(No Model.) 5 Sheets—Sheet 1.

J. C. WALLICH.

BRIDGE GATE.

No. 451,963. Patented May 12, 1891.

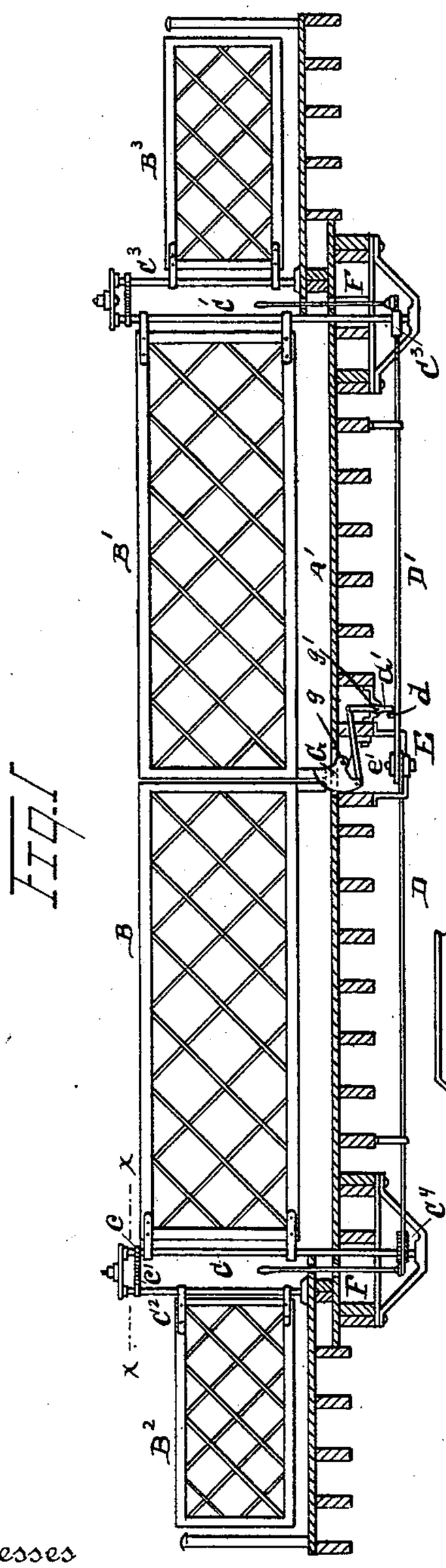

FIG. 1.

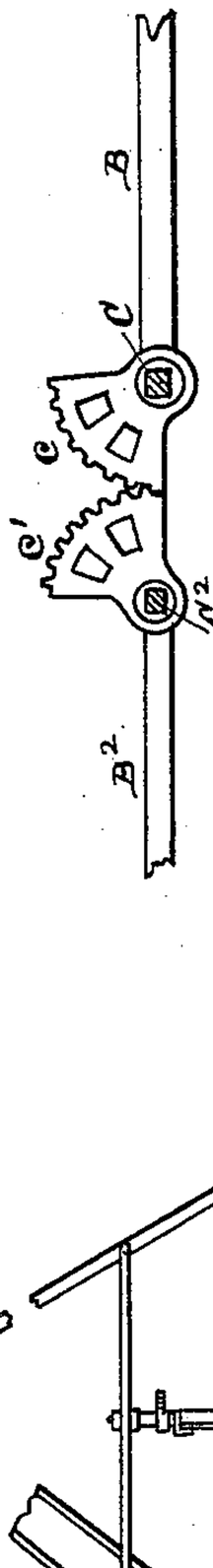

FIG. 4.

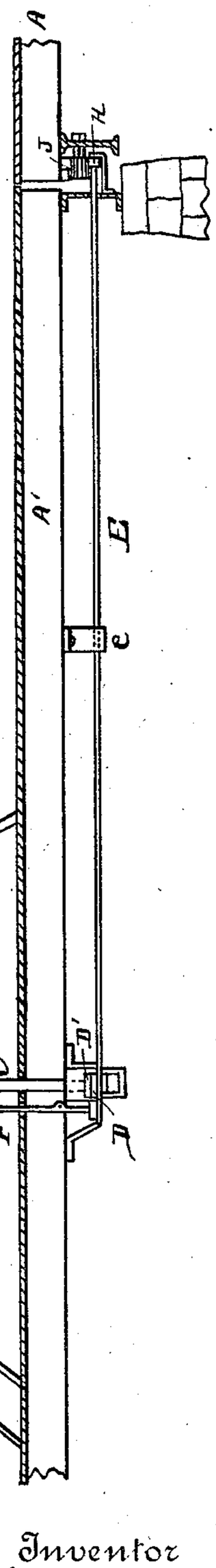

FIG. 3.

Witnesses
John Schuman.
John F. Miller

Inventor
Joseph C. Wallich
By his Attorney
Newell S. Wright.

(No Model.) 5 Sheets—Sheet 2.

