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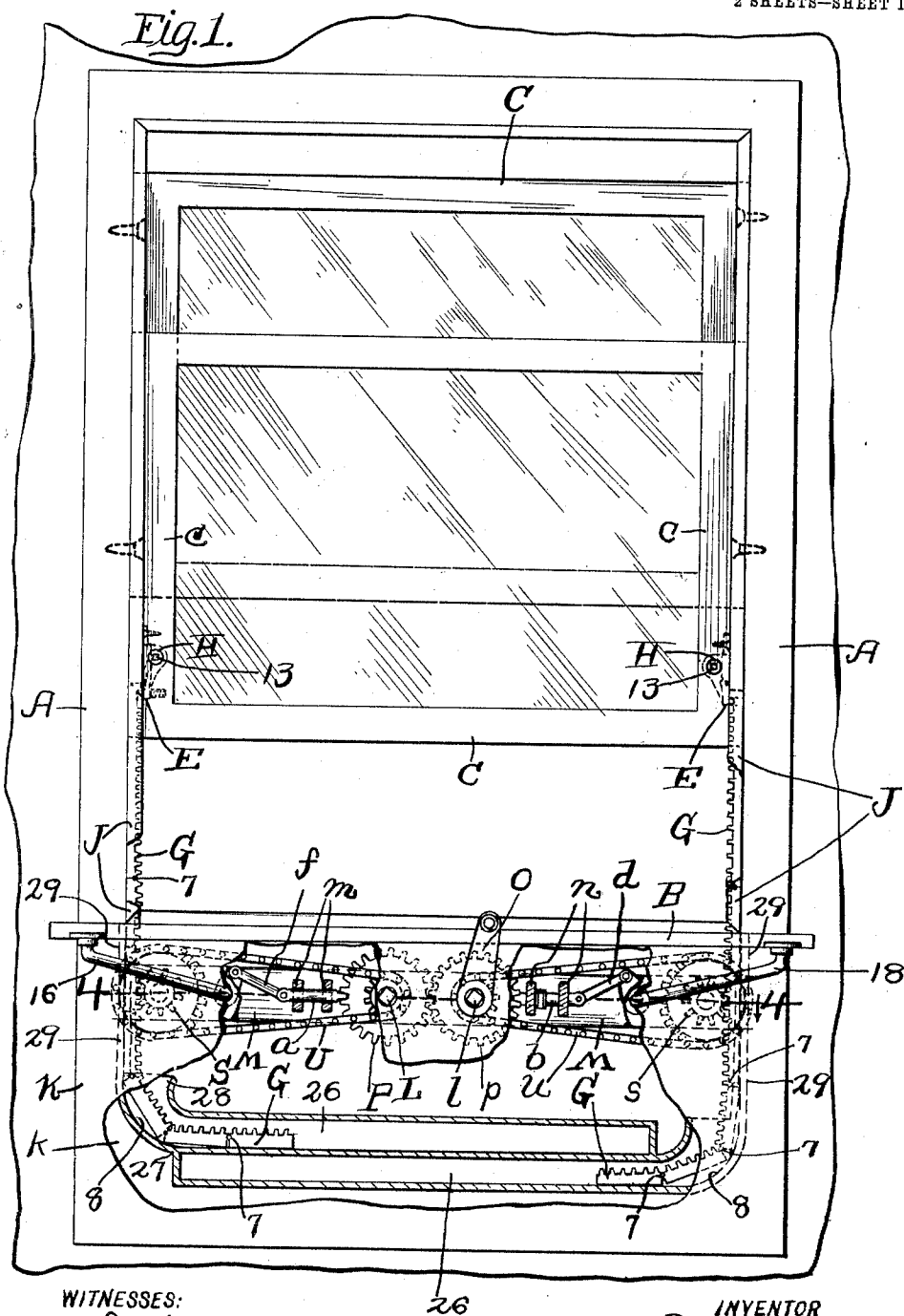
E. FEDER.

