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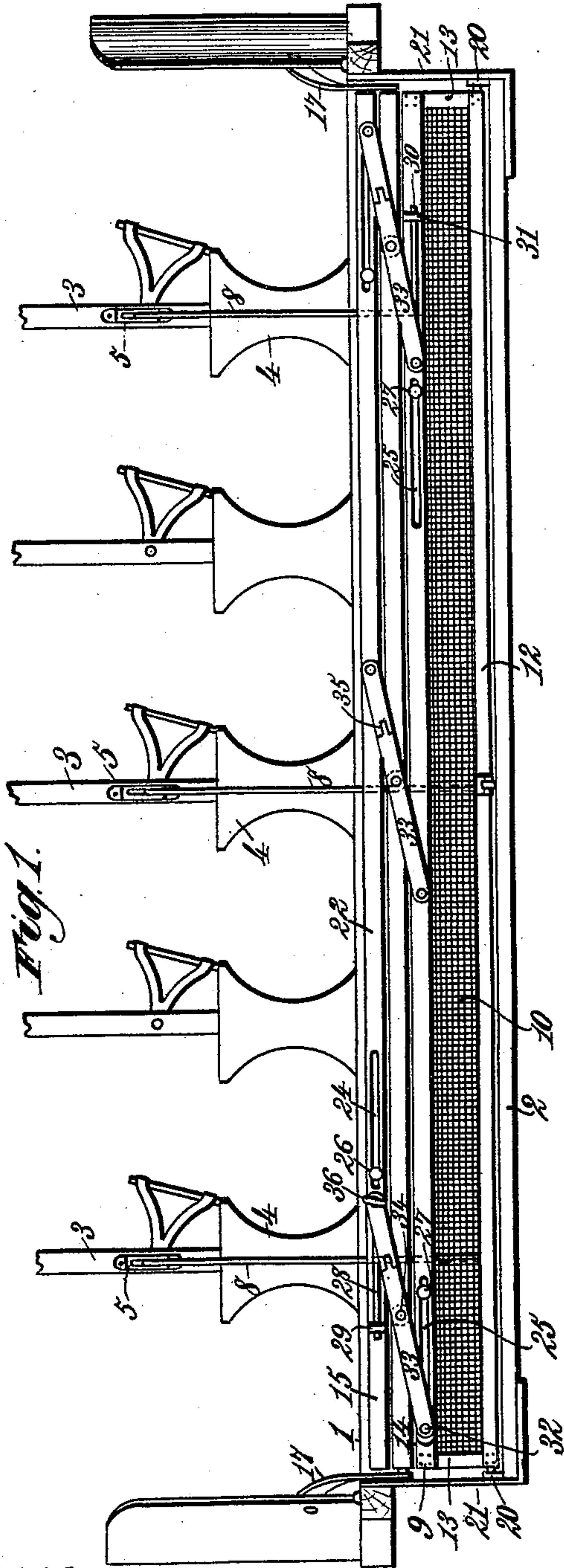
4 Sheets—Sheet 1.

W. M. FRANCIS & F. G. TAYLOR.

COLLAPSIBLE GATE FOR RAILWAY CARS.

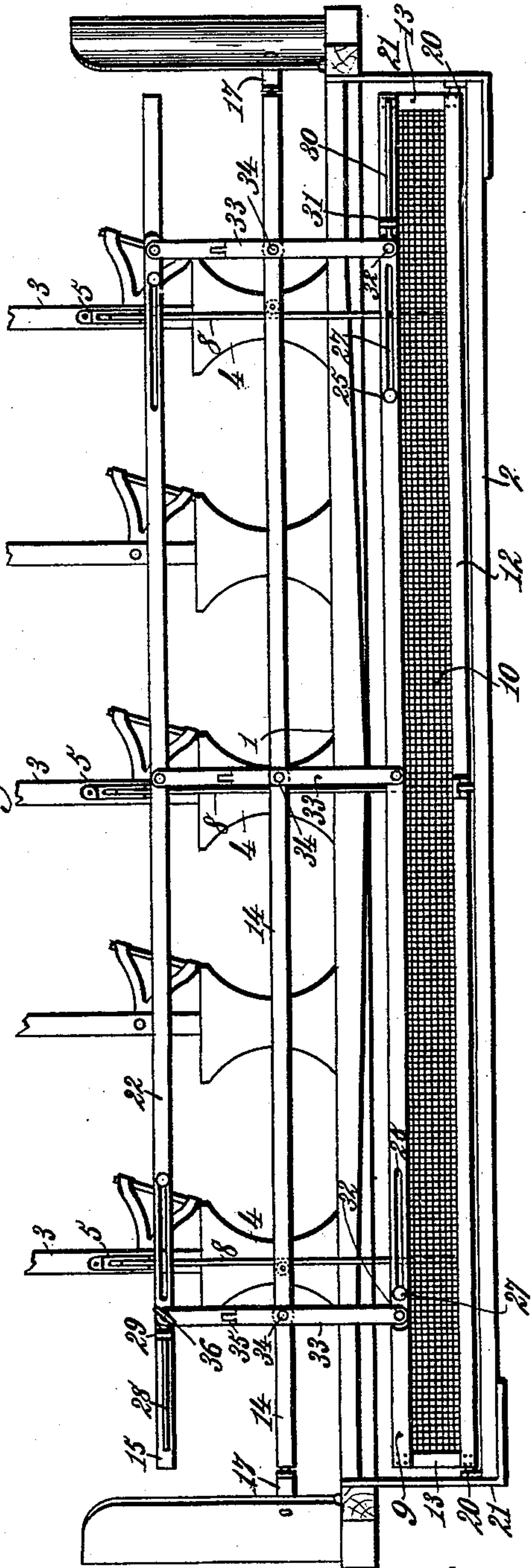
No. 538,161.

Patented Apr. 23, 1895.



Witnesses.
Robert G. Smith
G. W. Rea.

Fig. 2.



Inventors.
William M. Francis.
Frederic G. Taylor.
By *James L. Norris*, atty.

(No Model.)