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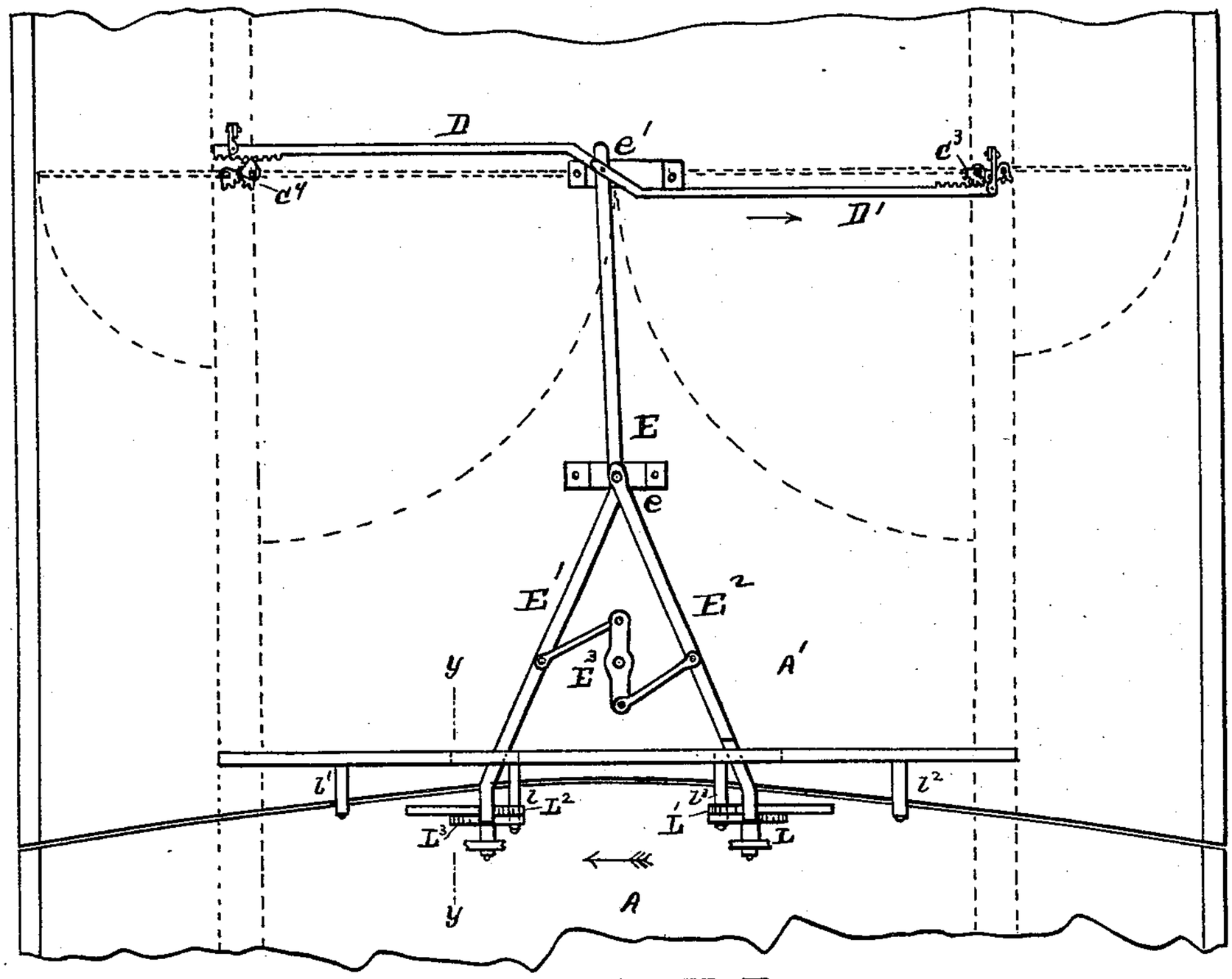


Fig. 2

Fig. 5

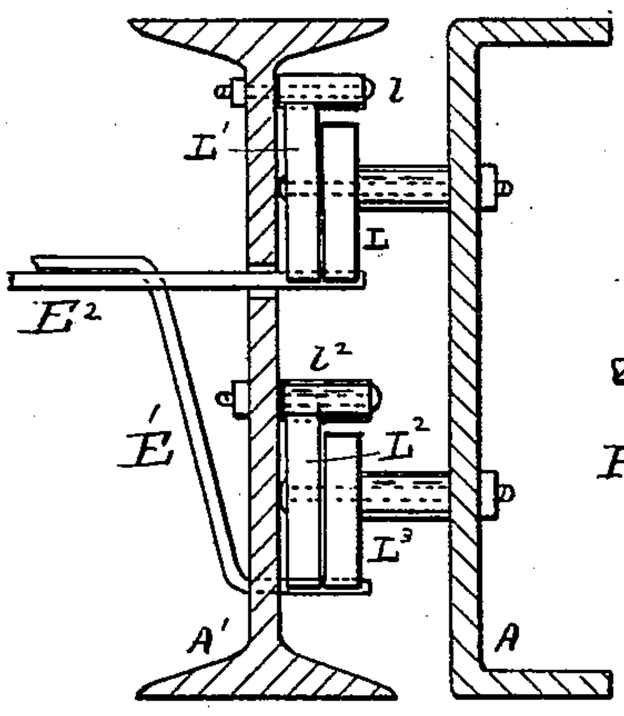


Fig. 6

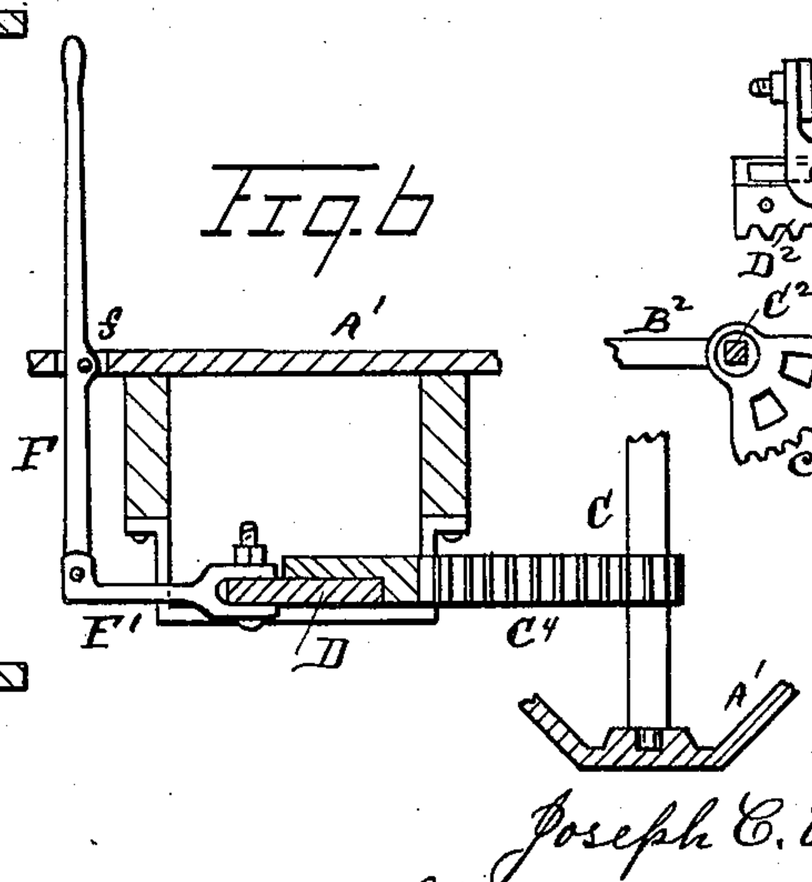
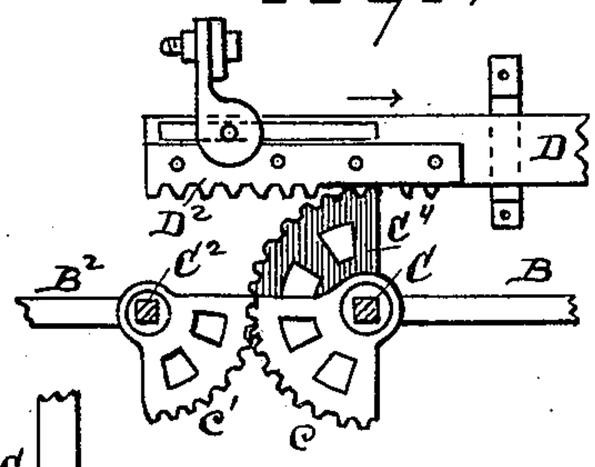


Fig. 7



Witnesses
John Schuman
John F. Miller

Inventor
Joseph C. Wallich
By his Attorney
Newell S. Wright.

