

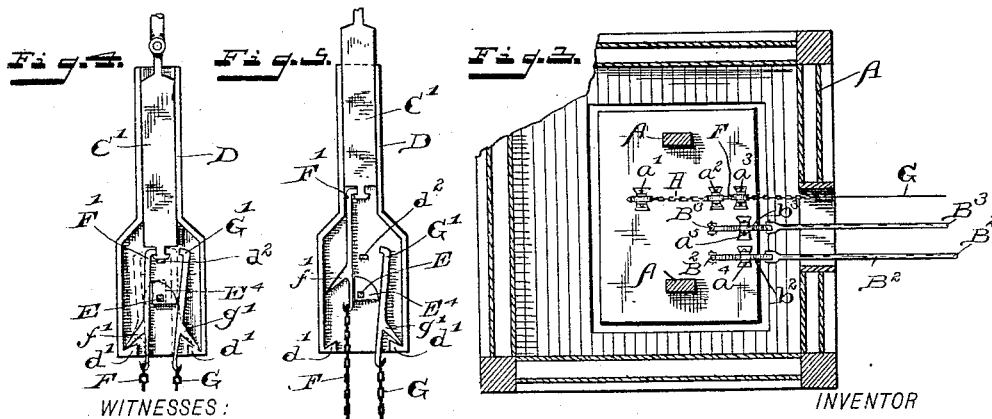
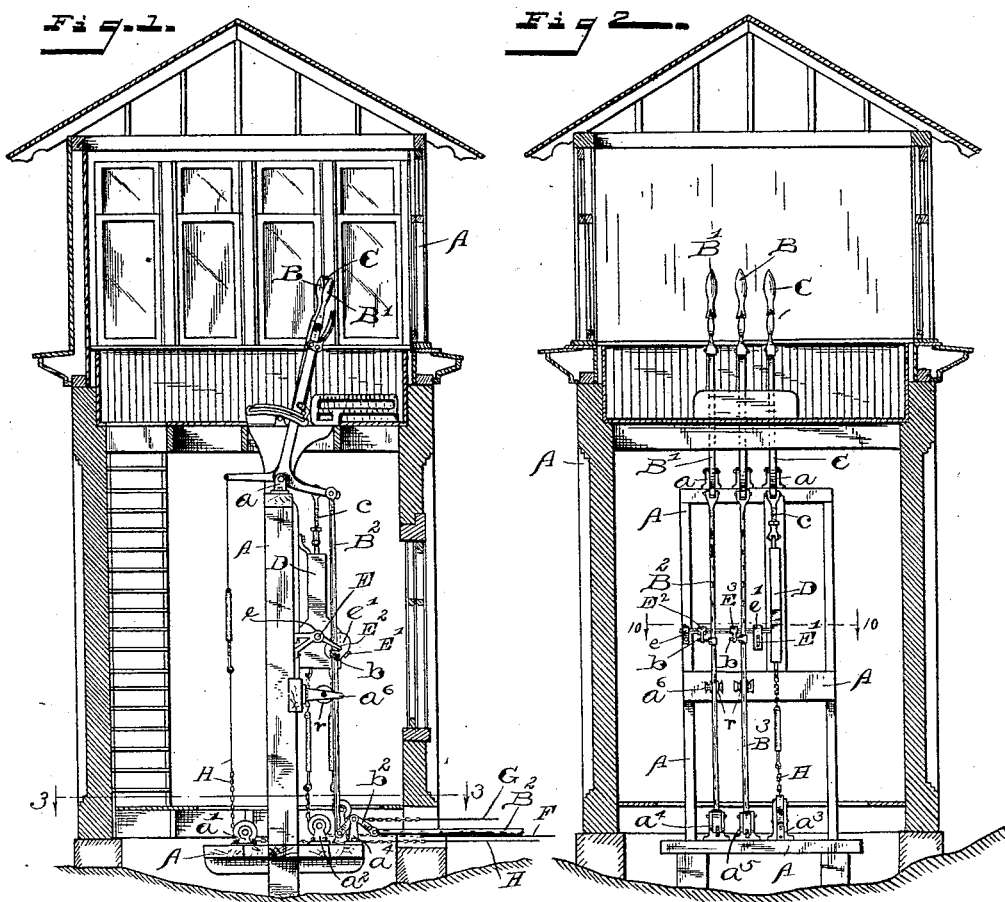
(No Model.)

