

(No Model.)

5 Sheets—Sheet 1.

J. A. DUGGAN.
RAILROAD SWITCH.

No. 405,020.

Patented June 11, 1889.

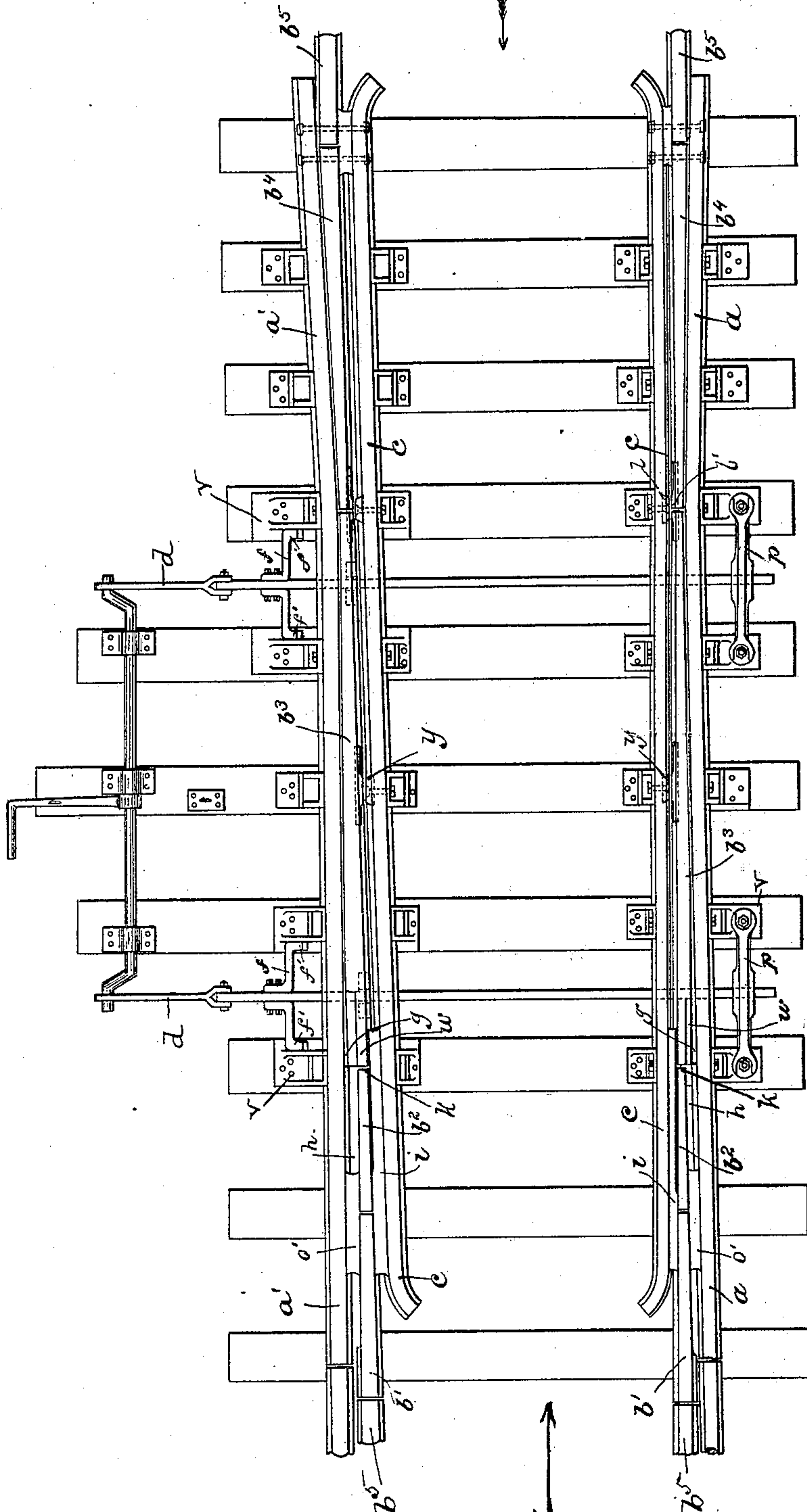


Fig. 1.

WITNESSES.

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George L. Kelme.

INVENTOR.

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by Charles H. Duggan
Attorney.

