June 13, 1933. H. D. COLMAN 1,913,976

GATE OPERATING MECHANISM

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Fig. 1.

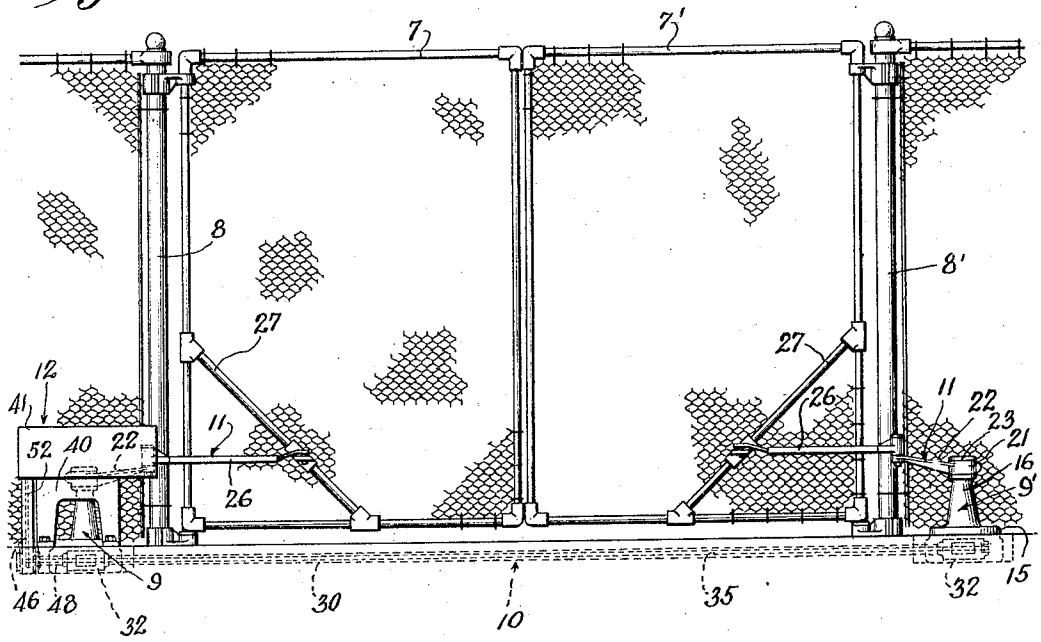
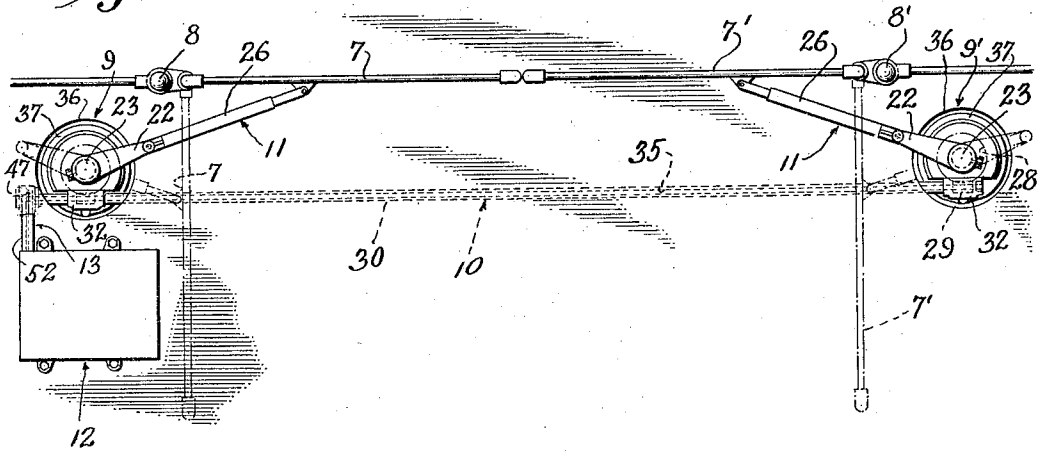


Fig. 2.



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Fig. 3.