2 Sheets—Sheet 1.

C. A. CHRISTOFFERSON.
INTERLOCKING SWITCH AND SIGNAL.

No. 489,581.

Patented Jan. 10, 1893.



WITNESSES:

F. W. Harner
J. A. Walsh

INVENTOR
Christian A. Christofferson
per
W. C. W. Bradford,
ATTORNEYS.

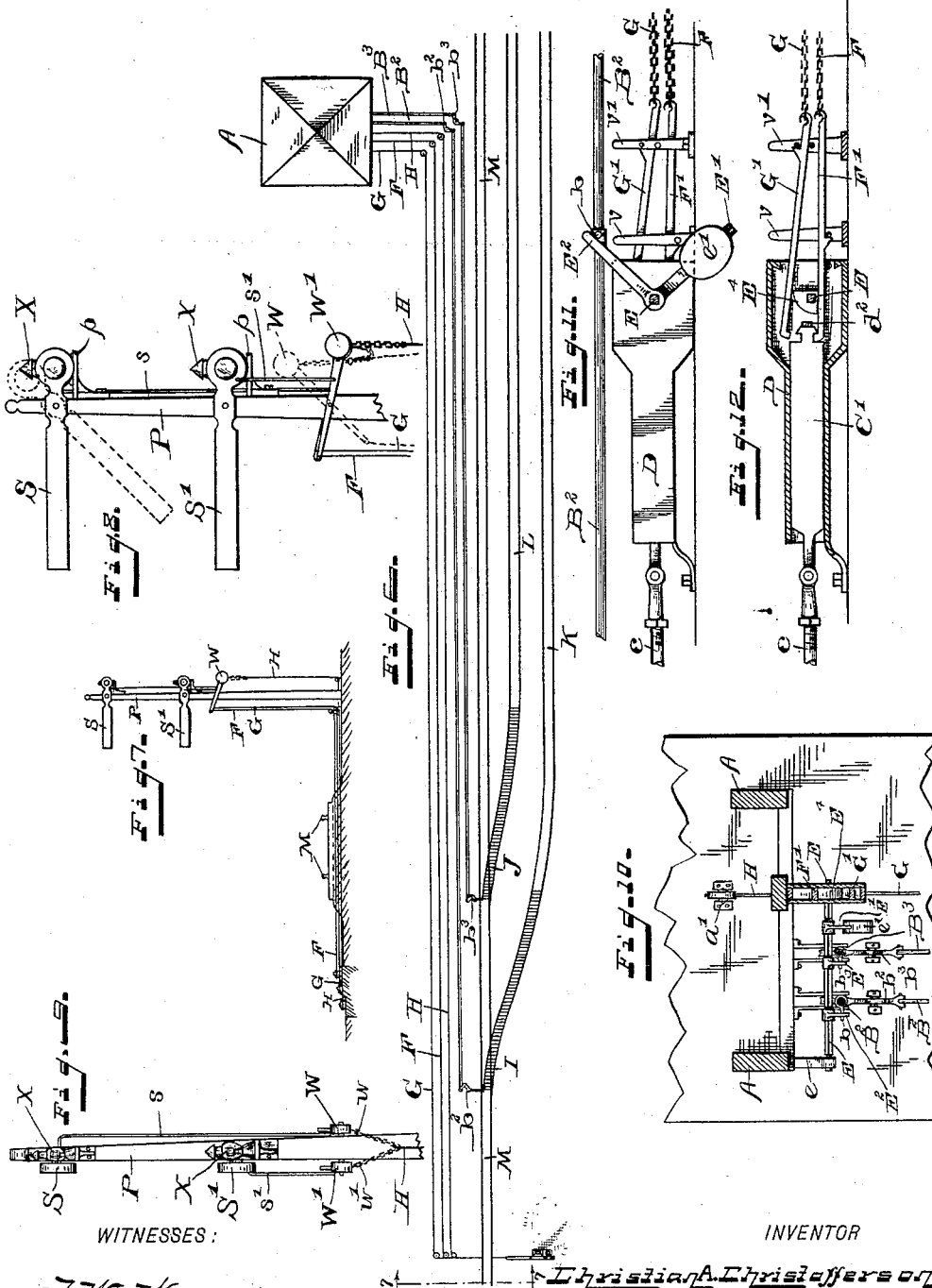
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F. W. Kanner
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UNITED STATES PATENT OFFICE.

