Jan. 2, 1923. **1,440,586**

C. G. FEUCHT.
ROLLER COASTER.
FILED MAY 15, 1922.

2 SHEETS-SHEET 1

Fig. 2.

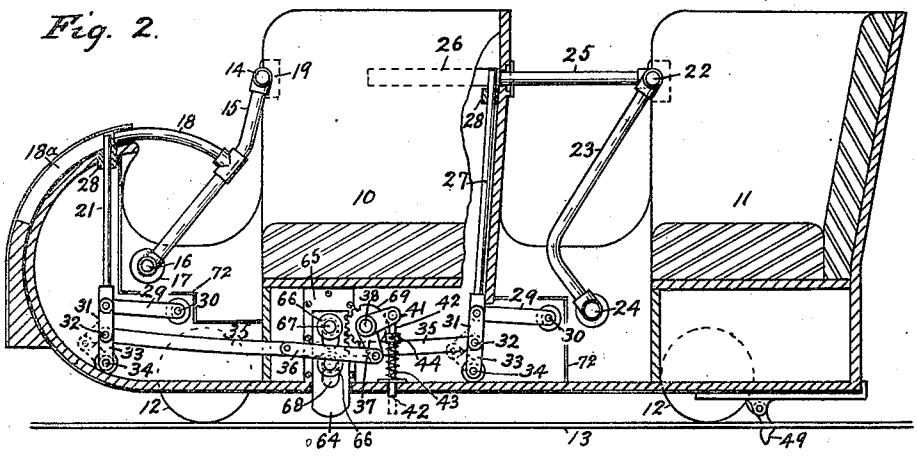
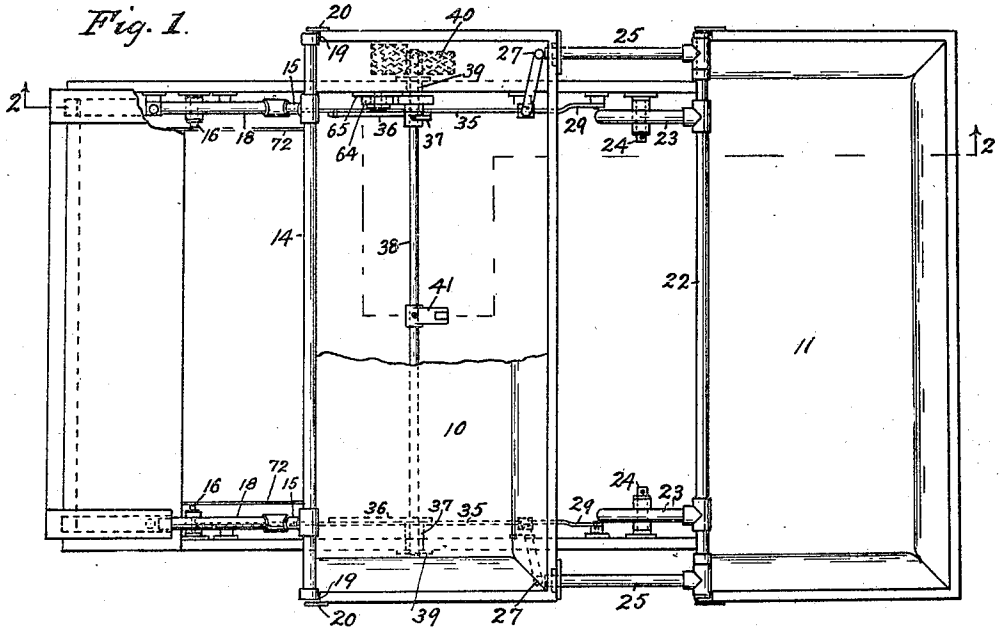


Fig. 1.



Inventor
Christian G. Feucht

By Attorney
Wm Bodge

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2 SHEETS-SHEET 2

Fig. 3.