MECHANISM FOR ACTUATING SLIDING WINDOW SASHES.

APPLICATION FILED SEPT. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

Daniel E. Daly.
G. M. Hayes.

INVENTOR

Emanuel Feder

BY

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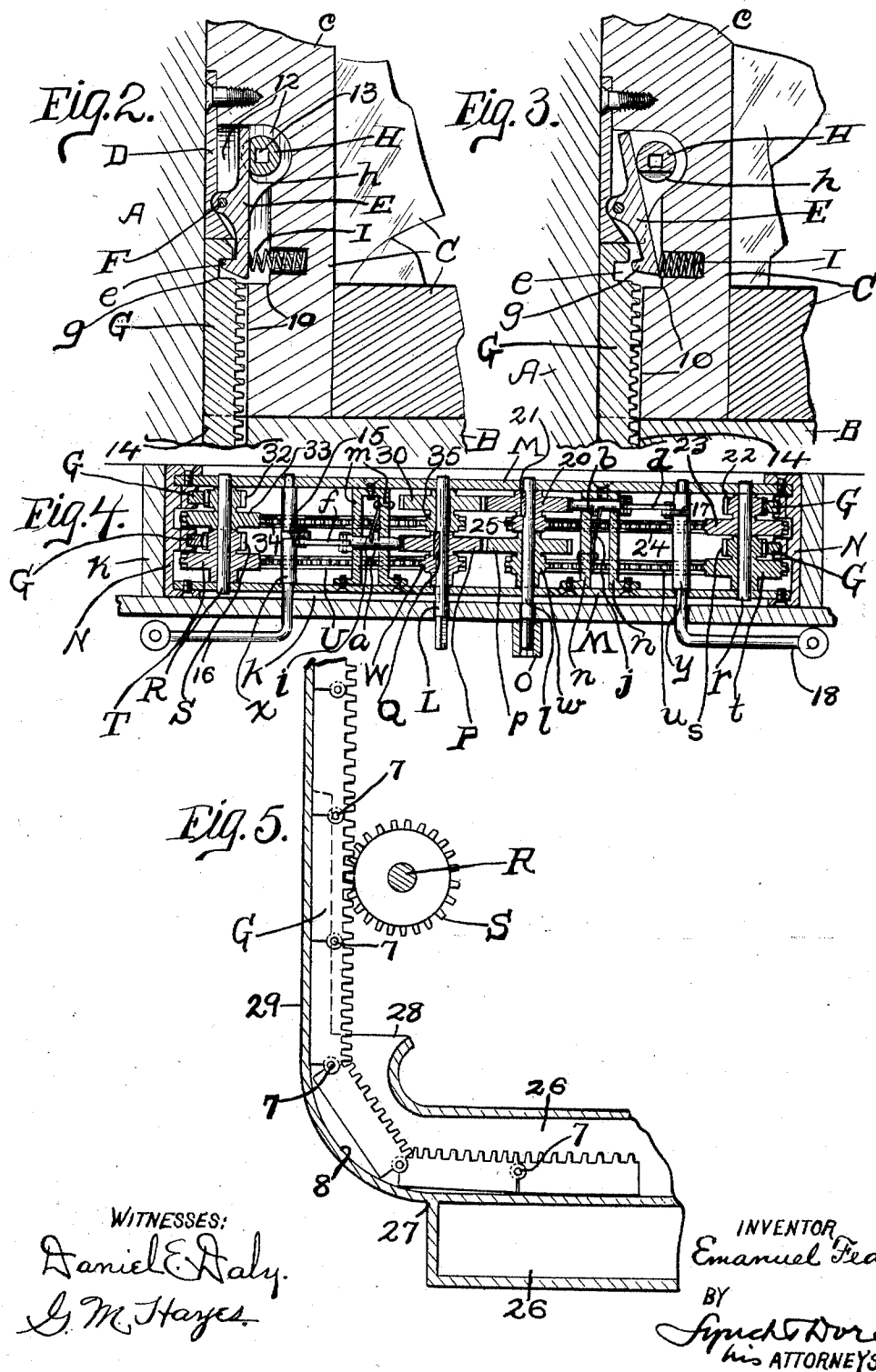
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Daniel E. Daly.
G. M. Hayes.

