(No Model.) 2 Sheets—Sheet 1.

J. BOUCHER.

COMBINED SWITCH AND SIGNAL DEVICE FOR RAILWAY CROSSINGS.

No. 490,736. Patented Jan. 31, 1893.

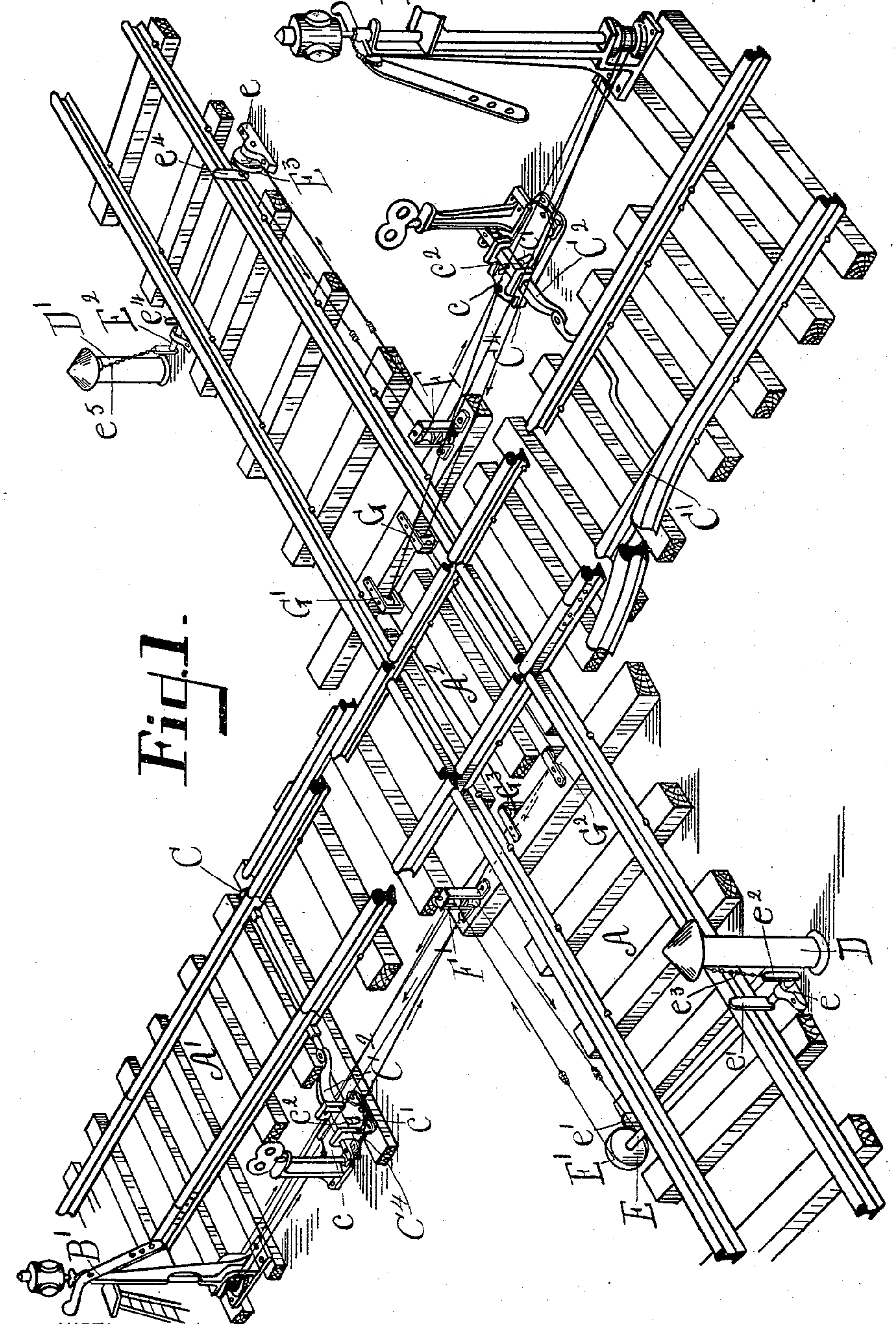

Fig. 1.

