

No. 713,780.

Patented Nov. 18, 1902.

C. F. LUQUER.  
CANAL LOCK GATE.

(Application filed Oct. 22, 1901.)

(No Model.)

2 Sheets—Sheet 1.

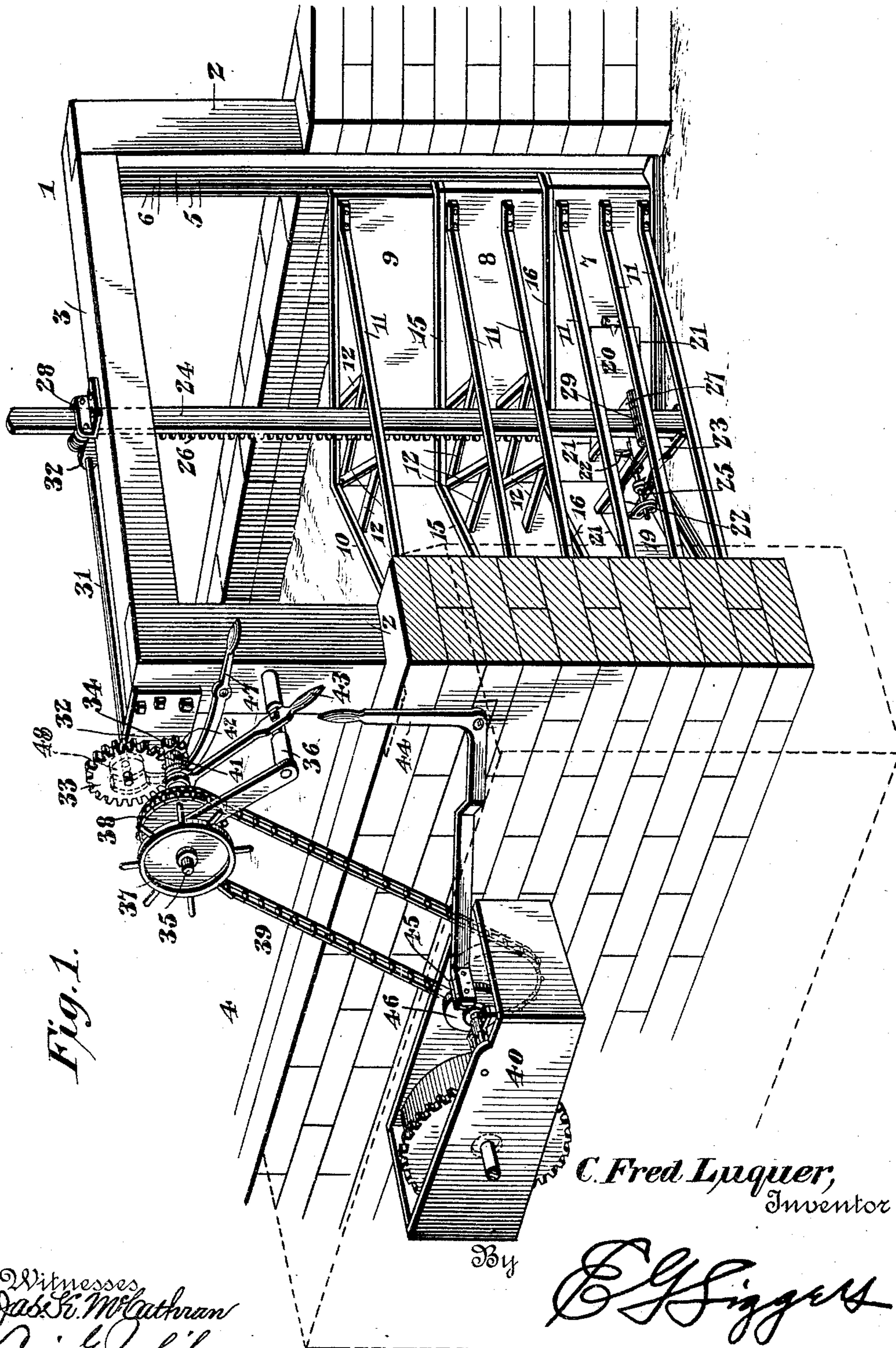


Fig. 1.

