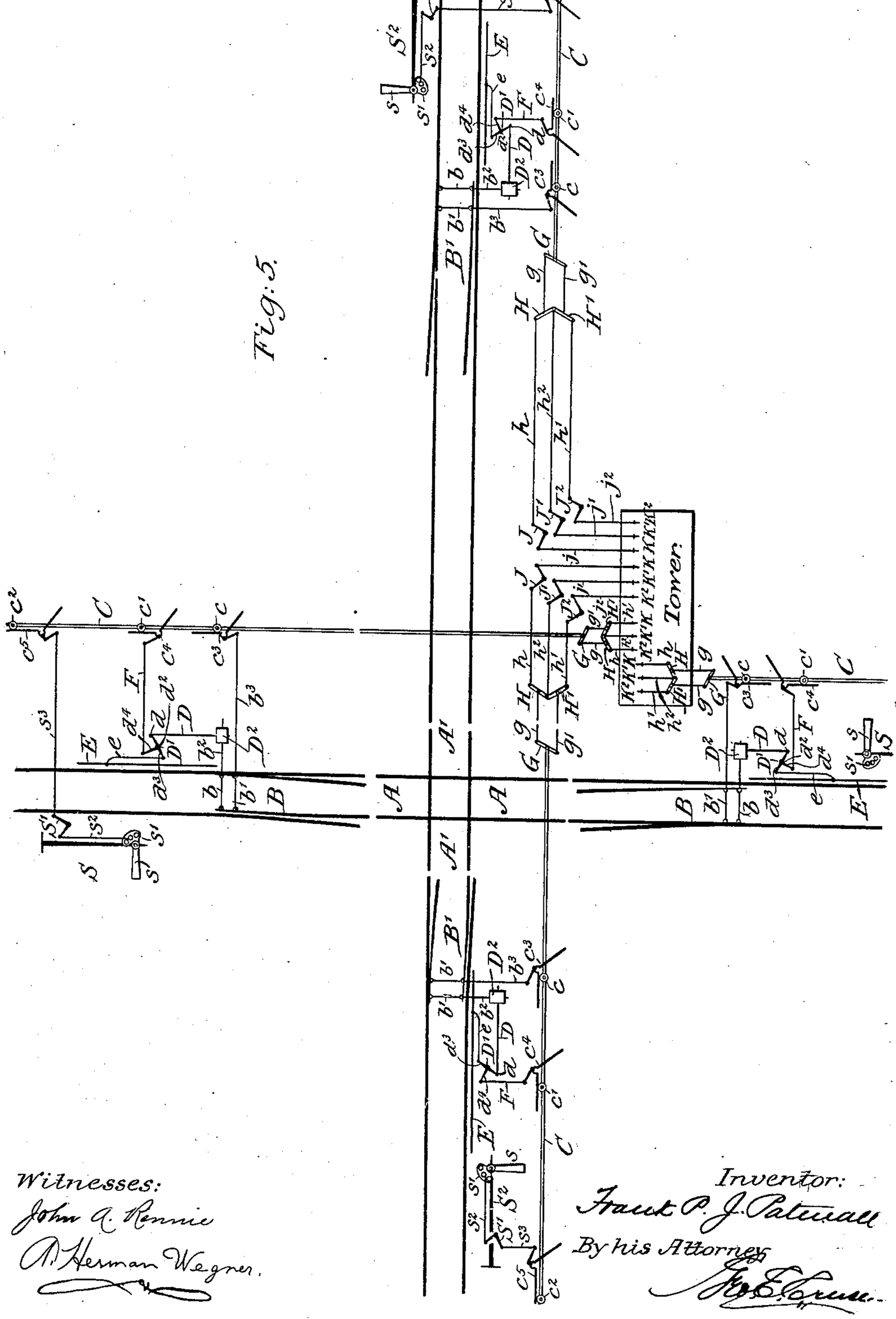
3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MOVING RAILWAY SWITCHES AND SIGNALS.

No. 830,522. Specification of Letters Patent. Patented Sept. 11, 1906.

Application filed November 25, 1905. Serial No. 289,018.

To all whom it may concern:

Be it known that I, FRANK P. J. PATENALL, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Apparatus for Moving Railway Switches and Signals, of which the following is a specification.