WITNESSES
F. Clough.
D. W. Bradford

INVENTOR
John Boucher
by Parker & Burton
his Attorneys.

(No Model.) 2 Sheets—Sheet 2.

J. BOUCHER.

COMBINED SWITCH AND SIGNAL DEVICE FOR RAILWAY CROSSINGS.

No. 490,736. Patented Jan. 31, 1893.

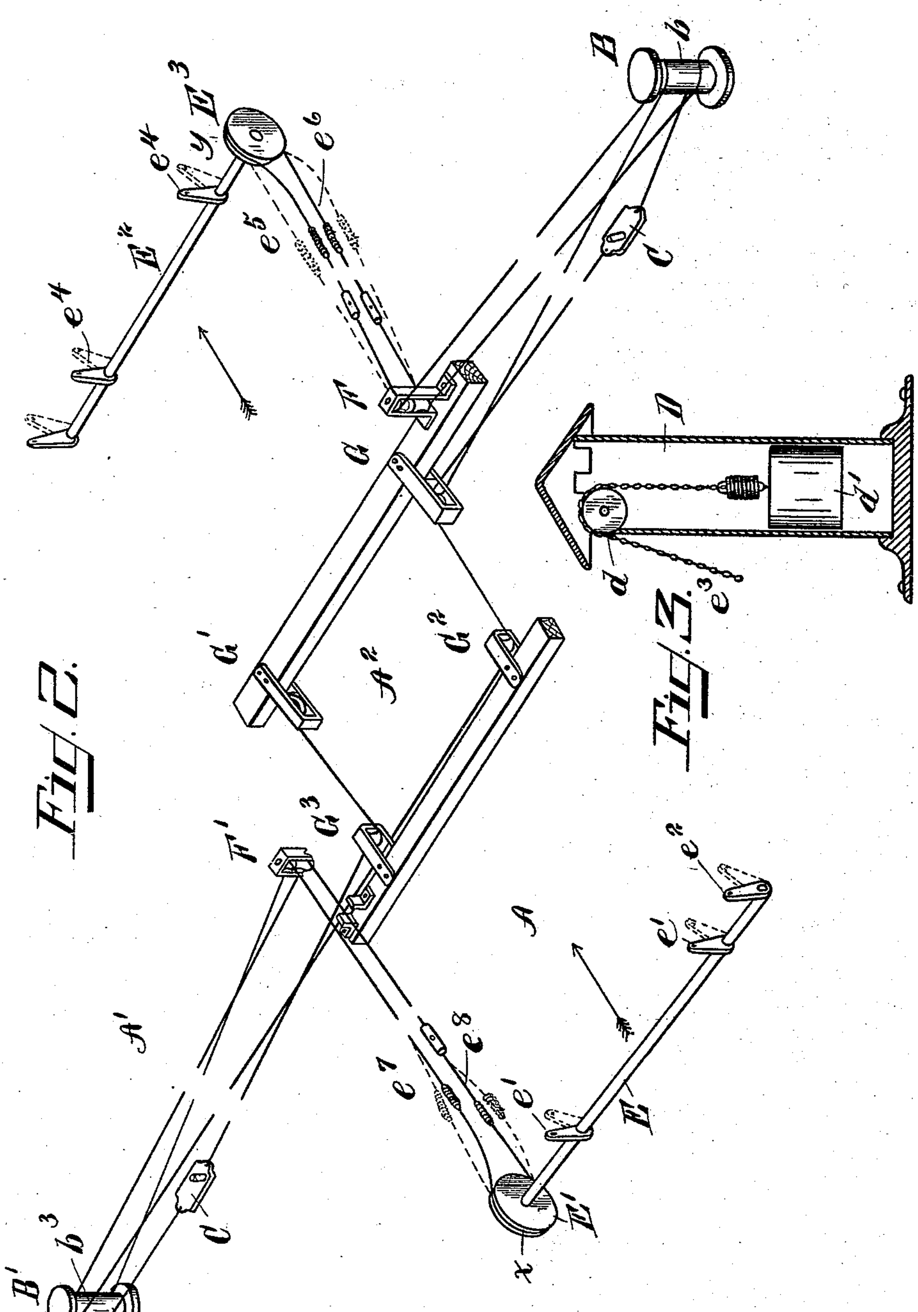

Fig. 2.