CHRISTIAN A. CHRISTOFFERSON, OF INDIANAPOLIS, INDIANA.

INTERLOCKING SWITCH AND SIGNAL.

SPECIFICATION forming part of Letters Patent No. 489,581, dated January 10, 1893.

Application filed June 23, 1892. Serial No. 437,740. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN A. CHRISTOFFERSON, (formerly of Denmark, who has declared his intention to become a citizen of the United States,) residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Signals for Interlocking Railway-Switches, of which the following is a specification.

My said invention relates to apparatus by which switches controlling two or more routes or tracks are enabled to simultaneously so control or adjust the signals connected therewith that only the proper signal for the route to which the switch has been adjusted can be given; and it consists in certain mechanism for the purpose whereby simplicity, certainty, and security of operation are attained with a comparatively small number of parts. Said invention will be first fully described, and then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a longitudinal vertical sectional view of a signal station equipped with my improved apparatus; Fig. 2 a transverse sectional view of the same; Fig. 3 a horizontal sectional view looking downwardly from the dotted line 3 3 in Fig. 1; Figs. 4 and 5 detail views on an enlarged scale, of the devices which are especially peculiar to my invention, in their several positions; Fig. 6 a diagrammatic plan view of a railway track having two switches adapted to be manipulated by the use of my invention; Fig. 7 a transverse sectional view of the track on the dotted lines 7 7 in Fig. 6, and including an elevation of the signal post and signals; Fig. 8 a detail view of the upper portion of said signal post, on an enlarged scale; Fig. 9 a rear elevation of the same; Fig. 10 a detail horizontal sectional view, looking downwardly from the dotted line 10 10 in Fig. 2; Fig. 11 a detail side elevation of the parts which are especially peculiar to my invention, when placed in a horizontal position, and Fig. 12 a central sectional view of the same.

In said drawings the portions marked A represent the frame-work in the signal house

(also said house as a whole) which supports the mechanism; B B' the switch levers; C the signal lever; D a housing containing the mechanism immediately operated by said signal lever; E a rock-shaft whereby the operation of one of the switches "selects" the appropriate signal; F and G chains or ropes running to the signals, whereby they are operated; H a chain or rope whereby the return of the signals to position when released is insured; I and J two switches illustrated in connection with my invention; K and L the two switch or branch routes, and M the main railway track.

I have illustrated said invention in connection with a main track having two switches, with one signal for said main track, and one signal for said two switches, and this is one of the simplest arrangements possible. Obviously the system may embody only a single switch, and it may be extended to any extent. Where the extension consists in adding more switches, only, the signaling apparatus may remain as shown, it being only necessary usually to provide one signal for all the switches on one track; but the signals may of course be multiplied in case it is desired to do so. Where there are additional tracks or crossings, additional signals must, of course, be provided.

A leading feature of my invention consists in the construction whereby a vertical arrangement of the "selecting" mechanism is possible, which is thus enabled to be brought within the signal station, and occupy a portion of the lower story thereof, when, as is usual, such station is two stories in height. The principal parts of said mechanism are the vertically moving-latch-bar C', the catches F' and G', and the cam-bearing rock-shaft E, or equivalents, which, with the surrounding or supporting housing or structure are known in railway parlance as the "selector."

The frame A is, of course, arranged suitably to support the mechanism, and varies according to circumstances. Bearings a support the switch and signal levers, and other bearings a' a² and a³ support the sheaves for the chains or ropes running to the signals, while bearings a⁴ and a⁵ support the bell-crank levers whereby the rods running from the

switch levers are given the necessary change of direction.

The switch levers B and B' are of a form common to this class of apparatus, and are suitably mounted in the bearings *a*, as shown. Rods B² and B³ run from said levers to the switches, and have the bell-crank levers *b*² and *b*³ (see especially Figs. 1 and 6) interposed at the points of change of direction, all as will be readily understood. Upon the vertical portions of these rods B² and B³ in my preferred arrangement, as shown in the principal figures of the drawings, are fingers *b* which engage with arms E² E³, on the rock-shaft E, for purposes which will be presently described. Rollers *r*, mounted in bearings *a*⁵ upon the framework, guide these rods in their vertical movement, so that they shall not vary from the proper position to operate said shaft effectively. In their general arrangement these switch rods are of an ordinary character, as is illustrated more particularly in the diagrammatic view Fig. 6, where they are shown as embodying a second and third change of direction by means of the bell-crank levers, and are connected to the switches I and J, respectively, which lead to side tracks K and L from the main track M, all of which are of an ordinary and well known construction and arrangement.

