

(No Model.)

4 Sheets—Sheet 1.

C. LENZ & J. STUMPF.  
WINDOW.

No. 556,759.

Patented Mar. 24, 1896.

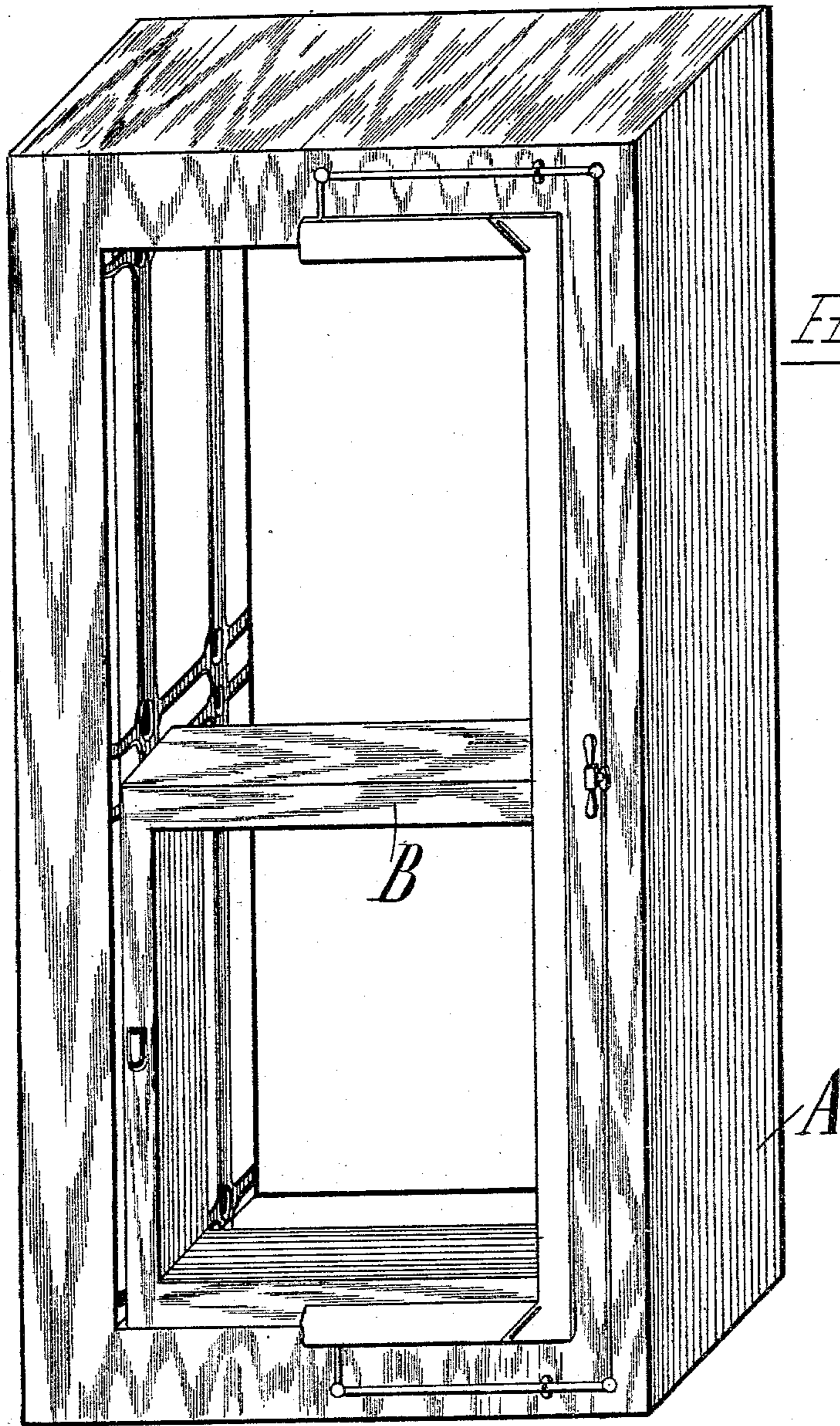


Fig. 1.

Witnesses:

Max Frankau

Herman Herod

Inventors

Christian Lenz

Johannes Stumpf

by Carl W. Meilner

Attorney.

