United States Patent [19]

Ries

[11] **3,839,826**

[45] **Oct. 8, 1974**

[54] **POWER OR MANUALLY OPERABLE GATE**

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[22] Filed: **May 15, 1973**

[21] Appl. No.: **360,432**

[52] **U.S. Cl.** **49/139,** 49/25, 49/385, 49/386, 16/85

[51] **Int. Cl.** **E05f 15/00**

[58] **Field of Search** ..... 49/139, 266, 385, 191, 49/272–274, 386, 25; 16/1 C, 191, 85

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[57] **ABSTRACT**

A rectangular gate is mounted to pivot, in a vertical plane, about an axis at a lower corner of the gate, a first spring urges the gate toward open position and a second spring acts, as the gate approaches open position, to resist the action of the first spring. The pivot for the gate is a horizontal, selectively power driven, shaft and the gate is mounted on the shaft by a split-band adjustable friction clutch so that the gate may be opened or closed manually or by power means, selectively.

6 Claims, 5 Drawing Figures

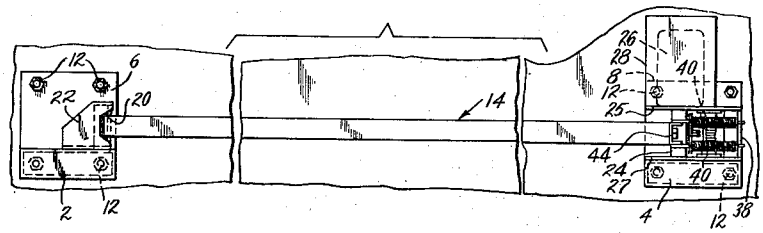


Fig. 1.

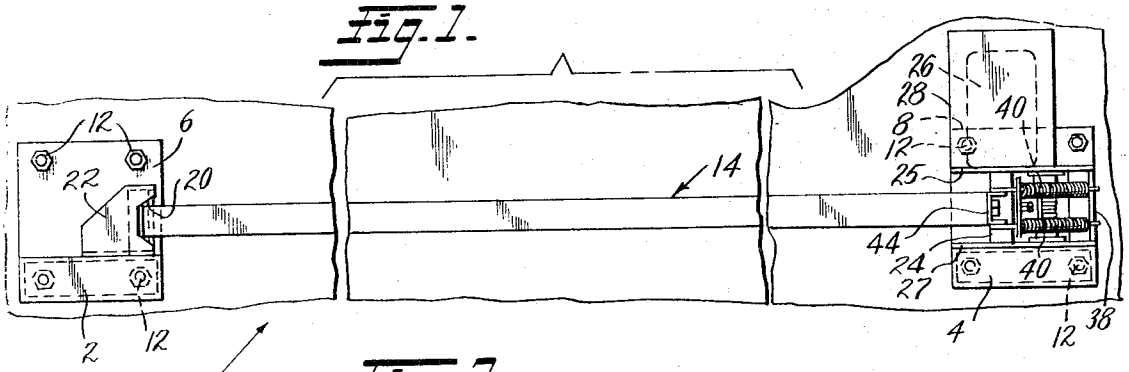


Fig. 2.