Fig. 3.

WITNESSES
F. Clough.
D. W. Bradford

INVENTOR
John Boucher
by Parker & Burton
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN BOUCHER, OF BELLE RIVER, CANADA, ASSIGNOR OF ONE-HALF TO DAVID BECHARD, OF SAME PLACE.

COMBINED SWITCH AND SIGNAL DEVICE FOR RAILWAY-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 490,736, dated January 31, 1893.

Application filed September 12, 1891. Serial No. 405,472. (No model.)

To all whom it may concern:

Be it known that I, JOHN BOUCHER, of Belle River, county of Essex, Province of Ontario, Canada, have invented a certain new and useful Improvement in a Combined Switch and Signal Device for Railway-Crossings; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to switch and signaling devices for railway crossings, and its object is to provide means for automatically blocking incoming trains at a crossing by a train on the opposite track, and it consists in the combination of the devices hereinafter described, and shown in the drawings, in which

Figure 1 is a perspective of a crossing of railway tracks, showing the several semaphore signals, switches, connecting cables, and operating mechanism. Fig. 2 is a diagram of the system of cables used by me. Fig. 3 shows the stand-pipe, weight, spring and chain.

In the drawings, A and A′ are the respective tracks crossing one another at A^2.

B and B′ are semaphore signals, which are to be located a sufficient distance from the crossing to permit the train to be stopped by the signal before it reaches the crossing or the derailing switches hereinafter described.

C and C′ are switches adapted to open the track A′ at each side of the crossing, and may be provided to switch a train coming in on this track from either direction onto the side-track, or to derail it, as the case may be, if from a failure to recognize the semphore signal, the train be allowed to pass the signal and approach the crossing when blocked by a train on the opposite track at the crossing.

I employ an automatic switching device, consisting of shaft E running underneath the rails and mounted in any suitable support, as *e*, and provided with trips *e*′ or any other suitable method for revolving the shaft E in either direction by a passing train. On the shaft E, at one side of the track is mounted a standard e^2, normally in a vertical position and adapted to be held in that position by means of the chain e^3 running up over a sheave *d*, and provided with a weight *d*′ in a stand-pipe D at the side of the track. This weight and chain operate to hold the standard e^2 and the shaft E in a position to be operated by a passing train. On the opposite end of the shaft E is mounted a sheave E′, adapted to carry a cable as hereinafter described. At the opposite side of the crossing is provided an automatic switch, arranged similar to that just described, adapted to be acted upon by a train approaching from the opposite direction, or a train going out from the crossing, as hereinafter described, and which I will separately letter the stand-pipe D′, shaft E^2, pulley E^3, trip e^4, standard, and chain e^5.

F and F′ are double sheaves, located near the track for carrying the cables. G, G′, G^2, and G^3 are sheaves located within the track, also for carrying the cables in the system hereinafter described.