(No Model.) 5 Sheets—Sheet 3.

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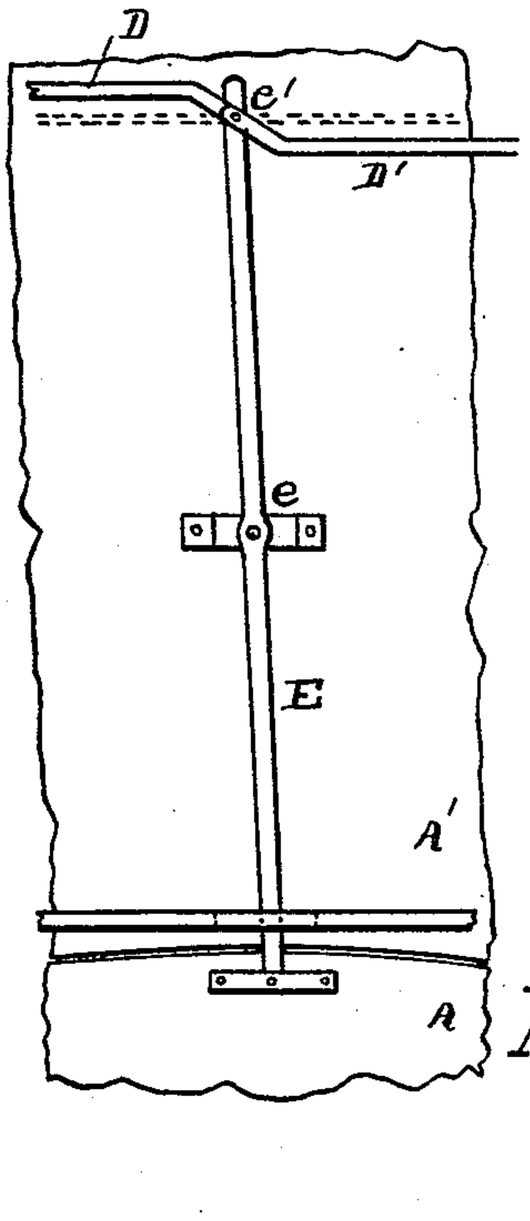


