Dec. 5, 1933. S. W. NICHOLSON 1,937,662

WINDOW REGULATOR

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FIG. 1.

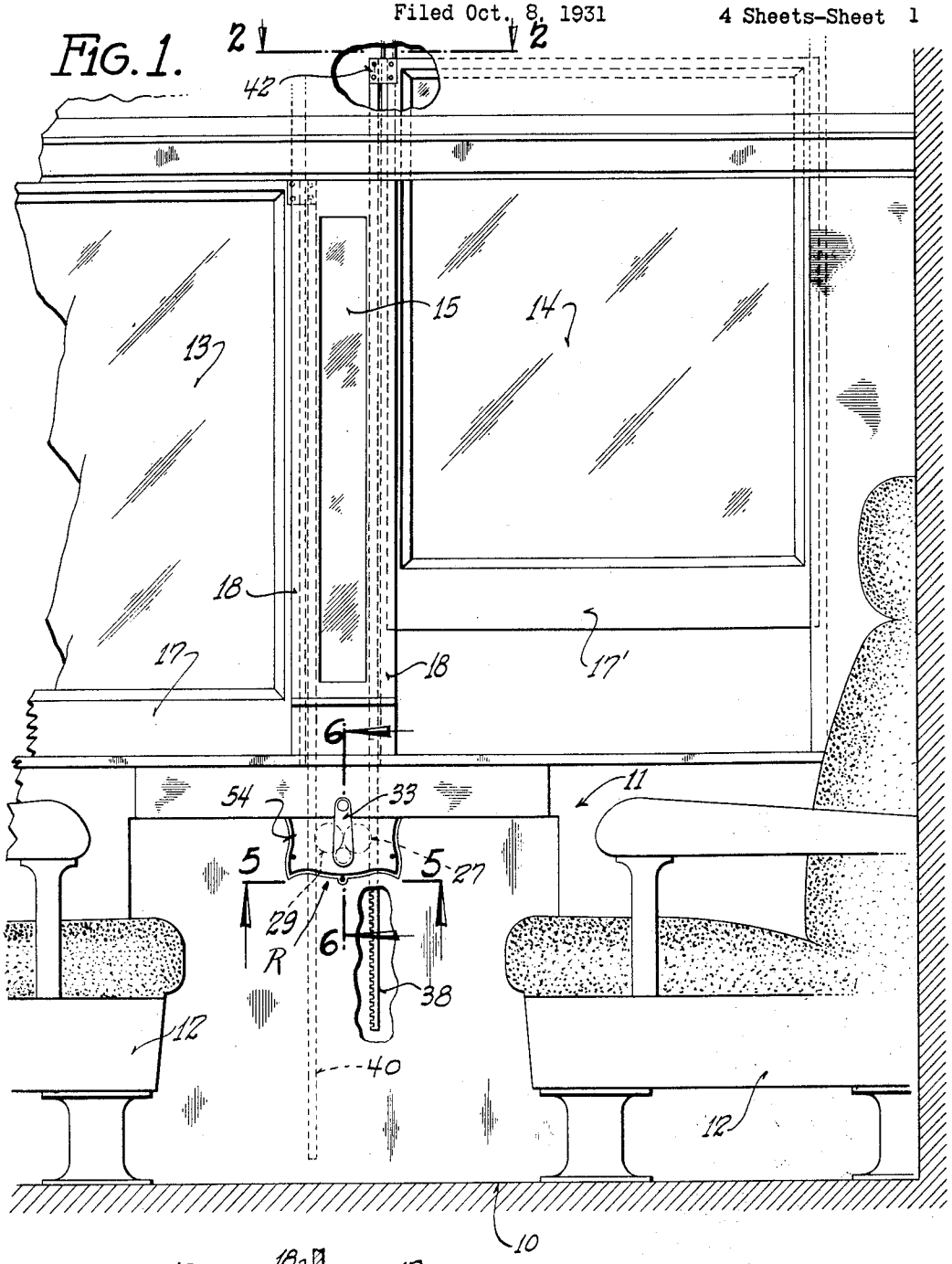
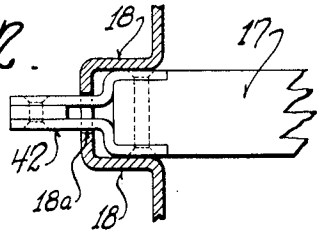


FIG. 2.