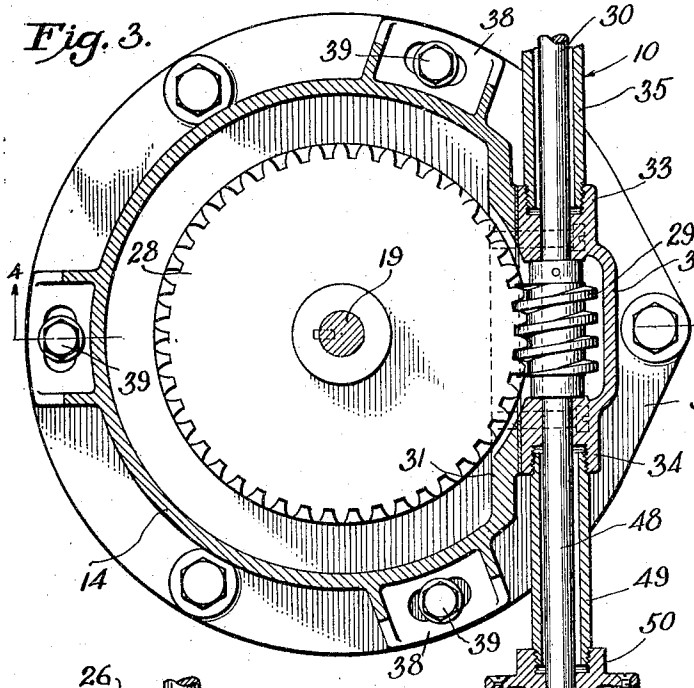
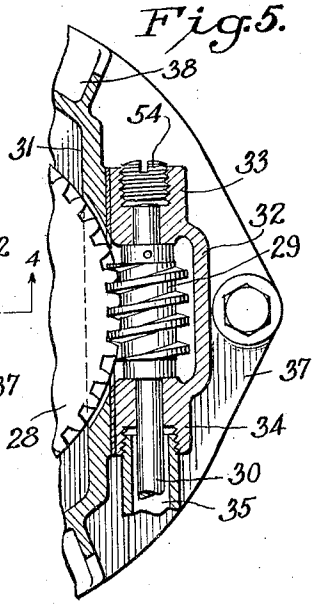


Fig. 5.



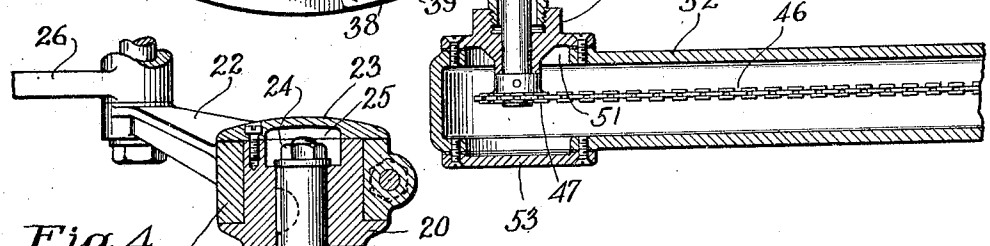
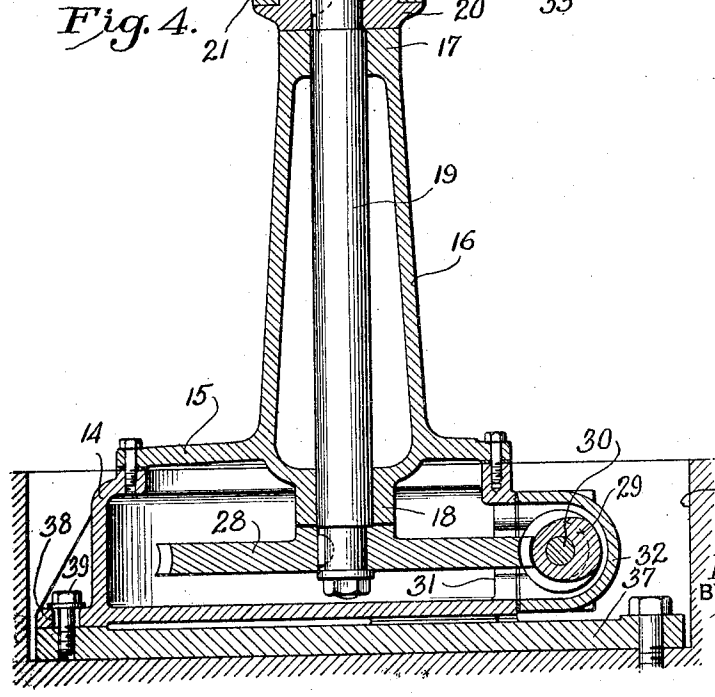


Fig. 4.



