(No Model.) 3 Sheets—Sheet 1.

H. & A. H. JOHNSON.

INTERLOCKING APPARATUS FOR RAILWAY SWITCHES AND SIGNALS.

No. 485,799. Patented Nov. 8, 1892.

Fig. 3.

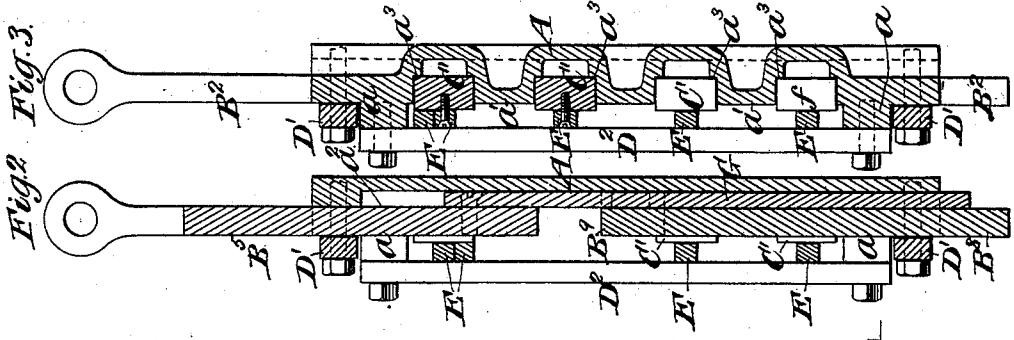

Fig. 2.

Fig. 1.