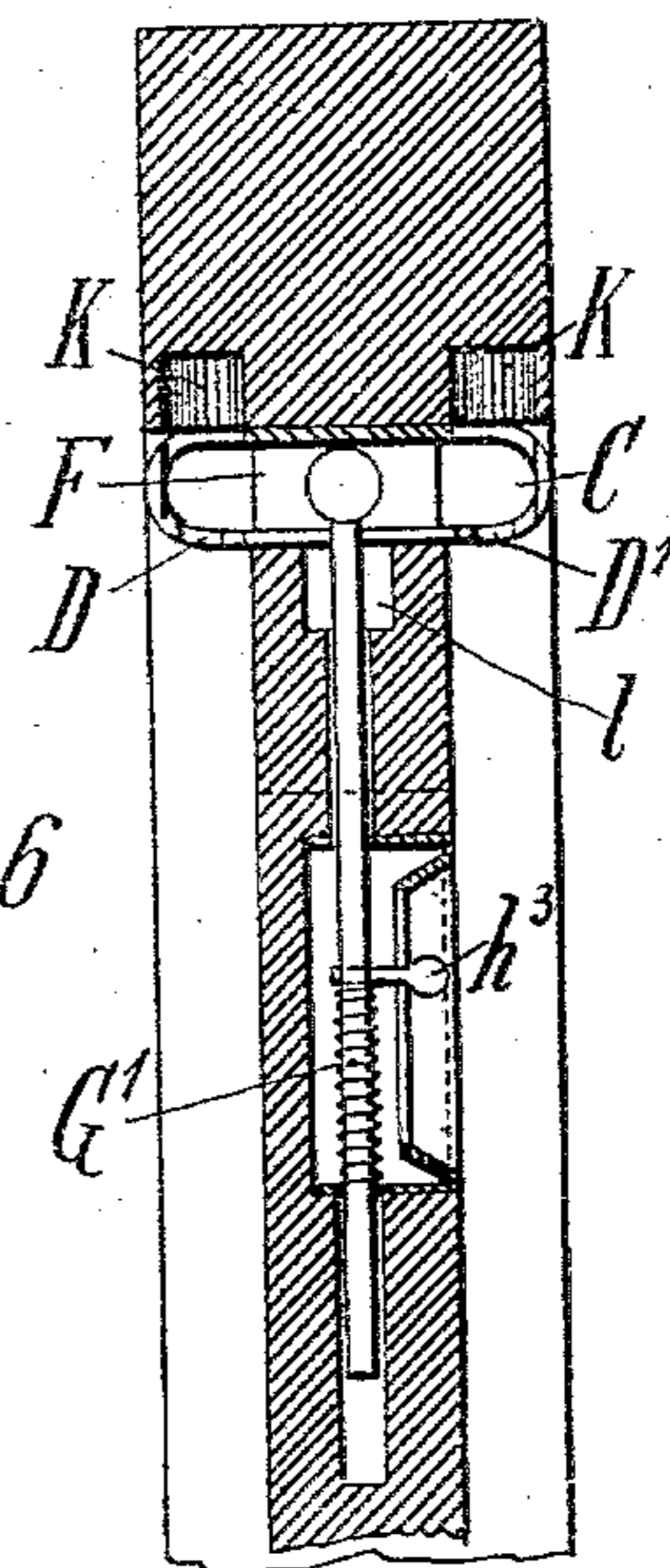