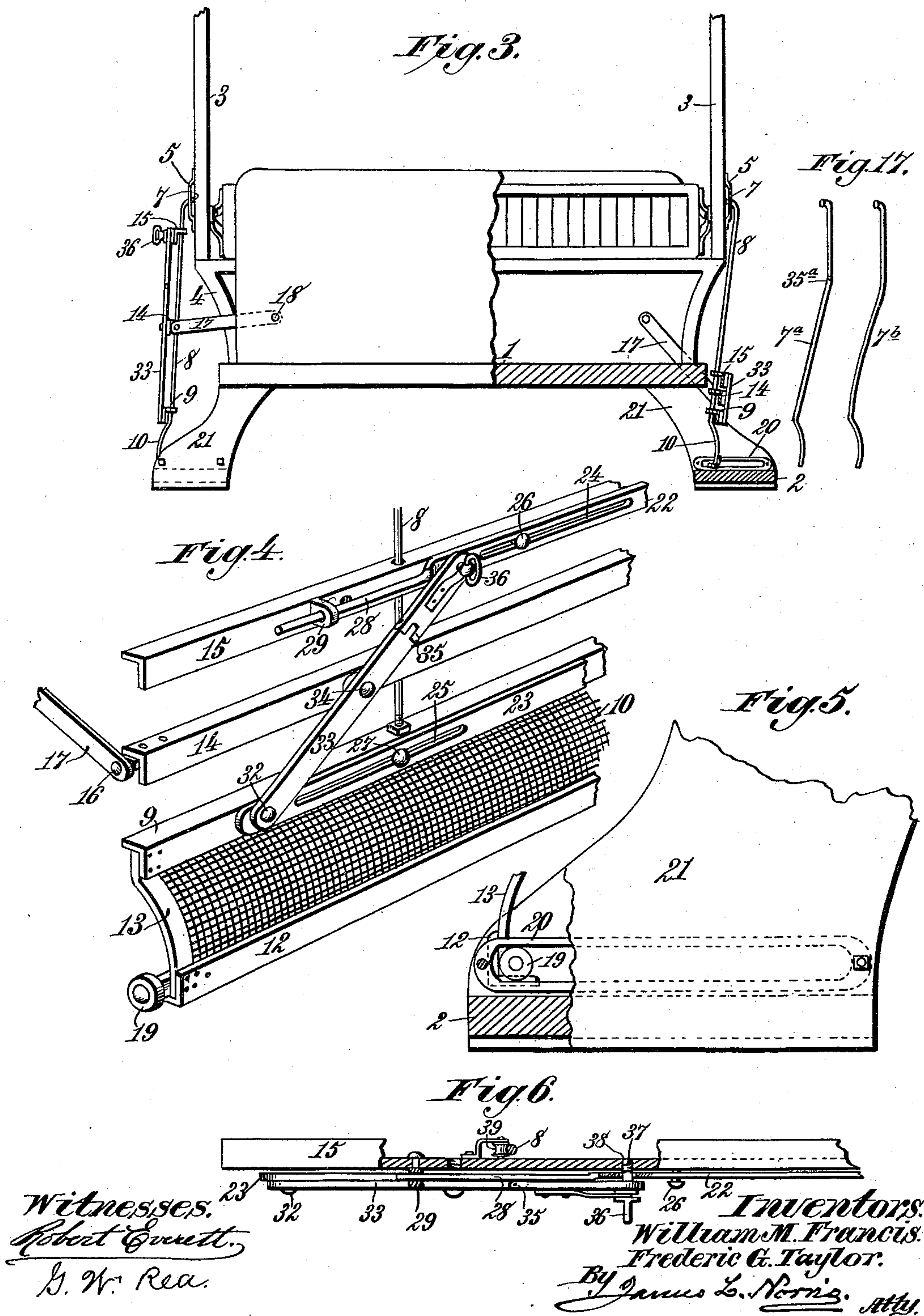
4 Sheets—Sheet 2.

