6 Sheets--Sheet 1.

J. SAXBY & J. S. FARMER.

Improvement in Locking Apparatus for Railroad Switches.

No. 132,416. Patented Oct. 22, 1872.

FIG. 3.

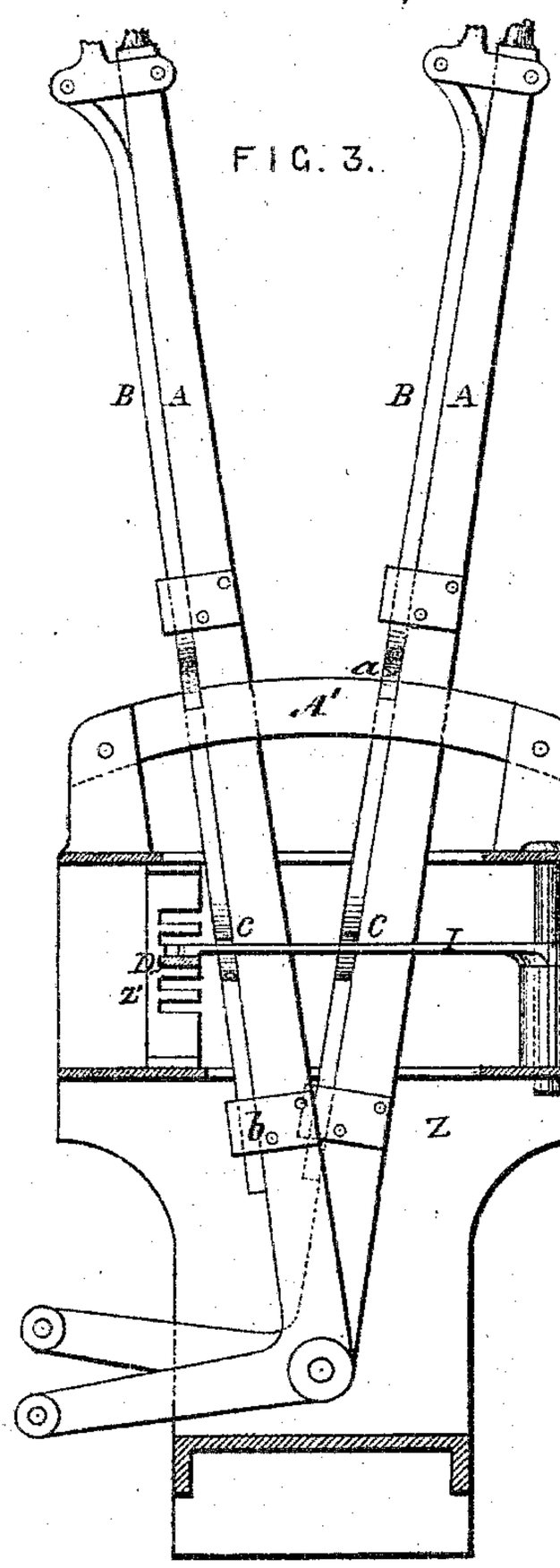


FIG. 2

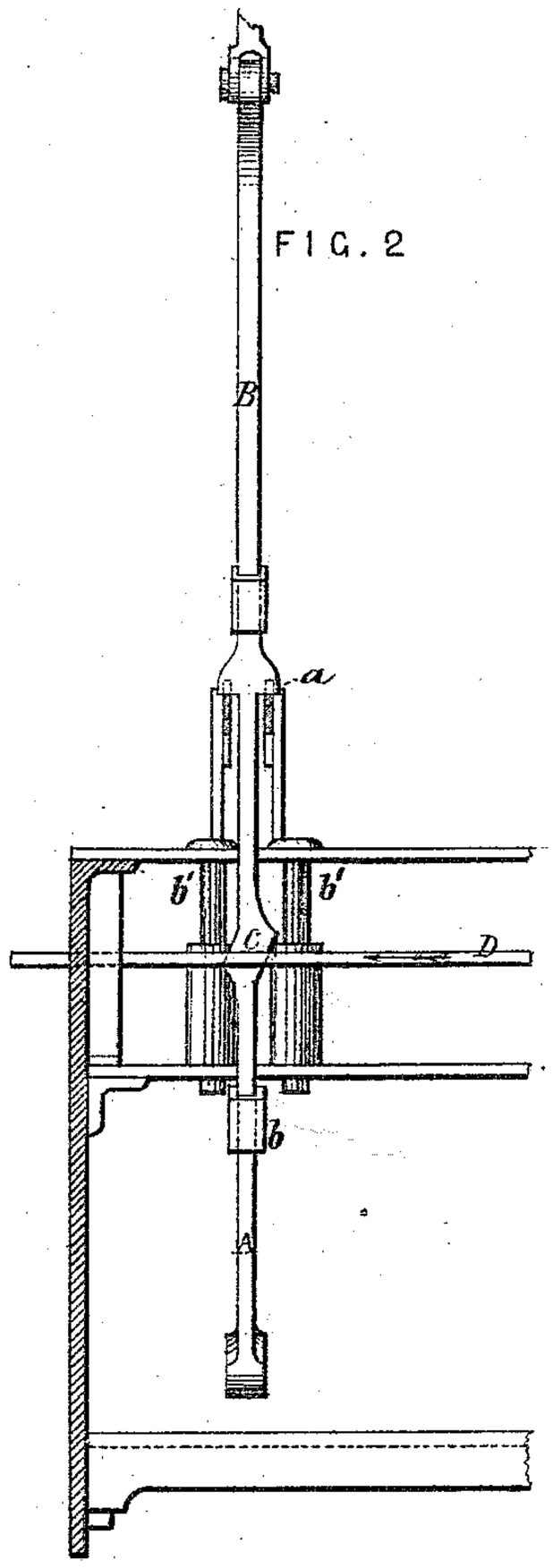


FIG. 5.