Fig. 8

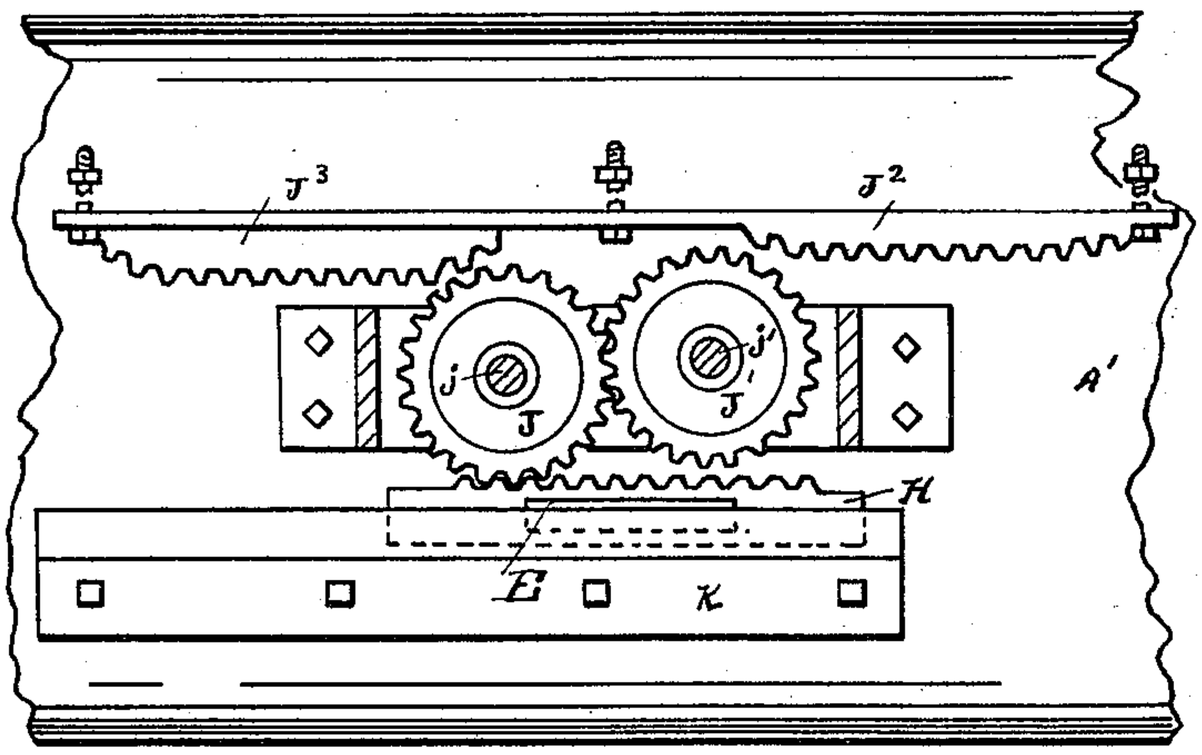


Fig. 9

Fig. 10

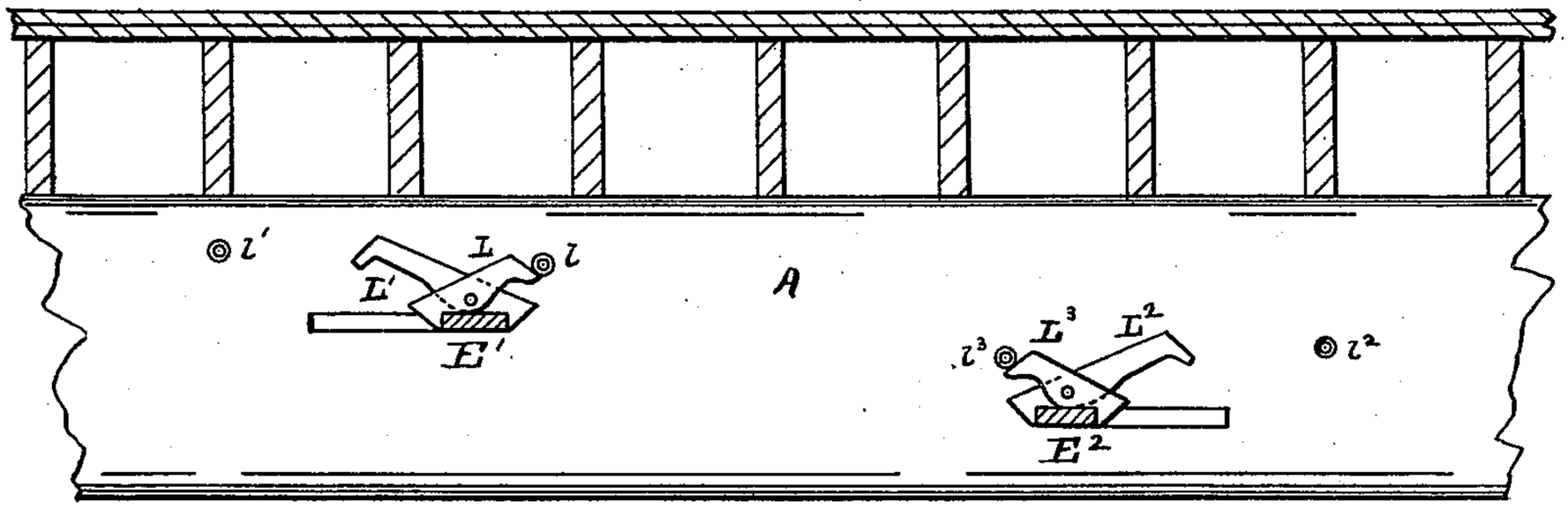


Fig. 11

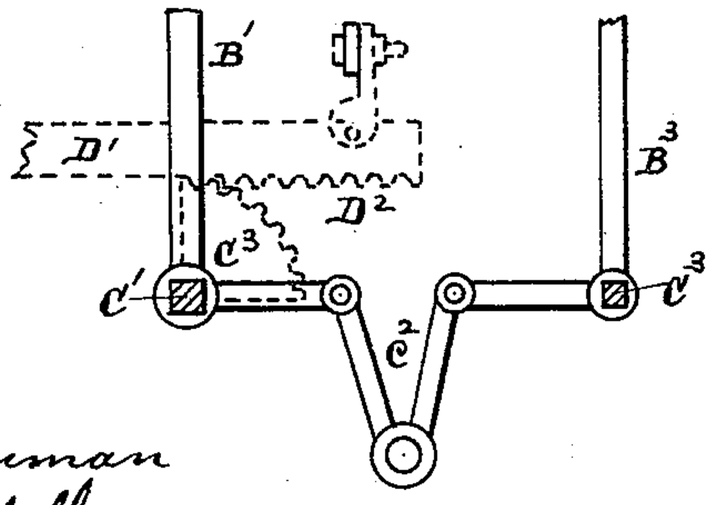
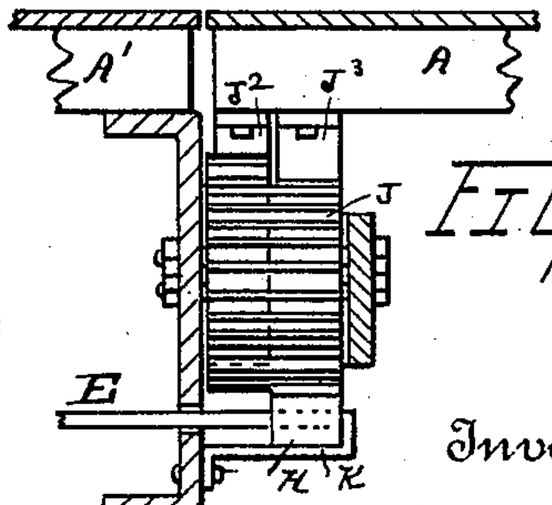


Fig. 12



Witnesses
John Schuman
John. F. Miller.

Inventor
Joseph C. Wallich
By his Attorney
Newell S. Wright.

(No Model.) 5 Sheets—Sheet 4.

J. C. WALLICH.

BRIDGE GATE.