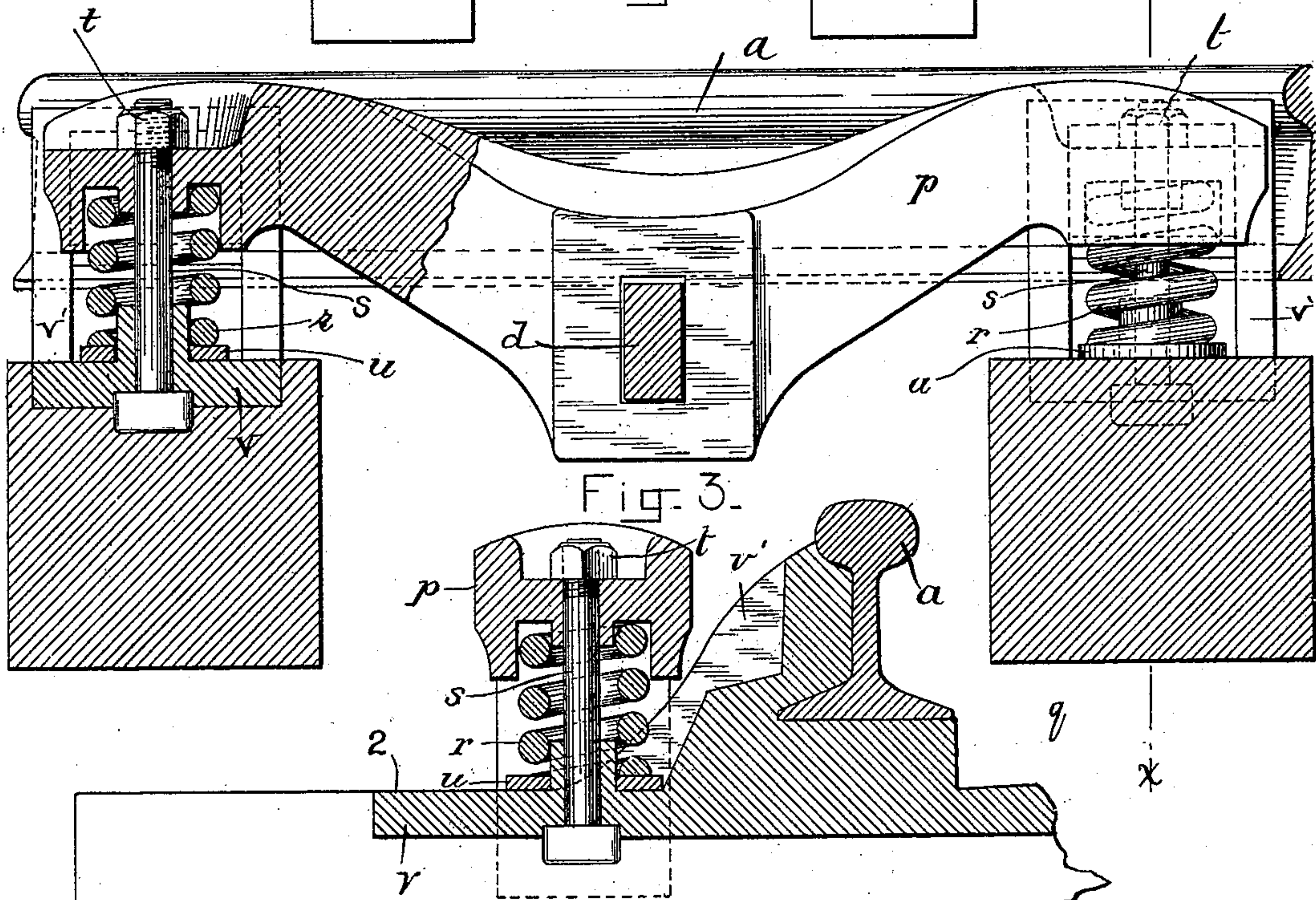
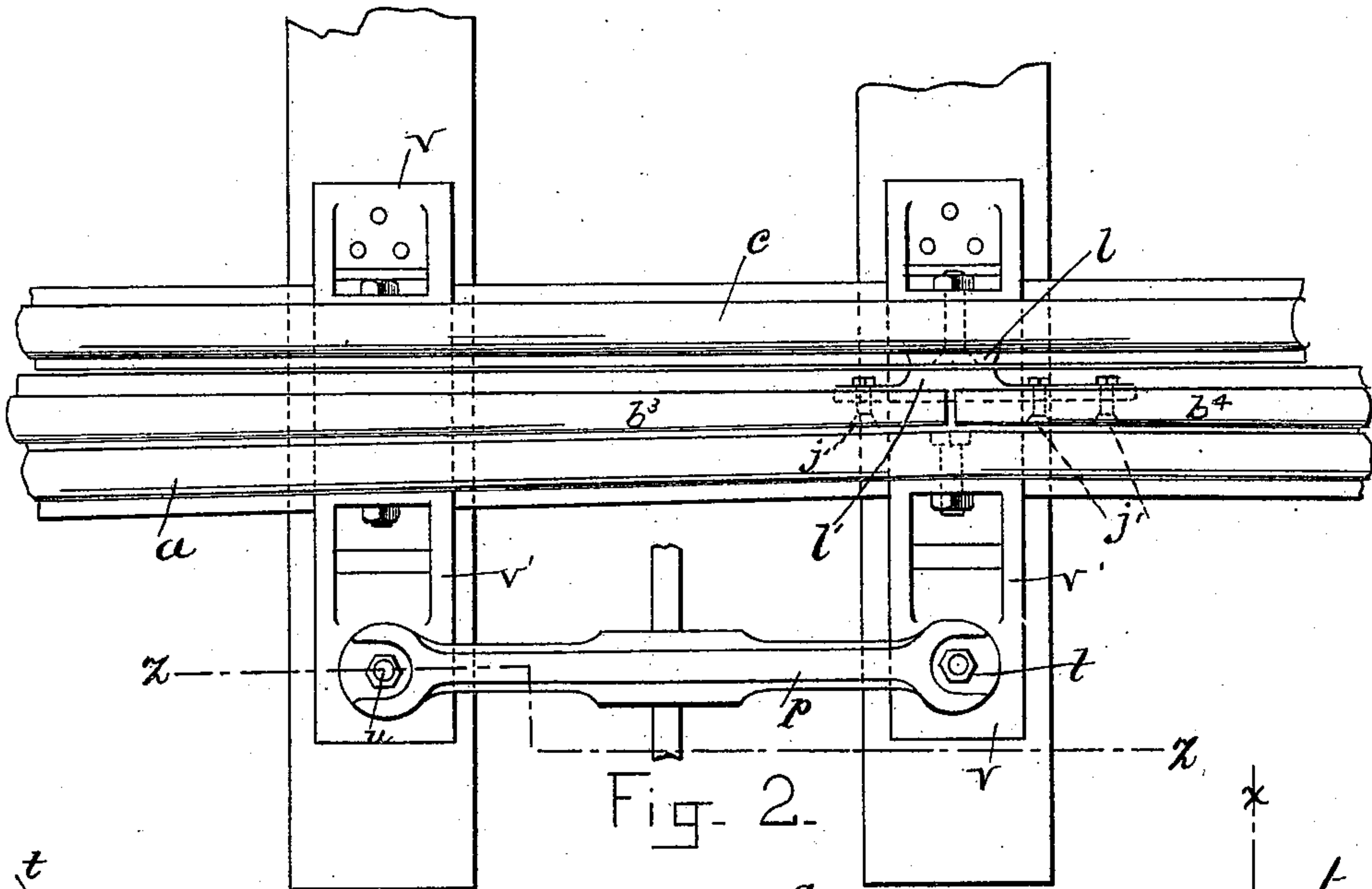
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WITNESSES.

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Fig. 4.

