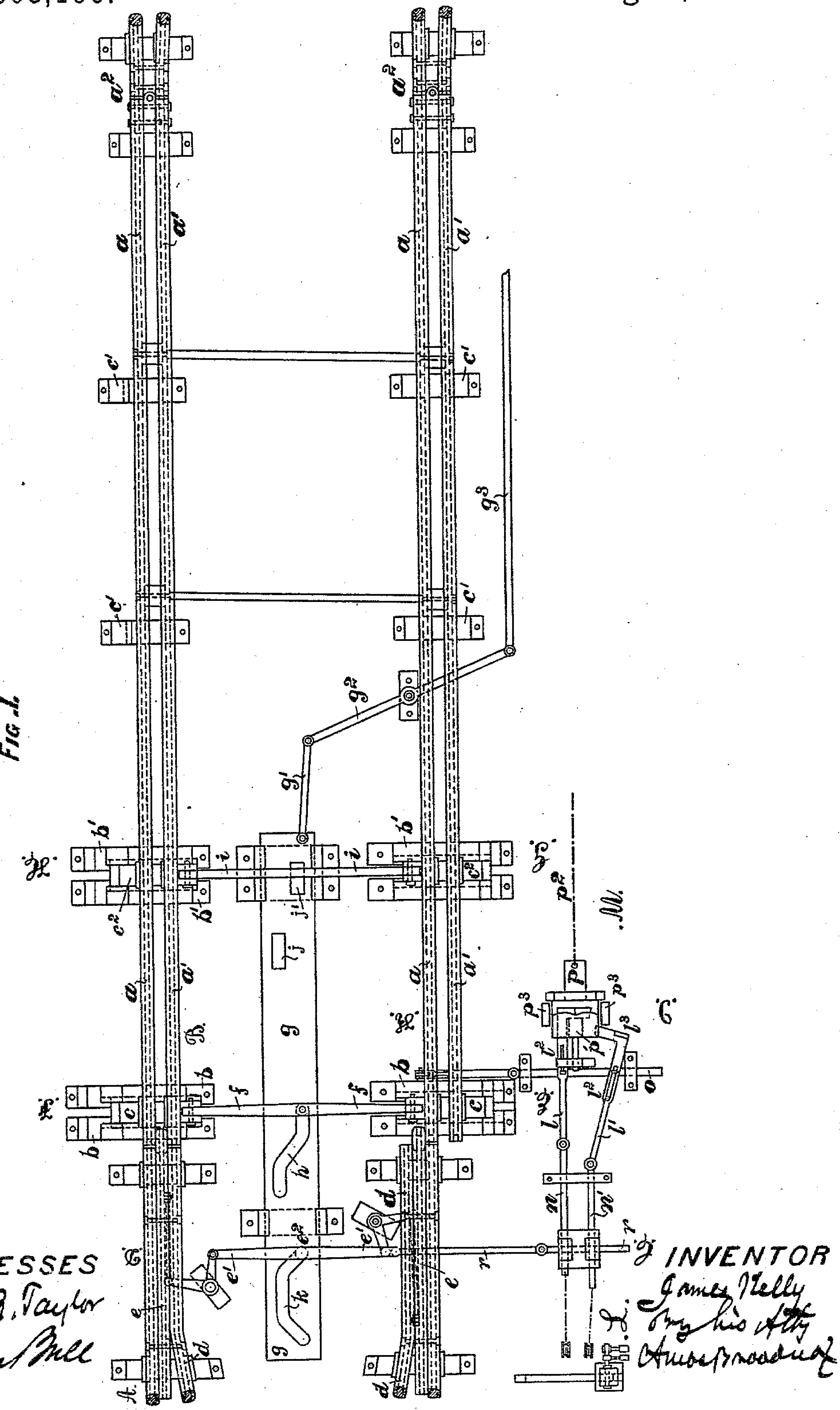
(No Model.)

3 Sheets—Sheet 1.

J. KELLY.

RAILWAY POINT AND LOCKING APPARATUS FOR SAME.

No. 303,166. Patented Aug. 5, 1884.



WITNESSES

Samuel B. Taylor

[signature]

INVENTOR

James Kelly

by his Atty

Amos Broadnax

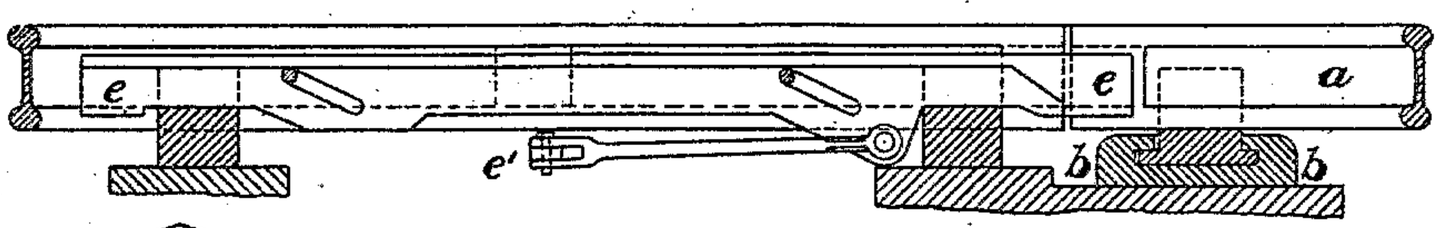
(No Model.) 3 Sheets—Sheet 2.