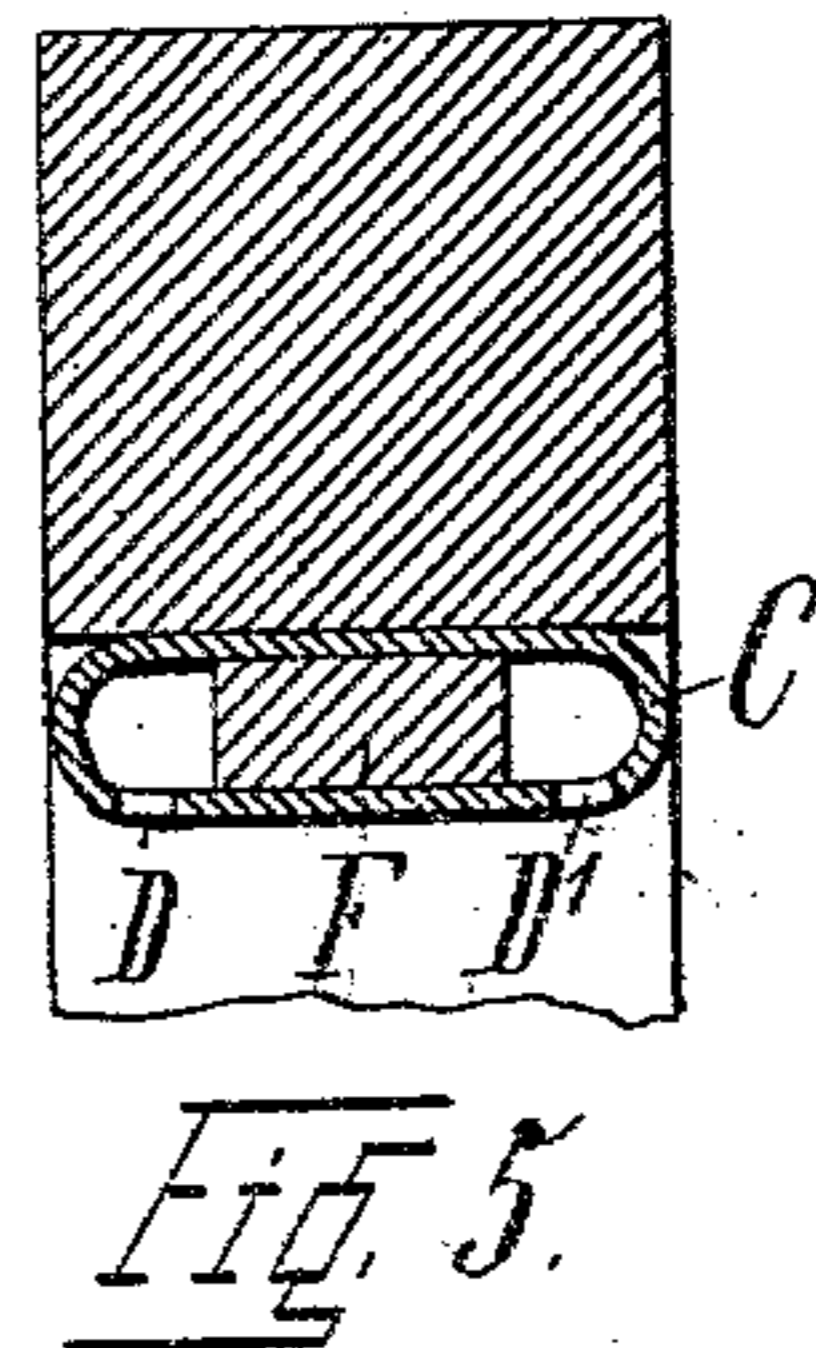
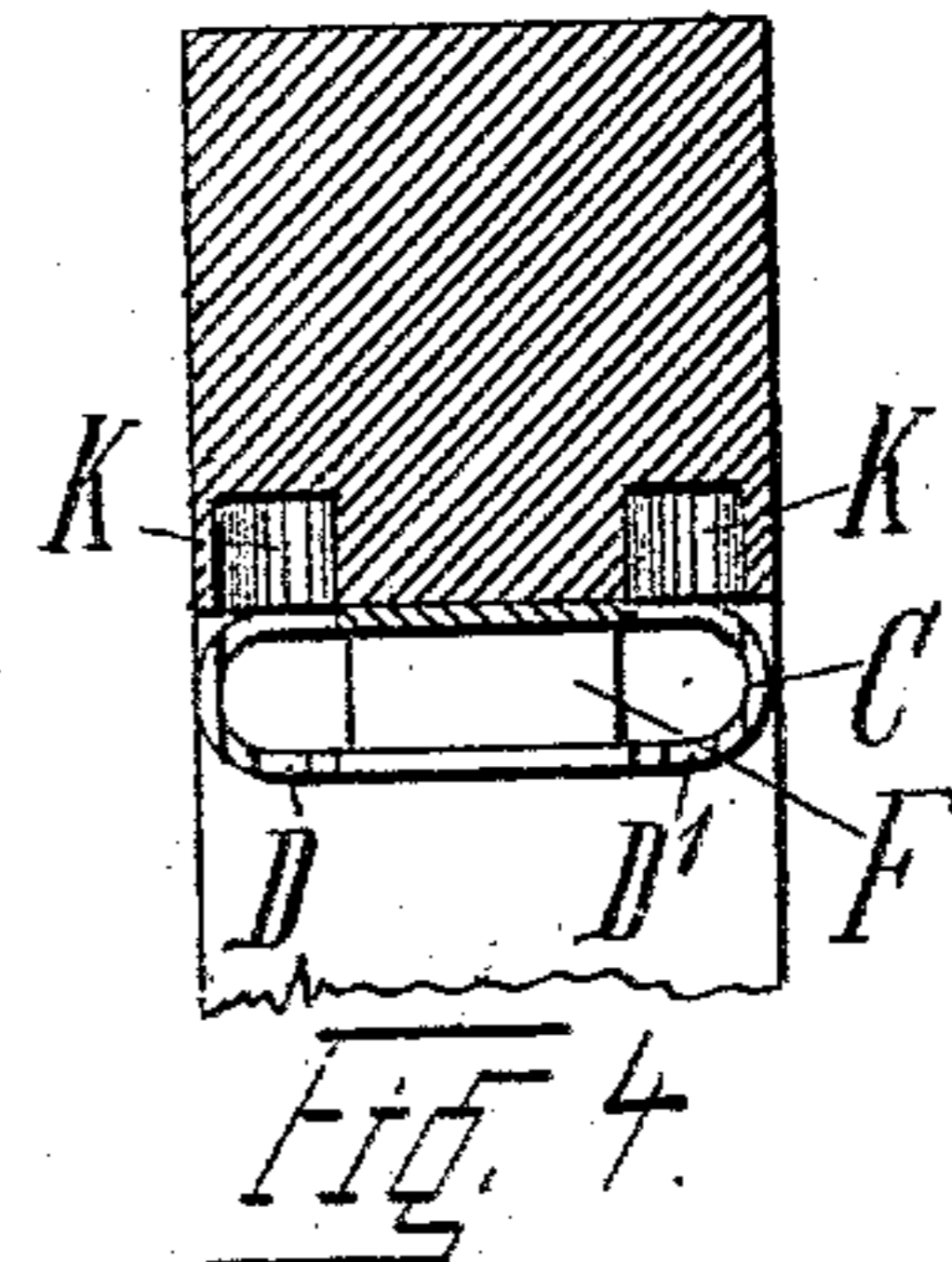