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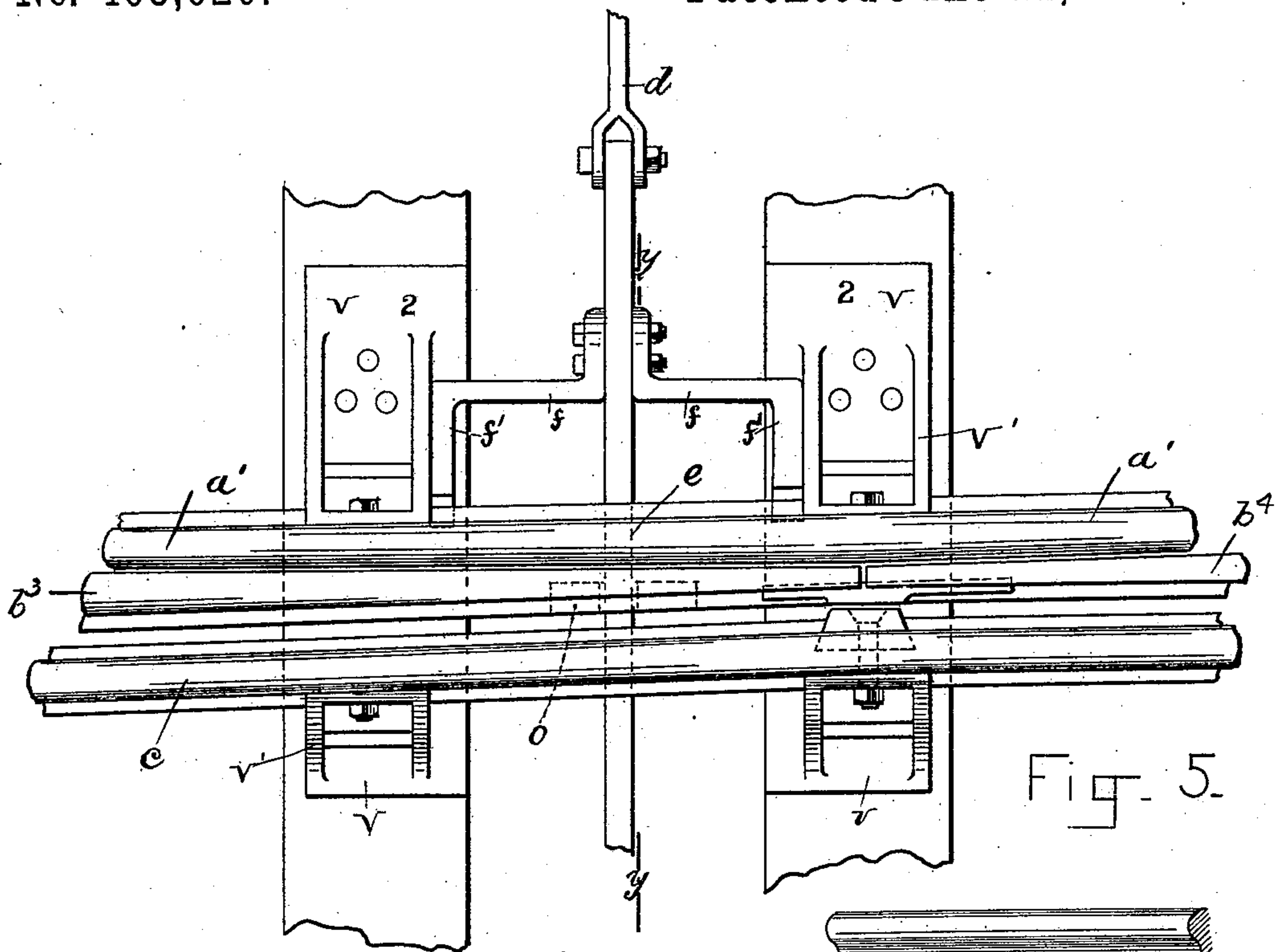


Fig. 5.

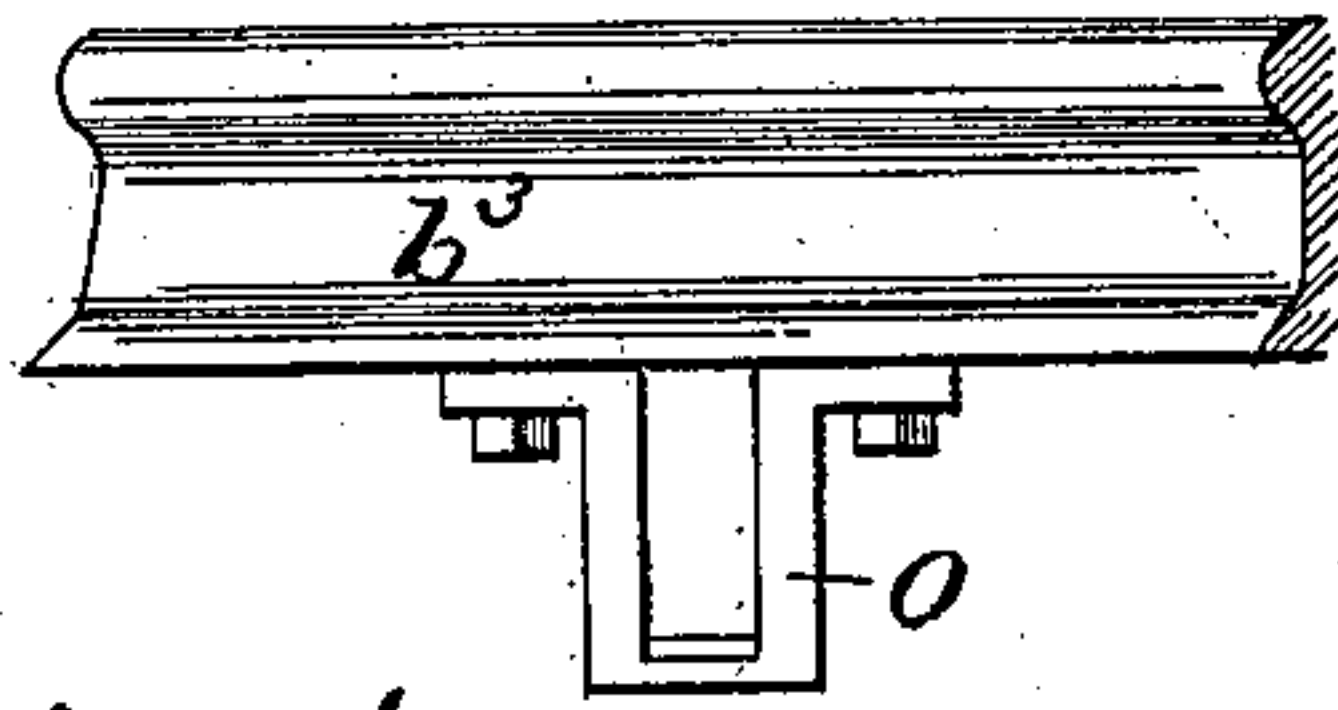


Fig. 12.