J. KELLY.

RAILWAY POINT AND LOCKING APPARATUS FOR SAME.

No. 303,166. Patented Aug. 5, 1884.

FIG. 2.



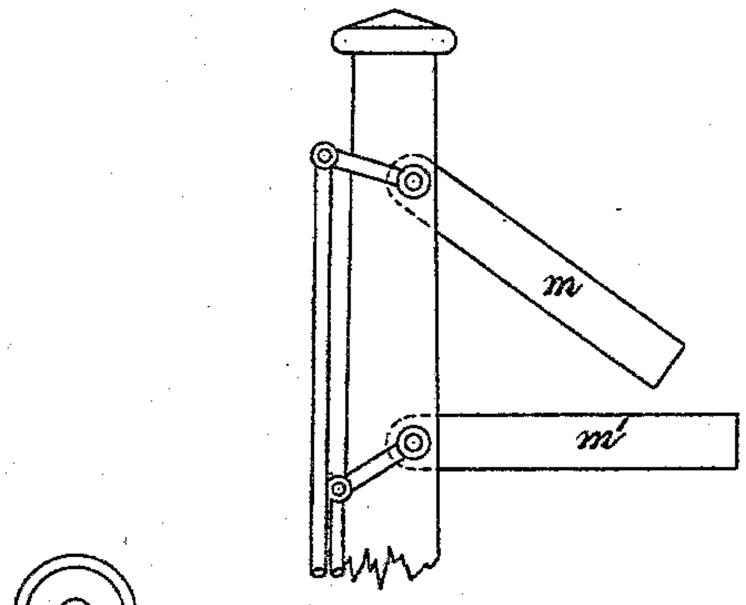


FIG. 6.

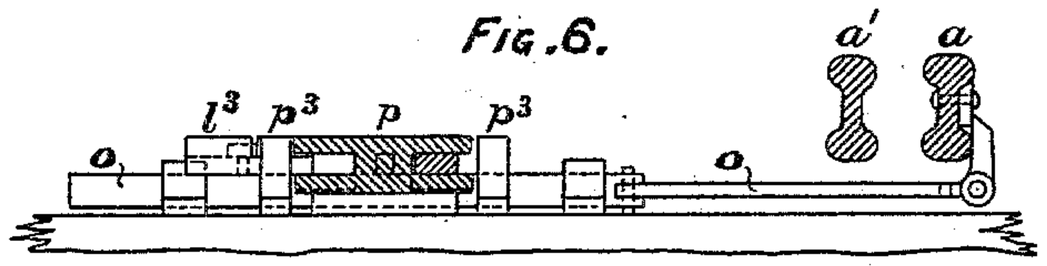


FIG. 3.

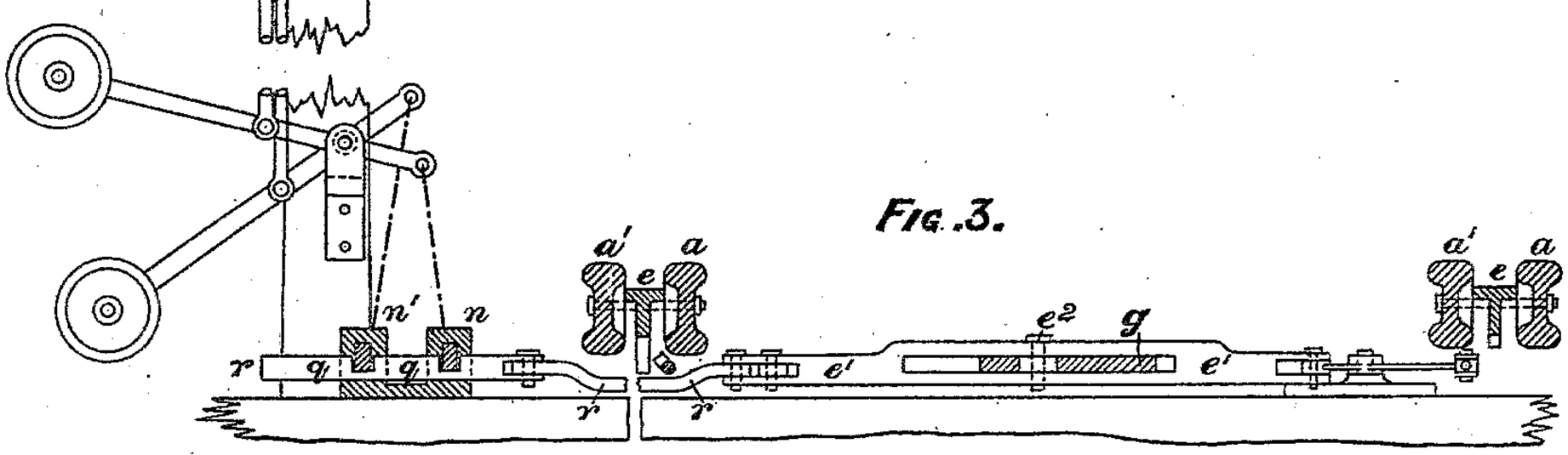


FIG. 4.

