

No. 741,599.

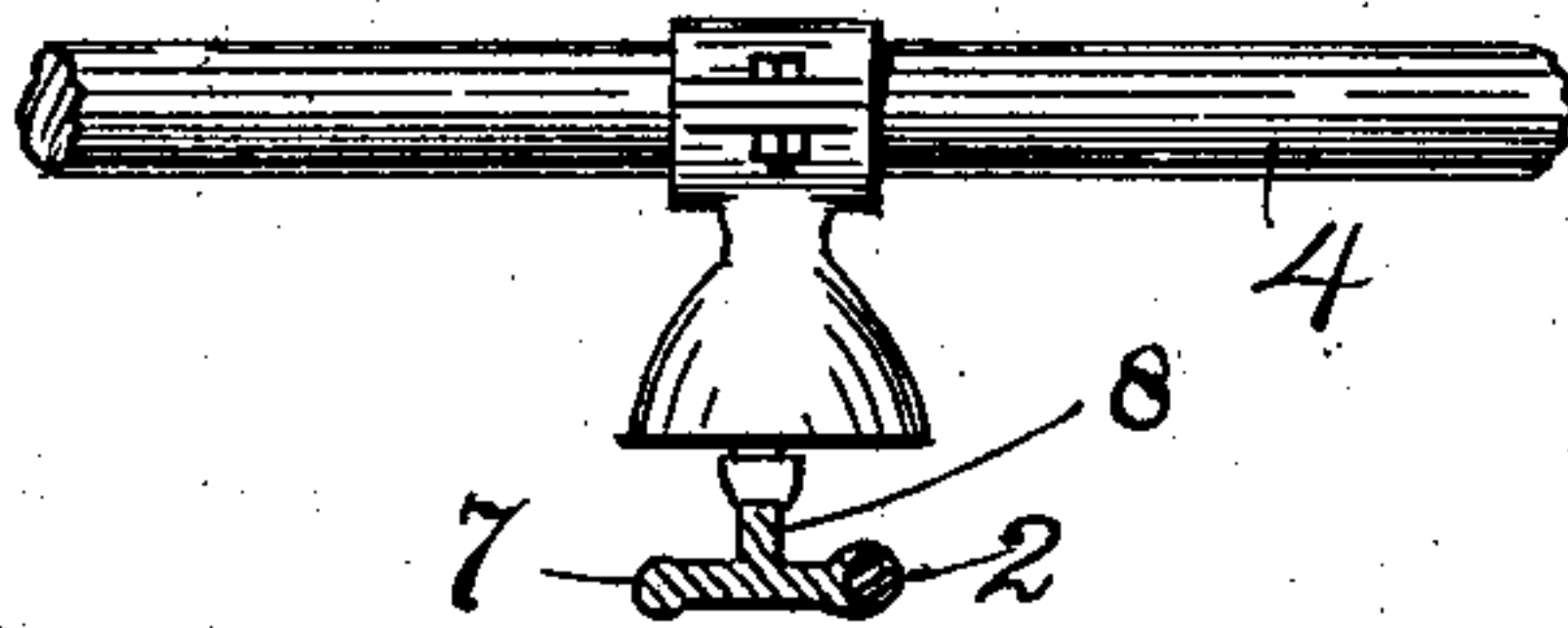
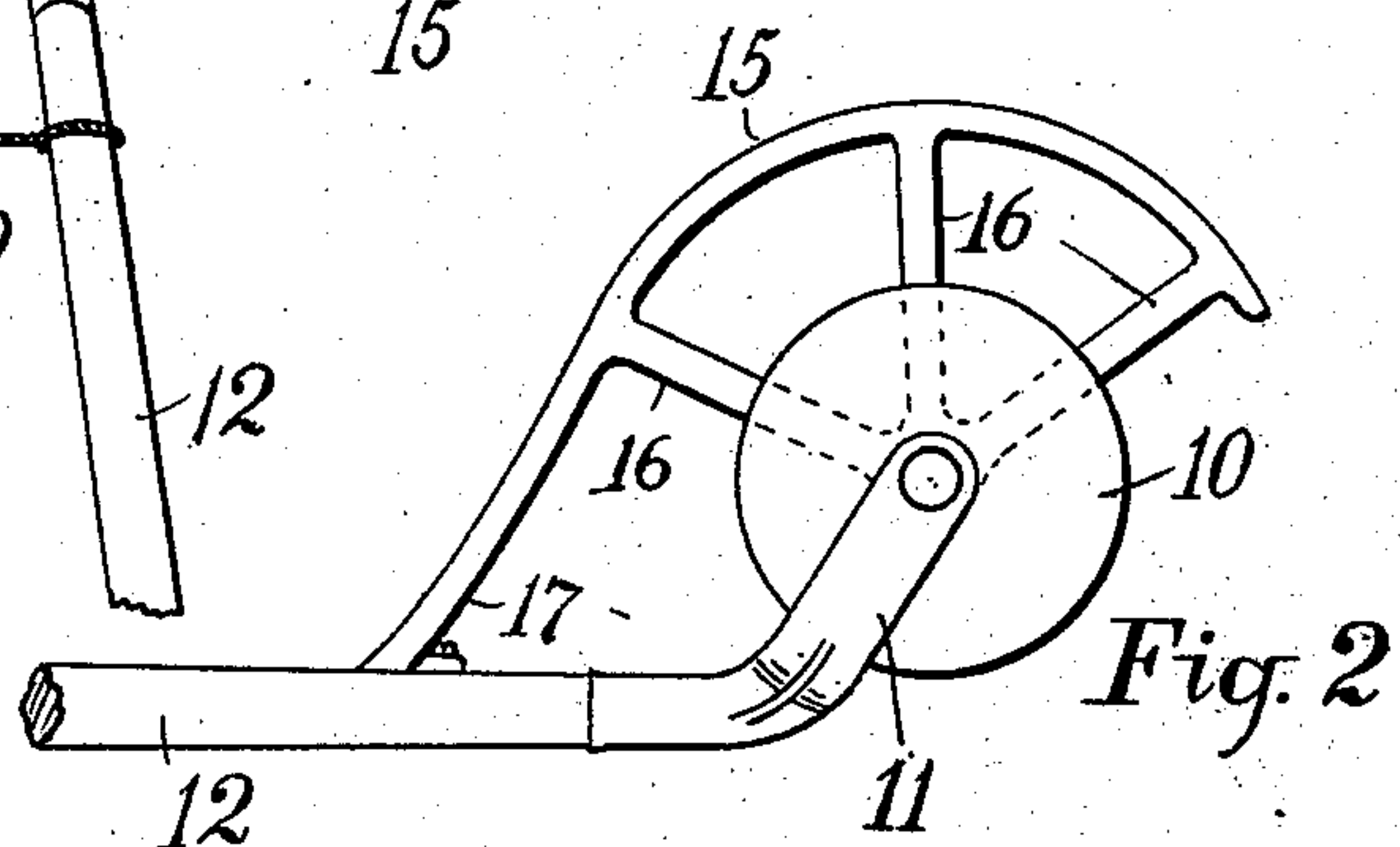