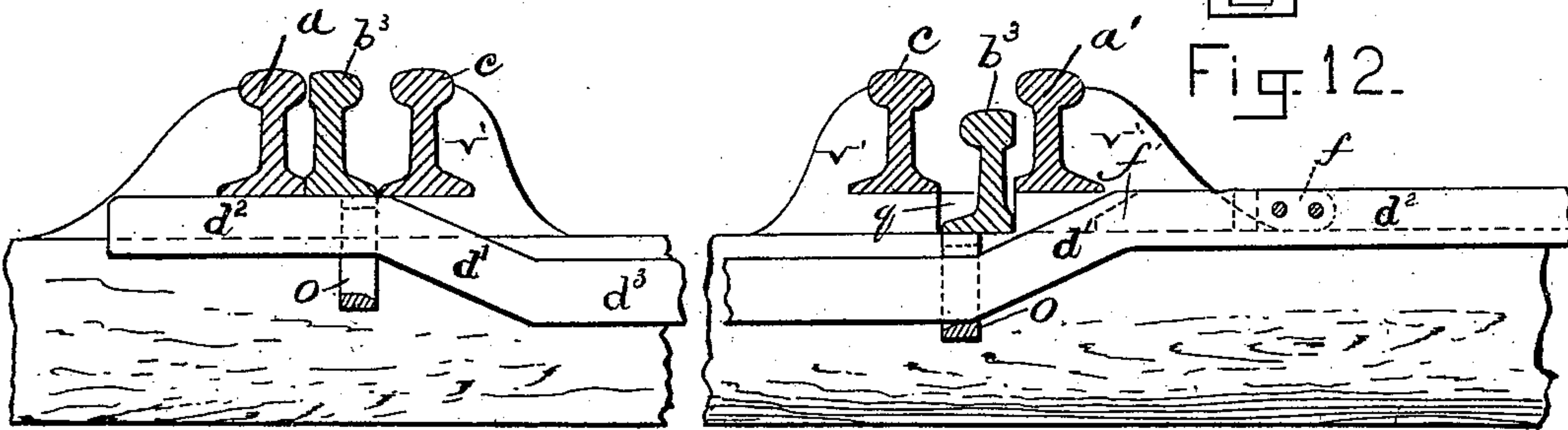


Fig. 6.

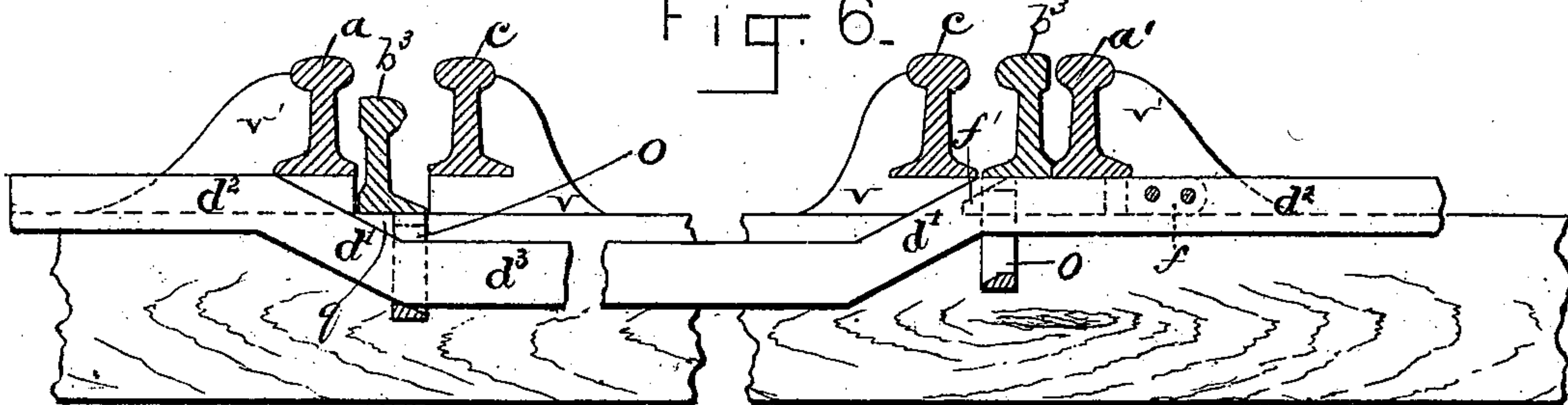


Fig. 7.

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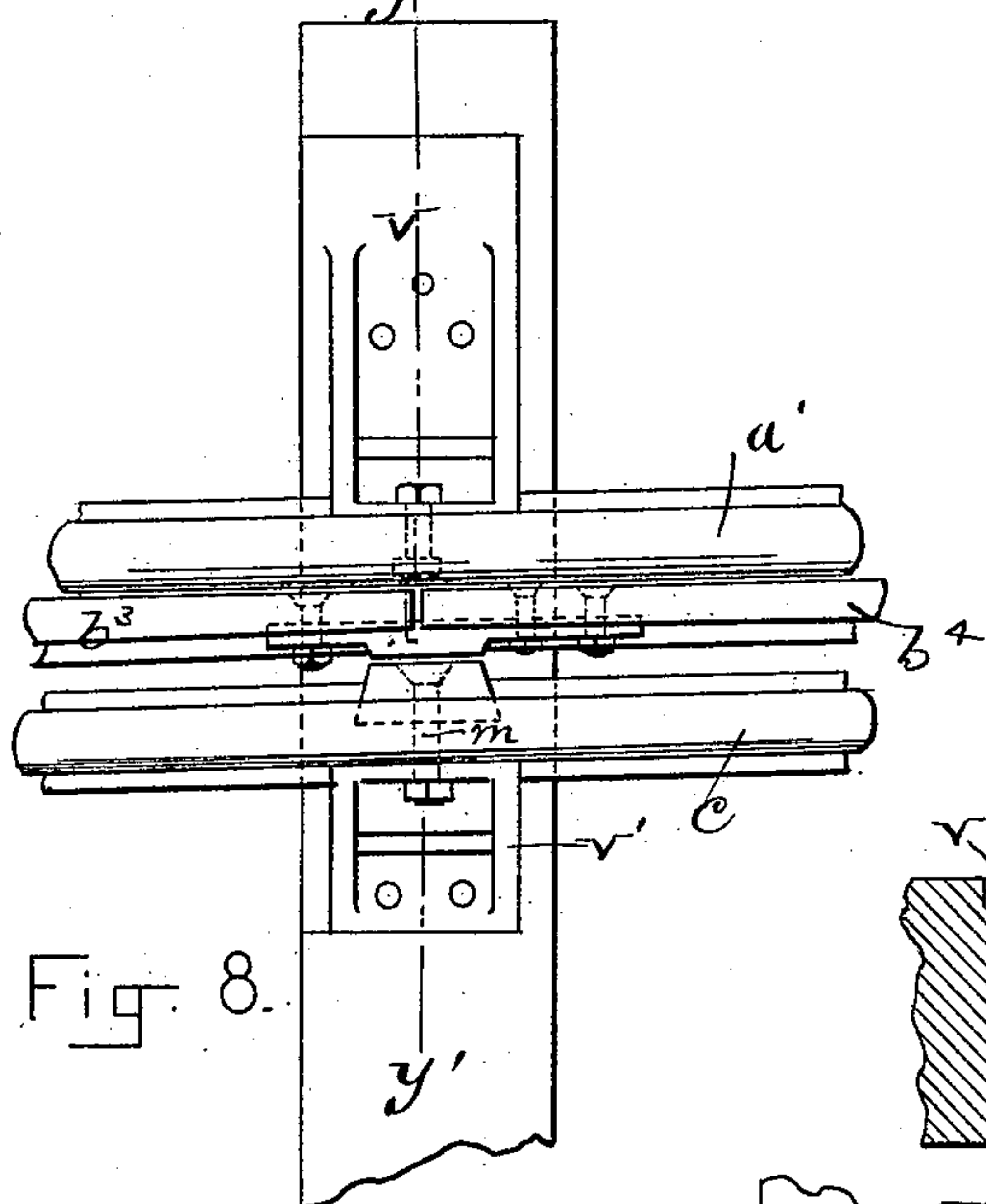