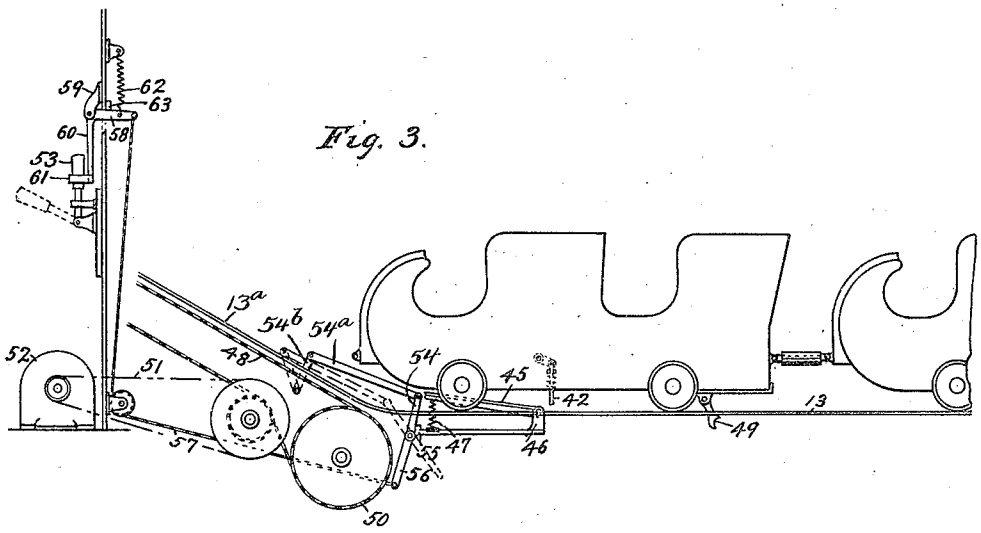
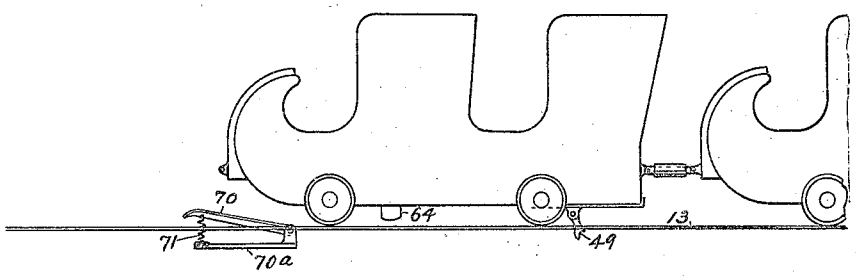


Fig. 4



Inventor
Christian G. Feucht
By his Attorney
Wm Dodge

Patented Jan. 2, 1923. 1,440,586

UNITED STATES PATENT OFFICE.

CHRISTIAN G. FEUCHT, OF BROOKLYN, NEW YORK.

ROLLER COASTER.

Application filed May 15, 1922. Serial No. 561,091.

To all whom it may concern:

Be it known that I, CHRISTIAN G. FEUCHT, a citizen of the United States, and resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Roller Coasters, of which the following is a specification.

The invention relates to roller coasters of the well-known class of amusement devices comprising a plurality of cars coupled together to form a series of trains adapted to run at short intervals upon an endless track, the latter being divided into sections including a receiving and discharging station, an upwardly inclined section provided with power operating means arranged to elevate the trains to a relatively high level, and from which point the cars run by gravity over track sections extending in a series of undulations back to the receiving station.

Each of the cars which comprise the train is provided with a plurality or seats arranged for the accommodation of passengers, a handle-bar or safety gate being furnished for each seat to assist the persons in maintaining their positions against the pitching or swaying movements of the car.

The object of the present invention is to provide a gate that shall afford additional security for the passengers against accidents under frequently occurring conditions of over-crowding or excitement in which unauthorized attempts are made to operate the gates and overload the cars.

A further object is to provide means operated by an attendant for adjusting and jointly locking in one movement the several gates in a car, said locking means remaining inoperative unless the gates are suitably positioned.

A further object provides means, in case the attendant fails to lock the gates, to automatically effect the locking action providing the gates are properly positioned, otherwise, to automatically cut off the power and prevent the advancement of the cars.

A further object is to provide means for automatically unlocking the gates at a point or station of the track at which the passengers are discharged.

The invention also includes certain details of construction and arrangement of parts hereinafter set forth.

For further comprehension of the invention, and of the objects and advantages thereof, reference is had to the following description and accompanying drawings, and to the appended claims in which the various features of the invention are more particularly pointed out.

Figure 1 of the drawings is a plan view of a car embodying my invention, portions thereof being broken away to show more clearly the gate operating mechanism.