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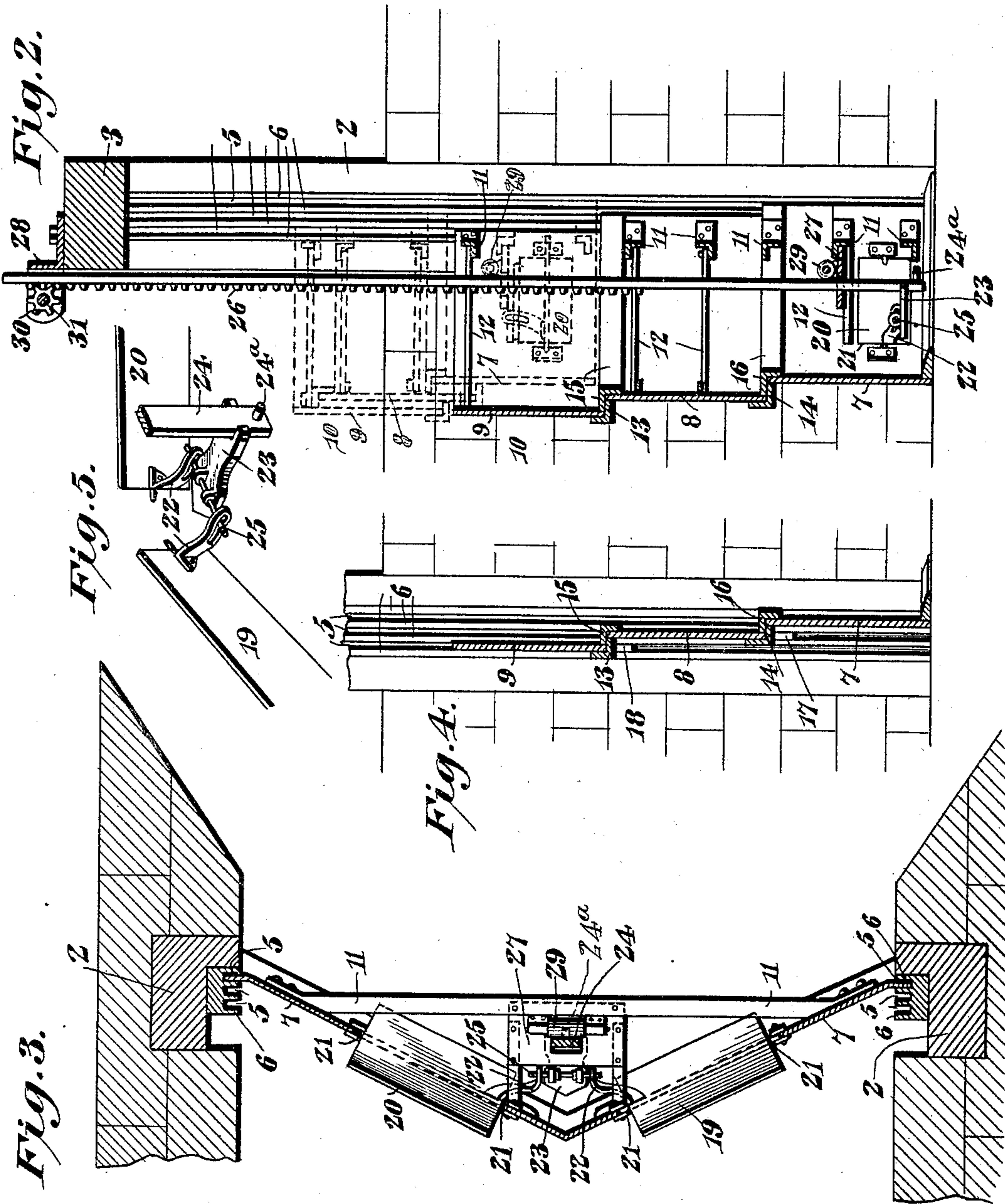
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# UNITED STATES PATENT OFFICE.

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## CANAL-LOCK GATE.

SPECIFICATION forming part of Letters Patent No. 713,780, dated November 18, 1902.

Application filed October 22, 1901. Serial No. 79,568. (No model.)