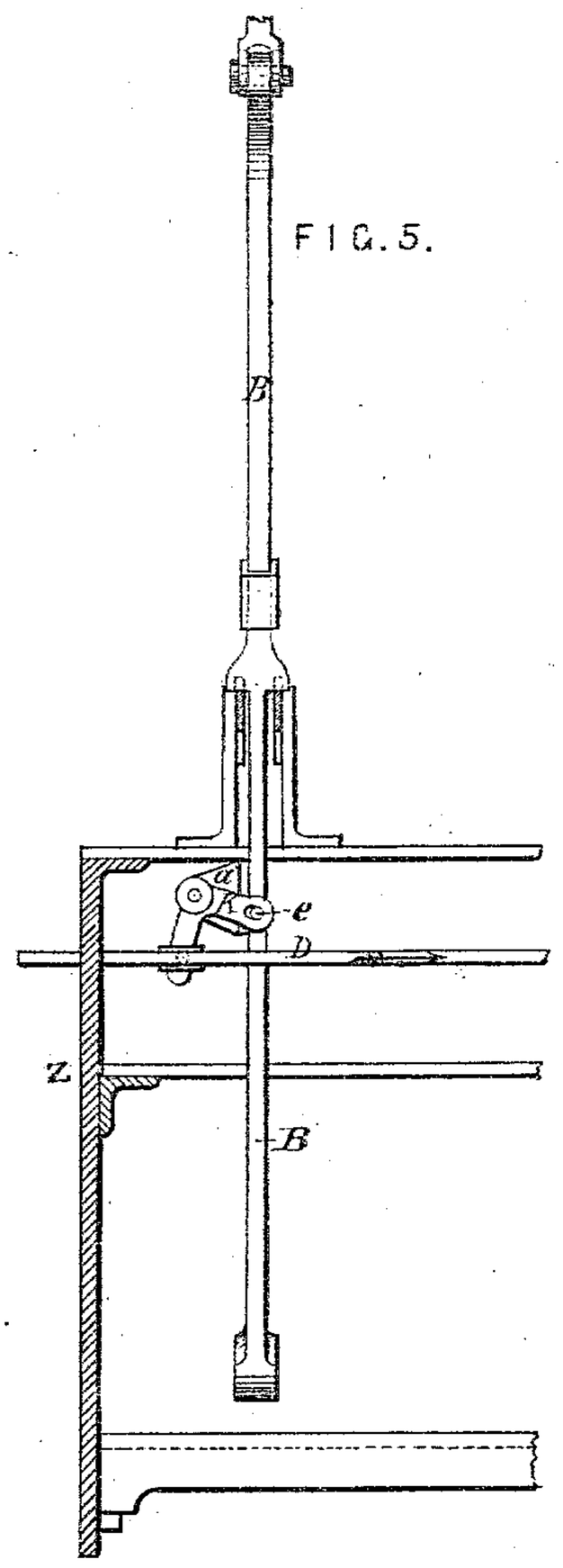


FIG. 4.

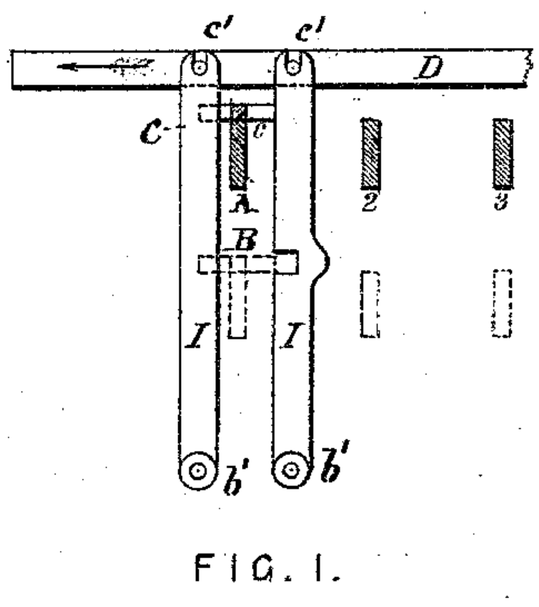


FIG. 6.

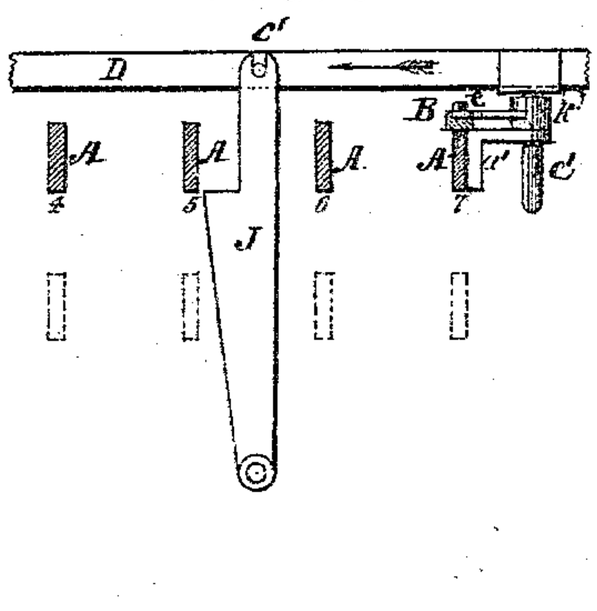
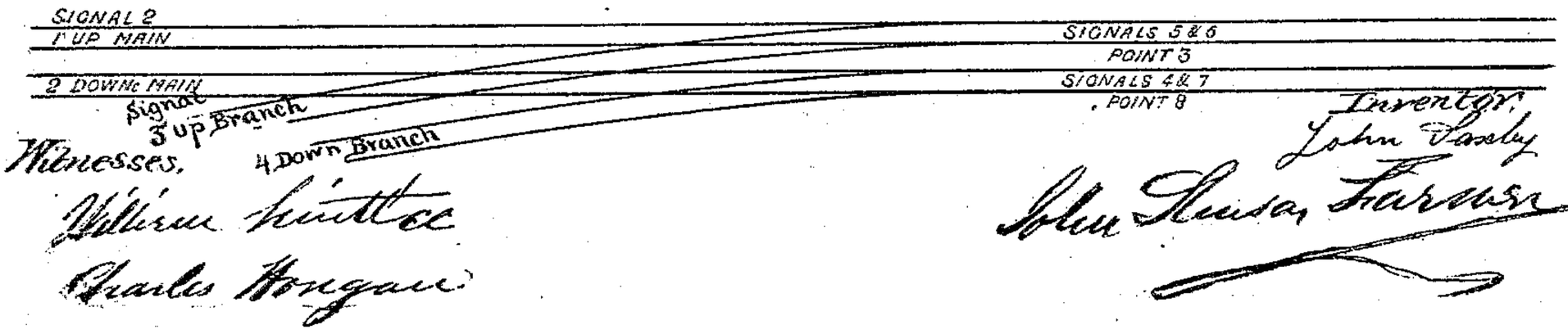


FIG. 1.



Witnesses.

William Smith

Charles Hongan

Inventor.

John Saxby

John Stuart Farmer

6 Sheets--Sheet 2.

J. SAXBY & J. S. FARMER.

Improvement in Locking Apparatus for Railroad Switches.

No. 132,416. Patented Oct. 22, 1872.

FIG. 7.