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Fig. 6.

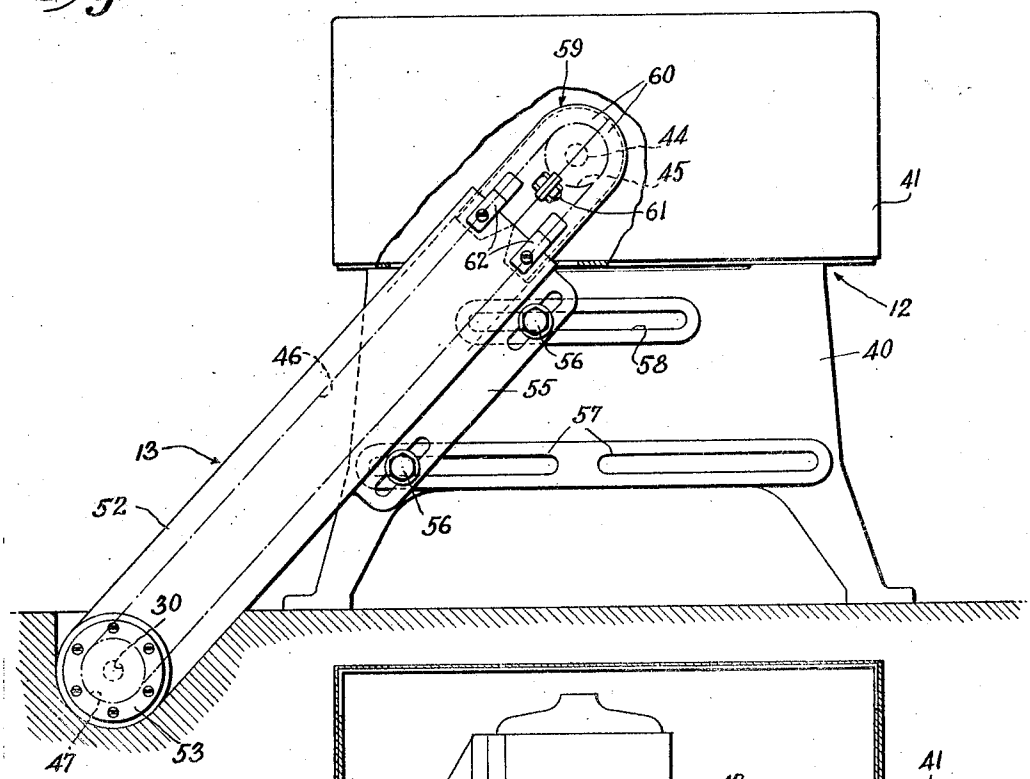
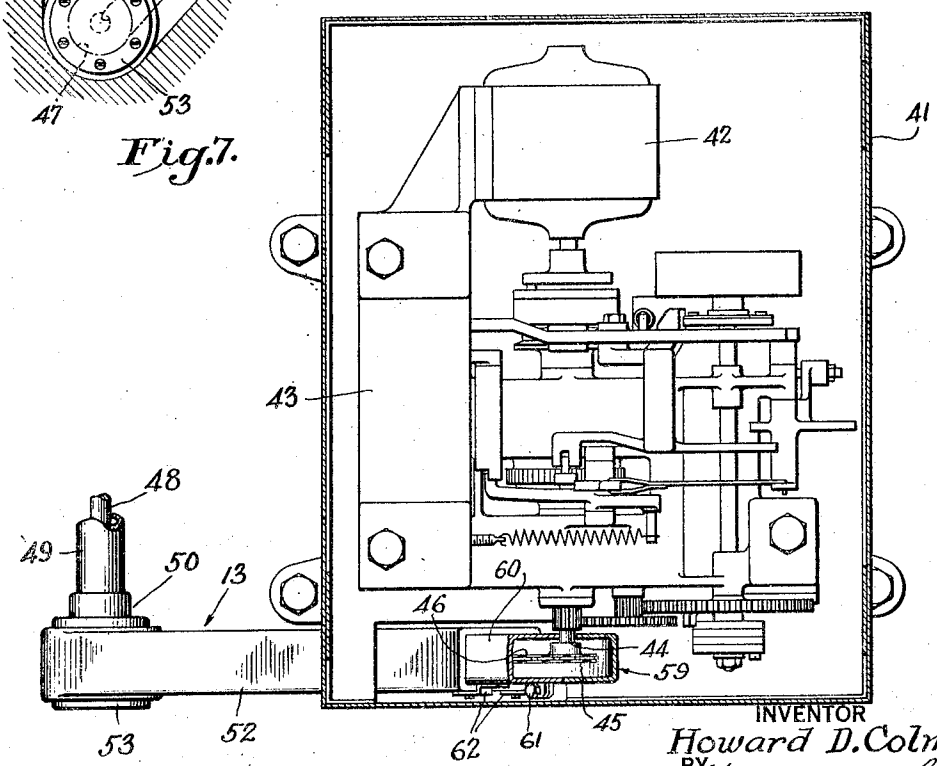


