

No. 886,851.

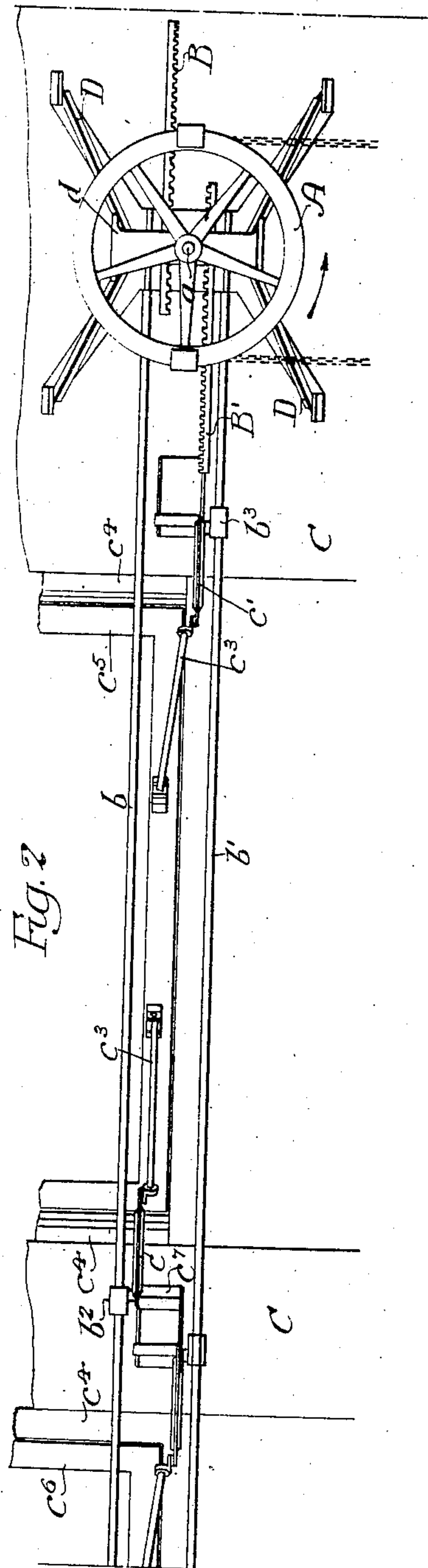
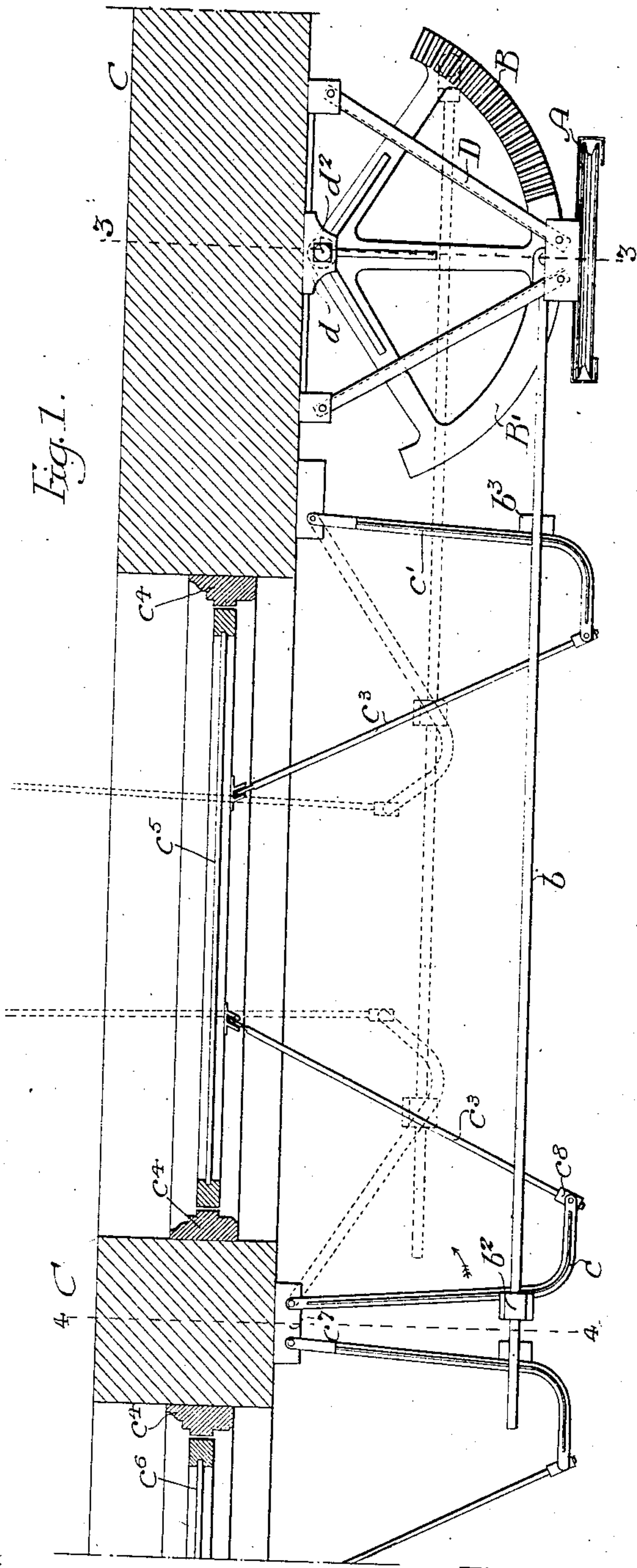
PATENTED MAY 5, 1908.

C. P. POND.

WINDOW OPERATING MECHANISM.

APPLICATION FILED MAY 9, 1907.