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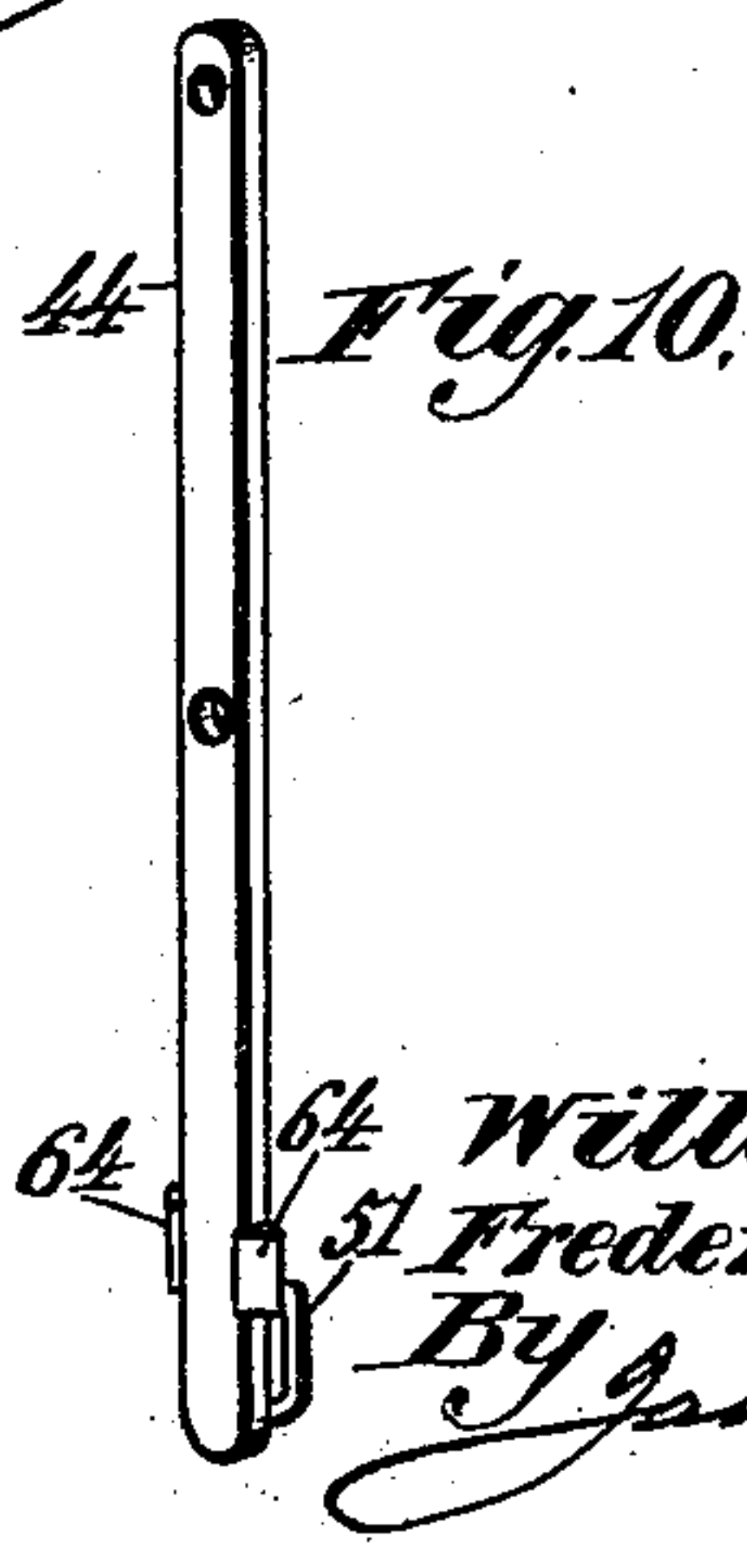
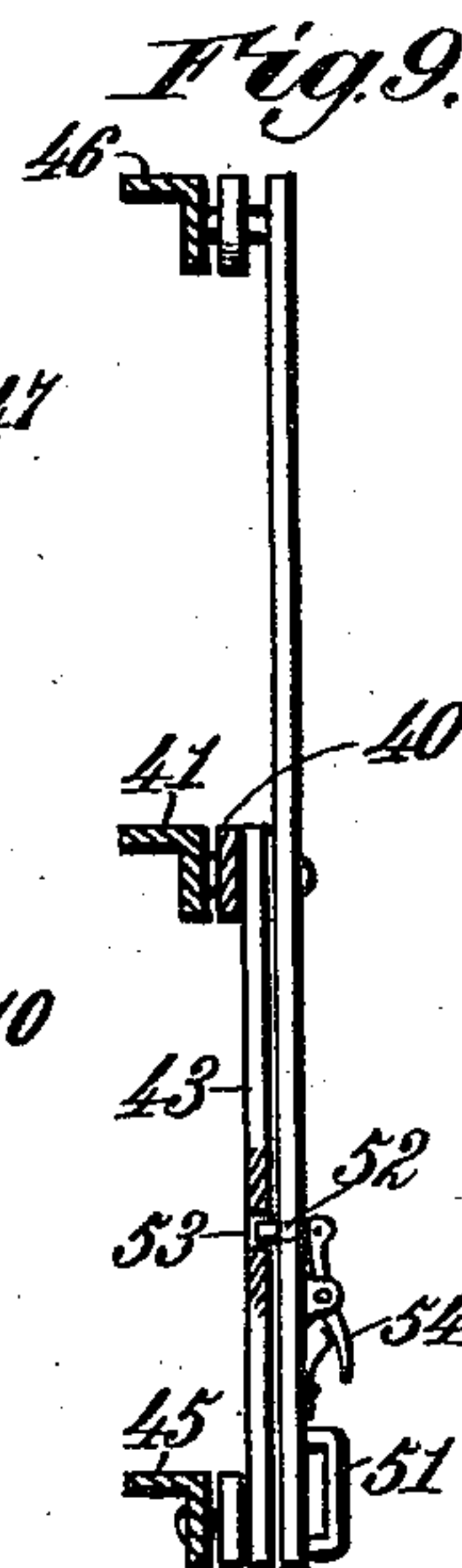
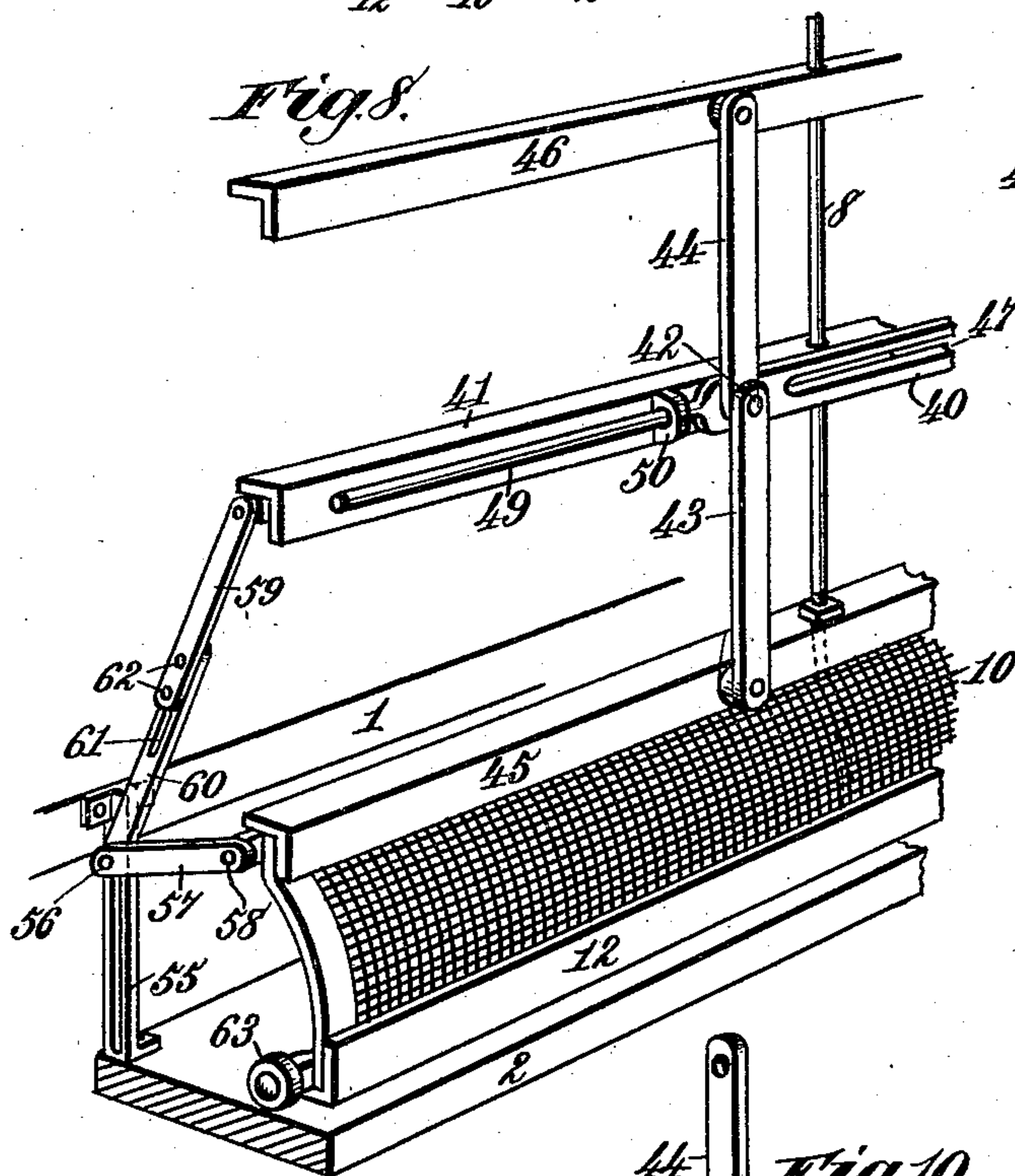
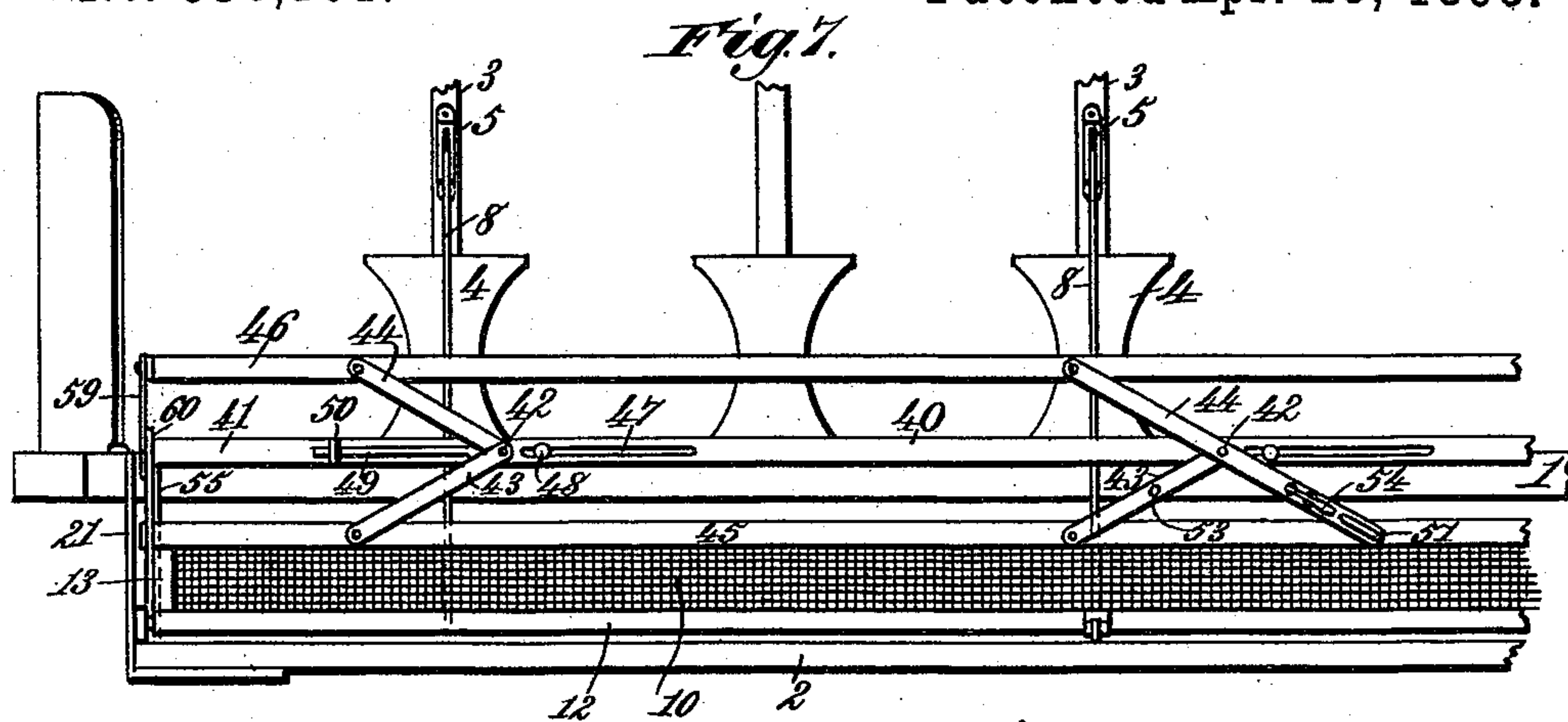
4 Sheets—Sheet 3.