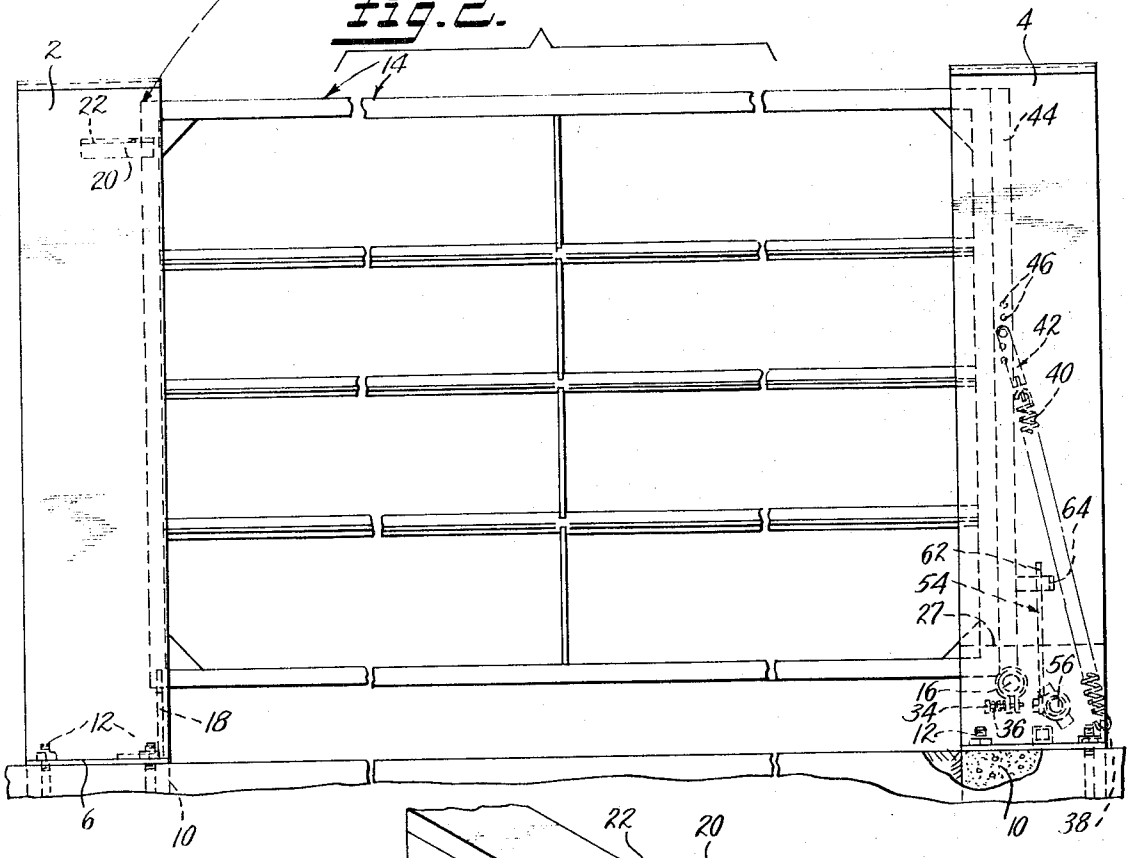


Fig. 5.

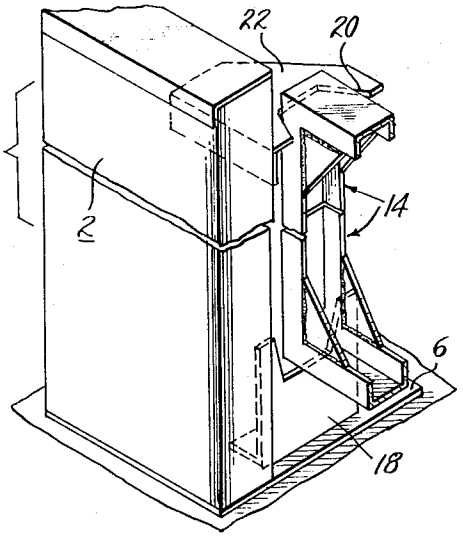


Fig. 3.