3 SHEETS—SHEET 1.



Witnesses:

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Inventor:
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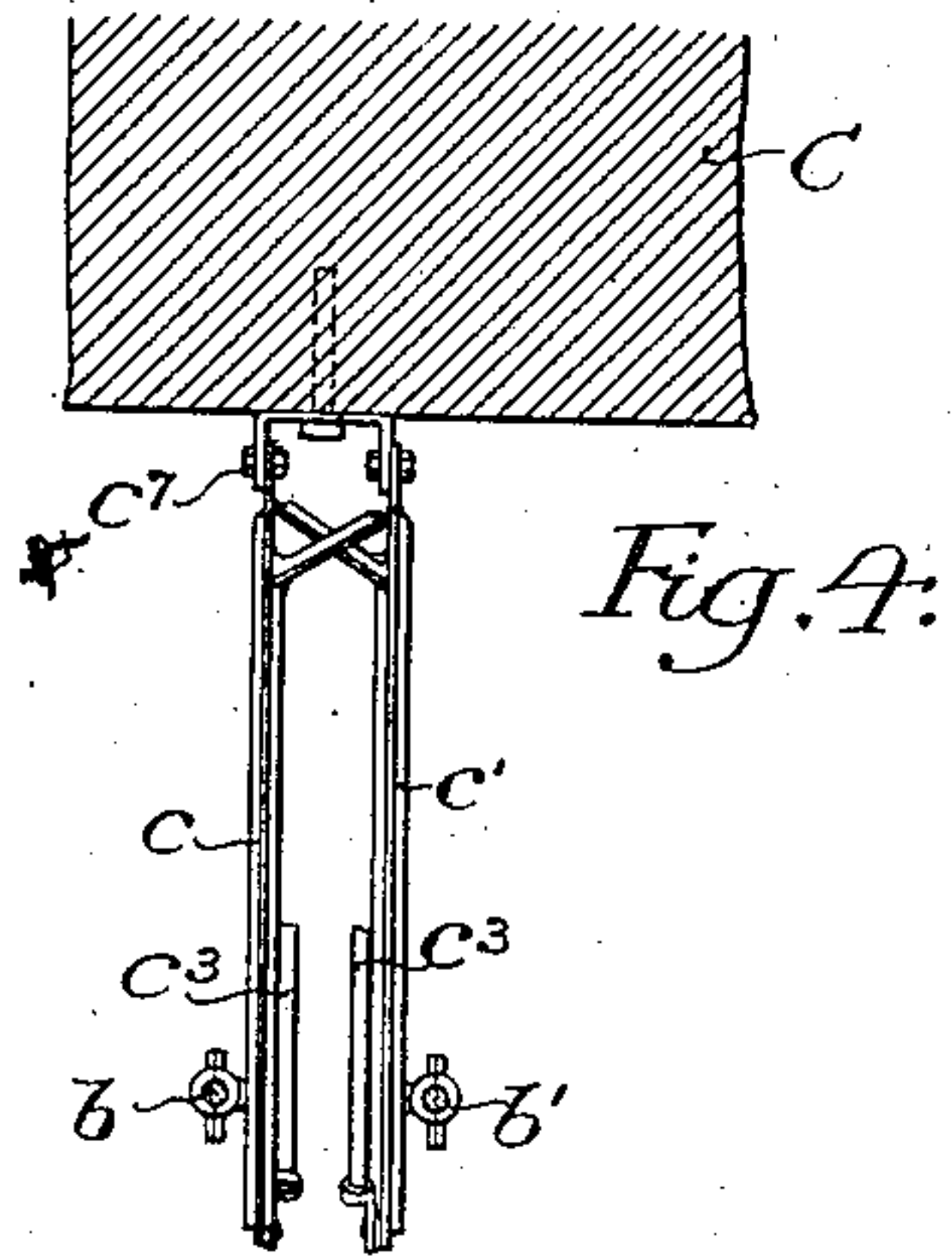


Fig. 4.