INVENTOR

Emanuel Feder

BY

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UNITED STATES PATENT OFFICE.

EMANUEL FEDER, OF CLEVELAND, OHIO.

MECHANISM FOR ACTUATING SLIDING WINDOW-SASH.

SPECIFICATION forming part of Letters Patent No. 759,508, dated May 10, 1904.

Application filed September 19, 1903. Serial No. 173,825. (No model.)

To all whom it may concern:

Be it known that I, EMANUEL FEDER, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Mechanism for Actuating Sliding Window-Sash, &c.; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in mechanism for actuating a sliding window-sash, door, or gate.

This invention relates more especially to mechanism which comprises two corresponding racks arranged at opposite side edges, respectively, of a window-sash between the sash and the window-casing and instrumental in lifting the said sash and held to the sash by latches arranged within and supported from the stiles of the sash and movable out of engagement with the racks against the action of springs which act to retain the said latches in their normal and operative position.

Another object of this invention is to provide flexible racks which are capable of movement in, under, and longitudinally of the sill of the window.

Another object of this invention is to conveniently and compactly arrange below the window-sill the mechanism employed in operating the sash-actuating racks of a window having an upper sash and a lower sash with the two sashes capable of movement independently of each other.

With these objects in view and to the end of realizing other advantages hereinafter appearing this invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a window having an upper sash and a lower sash and mechanisms for operating the two sashes independently of each other from below the sill of the window, and portions are broken away and in section in this figure to more clearly show the construction. Fig. 2 is a side elevation in section of

a portion of a window-sash lowered against the window-sill. Fig. 2 is illustrative of a rack and the engaging latch. Fig. 3 is a side elevation in section corresponding with Fig. 2, except that in Fig. 3 the said latch is shown in its inoperative position. Figs. 2 and 3 are drawn on a larger scale than Fig. 1. Fig. 4 is a top plan, mostly in horizontal section, on line 4 4, Fig. 1. Fig. 5 is a side elevation in section, showing a portion of one of the flexible racks, the pinion meshing with the said rack, and means for preventing displacement of the said rack from the pinion.

In the drawings, A designates the window-casing, B the window-sill, and C and C' the lower sash and upper sash of the window, which sashes are arranged to slide in different vertical planes, respectively, and independently of each other in the usual manner.

Each stile of each window-sash is provided at its outer side edge with a mortise 10, which contains a metal plate D, arranged vertically and secured to the said stile, as shown very clearly in Fig. 2, which illustrates a portion of a window-sash. In other words, each side edge of each window-sash is provided with a mortise 10, which extends to and is open at the bottom of the sash. Each plate D (see Fig. 2) is provided within the mortise containing it with a bracket 12, to which a latch E is pivoted horizontally, as at F, and the extension of the mortise to the bottom of the sash containing it—that is, to the lower end of the stile in which the said mortise is formed—accommodates the extension of a rack G upwardly into the said stile. Each mortise 10 is engaged, therefore, by a rack G, which abuts at its upper end against the lower end of the latch-plate D, contained within the said mortise. It is obvious, therefore, that each window-sash is lifted by the racks of the said sash during the upward actuation of the said racks and lowers by gravity during the descent of the said racks.