Fig. 8.

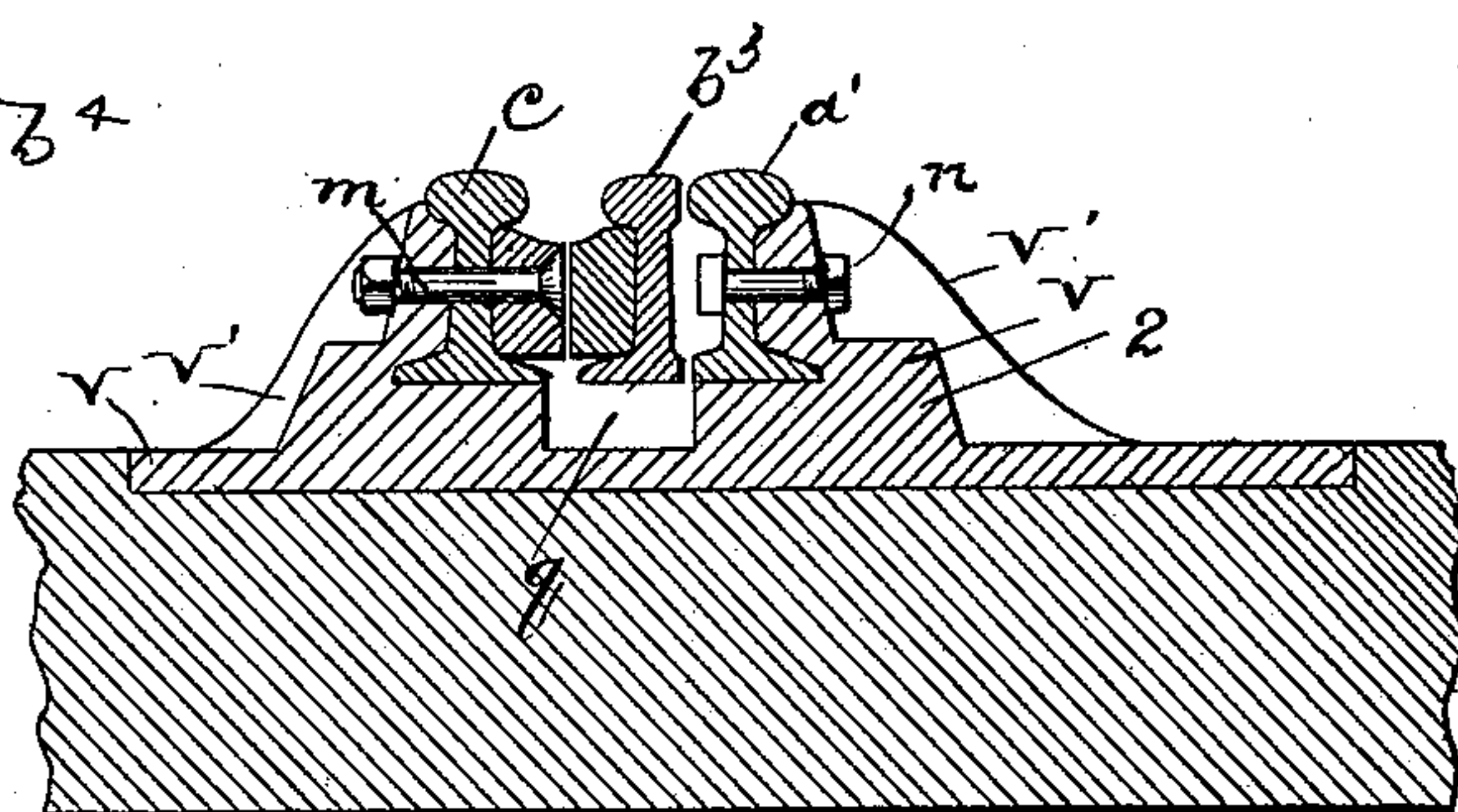


Fig. 9.