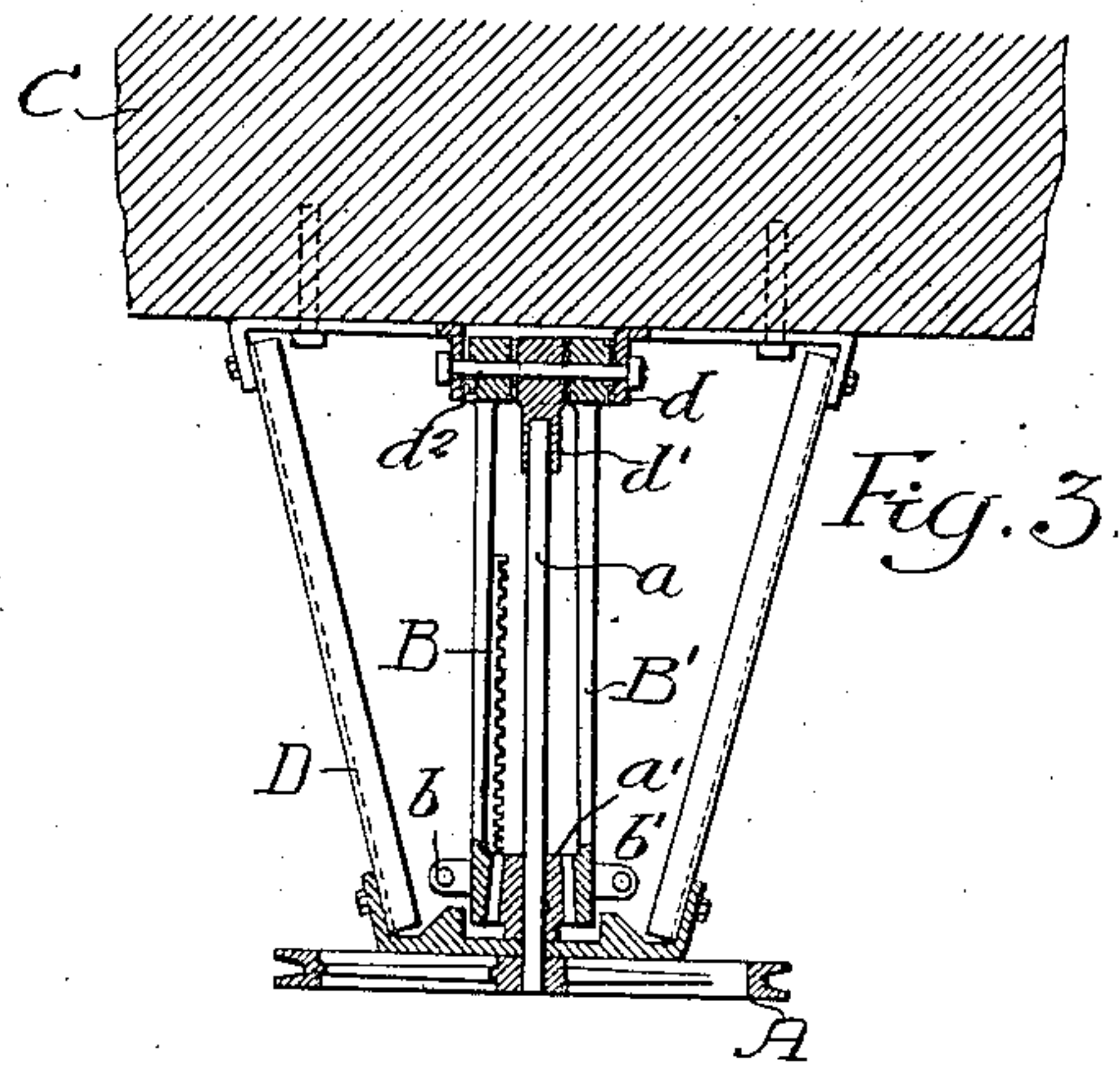


Fig. 3.

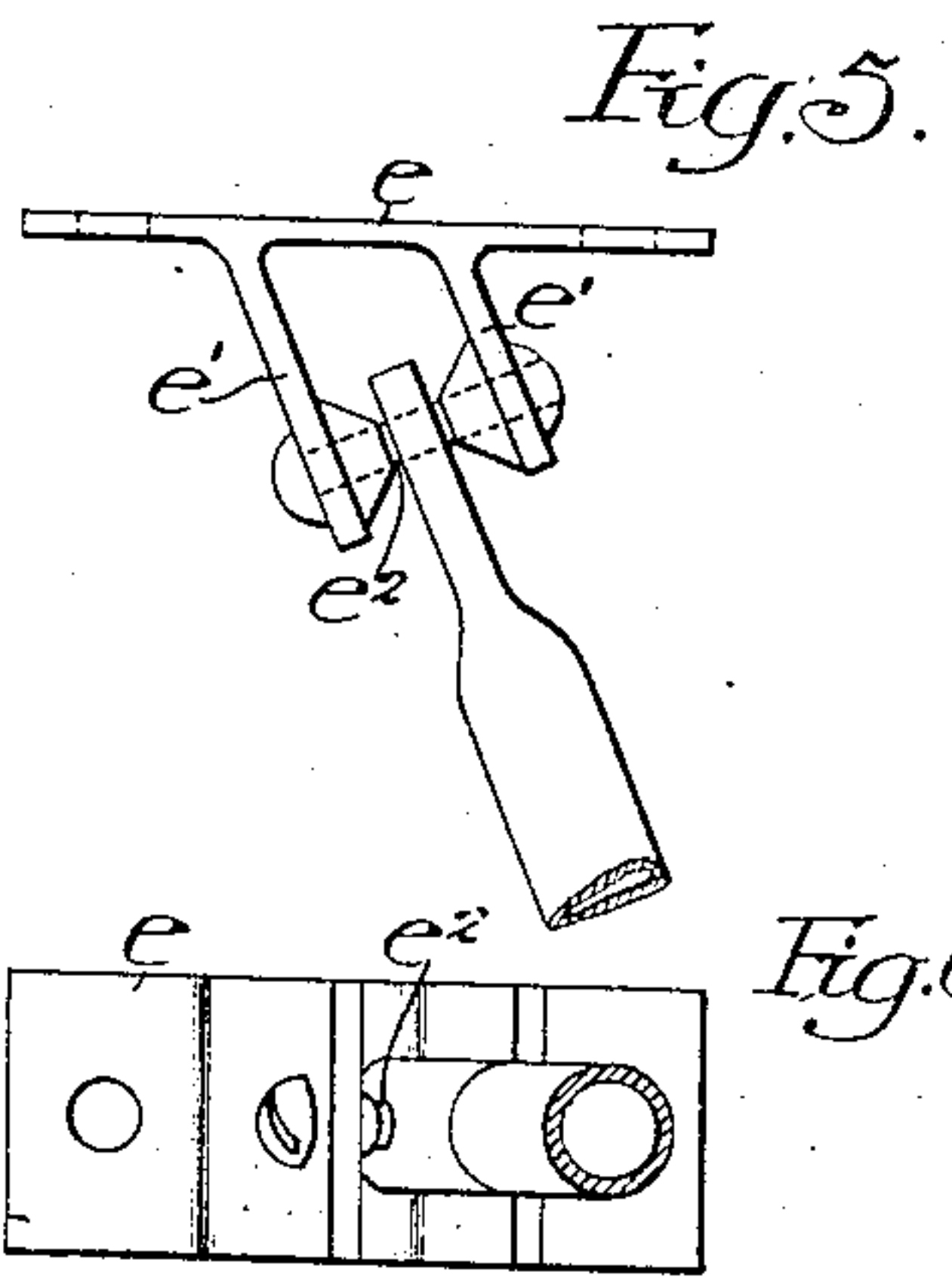


Fig. 5.