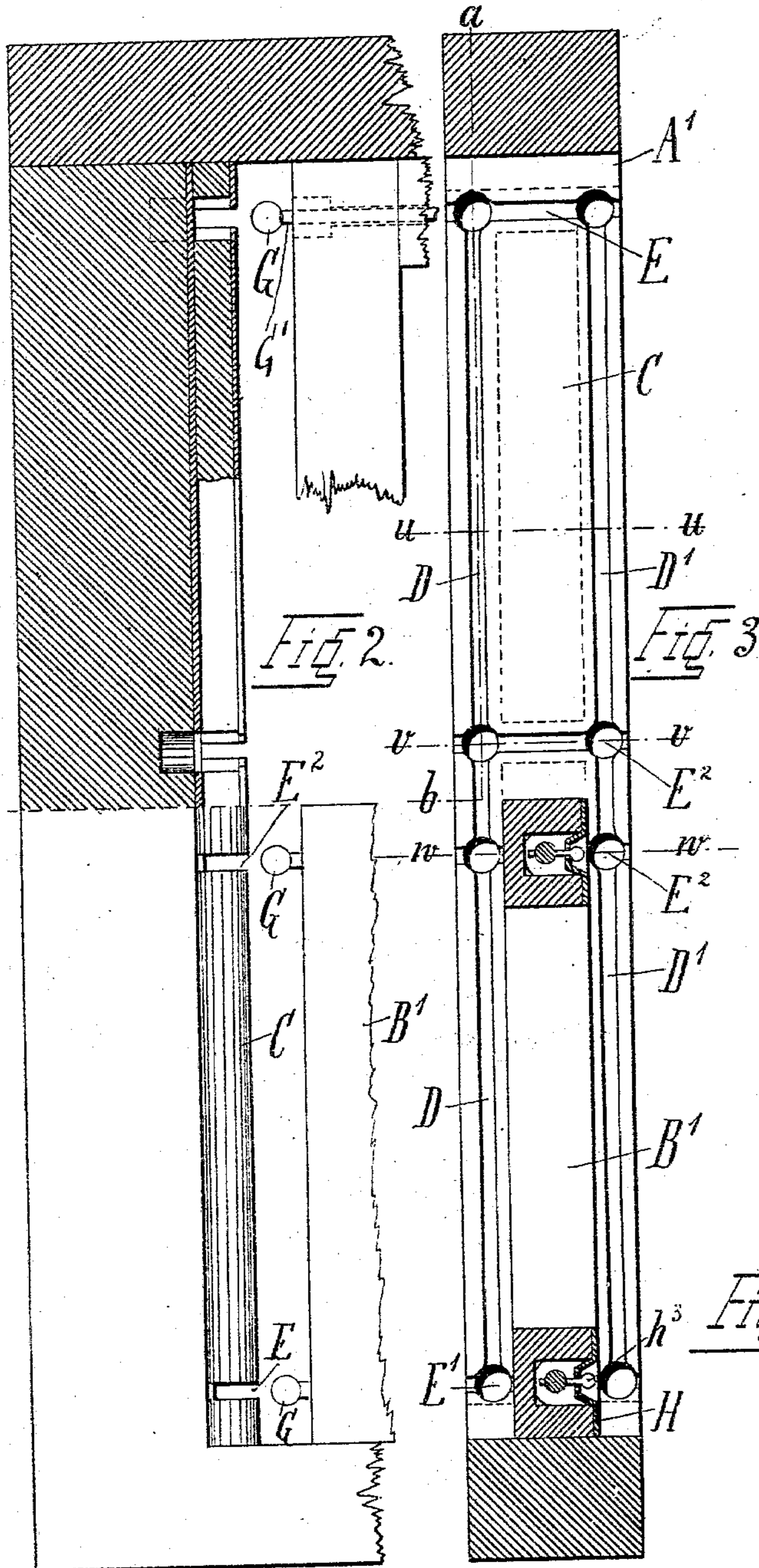
(No Model.)