W. M. FRANCIS & F. G. TAYLOR.

COLLAPSIBLE GATE FOR RAILWAY CARS.

No. 538,161.

Patented Apr. 23, 1895.



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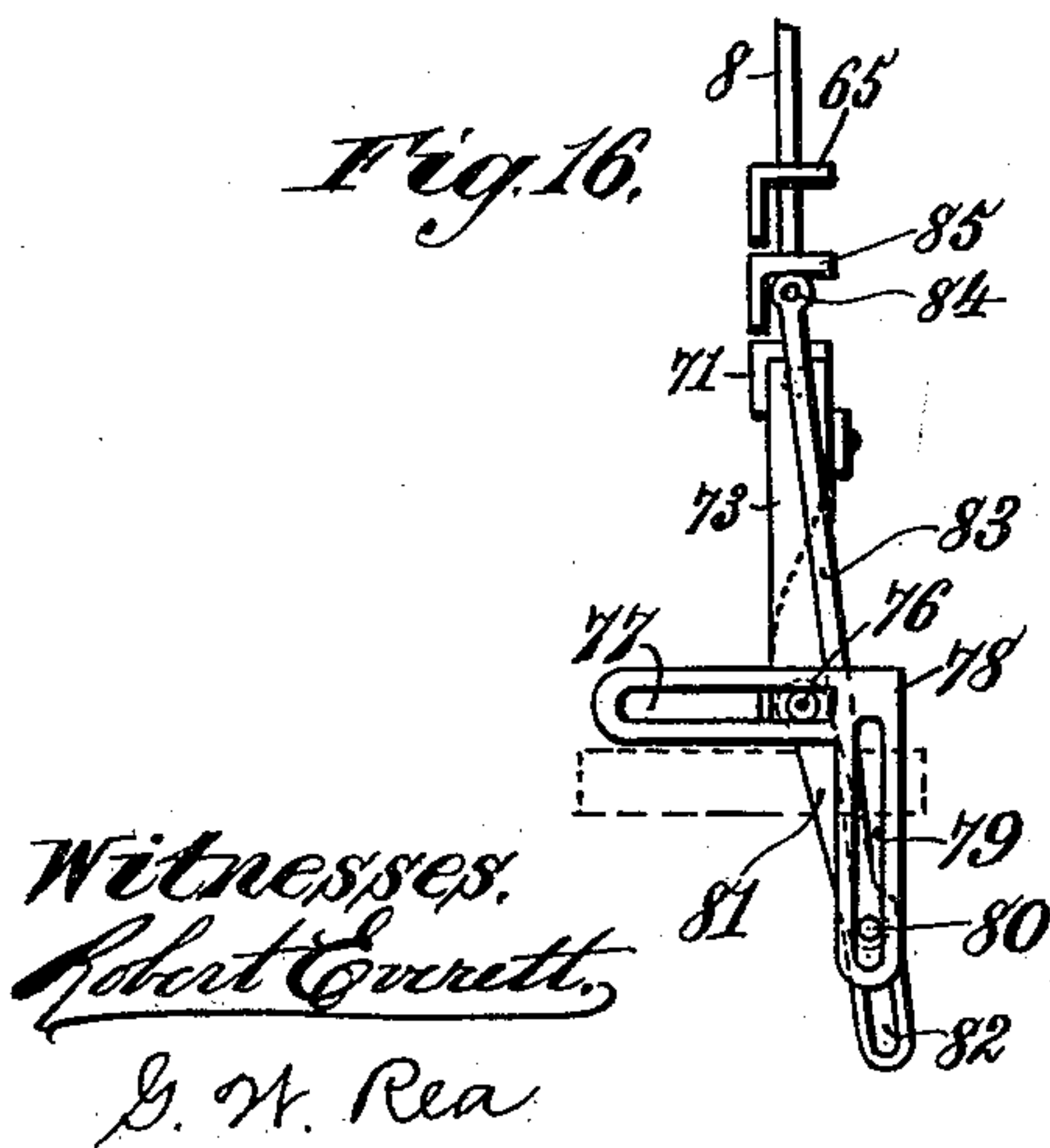
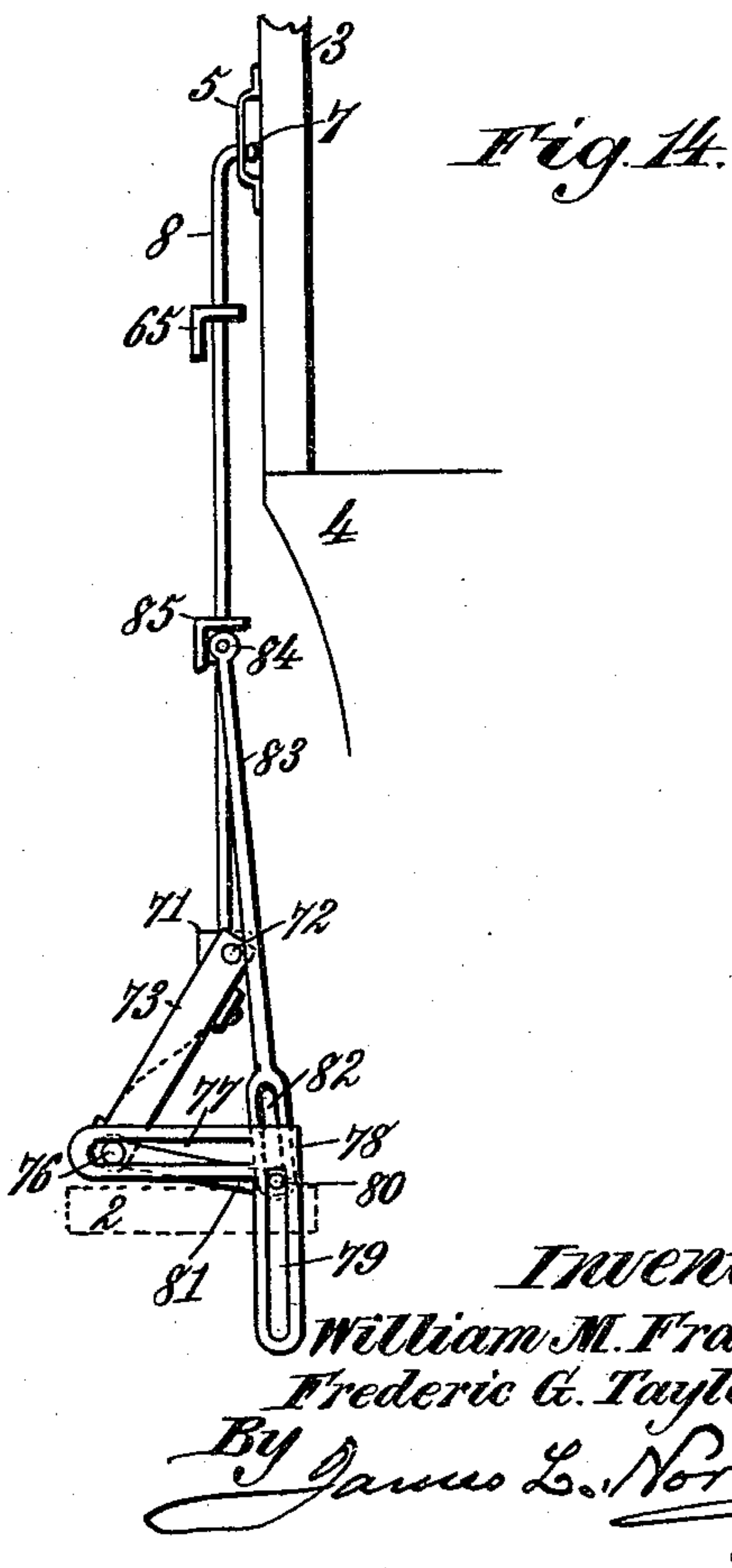
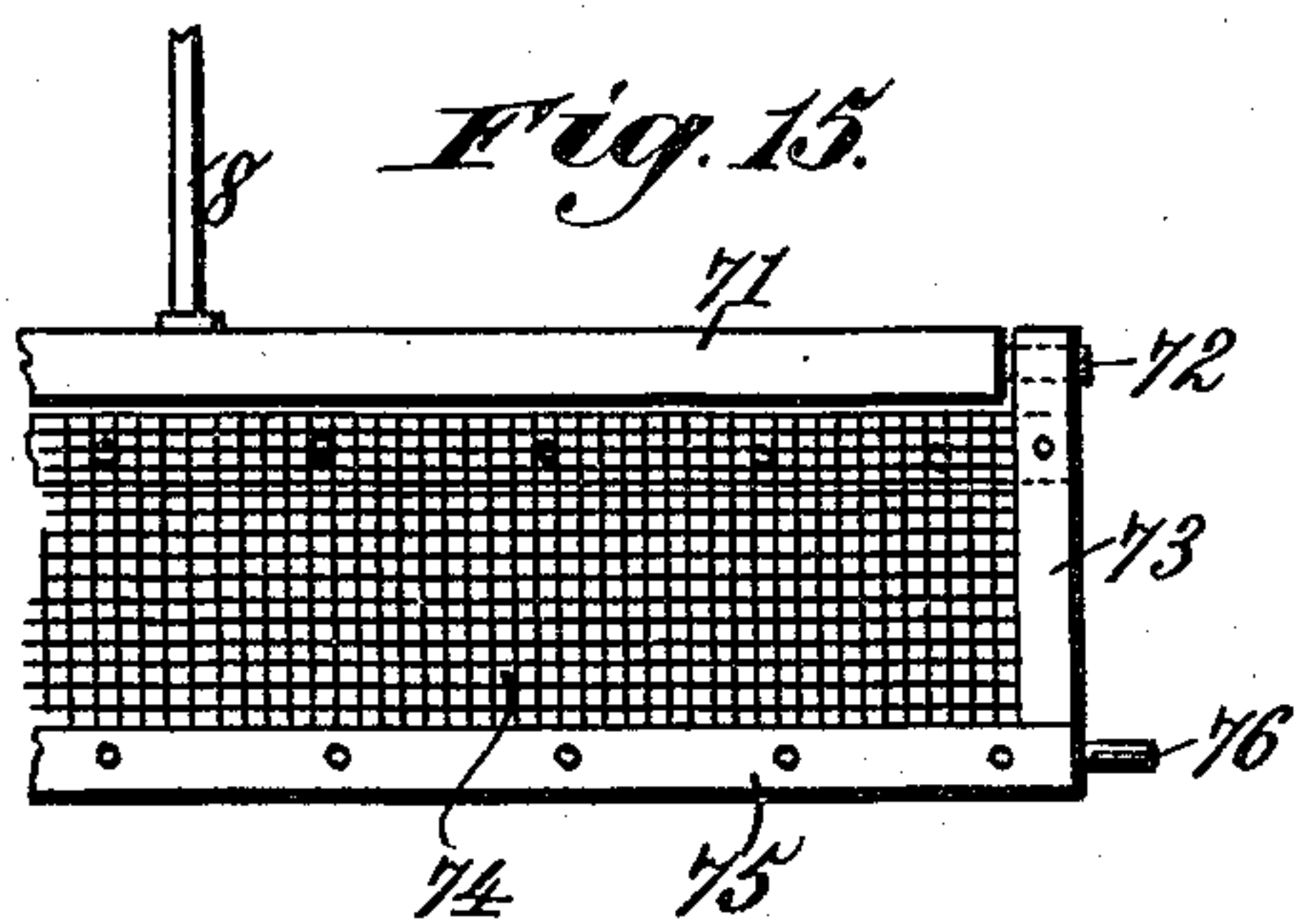
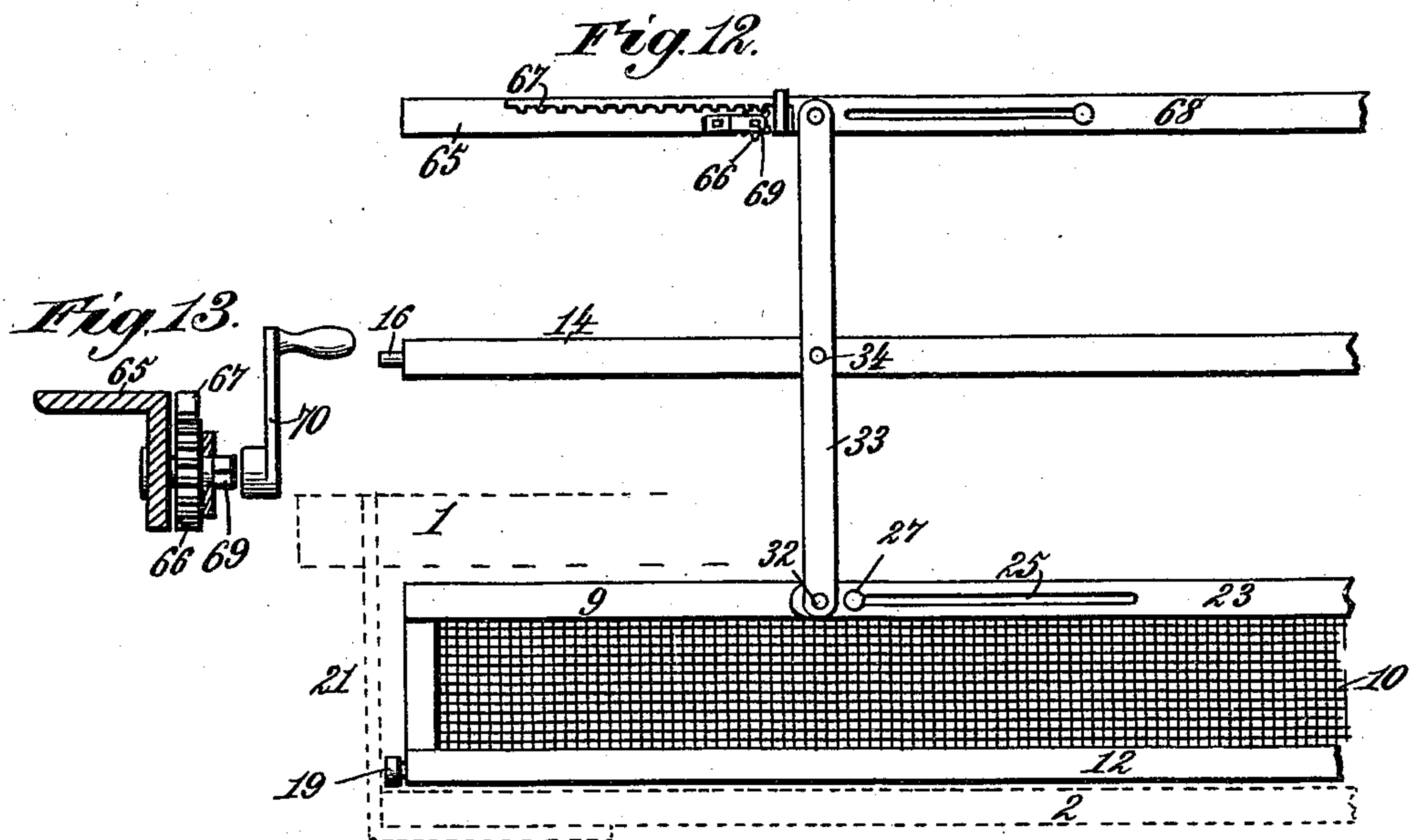
4 Sheets—Sheet 4.