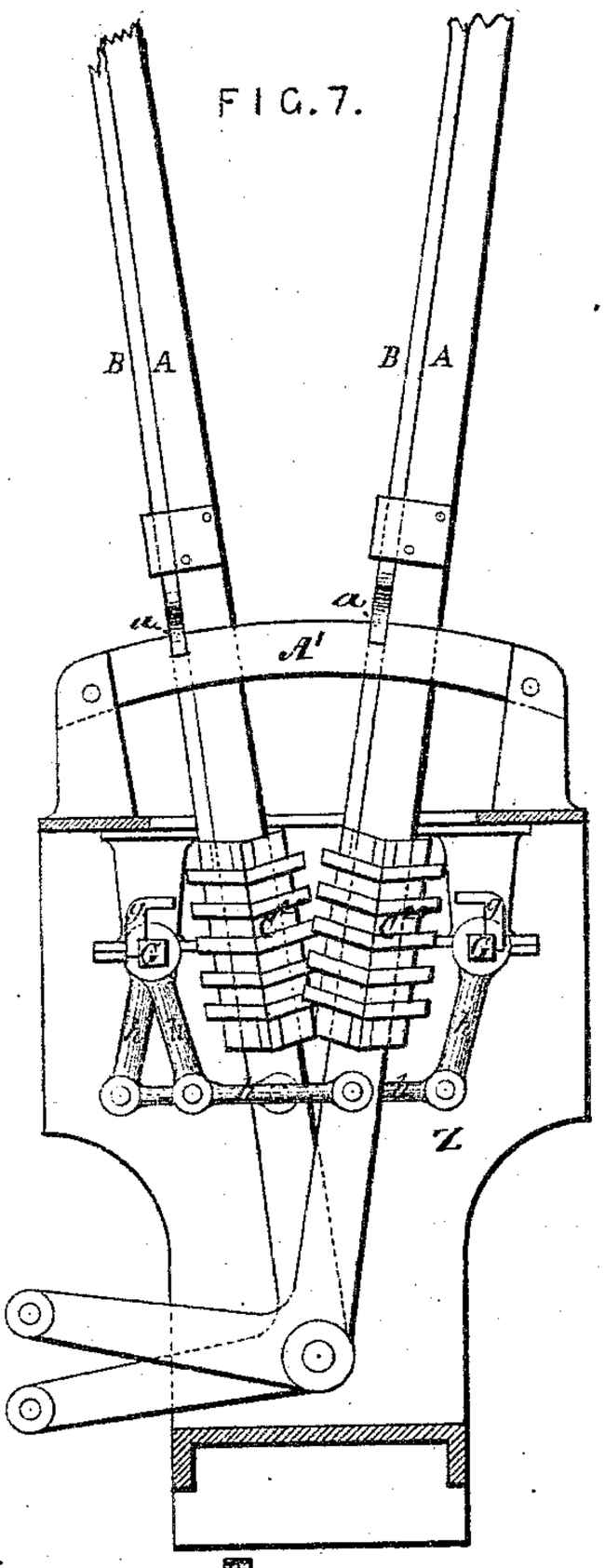


FIG. 8.

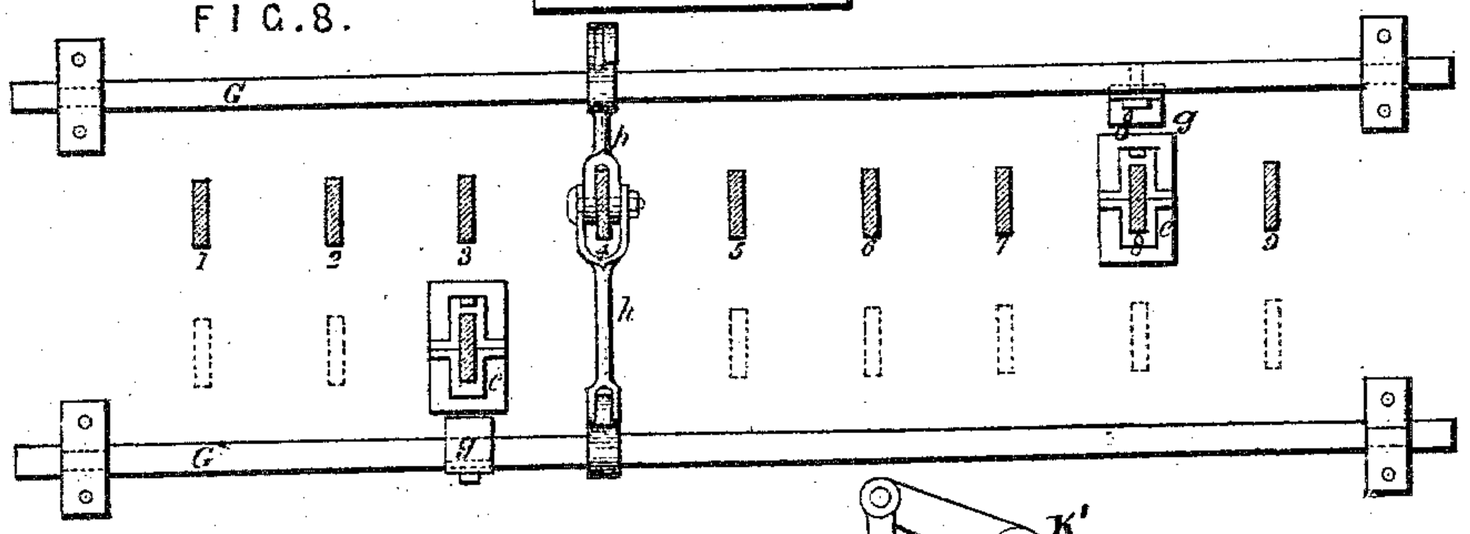
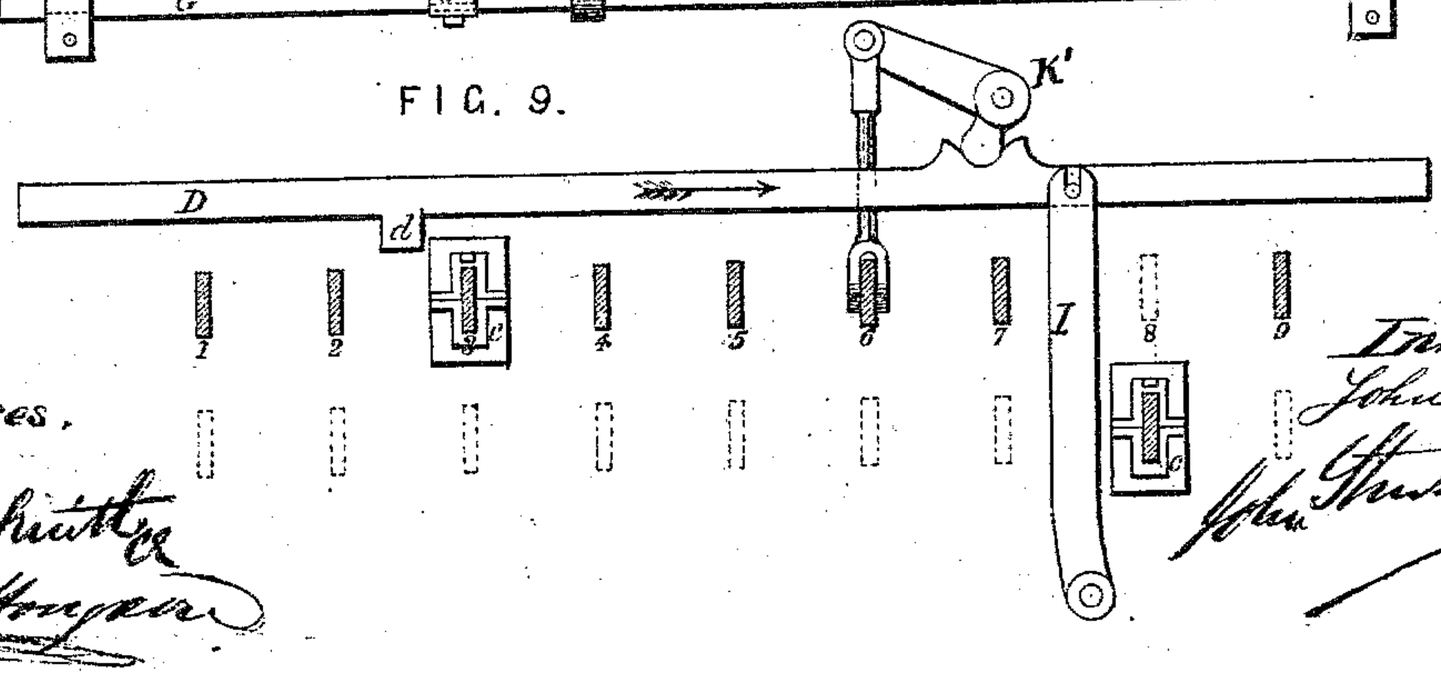