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Fig. 14

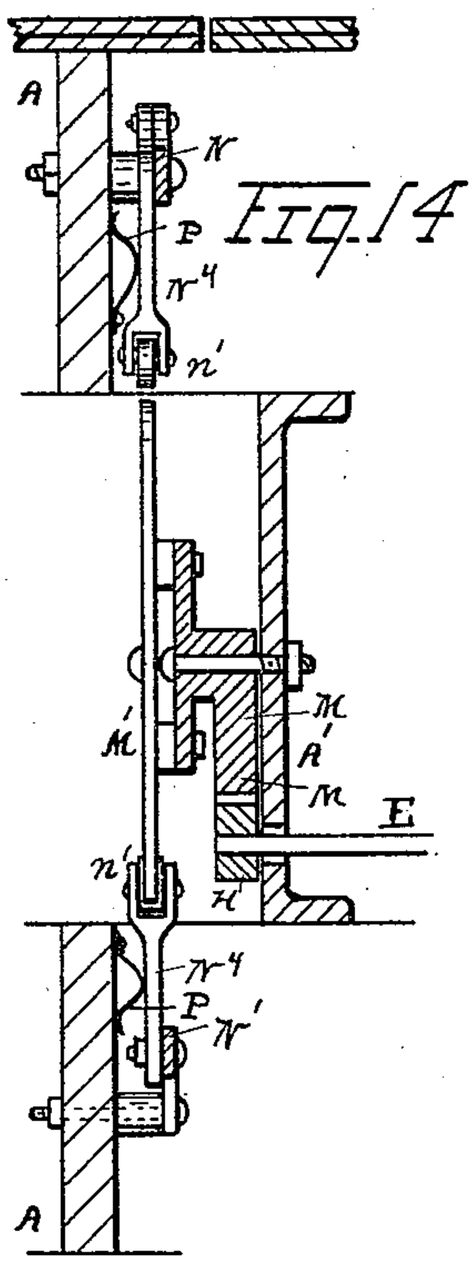
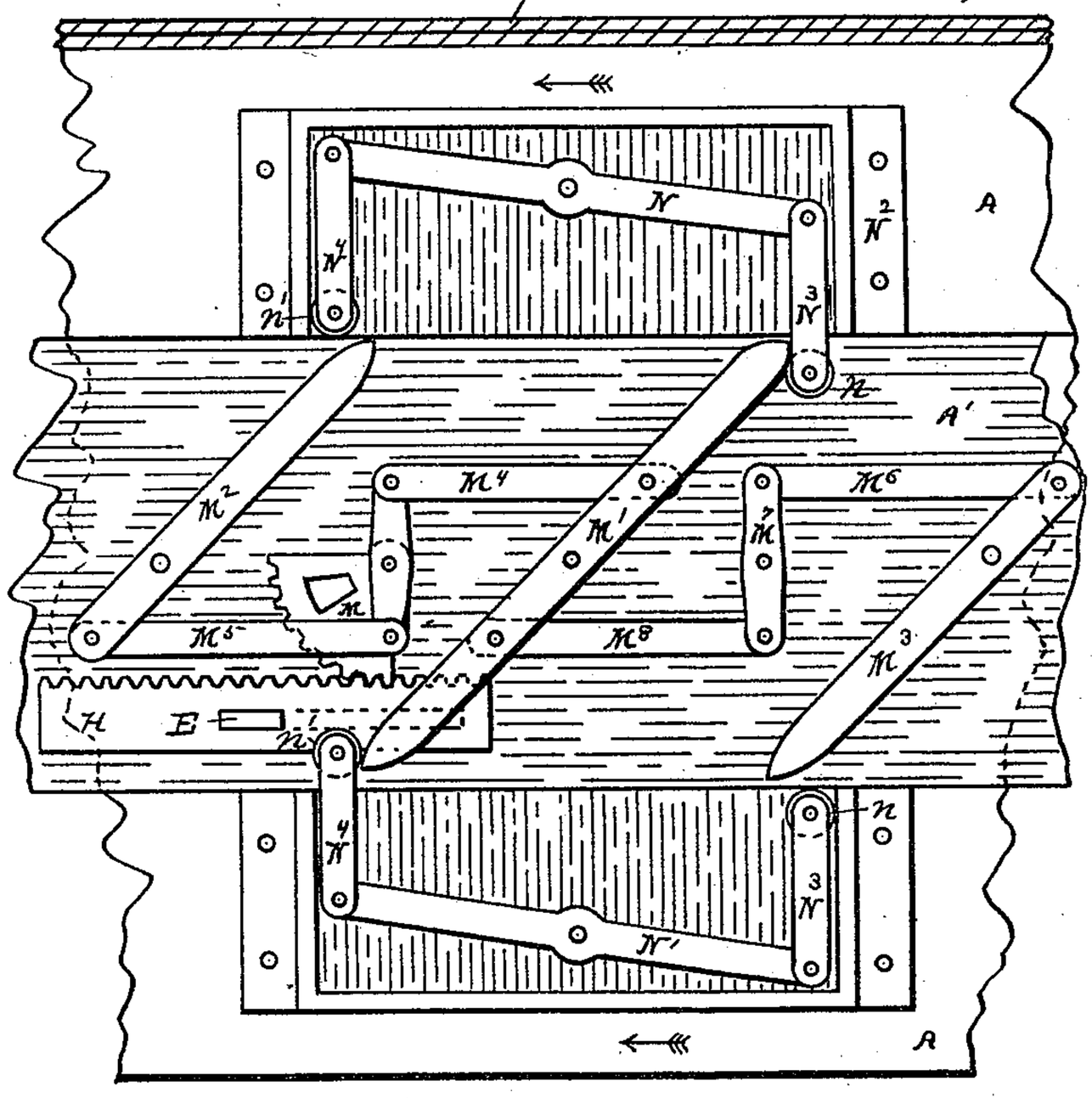


Fig. 13



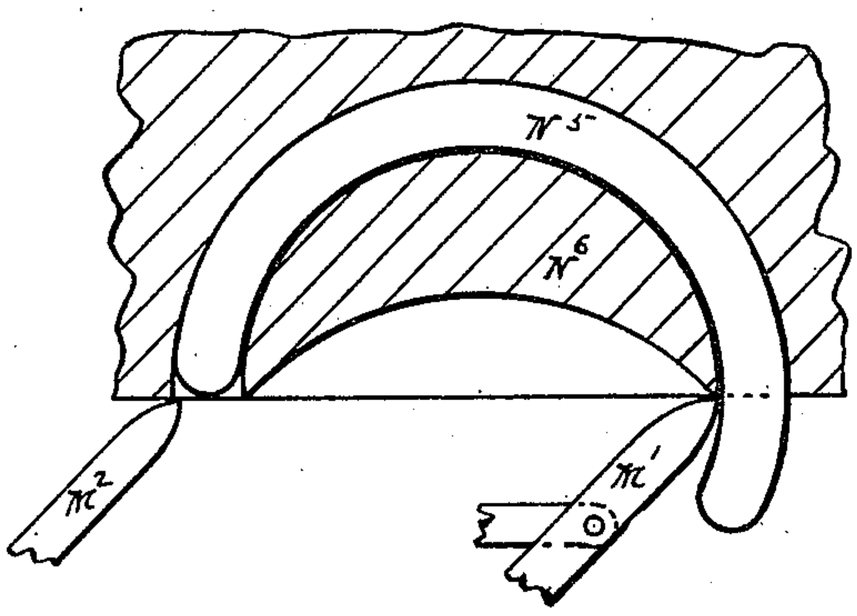


Fig. 15

Witnesses
John Schuman.
John F. Miller.

Inventor
Joseph C. Wallich
By his Attorney
Newell S. Wright.

(No Model.) 5 Sheets—Sheet 5.