Fig. 7.



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Patented June 13, 1933 1,913,976

UNITED STATES PATENT OFFICE

HOWARD D. COLMAN, OF ROCKFORD, ILLINOIS

GATE OPERATING MECHANISM

Application filed May 26, 1930. Serial No. 455,712.

The invention pertains to closures arranged for actuation by a motor-driven power unit, and pertains more especially to the operation of gates or the like which are used out of doors, and hence under conditions such that the operating mechanism must necessarily cope with adverse weather conditions.

One object of the invention is to provide an operating mechanism for gates and the like which is effectually protected against such adverse weather conditions.

Another object is to provide a power-driven operating mechanism of such a character as to operate efficiently over a long period of time without attention.

A further object is to provide a practical operating mechanism for a pair of swinging gates embodying individual operators for the respective gates with a driving connection therebetween and a power unit capable of convenient association with either of said operators for the purpose of supplying motive force to both of them.

Still another object is to provide an operating mechanism of the above character in which the connection between the individual operators is located underground and in which provision is made for effectual lubrication.

The objects of the invention thus generally set forth, together with other and auxiliary advantages, are attained in the preferred embodiment of the invention illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view illustrating the application of my improved operating mechanism to a pair of swinging gates.

Fig. 2 is a plan view of the same.

Fig. 3 is a fragmentary plan section on an enlarged scale through the base of one of the operators and illustrating its connection with the power unit and also its association with the connection between the two operators.

Fig. 4 is a fragmentary vertical sectional view taken approximately in the plane of line 4—4 of Fig. 3.

Fig. 5 is a fragmentary horizontal sectional view illustrating a detail of construction.

Fig. 6 is an end view illustrating more especially the power unit employed, a portion of the enclosing casing being broken away to illustrate the construction of a housing which encloses the driving connection between the power unit and the operating mechanism proper.

Fig. 7 is a plan view of the operator with the enclosing casing shown in section.

As herein shown the invention is applied to the operation of two gates 7 and 7′ swingably mounted on posts 8 and 8′ defining an opening in a fence or other enclosure. Usually the gates control passage over a driveway leading through the opening, for use by motor vehicles, and the employment of a power-driven operating mechanism for the gates is especially advantageous where such mechanism is subject to control from a motor vehicle either by the manual operation of a control device such as an electric switch, or by radio control as set forth in my Patent No. 1,760,479, issued May 27, 1930.

Individual operators 9 and 9′ are provided for the respective gates, being located at opposite sides of the opening adjacent the posts 8 and 8′. The two operators are operatively connected as illustrated in broken lines in Figs. 1 and 2, by a connection generally designated 10, extending across the driveway, and each operator has a suitable connection generally designated 11 with its corresponding gate. A power unit 12, located at either side of the driveway, has a connection generally designated 13 with the common connecting means 10 extending between the operators.