FIG. 9.



Witnesses.

William Smith 2d

Charles Hooper

Inventors:

John Saxby

John Stanley Farmer

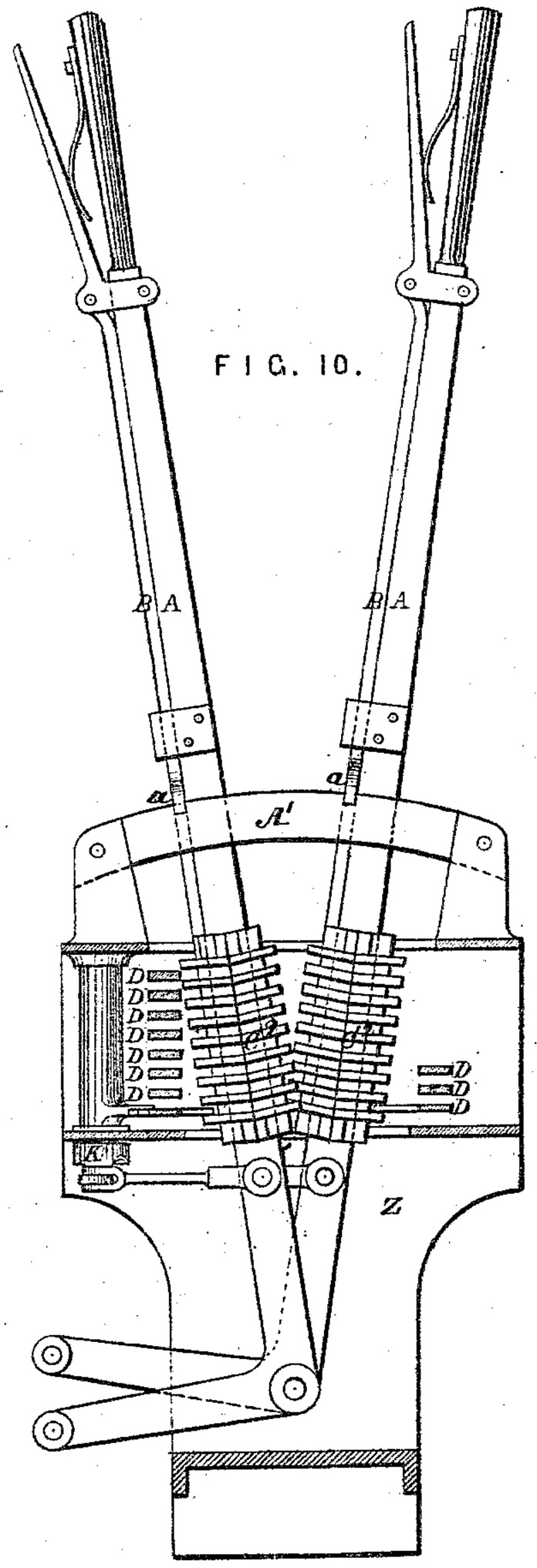
6 Sheets--Sheet 3.

J. SAXBY & J. S. FARMER.

Improvement in Locking Apparatus for Railroad Switches.

No. 132,416. Patented Oct. 22, 1872.

FIG. 10.



Witnesses.
William Smith Jr.
Charles Hooper

Inventor:
John Saxby
John Stubbs Farmer

6 Sheets--Sheet 4.

J. SAXBY & J. S. FARMER.

Improvement in Locking Apparatus for Railroad Switches.

No. 132,416. Patented Oct. 22, 1872.

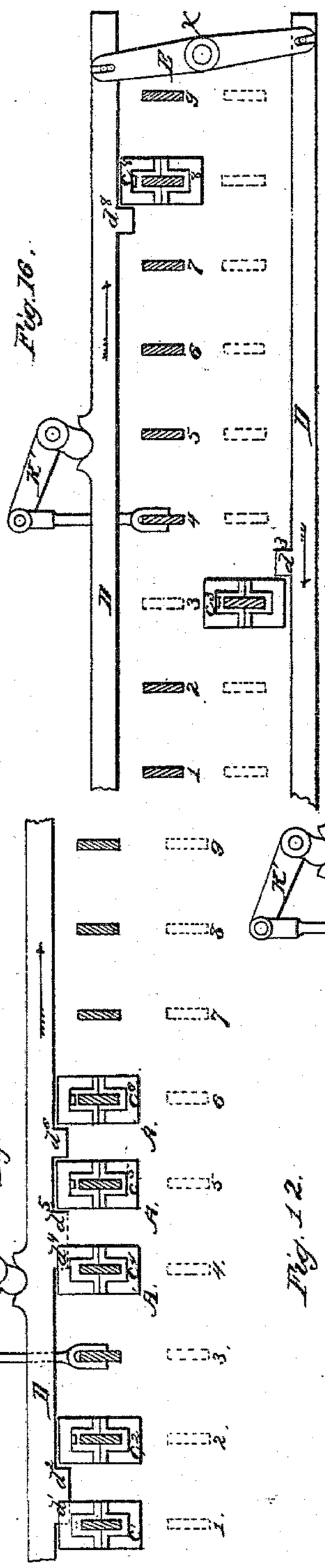


Fig. 16.

