

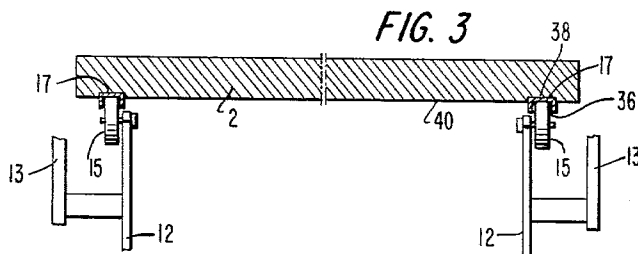
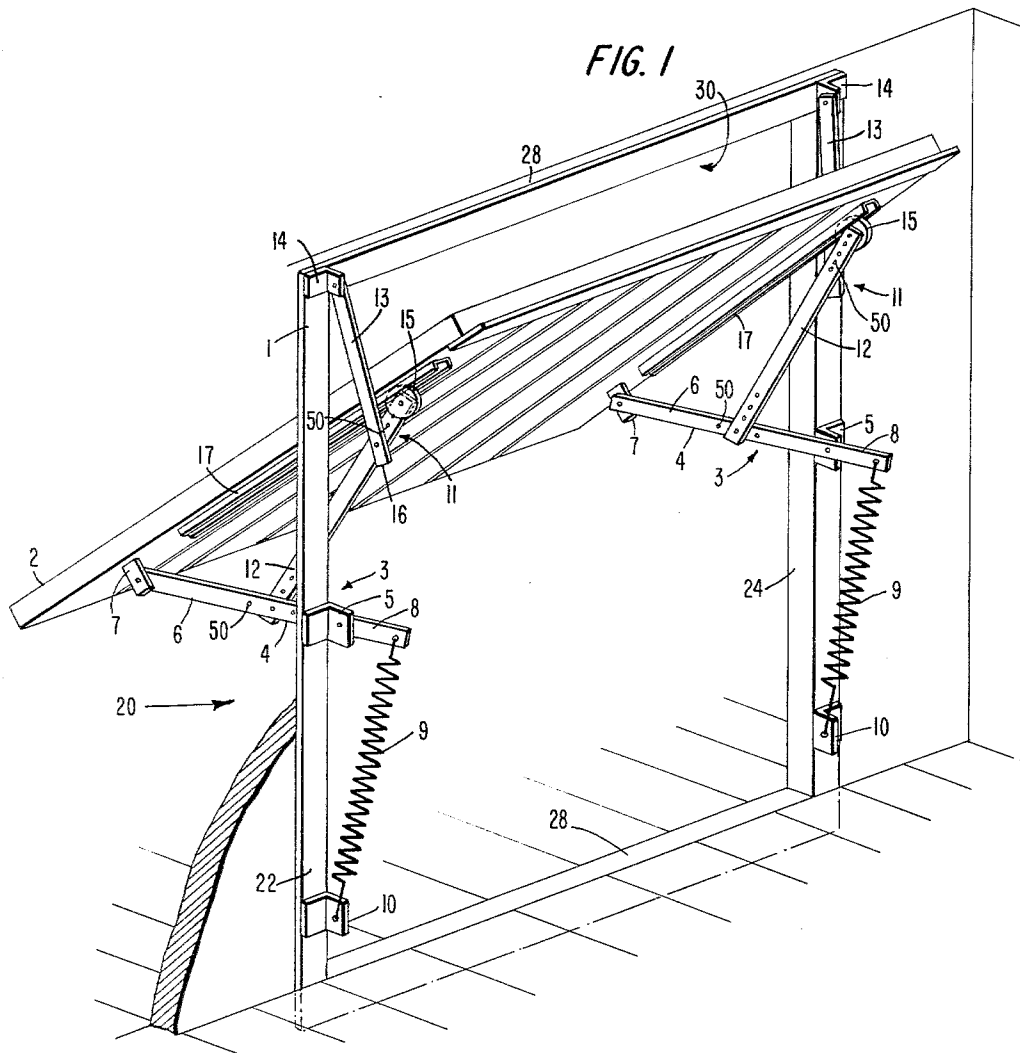
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2 Sheets-Sheet 1



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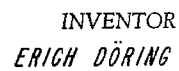
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GARAGE LIFT GATE

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The present invention relates to a garage lift gate, the gate plate of which can be shifted from its closing position by means of a tilting movement caused by an upper and a lower guide device, combined with a translatory movement, in an essentially horizontal retracted position near the ceiling.