Each of the operators 9 comprises (Figs. 3 and 4) a base 14 in the form of a hollow casting with an opening at its upper side closed by a plate 15. Cast integral with said plate 15 is a tubular standard 16 providing bearings 17 and 18 at upper and lower ends respectively, for a shaft 19. The upper end of the shaft projects above the bearing 17 and has secured thereon a bushing 20 carrying the hub 21 of a crank arm 22. The hub

is suitably secured to the bushing in adjustable relation thereto, and overlying the hub and the bushing is a cap plate 23 secured to the bushing. In securing the bushing on the upper end of the shaft 19, a nut 24 is applied thereto, a cavity 25 being formed between the bushing and the cap plate to accommodate the nut.

The crank arm 22 may be connected to the gate by suitable means such as a link 26 (Figs. 1 and 2), and this link is connected to the lower portion of the gate some distance from its axis. Herein the link is shown connected to a diagonal bar 27 across the lower hinged corner of the gate.

The shaft 19 of each of said operators carries at its lower end within the base 14 a worm wheel 28 made rigid with the shaft in any preferred manner, and this wheel is driven by means of a worm 29 on a shaft 30, which is horizontally disposed in approximately tangential relation to the worm wheel 28.

To permit of the intermeshing of the worm and worm wheel, the base is constructed to provide at one side a flat wall 31 centrally apertured to receive a segment of the worm wheel, and the base has a removable section in the form of a bearing bracket 32 for the shaft 30. The bracket is bolted to said side wall 31 and the worm 29 is disposed within a chamber between bearing members 33 and 34 of said bracket.

The shaft 30 constitutes the common driving connection 10 between the two operators 9 and 9′, and therefore is made of a length such as to extend across the driveway with the worms 29 of the individual operators secured near opposite ends of the shaft. To enclose the portion of the shaft between the operators, an elongated tubular housing is provided which is in the form of a pipe 35 having its opposite ends threaded into the bearing members 33 of the two operators (Fig. 2).

The driving connection 10 between the operators is preferably disposed beneath the surface of the driveway, and the operators are accordingly mounted in wells 36 provided at opposite sides of the driveway. Said wells, which may conveniently be formed in concrete, are made of a depth to receive the bases of the operators so that the bearing brackets 32 thereon and the tubular housing 35 extending between the brackets shall be disposed a suitable distance below the surface of the ground. Plates 37 rigidly secured at the bottoms of the wells 36, provide a convenient mounting for the bases of the operators, and in order to permit of a slight circumferential movement of the bases in adjusting the worm and worm wheel drives, the bases are formed with radial arms 38 slotted to receive fastening bolts 39 anchored in the plates 37.

The power operating unit 12 is located at one side of the driveway, herein adjacent the operator 9 at the left (Figs. 1 and 2), and is mounted on a suitable standard 40 (Fig. 6) carrying a removable casing 41 within which the unit is enclosed. The construction employed for the unit forms per se no part of the present invention but may be of the type disclosed and claimed in my copending application Serial No. 166,086, filed February 5, 1927.

Briefly stated the power unit comprises an electric motor 42 located at one side of a frame structure 43 and operating under a suitable control mechanism to drive a shaft 44 successfully in opposite directions for the purpose of effecting alternate opening and closing cycles.

The connection 13 between the power unit and the two operators comprises in the present instance a sprocket wheel 45 on the shaft 44 of the power unit connected by a chain 46 with a sprocket 47 on the shaft 30. The latter has an extension 48 for this purpose (Fig. 3) projecting from the bearing 34 of the bracket 32 of one of the operators, herein the left hand operator. To enclose the extended end of the shaft a tubular housing 49 is provided, which housing is in the form of a pipe screw-threaded at one end into the bearing 34, and at its other end to a bearing member 50 through which the end of the shaft extension 48 passes.