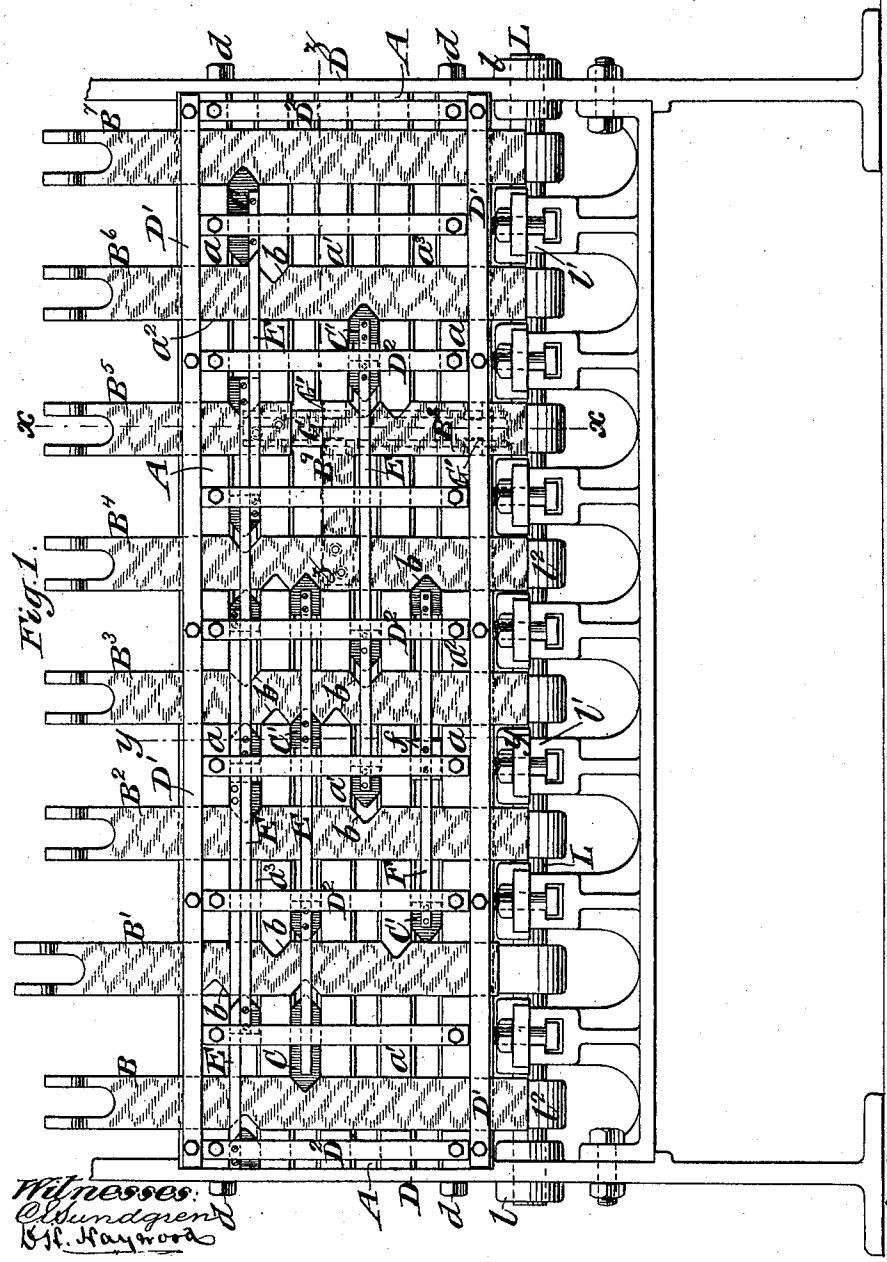

Fig. 4.

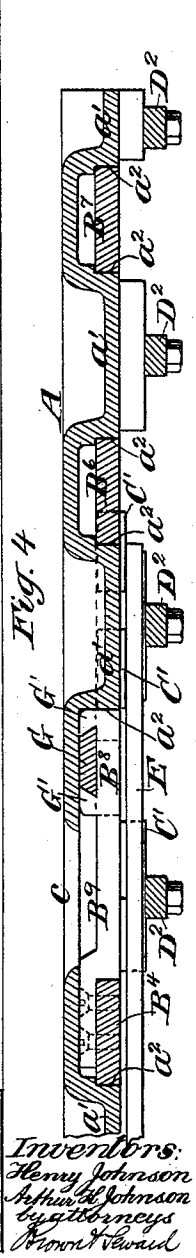

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Fig. 5.

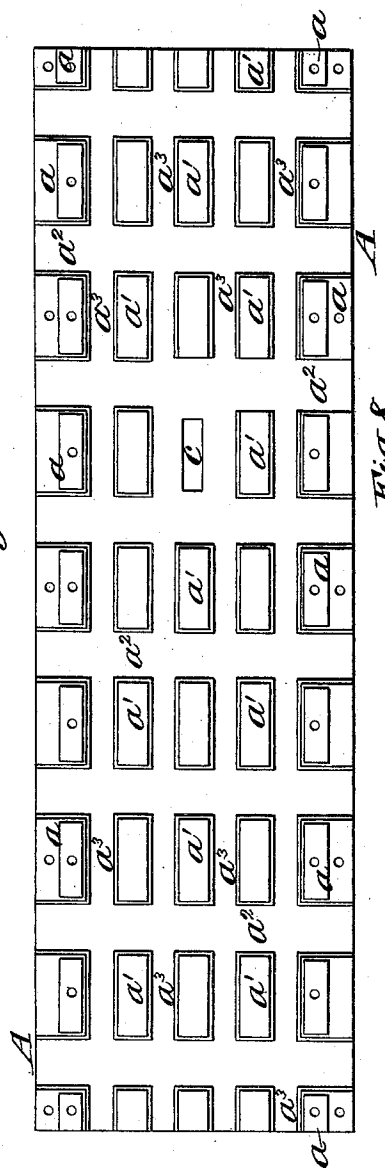

Fig. 7.

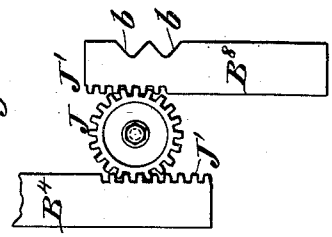

Fig. 8.