Doors with a gate plate pivotable over the head and guided at the bottom by a guide rod pair and at the top by rollers and rails, are already known. The guide rods are generally double-armed, whereby on the one short free end of the arm a counterbalance weight is arranged.

Thus such a construction makes use of a double arm guide rod pair engaging on the one hand a middle point of the height of the door frame and on the other hand at the lower extremity of the gate plate. The second guide of the gate plate is obtained by a pair of rollers or pins engaging at the upper extremity, which pins or rollers run in horizontally suspended rails.

The rails extend far into the room, but must be suspended at the ceiling and propped against each other, so that the rollers do not leave the rails.

This is why a second pair of guide rods was already provided instead of the rollers and rails. This pair engages likewise at the middle of the height of the gate frame, is directed upward and has at the upper end a roller each which runs in a guide rail fastened on the gate plate. The vertical movement of the upper guide rods is limited by chains fastened on the gate frame. All the parts are fastened on the gate frame and the gate plate is suspended freely in the space in its open position. In this known gate the upper guide device has little lateral rigidity and does not allow in any case a movement obtained by force.

The gate according to the invention is characterized by the combination of the following features:

- (a) the lower guide device comprises a double-armed levers which are pivotably carried at a fixed location at the middle height of the gate frame and the longer arm of which is linked to the lower extremity of the gate plate, while a tension spring is fastened on the shorter end of the arm, the other end of the spring being fastened on an abutment at the lower extremity of the gate frame, whereby the tension springs run laterally from the gate plate behind its frame.
- (b) the upper guide device comprises lateral lever arms forming a pair of scissors, whereby the one extremity of the pair of scissors is fastened on the frame adjacent to the upper extremity of the gate plate pivotally mounted at a fixed location, while the other extremity of the scissors is fastened pivotably on the lower longer arm of the double armed lever of the lower guide device and on the upper arm of the scissors or on the extended lower arm of the scissors a guide roller each is suspended in a floating manner.
- (c) on the rims of the gate plate, guide or running

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rails are fastened to form a race for the guide rollers.

- (d) the gate plate forms together with a gate frame one mobile unit having the abutments for the tension springs, as well as the bearing blocks for the double armed levers of the lower guide device and for the scissors levers of the upper guide device respectively are fastened on the gate frame.

By means of the invention an assembly including an overhead swinging gate plate or door is provided which has considerable advantages when compared with prior gate assembly constructions. The gate plate is moved by a lower and an upper guide device on a path enforced by said two guide devices. Said path can be determined in such a way that the gate can be built in without any difficulties also into garages with limited space encountered in use today. Because there are no parts on the door frame protruding into the space occupied by the door, the gate plate can be supplied to the building site mounted in its frame so that no special fittings are necessary for mounting the gate assembly. The operations necessary to mount said assembly are limited to a minimum. By the special guide of the gate plate the gate itself becomes sufficiently rigid. In addition, the structure of the invention permits the path of the gate plate during opening and closing to be changed quickly and easily by changing the points at which the scissors levers are fixedly secured on the double armed lever of the lower guide device and the arrangement of the guide rollers on the scissors arms.

Other objects and advantages will be apparent from a consideration of the specification and claims.

FIG. 1 is a diagrammatic, perspective view of the mounted gate assembly with the gate plate in half-opened position;

FIG. 2 is a diagrammatic vertical section corresponding to the position of the gate in FIG. 1;

FIG. 3 is a section along the line III—III of FIG. 2, and

FIG. 4 is a diagrammatic vertical section with the gate plate in different positions.