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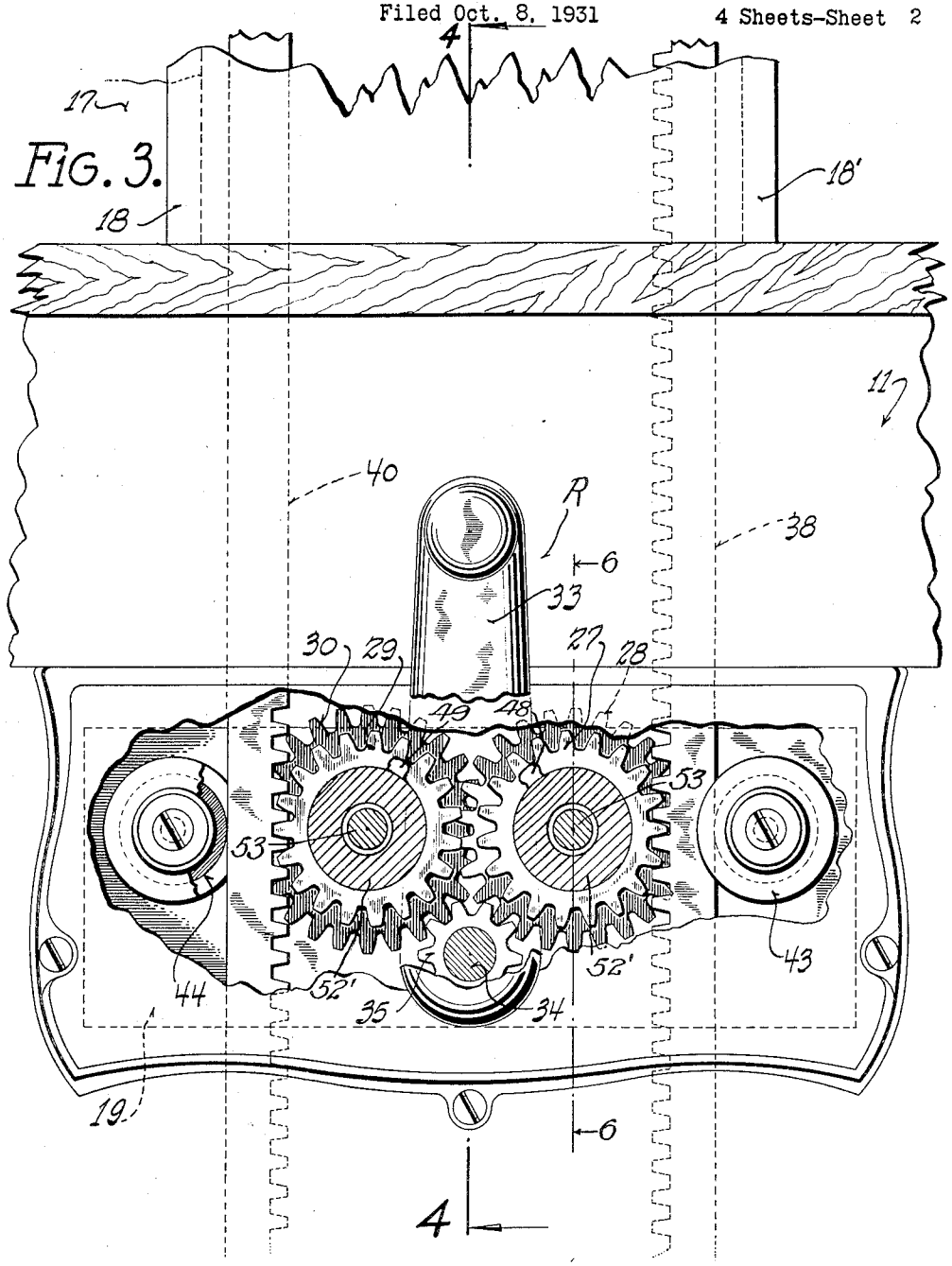
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WINDOW REGULATOR

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FIG. 3.