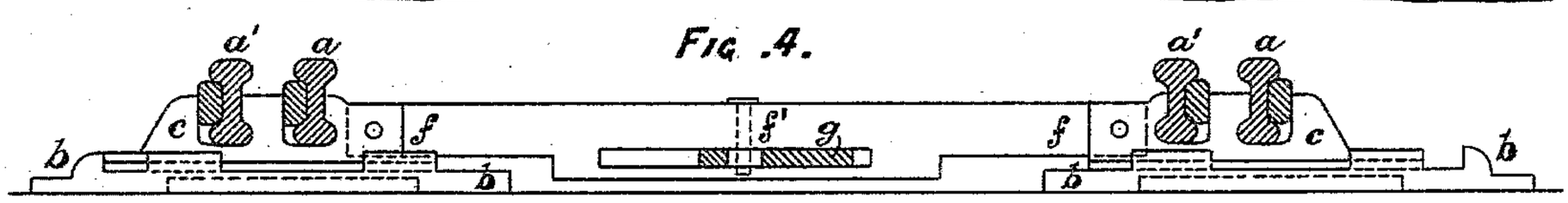


FIG. 5.

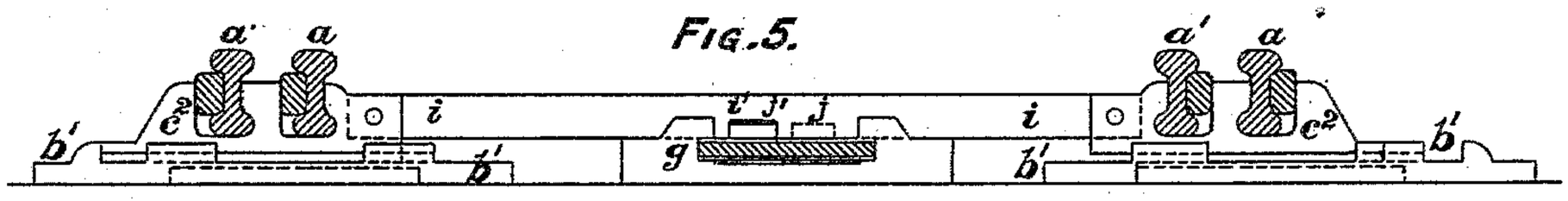
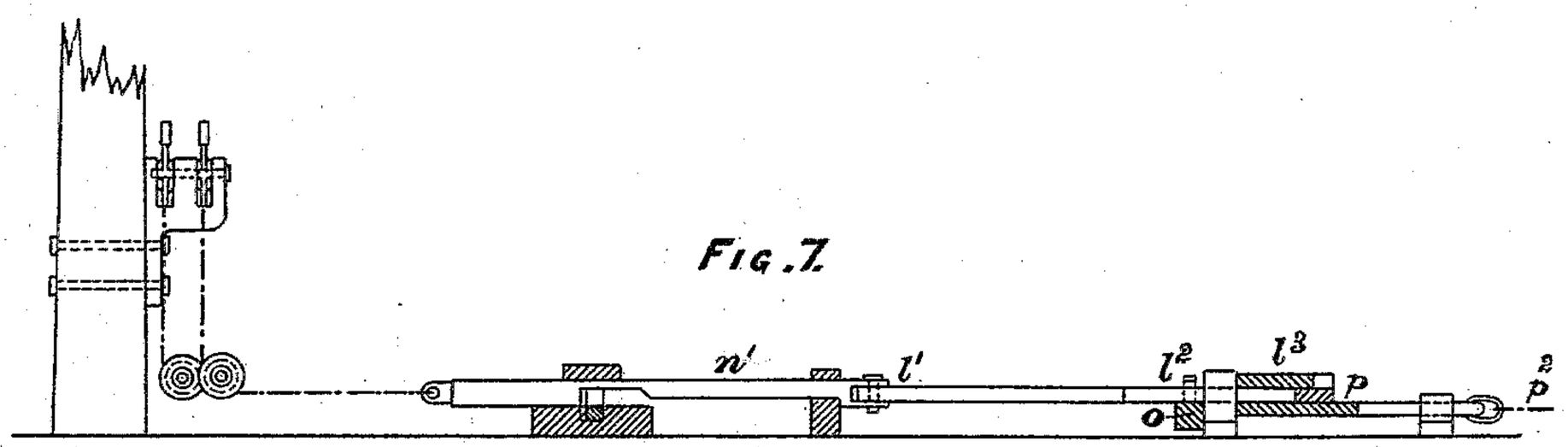


FIG. 7.



WITNESSES

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(No Model.) 3 Sheets—Sheet 3.

J. KELLY.

RAILWAY POINT AND LOCKING APPARATUS FOR SAME.

No. 303,166. Patented Aug. 5, 1884.

FIG. 8.