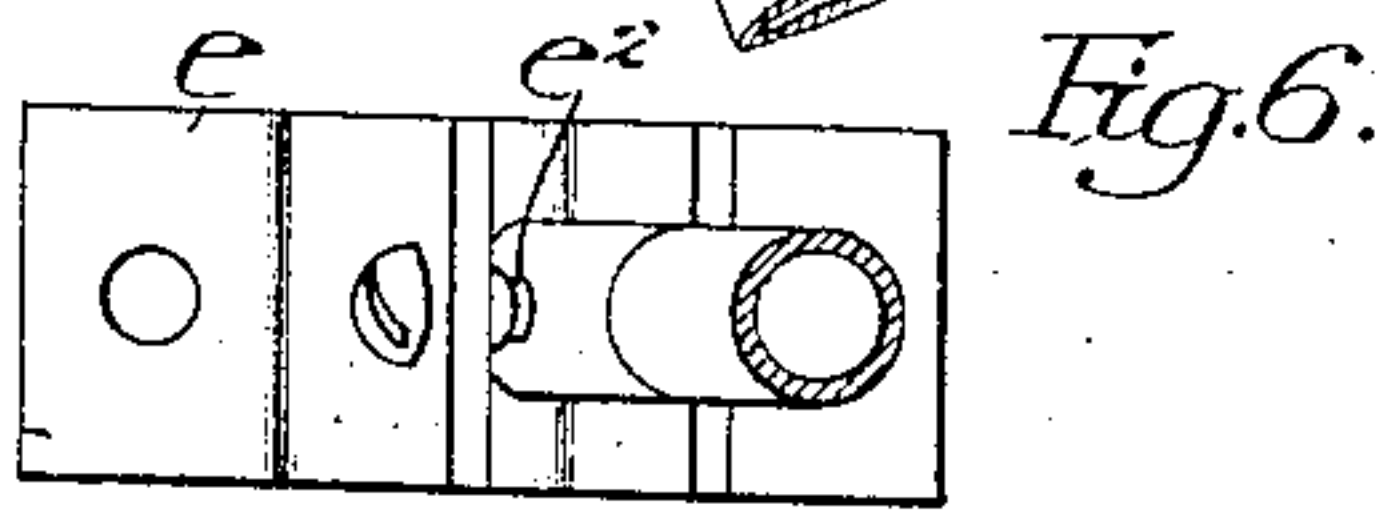


Fig. 6.

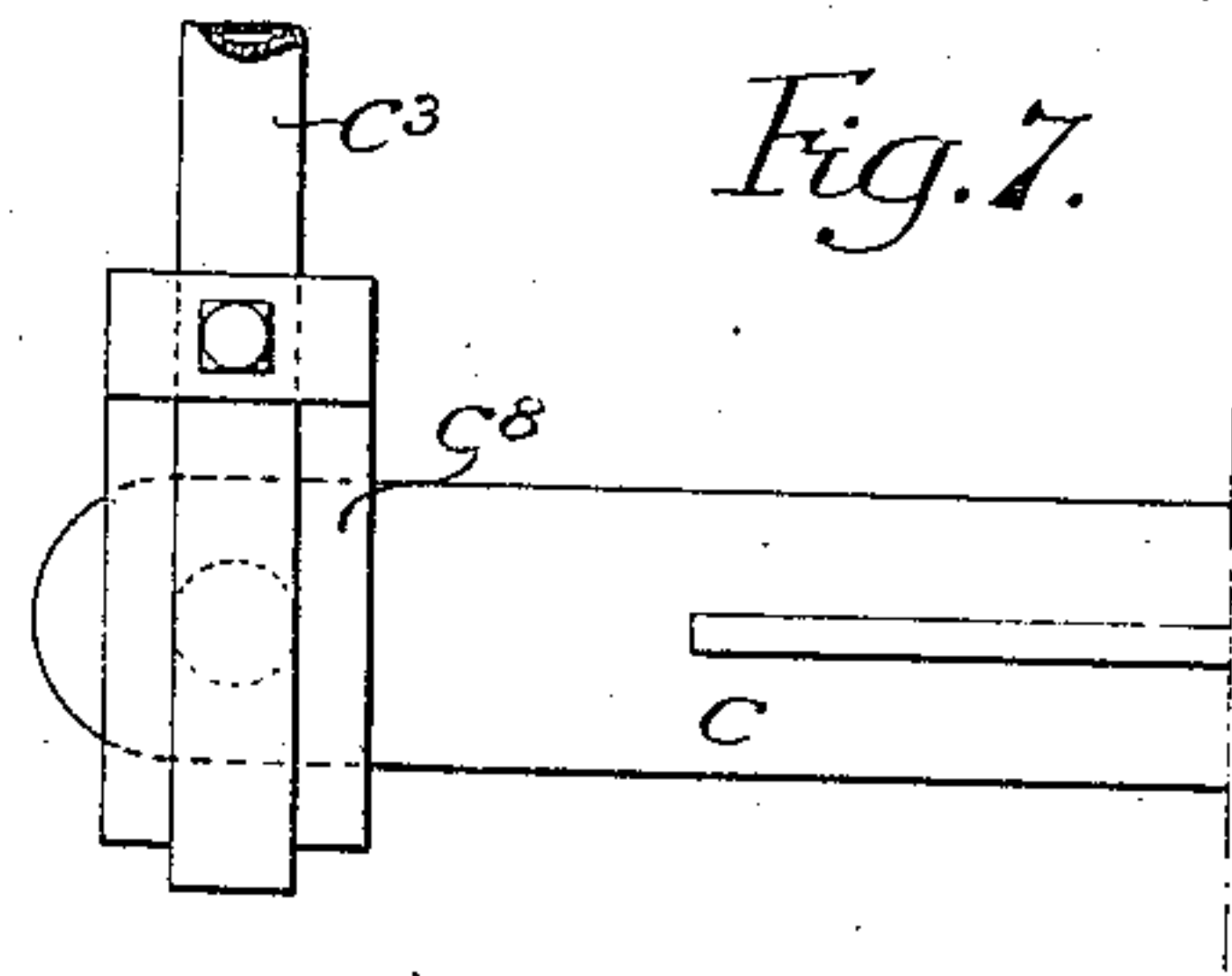


Fig. 7.