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FIG. 4.

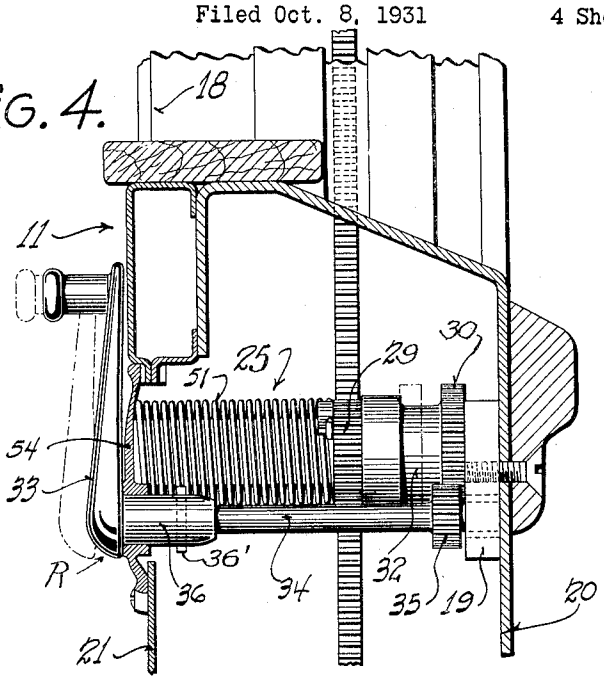
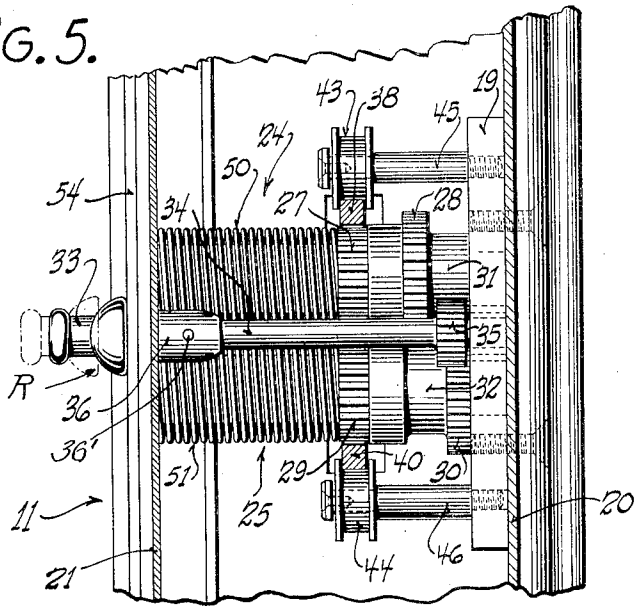


FIG. 5.



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FIG. 6.