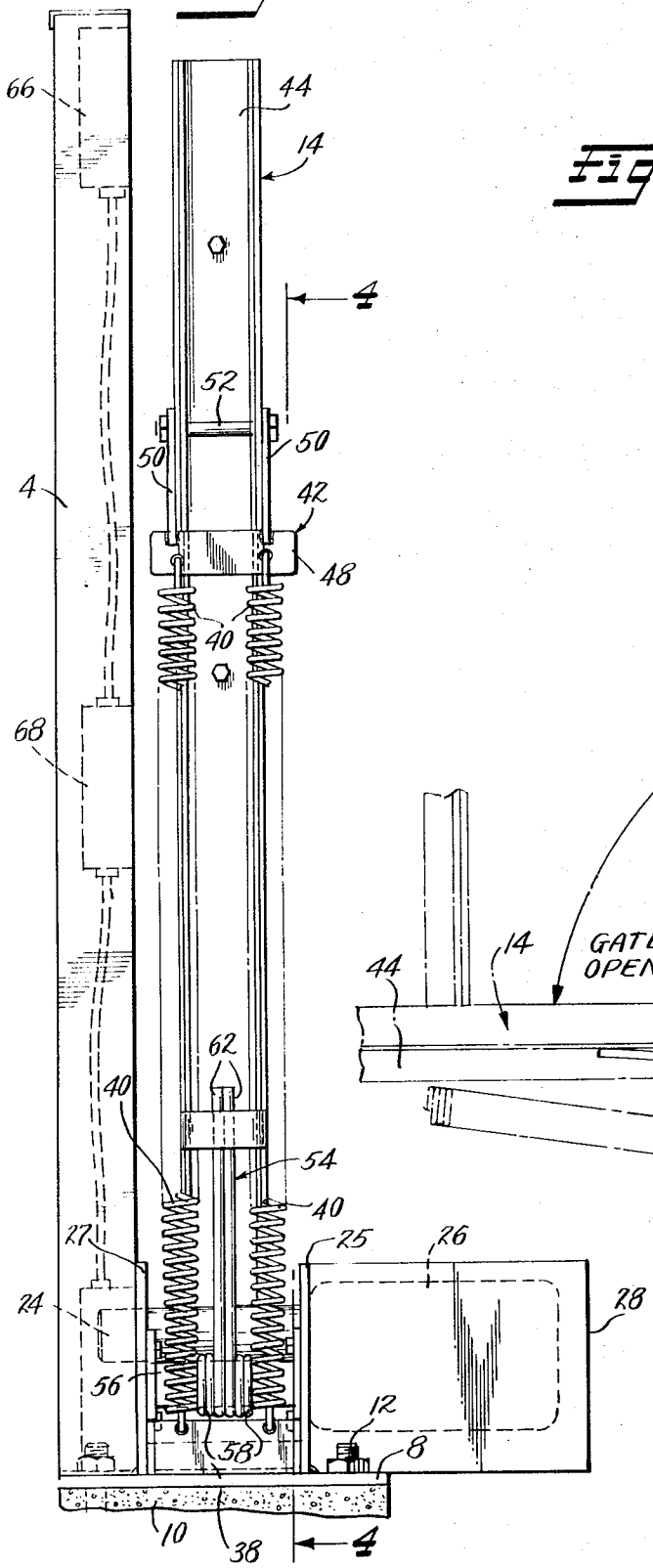
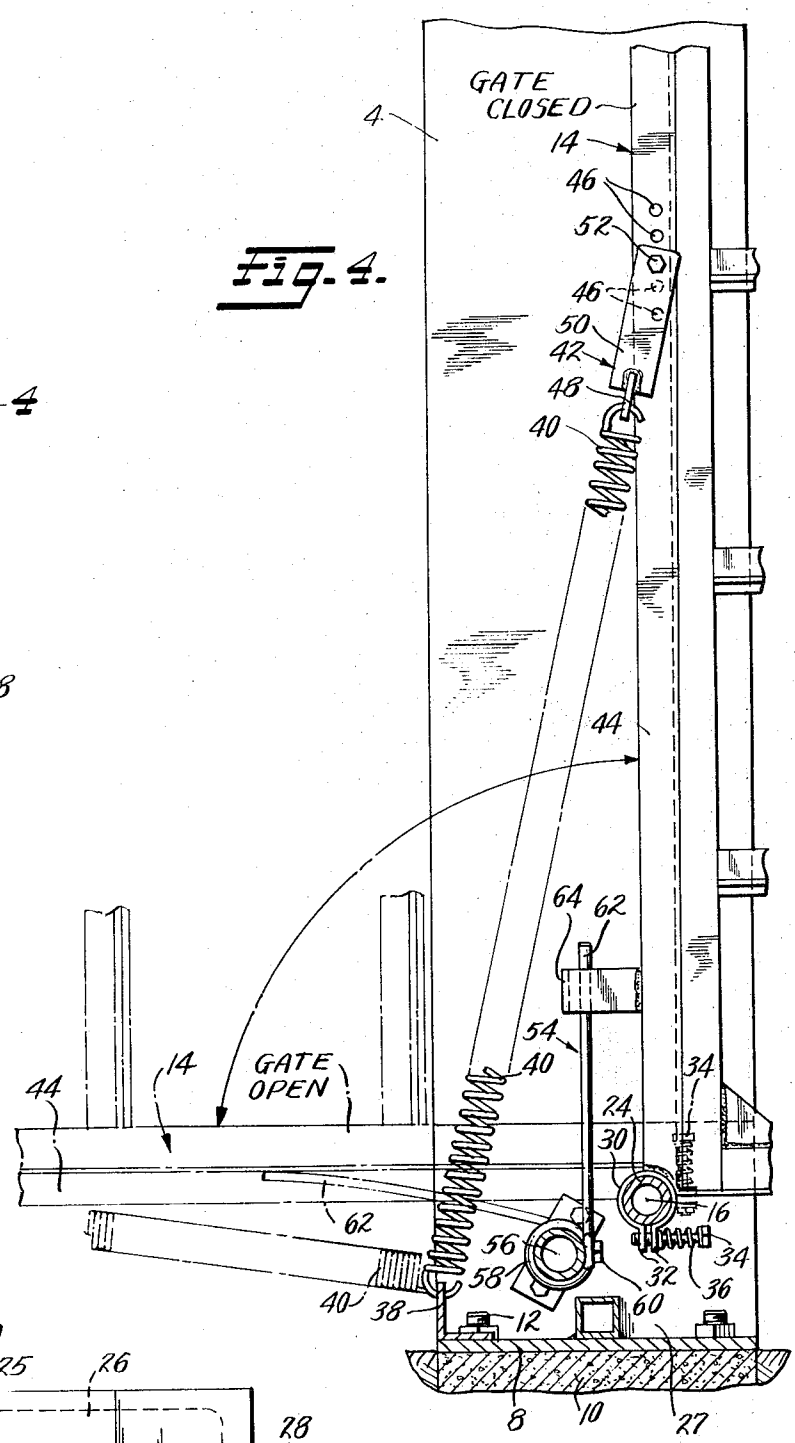