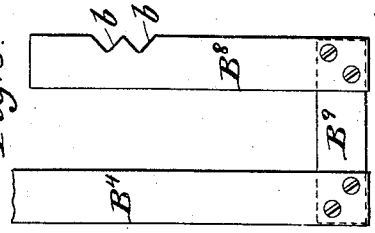

Fig. 6.

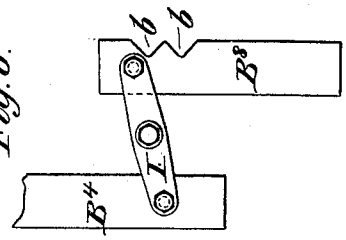

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Fig. 9.

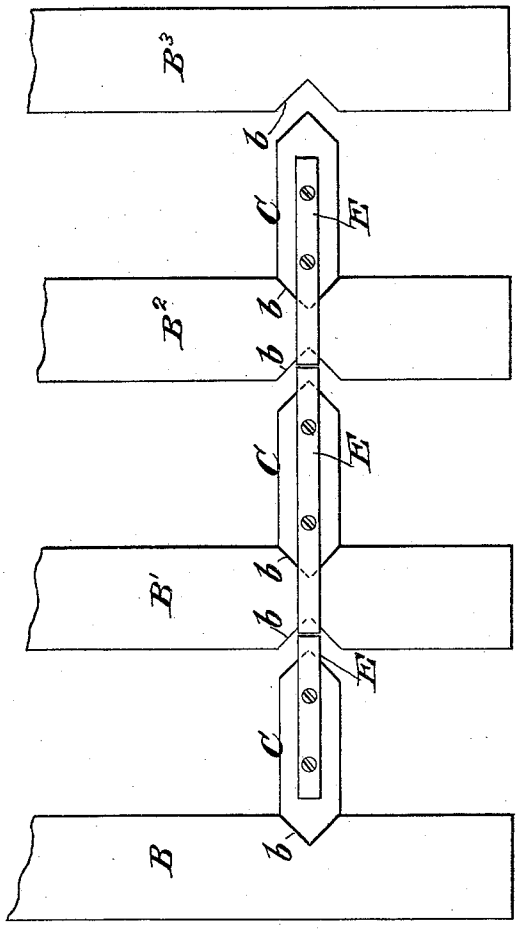
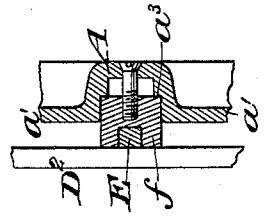


Fig. 10.



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UNITED STATES PATENT OFFICE.

HENRY JOHNSON AND ARTHUR H. JOHNSON, OF RAHWAY, NEW JERSEY.

INTERLOCKING APPARATUS FOR RAILWAY SWITCHES AND SIGNALS.

SPECIFICATION forming part of Letters Patent No. 485,799, dated November 8, 1892.

Application filed March 29, 1890. Serial No. 345,836. (No model.)

To all whom it may concern:

Be it known that we, HENRY JOHNSON and ARTHUR H. JOHNSON, both of Rahway, in the county of Union and State of New Jersey, have invented a certain new and useful Improvement in Interlocking Apparatus for Railway Switches and Signals, of which the following is a specification.

Our improvement relates to interlocking apparatus for operating railway switches and signals.

We will describe an interlocking apparatus embodying our improvement in detail, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a front elevation showing such portions of switch and signal interlocking apparatus as are essential to an understanding of our improvement. Fig. 2 is a vertical section taken on the line x x, Fig. 1. Fig. 3 is a vertical section taken on the line y y, Fig. 1. Fig. 4 is a horizontal section taken on the line z z, Fig. 1. Fig. 5 is a detail view showing a back or locking plate, which we may employ. Fig. 6 is a detail showing certain means which we may employ for transmitting motion directly from one tappet to another. Fig. 7 is a detail showing another means for accomplishing the same result. Fig. 8 is a detail showing a somewhat modified means for connecting two or more tappets together. Fig. 9 is a detail showing a modified form of connecting-bar. Fig. 10 is a detail showing one form of guide for a connecting-bar. Figs. 2, 3, 4, 6, 7, 8, 9, and 10 are drawn to a larger scale than Figs. 1 and 5.