I will now describe the system of cables shown in the diagram in Fig. 2, used by me in operating the several semaphores and switches heretofore mentioned. I provide this diagram that the course of the cables may be followed without confusion. The line of the cable we will say starts at E′, around sheave F′ to a sheave b^3 on the semaphore B′, through the switch C, sheave G^3 and G′, and the second switch C′, around the semaphore B, sheave F and pulley E^3, and back around sheave F, semaphore B, sheaves G and G^2, semaphore B′, and sheave F′ to beginning. This makes a continuous double cable from sheave E′ to sheave E^3 around the semaphores, so that the operation of the trip or other means for utilizing the movement of the train, will operate all of the semaphores. The main cable between the semaphores passes through the switches C and C′, and is attached to the sliding blocks *c*. The cable is so adjusted that it has throughout its extent a slackness substantially equal to twice as much as would be taken up by the return of the trips *e*′ to their normal position after the passage of a train. This slackness, however, is equally divided, one half of it being adjacent to the trips *e*′, and the other half being adjacent to the trips e^4. In the normal position, with the semaphores set at "safety" and the switches set for the main tracks, the trips e', e^4, are held in an upright position by the weights and standards e^2 hereinbefore described. In this position, the slack portions of the cables are respectively adjacent to the sheaves E′, E^3, and are respectively located in the upper strands of the cables passing over sheaves E′ and E^3, whereas the under strands of the cables adjacent to those sheaves are substantially taut, as is more particularly shown by the lines representing the cables in Fig. 2, at e^5 and e^6, e^7 and e^8 respectively. The cables when so adjusted are respectively fastened to the sheaves E′ and E^3 at points marked x and y; or they may be wound a number of times upon the sheaves to prevent slipping. It is obvious that, upon a train approaching the crossing in the direction of the arrows, as shown in Fig. 2, it would depress trips e', e', to the position shown by the dotted lines. This depression would partially rotate the sheave E′, and by such rotation would draw upon the under strand e^8 of the cable adjacent to the sheave E′. The drawing upon this strand would operate the semaphores and switches, and set them to the position of 'danger." At the same time, it would take up the slack in the upper cable adjacent to the sheave E^3 to substantially the dotted line. This depression of the trip e' thus draws the upper cable adjacent to E^3 straight, without rotating the sheave E^3, and at the same time slackens the lower cable to the position shown in the dotted line thereunder. This leaves the amount of slack in the upper cable adjacent to E′ substantially the same, while the trip e' is depressed. On the return of the trip e' to its normal position, the rotation of the sheave E′ takes up the slack in the upper cable and draws it taut, substantially as shown in the upper dotted line, at the same time, it slackens the lower cable, as shown by the dotted lines thereunder. The continued passage of the train in the line of the arrow operates the trips e^4, and rotates them to the position shown in the dotted lines. This rotates the sheave E^3, thus draws on the taut upper cable, as shown by the dotted line, lowers the semaphore, and resets the switches at "safety." It also takes up the slack in the under cable and slackens the upper cable adjacent to sheave E′, when the position is the same as that shown normally in the drawing of Fig. 2, and the operation is ready to be repeated by the passage of the trains in the same direction. The passage of a train in the opposite direction reverses the process, the rotation of the trip e^4 toward the crossing draws upon the taut under cable adjacent to sheave E^3, and at the same time arranging the cables adjacent to sheave E′, as shown in the dotted lines, the upper portion taut, and the lower portion slack. The return of the trips e^4 to their normal position tautens the upper cable and slackens the lower cable adjacent to the sheave E^3, the continued passage of the train, striking trips e', draws upon the upper cable adjacent to E′, sets the switches and signals at "safety," tautens the under cable, and slackens the upper cable adjacent to sheave E^3. The block c is mounted in any suitable frame or guide C^4, so that the movement of the cable will move the block end-wise. Mounted in the frame C^4 across the sliding block is the switch bar C^2 in suitable guides, provided with a guide c^2 operating in a cam slot c' in the sliding block c. The switch bar C^2 is attached to any suitable switch in the track, which may be either a split switch or otherwise as desired. This construction is such that the operation of the cable connecting the semaphores will operate the semaphores, and at the same time and with the same movement operate the sliding blocks c and open or close the switches through the action of the cam slot and the guide of the switch bar. This combination of the semaphores, the continuous cables having the switches connected therewith, is designed to operate the semaphores and switches simultaneously through the action of a train passing on the opposite track.

Instead of the continuous cable taking the course as described by me in detail, I may use three separate cables, one consisting of a double line from one semaphore to the other, and connected with the switch operating mechanism, and two other independent lines, one connecting each semaphore with the mechanism to be operated with the moving train; and, in either case, whether using the continuous cable or the three separate cables, they may be attached to the pulleys or sheaves wherever power is to be exerted, so that the action will be positive between two points, and not continuous through the entire system. Any suitable means may be used for keeping the length of the cables adjusted in any section or throughout the entire length of the continuous cable.