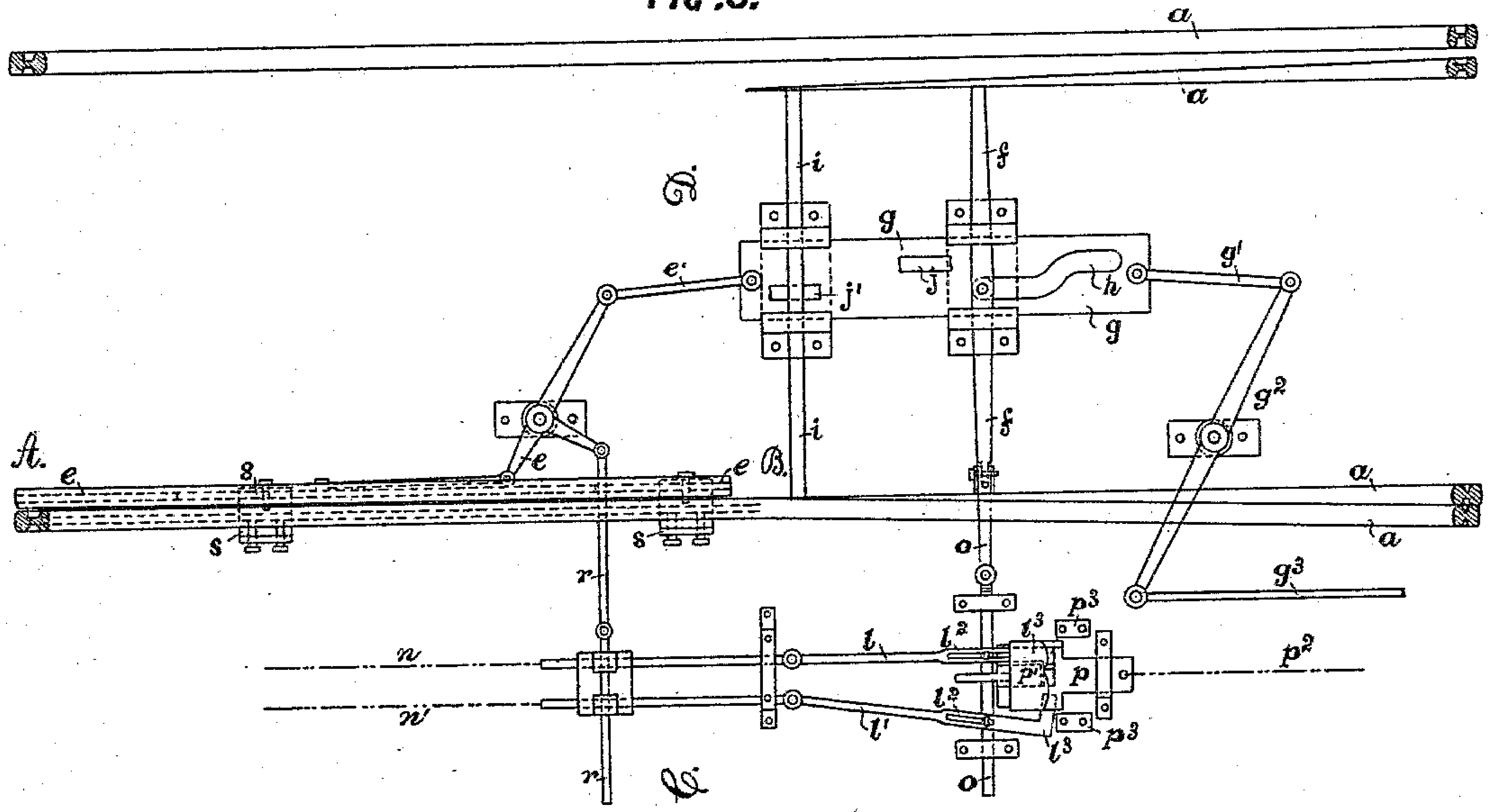


FIG. 9.

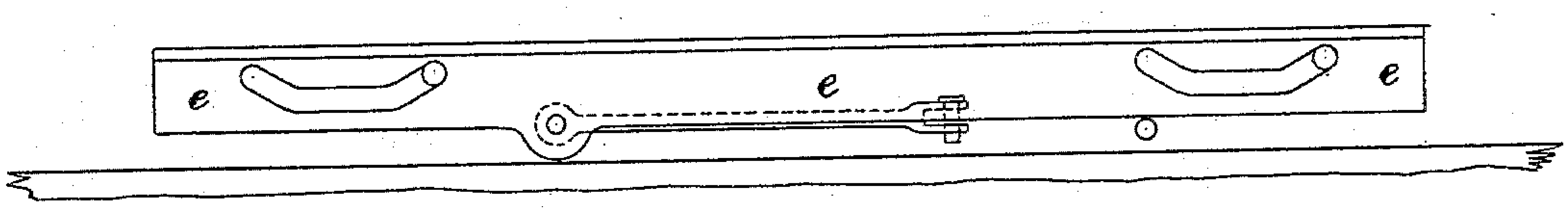


FIG. 10.