My invention relates to manually-operated apparatus for moving railway switches and signals and which is designed more particularly for use in connection with what is known in the art as "derailing-switches." These switches in practice are in an "open" position or set to derail; and an object of the present invention is to provide simple, inexpensive, and effective means for moving the switch-rails to a reverse or closed position, for operating the detector-bar and lock-bolt to lock the switch-rails at the completion of their reverse or closed movement, and, furthermore, for moving the signal-arm from one of its positions of indication to another.

Briefly, my invention may be said to comprise a single line of connection with a sliding member, coacting parts or adjuncts operated by the sliding member for moving the switch-rails, detector-bar, and lock-bolt and also the signal-arm, and a plurality of levers for performing a plurality of functions and adapted to be operated so as to impart an intermittent movement to the sliding member in both directions.

I will now describe an apparatus embodying my invention and then point out the novel features in claims.

In the accompanying drawings, Figures 1, 2, 3, and 4 illustrate, respectively, diagrammatic views of an apparatus embodying my invention, the same being shown in connection with a derailing-switch and an ordinary semaphore-signal. Fig. 5 is a similar view showing the application of an apparatus embodying my invention to a railway-crossing. In this view a derail-switch and signal is located at each side of the crossing, and the levers for operating the same are arranged in four separate series within a cabin or tower from which the switch-rails and signals are controlled.

Similar reference characters designate like parts in all the figures of the drawings.

Referring more particularly to Figs. 1 to 4, inclusive, A designates a portion of a railway; B, a derailing-switch the points of which are connected by means of the bridle-rods b b', respectively, the former having secured to it the lock-rod b^2 and the latter the switch-rod b^3, which usually extends outwardly and connects with the switch-operating mechanism. These are all of the usual construction and so well known as to need no further description.

C designates a sliding member, here shown as a bar, which is conveniently arranged alongside the track and in proper relation with the switch and signal, the said sliding member being provided with a plurality of studs or rollers c c' c^2, adapted to engage, respectively, with escapement-levers (sometimes termed "alligator-jaws") c^3 c^4 c^5. These levers may be of any ordinary or usual construction and are so arranged and connected up to the switch-points, lock-bolt, and signal that they are successively operated in the order mentioned by a movement of the sliding member.

D designates a lock-rod one end of which is secured to one arm d of a three-arm lever D′, its opposite free end passing through an opening in a housing D^2 and engaging with and locking the lock-rod b^2, which latter likewise passes through an opening in the housing D^2, arranged at right angles to the lock-bolt D. The lock-rod b^2 when the parts are in the position shown in Figs. 1 and 2 is free to move within the housing D^2. In other words, while the parts are in this position the switch-rails are unlocked and are capable of being moved to the reverse position. (Shown in Figs. 2, 3, and 4.)

D′ designates a three-arm lever which is pivotally supported, as shown at d^2, and to that arm thereof oppositely disposed to the arm d' and designated d^3 is secured one end of a rod e, which is connected at its opposite end to a detector-bar E, while the third arm d^4, which is disposed at approximately right angles to the arms d' d^3, has one end of a rod F secured to it, the opposite end of said rod being in turn connected to an arm secured to or forming part of the escapement-lever c^4. Thus when the latter is moved, as I shall presently describe, the connections just described will cause the simultaneous movements of the detector-bar E and lock-rod D.

The switch-rod b^3 is connected to an arm secured to or made integral with the escapement-lever c^3 and serves to move the switch-rails back and forth from one position to another as the sliding bar is moved in one direc-

tion or the other to effect the engagement of the stud *c* with said escapement-lever c^3.

S designates a railway-signal which may be of the semaphore-type, having the usual arm or blade *s* and counterbalance *s'* for bringing the signal-arm to the position of "danger," all of which is well known in the art. The signal-rod s^2 is connected at one end to the counterbalance *s'* in the usual manner, and its other end connects with one arm of a bell-crank lever S', pivotally supported in proper relation to the signal S, the other arm of said bell-crank lever being connected to a rod s^3, which in turn connects with an arm secured to or forming part of the escapement-lever c^5. Thus when the latter is moved through the intermediary of the stud or roller c^2 the parts will be operated to move the signal from one of its positions to another, as will be apparent.

The sliding member C has connected to it a lever G, to the outer free ends of which are secured connecting-rods *g g'*, one of which is pivotally secured to the center of a floating lever H, and the other is similarly secured to the center of a corresponding floating lever H', the said floating levers being pivotally secured to each other at their abutting ends, as clearly shown at *x*, which causes them to maintain a relative position at that point.