J. C. WALLICH.

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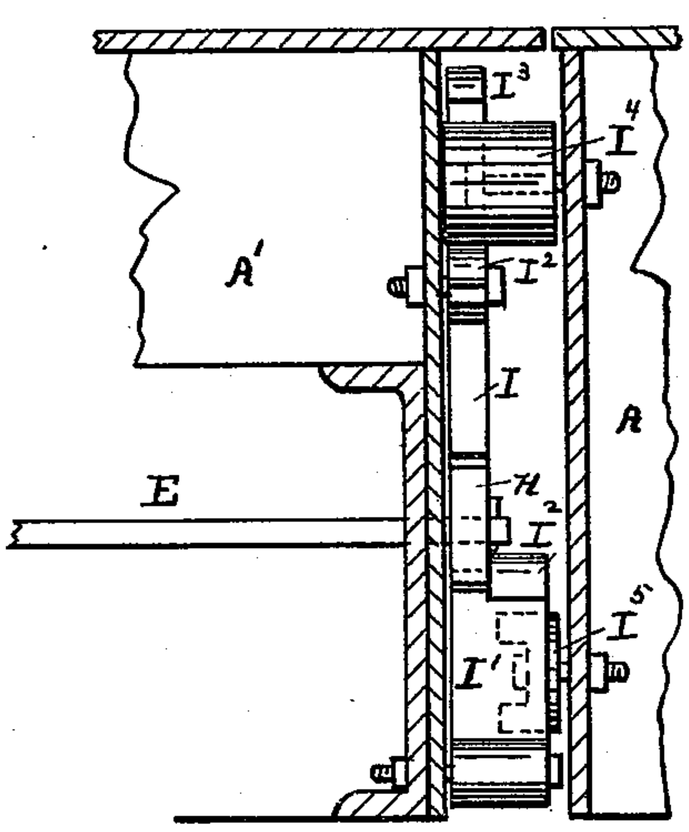

Fig. 16

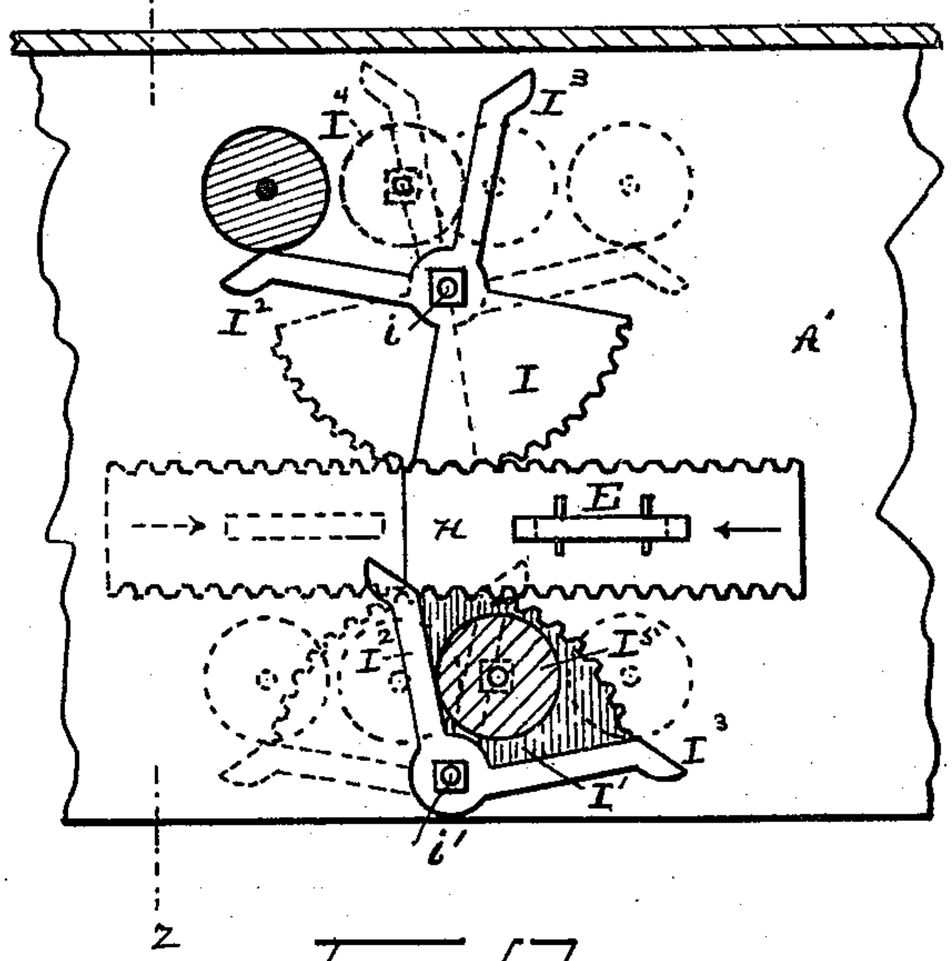

Fig. 17

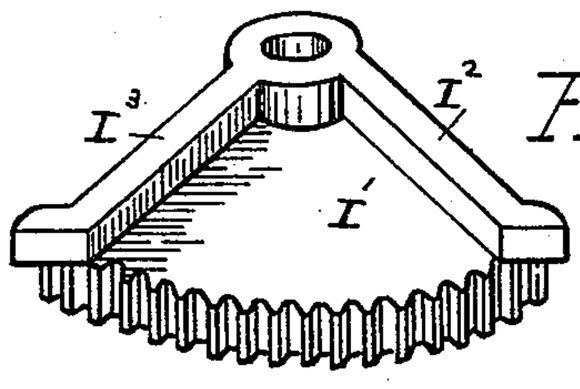

Fig. 18

Witnesses
John Schuman.
John F. Miller

Inventor
Joseph C. Wallich
By his Attorney
Newell S. Wright.

UNITED STATES PATENT OFFICE.

JOSEPH C. WALLICH, OF DETROIT, MICHIGAN.

BRIDGE-GATE.

SPECIFICATION forming part of Letters Patent No. 451,963, dated May 12, 1891.

Application filed November 3, 1890. Serial No. 370,173. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. WALLICH, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvements in Bridge-Gates; and I 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 appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in bridge-gates, and has for its object to provide a safety-gate for each approach to a draw-bridge of superior simplicity, economy, and efficiency.