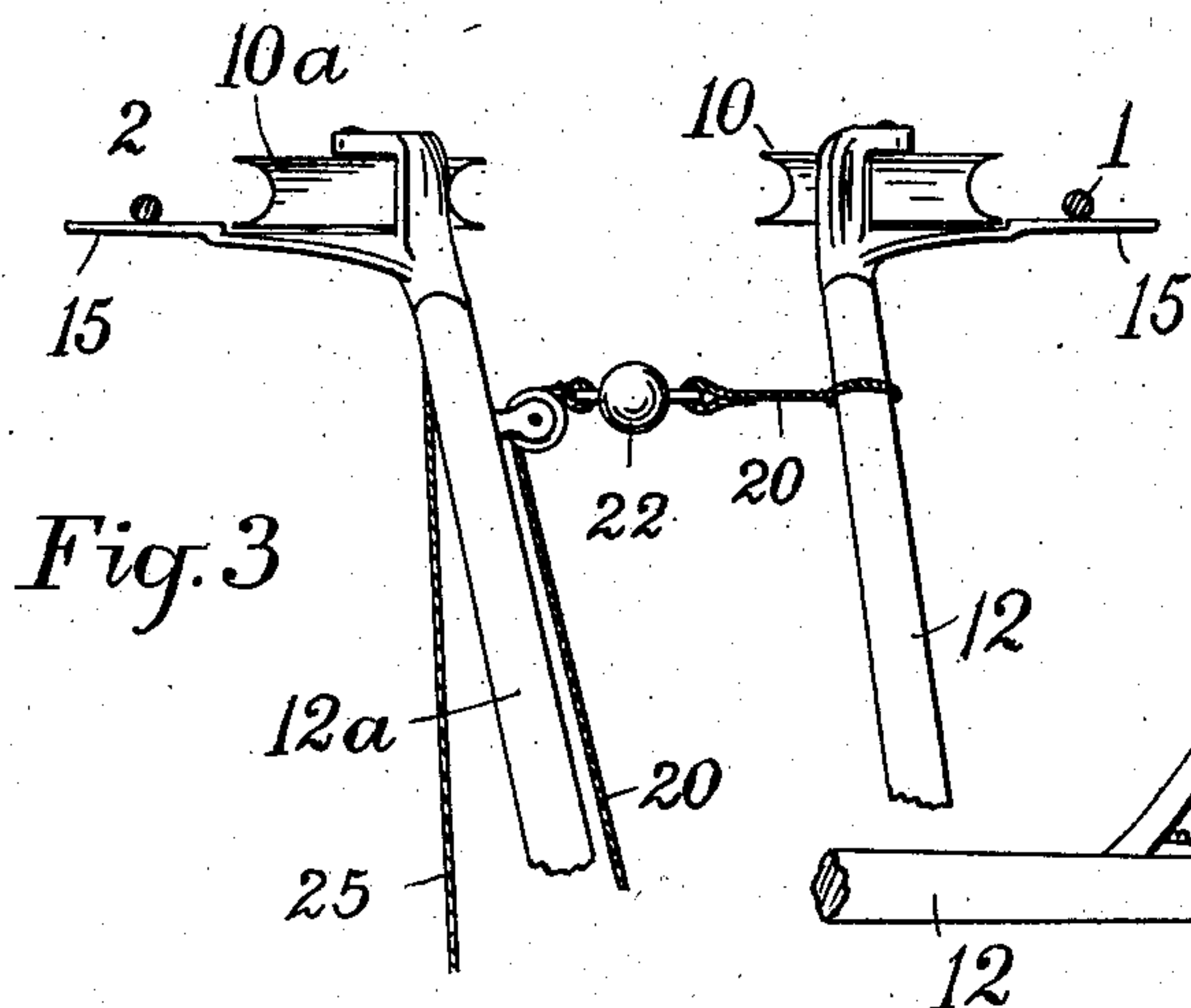
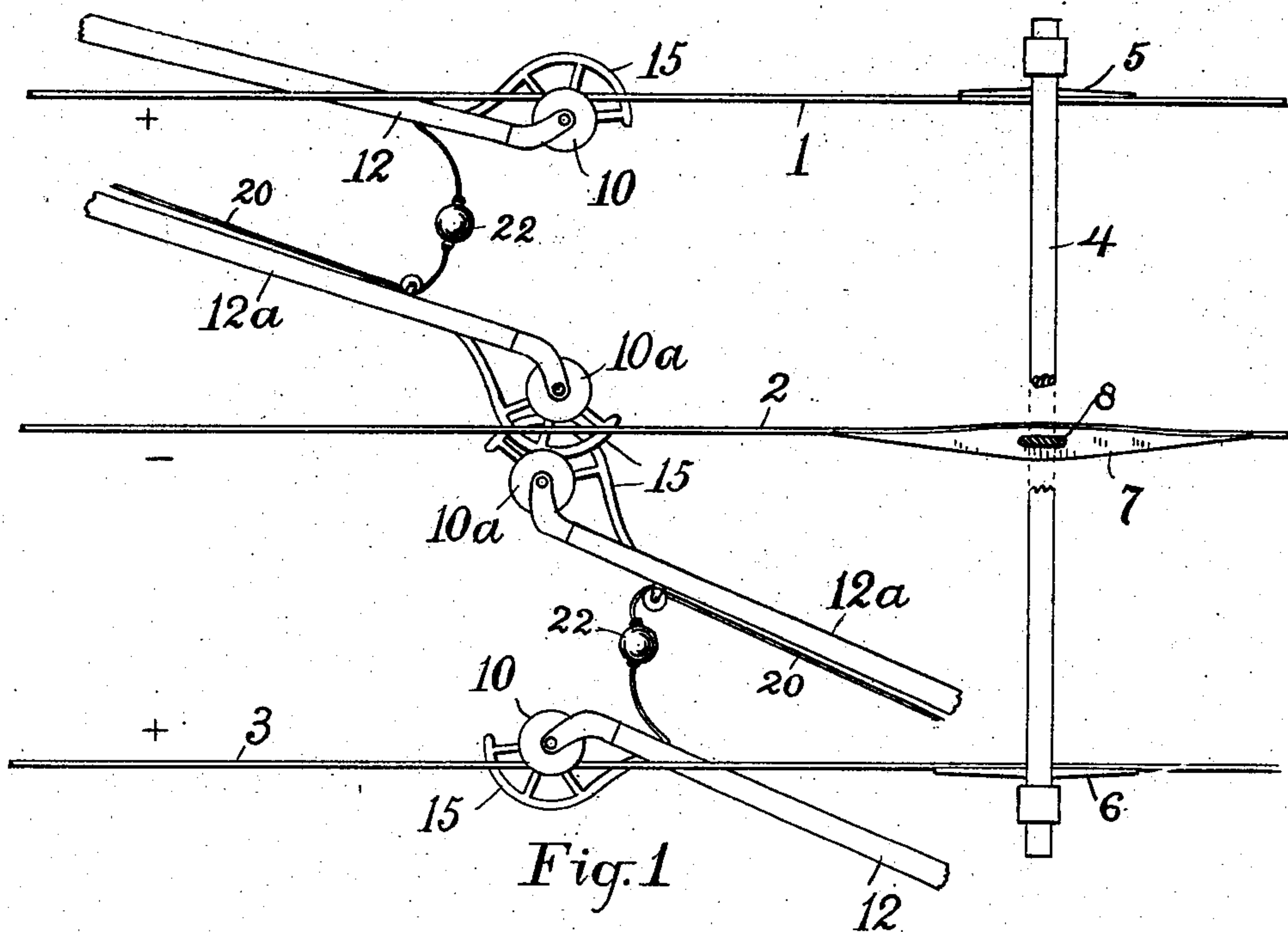
PATENTED OCT. 13, 1903.