Figure 2 is a sectional elevation taken along the broken line 2—2, Fig. 1.

Figure 3 is a side elevation of a car shown in connection with automatic means for locking the gates and for cutting off the driving power for operating the cars.

Figure 4 is a side elevation of a car shown in connection with automatic means for releasing the gate locks.

In the drawings, see Figs. 1 and 2, the car is shown as being provided with the seats 10 and 11, the wheels or castors being indicated at 12 and the track at 13. The gates as herein shown are preferably formed of pipe and fittings, and comprise, for the forward seat 10, a transversely extending handle-bar 14 connected to the uprights 15, the latter being pivoted at their lower ends to the pins 16, secured by flanges 17 to the side walls of the car. Connected to the uprights 15 intermediate their ends are the side rails 18, bent in the form of circular arcs having their central points at the pins 16 and about which the gate swings in its opening and closing movements. In its closed position the opposite ends of the handle-bar 14 engage in recesses 19 formed in the side walls of the car, the outer ends of these recesses being closed with thrust plates 20 which serve to resist the endwise movements of the bar occasioned by the pulling action of the passengers thereon. In the closed position of the gate the latch-bars 21 are free to pass upwardly in front of the free end of the side bars 18 and lock the same, and upon the withdrawal of the latch-bars the circular side bars, in the opening movement of the gate, are free to pass along the correspondingly curved space 18^a and permit the gates to be opened.

A similar gate for the rearward seat 11 is provided, which comprises a corresponding handle-bar 22 and connected uprights 23, the latter pivoted at their lower ends to the pins 24, likewise fixed to the side walls of the car,

Horizontal side rails 25 are pivoted at one of their ends upon the bar 22 and the opposite ends thereof pass into forwardly extended openings 26 in the side walls of the car. The ends of the bar 22 are supported in recesses in the side walls in a similar manner to that of the bar 14, and the side bars 25 are locked in a corresponding manner by the latch-bars 27. At their upper ends the several latch-bars are slidably mounted in the guide blocks 28, secured to the side walls of the car in a manner to resist the thrust from the side rails in any attempt to open the gates, and at their lower ends the latch-bars are pivotally connected to one end of the radius bars 29, the opposite ends of the latter being pivotally mounted on the pins 30 fixed to the side walls of the car. Also pivotally connected to the lower ends of the latch-bars are the toggle-links 31 which in turn are pivoted by the pins 32 to corresponding toggle links 33, the latter being pivotally secured at the lower end to the side walls of the car by means of the pins 34. At their pivotal points 32 the opposite toggle links are connected together by the connection bars 35 which in turn are pivotally connected by the links 36 to the lever arms 37, fixedly secured upon the shaft 38, the latter extending transversely across the car and rotatively supported in the flanged bearings 39 secured to the opposite side walls thereof. At one end the shaft projects exteriorly of the car and is provided with a foot treadle 40 in fixed relation with the shaft, which latter, midway its length, is also furnished with an operating lever 41, having its free end pivotally connected to an actuating rod 42, the lower or free end of which extends below the floor of the car. Also surrounding the rod 42 within the car is a helical spring 43, the opposite ends of which exert a thrust between the floor of the car and a collar 44 adjustably fixed lengthwise of the rod, the said thrust of the spring normally tending to partially urge the latch-bars 21 and 27 into locking position.

By means of the foot treadle 40 the shaft 38 may be rocked in opposite directions and which in turn acts through the arms 37 and links 36 to reciprocate the connection bars 35, the latter in their movements operating the toggle links 31 and 33 to jointly raise and lower the latch-bars 21 and 27. As thus arranged it will be obvious that in case either one of the gates be not fully closed the position of the side bars 18 or 25 thereof will intercept the upward or locking movement of the jointly-connected latch-bars 21 and 27 and prevent the locking action of either gate. It will be clear that in like manner the device may also be applied to the gates of three or more seats and the locking action of any one of said gates will be dependent on the proper positioning of all thereof.