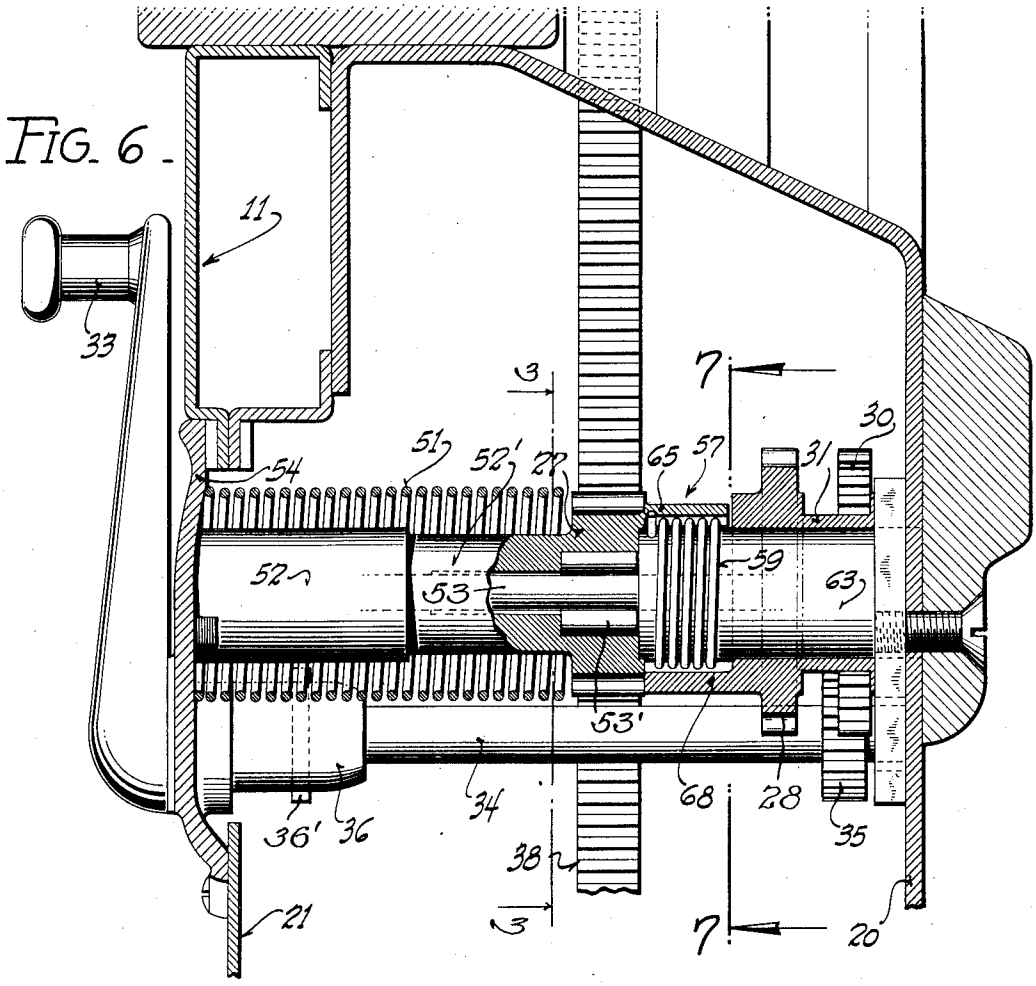
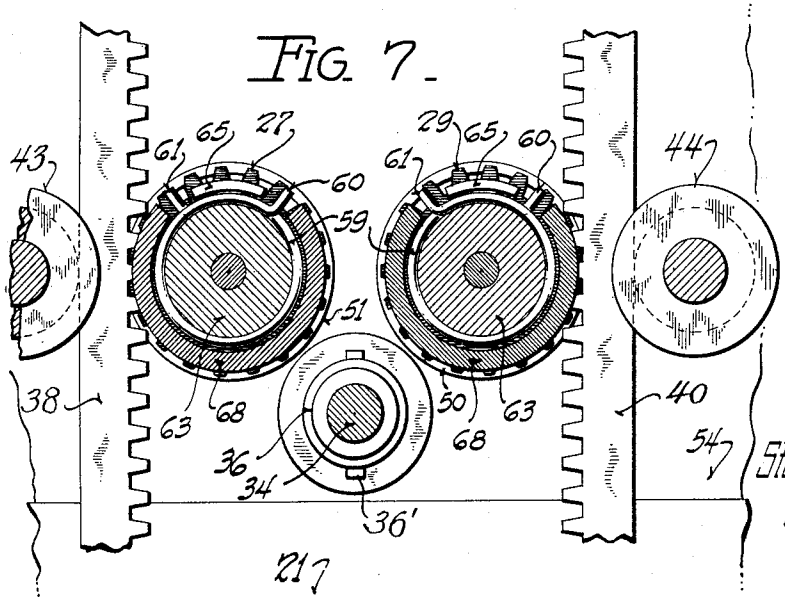


FIG. 7.