Similar letters of reference designate corresponding parts in all the figures.

A designates a back or locking plate for the apparatus. Referring more particularly to Fig. 5, it will be seen that said plate is provided upon one of its sides with outwardly-projecting portions a a'. These projecting portions are arranged in rows, so that spaces a^2 a^3 will be left between them, which spaces cross and extend at right angles to each other. The plate A and the projections a a' may be cast in one piece. The spaces a^2 we call "tappet-spaces," while the spaces a^3 we designate "dog-spaces." In other words, tappets B, B′, B^2, B^3, B^4, B^5, B^6, and B^7 are arranged in said tappet-spaces, while dogs C C′ are arranged in the dog-spaces. The projections a a' are shown as rectangular in shape and are "stepped" upon their side edges. Said projections therefore operate not only as guides for guiding the tappets B, &c., in their vertical movements, but also as guides for guiding the movements of the dogs C C′. The ends of the plate A are secured to standards D, as shown, by means of bolts d. When the tappets are arranged upon the plate A, we secure in front of them, as shown more clearly in Fig. 1, bars D′. The bars D′ are secured to the plate A at different points in their length by bolts passing through them and engaging the projections a upon the plate A, which are at the upper and lower edges of said plate. The bars D′ operate to retain the tappets B, &c., in position on the plate. In order to retain the dogs C C′ in position upon the plate, we employ bars D^2, which bars are secured at their ends by bolts or otherwise to the projections a upon the plate A. Each of the tappets B, &c., is provided upon its side edge or edges with one or more notches or indentations b. These notches or indentations are shown as V-shaped. The dogs C C′ have ends corresponding in shape to the notches or indentations b. When the dogs are moved into any of said notches and held there, they will prevent the movement of the tappet with which they engage until they are again released. The longitudinal movement of the tappets or any of them causes a transverse movement to be imparted to certain of the dogs by which other of the tappets are locked against movement, all in a well-known manner. The dogs C C′ we have shown as connected together in sets by means of connecting-bars E, and two or any desired number of said sets of dogs may be arranged in line with each other in the same dog-space, as illustrated more clearly at the upper part of Fig. 1, wherein three sets of dogs are shown as arranged in the same dog-space. In order to accomplish this, it is necessary that the bars E should overlap each other and that they should be only of such width that two or more of them may be arranged one at the side of another over the face of each dog. The bars E, connecting the several sets of dogs, may thus slide freely past each other and will not occupy any more

space in width than is occupied by the dog-spaces, in which the dogs to which they are connected move. This is advantageous because it provides means whereby the plate A may be materially reduced in size over what would be necessary were each set of dogs to be operated in a separate dog-space. The bars D^2 extend outside the bars E, and thus operate to maintain the dogs in their respective spaces in a position into which they may be adjusted.

Where the bars E accomplish a long "reach" between two of the dogs—as shown, for instance, at F, near the bottom of Fig. 1—we may secure a guide-piece *f* to the bar E, which guide-piece is arranged in the dog-space between two of the tappets and is guided in its movements by the projections *a* on the plate A. This guide-piece operates to stiffen the bar E and prevents "buckling," as might be the case were the said guide-piece omitted. It enables us, also, to use a connecting-bar of much smaller section and have more bars to each dog-space than if we depended on the strength of the bar alone to resist buckling. Instead of securing the guide to the connecting-bar it might be secured to the plate A and the bar be caused to pass through a suitable aperture in the guide, as shown more clearly in Fig. 10.