A. B. UPHAM.
TROLLEY.

APPLICATION FILED APR. 13, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses;
Fred G. Tilton,
Chas. E. Tilton,

Inventor,

Artemas B. Upham

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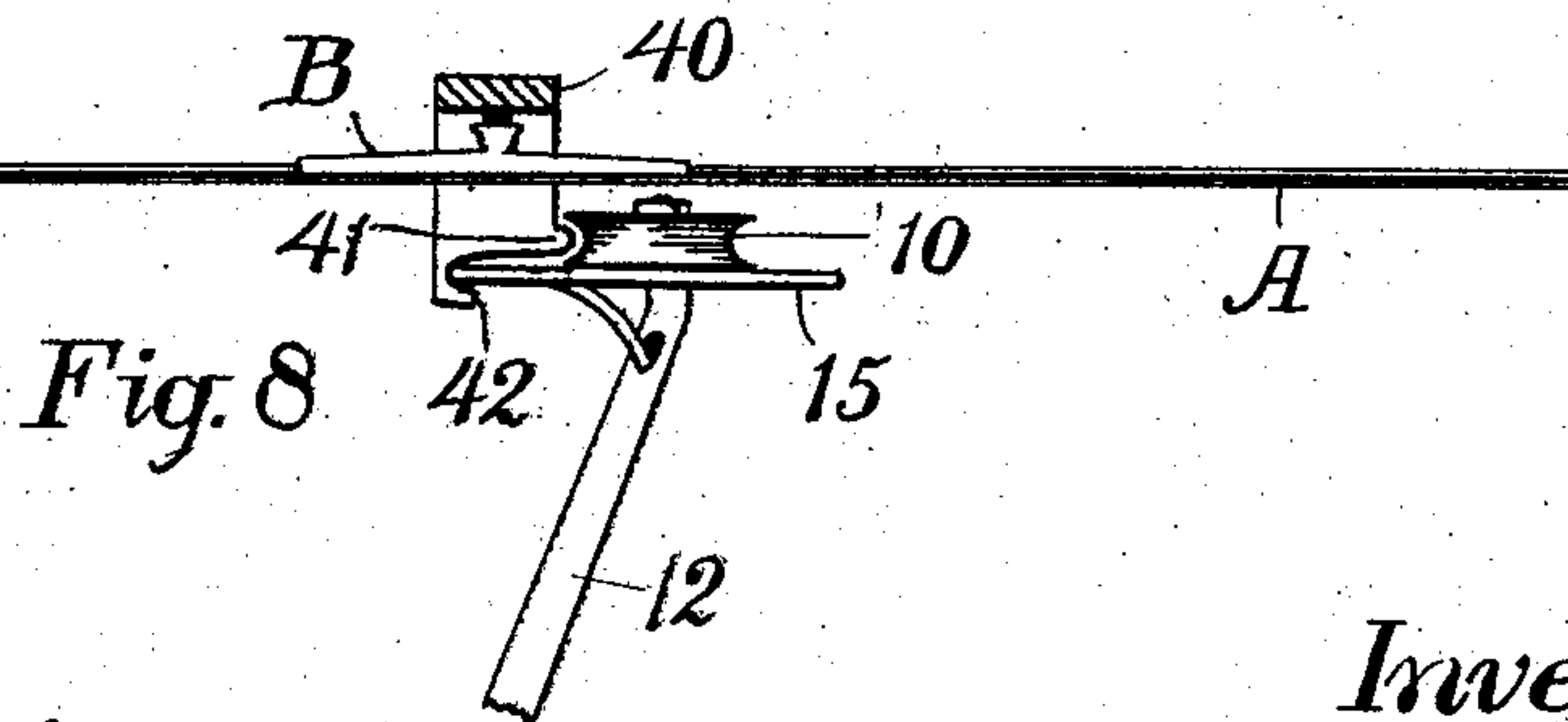
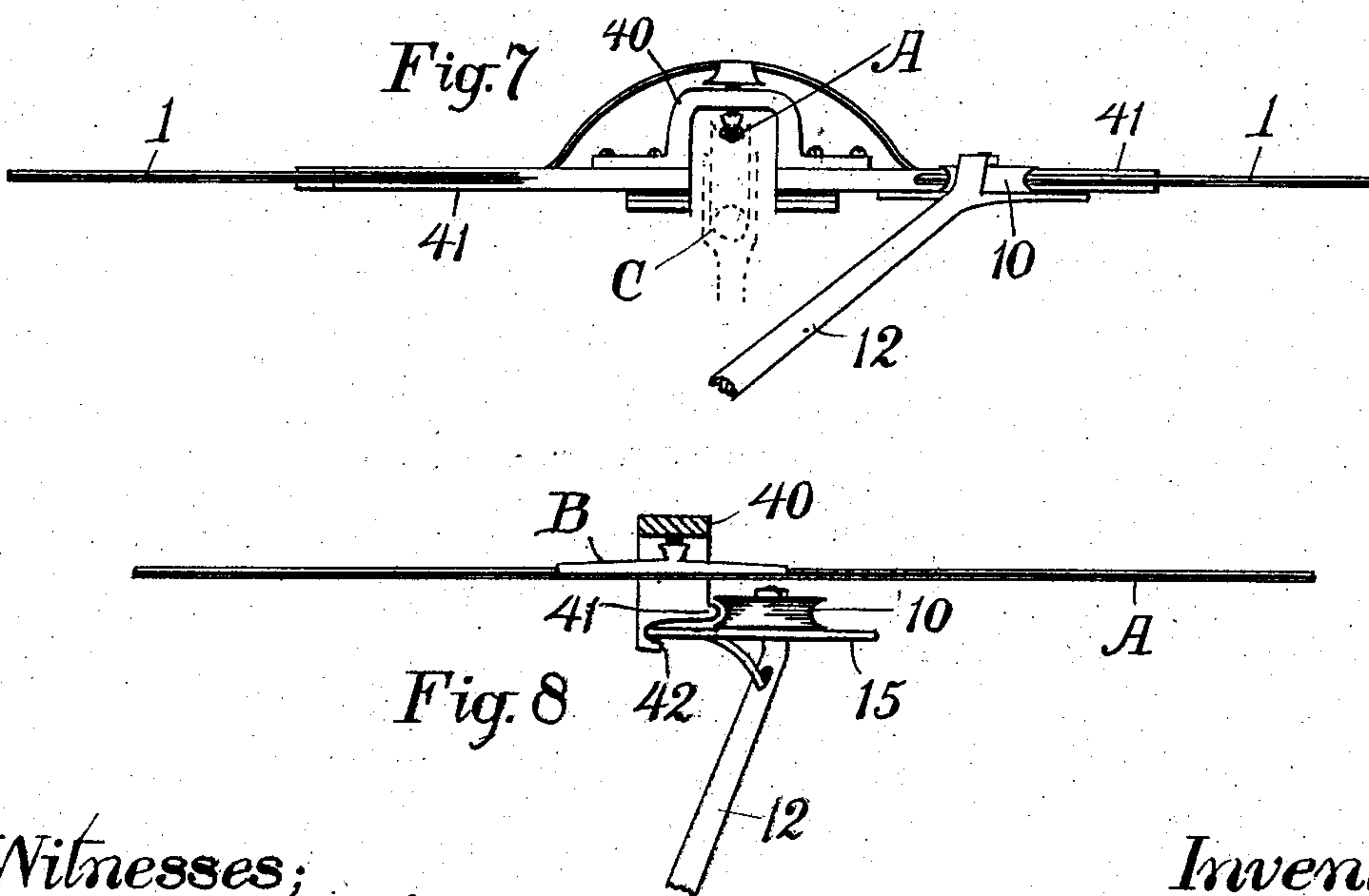
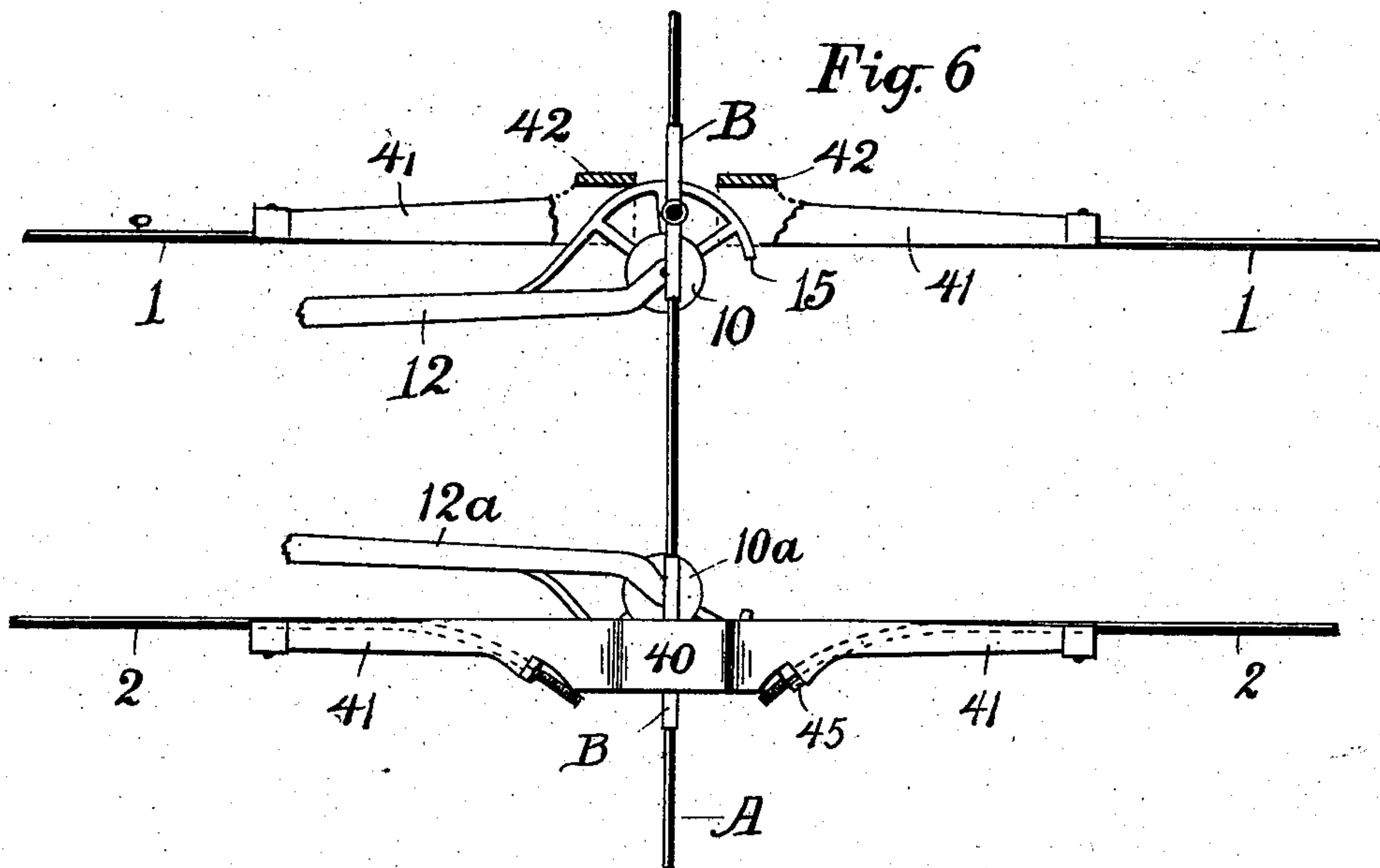
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