I carry out my invention as more fully hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section of the approach, showing the gates in elevation and closed. Fig. 2 is an inverted plan of portions of a bridge, illustrating my invention. Fig. 3 is a side elevation of portions of the bridge and of the approach, showing parts in section. Fig. 4 is a horizontal section of portions of the mechanism on the line *x x*, Fig. 1. Fig. 5 is a vertical section on the line *y y*, Fig. 2. Fig. 6 is a detail view, partly in vertical section and partly in elevation, showing the mechanism for throwing the gate out of gear. Fig. 7 is an enlarged view, partly in plan and partly in horizontal section, showing a rack-bar engaged with toothed segments to operate the gates. Fig. 8 is an inverted plan of portions of the draw and the approach, showing a modified form of the operating-lever. Fig. 9 is a view of a modification showing rack-bars and gearing for shifting the operating-lever. Fig. 10 is an end elevation on a vertical line through the pins on which the pawls are mounted, Fig. 5, and looking toward the bridge. Fig. 11 illustrates a modification of the mechanism for swinging the gates by the reciprocatory bar. Fig. 12 is a vertical section showing the rack-bars and gearing illustrated in Fig. 9 in side elevation. Fig. 13 is an end elevation, and Fig. 14 a vertical section, of the same, showing a modification of the mechanism for operating the lever E. Fig. 15 shows another form of one of the beams N N′. Fig. 16 is a vertical section on the line *z z;* Fig. 17, an end elevation of the same, illustrating still another modification of the mechanism for shifting the operating-lever, and Fig. 18 is a separate view of one of the geared segments I I′.

The necessity of having bridge-gates for draw-bridges to guard the approaches to the draw when the same is open, is well known. The advantages of having said gates operated automatically when desired are also apparent. My invention is adapted to accomplish these ends, while at the same time the gates guarding admission to the draw may be operated either automatically or independently by an attendant, as circumstances may require.

As shown in the drawings, A represents the draw, and A′ the approach thereto.

B B′ denote the driveway-gates, and B^2 B^3 the sidewalk-gates, which I locate upon the approach, preferably at a little distance back from the edge of the approach, allowing the gate room to swing between said edge and their closed position. This location also keeps persons and teams from being so near as to look down directly into the water and being possibly frightened thereby. It also obviates other dangers which may possibly arise. The driveway-gates have a fixed engagement, respectively, upon upright rotatable shafts C and C′. The sidewalk-gates are similarly engaged, respectively, upon upright rotatable shafts C^2 and C^3, connected in any suitable manner with the shafts C and C′, so as to be simultaneously rotated therewith to open and close the connected driveway and sidewalk gates. As shown in Figs. 3, 4, and 7, said shafts are geared together, each being provided toward the upper ends with toothed segments *c c′*, meshing together. In Fig. 11 said shafts are shown united by a hinge c^2. I would have it understood that I do not limit myself to any specific manner of connecting said shafts to secure their simultaneous operation, as it may be done in any suitable manner within the scope of my invention.

To suitably rotate the upright shafts C and C′, I employ a reciprocatory bar or bars D D′, operated by a lever E, fulcrumed upon the approach, as shown at *e*. I prefer to employ

separate bars D D′, jointedly engaged upon the end of the lever E, as shown at *e′*, so that either or both of the bars can be thrown out of gear with the upright shaft, whereby the gates are swung. However, instead of two bars D D′ one might be employed without departing from my invention and pivotally engaged intermediate its ends upon the said lever.

As shown in various views in the drawings, the bars D D′ are provided with rack-teeth, as shown at D^2, toward their respective outer extremities, said rack-teeth meshing with segmental gears C^3 C^4 upon the shafts C and C′, respectively. By this construction, it will be observed, the reciprocation of the bars D and D′ rotates the said shafts, and thereby operates the gates. While I show said bars geared to said shafts, I do not limit myself thereto, as they may be engaged in any suitable manner, whereby said shafts may be operated by the reciprocation of said bars.

During the busy portion of the day and evening, when many people and teams are likely to be passing over the bridge, I prefer to throw the driveway and sidewalk gates guarding the admission to the draw and the driveway and walk gates guarding its exit to the draw out of gear with said bar, so that they can be independently operated by an attendant. It is obvious that when there is a crowd upon either or both approaches it is practically impossible for the engineer upon the draw to allow the automatic closing of the gates, when the draw is to be moved, without the liability of swinging the gates suddenly by an unseen power into the faces of persons and teams, thereby incurring great liability of causing fright and injury, possibly resulting in great damage. To overcome any such liability I provide means whereby said bars D D′ may be thrown out of engagement with the adjacent shaft. To this end, as shown in Fig. 6, a lever F is fulcrumed in any desired manner to the approach, as at *f*, and engaged to the bar, as by an arm F′, jointedly connected with the said lever. In this manner the attendant can readily throw out of gear the gates guarding the entrance to the draw, so that he may swing shut said gates independently of the gates guarding the exits from the draw, which latter gates may still be operated automatically when the draw moves.

Whenever it is desired to operate all of the gates automatically—as, for instance, in the night, when there is but little travel and the extra attendants may be dispensed with—the bars D D′ are thrown into engagement with said shafts. It is obviously important, also, to lock the gates when closed, so that they cannot be opened by pressure from without, as by a crowd upon the approach. This my invention contemplates accomplishing in any proper manner. As shown in Fig. 1, a gravity-tumbler G is fulcrumed upon the approach, as shown at *g*, to which is engaged a bell-crank lever G′, fulcrumed upon the approach, as shown at *g′*. One of the adjacent bars D D′ is provided with a lug *d*, which will engage the depending end of said bell-crank lever in the reciprocation of the bar and throw up said tumbler into a locking position at the last inch of the movement of the bar, as shown in Fig. 1. By this construction it is evident the gates cannot be pressed open. When the bar moves in the opposite direction, the tumbler drops by its own weight out of the way. To give the bar D an extra movement of an inch or more after the gates have been shut to throw the lock, I prefer to cut away several teeth, as shown in Fig. 7. Various devices may be employed within the scope of my invention to operate said lever E, several modifications of which I have shown in the accompanying drawings. Thus, for example, in Figs. 16, 17, and 18 I have shown the lever E at its outer extremity, toward the draw, provided with a rack-bar H, toothed upon both its upper and upon its lower edges. Meshing therewith above and below are two geared segments I and I′, suitably journaled at the forward end of the approach, as shown at *i* and *i′*. These segments are each provided with radial arms I^2 I^3. Upon the end of the draw are located rollers I^4 and I^5, arranged to engage against said arms, respectively, as the draw is swung in one direction or the other, and thereby throw the segment to operate the rack-bar H, and in consequence the lever E.

By locating segmental gears with operating-rollers both above and below the bar H provision is made for the operation of said lever E, whether the draw swings in one direction or the other. On one segment the arms preferably extend beyond the fulcrum and opposite the segment. In the other they are on the same side of the fulcrum as the segment.