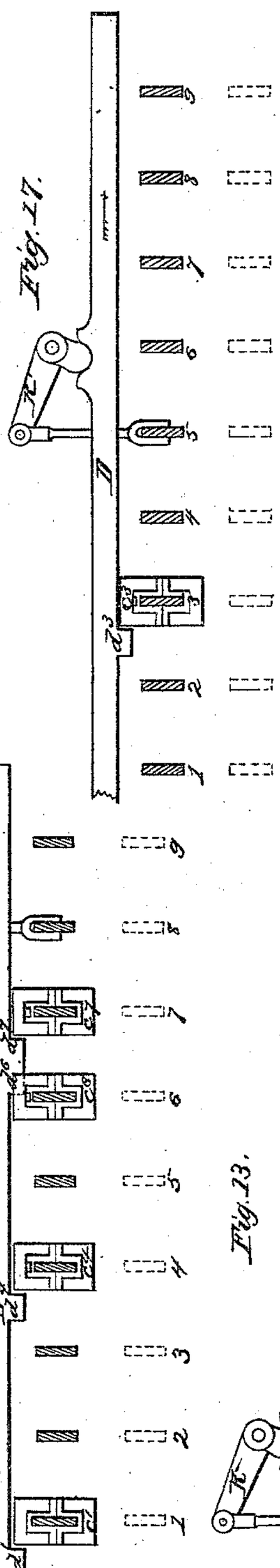


Fig. 17.

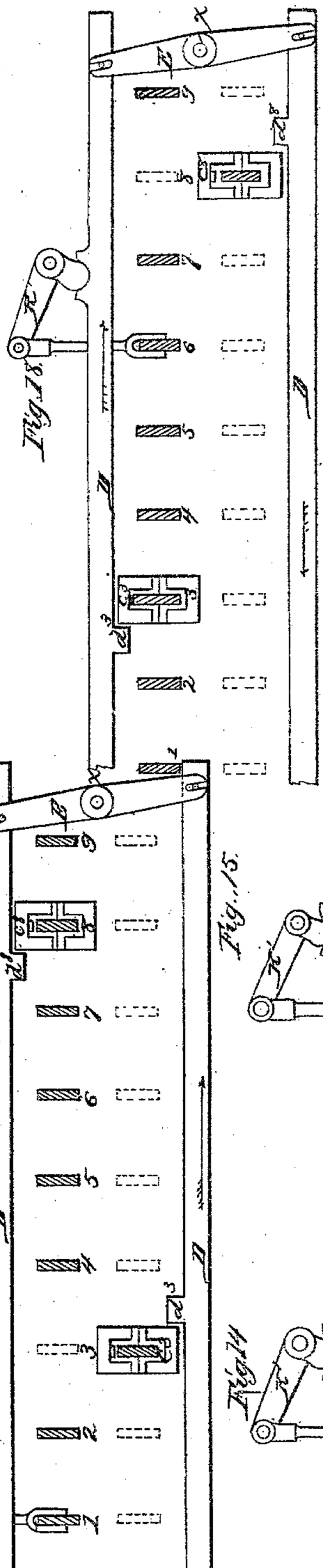


Fig. 18.

Fig. 11.

Fig. 12.

Fig. 13.

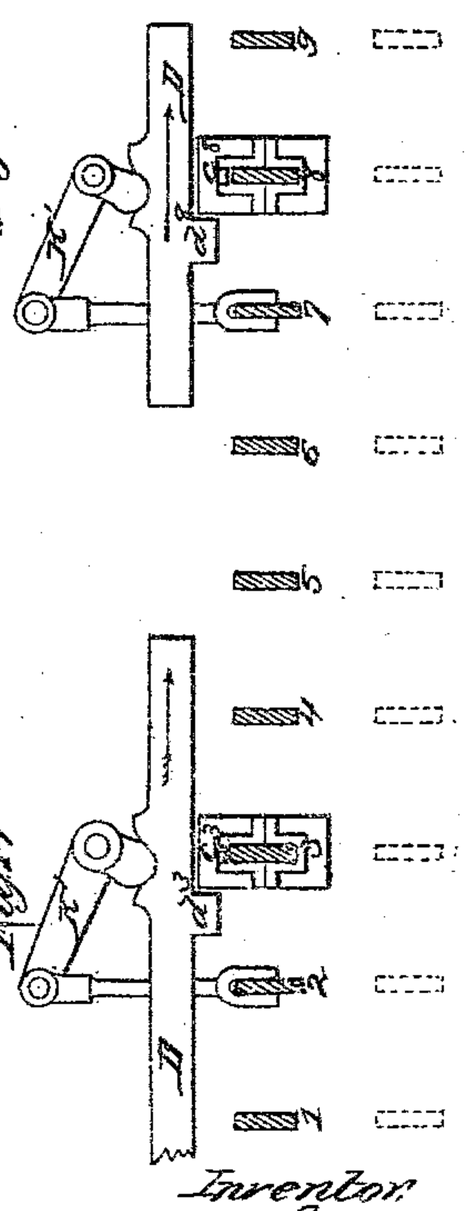


Fig. 15.

Fig. 14.

Witnesses.

William Smith Jr.

Charles Morgan

Inventor.

John Saxby

&

John Stuart Farmer.

6 Sheets--Sheet 5.

J. SAXBY & J. S. FARMER.

Improvement in Locking Apparatus for Railroad Switches.

No. 132,416. Patented Oct. 22, 1872.