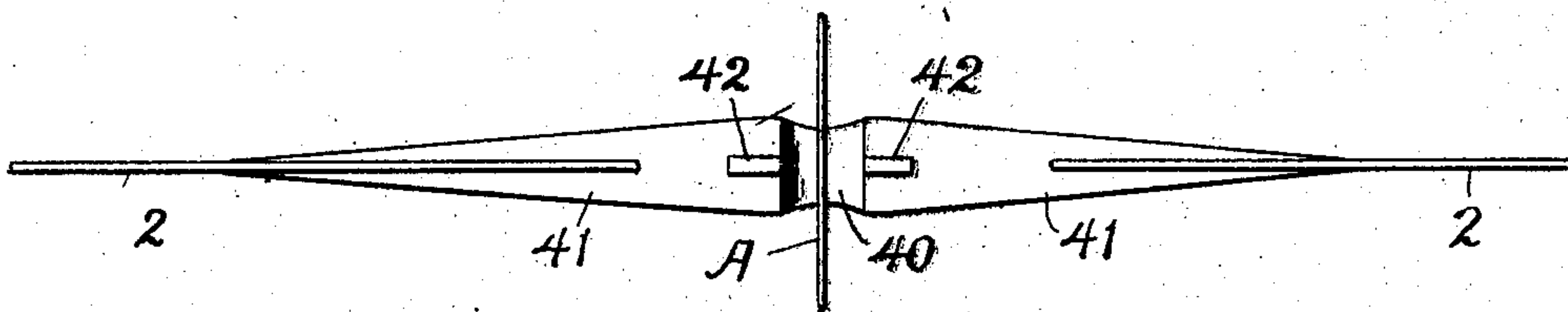


Fig. 9

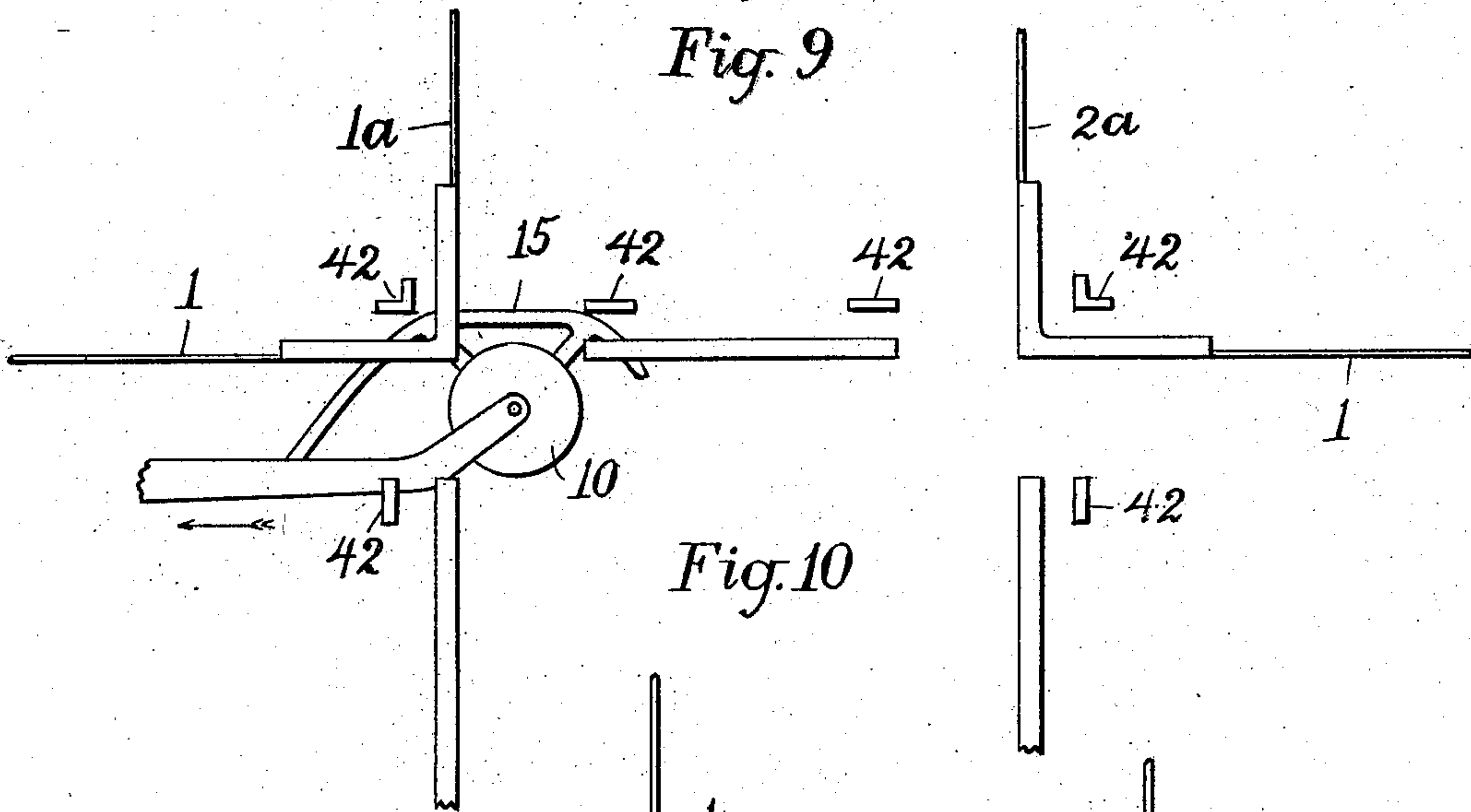


Fig. 10

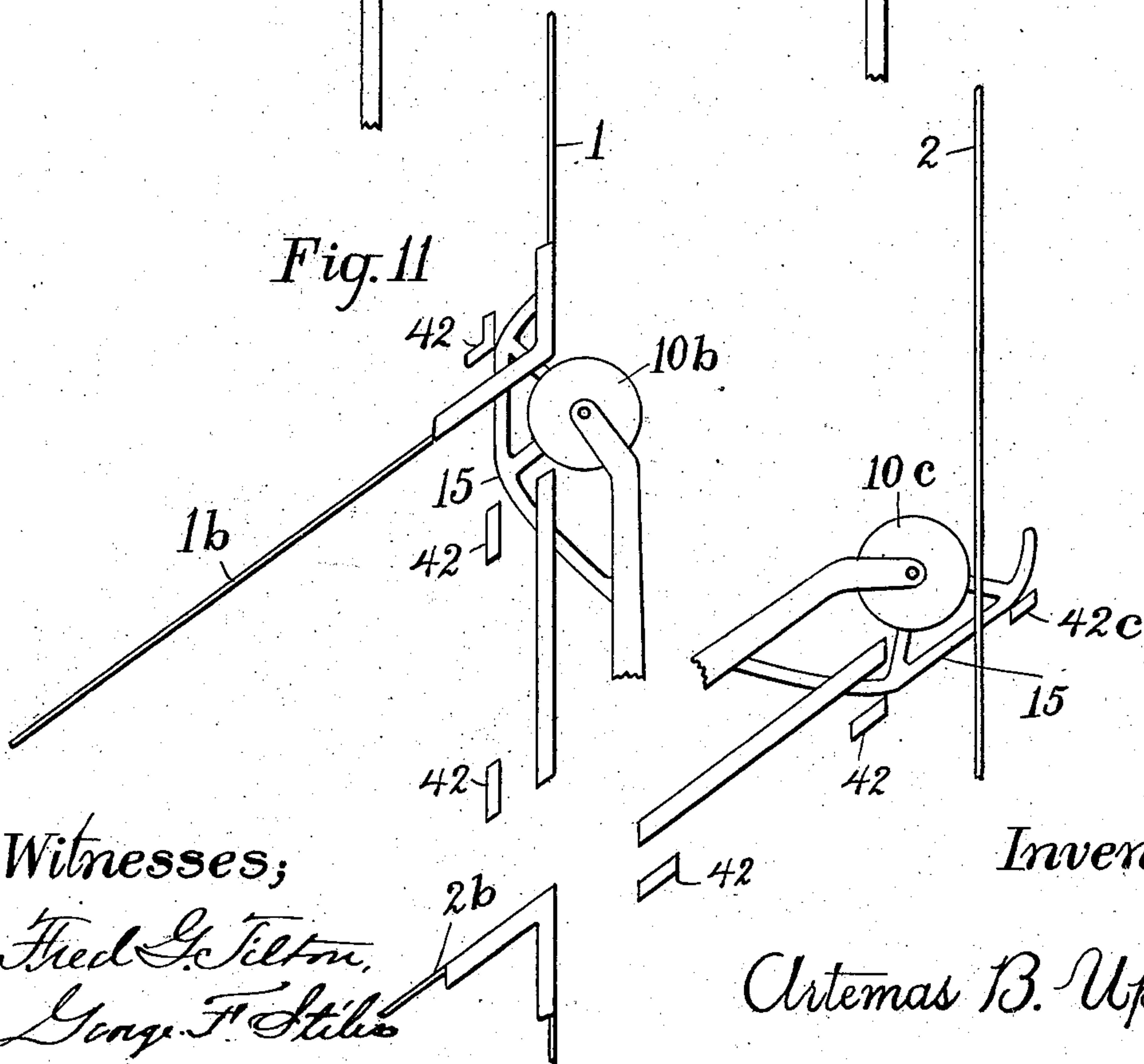


Fig. 11

Witnesses;

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George F. Stiles

Inventor,

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UNITED STATES PATENT OFFICE.

ARTEMAS B. UPHAM, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AMERICAN TRACKLESS TROLLEY COMPANY, A CORPORATION OF MAINE.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 741,599, dated October 13, 1903.

Application filed April 13, 1903. Serial No. 152,396. (No model.)

To all whom it may concern:

Be it known that I, ARTEMAS B. UPHAM, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Trolleys, of which the following is a full, clear, and exact description.

This invention is especially designed to be employed in connection with trackless trolleys of the character disclosed in my Letters Patent of the United States dated March 10, 1903, and numbered 722,654, the same being a system wherein the trolley-wheels are horizontal and pressed laterally against the wires.

The object of this present invention is the construction of improvements whereby such horizontal trolley-wheels may be more readily removed from and applied to the trolley-wires, also of means for enabling two trolley-wheels moving in opposite directions to pass each other on the same wire, of means for permitting trolley-wires to cross each other without interfering with the passage of the trolley-wheels of the other wires, and of means for switching the trolley-wheels to and from a main line without the employment of movable parts.

Referring to the drawings forming part of this specification, Figure 1 is a plan view of my three-wire system, showing the trolley-wheels in engagement with the wires and two wheels passing each other on the central wire. Fig. 2 is a plan view of a trolley-wheel having my improved guide applied thereto. Fig. 3 is an elevation with the trolley-wires in cross-section, showing a pair of trolley-wheels being applied to the wires by means of my improvement. Fig. 4 is a sectional elevation of a hanger for the central wire in my three-wire system. Fig. 5 is a perspective view of a pair of trolleys out of engagement with two trolley-wires. Fig. 6 is a plan view with parts broken away, showing my arrangement for enabling my side-running trolleys to pass at right angles a trolley-wire of the usual under-running type. Fig. 7 is a side elevation of the same. Fig. 8 is a cross-section of the same, showing the under-running trolley-wire in side elevation. Fig. 9 is an under view of the said arrangement

or crossover designed for the center wire of the three-wire system. Fig. 10 is a plan view of a plurality of side-running trolley-wires, showing one crossing two others at right angles and my means for enabling the trolley-wheels to continue on their own wires without interference with the crossing wires. Fig. 11 is a plan view of my switching arrangement, showing two main-line wires and two switch-lines connected therewith.