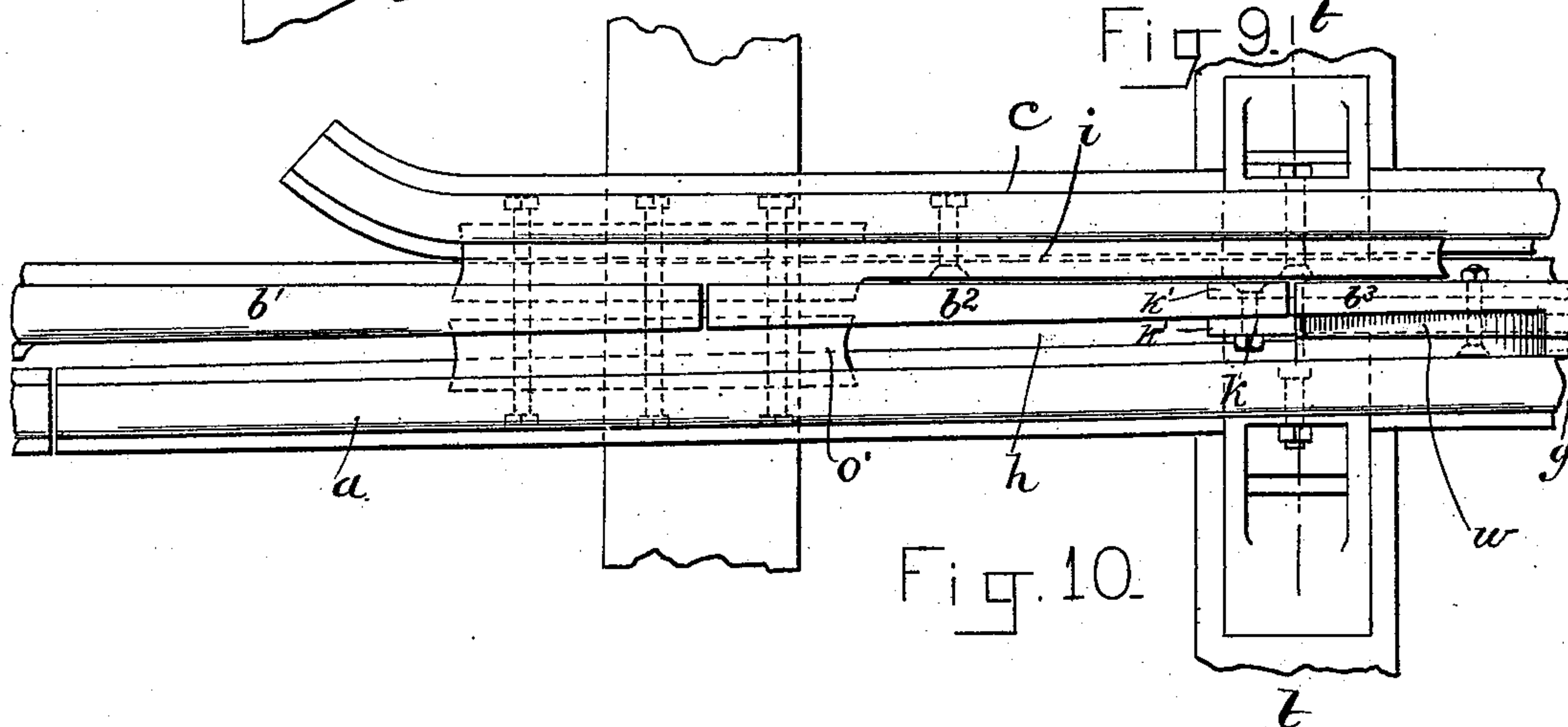
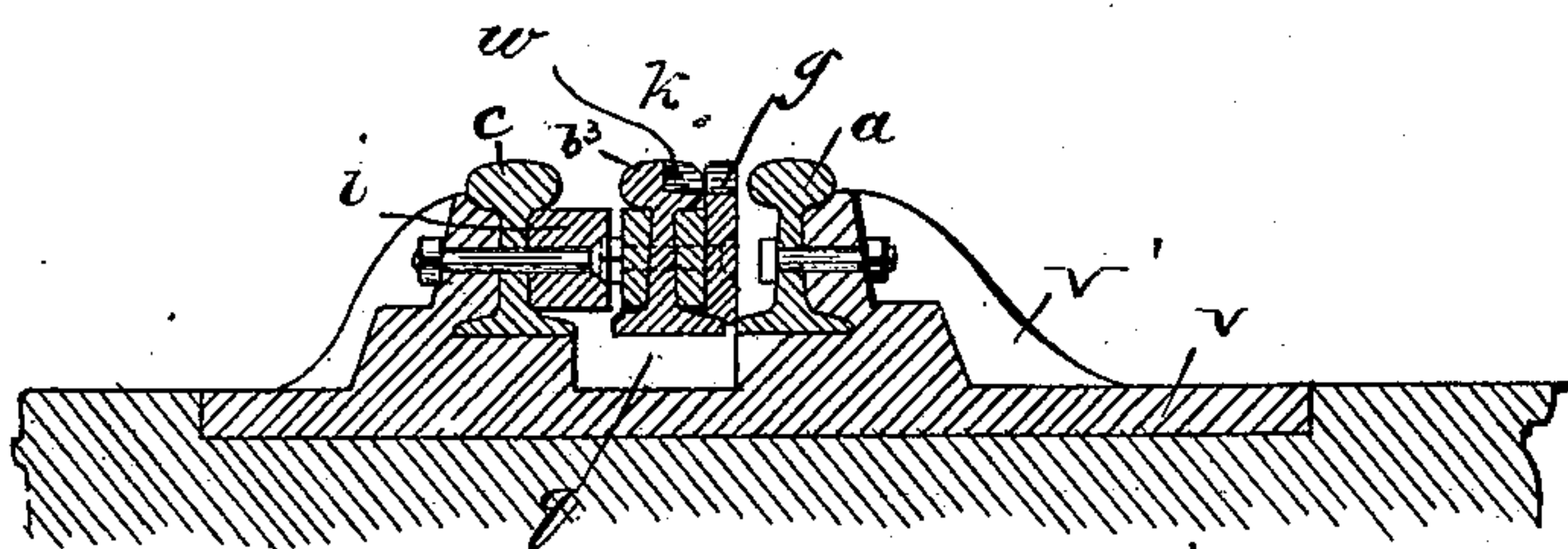


Fig. 10.



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Fig. 11.

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(No Model.)