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Patented Dec. 5, 1933

1,937,662

UNITED STATES PATENT OFFICE

1,937,662

WINDOW REGULATOR

Stanley W. Nicholson, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Milwaukee, Wis., a corporation of Delaware

Application October 8, 1931. Serial No. 567,632

8 Claims. (Cl. 268—26)

This invention relates to certain new and useful improvements in window regulators, and more particularly to a window regulator adapted for use in Pullman cars, railway coaches and the like in which it is desired to control two windows from a single source.

It is a particular object of the present invention to provide a window regulator operating upon rack bars attached to the windows and which will maintain the windows in parallelism throughout the opening and closing operation.

Another object of the invention is to produce a window regulator in which the window opening is positioned between the window and the regulator, and in which all operating mechanism is concealed so as to obtain a device in which the possibility of persons soiling their clothes on greased parts, or tearing their clothes on moving parts is precluded.

A further object of the invention is to generally improve the construction of window regulators, to simplify the design thereof and produce a window regulator which can be readily manufactured and installed.

The invention contemplates raising of two windows, which are closely adjacent, and accomplishes that object by means of rack bars and pinions connected to each of the windows, and means selectively driving one or the other rack bar to open the window connected therewith.

The more specific details of the invention are accomplished by means of the following preferred form of the invention, described in the following specification and shown in the accompanying drawings, in which:

Figure 1 is a section view through a Pullman car or railway car having seats facing each other and illustrating the application of this invention thereto;

Figure 2 is a cross section on the line 2—2 of Fig. 1;

Figure 3 is a detail elevational view of the operating mechanism of the regulator and its connection to the respective rack bars of the windows with parts broken away and the regulator units shown in section on a plane of the line 3—3 in Fig. 6;

Figure 4 is a cross section on the line 4—4 of Fig. 3; and

Figure 5 is a cross section on the line 5—5 of Fig. 1 showing the arrangement of the gears;

Figure 6 is a cross section on the line 6—6 of Fig. 4, looking in the direction of the arrows;

Figure 7 is a cross section on the line 7—7 of Fig. 6 looking in the direction of the arrows.

In the drawings, in which like numerals indicate like parts throughout the several views, the vehicle is shown as comprising a floor 10, sides 11, seats 12, and windows 13 and 14, separated by a partition, generally designated 15.

The window panes 13 and 14 are mounted in sashes 17 and 17' respectively, which are slidable in casements 18 and 18', the adjacent sides of which are carried by the partition 15.

Within the partition 15 which is hollow, are two rack bars 38 and 40. The bar 38 lies closely adjacent the inner face of the partition wall forming part of the casement 18' and the rack bar 40 lies closely adjacent the inner face of the partition wall which forms part of the casement 18.

The upper ends of the rack bars are attached to the window sashes in a manner best illustrated in Fig. 2. As here shown each rack bar has a bracket 42 fixed to its upper end which extends through a longitudinal slot 18a in the adjacent casement wall to be rigidly secured to the adjacent upper corner of its respective sash. In this manner, the rack bars are entirely concealed within the partition 15.

The lower ends of the rack bars 38 and 40 project beneath the window sill into the open space between the outer and inner walls 20 and 21, respectively, of the car side, and mounted beneath the sill and between the lower extended ends of the rack bars is the regulator indicated generally by the character R.