The bearing member 50 has a peripheral flange secured to the peripheral edge portion of an opening 51 in the lower end of an elongated housing 52 for the chain 46. The shaft extension 48 carrying the sprocket 47 terminates in the lower end of this housing which is inclined upwardly about the chain (Fig. 6). The housing is preferably cast in one piece, and to permit access to the lower end of the chain, the housing has an opening opposite the opening 51 which is closed by a cover plate 53. The opposite end of the shaft 30, which in the present instance is connected with the operator 9′ terminates in the bearing member 33 of that operator, the end of this member being closed by a plug 54 as shown in Fig. 5.

It will be observed that the operators 9 and 9′ together with the connection 10 therebetween and the connection with the chain housing 52, are so constructed as to enclose completely the operating parts, and all joints are made fluid tight through the use of suitable gaskets where necessary. Thus moisture is excluded and preferably the entire housing structure, including the bases 15 and the standards 16 of the operators, the bearing brackets 32, the tubular housings 35 and 49, and the lower portion of the chain housing 52 may be filled with oil. This insures a long life for the operating mechanism and avoids the necessity for fre-

quent attention for purposes of lubrication as would otherwise be necessary.

In order that the major portion of the chain housing 52 may thus be filled with oil and yet permit of convenient assembling of the mechanism, the housing is made of substantial length so that its upper end may enter an opening in the bottom of the casing 41 of the power unit 12, as shown in Fig. 6. To support the housing in various positions of adjustment relative to the standard 40 of the power unit, it has a flange 55 longitudinally slotted to receive clamping bolts 56. The latter are entered through slots 57 and 58 in the standard 40.

The upper end of the chain housing 52 is arranged to enter into the casing 41 of the operating unit, through a suitable opening in the bottom of an overhanging portion of the casing, and is thus protected by the casing 41 against the entrance of moisture into the housing. Within the casing 41 the housing is closed by a cap 59, which telescopes into the lower section and encloses the upper sprocket 45 on the driven shaft 44 of the power unit. Preferably the cap is formed from two sheet metal sections 60 bolted together as at 61 (Fig. 6). A pair of clips 62, spot welded onto the respective sections 60, are fastened by screws to the upper end of the chain housing 52, thereby securing the cap in position in the housing.

It will be seen that I have provided an operating mechanism which is especially adapted for application to the actuation of gates or other closures commonly necessitating the location of the operator out of doors. By the arrangement provided the power unit may readily be placed at either side of the opening to be closed, and where conditions permit the driving connection between the two operators may be extended into an adjacent building containing the power unit.

I claim as my invention:

1. A power driven closure operating mechanism comprising, in combination with a pair of swingably mounted gates or the like, an operator for each of said gates comprising a base, a standard rising from the base, a shaft mounted in said standard and having a crank arm at its upper end, means connecting the crank arms of the two operators to the respective gates, an underground driving connection between the shafts of the two operators, and a power driven actuating unit for applying a motive force to said driving connection.

2. An operating mechanism for a pair of swingably mounted gates or the like comprising, in combination, an operator for each of said gates, each comprising an upright shaft having a crank arm operatively connected with one of the gates, a horizontally disposed shaft extending across the opening to be closed by the gates and connected with each of the upright shafts, a power unit for actuating said horizontal shaft, and means forming an intercommunicating fluid-tight housing structure enclosing said upright shafts of the individual operators and said horizontal shaft.

3. An operating mechanism for a pair of swingably mounted gates or the like comprising, in combination, a pair of operators one for each of said gates and each comprising a standard having an upright shaft therein, crank arms connecting said shafts to their respective gates, a horizontal actuating shaft for the operators connected to said upright shafts respectively, and means coacting with said standards to provide an intercommunicating fluid-tight housing structure for the upright shafts and the horizontal actuating shaft.

4. An operating mechanism for a pair of swingably mounted gates or the like comprising, in combination, a pair of operators one for each of said gates and each comprising a standard having an upright shaft therein, crank arms connecting said shafts to their respective gates, a horizontal actuating shaft for the operators connected to said upright shafts respectively, means coacting with said standards to provide an intercommunicating fluid-tight housing structure for the upright shafts and the horizontal actuating shaft, and a power unit having a driving connection with said actuating shaft, with means communicating with the housing structure and enclosing the driving connection.

In testimony whereof, I have hereunto affixed my signature.

HOWARD D. COLMAN.