W. M. FRANCIS & F. G. TAYLOR.

COLLAPSIBLE GATE FOR RAILWAY CARS.

No. 538,161.

Patented Apr. 23, 1895.



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UNITED STATES PATENT OFFICE.

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OF ONE-HALF TO PHILIP A. WILLIAMS AND HELENUS E. FARRINGTON,
OF CHELSEA, MASSACHUSETTS.

COLLAPSIBLE GATE FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 538,161, dated April 23, 1895.

Application filed June 7, 1894. Serial No. 513,811. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM M. FRANCIS and FREDERIC G. TAYLOR, citizens of the United States, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Collapsible Gates for Railway-Cars, of which the following is a specification.

This invention relates to safety gates and fenders for the sides of open or summer railway cars run by cables, electricity, or other power, particularly that type of gate which is extensible and collapsible, so that when extended it bars the entrance or exit of passengers, and thus prevents accidents resulting from persons leaving the car on the danger side, or the side nearest the adjacent track.

The object of our invention is to provide a new and improved gate of the character alluded to, which is simple and economical in construction, easily operated and susceptible of being so collapsed that it offers no obstruction to persons entering or leaving the car at the side thereof, but when extended effectually prevents persons from entering or leaving at such side of the car.

The invention also has for its object to provide a collapsible and extensible gate which can be made of a series of horizontal gate bars arranged one above the other, and adapted to be opened and closed without endwise or lengthwise movements, so that while the upper bars rise and spread apart they remain parallel and do not move lengthwise.

The invention also has for its object to provide a novel fender arranged over the running board or longitudinal step and moved or shifted laterally by the movements of the gate as it is collapsed or extended.

These objects are accomplished in the manner and by the means hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a detail side elevation, showing a portion of a railway car with our invention applied thereto, the gate being collapsed. Fig. 2 is a similar view, showing the gate extended. Fig. 3 is a sectional end elevation, showing the gate at one side collapsed, and the step fender retracted, and the gate at the opposite

side extended and the step-fender in its outer position. Fig. 4 is a broken detail perspective view of portions of the gate and fender mechanism. Fig. 5 is a detail sectional view showing the guide-way for the roller-bearing at one end of the step-fender. Fig. 6 is a detail horizontal sectional plan view, the plane of section being on the line 6—6, Fig. 2. Fig. 7 is a broken side elevation of a portion of a car provided with a gate and fender mechanism constructed according to a modification of our invention. Fig. 8 is a detail broken perspective view of a portion of the gate and fender mechanism exhibited in Fig. 7. Fig. 9 is a vertical sectional view of the gate extended, the step-fender being omitted. Figs. 10 and 11 are detail views of a modification hereinafter explained. Fig. 12 is a detail broken side elevation, showing another modification of our invention. Fig. 13 is a detail vertical sectional view through the upper gate bar, Fig. 12. Fig. 14 is a detail end elevation, showing another modification of our invention, the gate being extended, and the fender moved to its outer position. Fig. 15 is a detail broken side elevation of a portion of the fender illustrated in Fig. 14. Fig. 16 is a detail view of the construction exhibited in Fig. 14, showing the step-fender retracted; and Fig. 17 is a view showing two different forms of suspension rods hereinafter specifically described.

In the accompanying drawings we have only exhibited sufficient of a railway car to enable our invention to be clearly understood by those skilled in the art. The car may be of any ordinary or suitable construction, but as here illustrated it comprises a platform 1 at each end, and a stationary running board or step 2, suspended by suitable supports from the car-body and extending longitudinally along each side to enable passengers to conveniently enter and leave at either side the same as in open or summer cars of this character.

The improved gate and fender mechanism may be used at one side only of those cars which are turned around or reversed at the end of the route or trip; but for cars which are not turned around or reversed, the gate

and fender mechanism will be applied to both sides of the car, in such manner that the mechanism at the safe side, or the side farthest from the adjacent track, may be collapsed or folded out of the way for the entrance or exit of passengers; while the mechanism at the danger side, or the side nearest the adjacent track, can be extended or unfolded to prevent passengers entering or leaving at the danger side.

For the reasons stated, and as both gate mechanisms are the same in construction and operation, we will only describe the mechanism at one side of the car, the same reference numerals being used for corresponding parts.

The numerals 3 indicate standards rising from the ends of the seat frames 4, and some of which are provided with vertically slotted brackets or plates 5, with which are loosely engaged the enlarged heads 7, Fig. 3, of vertically arranged suspension-rods 8 which can swing inward and outward, or to and from the side of the car-body. The lower ends of the rods are engaged in any suitable manner with the horizontal top bar 9 of a step or running board fender comprising any material suitable for the conditions required, but preferably made of foraminous metal, such as wire work or wire netting 10, which is secured at its upper edge to the fender-bar 9, and at its lower edge to a similar fender-bar 12. The suspension-rods 8 may be simply secured to the upper fender-bar 9, or they may extend through the latter to the lower fender-bar 12, and these fender-bars are preferably composed of angle irons rigidly connected at their ends by connecting bars or plates 13, to which the ends of the wire-work or wire-netting 10 are attached.

The collapsible and extensible gate for permitting or preventing persons entering or leaving the side of the car comprises horizontal bars 14 and 15 in addition to the top-fender bar 9. The gate-bars 14 and 15 are preferably made of angle iron, and are slidable vertically on the suspension-rods 8. The uppermost gate bars are preferably provided with eyes or orifices to receive the suspension-rods, but they may be otherwise slidably engaged with these rods. The ends of the intermediate gate-bar 14 are provided with pivot-pins 16 engaged with the outer ends of links 17, which, at their inner ends, are connected by pivot-pins 18, Fig. 3, with the dash-boards, or any other suitable part of the car-body or platform. The extremities of the lower fender-bar 12 are provided with roller-bearings 19, Fig. 4, which are adapted to travel back and forth in guide-ways 20, secured to the suspended supports or brackets 21 which are used to sustain the running board or step 2. The guide-ways 20 may be of any construction which will properly guide the roller-bearings 19 in approximately horizontal planes so as to facilitate the movements of the step-fender inward and outward.

The bars or angle irons 9 and 15 are pro-

vided with slides 22 and 23, composed of flat plates which are susceptible of moving endwise or lengthwise on the bars or angle irons 9 and 15 independent of any lengthwise movements of the latter. For this purpose the slides 22 and 23 are constructed with longitudinal slots 24 and 25, through which pass headed guide-pins 26 and 27, secured to the bars or angle irons 9 and 15. The slide 22 is reduced in thickness and size at one end to provide a cylindrical stem 28, adapted to move lengthwise in an eye 29 attached to the bar or angle iron 15, and the slide 23 is reduced at one end to form a similar stem 30, adapted to move in an eye 31 secured to the bar or angle iron 9, the construction being such that the two slides 22 and 23 are susceptible of moving lengthwise in opposite directions. The end portions of the slide 23 are pivotally attached, as at 32, to the lower ends of links 33, which, at their upper ends, are pivotally connected to the slide 22, and intermediate their ends are pivotally mounted on the bar or angle iron 14, as at 34, in such manner that when the slide 22 is shifted lengthwise in one direction, the slide 23 will be shifted lengthwise in the opposite direction and the links will swing on the pivots 34, thereby causing the gate-bars 14 and 15 to descend in a vertical plane for the purpose of collapsing the gate. As the bar or angle iron 14 descends, the links 17 will be swung downward, and as they move in the arcs of circles the gate mechanism, as well as the step-fender, will be swung inward toward the side of the car into the position shown at the right hand side of Fig. 3. In this movement of the parts, the roller-bearings 19 travel along the guide-ways 20 and facilitate the lateral shifting movement of the step-fender over the stationary step 2.

When the parts are in the position shown at the right hand side of Fig. 3, it is possible for passengers to conveniently enter or leave the car; but if it is desired to extend the gate and shift the fender over the step to prevent persons from entering or leaving the car, the slide 22 is moved in a direction the reverse of that above mentioned, in consequence of which the slide 23 will also be shifted in the reverse direction, and the gate-bars 14 and 15 will be caused to rise on the suspension-rods 8, whereby the gate will be extended, and the step-fender will be shifted to its outer position by the action of the links 17 in describing the arcs of circles incident to the rising movement of the bar or angle iron 14.