*To all whom it may concern:*

Be it known that I, CORNELIUS FRED LUQUER, a citizen of the United States, residing at Montgomery, in the county of Orange and State of New York, have invented a new and useful Canal-Lock Gate, of which the following is a specification.

This invention relates generally to valves or closures, but more particularly to that class of such devices known as "canal-lock gates."

The object of the invention, viewed in its broad aspect, is to produce a valve or closure associated with operating mechanism and controlling means related in a manner to place the valve under the complete control of an operator or attendant.

A further object of the invention, viewed in a more restricted aspect, is to produce a canal-gate of comparatively inexpensive and exceedingly durable construction and provided with operating mechanism which initially opens one or more wickets or subsidiary closures and subsequently effects the complete opening of the gate.

To the accomplishment of these objects and others subordinate thereto, the invention comprehends in its present embodiment an extensible canal-gate composed of a series of relatively movable sections operatively connected with means which controls the opening and closing of wickets formed in the gate and effects the contraction or extension of the gate and the bodily movement of the latter to its open or closed position.

The invention further consists in certain other details of construction and arrangement, which will be more fully described hereinafter, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings, Figure 1 is a perspective view of a portion of a canal-lock equipped in accordance with my invention. Fig. 2 is a central vertical section through the subject-matter of Fig. 1. Fig. 3 is a horizontal sectional view through the subject-matter thereof. Fig. 4 is a sectional elevation illustrating the guides and stops and the relation thereof to the gate-sections. Fig. 5 is a detail perspective view of the wicket-operating mechanism.

Like numerals are employed to designate

corresponding parts throughout the several views.

In the illustrated embodiment of the invention a supporting and guiding frame 1, comprising side and head beams 2 and 3, is set into the masonry at the end of the canal-lock 4 in any suitable manner. The inner or opposed faces of the side beams 2 of the frame are provided with suitable vertical guides 5, the number of which is of course determined by the number of sections composing the gate. These guides may be formed in any suitable manner, but, as shown in the drawings, they are defined between metallic rails 6 and are three in number for the reception of the opposite ends of the three gate-sections (indicated by the numerals 7, 8, and 9) of which the gate 10 is composed. These sections are preferably of angular form, inasmuch as they are subjected to considerable lateral pressure by the volume of water imprisoned in the lock, and their outer ends are bent to present them in a common plane for reception between corresponding guides at the opposite sides of the frame.

As best shown in Figs. 2 and 4 of the drawings, the several sections of the gate are disposed in different vertical planes, but in closely-adjacent relation, so that they may be free to move independently within their individual guides, and each section is stiffened by one or more tie-bars 11, extending directly between the opposite ends of the sections at the reëntrant side thereof and serve as backings for the diagonal struts 12, interposed between the tie-bars and the sections at the apices of the latter.

When the gate is in its extended or closed position, the sections 8 and 9 are located in successively-higher planes than the section 7, and for the purpose of effecting a practically water-tight connection between the sections the sections 8 and 9 are formed with horizontal flanges 13 and 14, disposed to be overlapped by similar but oppositely-disposed flanges 15 and 16, extended from the upper edges of the sections 8 and 7. The location of the flanges 15 and 16 above the flanges 13 and 14 enables the section 7 to be elevated independently of the section 8 and in like manner permits the section 8 to slide up to a position opposite the section 9. It therefore



follows that some means must be provided for limiting the gravitation of the sections 8 and 9 below those positions in which the several flanges will be disposed in direct apposition and in which the gate will have reached its maximum extension. The illustrated embodiment of such means comprises stops 17 and 18 in the form of projections located within the guides of the sections 8 and 9 and in a position to limit the gravitation of these sections. It will now appear that the lower section 7 may be elevated until its upper edge strikes against a projecting part of the next higher section 8 and that further movement thereof will cause the elevation of the section 8, which will in like manner move upwardly independently of the section 9 until the latter is engaged by the section 8 in a manner similar to the engagement of said last-named section by the section 7.

The engaging projections which effect the operative connection pointed out may be, and preferably are, the tie-bars 11; but any other character of engaging mechanism may of course be substituted therefor. At this point it may be noted that a single tie-bar and set of struts is provided for the section 9, while two and three sets, respectively, are provided for the sections 8 and 7, since the upper section is subjected to the least pressure and the others to a successively-increasing pressure, as they are located nearer the bottom of the lock.