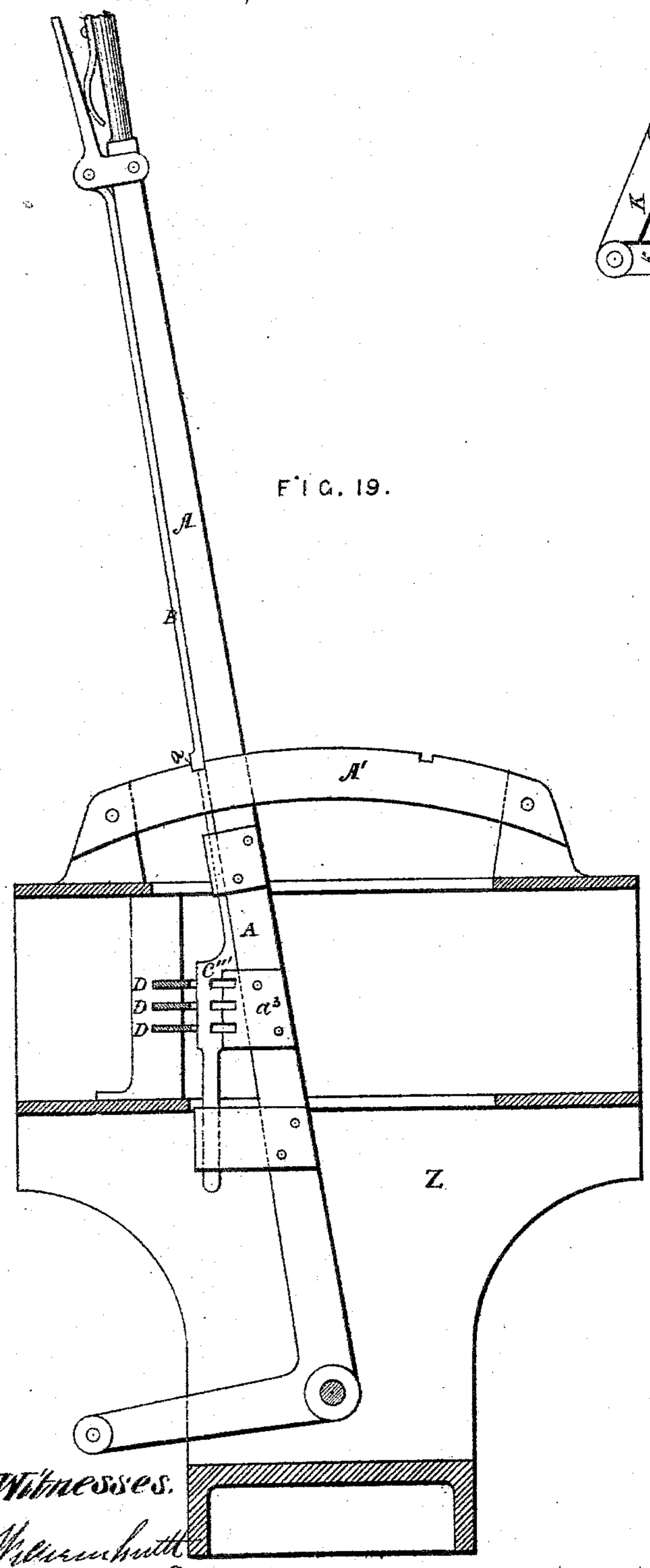


FIG. 19.

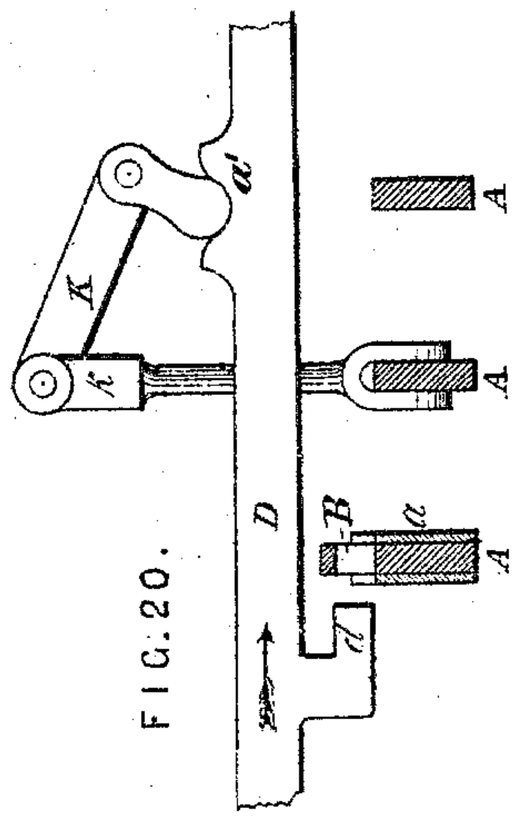


FIG. 20.

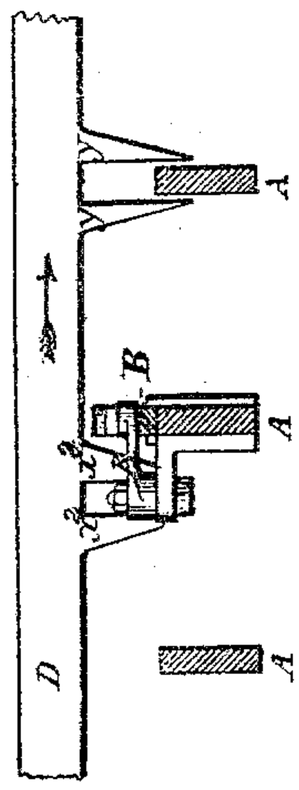


FIG. 23.

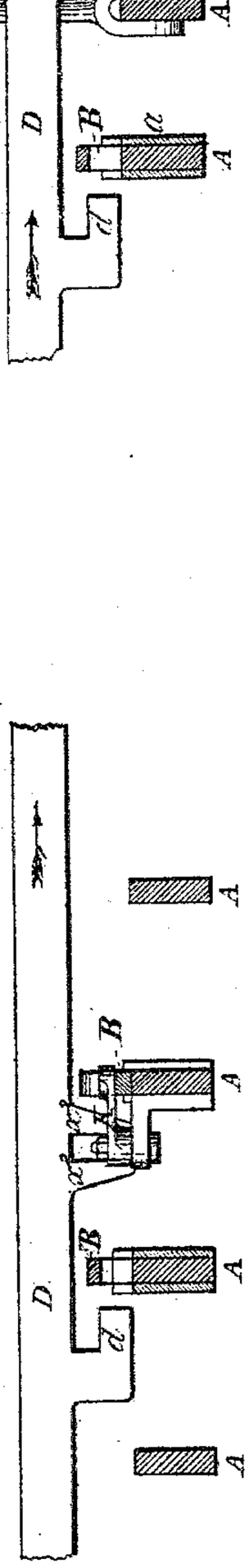


FIG. 22.

Witnesses.

William Smith

Charles Morgan

Inventor.

John Saxby

&

John Stanley Farmer

6 Sheets--Sheet 6.

J. SAXBY & J. S. FARMER.

Improvement in Locking Apparatus for Railroad Switches.

No. 132,416. Patented Oct. 22, 1872.