To render the inward and outward swinging movements of the gate mechanism smooth and easy, it is preferable to provide the links 33 with joints, as at 35, Figs. 1, 2, and 4, and these joints are particularly useful in connection with suspension-bars 7^a, Fig. 17, having joints 35^a, so that their lower portions can swing inward and outward to adapt the mechanism to varying shapes of cars. We have also illustrated in Fig. 17 another form of suspension-rod 7^b, which is rigid from end to end,

but is curved to approximately conform to the peculiar shape of the side of a summer car, so that the collapsed gate and step-fender can be retracted inwardly in the proper manner.

The upper ends of the suspension-bars 7^a and 7^b, Fig. 17, are designed to be loosely engaged with and move vertically in brackets the same as the brackets 5 hereinbefore described.

For the purpose of moving the slide 22 lengthwise on the gate-bar or angle iron 15, we provide a suitable handle 36, Fig. 4, which can be grasped by the conductor or attendant and moved in the proper direction to collapse or extend the gate. The handle 36 is preferably in the form of a loop mounted on the end of a screw-threaded stem 37, Fig. 6, adapted to screw into and out of a screw-threaded orifice or socket 38 in the gate-bar or angle iron 15. The screw-threaded stem 37 loosely passes through the upper end of one of the links 33, and also loosely passes through an orifice in the slide 22, so that when the gate is extended the handle 36 can be turned in the proper direction to screw the stem 37 into the bar or angle iron 15, so that the parts will be rigidly clamped in position, and the gate will be rigidly locked and held. If it is desired to collapse the gate the handle 36 is rotated until the stem 37 is unscrewed from the orifice or socket 38 to disengage the stem from the bar or angle iron 15, whereupon the slide 22 can be moved lengthwise by pressure applied to the handle 36.

The handle, screw-stem, and other parts above described and shown specifically in Fig. 6, constitute a very simple, efficient, and desirable locking mechanism for locking the gate in its extended position; but we do not wish to be understood as confining ourselves to this specific construction of locking devices, as other contrivances for the purpose can be employed without departing from the spirit of our invention.

The slides 22 and 23, movable lengthwise on the bars or angle irons 9 and 15, are very important features of our improved collapsible and extensible gate, in that they render it possible to raise and lower the gate-bars 14 and 15 through the medium of links 33 without the necessity of moving the said gate-bars or angle irons 14 and 15 in the direction of their length, while at the same time all the gate bars remain constantly parallel to one another.

The vertically movable gate-bars 14 and 15 are preferably provided at their inner sides with brackets carrying anti friction rollers, as at 39, Fig. 6, adapted to travel on the suspension-bars 8 and render the movements of the gate-bars smooth and easy.

If the links 17, which operate to swing the gate and step-fender inward and outward as the gate is collapsed or extended, are pivoted to the dash-boards they are preferably curved as in Fig. 1; but this is not indispensable, be-

cause, as before stated, these links can be pivoted to some other fixed part of the car-body or platform.

From the above description, which refers specifically to the gate and fender mechanism illustrated by Figs. 1 to 6 inclusive, it will be obvious that as the gate is extended, the step-fender will be shifted laterally in an outward direction over the stationary running-board or step 2; while if the gate is collapsed the step-fender will be shifted laterally in an inward direction.

In the modification illustrated by Figs. 7, 8, and 9 a single slide 40, composed of a flat plate is used on the central gate-bar or angle iron 41, and each of its end portions is pivoted, as at 42, to two links 43 and 44, which are pivoted respectively to the top fender-bar or angle iron 45 and top gate-bar or angle iron 46. The slide 40 is provided with slots 47, through which pass headed pins 48, secured to the gate-bar or angle iron 41. The slide 40 is provided at one end with a cylindrical stem 49, adapted to move in an eye 50, secured to the gate-bar or angle iron 41, in such manner that when the slide 40 is moved in one direction, the links 43 and 44 will be thrown out of vertical alignment, and the gate-bars or angle-irons 41 and 46 will be drawn together and collapsed onto or toward the upper fender-bar 45; while if the slide 40 be moved in the opposite direction, the gate-bars or angle-irons 41 and 46 will be raised and moved apart for the purpose of extending the gate. In order to shift or move the slide 40 lengthwise, we extend one of the links 44 into a handle 51, provided with a spring-bolt 52, adapted to engage a bolt-hole 53 in the link 43, as will be understood by reference to Fig. 9, and to the right hand portion of Fig. 7. The bolt 52 is designed to be operated by a finger-piece 54, so that when the gate is extended and the links 43 and 44 are in vertical alignment with the bolt 52 engaging the bolt-hole 53, the gate will be held locked until the finger-piece 54 is operated to disengage the bolt from the bolt-hole, whereupon the handle-portion 51 can be manipulated to shift the slide 40 in the direction required to collapse the gate.

In the construction illustrated by Figs. 7, 8 and 9 it is intended to shift the step-fender laterally over the stationary running-board or step 2 by devices connecting the gate-bar or angle iron 41 with the upper fender-bar 45. For this purpose we provide at or near the ends of the running-board vertical guide-ways, as at 55, Fig. 8, and with each guide-way is engaged a pin 56 secured to the end of a link 57, pivoted, as at 58, to a pivot-pin at the end of the fender-bar 45. The pin 56 is also pivotally connected with the gate-bar or angle-iron 41 through the medium of two links 59 and 60, one of which is provided with a longitudinal slot 61 to receive a pin or pins 62 on the other link, in such manner, for example, that the link 59 can move lengthwise

some distance before it commences to move the link 60 lengthwise.

When the gate is collapsed the gate-bar or angle iron 41 is caused to descend, and the link 59 moves a certain distance on the link 60, and then the latter commences to move lengthwise and causes the pin 56 to descend in the guide-way 55, and, since the step-fender is supported against downward movement by the roller 63 resting on the step 2, the link 57 will be caused to describe the arc of a circle and draw the step-fender inward.

The purpose of the pin and slot connection 61 and 62 between the links 59 and 60 is to permit the practical operation of the parts, due to the fact that the gate-bar or angle-iron 41 must move a greater distance than the distance which the pin 56 moves in the guide-way 55. If the gate is extended the gate-bar or angle-iron 41 rises, and for a certain distance the link 59 moves upward independent of the link 60, and then the pin 62, engaging the end of the slot connection 61, draws the link 60 upward and causes the pin 56 to rise in the guide-way 55, thereby shifting the step-fender in an outward direction.

The step-fender illustrated in Figs. 7 and 8, may be composed of wire-work or wire network and angle-bars the same as hereinbefore described with reference to Figs. 1 to 6 inclusive.

Instead of employing a locking-bolt 52, operated by a thumb-piece 54, as described with reference to Figs. 7 and 9, we may provide the handle end portion 51 of the link 44 with two opposite beveled catches 64, Fig. 10, adapted to snap over and engage opposite edges of link 43, Fig. 11, for the purpose of locking the handle portion 51 and holding the gate in its extended position.

In the above described arrangements, the gate is collapsed or extended by power applied through the medium of a handle, such as 36 or 51, and the power is limited to the strength of the attendant. In some cases it may be desirable to increase the leverage for the purpose of more readily collapsing and extending the gate, and therefore we propose to employ the construction exhibited in Figs. 12 and 13, where the upper gate-bar or angle-iron 65 is provided with a bearing for the shaft of a pinion 66 engaging a rack 67 on one end of a slide 68, which is otherwise, in all respects, the same as the slide 22 or the slide 40. The head 69 of the pinion-shaft is adapted to receive a crank-handle 70, so that the pinion can be rotated in engagement with the rack, for the purpose of moving the latter, and thereby shifting the slide 68 in the direction of its length. By this means considerable leverage is obtained for the purpose of operating the gate.