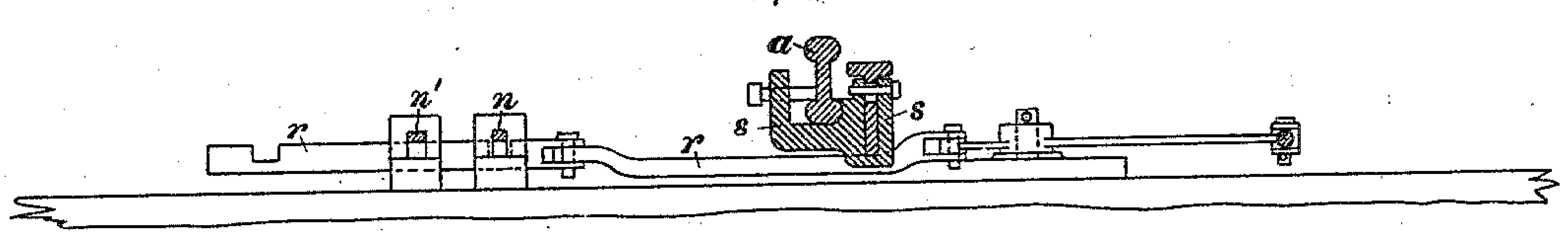
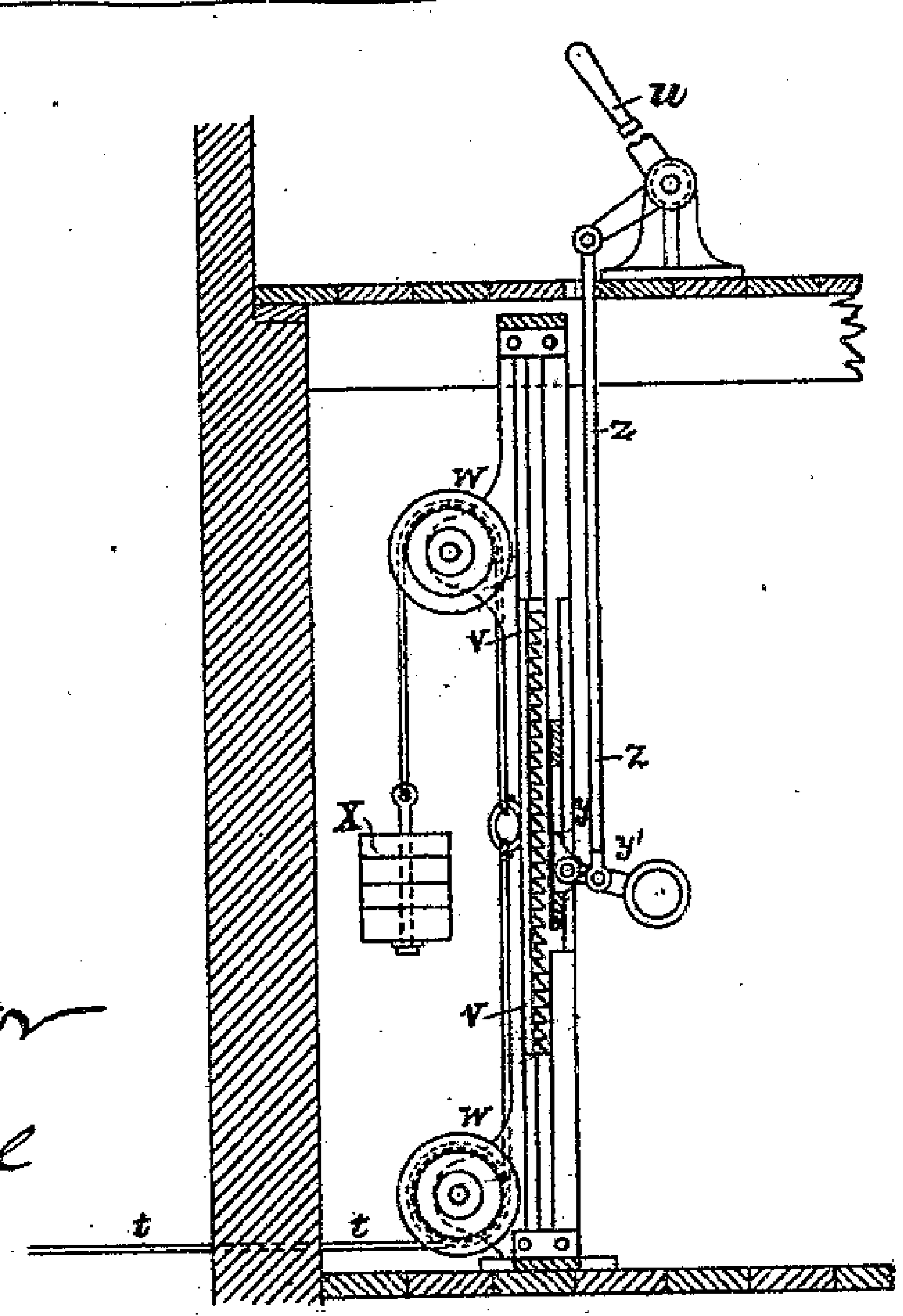


FIG. 11.



WITNESSES

INVENTOR

James Kelly
By his Atty

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JAMES KELLY, OF LIVERPOOL, COUNTY OF LANCASTER, ENGLAND.