The reference-numerals 1, 2, and 3 designate three parallel overhead conductor-wires, constituting what I term my "three-wire" system. The design of this system is to enable three trolley-wires to do the work of four, so far as enabling trolleys to move in opposite directions is concerned, so that the three wires serve for a double-track line.

10 10^a are horizontal trolley-wheels mounted in suitable bearings at the upper ends of the trolley-poles 12 12^a, which are pressed apart by a spring 35, tensioned between the arms 32 32^a, rigid with the poles, while the pole ends are normally but yieldingly supported at a height of from one to two feet above the trolley-wires when not in engagement with the latter, as shown by Fig. 5, such support consisting of the tension-springs 34 34^a, connected with said arms 32 32^a and anchored at their lower ends to the arms 33 33^a. The trolley-poles are pivoted to swing vertically upon the upper ends of the tubular posts 30 30^a, which turn upon the fixed standards 31 31^a. The trolley-wheels being applied to the trolley-wires are kept in engagement therewith by the lateral pressure given to the poles by the spring 35. To remove and reengage the trolleys with the wires, I have devised the following arrangement:

The trolley-poles are drawn toward each other by pulling upon the end 24 of the small rope 20, whose upper end is fastened to the trolley-pole 12 and passes from thence through the pulley-blocks 21 23, the block 21 being secured to the pole 12^a near its upper end and the other block being held by the tubular post 30^a. The ball-insulator 22 introduced into said rope between the poles serves the double function of preventing short-circuiting and of limiting the distance between the

trolley-wheels when drawn toward each other by the rope 20. This degree of limitation is about that illustrated in Fig. 3, being such as will bring the trolley-wires 1 and 2 a short distance away from the wheel-flanges.

Fixed to the trolley-wheel bearings 11 just below the wheels are the guides 15. (Shown in Figs. 2 and 3.) These guides comprise a curved bar formed as a part of the radial arm 16, said bar being fixed at its end 17 to the trolley-pole for the purpose of guarding the arrangement from catching upon the trolley-wire hangers should by any means the trolleys become dislodged when the coach is in motion.

By drawing the trolley-wheels together, as described, and then swinging them by means of the rope 25 to the proper position beneath the trolley-wires and allowing them to rise until the guides 15 meet the wires, as in Fig. 3, nothing remains to be done but to let go of the rope 20. Instantly the trolley-wheels fly apart until they meet and engage the trolley-wires, since the springs 34 34^a are pressing the guides 15 against the under sides of the wires, and the wheels must remain at the proper level to meet the wires.

The second function performed by the guides 15 is that of enabling two trolley-wheels to pass each other when moving in opposite directions on a single wire—in other words, to enable a three-wire system to be employed. This is done by one of the guides serving as a curved track for the wheel of the other trolley, as shown in Fig. 1, upon which the latter passes about the other trolley-wheel and is delivered again to the wire. Without the guides the attempt for the two wheels to pass each other would result in making one or both jump the wire; but provided with such devices there can be no jumping, inasmuch as both guides are beneath the wire and guide the wheels back thereto, even if both leave it temporarily, as shown. The front edges of the guides are sharpened somewhat to insure their slipping past each other; but it makes no difference as to which one passes beneath the other.

The hangers 5 6 for the outer wires 1 and 3 may be of the side-engagement type; but the hangers for the center wire 2 require to differ somewhat from the others. This difference consists in making such hanger in the shape of a dart, as shown at 7 in Fig. 1, in order to keep the trolley-wheel flanges from contact with the supporting-neck 8 of the hanger at either side. (See Fig. 4.) The trolley-wire is fixed in a groove along one edge of this hanger 7 in the usual manner; but I prefer to have this edge belly but slightly in order that the tension of the wire shall not cause the latter to tear loose from the extremities of the hanger, the larger part of the widening of the central part of the hanger occurring along the edge thereof opposite to the wire. Another function performed by the guide 15 is that of enabling my trolley to

freely pass an under-running trolley-line at right angles. To accomplish this, I locate my trolley-wires at a slightly-lower level than the other wire and terminate them at points an inch or two each side of the latter wire in order to leave a gap for the passage of the under-running trolleys C. As my side-running trolley-wheels would be pressed sideways into such gaps while passing the same, and thereby either leave the wires or strike the opposite side of the gaps with force enough to cause damage, I provide a path or track for the guide 15, which being of much greater radius than the wheel is thereby enabled to bridge over such gap and land the wheel upon the wire at the other side with perfect ease and certainty. To hold the extremities of the wire in position at such gap and also keep the under-running trolley-wire in proper place relative to said extremities, I connect said extremities with a rigid arch 40 and provide the under-running trolley-wire A with a hanger B, fixed to the center of said arch, as shown in Fig. 7. To connect the wires 1 and 2 with said arches, I provide the bars 41, preferably of insulating material, and bolt the arches 40 thereto, while the wire ends are secured thereto in any suitable manner, as by the tightening-nuts 45. (Shown in Fig. 6.) The tracks 42 for the guides 15 are grooved, as shown in Fig. 8, and are located at such points as to permit the wheels to conform as nearly as possible to the path which they would take were the trolley-wires continuous. The positions of said tracks are shown in Figs. 6 and 8, they being offset as far from the line of the wires as the edge of the guide 15 is from the groove of the wheel.

For the three-wire system the bridging device is made two-sided, as shown in Fig. 9—that is, the bars 41 are tapered and the track-blocks 42 are located midway between the lateral edges of the same.

To enable the trolleys to cross where two side-running trolley-wires pass each other at right angles, I employ the construction shown in Fig. 10. Here all the trolley-wires are in the same horizontal plane; but a gap is formed in each to allow the wheels to slip through, while the track-blocks 42 keep the wheels from flying through the wrong gap to the cross-wires. The same arrangement enables the side-running trolley to be switched from one line to another, as shown in Fig. 11, where a trolley-wheel 10^b is shown passing over the gap opening to the wire 1^b in the manner already described. For the trolley-wheel to leave the wire 1 and switch onto the wire 1^b it is only necessary for the driver of the trolley-coach to turn his coach to the side in the direction of said wire 1^b, but before the trolley-wheels reach the switch. Then when said wheels do reach the switch the trolley-poles will be lying in the direction of the switch-line, so that the wheel 10^b will pass through the gap to the wire 1^b. The wheel 10^c will also leave the wire 2 and be switched

to the wire 2^b by the same action of the motorman, since the guide 15 thereof by its meeting with the track-block 42^c will divert its wheel from the wire 2 across the gap to the wire 2^b.