4 Sheets—Sheet 2.

C. LENZ & J. STUMPF.  
WINDOW.

No. 556,759.

Patented Mar. 24, 1896.



Witnesses:  
Max Frankhaen  
Herman Herck

Inventors  
Christian Lenz  
Johannes Stumpf  
by *Carl M. Reicher*  
Attorney.

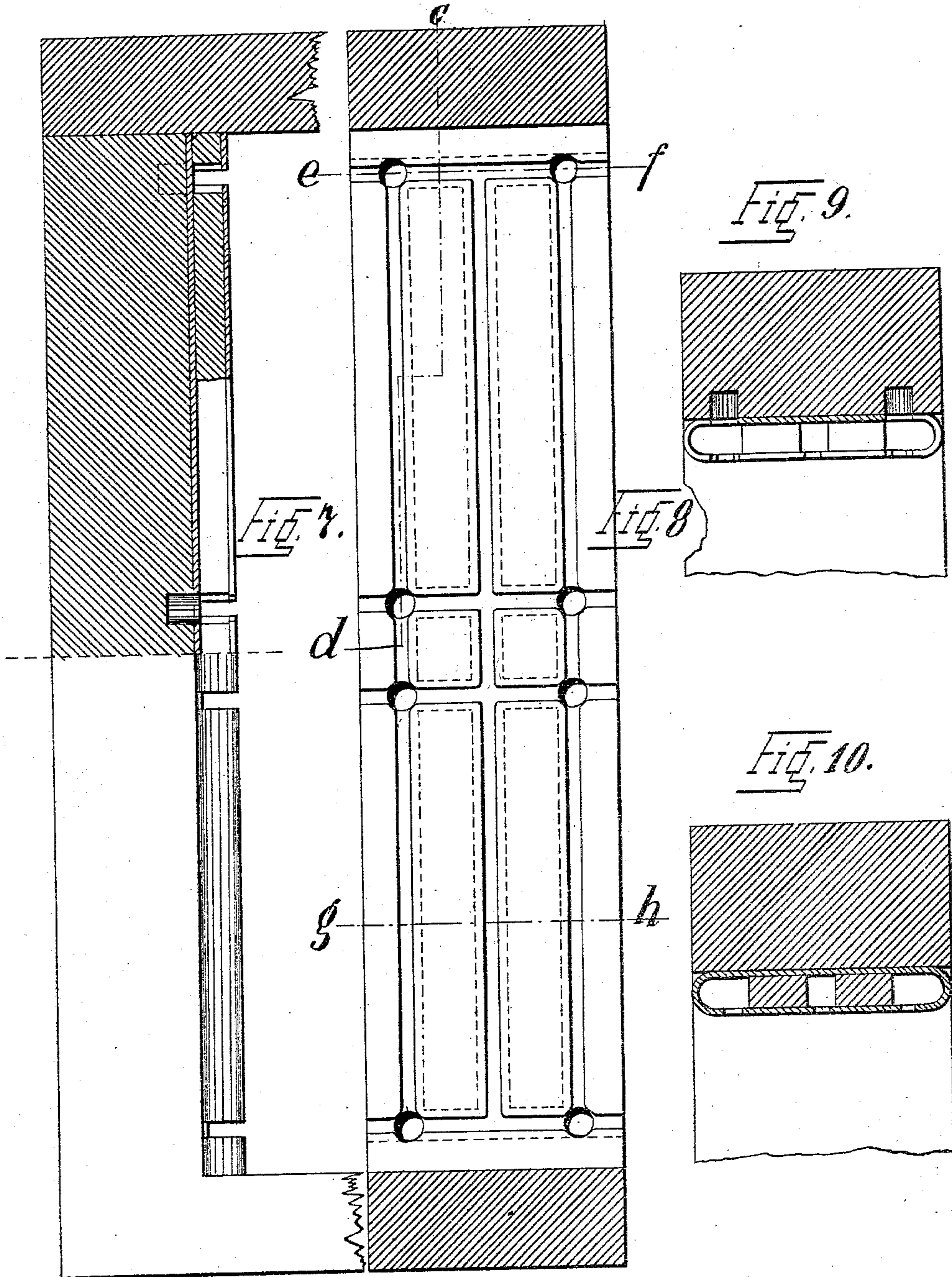
(No Model.)

4 Sheets—Sheet 3.

C. LENZ & J. STUMPF.  
WINDOW.

No. 556,759.

Patented Mar. 24, 1896.



Witnesses:

Max Frankhauser

Herman Herck

Inventors

Christian Lenz

Johannes Stumpf

by *Carl W. Reiche*  
Attorney.

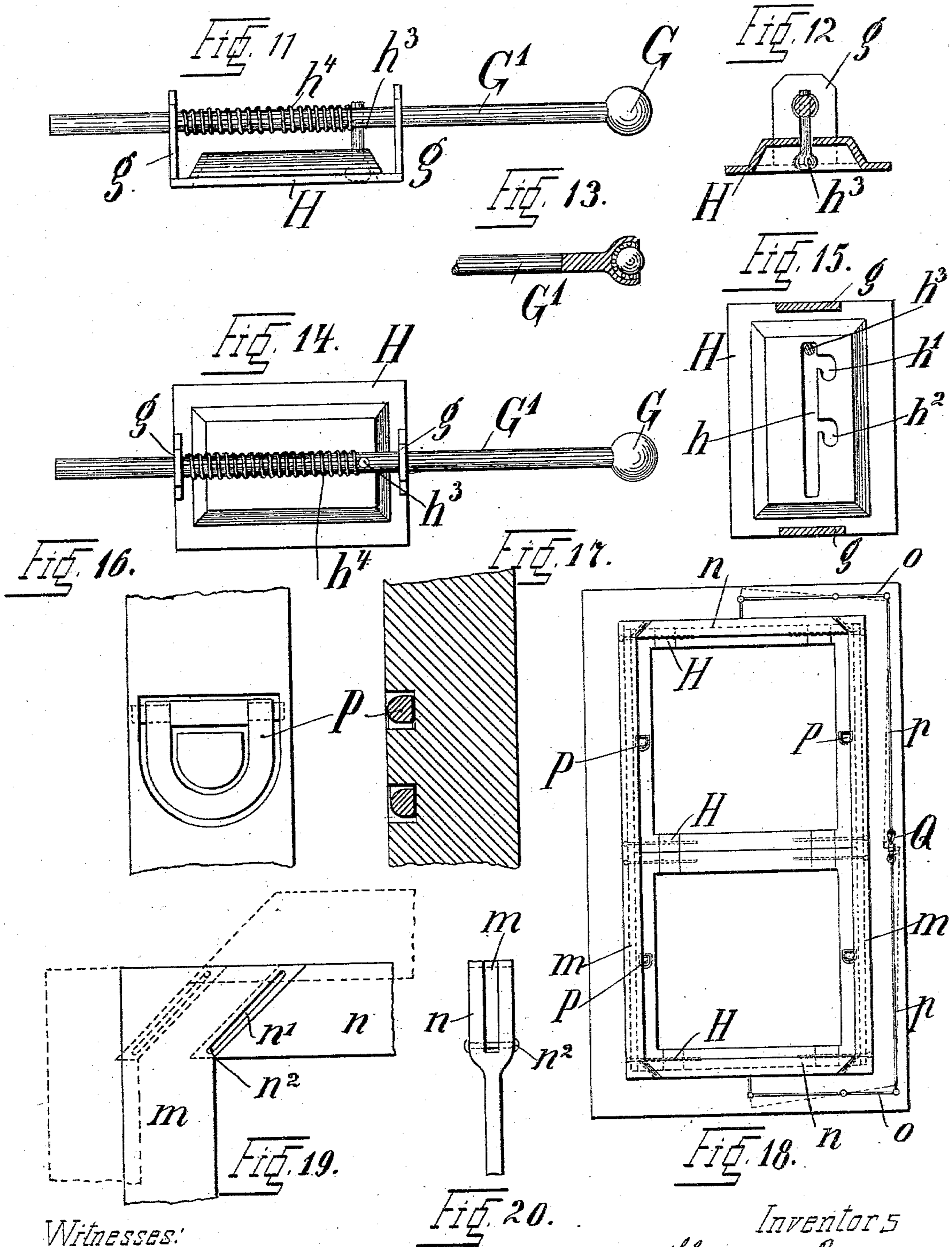
(No Model.)