We do not deem it necessary to more specifically describe Figs. 12 and 13, because in all other respects the construction may be the

same as described with reference to Figs. 1 to 6 inclusive, or with reference to Figs. 7 to 10 inclusive. We also propose to shift the step-fender laterally over the stationary running-board or step 2 through the medium of the modified construction illustrated in Figs. 14, 15 and 16, wherein the upper fender-bar 71, Fig. 14, is provided at each end with a pivot-pin, as at 72, on which is mounted the end bar or plate 73 of the fender 74. The lower fender-bar 75 is provided at each end with a pin 76, adapted to move horizontally back and forth in a slot 77, formed in an angular-shaped stationary-plate 78, suitably secured in the proper position to a part of the car. The angular plate 78 is also provided with a vertical slot 79, in which is adapted to move a pin 80, secured to one end of a link 81, the other end of which is engaged with the pin 76 which extends from the end of the lower fender-bar 75. The pin 80 passes loosely through an approximately vertical slot 82 in the lower end portion of a rod 83 which is pivotally engaged at its upper end, as at 84, with one end of the gate-bar or angle iron 85. The gate-bar or angle-iron 85 may correspond to the gate-bar or angle-iron 14, or the gate-bar or angle-iron 41; and when this gate-bar or angle-iron descends as the gate is collapsed, the rod 83 is moved downward until the upper end of its slot 82 engages the pin 80, whereupon the latter will be moved downward in the slot 79, thereby drawing the pin 76 inwardly along the slot 77 from the position shown in Fig. 14 to the position, shown in Fig. 16, so that by these movements the step-fender is shifted to its inward position. When the gate-bar or angle-iron 85 rises as the gate is extended, the rod 83 moves upward until the lower end of its slot 82 engages the pin 80, when the latter will be moved upward in the slot 79, and the pin 76 will be moved along the slot 77 from the position shown in Fig. 16 to the position shown in Fig. 14, thereby shifting the step-fender to its outward position.

As regards those features in Figs. 14, 15, and 16 not specifically explained, they may be the same as described with reference to Figs. 1 to 6 inclusive; or the same as described with reference to Figs. 7 to 10 inclusive.

To reduce friction and render the shifting movements of the slides 22 and 23 or 40, free and easy, we may provide the pins 26, 27, and 48 with anti-friction rollers to roll against the upper and lower edges of the slots 24, 25, and 47; but as this is an obvious expedient we do not deem it necessary to illustrate the same in the drawings.

In Figs. 8, 14, and 16, we only show the devices at one end of the running-board or step, but obviously the same devices will be used at both ends.

The improved constructions described and shown provide simple, efficient, and economical gates and fenders which will be found very

desirable for cars and other wheeled vehicles, particularly open or summer cars designed to be operated by cable or electric systems.

Having thus described our invention, what we claim is—

1. The combination with suitable suspension-rods, adapted to be secured at their upper ends to a car, of upper and lower gate-bars movable vertically on and guided by the said rods, a slide mounted on and movable lengthwise independent of one of the gate-bars, and links pivotally connecting the slide with another gate-bar, substantially as described.

2. The combination with suitable suspension-rods, adapted to be secured at their upper ends to a car, of upper and lower gate-bars movable vertically on and guided by the said rods, a slide mounted on and movable lengthwise independent of one of the gate-bars, links pivotally connecting the slide with another gate-bar, and means for rigidly locking the links to hold the gate extended, substantially as described.

3. The combination with suitable suspension-rods, adapted to be secured at their upper ends to a car, of upper and lower gate-bars movable vertically on and guided by the said rods, a slide mounted on and movable lengthwise independent of the upper gate-bar, and links pivotally connecting the lower gate-bar with the slide on the upper gate-bar, substantially as described.

4. The combination with suitable suspension-rods, adapted to be secured at their upper ends to a car, of upper and lower gate-bars, movable vertically on and guided by the said rods, a slide mounted on and movable lengthwise independent of the upper gate-bar, links pivotally connecting the lower gate-bar with the slide on the upper gate-bar, and means for locking the links to hold the gate extended, substantially as described.

5. The combination with vertically arranged rods or guides, of a series of horizontal bars arranged one above the other, and some of which have slidable engagement with said rods or guides, slides mounted on and movable lengthwise independent of the upper and lower bars, and links pivoted to said slides and to an intermediate horizontal bar, substantially as described.

6. The combination with vertically arranged rods or guides, of a series of horizontal bars arranged one above the other, and some of which have slidable engagement with said rods or guides, slides mounted on and movable lengthwise independent of the upper and lower bars, links pivoted to said slides and to an intermediate horizontal bar, and locking devices for rigidly locking the links to hold the gate extended, substantially as described.

7. The combination with suitable suspension-rods, of upper and lower gate-bars movable vertically on the said rods, a longitudinal slotted slide engaged with and movable

lengthwise independent of one of the gate-bars, and links pivotally connecting the slotted slide with another gate-bar, substantially as described.

8. The combination with vertically arranged rods or guides, of a series of horizontal bars arranged one above the other, and some of which have slidable engagement with said rods or guides, longitudinally slotted slides mounted on and movable lengthwise independent of the upper and lower bars, and links pivoted to said slotted slides and to an intermediate horizontal bar, substantially as described.

9. The combination with a car having a running-board or step at its side, of a collapsible and extensible gate, and a step-guard or fender moved inward and outward over the stationary running-board or step by the action of the gate as it is collapsed or extended, substantially as described.

10. The combination with a car having a stationary running-board or step along its side, of an upright step-guard or fender supported at its lower portion and movable bodily, while in an upright position, from the inner to the outer longitudinal edge of the stationary running-board or step, substantially as described.

11. The combination with a car having a stationary running-board or step at its side, of a collapsible and extensible gate composed of vertically movable horizontal bars, means for raising and lowering the bars to extend or collapse the gate, and devices operated by one of the horizontal bars to shift the step-guard or fender laterally over the running-board or step, substantially as described.

12. The combination with a car having a running-board or step at its side, of a guard or fender movable laterally over the stationary running-board or step, and provided at its end portions with roller bearings, which support the guard or fender in its lateral movements over the running-board or step substantially as described.

13. The combination with a car having a running-board or step along its side, of a collapsible and extensible gate composed of horizontal, flexibly connected bars, means for raising and lowering the bars to extend or collapse the gate, a step-guard or fender movable laterally over the stationary running-board or step, and provided at its ends with roller-bearings, and devices operated by one of the horizontal bars for shifting the step-guard or fender as the gate is collapsed or extended, substantially as described.

14. The combination with a car having a running-board or step at its side, of a laterally swinging collapsible and extensible gate pivotally suspended from the side of the car and composed of horizontal bars and links pivotally connecting the bars and adapted to move the upper bars vertically for collapsing or extending the gate, and means for holding

or locking the gate extended, substantially as described.

15. The combination with a car having a running-board or step at its side, of a later-
5 ally swinging collapsible and extensible gate pivotally suspended from the side of the car and composed of horizontal bars and links pivotally connecting the bars and adapted to
10 move the upper bars vertically for collapsing or extending the gate, and a step-guard or fender moved laterally over the running-board or step as the gate is collapsed or extended, substantially as described.

16. The combination with a car having a

running-board or step at its side, of a guard 15 or fender movable laterally over the running-board or step and composed of upper and lower angle irons, connecting end plates or bars, and wire-work secured to the angle-bars and the end plates, substantially as described. 20

In testimony whereof we have hereunto set our hands and affixed our seals in presence of two subscribing witnesses.

WILLIAM M. FRANCIS. [L. S.]
FREDERIC G. TAYLOR. [L. S.]

Witnesses:

I. T. UMPHREY,
EBEN HUTCHINSON, Jr.