What I claim as my invention, and desire to secure by Letters Patent, is as follows, to wit:

1. The combination with an electric conductor, of a trolley-wheel yieldingly pressed in its own plane toward said conductor and also yieldingly pressed in a direction at right angles to its plane, and a guide connected with said wheel and projecting radially from near one flange thereof, substantially as described.

2. The combination with an electric conductor, of a trolley-wheel yieldingly pressed in its own plane toward said conductor and also yieldingly pressed to a lesser degree in a direction at right angles to its plane, and a guide connected with said wheel and projecting radially from one flange thereof, substantially as described.

3. The combination with an electric conductor, of a horizontal trolley-wheel yieldingly pressed horizontally toward said conductor and also pressed upward toward a point above said conductor, and a guide projecting radially from the lower flange of said wheel, substantially as described.

4. The combination with an overhead electric conductor, of a current-collector pressed laterally into engagement with said conductor and also given an upward pressure, and a guide projecting laterally from said collector just beneath said conductor, substantially as described.

5. The trolley comprising two horizontal trolley-wheels yieldingly pressed apart and supported, and a guide for each wheel projecting radially from the lower flange thereof, substantially as described.

6. A trolley comprising two horizontal trolley-wheels yieldingly pressed apart and supported, guides projecting radially from the lower flanges thereof, and means for temporarily forcing said wheels toward each other to a predetermined distance between them, substantially as described.

7. A trolley comprising two horizontal trolley-wheels yieldingly pressed apart and supported, a guide for each wheel projecting radially from the lower flanges thereof, a rope connected with said wheels for temporarily forcing them toward each other, and a stop on said rope for limiting the extent of such temporary movement, substantially as described.

8. A trolley comprising a pair of pivoted poles yieldingly pressed apart and supported at their upper ends, horizontal trolley-wheels at such ends of said poles, guides radially projecting from the lower flanges of said wheels, a rope depending from one pole, an eye on the other pole, a rope attached to the other pole and passing through said eye, and an insulating-stop on the last-named rope be-

tween its point of attachment and said eye, substantially as described.

9. The combination with an electric conductor, of a trolley-wheel having its groove pressed into engagement with said conductor, and a guide connected with said wheel and projecting alongside of said conductor; said guide having a portion of its edge substantially straight, substantially as described.

10. The combination with a trolley-wire, of horizontal trolley-wheels engaging opposite sides of said wire and each having a guide projecting radially from its under flange; said guides being constructed to enable the wheels to pass each other when moving in opposite directions, substantially as described.

11. The combination with three parallel trolley-wires, the center one of which is of opposite polarity to the others, of two pairs of trolley-wheels contacting with said wires, one pair engaging the center wire and one of the outer ones, and the other pair engaging the center wire and the other of said outer wires; the wheels contacting with the center wire being constructed to pass each other, substantially as described.

12. The combination with three parallel trolley-wires, the center one of which is of opposite polarity to the others, of two pairs of horizontal trolley-wheels contacting with said wires, one pair engaging the center wire and one of the outer ones, and the other pair engaging the center wire and the other of the outer wires; said wheels being provided with guides constructed to enable the wheels contacting with the center wire to freely pass each other, substantially as described.

13. The combination with horizontal trolley-wheels, and a trolley-wire engaged upon opposite sides by said wheels, of the dart-shaped plate centrally supported and constructed to sustain said wire, substantially as described.

14. The combination with horizontal trolley-wheels, and three parallel trolley-wires engaged thereby, of hangers for said wires comprising the side-engaging hangers for the outer wires and the dart-shaped plate having a central supporting-neck, for sustaining the center wire, substantially as described.

15. The combination with a trolley-wire designed for the usual under-running trolley, of a second trolley-wire located at a lower level than the first-named wire and interrupted for a short distance in the vicinity thereof to permit an under-running trolley to freely pass through such interruption or gap, and a horizontal trolley-wheel running on the second-named wire and constructed to cross said gap, substantially as described.

16. The combination with a trolley-wire designed for the usual under-running trolley, of a second trolley-wire located at a lower level than the first-named wire and interrupted for a short distance in the vicinity thereof, a rigid arch joining the ends of the second-named wire at such interruption or gap, and a hori-

zontal trolley-wheel running on the second-named wire and constructed to cross said gap, substantially as described.

17. The combination with a trolley-wire designed for the usual under-running trolley, of
5 a second trolley-wire located at a lower level than the first-named wire and interrupted for a short distance in the vicinity thereof, a rigid arch joining the ends of the second-named
10 wire at such interruption or gap, an insulated hanger rigid with said hanger and holding the first-named wire, and a horizontal trolley-wheel running on the second-named wire and constructed to cross said gap, substantially
15 as described.

18. The combination with a trolley-wire designed for the usual under-running trolley, of
20 a second trolley-wire located at a lower level than the first-named wire and interrupted for a short distance in the vicinity thereof, an arch rising over the first-named wire and joining the interrupted ends of the second-named wire, insulating means holding the first-named wire in position within said arch,
25 projections or blocks at one side of and below said interrupted wire ends, and horizontal trolley-wheels having radially-projecting guides constructed to bridge over said interruption or gap and so permit the wheels to
30 cross the same, substantially as described.

19. The combination with a plurality of

trolley-wires crossing each other and having gaps at their intersections, of offset projections or track-blocks at such intersections
35 and gaps, and side-running current-collectors having the guides projecting laterally therefrom and constructed to bridge over said gaps and conduct the current-collectors across the same, substantially as described.

20. The combination with a plurality of intersecting trolley-wires having gaps at such
40 intersections, of a trolley-wheel in contact with the same and having a radially-extended guide constructed to bridge over said gap and enable said wheel to cross it, substantially as
45 described.

21. The combination with a plurality of intersecting trolley-wires having gaps at such intersections, of offset projections or track-
50 blocks at the sides of said gaps, and horizontal trolley-wheels running on said wires and having laterally-projecting guides constructed to bridge over said gaps and enable the wheels to cross the same, substantially as described.
55

In testimony that I claim the foregoing invention I have hereunto set my hand this 11th day of April, 1903.

ARTEMAS B. UPHAM.

Witnesses:

FRED G. TILTON,
GEORGE F. STILES.