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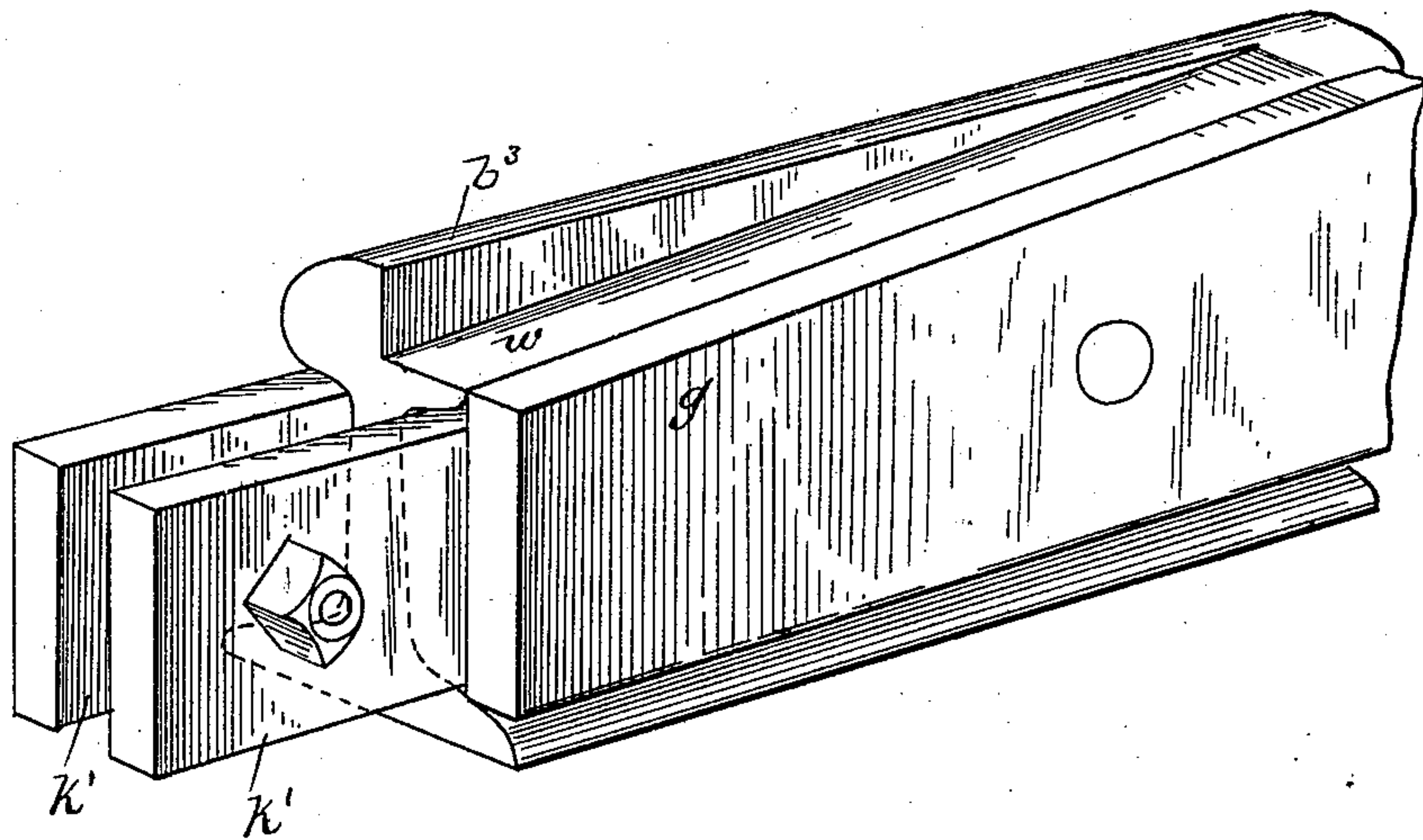


Fig. 13.

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UNITED STATES PATENT OFFICE.

JOHN A. DUGGAN, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO THE BURNHAM & DUGGAN RAILWAY APPLIANCE COMPANY, OF PORTLAND, MAINE.

RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 405,020, dated June 11, 1889.

Application filed July 17, 1886. Serial No. 208,288. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. DUGGAN, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Railroad-Switches; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention consists of improvements upon the railroad-switch described in Letters Patent to me dated November 24, 1885, No. 330,878.

I make use of guard-rails and switch-rails having their ends securely fastened to prevent lateral or rotary movement, resting upon solid bearings, and provided with joints, so that the middle portion of the rail may have a vertical movement. Instead of imparting the vertical movement to the switch-rail by a crank-shaft, as shown in my said patent, I accomplish the raising and lowering of the rail by means of operating-rods moving longitudinally and bent at the proper distance apart at angles, so as to form an incline on each side, which inclines pass under the movable rails, so as to depress the one and elevate the other, and thereby accomplish the switching from the main track to the siding and from the siding to the main track.

Other improvements upon the switch described in my said patent will be hereinafter described.

In the drawings I have shown in Figure 1 a plan of my switch; Fig. 2, enlarged view of portion of the rails and adjustable elastic yoke; Fig. 3, enlarged longitudinal sectional elevation of Fig. 2 on line $z z$; Fig. 4, section on line $x x$, Fig. 3; Fig. 5, plan of cross-arms and solid blocks; Fig. 6, sectional elevation on line $y y$, Fig. 5; Fig. 7, section on same line, showing operating-bar thrown to the left; Fig. 8, plan of joints and slide-blocks attached to rails; Fig. 9, section on line $y' y'$, Fig. 8; Fig. 10, plan of blocks, wedges, and incline; Fig. 11, section on line $t t$, Fig. 10, looking to the right of said figure; Fig. 12, an enlarged view of the strap con-

necting the operating or switch rod with the middle or switch rail, and Fig. 13 the construction of the joint connecting the parts b^2 and b^3 and of the incline w .

$a a'$ are the outside or stock rails. The middle or movable rails are made up of the sections $b' b^2 b^3 b^4 b^5$.

$c c$ are the guard-rails.

$d d$ are the switch or operating rods, which accomplish the raising and lowering of the rails by means of a longitudinal movement.

The mechanism for raising and lowering is shown in section in Figs. 6 and 7. A strap o is firmly attached to the middle rail and passes down under the operating-rod d . In Fig. 6 there is shown the strap on the left side under the rod and just above the incline d' , and on the right side the strap is below the incline d' on that side. In this position the upper part d^2 on the left side of the rod d supports the middle rail on that side, while the rod d , by means of the strap o on the right side, holds down the middle rail on that side. When it is desired to elevate the right-hand middle rail and depress the other, the rod d is moved to the left, as shown in Fig. 7. As the rod d is moved the strap on the left side passes down the incline d' , pulling down the middle rail on that side by means of the strap until the strap is under the part d^3 of the rod, when the middle rail is held at its lowermost point. At the same time the strap on the right side, which has before held down the middle rail on that side, passes up the incline d' , the middle rail being pushed up by the upper face of the incline, and the movement continues until the middle rail on the left side is at its lowest point, when the middle rail on the right side is raised so as to be on a level with the outer and guard rails and supported by the part d^2 of the rod d . This position of the middle rails, straps $o o$, and operating-rod d is shown in Fig. 7. The pieces f' , connected by arms f to the rod d , Fig. 5, pass under the middle rail, which is to be held up, sliding upon side projections or flanges on the chairs v' , which flanges also furnish a bearing on which the pieces f' rest, and thus a firm support is given to the middle rail.

In Fig. 1 I have shown on the left side the

device for a rigid support, and on the other side I have shown an elastic support, of which an enlarged view is shown in Fig. 3. This consists of the yoke *p*, resting at each end on the springs *r* and secured by the bolt and nut *s* to the chair *v*, to which the several rails are attached, as shown in Figs. 9 and 11.

If it should be desired to stiffen the springs, it may be done by unscrewing the nut *t*, removing the bolt and spring, and inserting the washer *u*, and also by means of the nut *t* the spring may be adjusted so as to increase its stiffness, if desired.

The chair *v* is so constructed that the outside or stock rail is supported upon a solid seat having braces *v'* on the outside of the rail. The rail is held in position against these braces by bolts *n n*. The guard-rail is in like manner supported on its seat by braces, and also held in position by bolts, one of which is shown in Fig. 9. This chair, which has its entire bearing-surface upon a solid tie, is provided with a space *q* directly beneath the middle rail, which allows the rail to move up and down, as already explained.