Each latch E extends a suitable distance below its pivotal bearing and is provided at its lower end with a projection *e*, engaging in the normal and operative position of the latch, as shown in Fig. 2, with a recess *g*, formed in the latch-facing and toothed side of the adja-

cent rack G. The latch extends a suitable distance above its pivotal bearing and above its axis engages in the normal and operative position of the latch with a recess *h*, formed in one side of a shaft H, which is arranged horizontally a suitable distance above the axis and extends transversely of the latch. The said shaft H has bearing in the bracket 12 of the latch-plate D, which supports the said latch, and is axially provided with an angular hole 13. The said shaft H of course does not extend to the outer side of the sash provided with the said latch, but extends to the inner side of the sash, and the hole 13 in the said shaft extends to and is open at the inner side of the said sash, as shown in Fig. 1, to accommodate the reception from the last-mentioned side of the sash of a key (not shown) employed in turning the shaft. A spring I engages the said latch and is applied as required to cause it to act to retain the latch in the latter's normal and operative position, and obviously a turning of the said shaft H will result in the disengagement of the recess *h* by the latch and bring the unrecessed circumferential surface of the shaft into engagement with the latch, and thereby swing the latch into its inoperative position, as shown in Fig. 3, against the action of the spring I.

It is obvious that when both latches E of a window-sash are rendered inoperative the said sash is rendered free to be lifted from the racks of the said sash and removed from the window-casing upon the removal of the window-stops J (shown in Fig. 1) and applied to prevent displacement of the said sash from the other sash and removably attached to the window-casing in the usual manner. It is obvious also that the two racks employed in lifting a sash are actuated simultaneously in the one or the other direction according as the said sash is to be lifted or lowered, and the said racks, as shown in Figs. 1 and 4, have their teeth upon their opposing and latch-engaging sides and extend through and below the sill of the window into the interior chamber *k* of the case K, formed next below the said sill which forms the top of the said case. The chamber *k* extends longitudinally of the window-sill. Obviously the window-sill is slotted, as at 14, wherever required to accommodate the location and operation of a rack G, as shown in Fig. 2.

Within the chamber *k* are arranged two parallel metal bars M, extending longitudinally of the said chamber and suitably spaced apart transversely of the said chamber. The bars M are connected together and braced apart at the ends by two cross-bars N, which snugly fit within and extend transversely of opposite ends, respectively, of the chamber *k*.

Two parallel shafts L and *l*, arranged horizontally and transversely of the case K a suitable distance apart longitudinally of the said case, have bearing in the bars M. The shafts

L and *l* extend each beyond the outer side of the front of the case K and are angular at the said side of the said case, as shown in Figs. 1 and 4, to receive a crank *o* for turning the shaft, which crank is shown applied to the shaft *l*. Two corresponding gears P and *p* are mounted upon the shafts L and *l*, respectively. The gear P is operatively connected with the shaft L by the well-known means of groove and feather, as at Q, (see Fig. 4,) and the gear *p* is loose upon the shaft *l*. The gears P and *p* mesh with each other and when rotated turn in opposite directions, respectively. The gears P and *p* are operatively connected with the racks G, instrumental in the actuation of the lower sash in such a manner that upon applying the crank *o* to the shaft L and thereupon actuating the crank the said racks are actuated in the direction required to lift the said sash or to permit the said sash to lower by gravity, according as the said crank is turned in the one or the other direction.

Two parallel axles R and *r* are arranged horizontally and transversely of the said case K within opposite ends, respectively, of the said case. The axles R and *r* are parallel with the shafts L and *l*. Two corresponding pinions S and *s* are loosely mounted upon the axles R and *r*, respectively. One of the racks instrumental in the actuation of the lower sash meshes with the pinion S, and the other rack meshes with the pinion *s*. The pinion S is operatively connected with the gear P, preferably by means comprising a sprocket-wheel T, which is integral and arranged in line axially with the said pinion and operatively connected by an endless chain U with a sprocket-wheel W, integral and arranged in line axially with the said gear P. The pinion *s* is operatively connected with the gear *p*, preferably by means comprising a sprocket-wheel *t*, which is integral and arranged in line axially with the said pinion and operatively connected by an endless chain *u* with a sprocket-wheel *w*, which is integral and arranged in line axially with the gear *p*. The arrangement of the parts and the relative size of the sprocket-wheels T, *t*, W, and *w* are such that the racks instrumental in the actuation of the lower sash are during their actuation moved simultaneously in unison and in the same direction.