The gate assembly of the invention is designated generally by reference character 20 in FIG. 1 and comprises a gate frame 1 of substantially rectangular construction including a pair of vertical framing standards 22, 24 and a pair of horizontal framing standards 28 being the lower horizontal standard. The gate frame 1 is adapted to be secured within an opening 30 formed in the wall of a garage or like gated enclosure and being of size and configuration complementary to that of said frame 1. A gate plate 2 is provided which is adapted to be supported within said gate frame 1 for pivotal movement on a horizontal axis relative to said opening 30 for operation of the assembly 20. The gate assembly 20 also includes guide means generally designated by reference character 32 and disposed adjacent opposite side edges of the gate plate 2 and the gate frame 1 for defining a path of movement of said gate plate 2 relative said gate frame 1 for opening and closing of said gate assembly. For the purposes of this description, the structural mechanism of the invention will be described with reference to that disposed along one side edge of the gate assembly, the other mechanism disposed along the opposite side edge thereof being identical thereto in structure and in operation, both mechanisms operating in the same manner simultaneously to operate the gate assembly 20.

The guide means 32 comprises a lower guide device 3 and an upper guide device 11. The lower guide device 3 comprises a lever 4 having a pair of opposite ends 4' and 4''. Said lever 4 is supported pivotally on the bearing block 5 at a location 5' between said ends 4 and 4'' to define a long arm 6 and a short arm 8 of said lever 4, which lever may be hereinafter referred to as a double-arm lever. The long arm 6 of the double arm lever 4 is secured pivotally to a link 34 as shown at 7, said link 34 being fixedly secured to the lower extremity of the gate plate 2. The shorter arm 8 of the double-arm lever 4 carries one extremity of a tension spring 9 fixedly secured thereto closely adjacent the end 4'' of said double-arm lever 4. The opposite extremity of the tension spring 9 is fastened to an abutment 10 which is fixedly secured to the lower extremity of the vertical framing standard 22 at a position in the vicinity of the lower extremity of the gate plate 2 assumed when the gate assembly is in closed condition. Thus, in said closed condition, the tension spring 9 may be said to be disposed laterally relative to the gate plate 2 and substantially parallel to said vertical standard 22 of the gate frame 1.

The upper guide device 11 comprises lateral lever arms 12 and 13. Lateral arm 12 has a pair of opposite ends 12' and 12'', and, likewise, lateral arm 13 has a pair of opposite ends 13' and 13''. Lateral arm 13 is secured pivotally at one end 13' thereof to upper bearing block 14 which, in turn, is fixedly secured to the upper extremity of the vertical standard 22 in the vicinity of the upper extremity of the gate plate 2 assumed in the closed position of the gate assembly 20. The opposite end 13'' of said lateral arm 13 is secured pivotally to lateral arm 12 at a location 16 between the ends 12' and 12'' thereof. Lateral arm 12 is secured pivotally at one end 12' to arm 6 of double arm lever 4 at location 16' chosen between the bearing block 5 and the end 4' thereof. The other and opposite end 12'' of lateral arm 12 carries guide roller 15 floatingly secured thereon for independent rotation along the race 36 to be described. Thus one could describe the arrangement of lateral arms 12 and 13 of the upper guide device 11 as forming a scissors with the longer "blade arms" terminating respectively at ends 12' and 13', and the single "handle" arm terminating at end 12'' of arm 12, with the point of pivot located at the junction 16 of end 13'' of arm 13 and the arm 12.

A running rail 17 is secured to said gate plate 2 adjacent the side edge thereof and is adapted to provide a race 36 for the guide roller 15. Such running rail 17 preferably is formed as a U-shaped member, the bottom portion 38 thereof engages the inner surface 40 of the gate plate and is secured thereon, as shown in FIG. 3, by any conventional fastening means (specifically not shown). The running rail 17 may be secured to the gate plate along the edge of the lateral rim thereof or, with equal advantage, only one leg thereof need be secured to surface 40. The length of the rail 17 is chosen to be less than the length of said side edge whereby the lower extremity of the gate plate is free of such rail.

By varying the location 16' and the arrangement of the guide roller 15 on arm 12, it is possible to predetermine the path to be followed by the gate plate 2 during the operation of the gate assembly 20 whereby the depth of entry of the gate plate 2 interior of the building is controlled.

It should be noted that the gate plate and gate frame are preferably formed of metal although other material may be suitable. Preferably, the levers comprising the upper and lower guide devices are formed of flat iron in which case the bending thereof is performed by pressing in well known manner.

Also, while the guide roller 15 is shown and described as secured to the lateral arm 12, attachment of said roller to arm 13 at a suitable location thereon would likewise result in enjoyment of the advantage of the invention.