J J' J^2 designate, respectively, a plurality of bell-crank levers pivotally supported in any suitable manner, as on the uprights or posts 1 2 3 herein shown, which may be located at a distance from the switch and signal, one arm of each bell-crank lever being connected, respectively, to rods *h h'* h^2, the rod *h* being connected to the outer end of the floating levers H and the rod *h'* being similarly connected to the outer end of the floating lever H', while the rod h^2 connects with both of the floating levers and preferably at their junction or pivotal point *x*. Thus it will be understood as the rods *h* or *h'* are moved in either direction and while the rod h^2 is held in rigid position the floating lever H or H', as the case may be, will also be moved, the pivot-point at *x* serving as a fixed fulcrum therefor. The rods *g* or *g'* will of course be affected by these movements of the floating levers, causing them to act upon the lever G in such manner as to impart an intermittently-sliding movement to the sliding member C, and so bring its studs or rollers *c c'* c^2 into engagement with the escapement-levers c^3 c^4 c^5 in proper order and sequence to move the various parts and adjuncts comprised in the switch and signal operating apparatus.

The movement of the floating levers and their connections is effected by a plurality of levers K K' K^2, which may be, and generally are, located at a distance from the switch and signal (and frequently in a tower or cabin shown in Fig. 5) and are connected by rods *j j'* j^2, respectively, to the opposite arms of the bell-crank levers J J' J^2, to which the rods *h h'* h^2 are secured. As is usual, these levers are "mechanically interlocked" in order that they shall have a certain order of movement.

In order that my invention may be the better understood, I will briefly describe its operation, premising, however, that the operation of the apparatus shown in Fig. 5 will be precisely similar, the only exception being that where the switch-rails and signals are located at right angles or at any angle of appreciable degree relatively to the movement of the levers K K' K^2 the interposition of appropriate levers will be necessary between them and the connections with the sliding member C in order that proper movement may be given to the latter. This is clearly illustrated at the right-hand side of Fig. 5 and will be later on described.

As will be observed on reference to Fig. 1, the levers K K' K^2 are in what may be termed their "normal" position, all of them inclining to the right and thereby keeping the slide member C in such position that the studs or rollers c^3 c^4 c^5 will be so disposed relatively with the escapement-levers *c c'* c^2 that upon the initial movement of the sliding member C the stud or roller *c* will first engage and move the escapement-lever c^3, throwing the switch-rails over to the reverse or closed position. (Shown in Fig. 2.) This movement will bring the stud or roller *c'* into a position similar to that previously occupied by the roller *c* and ready to engage and move the escapement-lever c^4 at the next movement of the sliding member. The lever K' is moved to its reverse position—that is, to the left (see Fig. 2)—in effecting this partial movement of the sliding member, while the other levers K K^3 are in their normal position, so as to provide fixed fulcrums for the floating levers H H' at their outer ends, and, as will be observed, the floating levers are moved to assume a different position—*i. e.*, they will assume a position reverse to that shown in Fig. 1, thus exerting an equal pull upon the rods *g g'* and lever G and causing the sliding member to move sufficiently to bring the stud *c* into engagement with and reverse the position of the escapement-levers c^3, thus moving the switch-points to the opposite or reverse position. The lever K is then moved to its reverse position, which movement of the lever through its connections (the rod *j*, bell-crank lever J, and rod *h*) will exert a pull upon the outer end of the floating lever H, causing it to move upon the fixed fulcrum *x* to the position shown in Fig. 3. This movement of course exerts a pull upon the rod *g* and the end of the lever G to which it is attached, the opposite end of said lever serving as a fulcrum, and by reason of the position of the operating-levers K' K^2 and the floating lever H' the sliding member C will be moved sufficiently to bring the stud or roller *c'* into engagement

with and operate the escapement-lever c^4, thereby causing the simultaneous movement of the lock-bolt D and detector-bar E. When now the operating-lever K^2 is moved to its reverse position, the floating lever H', through the connection previously described, will be moved upon the fixed fulcrum x, while the floating lever H is held in fixed position by reason of the levers K and K' being in their reverse position, the lever G, through the rod g, being held in a similarly-fixed position. Thus the pull upon the rod g' will move that end of the lever G to which it is attached, thereby giving a still further movement to the sliding member C and causing the stud or roller c^2 to engage with and move the escapement-lever c^5, which latter, through the connections with the signal, will move the signal-arm to a position indicating "safety." This is clearly illustrated in Fig. 4.