While the structure thus far described constitutes a complete embodiment of my invention in one aspect thereof, since it comprehends a bodily-movable valve or closure made up of relatively movable sections so arranged that the sections may be moved successively to contract the gate and may then be moved simultaneously to effect the bodily movement of the latter, I have nevertheless developed the invention much further for the purpose of providing suitable gate-operating means and subsidiary closures or wickets mounted in the gate and designed to be opened by the gate-operating means prior to the movement of the gate-sections. These subsidiary closures are preferably in the form of pivoted wickets 19 and 20, mounted in suitable bearings in the lower section 7 and controlling sluice-openings 21, formed in the gate for a purpose which will be understood by those skilled in the art. From the adjacent ends of the wickets 19 and 20 extend the slotted arms 22, having loose pivotal connection with a horizontal arm 23, projecting from the lower end of a vertical rack-bar or actuator 24, the pivotal connection being preferably effected by means of a pintle-bar 25, extended beyond the opposite sides of the arm 23 and engaging the slots in the arms 22. The rack-bar 24 is provided upon one face with a toothed rack 26 and is guided in suitable antifrictional bearings 27 and 28, mounted, respectively, on the section 7 of the gate and on the head-beam 3 of the frame 1. The specific

mounting of these bearings may be varied within wide limits; but they preferably comprehend the employment of antifriction-rollers 29 as bearing parts, so that the movement of the rack-bar is opposed by a minimum frictional resistance. This rack-bar is the primary element of the gate-operating mechanism, and, in fact, it is entirely effective without association with other devices, provided the character of the gate is such that it may be operated manually through the manipulation of the bar. By preference, however, the rack-bar 24 is enmeshed with a pinion 30, keyed or otherwise secured upon a counter-shaft 31, journaled in suitable bearings 32, supported by the frame 31, said counter-shaft being provided at its end opposite the pinion with a gear-wheel 33, meshing with a pinion 34, fixed upon a stud-shaft 35, extending from end of the frame 1 and supported by one of the bearings 32 and in part by a bracket 36, extending from one of the side beams 2. The shaft 35 is provided at its outer end with a hand-wheel 37, by means of which the shaft may be rotated in the absence of a motor or in the event of the derangement of the latter, and said shaft also carries a power-wheel 38, loosely mounted thereon and geared, as by a sprocket-chain 39 or other suitable form of gearing, with a motor 40, which may obviously be mechanical, electrical, hydraulic, or any other type desired.

For the purpose of effecting an operative connection between the motor and the gate-operating mechanism when desired the power-wheel 38 is provided with a clutch-collar 41, designed to engage a similar clutch collar or hub 42, projecting from one side of the pinion 34, the shifting of the collar 41 to effect its engagement or disengagement with the pinion being effected by means of a controlling-lever 43, preferably pivoted upon the frame 36 and connected, as by means of the usual yoke, to the collar 41.

44 indicates the motor-controlling lever, which in the illustrated construction is provided with a brake-shoe 45, bearing upon a friction-wheel 46, constituting an element of the motor construction; but it will of course be understood that this arrangement is intended simply as a disclosure of motor-controlling means. The rack-bar 24 is provided at its lower end with a stud or projection 24<sup>a</sup>, designed to contact with one of the tie-bars of the section 7 after predetermined movement of the rack-bar, as will hereinafter appear, and in order to prevent the too-rapid gravitation of the gate to its closed position suitable retarding or brake mechanism is preferably provided. In the present embodiment of this mechanism it comprehends a brake-lever 47, mounted at one side of the frame 1 and arranged for frictional contact with a friction wheel or drum 48, fixed upon the counter-shaft 31, adjacent to and possibly integral with the gear-wheel 33.