4 Sheets—Sheet 4.

C. LENZ & J. STUMPF.  
WINDOW.

No. 556,759.

Patented Mar. 24, 1896.



Witnesses:

Max Frankau

Herman Herz

Inventors

Christian Lenz

Johannes Stumpf

by Carl H. Reichert  
Attorney.

# UNITED STATES PATENT OFFICE,

CHRISTIAN LENZ AND JOHANNES STUMPF, OF BERLIN, GERMANY.

## WINDOW.

SPECIFICATION forming part of Letters Patent No. 556,759, dated March 24, 1896.

Application filed June 22, 1895. Serial No. 553,719. (No model.)

*To all whom it may concern:*

Be it known that we, CHRISTIAN LENZ, engineer, and JOHANNES STUMPF, merchant, citizens of the Kingdom of Prussia, and residents of Berlin, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Windows, of which the following is a specification.

This invention relates to window frames and sashes or casements, and the improvements are intended to afford the advantages of vertically-adjustable sashes and of hinged casements without possessing disadvantages common to combined sash and casement window-fittings.

The construction admits of a vertical adjustment of the single sashes in such manner that, for instance, in double windows the upper exterior sash or sashes may be laterally displaced—that is to say, in the depth of the frame—and lowered. The rear sash or sashes may be in the same manner displaced, raised or lowered respectively or replaced by each other, so that, for instance, the uppermost sash of the exterior window may be exchanged or replaced by the lowermost sash of the interior window or be laterally entirely removed. It is therefore possible to take out each sash for cleaning purposes and then exchanging it for another, whereby the frequent accidents connected with the operation of cleaning the upper frames of windows may be prevented. As mentioned above, these improved window-fittings are also constructed to permit of each sash turning about a vertical border, and they are at the same time so constructed that, swinging about a horizontal border, they may be placed in an oblique position, an arrangement which provides for ventilation of the respective apartment without the entrance of draft or rain.

The annexed drawings represent the improved window-fitting.

Figure 1 illustrates a window-frame A for a double window with a sash B inserted to fill the lower part. Figs. 2 to 6 illustrate the construction for a single window, Fig. 2 being a partial side view and cross-section on the line *a b* of Fig. 3, the latter being a vertical section through the frame A', passing also through a sash B' therein. Fig. 4 is a horizontal section on line *v v* of Fig. 3; Fig. 5, the

same on line *u u*; Fig. 6, the same on line *w w*. Figs. 7 to 10 are corresponding representations for double windows, Fig. 7 being a partial side view and section, respectively, on line *c d* of Fig. 8; Fig. 8, a vertical section; Fig. 9, a horizontal section on line *ef*; Fig. 10, the same on line *g h*. Figs. 11 to 15 illustrate adjustment and locking devices in different views. Fig. 11 is a front view, and Fig. 12 a cross-section, of the locking device; Fig. 13, a modification of the slip-bolt of the locking device represented in Fig. 11. Fig. 14 is a plan view; Fig. 15, a such one of the ground-plate, the above-placed parts being cut away. Figs. 16 and 17 show a manipulating-ring, Fig. 16 in front view and Fig. 17 in central cross-section; Figs. 18 to 20, the mode of closing the beads between frames and sashes. Fig. 18 is the front view of a window-frame equipped in this manner. Fig. 19 is a corner of it in greater scale; Fig. 20, a side view of Fig. 19.

To describe the arrangement for single windows, as may be seen from Sheet 2, the inner vertical surfaces are provided with metallic beadings C, in their appearance similar to flattened tubes, in the interior hollow spaces of which is introduced a bar F, as shown in Figs. 4 to 6. This frame is intended to be constructed for two sashes, an upper and a lower one. The tubes C have near their edges the grooves D D', the latter running at their ends into the cross-grooves E E', while there are other cross-grooves, E<sup>2</sup> E<sup>2</sup>, at the middle of their length. The longitudinal and cross grooves are at their meeting points enlarged into circular holes, the cross-grooves E E' E<sup>2</sup> running the entire width of tubes C and passing through the interior longitudinal bars F.