While the locking action of suitably positioned gates may be readily effected by the foot treadle 40, in the event of a failure on the part of the attendant this action may be accomplished by the automatic upward movement of the actuating rod 42, the uppermost position thereof being shown in full lines while its lowermost position is indicated by the dotted lines representing the lower or projecting end of the rod, which in such position is adapted during the initial forward movement of the car to engage the cam section 45, pivotally mounted on a fixed support 46 and disposed adjacent the upwardly inclined section 13a of the track 13, as shown in Fig. 3. The cars at this point advance by gravity over a slight down-grade section of the track, and the engagement between the cam section and the projecting end of the rod 42 causes the latter to be raised and effect the locking action of the gates. To effect this action the cam section is provided with a compression spring 47 so connected as to exert a sufficient upward pressure to overcome the operative resistance of the rod 42 providing the jointly connected gates are properly positioned. As the car continues its advancement with its gates in locked position, it engages the upwardly inclined section 13a of the track and also engages the driving chain 48 by means of the dog 49, pivotally secured to the car under the floor thereof. The driving chain 48 together with its operating means may be of any approved construction, the lower portion only of the chain being herein diagrammatically shown as carried by the sprocket wheel 50 and driven through the belt 51 by the electric motor 52, the current to the latter being controlled by the switch handle 53 operating in the usual manner to open and close the electrical circuit.

In the relative position of the several parts as shown by full lines the cars with their gates in regularly locked position are free to be operated around the track in the usual manner; and in the event of an irregular positioned or unlocked gate in any of the cars, the actuating rod 42 thereof will be retained in its lowermost or projecting position, and in the forward movement of the car will cause the cam section 45 to swing downwardly about its pivotal point and compress the connected spring 47. As the movement of the car continues the projecting rod 42 will engage the upper arm 54 of the lever pivotally supported by the bracket 55, the opposite arm 56 of the lever being connected to a flexible cable 57 leading in a convenient manner to an arm 58 of a bell-crank lever pivotally supported by the bracket 59, the opposite arm 60 of the lever having a U-shaped spring connection 61 engaging the switch handle 53, the lever being also provided with a tension spring 62 connected to

the arm 58 and adapted to exert an upwardly pulling force thereon to normally hold the same against a stop 63, and the several lever connections in their respective positions shown. At its upper end the arm 54 is pivotally connected to one end of an extension bar 54[a], the opposite end of the latter being correspondingly connected to a link arm 54[b] adapted to direct the movement of the bar in a downwardly parallel manner with respect to the inclined track 13[a], as indicated in dotted lines, and as effected by the engagement of the projecting rod 42 with the arm 54, and in which movement the latter acts through the opposite lower arm 56, cable 57, arms 58 and 60 and against the spring 62 to throw the switch-handle 63 into the dotted position shown, thus opening the power circuit, stopping the driving chain 48 and preventing further advancement of the cars along the upwardly inclined track section. During the terminal gravity momentum of the train, the projecting rod 42 engages and rides along the upper surface of the extension bar 54[a], holding the arm 54 in its power cut off position, the length of the bar being sufficient to insure engagement by the projecting rod 42 until the cars have come to a full stop. The interruption of the driving mechanism will thus be maintained until the misplaced gate is properly adjusted and the projecting rod 42 disengaged from the extension bar 54[a], whereupon the switch operating device will assume its normal inactive position by the reaction of the tension spring 62. In the normal inoperative position of the switch operating arm 60, the spring connections 61 thereof permit the independent manual operation of the switch-handle 53, but when the arm 60 is automatically shifted to its cut-off position, as indicated by the dotted lines, the switch handle cannot again be operated to turn the power or until the gates are properly locked, and the projecting rod 42 is returned to its normally retracted and inoperative position.

Referring again to Figs. 1 and 2, the joint automatic releasing action of the latch bars 21 and 27 is effected through the means of the rack-bar 64, slidably mounted on the back plate 65, fixed to the side wall of the car. A pair of flanged rollers 66 are rotatably supported on the back plate by the studs 67, the smaller diameter of the rollers passing through elongated perforations 68 of the rack-bar while the larger diameter serves as a lateral support to hold the bar in slidable contact with the plate. As thus supported the rack-bar is free to receive a vertical movement and to transmit such movement to the gear segment 69, fixed upon the shaft 38. In the treadle operation of the latch bars 21 and 27, idle vertical movements of the rack-bar 64 are effected from the segment gear 69, and for the active operation of the rack-bar the lower end thereof extends through and projects below the floor of the car and presents a contact end adapted to engage an angularly positioned shoe 70, pivotally supported at its lower end by the bracket 70[a], fixed to the track support adjacent the discharging station thereof, as clearly shown in Fig. 4. At its upper end the shoe is provided with a compression spring 71 adapted to exert an upward pressure thereon, and in its engagement by the rack-bar during the relatively slow terminal movement of the car, the pressure of the spring 71 is sufficient to overcome the operative resistance of the rack-bar and cause the latter to rotate the shaft 38 and jointly effect the unlocking movement of the latch bars 21 and 27.