The adjustment of the pivot point 16' and the position of the guide rollers may be made by utilizing various of the apertures 50 on the arms 12 and 13. This common type of pivot point adjustability is shown in the U.S. Patent to McFarlane, No. 2,557,833, issued June 19, 1951. Other variations in the structure, arrangement of parts dimensions, etc. may occur to the skilled artisan without departing from the concept and scope of the invention as defined in the claims appended hereto.

What I claim is:

1. A lift-gate assembly for a gated enclosure comprising a gate plate, a gate frame of size and configuration for accommodating said gate plate therein and adapted to be set in an opening of complementary size and configuration formed in the wall of said gated enclosure, a pair of abutments and a pair of upper and a pair of lower bearing blocks respectively secured on said frame along opposite vertical sides thereof, a pair of doublearm levers and a pair of pivotally connected lateral lever arms, a pair of guide rollers each respectively secured for rotation to one of each pair of said lateral lever arms, a pair of straight-running rails adapted to form a race for said pair of guide rollers and fastened respectively adjacent opposite side rims of said gate plate, and tension springs disposed laterally relative to said gate-plate and adjacent respectively opposite vertical side edges thereof, said double arm levers being pivotally secured respectively to the lower one of said bearing block pairs, said lower one of said bearing block pairs being secured fixedly to said frame at a location substantially midway between the extremities of said vertical sides thereof, the double-arm levers each consisting of a longer arm and a shorter arm, the longer arm of each being secured to said gate plate adjacent the lower extremity thereof and the shorter arm of each having one extremity of the tension spring secured at the free end thereof, the other extremity of each of the tension springs being secured to a respective abutment, said abutment being fixedly secured to said frame closely adjacent the lower extremity of the gate plate assumed during closed condition of the gate assembly, said arms of each of the lateral lever arm pairs pivotally secured to the other, each forming a scissors arrangement having a first point of pivot, one of the scissors arms being pivotally secured to a respective one of said upper bearing block pair, the other of the scissors arms each being fastened respectively to the longer arms of said double arm lever pairs at a second point of pivot, said guide rollers each being floatably carried respectively on one of the arms of the scissors opposite the ends thereof secured to the double arm levers, said guide rollers adapted reciprocally to move along the races defined by said pair of running rails whereby the path of movement of said gate plate permits to the least depressed entry of the gate plate fully within the gated enclosure.

2. The lifting gate structure as claimed in claim 1 in which said guide rollers each are carried on the end of the respective scissors arm which is pivotally connected at its opposite end to the double lever arm.

3. In a lifting gate assembly for garages and the like gated enclosures, including a gate plate, a gate frame, abutments and bearing blocks fastened respectively on opposite sides of said gate frame, double-armed levers and lateral lever arms, guide rollers, straight running rails for said guide rollers and fastened on the rims of said gate plate, and tension springs running laterally at the side of said gate plate closely adjacent said gate frame, the lower one of said bearing blocks fixedly secured to said gate frame at a location at the middle of the height of said gate frame, the upper one of said bearing blocks being fixedly secured to the upper extremity of said gate frame, the abutments being secured to the lower extremity of said gate frame, the double-armed levers being pivotally secured to said lower pair of bearing blocks with the longer arms thereof being linked to the lower extremity of said gate plate respectively adjacent opposite side

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edges thereof, the shorter arms thereof being secured to the upper extremities of said tension springs, the lower extremities of said tension springs being secured to said abutments respectively; the invention comprising, said lateral lever arms arranged in pairs to form a pair of scissors, the ends of the upper scissors arms being pivotally secured respectively to said upper bearing blocks closely adjacent the upper extremity of said gate plate, the ends of the lower scissors arms being secured to the longer arms of said double-armed levers at a point of pivot, and the upper ends of the lower scissors arms having guide rollers secured thereto at a location selectively adjustable whereby to be movable along a path of movement along said straight running rails, said point of pivot being capable of selective adjustment in concert with the change in location of said rollers on said lower

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scissors arm albeit to permit selective and predetermined variation in the path of movement defined for said gate plate within said enclosure during operation of said gate assembly to dispose the gate plate entirely within said enclosure.

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15 HARRISON R. MOSELEY, *Primary Examiner.*