It sometimes occurs that we are enabled to materially decrease the size of the plate A by causing two or more tappets to occupy the same tappet-space. In such event the tappets arranged in the same space will be in line one with the other, but will have movements imparted to them independent of each other. We have shown one form of such an arrangement in Fig. 1. The tappet B^5 constitutes one of the tappets in a tappet-space, while a tappet B^8 constitutes another, arranged in the same space. The tappets B^5 B^8 have independent movements imparted to them, the former by the shifting-lever ordinarily employed and the latter by means of a direct connection which it has with the tappet B^4, adjacent to it. Such direct connection is made by means of a cross-bar B^9, rigidly connected near its ends both to the tappet B^4 and the tappet B^8. When the tappet B^4 is moved, corresponding movement will be imparted to the tappet B^8. In order to provide a space in which the bar B^9 may move, we may cut away one of the projections *a'*, as shown more clearly at *c* in Fig. 5. We may, however, if desired, connect the two tappets together beyond the plate A, as shown more clearly in Fig. 8, in which case it will be unnecessary to cut away any of the projections *a'*.

We prefer that the tappets B^5 B^8 should be guided in their movements one upon another. For this purpose we have shown in Figs. 1 and 2 a tongue G, secured near its upper end to the tappet B^5 and extending downwardly. This tongue extends into a grooved or dovetailed guide G', secured upon the rear side of the tappet B^8. Thus the tappets B^5 and B^8 may be moved independently of each other, but will be guided the one upon the other. Two or more tappets may be connected together in the manner described, so as to be all operated by a single lever and each occupying the whole of a tappet-space. This is advantageous where a great deal of locking comes on one lever, as by this means we are enabled to decrease the length of the lever-tappet. Such an arrangement is shown in Fig. 8.

In Fig. 6 we have shown that instead of connecting the tappets B^4 B^8 rigidly together by means of the bar B^9 they may be connected together by a lever I, fulcrumed upon the plate A and pivotally connected near its ends to the tappets B^4 B^8. When longitudinal movement is imparted to the tappet B^4, it will cause movement in a reverse direction to be imparted to the tappet B^8.

In Fig. 7 we have shown a similar arrangement, except that instead of using a lever we employ a pinion J, which pinion meshes with racks J' upon the tappets B^4 B^8. In this instance, also, when longitudinal movement is imparted to the tappet B^4 movement will be imparted to the tappet B^8 in a reverse direction.

In Fig. 9 we have shown that the connecting-bars E need not be solid, but may be divided into sections, the ends of which abut against each other. This is advantageous, because it decreases the number of dogs necessary to be used where the connecting-bars are continuous, as any desired number of the dogs may be moved together or separately in both directions of the same connecting-bar.

Longitudinal movement may be imparted to the tappets B, &c., by levers operated in switch and signal towers in the usual manner. We have not illustrated such well-known means, as they do not broadly constitute part of our invention. We have, however, illustrated in Fig. 1 a shaft L, journaled in bearings *l l'*, upon which shaft are to be mounted bell-crank or other suitable levers l^2 by which switch and signal rods may be operated.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In switch and signal interlocking apparatus, the combination, with longitudinally-movable tappets, of guides for said tappets, dogs arranged between said tappets and adapted to be shifted thereby to cause the locking of other of the tappets, a bar connecting certain of said dogs together substantially in a row, and a guide for said bar between the dogs and the tappets, substantially as specified.

2. In switch and signal interlocking apparatus, the combination, with two or more longitudinally-movable tappets, of a connection between said tappets, whereby movement imparted to one will be transmitted to another or others, guides for said tappets, and dogs

adapted to be shifted by the tappets, substantially as specified.

3. In switch and signal interlocking apparatus, the combination, with a longitudinally-movable tappet, of a second tappet, a connection between said tappets, whereby movement imparted to one will be transmitted to the other, guides for said tappets, a third tappet arranged in line with one of the tappets first named, but moved independently thereof, and dogs adapted to be shifted by the tappets, substantially as specified.

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