The means employed in the actuation of the upper sash is substantially the same as the means employed in the actuation of the lower sash and already described and (see Fig. 4) comprises, therefore, the following: Two corresponding gears 20 and 30 are mounted upon the shafts L and *l*, respectively. The gear 20 is operatively connected with the shaft *l* by the well-known means of groove and feather, as at 21, and the gear 30 is loose upon the shaft L. The gears 20 and 30 mesh with each

other and when rotated turn in opposite directions, respectively. The gears 20 and 30 are operatively connected with the racks G instrumental in the actuation of the upper sash in such a manner that upon actuating the crank *o* when applied to the shaft *l*, as shown, the said racks are actuated in the direction required to lift the said sash or to permit the said sash to lower by gravity, according as the said crank is turned in the one or the other direction. Two corresponding pinions 22 and 32 are loosely mounted upon the axles *r* and *R*, respectively. One of the racks G instrumental in the actuation of the upper sash meshes with the pinion 22, and the other rack G employed in the actuation of the said sash meshes with the pinion 32. The pinion 22 is operatively connected with the gear 20, preferably by means comprising a sprocket-wheel 23, which is integral and arranged in line axially with the said pinion and operatively connected by an endless chain 24 with a sprocket-wheel 25, integral and arranged in line axially with the said gear 20. The pinion 32 is operatively connected with the gear 30, preferably by means comprising a sprocket-wheel 33, which is integral and arranged in line axially with the said pinion and operatively connected by an endless chain 34 with a sprocket-wheel 35, which is integral and arranged in line axially with the gear 30. The relative size of the sprocket-wheels 23, 33, 25, and 35 and the arrangement of the parts are such that the racks instrumental in the actuation of the upper sash are during their actuation moved simultaneously in unison and in the same direction.

By the construction and arrangement of parts hereinbefore described it will be observed also that the mechanisms instrumental in the actuation of the racks provided for the window-sashes are contained compactly within the case K.

The gear P of the mechanism employed in the actuation of the lower sash is normally locked against rotation by an endwise-shiftable bolt *a*, which is arranged within and longitudinally of the interior chamber *k* of the case K and has bearing in cross-bars *m*, which connect together and brace apart the bars M. The said bolt is arranged to engage the space between two adjacent teeth of the gear P and is operatively connected by a link *f* with the upright arms 15 of an oscillating shaft *x*, which is arranged horizontally and parallel with the shaft L and has bearing in the bars M. The shaft *x* extends through the front of the case K and is provided at the outer side of the said front with a crank 16 for turning the shaft, and obviously the said bolt is rendered inoperative upon oscillating the shaft *x* in the direction and to the extent required. A suitably-applied spring *i* acts to retain the bolt *a* in its inoperative position.

The gear 20 of the mechanism employed in

the actuation of the upper sash is normally locked against rotation by an endwise-shiftable bolt *b*, which is arranged within and longitudinally of the interior chamber *k* of the case K and has bearing in cross-bars *n*, which connect together and brace apart the bars M. The said bolt is arranged to engage the space between two adjacent teeth of the gear *p* and is operatively connected by a link *d* with the upright arm 17 of an oscillating shaft *y*, which is arranged horizontally and parallel with the shaft *l* and has bearing in the bars M. The shaft *y* extends through the front of the case K and is provided at the outer side of the said front with a crank 18 for turning the shaft, and obviously the said bolt is rendered inoperative upon oscillating the shaft *y* in the direction and to the extent required and must be rendered inoperative preparatory to the actuation of the upper sash. A suitably-applied spring *j* acts to retain the bolt *b* in its operative position.