Briefly, the operation of the mechanism de-



scribed is as follows: Assuming the parts to be related, as in Fig. 1 of the drawings, and that it is desired to lower the level of the water within the lock 4, the motor is connected with the gate-operating mechanism by the manipulation of the controlling-lever 43 and the rotation of the pinion 30 will effect the elevation of the rack-bar 24. The initial upward movement of the rack-bar will effect the swinging of the arms 22, and the wickets will accordingly be swung to their open positions, as indicated in Fig. 3 of the drawings. The effect of this opening of these subsidiary valves will be to relieve the pressure upon the lower section 7 of the gate, and continued movement of the rack-bar will cause the lug 24<sup>a</sup> to engage the under side of the lowermost tie-bar 11 of the section 7. The latter section will now be carried upward by the rack-bar until the section 8 is engaged, when, as has heretofore been explained, said section 8 will be elevated until the section 9 is engaged in a similar manner, and the gate, which is now contracted by the material lapping of its sections, will be bodily lifted until it has reached its completely-opened position. The gate-operating mechanism will now be disconnected from the motor and the gravitation of the gate to its initial position will be prevented by the brake-lever 47 in frictional contact with the hub or drum 48.

When it is desired to close the gate, it is simply necessary to swing the brake-lever 47 out of contact with its friction-drum, when, as will be evident, the gate will gravitate to its closed position, the sections 8 and 9 being arrested at the proper points by the stops 17 and 18 and the wickets being finally closed by the weight of the rack-bar.

It is thought that from the foregoing the construction and operation of my invention will be clearly understood; but while the illustrated embodiment thereof may perhaps be preferred in the equipment of canal-locks it is evident that the valve or closure may be employed in other connections than that in which it is illustrated and that in the equipment of a lock various changes, modifications, and variations of the illustrated structure may be effected. I therefore reserve the right to effect any and all variations of the construction, arrangement, and application of the invention which may be properly comprehended within the scope of the protection prayed.

What I claim is—

1. The combination with a canal-lock gate composed of relatively movable sections, of gate-operating mechanism arranged to impart relative upward movement to the sections and to subsequently raise the gate bodily.

2. The combination with a canal-lock gate composed of relatively movable gate-sections, of means for connecting the sections, and gate-operating mechanism for imparting relative upward movement to the sections to effect their connection and for subsequently raising the gate bodily.

3. The combination with a canal-lock gate composed of relatively movable gate-sections, of means for connecting the sections after predetermined relative upward movement thereof, gate-operating mechanism disposed to impart relative upward movement to the sections to effect their connection and to thereafter raise the gate bodily, and means for disconnecting the gate-operating mechanism from the gate to permit said gate to gravitate bodily for a predetermined distance, and to permit relative downward movement of the sections to effect the closing of the gate subsequent to the bodily downward movement thereof.

4. In a device of the character described, the combination with a gravity-closed gate composed of relatively movable sections, of gate-operating mechanism disposed to effect the successive elevation of the sections and independent guides for said sections.

5. In a device of the character described, the combination with a gate composed of relatively movable sections disposed to gravitate independently, of means for elevating one of said sections, said section being disposed, after predetermined independent movement thereof, to engage and move another section of the gate.

6. In a device of the character described, the combination with a gate composed of relatively movable sliding sections, of stops for limiting the downward movement of the sections, and means for effecting the engagement of the sections with each other to permit of their movement in unison after predetermined relative movement thereof in the opposite direction.

7. In a device of the character described, the combination with a movable gate composed of relatively movable sliding sections, of parallel guides for the reception of the ends of said sections, stop devices associated with said guides for retaining the sections in their proper relative positions when the gate is closed, gate-operating mechanism connected with one of the gate-sections to elevate the same, and means for connecting the sections to effect their movement in unison after predetermined relative movement thereof.

8. In a device of the character described, the combination with a gate composed of relatively movable sliding sections disposed normally in different horizontal planes, of stop devices for retaining the sections in their predetermined relative positions when the gate is closed, gate-operating mechanism connected to the lowest section of the series, and means for effecting the connection of said lowest section during the upward movement thereof with each of the next higher sections successively, whereby independent relative movement will be imparted to each successive section of the gate prior to the bodily movement thereof.

9. In a device of the character described, the combination with a gate composed of relatively movable sliding sections, of a rack-bar



connected with one of the sections to operate the same, gate-operating mechanism geared to the rack-bar, and means for causing said last-named section to connect with and move the other sections of the gate successively.