RAILWAY-POINT AND LOCKING APPARATUS FOR SAME.

SPECIFICATION forming part of Letters Patent No. 303,166, dated August 5, 1884.

Application filed October 24, 1883. (No model.) Patented in England July 10, 1874, No. 2,421.

To all whom it may concern:

Be it known that I, JAMES KELLY, a subject of the Queen of Great Britain, and a resident of the city of Liverpool, in the county of Lancaster, in that part of the United Kingdom of Great Britain and Ireland called England, have invented certain new and useful Improvements in Railway-Points and Locking Apparatus for Same, and in the means of actuating signals connected therewith and interlocking same with the points, and compensating for contraction and expansion of the rods or wires working such signals, (for which I have obtained a patent in Great Britain, No. 2,421, bearing date July 10, A. D. 1874;) and I do hereby declare that the following is a description of my invention in such full, clear, and distinct language as to enable any one skilled in the art to which it belongs to put the same into practice, reference being had to the sheets of drawings hereto annexed, and to the letters and figures of reference marked thereon.

My invention relates to improvements in railway-points for changing the direction of trains from one line to another, and to apparatus for locking such points when in the desired position, and for actuating semaphore or other signals to show "line clear" or "danger," and for automatically interlocking the signals with the points, so that the signals can only indicate the position of the points.

My invention consists in certain novel parts and combinations of parts forming improved mechanism for operating and locking railroad-points, and also for operating and locking signaling devices connected thereto. Both points move in unison, and are fitted in double chairs which move with a limited traverse on suitable guides, and where required suitable half-chairs may be used. In front of the points and within the gage are fixed two guide-rails, to insure that the train takes the points.

My invention also relates to an apparatus which I will call the "point-lock," which consists in fitting between these guide-rails and the main rails a bolt or bar of iron so arranged that it is capable of a rising and falling movement, and also of a forward movement, the object of which movements will be hereinafter explained. The double chairs carrying the extreme ends of the main and branch points are connected by a transverse rod having in its center a pin fitted with an anti-friction roller. The levers working the point-locks are also connected by a transverse rod having a similar pin in its center. In the gage and between the rails is fitted a sliding plate which has action parallel with the rails, and is operated by suitable rods, levers, or their equivalents, under control of the pointsman. This sliding plate is fitted with two grooves or slots of peculiar construction, into which take, respectively, the rollers on the two pins upon the transverse bars before mentioned. The first slot is thus connected with the point-lock, and the second slot with the sliding chairs which carry the points themselves. The first slot is formed with three distinct directions—namely, diagonal, longitudinal, and return diagonal. The second slot is also formed with three distinct directions—namely, longitudinal, diagonal, and longitudinal. The combined main and branch points are also fitted in a second set of double chairs placed somewhat nearer the heel of the points. These chairs also move with a limited traverse on suitable guides, and are connected by a transverse bar passing over the tail end of the sliding plate before named, and on the under side of this last-mentioned transverse bar there is a slot or groove, which in certain positions of the sliding plate acts as a lock by taking onto one or the other of two longitudinal lugs formed on the tail portion of the face of the sliding plate and having position relative to the side travel of the points.

The action of the above-described apparatus is thus, the first slot in the traveling plate having a diagonal direction and being in connection with the point-lock, the second slot in the traveling plate having a longitudinal direction and being in connection with the points themselves, and one of the locking-lugs on the tail of the traveling plate taking into the slot or groove on the under side of the transverse bar in connection therewith. The result of the first movement of the traveling plate is to lift up and withdraw the point-lock, and the locking-lug on the tail end of the traveling plate is also withdrawn from the transverse bar, thus leaving the combined points free to travel. Upon a further

stroke of the traveling plate the first slot, having a longitudinal direction, leaves the point-lock in the position obtained by the first portion of the stroke. The second slot, however, having a diagonal direction, causes the combined points to travel to the required position. In the traverse of the combined points the transverse bar passing over the tail end of the traveling plate travels also its proportionate distance, and brings the groove or slot in the under side of this transverse bar opposite the second locking-lug on the tail end of the traveling plate. Upon a further stroke of the traveling plate, the first slot, having a return diagonal direction, causes the point-lock to resume its normal position, and so to lock the combined points. In this portion of the movement of the traveling plate, the second slot having a longitudinal direction, the position of the combined points remains unaltered; but the second lug on the tail end of the traveling plate enters the groove or slot on the transverse bar in connection therewith, and so acts as a further lock.

It will be seen by the foregoing that the operations of unlocking, shifting, and relocking the points are accomplished by one movement in one direction of the traveling plate, which is itself caused to travel by a lever-and-rod connection actuated by one stroke of the pointsman's lever.

The apparatus for the signals consists of two rocking levers having longitudinal slots and quadrant ends. These levers are respectively connected with and operate the signals in connection with the points—that is to say, one lever is connected with the rod and wire which move the signal for the main line, and the other lever is connected with a rod and wire which move the signal for the branch lines. Each of these levers is provided with a longitudinal slot, into which takes one of two pins or studs fixed to a traveling bar which is attached to and moves in unison with the combined points. The quadrant ends of the rocking levers work across the face of a sliding plate, having a stud or projection so arranged thereon that it will act upon whichever of the rocking levers may be in gear with it, and by this means move the signals. The signals for the main line, and also for the branch line, are both by this arrangement worked by one rod or wire only which operates the sliding plate, and this sliding plate is actuated by one lever only under the control of the signalman.