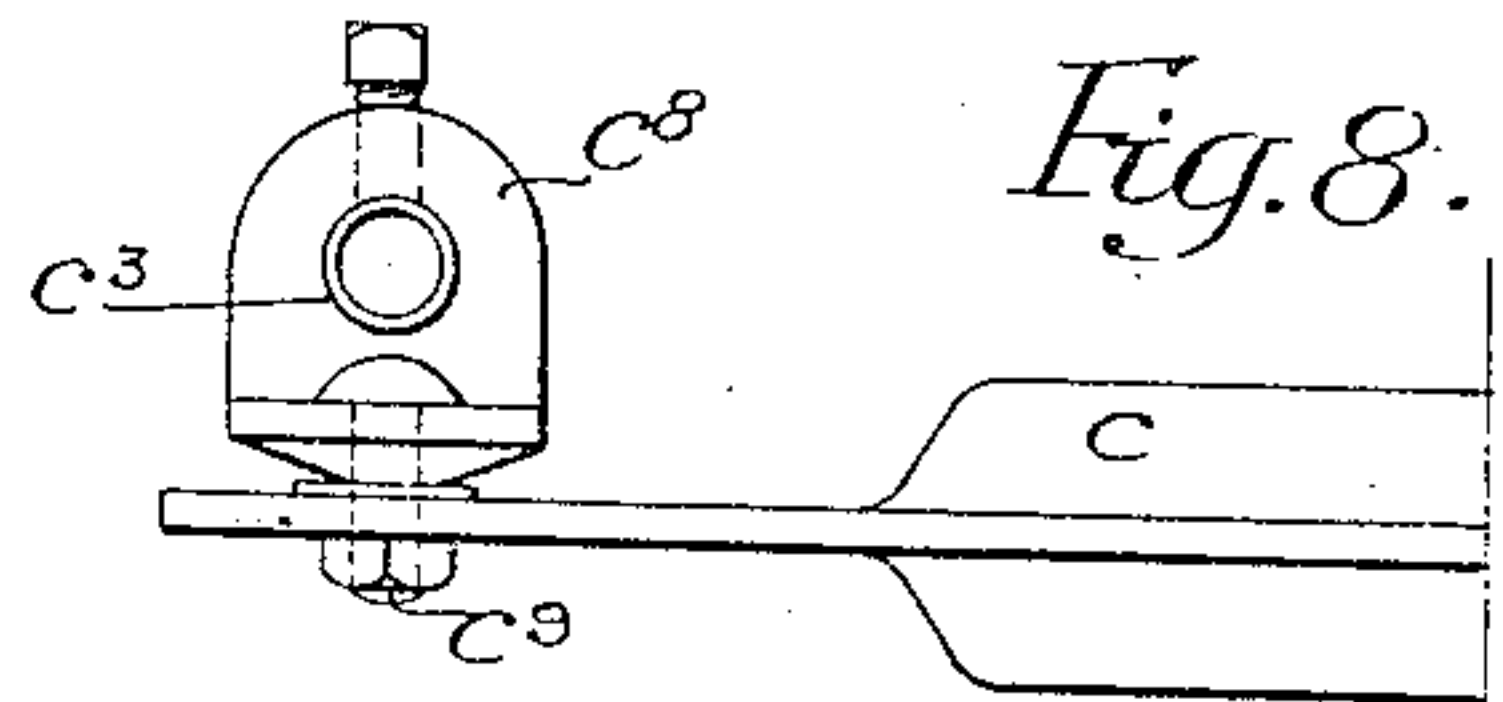


Fig. 8.

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3 SHEETS—SHEET 3.