To avoid possible accidents during the running action of thes everal cars, the gate locks and operating means therefor are positioned beyond the reach of the seated passengers, the operative parts being partially enclosed below a seat of the car and in part by separate casings indicated at 72. It is to be understood that the track section comprising the receiving and discharging station for the passengers is provided with a platform having a suitably arranged free space to permit the attendant to operate the foot-treadle for locking the gates, and after the car has left the station to prevent further treadle operation by a protecting cover therefor. As a further security at the loading station it is to be noted that the side rails of the gates are conveniently supported and arranged to close the entrances to the car when the seats are filled and prevent overcrowding thereof.

It is to be understood that while I have illustrated and described the preferred embodiment of the invention it is susceptible of various changes as regards its form, proportion, detail construction, application and arrangement of parts, without departing from the essential principle and scope or sacrificing any of the advantages thereof.

What I claim as my invention and desire to secure by Letters Patent, is:

1. In a car of the class described, a seat, a gate therefor having concealed locking means, means for operating said locking means beyond the reach of the passengers in said seat, and means for rendering said locking means inoperative when said gate is imperfectly closed.

2. In a car of the class described, a plurality of seats, a gate for each of said seats provided with locking means, means for jointly locking said gates beyond the reach of the passengers in said seat, and means for rendering said locking means inoperative when any of the said gates are imperfectly closed.

3. In a car of the class described, a seat, a gate therefor, locking means for said gate held inoperative when the gate is imperfectly closed, means for locking said gate beyond the reach of the passengers in said seat, and means for releasing said locking means by the movement of the car.

4. In a car of the class described, a plurality of seats, a gate for each of said seats, locking means held inoperative when any of said gates are imperfectly closed, means for jointly locking said gates beyond the reach of the passengers in said seats, and means for jointly releasing said locking mean by the movement of the car.

5. In a car of the class described, a seat, a gate therefor, having side rails disposed to close the entrance to said seat, passages formed in the side walls of said car and arranged to laterally support said side rails and to receive the same in the closing movement of said gate.

6. In a car of the class described, a seat, a gate therefor having side rails disposed to close the entrances to said seat, passages formed in the side walls of said car to receive and laterally support said side rails, and locking means for said gate arranged to engage the free ends of said side rails and prevent the opening movement of said gate.

7. In a car of the class described, a seat, a gate therefor, means including a foot treadle normally serving to lock said gate in closed position, and automatic means operated by the movement of the car to effect the locking movement of said gate upon the failure of the foot-treadle action.

8. In a car of the class described, a plurality of seats, a gate for each of said seats, means including a foot-treadle normally serving to jointly lock said gates in closed position, and automatic means operated by the movement of the car to effect the joint locking movements of said gates upon the failure of the foot-treadle action.

9. In a car of the class described, a seat, a gate therefor, treadle operating means normally serving to lock said gate in closed position, and automatically operated means for locking said gate upon the failure of said treadle operating means.

10. In a car of the class described, a seat, a gate therefor, means including a foot-treadle normally serving to lock said gate in closed position, means actuated by said foot-treadle for releasing said locking means, and means actuated by the movement of the car for releasing said locking means independently of said foot-treadle.

11. In a car of the class described, a plurality of seats, a gate for each of said seats, means including a foot-treadle for jointly locking said gates in closed position, means actuated by said foot-treadle for jointly releasing said locking means, and means actuated by the movement of the car for releasing said locking means independently of said foot-treadle.

12. In a car of the class described, a gate, means operated by a foot-treadle for locking said gate in closed position, means independent of said foot-treadle for locking said gate by the movement of the car, a source of power arranged to elevate said car, and means actuated by the movement of the car to cut off said power upon the failure of said independent locking means.

13. In a car gate, locking means therefor including a rock shaft, a foot-treadle connected to said shaft for locking said gate, and means independent of said foot-treadle for rocking said shaft by the movement of the car to lock said gate.