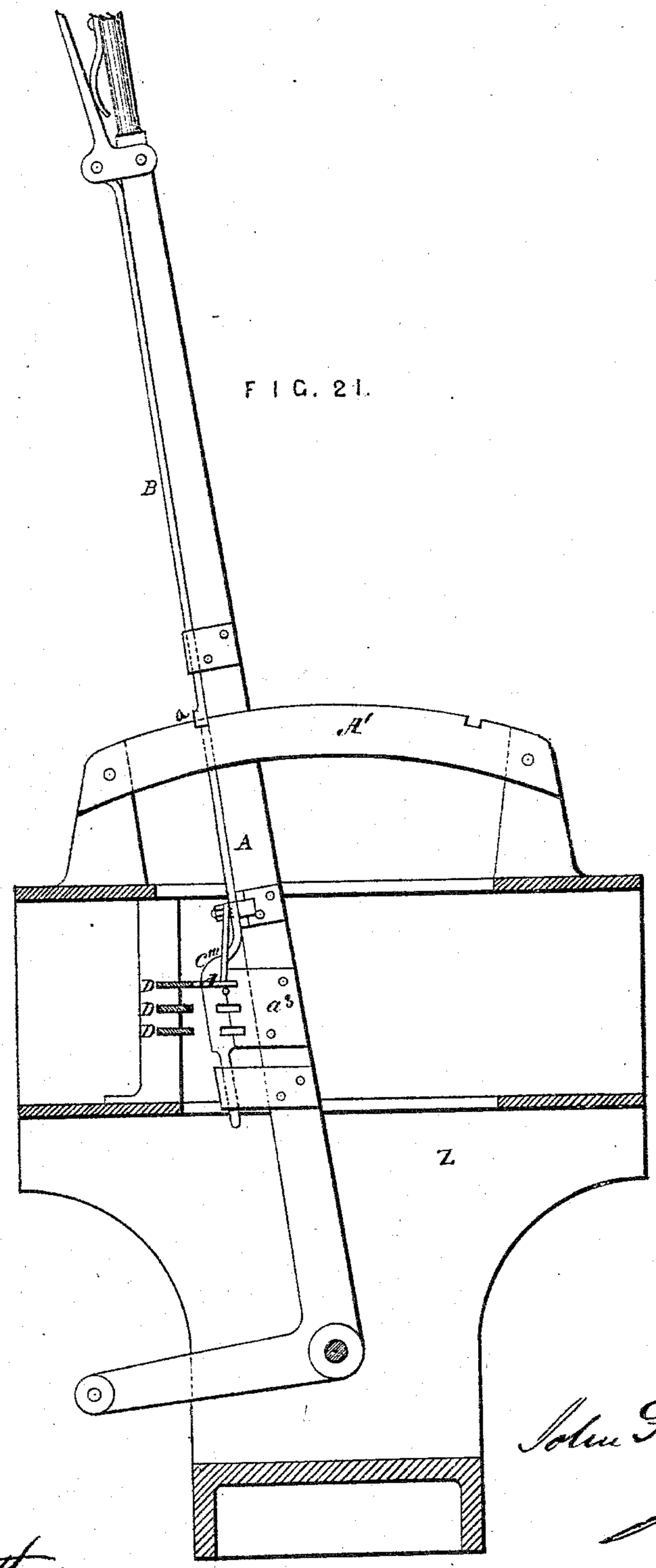


FIG. 21.

Witnesses.
William Smith Jr.
Charles Hoyeau

Inventors
John Saxby
John Stuart Farmer

UNITED STATES PATENT OFFICE.

JOHN SAXBY AND JOHN STINSON FARMER, OF KILBURN, NEAR LONDON, ENGLAND.

IMPROVEMENT IN LOCKING APPARATUS FOR RAILROAD SWITCHES.

Specification forming part of Letters Patent No. **132,416,** dated October 22, 1872.

To all whom it may concern:

Be it known that we, JOHN SAXBY and JOHN S. FARMER, of Kilburn, near London, England, have invented certain Improvements in Apparatus for Locking and Governing Switch-Rails and Signals connected therewith, of which the following is a specification:

As is well known, accidents of a more or less serious nature are frequently caused by improper position of the branch or switch rails and display of an improper signal at the junctions of tracks, particularly where three or more come together, owing mainly to negligence or ignorance of the switch-tender.

The object of our invention is to furnish a comparatively simple yet reliable apparatus by which, when the lever which operates one set of switch-rails and the lever or devices which operate the appropriate signals thereof are free to move, all the other switch or signal levers shall be securely locked. Thus we may lock all the signal and switch levers except that or those we are using, so that when we open one switch all that should be closed while that set is open have the hand-levers and apparatus belonging thereto locked or secured; and when the said set of rails is in its turn closed those that should be open or should be free to be opened have their hand-levers set free. Thus the signal-man cannot give a wrong signal, nor can a switch and signal be set at variance. To additionally explain the principle of our invention, it may be stated that we regulate the action upon the locking apparatus by and through the movement either of the sliding bolt or rod with which each switch or signal hand-lever is provided, or of the levers and sliding bolts jointly; and we also cause the locking apparatus in its turn to act upon and secure some of the switch and signal levers through or by means of the movement of the sliding bolts of some one or more of said levers. In this way the lever-locking apparatus is employed in the double capacity of acting upon or being acted upon in turn by the main locking gear or apparatus through the movement of the hand of the operator upon the sliding bolt.

In carrying out our invention practically we may employ various allied mechanical expedients or arrangements, and accordingly we have shown in the accompanying six sheets of drawing several modifications of one general plan, which we will now proceed to describe.

In Figures 2 and 3, Sheet 1, respectively a back view and sectional elevation, A indicates a switch or signal lever, which is shown in two positions, and B the sliding bolt or rod, by the shoulders *a* of which the lever is locked to the arc A′ of the stand Z in the usual way. The lower end of this rod slides in a keeper, *b*, and is broadened to form beveled shoulders at C, to act on the vibrating bars I, which are pivoted on vertical studs *b′* of the frame of the switch-stand, and are notched at their free ends to engage with or fit over studs *c′* on the bar D, by which bar the locking of various hand-levers is effected, as will be presently described. The bars I are clearly shown in plan view, Fig. 4, as are also several switch or signal levers in cross-section, the dotted lines indicating the alternate position of the same; but for sake of clearness only one set of vibrating bars is shown. The notch in one of the vibrating bars I is to allow one shoulder of the beveled plate C to pass through while the opposite bar, in which no notch is formed, will be caused to move laterally out of the way of the beveled plate when the sliding bolt B is raised or lowered, as the case may be. The notched bar will thus be brought above the beveled plate and caused to lock the lever A in the required position. As shown in Fig. 3, a vertical notched bar, Z′, may be employed to receive and guide or support the bar or bars D.

As another means of connecting the hand-lever A with the sliding locking-bar D, an elbow or bell-crank lever, K, may be used, as shown in elevation or back view, Fig. 5, and plan view, Fig. 6, Sheet 1. The lever is pivoted at its angle to a lug or projection, *a′*, of the lever, while one end thereof has an elongated slot to receive a stud, *e*, of the sliding bolt, B, and the other connects with the bar D through the medium of a long stud, *e′*, which permits of the necessary travel of the hand-lever. Thus, when the sliding bolt B is moved up, the pendent arm of the bell-crank moves the bar D in the direction of the arrow, Fig. 6, thereby causing the shouldered bar J to lock one of the levers. It is evident the same

operation will serve to lock any required number of levers through the medium of a corresponding number of vibrating bars, J.

In Fig. 7, Sheet 2, we have shown another mode of operating the bar D. C^2 is a socket or clip, sliding on the lever A and connected with or forming the lower termination of the bar B. The socket has five bars and four grooves. To engage with the sockets or clips, and thereby lock the hand or switch lever A in one position or the other, we employ fingers *g*, which are attached to or project from rock-shafts G G. These last are hung parallel to each other in suitable pendants of the frame Z, and the hand-levers A are put in connection with them through the medium of the jointed arms *h*, so that whenever a lever, A, is shifted or "moved over" the clips or sockets C^2 will be correspondingly locked, and thereby their levers also.