The signal lever C is in itself constructed and mounted very much like corresponding levers in other systems. To it, however, is connected, by means of a link *c* or otherwise, the vertically moving latch-bar C', by means of which, and the mechanism connected therewith, as will be presently explained, I am enabled to operate two or more signals with the single lever, the appropriate one of which has been "selected" by the movement of the corresponding switch lever. This latch-bar has a double-sided head at the lower end, with which the catches F' G' on the chains or wires engage, as will be presently described.

The housing D is arranged to contain the mechanism especially peculiar to my invention. Its upper or smaller part constitutes a vertical way in which the latch-bar C' moves. Its lower portion contains the catches which are attached to the signal chains or wires, and the cam or cams by which they are caused to assume their appropriate positions, and its size is enlarged to accommodate this mechanism, as shown most plainly in Figs. 4 and 5. At its lower end it is provided with rests *d'* with which wings on the catches will engage, and by which they are supported when disengaged from the latch-bar.

The shaft E passes centrally through the housing D, and out horizontally to one side of said case, and is mounted in an appropriate bearing *e* on the frame-work at one end, and in one side of said housing D at the other. It is provided with an arm E' on which is a weight *e'*, which holds it in the position shown, except when forcibly moved therefrom, and

with arms E² and E³ with which the fingers *b* on the rods B² and B³ will engage. Within the housing D and rigidly mounted on said shaft is a cam E⁴ positioned between the two catches. The various positions of these parts are shown by means of full and dotted lines in Fig. 4, in which all the parts are also shown at rest, and in their normal position, with both the signals set at "danger," but ready to be operated to show the main track "clear."

The chains or wires F and G run from the signals on the distant signal post P to the catches F' and G' within the housing. Said catches are of peculiar construction. They stand substantially vertically within the housing D alongside the cam E⁴ on the shaft E, by which cam they are separated and operated. They are respectively provided with wings *f'* and *g'* which are adapted to come in contact with the rests *d'* and *d'*, and which aid in the operation, as will be presently described. The upper ends are turned inwardly at right angles and adapted to engage with the head of the latch-bar C', and are caused to do so by the angular direction of the wings *f'* and *g'*, except when forced into the other position by means of the cam E⁴. It should be mentioned here that there is a stop *d*² inside the housing D, with which the lower end of the latch-bar comes in contact when in its lower position, and whereby said latch-bar is held so that its notches will just register with the points of the catches, as shown.

The chain or wire H runs to the counter weights W W' for the signal arms S S' to which it is connected by the usual short chains *w w'*, whereby the certain return of said counter weights is secured in case anything (as snow or ice) should prevent their easy and certain automatic movement. These signals, and counter weights, and the connections, are all of a well known construction, and need not be further described herein. The post P carries brackets *p* for the lamps X, and the counter weights are connected to the signal arms by rods *s s'*, all in a well known manner.

The operation is as follows:—The parts being positioned as shown in the principal drawings, and it being desired to signal a train to pass ahead over the main track, all that is necessary is to pull the signal lever, the switches being already set, when the signal arm S will drop to the position shown by means of dotted lines in Fig. 8, which indicates that the main track is "clear," and that the approaching train can pass. When, however, it is desired to open the switch, either the switch lever B or B' is thrown back, when the finger *b* will come in contact with an arm on the rock-shaft E, which rocks said shaft and its cam E⁴, so that the positions shown by the full lines in Fig. 4 are changed to those shown by the dotted lines. Pulling the signal lever after this is done will drop the signal arm S' instead of the signal arm S, and thus indicate to the approaching train that, if it proceeds,

it will enter one of the tracks K or L instead of passing along over the main track M. The parts are shown in Fig. 5 in the positions they occupy when the signal arm S is dropped, (see dotted lines, Fig. 8) and the train thus signaled to proceed over the main track. After the train has passed, and the signal lever is thrown back to normal position, the parts return to the positions indicated by the full lines in Figs. 4 and 8. The weight *e'* operates to rock the shaft E, and thus return the cam thereon to its position, while, as before explained, the wing *f'* on the catch F' throws it over into engagement with the latch bar C'. The weight of the chain or wire F aids in this, as will be readily understood.