14. In a car gate, locking means therefor including a rock shaft, a foot-treadle connected to said shaft for locking said gate, means independent of said foot-treadle for rocking said shaft by the movement of the car to lock said gate, a source of power arranged to elevate said car, and means actuated by the movement of the car to cut off said source of power upon the failure of said independent locking means.

15. In a car gate, locking means therefor arranged to be operated by a foot-treadle, and locking means for said gate arranged to be operated by the movement of the car upon the failure of said foot-treadle locking means.

16. In a car provided with elevating means arranged to be engaged by the manual initial movement of said car, a gate for said car adapted to be manually closed, locking means for said gate arranged to be operated by a foot-treadle, locking means for said gate arranged to be operated by the initial movement of said car upon the failure of said foot-treadle locking means, and means operated by the initial movement of the car to arrest the elevating movement thereof upon the failure of the said several gate locking means.

17. A gate for a car seat, comprising a handle-bar arranged to be operated into open and closed position with respect to said seat, uprights secured to said handle-bar and arranged to movably support the latter in its open and closed positions, and side bars connected to said gate sections and adapted to close the car entrances to said seat.

18. A car gate comprising a pair of upright members having a horizontal member or handle-bar connected thereto and mounted for swinging movement, a pair of side rails included in said gate members and arranged to move across and close the entrance of said car, and locking means for said gate consisting of a pair of latch bars arranged to move across the path of said side rails.

19. A car gate including a pair of side

rails arranged to move across and close the entrance of said car, latch-bars arranged to move across the path of said side rails and lock the gate in a closed position, means for operating said latch-bars consisting of toggle links having connection rods leading to a rock shaft, and a foot-treadle fixed to and adapted to actuate said rock shaft for the locking and releasing movements of said latch-bars.

20. A car gate including a pair of side rails arranged to move across and close the entrance of said car, latch-bars arranged to move across the path of said side rails and lock the gate in a closed position, means for operating said latch-bars consisting of toggle links having connection rods leading to a rock shaft, a foot-treadle fixed to and adapted to actuate said rock shaft for the locking and releasing movements of said latch-bars, and means independent of said foot-treadle for rocking said shaft for the release of said latch-bars consisting of a segmental gear fixed to said rock-shaft, and a rack-bar engaging said segmental gear.

21. In a car of the class described, power advancing means therefor, a gate for said car, locking means for said gate normally operated by an attendant, yielding means adapted to be operated by the advancement of the car for locking said gate upon the failure of operation by the attendant, and means operated by the movement of the car to arrest said power advancing means upon the failure of operation of said yielding means.

22. In a car gate, locking means therefor including an actuating rod projecting from said car and adapted to be operated by the movement thereof, the said rod remaining inoperative with respect to said locking means when the gate is imperfectly closed, a source of power arranged to elevate said car, a lever arm disposed for engagement by said actuating rod during the movement of the car, and connecting means between the lever arm and said source of power whereby the latter will be cut off and the elevating movement of the car arrested when the gate is unlocked.

23. In a car gate, locking means therefor including an actuating rod projecting from said car and adapted to be operated by the movement thereof, and a cam section disposed to be engaged by said actuating rod during the movement of the car and operate said locking means.

24. In a car gate, locking means therefor including an actuating rod projecting from said car and adapted to be operated by the movement thereof, the said rod remaining inoperative with respect to said locking means when the gate is imperfectly closed, a source of power arranged to elevate said car, a cam section yieldingly mounted in the path of said actuating rod and adapted to yield under the engagement thereby when the gate is unlocked, a lever arm disposed for engagement by said actuating rod during the movement of the car, and connection means between the lever arm and said source of power whereby the latter will be cut off and the elevating movement of the car arrested when the gate is unlocked.

25. In a car of the class described, a gate, locking means for said gate, a source of power arranged to elevate the car, and means for automatically cutting off said power upon the failure of the gate locking means.

26. In a car of the class described, a gate, locking means for said gate, a source of power arranged to elevate the car, means for automatically cutting off said power upon the failure of the gate locking means, and means whereby the power will remain inoperative while the gate is unlocked.

Signed at Brooklyn in the county of Kings and State of New York this 10th day of May A. D. 1922.

CHRISTIAN G. FEUCHT.