In general, this regulator comprises a pair of pinions 27 and 29 meshing respectively with the racks 38 and 40 and selectively operable upon proper actuation of a single operating handle 33. As will be defined more in detail hereinafter, the operating handle besides being rotatable is shiftable axially to select the pinion to be actuated.

The pinions 27 and 29 are each a part of two separate, but similar, units indicated generally by the numerals 24 and 25 respectively. These units are both supported from and mounted between a base 19 secured to the outer wall 20 and an escutcheon plate 54 attached to the inner wall 21. The escutcheon plate 54 closes an opening in the inner wall 21 which is large enough to permit the entire regulator mechanism to be inserted and secured in position.

The detailed construction of the regulator units 24 and 25 will now be described. Each unit comprises a main stationary journal preferably of sectional construction to facilitate assembly, and consisting of a stud 52 fixed to the plate 54, a stud 63 fixed to the base 19 and a stem or shaft 53. The ends of the stem 53 are securely embedded in the studs 52 and 63 and maintain the same rigidly connected in spaced relation. The shaft or stem 53 is considerably smaller in diameter than the studs 52 and 63 which are of substantially the same diameter.

Journalled on each stem or shaft 53 between the studs 52 and 63 is a rotatable hub 52'. To minimize friction, suitable roller bearings 53' are

provided for the hubs 52', as best illustrated in Fig. 6. These rotatable hubs 52' carry the pinions 27 and 29 which may be separate units attached to the hubs, or, as in the present embodiment, integral therewith.

Rotatably journalled on the studs 63 of the units 24 and 25, are rotatable hubs 31 and 32 respectively. These hubs extend from the base 19 to the adjacent end of the hubs 52' and have enlarged counterbored projections 68 at their inner ends to overlie coiled springs 59 which are part of releasable brake mechanisms or clutches 57, to be later described.

The rotatable hubs 31 and 32 also have driving gears 28 and 30 respectively mounted thereon. These gears are of larger diameter than the pinions 27 and 29 and are axially offset with the gear 28 spaced further from the base 19 than the gear 30, the rotatable hub 32 which carries the gear 30 being cut away to accommodate the gear 28 and the hub 31 being reduced in diameter at its end portion adjacent the base to accommodate the gear 30.

The gears 28 and 30 are of a diameter and pitch to have a pinion 35 operable by the handle 33, selectively meshed therewith. The pinion 35 is secured to a shaft 34 which has its inner end slidably journalled in a suitable bearing carried by the base 19 and at its outer end has the hub 36 of the crank handle 33 secured thereto. The hub 36 is journalled in a suitable bearing formed in the escutcheon plate 54.

A pin 36', which secures the hub 36 to the shaft 34 projects therebeyond to be engageable with the inner end of the bearing on the plate 54 to limit the axial shifting of the operating unit in one direction, axial shifting in the opposite direction being limited by the engagement of the handle 33 with the bearing in the escutcheon plate.

Obviously when the operating unit comprising the crank handle, the pinion 35 and the connection therebetween, is shifted to its innermost position shown in Fig. 6, the pinion 35 meshes with the gear 30 and enables the rotatable hub 32 to be driven at will. Such actuation of the hub 32 or of the hub 31 is imparted to its respective pinion through the associated one-way clutch or releasable brake 57.

The construction of the releasable brakes 57 is more or less conventional, and comprises the springs 59 coiled about the studs 63 and cooperating abutments on the hubs 31 and 32 and the hubs 52' operable, as will be described, to release the brake and transmit motion. The ends 60 and 61 of the springs are directed outwardly in spaced relationship, and the counterbored projections 68 which overlie the springs have openings cut in their walls to receive the projected ends with the edges of the openings engageable with the projected spring ends upon rotation of the hubs 31 or 32. A lug 65 extended from each hub 52', also projects into the openings cut in the walls of the projections 68 to lie between the extended spring ends, as best illustrated in Fig. 7.

The operation of the regulator units will now be described.