To interlock the signaling apparatus with the apparatus for locking the points above described, I provide rods (which connect the locking-levers with the signals) with a projection on their under side, so arranged that they are respectively locked or free, according to the position of that transverse bar which is worked by the point-locking apparatus. This transverse bar has cross-grooves therein, so arranged that the stud or projection on the signal-rods will pass through or be locked by it, according to the position of the point-lock, and when the points are unlocked both signals stand at "danger," and when the main line is open the branch signal is both locked and disengaged, and similarly, when the branch line is opened, the main-line signal is both locked and disengaged. The signalman is therefore entirely dependent upon the position of the points, and can only give his signal that either main or branch line is clear when such is actually the case. I may apply to the wire or rod which transmits motion to the signals a toothed rack, and also a weight sufficient to take up all slack due to expansion or contraction of the rod or wire, but not sufficient to actuate it or affect the signal. In connection with the rack is a pawl with a lever and weight, so arranged that when the signalman is not operating the signal the pawl automatically falls out of gear with the rack, and which also automatically retakes into gear with the rack so soon as the signalman attempts to move the signal.

Referring to the drawings, Figure 1 is a plan showing my invention applied to rails having square points and of the same section as the main rail, also apparatus for moving and locking the points and apparatus for actuating signals and interlocking same with the points. Fig. 2 is a section through A B, Fig. 1. Fig. 3 is a section through C D, Fig. 1. Fig. 4 is a section through E F, Fig. 1. Fig. 5 is a section through G H, Fig. 1. Fig. 6 is a section through I K, Fig. 1. Fig. 7 is a section through L M, Fig. 1. Fig. 8 is a plan showing my invention applied to feather-points. Fig. 9 is a section through A B, Fig. 8. Fig. 10 is a section through C D, Fig. 8. Fig. 11 is a side elevation showing apparatus for compensating for contraction and expansion of rods or wires working signals according to my invention.

Upon reference to Fig. 1 it will be seen that the points *a a* and *a' a'* are formed square and of the same section as the main rail. The main point *a a* and the branch point *a' a'* are bolted together and hinged or jointed to the main and branch line at the heel-chair at a^2, as shown in the drawings. The length of rail, being the main point *a a* and the branch point *a' a'* move together in unison. They are fitted in double chairs *c*, moving on suitable guides, *b*, and having a fixed travel thereon. They are also, where requisite, fitted on half-chairs, as at *c'*. In front of the points and within the gage there are fixed two check or guide rails, *d*, to insure the certainty of the train taking the points.

Between the check-rails *d* and the main rails I provide a locking apparatus, as shown at Fig. 2. This apparatus consists of a bar of iron, *e*, arranged to receive three movements during the change of the points—namely, a rising movement, a forward movement, and a falling movement. The double chairs *c*, carrying the main and branch points *a a* and *a' a'*,

are connected by a transverse rod, *f*, having a pin with an anti-friction roller, as shown at Fig. 4, *f'*. The levers working the point-locks *e* are also connected by a transverse rod, *e'*, as shown at Fig. 3, having a pin with an anti-friction roller in its center e^2. In the gage and between the rails there is fitted a sliding plate, *g*, having action parallel with the rails, and operated by the rods and lever g' g^2 g^3 under control of the pointsman. The plate *g* is fitted with two grooves or slots, *h k*. Into these slots take the rollers *f'* and e^2 on the transverse bars *f* and *e'*. Thus one slot is connected with the point-lock *e*, and the other is connected with the sliding chairs *c*, carrying the main and branch points *a a* and *a' a'*. The first slot, *k*, is formed with three distinct directions—namely, diagonal, longitudinal, and return diagonal, as shown. The second slot, *h*, is also formed with three distinct directions—namely, longitudinal, diagonal, and longitudinal. Further down, and nearer the heel of the combined main and branch points, they are carried on a second set of double chairs, c^2, working on suitable slides, *b'*, and having a fixed travel. These chairs c^2 are connected by a transverse bar, *i*, passing over the tail of the sliding plate *g*. Upon the under side of the bar *i* there is a slot or groove, *i'*, (see Fig. 5,) which also acts as a lock by taking onto the two horizontal lugs *j j'*, formed on the face of the sliding plate *g*, and having position relative to the side travel of the points *a a* and *a' a'*.

The action of the gear is thus: the first slot, *k*, in the traveling plate *g* having a diagonal direction and being in connection with the point-lock *e*, the second slot, *h*, in the plate *g* having a longitudinal direction and being in connection with the points *a a* and *a' a'*, and the locking-lug *j'* on the tail of the plate *g* taking into the groove *i'* in the transverse bar *i*.