The sashes to be inserted are provided with laterally-extended bolts G', which end in knobs G and may, by means of the arrangement represented in Figs. 11 to 15, be moved forward and backward, as hereinafter described. Said bolts G are attached near the horizontal rails of the sash (see upper part of Fig. 2) and correspond as regards their position with the horizontal grooves E E' E<sup>2</sup>. It is therefore manifest that such a sash may easily and conveniently be introduced in horizontal direction into the grooves E' E<sup>2</sup> or E E<sup>2</sup> after the knobs G have been moved backward, whereupon the knobs with their ends enter

through the meeting points D E, &c., into the grooves D or D'. When, as shown in Fig. 3, the sash B' is placed in its middle position its raising or lowering in a vertical sense is impossible. A sash may, therefore, on drawing back the knobs G, be inserted into the frame, and after introducing the bolts G' into the grooves at the meeting points the sash may be raised along the grooves D or D' and suspended from the lower edges of cross-grooves E E<sup>2</sup>. The bolts G' (see Figs. 11 to 15) rest in sockets or eyes in the iron frame H, said frame being bent inwardly, as shown in Fig. 12 in section, and having a longitudinal slot *h*, with lateral extensions *h'* and *h''*, (see Fig. 15,) in which the pin *h*<sup>3</sup>, passing through slot *h* and fastened by the bolt G', is adapted to engage. The bolt G' is by means of spring *h*<sup>4</sup> always held in the position shown in Fig. 11.

In Figs. 11 and 14 the bolt G' is provided with a solid knob G, whose diameter allows only an entering into the cross points of D D' respectively with the horizontal grooves E E', &c., as already mentioned. In Fig. 13 the top of G' is hollow and spherically-shaped and comprehends a solid bowl, the latter being journaled with its inner back side on anti-friction-balls put into the hollow top. This arrangement is provided for diminishing the friction of the bolt end within the grooves. These devices are inserted in the upper and lower rail of the sash in such manner that the back of plate H will be flush with the outer surface of the sash (see Fig. 6) and the axis of bolt G' coincides with the middle of the sash. The pin *h*<sup>3</sup> will then not unnecessarily protrude from the sash.

Fig. 3 represents the cross-section of the window-frame with the device in position and Fig. 6 a horizontal section. In order to illustrate with the aid of Fig. 6 the effect and operation of this device it is to be mentioned that at the meeting or crossing points of the vertical and horizontal grooves D E, &c., the back walls of the guide-tubes C have also openings, while there are recesses K K in the frame, which are shown in Figs. 4 and 6. In the position given in Fig. 6 the pin *h*<sup>3</sup>, Fig. 15, engages with the recess *h*<sup>2</sup>, thereby not hindering a horizontal displacement of the sash. When the latter is slid, so that the axis of bolts G' assumes a position opposite D or D', the knob G will on disengaging the pin *h*<sup>3</sup> from *h'* engage with the recess K, when neither vertical nor horizontal displacement of the window-sash is possible.

As may be seen from the drawings, inasmuch as the horizontal grooves run the entire width of the tube the window-sashes may, when the knob *h*<sup>3</sup> is inserted in the middle position *h*<sup>2</sup>, as in Fig. 6, be swung outward about the upper or lower knobs G, respectively, like an ordinary hinged casement, the latter then swinging upon the lower edges of the smaller surfaces of E' E<sup>2</sup> and E<sup>2</sup> E, respectively, while the knobs G will prevent a removing of the bolts G' from the slits, as the latter are not

much wider than the diameter of the bolts G'. This arrangement finally admits of an oblique displacement of the sashes, for supposing the knobs G to be drawn in sufficiently so as to lie above and below at either end entirely in the sashes, in which position the sash-frame can be inserted and taken out from the window-frame, the upper bolts G', Fig. 2, are to be brought opposite the crossing point of E<sup>2</sup> and D, the pins on the upper bolts being permitted to assume the middle position in their frames H, so that the knobs engage. The sash is then raised till above the meeting point of the upper grooves E<sup>2</sup> and groove D and is placed in an oblique position, so that the lower bolts (which are entirely drawn back) will lie opposite the middle of grooves D'. Having then moved the sash sufficiently to oblige the lower bolts with a crossing point of groove D'—for instance, that of the lower groove E<sup>2</sup>—said bolts are passed through the respective openings into the recesses *k*, whereby the frame is kept in its oblique position, or, having in the same manner placed the upper bolts in the middle position, as shown in Fig. 6, upon the lower edges of one of the grooves E E<sup>2</sup>, respectively, and drawn in the lower bolts, the sash may be allowed to swing about the upper bolts, thereby assuming any desired position for cleaning, if it is not preferred to entirely take the sash out of the frame by drawing back the upper bolts.

These improved frames offer the following advantages:

First. The sash when taken out on completely drawing back the bolts may be inserted into the frame, the bolts be brought opposite the grooves D or D', passed in at the meeting points E' E, so that that sash by the engagement of the knobs with the recesses K will be prevented from moving.

Second. In this position, as described, the sashes may, on displacing the bolts and holding the latter in their middle position so that they cannot engage with recesses K, be vertically moved upward, the bolts G' sliding along the grooves D or D', respectively. Said sash can then be raised to the extreme limit, when by releasing the bolts and placing them in the upper recesses K they are caused to remain, or the sashes may, on permitting the bolts in their middle horizontal displacement to slide in the horizontal grooves, be brought from one vertical groove to the other, so that, for instance, the upper sash can be laterally displaced, lowered and entirely removed, or the upper and lower sash replaced by each other without their removal being necessary.