Assuming that the window 13 is to be raised or lowered, the operating handle, if in its outer position shown in dotted lines in Figs. 4 and 5, will be pushed in so as to engage the pinion 35 with the gear 30. Rotation in the direction necessary to actuate the window in the desired direction will then be imparted to the handle to turn the gear 30 and the hub 32 to which it is secured. Such rotation of the hub 32 will engage the leading edge of the opening in its counterbored projection 68 with the adjacent spring end 60 or 61 (depending upon the direction of rotation) causing the spring to unwind and release its grip on the stud 63, and upon the taking up of the slack, will impart a driving force to the lug 65 to turn the adjacent hub 52' and the pinion 29 fixed thereto. Rotation of the pinion obviously will raise or lower the rack bar 40 to impart the desired movement to the window pane.

It is observed that idler rollers 43 and 44 are provided to insure the tracking of the rack bars 38 and 40 respectively on their pinions 27 and 29. These idler rollers 43 and 44 are supported on studs 45 and 46 secured to the base 19.

The releasable brake or clutch mechanism, as has been seen from the description thus far, is releasable only when the driving force is imparted to the hubs 31 and/or 32 so that movement of the window by gravity or even the application of stress to the window, merely serves to tighten the brake and thus positively precludes the shaking down of the window pane from its desired position.

The weight of the windows is counterbalanced by torsion springs 50 and 51 coiled about the studs 52 and the rotatable hubs 52' of the regulator units 24 and 25, respectively. Each spring has one end anchored to the escutcheon plate 54. The other ends of the springs are hooked about lugs 48 and 49 extended from the pinions 27 and 29, and the springs are so tensioned that as the window panes are lowered the springs are wound up and as they are raised they are unwound.

While the invention has been illustrated as being applied to two adjacent windows, it will be apparent that by the use of suitable gearing, the use could be extended to quite readily operate other windows, such as for example, double windows on trains, busses, etc.

It will thus be seen that applicant has provided a relatively simple compact and rugged structure to operate upon either of two windows of the type ordinarily found in Pullman cars or the like, and it will be readily apparent that the invention is susceptible to various changes and modifications falling well within the scope of one skilled in the art and it is not, therefore, desired to limit the invention to precisely the embodiment herein shown and described, but only by the scope of the appended claims.

What is claimed as new and desired to secure by Letters Patent is:

1. In a window regulator adapted to selectively operate one of a plurality of windows, a first rack bar attached to one window for movement therewith, a first pinion in constant mesh with said first rack bar, a second rack bar connected with another said window for movement therewith, a second pinion in constant mesh with said second rack bar, a first counter-balancing means operatively connected to said first pinion, a second counter-balancing means operatively connected with said second pinion, means operable from a single handle adapted to alternatively operate said pinions to raise or lower said windows, a first releasable clutch connected between said first pinion and said operating means and a second releasable clutch connected between said operating means and said second pinion.

2. In a window regulator adapted to selectively operate one of a plurality of windows, a first rack bar attached to one window for movement

therewith, a first pinion in constant mesh with said first rack bar, a second rack bar connected to another said window for movement therewith, a second pinion in constant mesh with said second rack bar, a third pinion mounted co-axially with said first pinion, a releasable clutch driving means connecting said third pinion and said first pinion, a fourth pinion mounted co-axially with said second pinion and a releasable clutch driving mechanism connecting said second pinion and said fourth pinion, and means operable from a single handle to alternatively operate said third and fourth pinions whereby motion is transmitted from said third and fourth named pinions to operate said rack bars.

3. In combination with a pair of side by side windows, having panes slidably mounted to be raised and lowered, means to selectively raise and lower either of said panes, comprising a rack bar attached to each of said window panes, said rack bars being mounted in the space between the windows and extending vertically beneath the window sills, and a regulator mounted beneath said sills between the extended ends of the rack bars and comprising side by side units, each of which includes a pinion meshing with one of the rack bars, and a single operating handle to selectively actuate either of said units.