10. In a device of the character described, the combination with a sliding gate provided with sluice-openings, of swinging wickets within said openings, and gate-operating means disposed to swing the wickets to their open positions prior to the sliding of the gate.

11. In a device of the character described, the combination with a gate composed of relatively movable sections, of a sluice-opening in one section, a wicket closing said opening, and gate-operating mechanism disposed to move the wicket and the several sections of the gate successively.

12. In a device of the character described, the combination with a gate composed of relatively movable sliding sections disposed one above the other, a sluice-opening in the lowest section of the gate, and a movable wicket closing said opening, of a gate-elevating device connected to the wicket to move the same to its open position, means for effecting a connection between the gate-elevating device and the lowest section of the gate after the opening of the wicket, and means for causing the lowest gate-section when elevated to effect the successive elevation of the other sections of the gate.

13. In a device of the character described, the combination with a gate composed of relatively movable sliding sections, one of said sections having a sluice-opening, of a pivotally-mounted wicket disposed to close said opening and provided with an outstanding arm, a vertically-disposed rack-bar having pivotal connection with the arm, means for operating the rack-bar to swing the wicket, and a projection on the rack-bar arranged to engage a gate-section to move the same subsequent to the swinging of the wicket.

14. In a device of the character described, the combination with a gate composed of relatively movable sections and provided with bearings, and a rack-bar mounted in said bearings on the gate and having a horizontal arm, of swinging wickets closing sluice-openings formed in the gate and provided with outstanding arms having loose pivotal connection with the horizontal arm of the rack-bar, and means for moving the rack-bar longitudinally to effect the movement of the wickets and gate-sections successively.

15. In a device of the character described, the combination with a frame provided on opposite sides thereof with vertically-disposed guideways, and a gate composed of separate sections having their opposite ends extended into the guideways of the frame, of stop means associated with the guideways for retaining the gate-sections normally in their proper relative positions, wickets located in one of the gate-sections, bearings carried by

the gate and frame, respectively, a rack-bar mounted in said bearings for limited movement independent of the gate and operatively connected with the wickets, operating mechanism connected to the rack-bar, and means for effecting the connection of the gate-sections to permit their movement in unison after predetermined movement thereof.

16. A canal-lock gate made up of a plurality of sections of angular form, and tie-bars and struts located at the reëntrant side of the angular sections to brace the same.

17. A canal-lock gate composed of a plurality of sections arranged to move one upon the other, said sections being provided with oppositely-disposed flanges at their contiguous edges to form a water-tight connection between the sections.

18. In a device of the character described, the combination with a gate composed of relatively movable sliding sections disposed normally in different horizontal planes, of gate-operating mechanism connected to the lowest section of the series, and means for effecting the connection of said lowest section during the upward movement thereof with each of the next higher sections successively, to move the same.

19. In a device of the character described, the combination with a gate composed of relatively movable sections, of a single actuator, said actuator being connected to one of the sections to operate the same, means for causing the last-named section to move the other sections of the gate successively, and means for operating the actuator.

20. In a device of the character described, the combination with a gate composed of relatively movable sections, of a sluice-opening in one section, a wicket closing the opening, and operating mechanism common to the wicket and gate-sections.

21. In a device of the character described, the combination with a gate having a sluice-opening, of a wicket disposed to close said opening and provided with an outstanding arm, a vertically-disposed rack-bar having connection with the arm, means for operating the rack-bar to move the wicket, and a projection on the rack-bar arranged to engage the gate to move the same subsequent to the movement of the wicket.

22. In a device of the character described, the combination with a gate composed of separate sections, of stop means for retaining the gate-sections normally in their proper relative positions, wickets located in one of the gate-sections, a rack-bar mounted for limited movement independent of the gate and operatively connected with the wickets, operating mechanism connected to the rack-bar, and means for effecting the connection of the gate-sections to permit their movement in unison after predetermined independent movement thereof.

23. In a device of the character described,



the combination with a movable gate composed of relatively movable sliding sections, of parallel guides for the reception of the ends of said sections, and stop devices associated  
5 with said guides for retaining the sections in their proper relative positions when the gate is closed.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CORNELIUS FRED LUQUER.

Witnesses:

BURTON E. ABLETT,  
W. D. LOWTHER.