Third. It is possible to let them assume an oblique position and turn about a horizontal axis.

Fourth. They may be used as casements when the bolts are brought into the middle position, the cross-grooves passing through the entire width permitting of a lateral turning of the bolts. If the bolts do not end in knobs, as in the drawings, but have instead

a cylindrical shape throughout, a lateral turning of the sashes would be precluded, but the other advantages remain. In that case the horizontal slits are only required to connect the vertical grooves  $DD'$  instead of extending beyond them through the entire width. As may be seen from Fig. 13, a friction of the bolt ends within the grooves is considerably diminished by the arrangement of an anti-friction-ball, which is guided in an anti-friction-bearing.

The double window-frame, as represented in Figs. 7 to 10, is a combination of two single frames, with the difference that this combination only requires one central vertical groove common to both. This form equally possesses all the advantages as regards the exchanging of the single sashes, their horizontal and vertical displacement, their placing in an oblique position, the separate removing of each sash, and, finally, their turning about a vertical axis.

This system is well applicable to windows of railroad-cars, as there the windows when placed in an oblique position, as above described, would permit of an inlet of fresh air without causing draft, where the upper open part of the window permits air to enter without inconvenience to the passengers. The lateral wedge-shaped grooves may here be closed by means of leather pieces cut to suitable form and fitted to the sash or frame.

Figs. 18 to 20 represent the means for closing the joint between the frame and sashes, the frame being supposed to be flush with the outer surface of the sashes. The joint is covered with flat iron bars or strips  $mmnn$ , the latter being connected to a lever with hand-crank  $q$  by means of levers  $oo$  and rods  $pp$ . On turning said crank the pieces  $mm$  move outwardly, thereby freeing the joints which they covered.

Figs. 19 and 20 show the way in which the lateral displacement of the strips  $m$  is effected by strips  $n$ . The ends of the latter are forked and beveled, whereas those of  $m$  have each a tenon adapted to engage between the said forked extremity. The bar  $n$  is, in addition, provided with slots  $n'$  to receive a pin  $n^2$  secured in bar  $m$ . On raising bar  $n$  with the aid of lever  $c$  the oblique forked ends slide on the tenon of bar  $m$  and laterally displace the latter.

What we claim is—

1. A window-frame having at its vertical inner surface, two, three or more parallel, longitudinal or vertical grooves, said grooves being, at the upper and lower ends and at their middle connected by horizontal cross-grooves in which vertical grooves the sashes, consisting of one or more parts are kept in place by means of laterally-projecting bolts in the manner described and illustrated.

2. A window-frame having at its inner surface two, three or more parallel longitudinal or vertical grooves, said grooves being, at the upper and lower ends and at their middle con-

nected by horizontal cross-grooves, the back walls of said grooves having in their cross-points recesses  $K$ , into which recesses engage laterally-projecting bolts attached to the sashes, as described and illustrated.

3. A window-frame having at its inner surfaces two, three or more parallel, longitudinal and vertical grooves  $DD'$ , said grooves being, at the upper and lower ends and at their middle connected by horizontal cross-grooves passing through the entire width of the frame, in which vertical grooves the sashes, consisting of one or more parts, are kept in position by means of laterally-projecting bolts  $G$  in the manner as described and illustrated.

4. A window-frame having its inner vertical surfaces covered with metallic layers  $C$ , forming in their cross-section flattened tubes into which are passed or inserted vertically-running bars  $F$  dividing the inner of the layers in several channels, while the inner front faces of these layers are slitted and the faces in this manner connected with the inner channels; the inner bars being crossed at the lower and upper ends and at their middle by horizontal grooves and the vertical slits of the layer-faces connected at the same places by horizontal slits  $E E' E^2$ , while the back walls of the layers  $C$  are perforated opposite to the cross-points of the horizontal and vertical grooves, in which slits and grooves the sashes, consisting of one or more parts are kept in place by means of laterally-projecting bolts  $G$  in the manner described and illustrated.

5. In a window-sash as described, the bolts  $G'$  in plates  $H$  provided with lateral cheeks  $g$  which plates have each a central longitudinal slot  $h$  with two lateral extensions  $h' h^2$  to receive a pin or bolt  $G'$ , a spiral spring  $h^4$  being arranged between the said cheeks  $g$  presses against one of the latter and the pin  $h$  and tending to press outwardly the bolt when the pin  $h^3$  is not resting in  $h'$  or  $h^2$  as described and illustrated.

6. In a window-fitting as described, the means for closing the joints between frame and sashes consisting of flat strips  $m n$  of which two opposite strips  $n$  with beveled ends engage with the corresponding ends of the strips  $m$ , the strips  $n$  being attached to two armed levers  $o$ , the other ends of which are by means of rod  $pp$  secured to a double hand-lever; the strips  $n$  having beveled fork-like ends which engage with the beveled end of strips  $m$  especially adapted thereto, slits  $n'$  in both fork ends, said slits engaging with pins  $n^2$  passing through the end of strips  $m$  as described and illustrated.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

CHRISTIAN LENZ.  
JOHANNES STUMPF.

Witnesses:

MAX FRAMBACH,  
RICH. SCHERPE.