66
44
14
4
52
50
50
42
48
40
68
62
40
54
40
27
25
26
28
24
56
12
58
8
10
38
4

Fig. 4.


GATE CLOSED
4
14
46
52
46
50
42
48
40
44
64
62
54
40
34
24
30
16
56
58
32
36
40
38
60
12
GATE OPEN
44
14
62
8
10
27

POWER OR MANUALLY OPERABLE GATE

BACKGROUND OF THE INVENTION

This invention is in the field of power operated gates and particularly such gates that may be selectively manually opened or closed manually without the application of other power.

Power operated garage doors are quite common and are usually under the control of a radio transmitter and receiver combination whereby the user may cause the garage door to open or close from a remote position. However, such devices involve overhead guiding and-/or suspension means and are normally incapable of being manually operated without disconnecting the motor drive. Insofar as applicant knows, no adaptation of radio controlled or power operated gates have been achieved. It is common to provide crossing gates or the like, for example, at railroad crossings, that are power operated in response to a signal indicating that a train is approaching. However, it is not believed that any such have been capable of selective operation by the power means or by manual means, selectively.

SUMMARY OF THE INVENTION

The present invention may best be summarized by the following objects.

First, to provide a gate that may be selectively power operated or manually operated.

Secondly, to provide a power operated gate free of any overhead guiding or suspending structures.

Third, to provide a power operated gate movable in a vertical plane from open to closed position and vice versa without swinging over any laterally positioned areas.

Fourth, to provide a gate of the type referred to having adjustment means for regulating the forces necessary to open the same manually and for substantially balancing the gate in all of its positions.

Fifth, to provide a gate of the type referred to that is relatively simple to construct and economical to manufacture and operate.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary top plan view of the gate of the present invention;

FIG. **2** is a side elevational view of the gate of FIG. **1**;

FIG. **3** is an enlarged end elevational view as seen from the right hand end of FIG. **2**;

FIG. **4** is a fragmentary vertical-sectional view, taken on the line **4—4** of FIG. **3**, showing the gate in its closed position in full lines and its open position in phantom lines; and