The lower portion of each rack of the mechanism employed in operating either window-sash is composed, preferably, of sections assembled endwise with adjacent rack-sections pivoted together, as at 7, horizontally and transversely of the rack at the toothed face of the rack, so as to render the rack flexible and capable of movement into a compartment 26 of a stationary sheath 27, which is arranged within the lower portion and longitudinally of the interior chamber *k* of the case K, which sheath is provided at the receiving end of the said compartment with a flaring or outwardly-enlarged mouth 28 to facilitate the entrance of the said rack into the said sheath, and the outer side wall of the said mouth is extended upwardly, as at 29, at and next to the outer side of the path of the said rack and slopes inwardly, as at 8, toward the bottom of the said compartment, and hence forms a guide for insuring a proper entrance of the said rack into the said sheath. Figs. 1 and 5 very clearly show the sheath 27 for receiving the racks of the mechanism employed in operating the lower window-sash, and the upward extensions 29 of the outer side walls of the mouths of the compartments of the said sheath form arms which extend longitudinally of the racks and are interposed between the racks and the inner sides of the cross-bars N, as shown in Fig. 4, and prevent displacement of the racks of the said mechanism out of mesh with the rack-engaging pinions. It will be observed, therefore, that by the flexibility of the racks their extension below the case K is avoided and that in the lower positions of the window-sashes they are compactly received within the said case.

By the construction hereinbefore described it is evident that the racks employed in the actuation of either sash are removably suspended from the said sash through the medium of the latches of the sash, and it will be ob-

served that adjacent sections of each rack are provided at their adjacent ends with straight surfaces which abut against each other when the said sections are in line.

5 What I claim is—

1. The combination, with a window-sash which is provided, in its side edges, with mortises extending to the bottom of the sash, of latch-plates arranged within the mortises and
10 secured to the sash; racks extending upwardly into the mortises and abutting, at their upper ends, against the latch-plates, which racks are provided, near their upper extremities, with
15 recesses; pivotal latches supported from the aforesaid plates and having projections normally engaging with the aforesaid recesses; springs acting to retain the latches in their operative position, and means for simultaneously
20 actuating the racks in unison.

2. The combination, with a window-sash which is provided, in its side edges, with mortises extending to the bottom of the sash, of latch-plates arranged within the mortises and
25 secured to the sash; racks extending upwardly into the mortises and provided, near their upper extremities, with recesses; latches supported from the sash within the said mortises and having projections normally engaging
30 with the aforesaid recesses, which latches are disengageable from the racks; springs acting to retain the latches in their operative position, and means for simultaneously actuating
35 the racks in unison, and the arrangement of the parts being such that the sash is lifted by the racks, or lowered by gravity, according as the racks are actuated in the one or the other
40 direction.

3. The combination, with a window-sash, racks instrumental in actuating the sash; means for detachably suspending the racks
40 from the sash, and means for simultaneously actuating the racks in unison, and the arrangement of the parts being such that the sash is lifted by the racks during the actuation of the
45 racks in the required direction.

4. The combination, with a window-sash which is provided, in each side edge, with a mortise extending to the bottom of the sash; a latch-plate contained within the said mortise
50 and secured to the sash, and a rack extending upwardly into the said mortise and abutting, at its upper end, against the latch-plate, which rack is instrumental in lifting the sash and is provided, near its upper extremity, with a recess,
55 of an upright latch contained within the aforesaid mortise and pivoted horizontally to the latch-plate and extending a suitable distance above and below its pivotal bearing, which latch is provided, below its axis, with a
60 projection which normally engages the aforesaid recess; a horizontally-arranged shaft extending transversely of the latch a suitable distance above the axis of the latch and having
65 bearing in the aforesaid bracket, which shaft is provided, at one side, with a recess normally

engaged by the latch, and a spring acting to retain the latch in its normal and operative position.