In Figs. 11 and 12 is shown the arrangement, when, as is sometimes the case, for lack of room or otherwise, it becomes desirable to locate the apparatus in a horizontal instead of a vertical position. I, however, much prefer the vertical position to the horizontal, and this illustration is only to show that the horizontal position can be employed. In these drawings, the parts, so far as they are similar to those shown in the principal drawings, have been given the same letters of reference. The weight *e'* is mounted on an arm, arranged in a crank position to the operating arm instead of parallel therewith, and operates in the manner that its changed position calls for. Bearings *v v'* are provided through which the catches F' and G' pass, the former of which has a rest for said catch F', and is positioned close to the housing D, and the latter of which is provided with a rest for said catch G' and is positioned near its outer end. This arrangement is so that the gravity of said catches themselves will aid in causing them to drop into proper position, when released from the operation of the cam.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an interlocking signal apparatus, with the signal lever and the wires ropes or chains running to the signals, of a latch-bar, a catch connected to each of said chains and adapted to engage with said latch bar, a cam shaft passing transversely of the catches and bearing a cam or cams adapted to shift the positions of said catches, and an engagement between the cam shaft and the switch levers.

2. The combination, in an interlocking signal apparatus, of a single signal lever carrying the catch-bar, two or more catches connected to the signal chains ropes or wires, and adapted to alternately engage with said catch bar, and mechanism by which the engagement and disengagement of said parts is effected, said mechanism consisting of fixed supports whereby said catches are thrown toward said latch by gravity, and a locking cam positioned between them whereby the force of gravity is overcome and first one and then the other of said catches thrown out of said engagement.

3. The combination, in an interlocking signal apparatus, of the signal lever, the chains ropes or wires running to the signal apparatus, a connection between said lever and said chains, ropes or wires, consisting of a vertically movable latch-bar and vertically arranged catches adapted to engage over a head or into notches on said latch-bar, and supports for said catches when disengaged.

4. The combination, in an interlocking signal apparatus, with catches arranged vertically in a housing and provided with side extensions or wings, of rests or supports in said housing below said wings adapted to support said catches and cause them to incline inwardly by the force of their own gravity.

5. The combination, in an interlocking signal apparatus, of the housing D, a catch-bar moving vertically in said housing, a stop to limit its downward movement, two or more catches adapted to alternately engage therewith, and a cam located between said catches, whereby one or the other, but not both, are thrown and held out of engagement with said latch bar.

6. The combination, in an interlocking signal apparatus, of the switch lever, connections to the signals which are attachable and detachable to and from said lever, a rock-shaft having a cam by which the detachment is effected, arms on said rock-shaft, and fingers mounted on the rods connected to the switch levers and extending behind the arms on the rock shaft, and adapted as said rods are pulled to come in contact with said arms and thereby operate said rock shaft.

7. The combination, in an interlocking signal apparatus, of switch levers, rods running therefrom to the switches, projecting fingers thereon, a signal lever, two or more connections running thereto from signals at a distant point which are adapted to be alternatively engaged therewith, means of engagement consisting of catches which are automatically forced into engagement, and a cam on a rock-shaft adapted to be operated by the fingers on the switch rods to effect such disengagement.

8. The combination, of the switch levers B and B', rods running therefrom to the switches, and provided with fingers, the signal lever C, the vertically moving latch bar C', a housing D within which said latch bar is situated, catches F' and G' also within said housing arranged to engage with said latch bar, a cam mounted on a rock-shaft and situated between said catches, a weighted arm on said rock shaft whereby it is normally held in position, and other arms thereon with which the fingers on the switch rods will engage, whereby its position will be changed as the switches are opened, and a different one of the catches brought into engagement with the latch bar, thus making ready for the display of a different signal.

9. The combination with the catches of an interlocking signal apparatus, of a cam mounted

on a rock shaft and situated between said catches, a weighted arm on said shaft for holding said cam in one position, whereby one of said catches will engage with the latch
5 bar, and other arms which engage with fingers or projections on the switch rods, whereby the position may be reversed.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 17th day of June, A. D. 1892.

C. A. CHRISTOFFERSON. [L. s.]

Witnesses:

CHESTER BRADFORD,
J. A. WALSH.