In Figs. 9 and 12 the approach is shown provided with gears J and J′, suitably journaled thereupon at its forward end, as illustrated at *j j′*, said gears meshing with each other and one of them with the rack-bar H upon the lever E, said rack-bar in this instance needing only to be toothed upon one edge, as shown. The rack-bar H in this case might have a sliding movement upon a bracket K. Upon the forward part of the draw are engaged rack-bars J^2 J^3, one arranged forward of the other, as shown in Fig. 12, each of said bars adapted to mesh with one of said gears in the movement of the draw in either direction. One of said gears is broadened, as shown in Fig. 12, to mesh both with the opposite gear and with one of the rack-bars. As my invention includes within its scope any mechanism to throw the lever E upon the movement of the draw, I show herewith, also, the following modifications as examples. Thus in Figs. 2, 5, and 10 at the ends of the draw I locate an arrangement of pawls, the same consisting of two sets of pawls L L′ and L^2 L^3, adapted to

engage and operate the lever E as the draw is moved in either direction. In the employment of the pawls the lever E is constructed with forks E′ and E³ at its forward end, the one arranged above the other, as illustrated in Fig. 5, for example, said forks being united by a toggle mechanism E³. (Shown in Fig. 2.) The two forks have a jointed engagement with the main portion of the lever E, as shown at *e*, this being also the fulcrum of the lever. Upon the end of the approach are located studs or rollers *l l′* and *l² l³*, arranged to trip the pawls and disengage them from the lever when it has been thrown a sufficient distance. The two sets of pawls and tripping-rollers so located are adapted also to throw the lever, by the movement of the draw, in either direction; or, again, as illustrated in Figs. 13, 14, and 15, the ends of the approach are provided with a system of levers and links arranged to throw a geared segment M, meshing with the rack H, on the lever E. These toggle-levers consist of an elongated intermediate lever M′ and outer levers M² M³, all fulcrumed at the end of the approach, as shown at *m*, *m′*, and *m²*. The levers M′ and M² are connected by pivoted links M⁴ M⁵ to the segment, while the levers M′ and M³ are connected together by links M⁶, M⁷, and M⁸. Above and below the said system of levers and links at the end of the draw are located beams N N′, respectively, jointedly engaged intermediate their ends upon a suitable supporting-base N², said beams each having at their extremities swinging arms N³ N⁴, preferably provided with rollers N N′. When the draw moves in the direction of the arrow in Fig. 13, the lower arm N³ on the beam N, engaged against the adjacent extremity of the lever M′, will carry said lever over, first into an upright position, when, the end of the lever being curved, the said arm will ride over the end of said lever as the draw moves, releasing the said arm from the lever M′ and throwing downward the opposite arm N⁴. By this movement the position of the system of levers and links is shifted or thrown over to the contrary side, ready to be operated upon the return of the bridge in the reverse direction.

Should it be desired to move the draw in the opposite direction from that above described, the position of the lower beam N′ with its arms is such as to engage the lever M′ from the other end and upon the other side to produce the desired throw.

Instead of a fulcrumed beam provided with arms N³ N⁴, simply a sliding beam N⁵ might be employed, (shown in Fig. 15,) the same being located in a channeled plate N⁶. It is obvious that when the draw moves this beam N⁵ will force over the adjacent lever until it comes to an upright position, in doing which the beam will be forced over the end of said lever on the opposite extremity of the sliding beam, being thrown down to engage the lever system on the return of the draw.

Any suitable friction or other means may be employed to hold the beams N N′ in a given position, to which they may be thrown by the movement of the draw—as, for example, a spring P. It will be seen that as thus constructed no cables, chains, springs, pulleys, or weights are essential to the operating mechanism in any part.

It is designed to have the mechanism on the approaches and upon the draw so related that the gates will close completely by about the first ten inches of the motion of the draw, and will not open until about the last ten inches of the draw's motion is reached and completed.

The gates preferably open toward the draw only.

I prefer to construct the rack-bars J² J³ with curved extremities, so that any unevenness of level on the part of the draw will still permit the operation of the rack-bars in connection with the gears J J′.

What I claim as my invention is—

1. In a bridge-gate, the combination, with the approach, of the gates, vertical rotatable shafts carrying the gates, a reciprocatory bar extending transversely of the approach engaged to operate said shafts, and an operating-lever connected with said reciprocatory bar, said lever extending longitudinally of the approach and fulcrumed thereupon, substantially as set forth.

2. In a bridge-gate, the combination, with the approach, of the gates, vertical rotatable shafts carrying said gates, a reciprocatory bar extending transversely of the approach engaged to operate said shafts, an operating-lever connected with said bar extending longitudinally of the approach and fulcrumed thereupon, and mechanism located upon the draw to operate said lever, substantially as set forth.

3. In a bridge-gate, the combination, with the approach, of the gates, vertical rotatable shafts carrying the gates, a reciprocatory bar extending transversely of the approach engaged to operate said shafts, an operating-lever connected with said bar extending longitudinally of the approach and fulcrumed thereupon, and a locking device, substantially as set forth.

4. In a bridge-gate, the combination of the approach, the gates, vertical rotatable shafts carrying the gates, a reciprocatory bar extending transversely of the approach engaged to operate said shafts, an operating-lever connected with said bar extending longitudinally of the approach and fulcrumed thereupon, and gear to operate said lever, substantially as set forth.

5. In a bridge-gate, the combination of the approach, the gates, vertical rotatable shafts carrying the gates, a reciprocatory bar extending transversely of the approach engaged to operate said shafts, a lever connected with said bar extending longitudinally of the approach and fulcrumed thereupon, gear to operate said lever, and devices located upon the

draw to operate said gear, substantially as set forth.

6. In a bridge-gate, the combination, with the gate provided with a toothed segment, of a reciprocatory bar provided with rack-teeth to engage said segment to operate the gate, a lever to operate said bar, and mechanism to throw the gate out of operation by said bar, substantially as set forth.

7. In a bridge-gate, the combination of an operating-lever provided with a rack-bar at its extremity toward the draw, and mechanism to engage said rack-bar to move said lever, substantially as set forth.

8. In a bridge-gate, the combination of an operating-lever, gear to operate said lever provided with radial arms, and devices to engage said arms, substantially as set forth.

9. In a bridge-gate, the combination, with the approach, of the gates, vertical rotatable shafts carrying the gates, a reciprocatory bar extending transversely of the approach engaged to operate said shafts, and mechanism to throw said bar out of operation with said shafts at the will of the attendant, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

JOSEPH C. WALLICH.

Witnesses:

N. S. WRIGHT,

JOHN F. MILLER.