FIG. **5** is an enlarged fragmentary perspective view, illustrating the left hand gate post and the free end of the gate in closed position.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring first to FIGS. **1** and **2**, FIG. **1** is a plan view of a gate embodying the present invention and the figure illustrates a left hand gate post **2** and a right hand gate post **4**. Each gate post is shown in the form of a hollow box-like structure of sheet metal welded or otherwise secured to base plates **6** and **8**, which in turn are secured to rigid foundation blocks or footings, such as

the concrete blocks **10** by means of bolts **12** or the like. The gate generally designated **14**, is illustrated as a substantially rectangular framework of channel and angle members but it is to be understood that any suitable gate construction may be employed. The gate is mounted adjacent gate post **4** for swinging movement in a vertical plane about a horizontal axis **16** at the lower right hand corner of the gate frame as seen in FIG. **2**. In FIG. **2** the gate is shown in its closed position wherein its free or left hand end extends behind gate post **2** and its bottom edge rests on a suitable lower cradle plate **18** (FIG. **5**), while the upper end of its outer edge nests in a notch **20** in an upper cradle plate **22**. The provision of plates **18** and **22** is, of course, optional, but are suggested herein to hold the gate firmly in position when closed. The plates **18** and **22** may be secured to base plate **6** and gate post **2**, respectively, in any suitable manner, such as by welding, bolts or the like (not shown).

Referring now more particularly to FIGS. **3** and **4**, the axis **16** referred to is defined by the center of a shaft **24** journalled in side plates **25** and **26** welded or otherwise secured to base plate **8**. The shaft **24** constitutes the output shaft of a motor and reduction gear combination shown schematically at **26** in FIG. **3**. Preferably, the motor and gear combination **26** is housed in a suitable enclosure **28** to protect the same from weather or other external damage.

As shown most clearly in FIG. **4**, the lower right hand corner portion of the gate **14** has secured thereto a resilient band **30** of suitable metal which terminates in end ears **32** and which circumscribes the shaft **24**. A bolt **34** extends through one of the ears and is threaded into the other and bears against a compression spring **36**. It will be obvious that the bolt **34** may be threaded inwardly or outwardly to regulate the force exerted by spring **36** and thereby the tension applied to band **30** on shaft **24**. Preferably, a band **30** is provided on each side of the gate frame **14**, the two bands being identical and engaging the shaft **24** at axially spaced positions. Thus, the bands **30** constitute means for journalling the gate **14** on shaft **24** and further constitute friction clutch means whereby the gate may be pivoted about shaft **24**, with frictional resistance and without rotating the shaft **24** as a result.

Fixedly secured to the base plate **8** is an anchor plate **38** having openings therein in which the lower ends of a pair of tension springs **40** are anchored. The tension springs extend upwardly toward the adjacent end of the gate **14** and are secured thereto by a clevis arrangement **42**. As shown, the vertical end frame member of the gate **14** is in the form of an outwardly facing channel member **44**, the side flanges of which have a plurality of vertically spaced aligned openings **46** therein. The clevis device **42** comprises a cross-plate **48** having openings therethrough and in which the upper ends of the springs **40** are anchored. Side plates **50** are welded to the plate **48** to extend along the outer surfaces of the side flanges of channel **41** and are provided each with an opening at its outer end which openings are alignable with a selected pair of the openings **46**. A bolt **52** extends through the aligned openings of plates **50** and the flanges of channel **44** to thus anchor the upper ends of the tension springs **40** to the end member of the gate frame. It will be obvious that the clevis device **42** may be selectively engaged with any of the openings **46** to thus adjust the tension of springs **40** and thereby the

force with which they urge the gate toward open position.

The springs **40** are adjusted to exert such force on the gate that the opening moment applied to the gate thereby about axis **16** is insufficient to overcome the friction of the bands **30** and weight of the gate but is of such value that a person may manually lift the gate **14** and, with the assistance of springs **40,** move the gate upwardly toward open position.