It is obvious that the outside rail and guard-rail are fixed and immovable, and the middle rail can only have a vertical motion. The chairs *v* differ from the others in having a flange on which *f'* slides and has a bearing, as above explained.

The middle rail *b* is made up of the following parts: the pieces *b'*, *b²*, *b³*, *b⁴*, and *b⁵*. The solid piece *b'* has no motion whatever. The short piece *b²* is held firmly in place, so as to allow of no lateral motion, by means of the long piece *i* and the piece *o'* and bolts passing through from side to side, as shown in Fig. 10; but it has a vertical motion—that is, when the piece *b³* is raised, as hereinafter explained, the front end of *b²* is correspondingly raised, and for that purpose is provided with the joints *k*, formed by two pieces of metal *k'*, placed in the hollow of the rail, one on each side and lapping over the joint between *b²* and *b³*, and having a bolt passing through each end and through the pieces *b²* and *b³*, on which bolts the part *b²* can turn, so as to adapt part *b²* to *b³* when the latter is raised. A similar joint is provided at the point where *b³* meets *b⁴*, so that *b⁴* moves down when *b³* descends and forms an incline.

The piece *i* extends across the joints *k*, so as to impart strength to the joints and prevent all sidewise motion. It is provided with a smooth face, which bears against the piece *k'*, also provided with a smooth face, and is permanently fastened to the guard-rail. This arrangement obliges the middle rail to remain firmly in its position and allows it no motion but a vertical one. Just in front of the piece *o'* is the space *h*, and immediately in front of this space is the wedge *g*, which fills a space which would otherwise exist between the middle rail and the running side of the outside rail and would allow a wheel-flange to press in between the outside rail

and the middle rail, and thus force the latter rail laterally from its position. It is securely fastened to the middle rail and has its top on a level, or nearly so, with the top of the movable rail. The piece *b³* is also jointed by means of bolts at each end. It is so fixed as to have only a vertical motion and is directly acted upon by the operating-rod, which lifts it up on one side and depresses it on the other, as above explained. Midway of this center rail are two blocks *y y*, for holding the center rail in position, so that it can move only vertically.

It will be seen that when the piece *b³* is depressed the piece *b²* at one end and the piece *b⁴* at the other move downward, turning on the bolts forming their joints, and thus make a slight incline from the solid and unmoving parts of the middle rail.

A part of the top of the piece *b²* of the middle rail is planed off on the back side, as shown in Fig. 10, so as to make the space narrow between the running side of the guard-rail and the running side of the outside rail, in order to secure a bearing for narrow wheel-treads on the outside rail, and also to provide a space for the wheel-flange to move in. The piece *b²* has also a part of its top planed off to give a space for the wheel-flange to pass between it and the outside rail. At one end of the piece *b³*, Figs. 1 and 10, is an incline, which is made by planing off a part of the top of the rail, but so that the running side of the rail is left intact. The wedge which fills the space between the middle rail and stock-rail is also planed off at the top, the two surfaces thus planed off forming the incline *w*.

l is a block rigidly fastened to the guard-rail, and having a smooth vertical face and filling a part of the space between the guard-rail and the movable rail.

l' is a block or bar of sufficient length to lap over the joint of the two parts of the middle rail and secured by the bolts *j'*. (Shown in Fig. 2.) This piece is enlarged in its central part, so as to fill the remaining space between the guard-rail and the middle rail, and is provided with a smooth face and adapted to have a vertical motion, moving with the part *b³* of the middle rail, to which it is attached.

The operation of my invention is as follows: Referring to Fig. 1, which shows the switch placed for the passage of a train in the direction of arrow 1 from the main track to the siding, if a train should come along the main track from the opposite direction, or "heel-on," as it is called, the wheel-flanges running in the space between the solid part of the middle rail and the outside rails would bear upon the incline on the right-hand side and force the rail down, the yoke mounted upon the springs giving way for that purpose. On the other side the wheels lap over onto the outside rails in the ordinary manner, and thus the train would pass through safely—

that is, when the switch is misplaced, being set for the siding, the wheels will force down the side which is mounted upon the spring-yoke and the wheels will run on the top of the rail on the other side. The weight is ordinarily supported on the outside or stock rail, the middle rail serving to guide and by means of the vertically-moving middle portion b^3 to switch the train.

10 What I claim, and desire to secure by Letters Patent, is—

1. A switch having guard and stock or outside rails supported upon solid bearings, to which they are fixed so as to permit of no motion, in combination with a middle or switch rail having neither ends nor points, the switching being accomplished by raising the central portion of the switch-rail on one side and lowering it on the other, substantially as and for the purpose above described.

2. In a railroad-switch, a switch-rail having the middle part adapted to be raised and lowered and connected with sections of the switch-rail which form inclines when the middle portion is lowered, the inclined parts being jointed at one end to the fixed section of the rail and at the other end to the vertically-moving middle part, substantially as and for the purpose above described.

30 3. The horizontally-moving operating-rods d , having thereon the inclines d' d' , and the horizontal supporting-faces d^2 d^2 , in combination with the switch-rails and straps o o , substantially as and for the purpose above described.

4. The operating-rod, the switch-rail having neither ends nor points, the central portion of which is capable of being elevated and depressed throughout its entire length, and the arms f f , provided with the supporting-pieces f' f' , in combination, substantially as described.

5. The operating-rod d , the yoke p , the springs s s , and the switch-rails, in combination, substantially as described.

6. The yoke p , the spring r , bolt s , nut t , and washer u , in combination, substantially as and for the purpose above described.

7. The double chair v , provided with outside braces and having a central recess, in combination with the stock-rails and guard-rails independently secured to said braces, respectively, substantially as and for the purpose above described.

8. The incline w , in combination with the switch-rail, the yoke p , and the spring r , substantially as and for the purpose above described.

9. The stock-rail lapping by the joint between b' and b^2 , having its top substantially level with the switch-rail and bolted through the guard-rail, in combination with the guard-rail, substantially as and for the purpose above described.

10. The blocks i and o' , in combination with the parts b' and b^2 of the middle rail, substantially as and for the purpose above described.

11. The vertically-sliding blocks l' l' , in combination with the guard and switch rails, substantially as and for the purpose above described.

12. The blocks y y , in combination with the middle rail, substantially as and for the purpose above described.

13. The pieces k' k' , in combination with the piece i and the parts b^2 b^3 , substantially as and for the purpose above described.

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Witnesses:

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