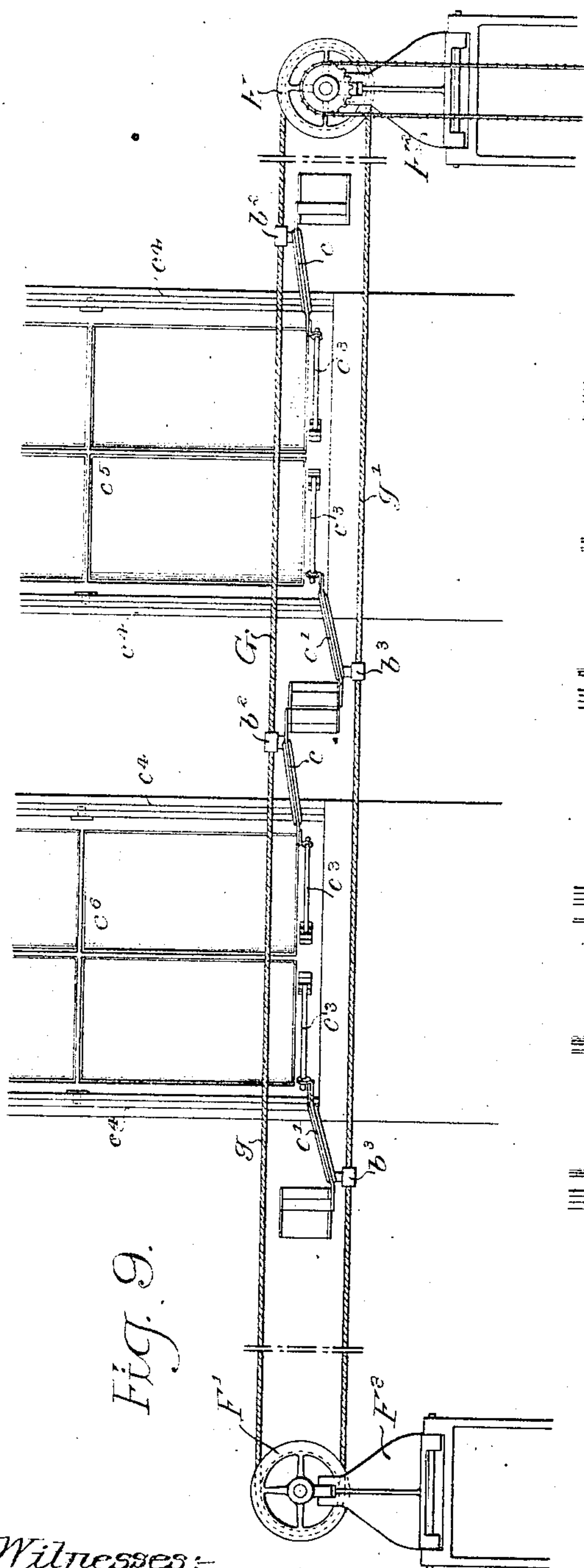


Fig. 9.

Witnesses:
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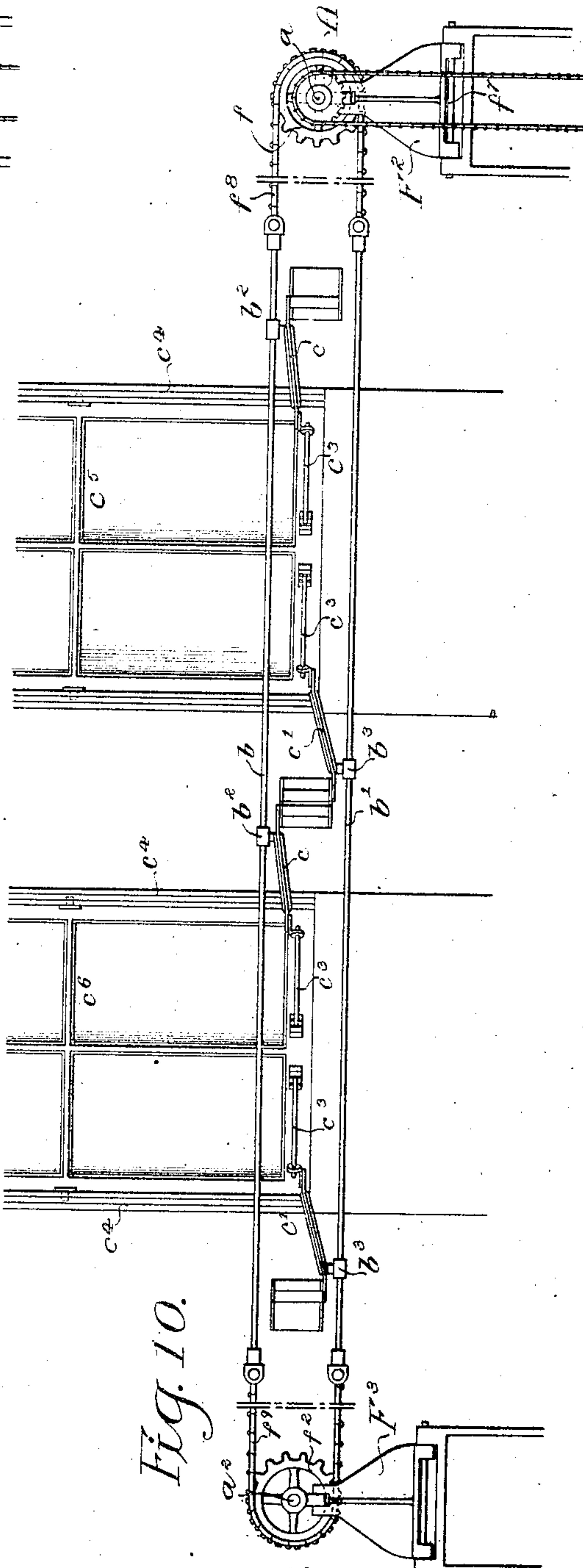


Fig. 10.

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UNITED STATES PATENT OFFICE.

CLARKE P. POND, OF PHILADELPHIA, PENNSYLVANIA.

WINDOW-OPERATING MECHANISM.

No. 886,851.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed May 9, 1907. Serial No. 372,733.

To all whom it may concern:

Be it known that I, CLARKE P. POND, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Window-Operating Mechanism, of which the following is a specification.

My invention relates to that particular class of mechanism particularly designed for simultaneously opening or shutting a number of windows, shutters, or the like; one object of the invention being to provide operating means of such a nature as to permit of a series of structures of the general character noted being moved to open or close them with the expenditure of less force than has heretofore been required to perform a similar work.

Another object of the invention is to provide mechanism, which, in addition to possessing the above noted characteristics, shall be of such a nature that not only will all of the structures operated upon be moved to an equal extent but the various parts shall utilize to the best advantage the force exerted upon them.

I also desire to provide window operating mechanism of the general type above noted, which shall be simple in construction, sure in action, and which shall not require operating rods subjected to torsion.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which:—

Figure 1, is a plan illustrating in horizontal section a part of a building and showing my invention arranged to operate a series of windows, of which two are illustrated; Fig. 2, is a side elevation of the mechanism illustrated in Fig. 1; Fig. 3, is a vertical section taken on the line 3—3, Fig. 1; Fig. 4, is a vertical section on the line 4—4, Fig. 1; Fig. 5, is a plan illustrating the detail construction of the joint between one of the links and a window sash; Fig. 6, is a side elevation of the structure shown in Fig. 5; Fig. 7, is a plan of the joint between one of the links and a pivoted lever employed as part of my invention; Fig. 8, is a plan of the structure shown in Fig. 7, and Figs. 9 and 10, are side elevations illustrating modifications of my invention.