Obviously in returning the parts to their normal or derail position a reversal in the order of operation of the levers K K' K^2 will be necessary. In other words, the lever K^2 will be first moved to its normal position, and the stud c^2 on the sliding member C will first engage and operate the escapement-lever c^5, moving the signal-arm back to the position indicating "danger." A movement of the lever K' to its normal position will again cause the slide member to move and bring the stud c' into engagement with and operate the escapement-lever c^4, effecting the unlocking of the switch-rails and simultaneous movement of the detector-bar, and finally by a movement of the lever K to its normal position the sliding member C will again be moved to bring the stud or roller c into engagement with and operate the escapement-lever c^3, which latter, through its connections, will move the switch-rails back to the normal or unlocked position.

Referring now to Fig. 5, A and A' designate, respectively, sections of a railway-track which cross each other, as at a grade or other crossing, at the four sides of which are located the derail-switches B B' and signals S S^2, the construction and arrangement of which are precisely similar to that described with reference to Figs. 1 to 4, inclusive. The signals S and switches B are operated in precisely the same manner as those previously described—*i. e.*, by a direct thrust of the respective levers K K' K^2 in a direction parallel to the movement of the sliding bars C, but the signals S^2 and switch-rails B' are operated by a thrust of the levers K K' K^2 at right angles to the movement of the sliding members C. It is therefore manifest that the bell-crank levers J J' J^2 will have to be arranged in such manner that the proper effect will be produced upon the floating levers H H' and the lever G to properly move the sliding members C. This I accomplish by connecting bell-cranks J J' J^2, which are mounted on vertical axis, as shown in Figs. 1, 2, 3, 4, to bell-cranks mounted on horizontal axis, as clearly shown in Fig. 5.

The levers K K' K^2 are suitably mounted in series within a cabin or tower conveniently located at some point of vantage, as is usual and customary in such installations.

I claim—

1. In a switch moving, locking and signaling apparatus, the combination with a switch, a lock therefor, and a signal, of a sliding member operatively connected with the switch, lock and signal, a lever for operating the switch, a lever for operating the lock, a lever for operating the signal, and a single line of connections between the lever and sliding member.

2. In a switch moving, locking and signaling apparatus, the combination with a plurality of levers adapted to perform a plurality of functions, of a sliding member adapted to coact with and move parts or adjuncts for operating the switch, lock and signal, and connections between the levers and sliding member which upon movement of said levers operate the sliding member to move the switch, lock and signal.

3. In a switch moving, locking and signaling apparatus, the combination of a plurality of levers adapted to perform a plurality of functions, a sliding member having means for operating the switch, lock and signal operating parts or adjuncts, and connections between the plurality of levers, and sliding member whereby the latter is given an intermittently-sliding movement to successively operate the switch, lock and signal.

4. In a switch moving, lock and signal apparatus, the combination with a plurality of independently-arranged levers adapted to perform a plurality of independent functions, of a sliding member having means for operating the switch, lock and signal, floating lever connections between the sliding member and levers whereby upon movements of the latter the sliding member is given an intermittently-sliding movement and the switch, lock and signal are moved from one position to another.

5. In a switch moving, locking and signaling apparatus, the combination with a plurality of levers adapted to perform a plurality of functions, of a sliding member having means for coacting with and operating the switch, lock and signal parts or adjuncts, a single line connection between the sliding member and levers comprising floating levers and rods, which upon movement of the levers are operated to impart an intermittently-sliding movement to the sliding member, whereby the switch, lock and signal are moved from one position to another.

6. A switch moving, locking and signaling apparatus, being operatively connected to escapement-levers, a sliding member having

means for coacting with and moving the escapement-levers, a connection between one of the escapement-levers and a detector-bar whereby the latter is moved from one position to another, a plurality of levers, adapted to perform a plurality of functions, and a single line connection between the sliding member and levers, whereby upon operation of the latter the sliding member is given an intermittently-sliding movement, and the switch, lock, detector-bar and signal are moved from one position to another.

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

FRANK P. J. PATENALL.

Witnesses:
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