Fig. 8 is a plan and partly-sectional view of nine hand-levers, (the number required for a simple junction,) and this locking apparatus applied thereto. Fig. 9 shows a slight variation of this plan of locking, in that the lever No. 6 is shown arranged to bring a bell-crank lever, K′, into action, and thereby cause the bar I (arranged as in Sheet 1) to engage the sliding sockets C^2 in place of fingers *g g*. This plan is however better, or at least further illustrated in Fig. 10, Sheet 3, which is a partly-sectional elevation; and, in fact, the same arrangement of bell-crank lever and sliding rod is seen in all the figures of Sheet 4, and in Fig. 20, Sheet 5. These last are hung parallel in suitable pendants of the frame Z, and connected with the levers A so that the movement of a lever causes a partial rotary motion to be imparted to the rocking-shafts G G, and thus the fingers *g* are caused to enter the grooves in the sliding clip C^2, which is prevented from moving, and consequently the catch or sliding bolt B is held down in the notch in the quadrant, and the lever A is locked while the sliding bolt or bolts of some other levers are set free.

In Fig. 19, Sheet 5, we have shown notches formed in cheek-pieces a^3 of the lever A′, and corresponding notches in an extension, c''', of the sliding rod B. When moved by the lever K′ the tongues *d* of the sliding bar or bars D will enter the slots thus formed and lock the sliding rod securely. Fig. 21, Sheet 6, and Figs. 22 and 23, Sheet 5, present an arrangement differing but slightly from that shown in Figs. 19 and 20, Sheet 5, and Figs. 5 and 6 of Sheet 1. The arrangement of the bell-crank lever is also substantially the same as in Sheet 1, while its pendent end connects with a horn piece, x^2, of the sliding bar.

Having now described, so far as appears to be necessary, the several modifications we employ, we will now describe more particularly the operation of the locking apparatus as applied to the switch and signal levers of a junction, such as shown in Fig. 1 of Sheet 1, wherein we show (to a small scale) a double main line or double-track railway with two branches, No. 3, or the up-branch connecting with No. 1, or the up-main and No. 4, or the down-branch with No. 2, or the down-main. It may be here stated that the terms "danger" and "safety" indicate opposite positions of the signal-levers corresponding to the open or closed position of the switch-rails of a given track. The switch and signal-levers belonging to these rails are shown in Figs. 10 to 18 inclusive, Sheets 3 and 4. In this case the levers Nos. 3 and 8 work the switch-rails, and the levers 1, 2, 4, 5, 6, and 7 work the various signals connected therewith; the lever No. 9, being the distant signal, is unconnected with the others. When all the levers are in their normal position, or that shown in Figs. 11 to 18, Sheet 4, the signals are at "danger," and the switch-rails are right for the "up-main" and the "down-branch." Now, as the points or rails of the up-main line, worked by lever No. 3, are in the proper position to allow of a train passing along the up-main line, it is evident that the signals which affect the working of the up-main line, Nos. 2 and 5, may be free to move to "safety," but that no signal should be permitted to go to "safety" that affects the up-branch line; and consequently the levers Nos. 1 and 4, which work those signals, are locked by having the tongues d^1 and d^4 inserted in their respective grooves in the sliding pieces c^1 and c^4, Fig. 11, Sheet 4. Again, supposing the signals 2 and 5, which, as before mentioned, are free to move, are placed at "safety," they each lock the switch-lever No. 3 in its normal position—*i. e.*, its proper position for a train to pass on the "up-main." These two motions will be seen by referring to Figs. 14 and 17, respectively. Thus, upon moving lever No. 2, Fig. 14, to the position shown in the dotted lines the sliding bar D is caused to move in the direction of the arrow, and the tongue D^3 is inserted into one of the grooves in the sliding piece c^3, which, being connected to the sliding rod B, prevents it from rising, and consequently locks the lever, as before explained. In like manner the signal-lever No. 5, Fig. 17, when pulled over to the position shown in the dotted lines, causes the slide-bar D, to which it is connected, to travel in the direction of the arrow, and the lever No. 3 is again locked in a similar manner to that just described. It will thus be seen that when the switch-rails of the "up-main" are in the proper position for a train to pass along the line the "up-branch" signals are locked to "danger" and the "up-main" signals are free to move; and again, when the up-main signals are moved to "safety," so as to allow a train to pass along, the rails (worked by lever No. 3) are locked or prevented from being opened until after the train has passed and the signals returned to "danger." By this illustration the entire working of a junction, such as shown in Fig. 1, Sheet 1, can readily be understood from the following schedule, showing the duty performed by each

of the levers: Lever 1 actuates the distant signal of the up-branch line B; lever 2 actuates the distant signal of the up-main line 1; lever 3 actuates the switch-rails of up-lines 1 and 3; lever 4 actuates the station or junction signal of up-branch 3; lever 5 actuates the station or junction signal of main line 1; lever 6 actuates the station or junction signal of down-main 2; lever 7 actuates the station or junction signal of down-branch line 4; lever 8 actuates the switch-rails of the down-lines 2 and 4; lever 9 actuates distant signal of the down-lines 2 and 4.

It will be seen that the object sought to be accomplished by this invention is not to fix the sliding bolt of some one or more hand-levers in the notch of the switch-stand by or through the movement of another hand-lever while moving through the arc of a circle, as such an action is only positive or effective at the end of the stroke of the hand-lever, and quite dormant and inoperative during any portion of the travel of the hand-lever, and, as such, would be quite inadequate for the purpose of locking or securing the hand-levers and preventing the confliction of the signals with the switch-rails or signals with signals.

We also wish it to be understood that no claim is made generally or broadly for the addition to the vertical sliding bolt constituting an elongation of the sliding bolt below the arc-bar of the switch-stand, nor to any use of the sliding bolt except in the combination hereinbefore specified; but

What we do claim is—

1. The mode herein described of locking or unlocking one or more sliding bolts of the switch and signal levers, and thereby locking or unlocking the levers themselves by means of, or through the action of, the sliding bolt or bolts of some other lever or levers, substantially as specified.

2. The mode of locking or unlocking the sliding bolt or bolts of a hand-lever or levers by the movement of one sliding bolt, which movement is effected before moving the hand-lever to which it is attached, substantially as hereinbefore described.

3. The combination of the hand-lever A, sliding bolt B provided with shoulders *a* and clip or socket C^2, lever K, sliding locking-bar D, and vibrating bars I, substantially as specified.

4. The bar E arranged with the bars D D, to operate as specified.

JOHN SAXBY.
JOHN STINSON FARMER.

Witnesses:
WILLIAM SMITH, C. E.,
CHARLES HODGSON.