It is evident that by the movement of the plate *g* three motions are obtained—namely, the point-lock *e* is lifted and withdrawn; secondly, the locking-lug *j'* on the end of the plate *g* is withdrawn from the transverse bar *i;* thirdly, the combined points *a a* and *a' a'* are free to travel and be moved. Upon a further stroke of the plate the slot *k* has a longitudinal direction, which leaves the point-lock in the position attained by the first portion of the stroke. The slot *h*, however, having a diagonal direction, causes the combined main point and branch point *a a* and *a' a'* to travel to the required position by means of actuating the transverse rod or bar *f*. In the travel of the combined main point and branch point the transverse bar *i* also travels over the face of the tail-plate *g* and brings the groove *i'* opposite the second locking-lug, *j*. Upon a further stroke of the plate *g*, the slot *k*, having a return-diagonal direction, causes the point-lock *e* to fall and resume its normal position and lock securely the line—namely, for the main or for the branch, as the case may be. In this movement of the plate *g*, the second slot, *h*, having a longitudinal direction, the position of the combined points remains unaltered; but the second lug, *j*, on the tail of the plate *g* is brought into gear with the groove *i'* on the transverse bar *i*, and in connection therewith acts as a further lock.

It will be seen by the foregoing that the operation of unlocking, moving, and locking the points *a a* and *a' a'* is done by one movement of the sliding plate *g*, which is actuated by the gear g' g^2 g^3 under contol of the pointsman.

The part of this invention which relates to actuating and interlocking the signals will be seen upon reference to Figs. 1, 3, 6, and 7.

l l' are two rocking levers having longitudinal slots at l^2 and quadrant ends at l^3. These levers are respectively connected with and operate the signals *m m'* in connection with the points—namely, the lever *l* is connected to the rod *n*, which operates the signal *m* for the main line, and the lever *l'* is connected with a rod, *n'*, which operates the signal *m'* for the branch line. The levers *l l'* are respectively provided with longitudinal slots at l^2, into which take pins or studs fixed on the traveling bar *o*. The bar *o* is attached to and worked by the shifting of the points *a a* and *a' a'*. The quadrant ends l^3 of the rocking levers *l l'* work across the face of the sliding plate *p*, having a stud or projection, *p'*, and so arranged that the said projection *p'* will operate whichever of the rocking levers *l l'* may be in gear with it, and by this means move the signal. The rocking levers *l l'* are prevented from actuating the signals when not in gear with the projection *p'* by the lugs p^3. The signals *m m'* for the main and for the branch are by this arrangement worked by one rod, wire, or its equivalent, p^2, which operates the sliding plate *p*, the rod or wire p^2 being actuated by one lever under the control of the signalman.

The signaling apparatus just described is interlocked with the point-lock *e* by providing the rods *n n'*, connecting the rocking levers *l l'* with the signals, with a projection on their under side, as shown at *q*, Fig. 3, so arranged that they can respectively be locked or free, according to the position of a transverse bar, *r*, worked by the point-locking apparatus *e*. This transverse bar has cross-grooves, as shown at Fig. 3, so arranged that the projection on the signal-rods will pass through or be locked by it, according to the position of the point-lock *e;* and when the points *a a* and *a' a'* are unlocked both signals *m m'* stand and are locked at "danger."

Upon reference to Figs. 8, 9, and 10 it will be seen that my invention is also applicable to feather-points in manner similar to that before described for square points.

Fig. 9 shows a modification of the point-lock *e*, which derives its movement from the action of the sliding plate *g*, which, by the attendant gear, actuates the bar *e* and locks the points, as will be understood upon reference to the drawings.

Upon reference to Fig. 10 it will be seen that the locking-bar *e* works in and is carried by a bracket, *s*, which is attached to the rail *a*, as shown.

Upon reference to Fig. 11, *t* is a wire connecting the lever *u* to the points or signals. This wire *t* is attached to the sliding toothed rack *v*, passing over the pulleys *w*, and is held tight by the weight *x*. The wire is actuated by a pawl, *y*, with a lever and weight, *y'*, attached to a sliding frame, and so arranged that, the signalman or pointsman operating the lever *u*, the rod *z* brings the pawl *y* into whichever tooth of the rack *v* which happens to be opposite the said pawl *y*. It will be seen that by this arrangement the lever *u* immediately transmits its motion to the point or signal, no matter how much contraction or expansion may have taken place in the connecting wire or rod *t*.

Having now fully described and ascertained the nature, object, and purposes of this my invention, and shown how the same may be put into practical effect, what I claim as my invention is—

1. The combination of point *a*, bar *o*, levers *l l'*, and plate *p*, all being connected with the mechanism for operating the switch, and with the signaling device, substantially as described.

2. The combination of the point *a*, bar *o*, levers *l l'*, plate *p*, and locking-bar *r*, all being connected with the mechanism for operating the switch, and with the signaling device, substantially as described, for the purpose specified.

3. The combination of the cross-bar *i*, provided with notches, and the traveling bar *g*, carrying projections *j* and *j'*, and provided with slots *k* and *h*, to operate the locking and shifting mechanism of a railroad-switch, substantially as described.

In witness whereof I, the said JAMES KELLY, have hereunto set my hand and seal this 1st day of October, in the year of our Lord 1883.

JAMES KELLY. [L. S.]

Witnesses:
FREDERICK JOHN CHEESBROUGH,
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