4. In combination with a pair of side by side windows, each comprising a sash slidably mounted in a casing and a hollow vertical partition separating the windows, means to selectively raise and lower either window sash comprising, a pair of rack bars mounted within the hollow partition and having their lower ends projecting beneath the sill of the windows, a rigid connection between each rack and one of the window sashes whereby the window sashes move with the rack bars, and a single regulator mechanism mounted beneath the window sill and between the extended ends of the rack bars and comprising a pair of side by side units each having a pinion meshing with one of the rack bars, and a single operating handle selectively connectable with either unit to drive its pinion and actuate the corresponding rack bar.

5. A window regulator adapted to selectively operate either of two side by side windows, comprising two rack bars, one attached to each of the windows, said rack bars being in parallel spaced relation, a pinion meshing with each of the rack bars, a drive member for each pinion, said drive members each having a gear co-axial with their respective pinions, a releasable clutch to drivingly connect each drive member with its respective pinion, said releasable clutch permitting the transmission of rotation from the drive member to the pinion but precluding the transmission of rotation from the pinion to the drive member, and means to selectively rotate either drive member comprising a manually operable handle, and a drive gear connected therewith and shiftable upon actuation of the handle into meshing engagement with the gear of either of said drive members.

6. A window regulator adapted to actuate either one of a pair of side by side window panes, comprising a rack connected with each window pane, said racks being in parallel spaced relationship with their teeth facing each other, a pair of parallel spaced fixed journals disposed between the racks, a pinion rotatable on each of said journals and in constant mesh with one of the racks, a drive member for each pinion rotatably mounted on each of said journals, releasable clutch means on each of said fixed journals to serve as a brake to sustain the window pane in any position by holding its respective pinion and to transmit rotation from the drive members to their respective pinions, a gear carried by each of said drive members, the gears of the two drive members being axially offset, and means to selectively operate either of the drive members comprising a gear axially shiftable to be meshed with the gear of either of the drive members, and a manually operable handle to turn said gear and shift the same axially.

7. In combination with a pair of sidewise spaced window panes adapted to be raised and lowered above a common sill and disposed on opposite sides of a hollow partition, means to raise and lower either of said window panes from a common source comprising, a rack bar attached to each window pane, said rack bars being disposed in the hollow partition between the window panes and having their lower end portions extended beneath the common sill, a pair of parallel spaced fixed journals disposed beneath the common sill and between the extended end portions of the racks, a pinion rotatable on each of said fixed journals and meshing at all times with one of the racks, a drive member rotatable on each of said journals, releasable clutch means to provide a driving connection between the drive members and the pinions, a gear on each of the drive members, said gears being axially offset, and means to selectively rotate either of the drive members comprising, a manually operable rotatable and slidably mounted shaft disposed between the fixed journals in parallel spaced relation thereto, and a gear on said shaft adapted to be meshed with either of the gears of the drive members by axial shifting of said manually operable shaft.

8. In combination with a pair of sidewise spaced window panes adapted to be raised and lowered above a common sill and disposed on opposite sides of a hollow partition, means to raise and lower either of said window panes from a common source comprising, a rack bar attached to each window pane, said rack bars being disposed in the hollow partition between the window panes and having their lower end portions extended beneath the common sill, a pair of parallel spaced fixed journals disposed beneath the common sill and between the extended end portions of the racks, a pinion rotatable on each of said fixed journals and meshing at all times with one of the racks, a drive member rotatable on each of said journals, releasable clutch means to provide a driving connection between the drive members and the pinions, a gear on each of the drive members, said gears being axially offset, means to selectively rotate either of the drive members comprising, a manually operable rotatable and slidably mounted shaft disposed between the fixed journals in parallel spaced relation thereto, a gear on said shaft adapted to be meshed with either of the gears of the drive members by axial shifting of said manually operable shaft, and a spring coiled about each of said journals and connected with the pinion rotatable thereon to counterbalance the associated window pane.

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