In the above drawings, C represents a portion of the wall of a building in which are placed window frames c^1 , which, in the pres-

ent instance, are provided with a number of sashes mounted to swing on substantially horizontal axes. Two of these sashes are indicated at c^5 and c^6 and these are typical of a series of sashes of any desired number.

Mounted upon the wall of the building in any suitable manner is a frame D including a plate d in which is a bearing for a shaft a projecting perpendicularly from the vertical face of the wall. The inner end of this shaft is mounted in a step bearing d' carried on a pivot pin d^2 , which is suitably attached to the frame D so as to lie adjacent to and substantially parallel with the face of the wall. The shaft a has fixed to it a wheel A having a grooved periphery for the reception of an operating rope or chain and also has mounted upon it a pinion a' . Two toothed segments B and B' are mounted so as to turn upon the pin d^2 as an axis and are so formed as to lie parallel to each other with the pinion a' between them and meshing with their respective teeth.

Inasmuch as the pin d^2 is preferably mounted so as to extend in a vertical line, the two toothed segments B and B' operate in substantially horizontal planes; there being pivotally attached to the first of the segments one end of a rod b of any desired length, extending parallel to the face of the wall and adjacent to the line of windows to be operated. Similarly, the toothed segment B' has pivotally attached to it one end of a rod b' extending immediately under and substantially parallel with the rod b . The connection between each rod and its particular segment is so constructed that relative movement between them is permitted on an axis substantially parallel to the pin d^2 . The rod b has clamped or otherwise fixed to it a series of collars b^2 , which in turn are pivotally connected to levers c . Each of these is fulcrumed at one end to a suitable supporting structure c^7 fastened to the wall of the building and has its other end bent so that it extends substantially at right angles to its length, as clearly illustrated in Fig. 1. A link c^3 connects the turned over or bent end of each lever with the adjacent window sash c^5 ; the construction between said lever and link being of such a nature, as illustrated in Figs. 8 and 7, as to permit of what is in effect a limited universal movement between said two parts. That is to say, a casting c^8 is clamped to the link c^3 , but is so connected to the lever c as to permit said parts to move

relatively to each other on a bolt c^9 as an axis, while at the same time the connection between the lever and the casting c^8 is such as to permit of a limited movement of the link c^3 in any of a number of planes including the line of the bolt c^9 . In addition to the levers c there is a second set of levers c' , each connected by a clamp or collar b^3 to the rod b' and having its end bent toward the end of that one of the levers c which is mounted to operate on the same window. That is to say, each of the windows to be operated has a pair of levers c and c' respectively mounted on the frame at the sides or edges of the window and having their free ends bent towards each other. The levers c' are likewise connected to the window sashes c^5 c^6 each by a link c^3 attached to it by the means illustrated in Figs. 8 and 7.

The connection between each link c^3 and the window sash is preferably made through the medium of the structure illustrated in Figs. 6 and 5, wherein e represents a casting or other suitable metallic piece fixed to the window and provided with two projecting lugs e' between which extends a pin e^2 . Both lugs have formed on their adjacent faces substantially conical projections through the centers of which the pin e^2 extends in such manner as to provide a pivotal support for the connection of the link c^3 . This link is loosely fitted on the pin e^2 in order to permit of a sidewise movement in addition to its pivotal movement upon the pin e^2 and the conical projections limit the link to a definite position on said pin so as to prevent its sliding to one side or the other and consequent bending, when the device is operated.

With the above described arrangement of parts, it will be understood that revolution of the chain wheel A in the direction of the arrow, Fig. 2, will move the rods b and b' in opposite directions, while at the same time their points of connection with the toothed segments B and B' will move around the pin d^2 as an axis so as to approach the wall of the building. Inasmuch, however, as the various other points of support of the rods b and b' , as provided by the levers c and c' , are pivotally mounted, both rods are moved bodily parallel to themselves toward the wall of the building; it being noted that the distance from the points of support of the various levers to collars b^2 and b^3 is the same as the distance between the pin d^2 and the points of attachment of the rods b and b' to the respective toothed segments B and B'. This combined longitudinal and transverse movement of the rod b causes all the levers c to be swung on their pivots in the direction of the arrow x so that there is a direct push transmitted from the ends of said levers through the links c^3 to the sash c^5 tending to open the same and it will be noted that the connection is such that this push takes place in the most

direct manner, until finally, when the various parts occupy the positions illustrated in dotted lines, the links c^3 lie in planes substantially at right angles to the line of the walls or to the line of the series of windows. Likewise, the longitudinal and parallel movement of the rod b' turns the levers c' on their pivots in a direction opposite to that taken by the lever c , with the result that they also transmit a direct push to their respective windows through their links c^3 and act with them to open said windows. By reason of this peculiar arrangement of parts, I am enabled to connect one set of the links c^3 through the levers c to points of the windows adjacent to one edge thereof and the other set of links through the levers c' to points adjacent to their opposite edges, so that under operating conditions each window is operated on equally by a force transmitted from the two rods b and b' . These rods are usually tubular under practical working conditions, as are the links c^3 .

As illustrated in Fig. 9, it is obvious that a suitable endless cable G may be substituted for the rods b and b' , in which case said cable would be provided with supporting pulleys F and F' at its ends, so mounted on frames F² and F³ as to be free to swing toward and from the wall of the building as the windows are opened and closed; its upper run g being connected to all of the levers c , while its lower run g' is similarly connected to the levers c' . In Figs. 9 and 10, I have shown these frames F² free to swing to a limited extent toward and from the wall on a rod f^7 as a pivot. Fixed to the shaft a as shown in Fig. 10, is a sprocket wheel f around which passes a sprocket chain f^8 having its ends respectively attached to the end of the rods b and b' , while the opposite ends of said rods are similarly connected by a cable or chain f^9 passing over a wheel f^2 mounted on a shaft a^2 carried by the frame F³, which, like the frame F² is free to swing towards and from the wall of the building. As before, revolution of the chain wheel causes movement of the rods b and b' in opposite directions: the frame F² swinging toward or from the wall as required by the position of the said rods.