5. The combination, with a window-sash, of flexible racks instrumental in lifting the sash; means for detachably suspending the racks
70 from the sash, and means for simultaneously actuating the racks in unison.

6. The combination, with a window-sash, the window-casing, the window-sill, and two
75 racks instrumental in lifting the sash and extending through the window-sill, of two bars arranged below and longitudinally of the window-sill and a suitable distance apart; two parallel shafts extending between and having
80 bearing in the said bars; two corresponding meshing gears mounted upon the different shafts respectively with one of the gears operatively connected with one of the shafts, and with the other gear loose upon the other
85 shaft; two axles parallel with the aforesaid shafts and extending between and having bearing in the aforesaid bars; two corresponding pinions loosely mounted on the different axles respectively and engaging with the different
90 racks respectively; such an operative connection between the pinions and the aforesaid gears that the racks, during the rotation of the said gears, are actuated simultaneously and in unison; an endwise-shiftable bolt normally
95 locking one of the said gears and arranged between and longitudinally of the aforesaid bars; a shaft having bearing in the said bars and provided with an upright arm operatively connected with the said bolt, and
100 a spring acting to retain the said bolt in its normal and operative position.

7. The combination, with a window-sash, the window-casing, the window-sill, and two
105 racks instrumental in lifting the sash and extending through the window-sill, of two bars arranged below and longitudinally of the window-sill and a suitable distance apart; two parallel shafts extending between and having
110 bearing in the said bars; two meshing gears mounted upon the different shafts respectively with one of the gears operatively connected with one of the shafts, and with the other gear loose upon the other shaft; two axles
115 parallel with the aforesaid shafts and extending between and having bearing in the aforesaid bars; two pinions loosely mounted upon the different axles respectively and engaging with the different racks respectively, and such an operative connection between the pinions
120 and the aforesaid gears that the racks, during the rotation of the said gears, are actuated simultaneously and in the same direction.

8. The combination, with a window-sash, the window-casing, the window-sill, and two
125 racks instrumental in lifting the sash and extending from the sash to and in under the window-sill, of two parallel shafts supported below and arranged transversely of the sill; two meshing gears mounted upon the differ-
130

ent shafts respectively with one of the gears
operatively connected with one of the shafts
and with the other gear loose upon the other
shaft; two pinions arranged below the win-
5 dow-sill and engaging with the different racks
respectively, and such an operative connection
between the pinions and the aforesaid gears
that the racks, during the rotation of the said
gears, are actuated simultaneously and in the
10 same direction.

9. The combination, with a window-sash,
the window-casing, the window-sill, and two
racks instrumental in lifting the sash and ex-
tending from the sash to and in under the
15 window-sill, which racks are composed re-
spectively of sections assembled end to end
with adjacent sections pivoted together hori-
zontally and transversely of the respective
racks, of means for operating the racks in uni-
20 son from below the window-sill, and means
for guiding the racks in under the rack-oper-
ating means.

10. The combination, with a window-sash,
the window-casing, the window-sill, and two

racks instrumental in lifting the sash and ex- 25
tending from the sash to and in under the
window-sill, which racks are composed re-
spectively of sections assembled end to end
with adjacent sections pivoted together hori- 30
zontally and transversely at the inner side of
the respective racks; pinions arranged below
the window-sill and meshing with the racks;
mechanism for operating the pinions, and a
sheath arranged below the pinions and longi- 35
tudinally of the sill, which sheath has two
compartments arranged to receive the differ-
ent racks respectively; means for guiding the
racks into the said compartments, and means
for preventing disengagement of the racks
40 from the pinions.

In testimony whereof I sign the foregoing
specification, in the presence of two witnesses,
this 29th day of August, 1903, at Cleveland,
Ohio.

EMANUEL FEDER.

Witnesses:

C. H. DORER,

G. M. HAYES.