It will be apparent that the springs **40** constantly apply an opening force on the gate **14** and that after the gate **14** has lifted to such position that its center of gravity is generally over the axis **16,** the weight of the gate no longer resists the spring force but is added therto. Under such conditions, the gate would slam to open position with undue force and it would be difficult for a person to manually control the same or to close the gate under those conditions. To overcome the aforementioned disadvantage, the apparatus is provided with a counteracting spring **54.** A fixed shaft **56** extends between plates **26** and **28** and is anchored thereto against rotation. A pair of torsion springs **58** surround the shaft **56** and have their outermost ends anchored thereto by suitable bolts **60** (see FIG. **4**). The innermost ends of the torsion springs **58** extend freely upwardly in a substantially vertical direction in close proximity to each other and thus the torsion springs will function as a single torsion spring device. The upwardly extending legs **62** of the torsion springs **58** are normally spaced from the adjacent upright channel **44** of the gate **14** when the gate is in closed position, as shown in full lines in FIG. **4.** However, when the gate is swung toward open position, the web of channel member **44** engages the upper end of torsion spring legs **62** and further opening movement of the gate serves to store energy in the springs **58.** From the foregoing description it will be obvious that the torsion springs **58** will be partially loaded before the center of gravity of the gate reaches a position over pivot axis **16** and thus function to resist the action of tension springs **40** at a time when that would normally accelerate the gate toward an open position. As noted, the upright **44** of the gate frame will engage the free end of spring arm **62** very shortly after the gate starts to open and thus considerable loading of the spring is achieved before the center of gravity reaches the upper position referred to. The parts are so proportioned and adjusted that a substantial force is exerted by the torsion spring legs **62** on the gate **14** after the center of gravity thereof has passed over the axis **16** and thus the springs **58** resist the urging of springs **40** to such an extent that the gate will not slam to its open position in an uncontrolled manner. When the gate is in its fully open position, the torsion springs **58** are tensioned whereas the springs **40** exert minimum force and the gate can then be easily manually swung toward closed position and as the center of gravity passes over axis **16** again, the springs **40** take over control for counterbalancing the gate and shortly thereafter the legs **62** are disengaged from channel **44** and the gate may be lowered gently and easily to its closed position. As shown, a protective yoke **64** of generally U-shape has its legs welded to the side flanges of channel member **44** and serves as a guard for the free end of legs **62** when the gate is in closed position.

As stated previously, the gate may be selectively operated by the power means **26** through the medium of shaft **24** and friction clutch bands **30.** It is contemplated that a suitable radio receiver **66** be provided, preferably housed within hollow gate closure **4** to receive a signal from a transmitter and to thereby actuate a reversing relay or relays in enclosure **68,** also housed in hollow gate post **4,** to energize the motor device **26** to operate in the proper direction to move the gate to open or closed position. Thus, if the gate is open, the next signal received by receiver **66** will cause the motor to rotate in a direction to close the gate. Suitable cams and microswitches, not shown, responsive to the position of the gate, are contemplated whereby movement of the gate to open or closed position will actuate the switches to condition the circuits for the next power cycle and to control or shut off the motor device **26,** all as is conventional in related devices, such as power operated garage doors or the like.

While a single specific embodiment of the invention has been shown and described herein, the same is merely illustrative of the principles involved and other embodiments may be resorted to within the scope of the appended claims.

I claim:

1. A generally rectangular substantially rigid gate frame lying in a generally vertical plane;

pivot means supporting said gate frame for pivotal movement about a generally horizontal fixed axis perpendicular to the plane of said frame and at a lower corner at one end thereof, said gate frame being movable about said pivot means between a closed position where its center of gravity is on one side of said axis and an open position where its center of gravity is on the other side of said axis;

tension spring means urging said gate from said closed position toward said open position; and

torsion spring means mounted adjacent said axis and having an arm extending into the path of movement of a portion of said gate frame and spaced therefrom when said gate is closed but engageable by said gate substantially before said center of gravity reaches a position over said axis and arranged to resist the urging of said tension spring as the center of gravity of said gate approaches and passes a position above said axis.

2. A gate as defined in claim **1** including adjusting means for selectively adjusting the tension of said tension spring.

3. A gate as defined in claim **2** wherein said tension spring is anchored at one end, outwardly of said one end of said frame and extends upwardly therefrom toward said frame, said adjusting means comprising means for connecting the upper end of said tension spring to said frame at a selected one of a plurality of positions.

4. A gate as defined in claim **1** wherein said torsion spring means includes an anchored torsion spring coil having an upwardly extending arm spaced outwardly of said one end of said frame when said gate is in closed position but being engageable by said frame, as it swings toward open position, to energize said torsion spring coil.

5. A gate as defined in claim **1** wherein said pivot means comprises a horizontal shaft at said axis and friction clutch means journalling said gate frame on said shaft;

selectively operable power driven means for rotating said shaft whereby said gate may be pivoted between open and closed positions either by said

power driven means through said friction clutch or manually by causing said friction clutch to slip on said shaft.

6. A gate as defined in claim **5** wherein said friction clutch means comprises a resilient band secured to said frame and extending around said shaft in frictional engagement therewith, spring means for tensioning said band, and means for selectively adjusting the force of said last-named spring means.

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