By the provision of the various joints illustrated in Figs. 5 to 8 inclusive, the various parts of my device are free to move so as to accommodate themselves to the varying positions of the windows caused by the points of attachment of the links c^3 moving in the arcs of circles and by the slight up and down movement of the links c^3 where these are connected with the levers c and c' .

While I have illustrated my invention as applied particularly to a series of windows, it is to be understood that it is equally applicable for the operation of shutters, or, in fact, any other movable structures of a like nature. It is, moreover, obvious that I may

employ the above described mechanism for simultaneously moving a number of structures, even though these be of a nature altogether different from windows and shutters.

5. I claim:

1. The combination of a supporting structure with a structure or series of structures to be moved, of two substantially parallel members extending adjacent to said structures, means for connecting each of the members to each of said structures to be moved, the same including a lever fulcrumed to the supporting structure and pivoted to each member, with a link extending between the lever and the movable structure, and means for moving said members in opposite directions, substantially as described.

2. The combination with a supporting structure of a plurality of structures to be operated, a pair of operating members lying substantially parallel to each other and extending adjacent to said structure to be moved, movable supports for said members for permitting them to move parallel to themselves, means for connecting said members to the structure to be moved, the same including levers fulcrumed to the supporting structure and pivoted to the members, with links movably connected between the levers and said movable structures, and means for longitudinally moving the operating members, substantially as described.

3. The combination with a supporting framework of a series of windows to be operated, two members for moving said windows, two links connected to each window, two levers fulcrumed to the supporting framework and respectively connected to the links and to the two members, with mechanism for simultaneously moving said members longitudinally in opposite directions and also parallel to themselves in order to open or close the windows, substantially as described.

4. The combination with a supporting framework of a series of windows to be operated, levers fulcrumed on the framework adjacent to the windows, links connecting the levers with the windows, and two operating members connected to the levers, with means for simultaneously moving said operating members in opposite directions and parallel to themselves, substantially as described.

5. The combination of a framework having a window, a pair of substantially parallel operating members therefor, two levers fulcrumed to the framework and respectively connected to said members, and a link connecting each lever with the window, with means for moving the operating members in opposite directions, said members being free to move parallel to themselves when moved longitudinally, substantially as described.

6. The combination of a window, a pair of levers respectively mounted at opposite edges of the same, the ends of said levers be-

ing bent toward each other, a link extending between the end of the bent portion of each lever and the window, two operating members respectively connected to the levers, with means for longitudinally moving said operating members and simultaneously causing them to move parallel to themselves, substantially as described.

7. The combination of a window, a pair of levers respectively having one end pivotally mounted at opposite edges of the window, operating members connected to the levers at points intermediate their ends, links respectively connecting the free ends of the levers with the window, and means for moving said members parallel to themselves to open or close the window, substantially as described.

8. The combination of a window, two links connected thereto so as to have a limited universal movement, two levers pivoted to opposite edges of the window and having their ends connected to the respective links to also permit of a limited universal movement between them, with two operating members respectively connected to the two levers, and means for moving said operating members in opposite directions, substantially as described.

9. The combination of a supporting framework, a window or series of windows, a pair of operating members therefor, means including a lever or levers fulcrumed on the framework for connecting said window or series of windows with said operating members, and a device capable of moving the operating members in opposite directions, and bodily toward and from the window or windows, said device consisting of a pair of segments respectively connected to the said members, and means for actuating the segments, substantially as described.

10. The combination of a window, a lever mounted adjacent thereto and a link having means for connecting it with the lever and with the window, said parts including a structure having a spindle, a member having a hole through which said spindle loosely passes, with projections placed to limit the sidewise movement of said member while permitting it to move in planes other than one perpendicular to the spindle, substantially as described.

11. The combination of a window, levers mounted at opposite edges thereof, operating members connected respectively to said levers, means for connecting the levers to the windows, means for actuating said operating members consisting of a pair of segments respectively connected to said members, and means for moving the segments at will, substantially as described.

12. The combination of a window, levers pivoted at opposite edges thereof, means for connecting the levers to the windows, a pair

of operating members respectively connected to the levers, two toothed segments respectively connected to the operating members, and means including a pinion meshing with the teeth of said segments for simultaneously actuating them, substantially as described.

13. The combination of a window, two levers supported adjacent thereto having their ends bent towards each other, a link extending between each lever and the window, two operating members connected respectively to the levers, a pair of toothed segments pivotally connected to the said operating members, an operating shaft having a pinion meshing with the teeth of said segments, and means for turning said shaft, substantially as described.

14. The combination of a supporting structure, two toothed segments having a common supporting spindle, a shaft having a pinion meshing with the teeth of said segments, an operating wheel on said shaft, two rods respectively pivoted to said toothed segments, levers pivotally connected to the respective rods so as to support them in lines substantially parallel with each other, a window to be operated, and a link connecting each lever with said window, substantially as described.

15. The combination of a supporting framework, a window or a series of windows, a pair of operating members therefor, means including links and levers fulcrumed on the framework for connecting said window or series of windows with said operating members, and a device capable of moving the operating members in opposite directions and also bodily toward and from the window or windows, substantially as described.

16. The combination of a supporting framework, a window or series of windows, an operating member therefor, means including a link and a lever fulcrumed to said framework for connecting each window or series of windows with said operating member, and a device capable of causing the operating member to move in opposite directions to open and close the same, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CLARKE P. POND

Witnesses:

ROBERT A. KAISER,
JOS. H. KLEIN.