In the drawings and description I have shown what may be called a single system, that is, a system in which one track is adapted to be blocked by the other; that is, in which track A′ is adapted to be blocked by a train passing on track A; but I would have it understood that this system may be duplicated so that each track may be blocked by the other. This would simply call for a duplicating of the system described herein, but to describe the same would complicate, and would serve no purpose in understanding the principle.

The operation of my device is as follows: A train approaching the crossing on the track A will operate the shaft E by striking the trips or levers e'. This operating device may be varied, there being many well-known methods of automatically operating signals by passing trains, any of which may be used. The operation of this shaft by an incoming train will operate, through the pulley E′, the entire system of cables, will set the semaphores on the opposite track on each side of the crossing, will operate the switches C and C′ and open the opposite track so that, if a train fails to stop or notice the semaphore, the switch is adapted to side-track or derail it. When the train on track A passes the crossing and reaches the operating mechanism at the other side, it operates the entire cable system in the opposite direction, closes the switches and resets the semaphores.

In the stand-pipes carrying the weight for re-adjusting the automatic switch operating mechanism, I provide a spring in the chain above the weight so as to relieve a sudden strain on the chain.

What I claim is—

1. In an automatic switch and signal system for railway crossings, the combination of semaphore signals situated at suitable distances from the crossing on a track approaching it, double cables connecting said semaphores adapted to operate them simultaneously, and mechanism adapted to be actuated by a passing train to operate said semaphores by means of said double cables, said mechanism consisting of trips, and operating sheaves to which said cables are fastened, each system of trips and operating sheaves being rigidly attached to a common rotating shaft, whereby the depression of the trips toward the crossing shall set the signals at "danger" and the depression of the trip outwardly from the crossing shall set the signal at "safety," substantially as described.

2. In an automatic switch and signal system for railway crossings, the combination of derailing switches situated at suitable distances from the crossing on the track approaching it, double cables connecting said switches adapted to operate them simultaneously upon the two sides of said crossing, and mechanism for operating said cables, consisting of trips adapted to be operated by the passing train, and operating sheaves to which said cables are attached, each system of trips and sheaves being rigidly attached to a common rotating shaft so adjusted that the depression of the trips respectively toward the crossing shall set the derailing switches for side-tracks and the depression of the trips outwardly from the crossings shall reset the switches for the main track, substantially as described.

3. In an autamatic switch and signal system for railway crossings, the combination of derailing switches situated at suitable distances from the crossing on the track approaching it, double cables connecting said switches adapted to operate them simultaneously upon the two sides of said crossing, mechanism for operating said cables, consisting of trips adapted to be operated by the passing train, and operating sheaves to which said double cables are attached so adjusted that the depression of the trips respectively toward the crossing shall set the derailing switches for side-tracks and the depression of the trips outwardly from the crossings shall reset the switches for the main track, and means for returning the trips to their normal position, the trip, sheaves and means for returning the trips being operated by a common shaft, substantially as described.

4. In a signal mechanism for railway crossings, the combination of a shaft operating transversely to the line of railway with which it is connected, trips rigidly attached thereto said shaft adapted to be operated by the passing train by rotating the shaft in either direction corresponding to the passage of the train, a sheave rigidly located upon said shaft and adapted to turn either way with double operating cables permanently attached to said sheave, and adapted to be operated thereby, mechanism whereby said cables are adapted to operate signals and switches to set them at "danger," and to return them at "safety," and means for returning the trips to their normal position whereby they may be operated by a train passing in either direction, substantially as described.

5. In an automatic crossing signal system, the combination with the track of two transverse shafts located in said track and upon opposite sides of a crossing, trips rigidly attached to said shafts adapted to be operated by a train passing in either direction, sheaves rigidly attached to said shafts, and double cables permanently attached to said sheaves and so adjusted that actuation of one trip and shaft to set the signals at "danger" shall adapt the trip upon the opposite side of the crossing, when actuated in the same direction, to rotate the signals to "safety," substantially as described.

6. In an automatic crossing signal system, the combination with the track of two transverse shafts located in said track and upon opposite sides of a crossing, trips rigidly attached to said shafts adapted to be operated by a train passing in either direction, sheaves rigidly attached to said shafts, double cables permanently attached to said sheaves and relatively so adjusted in length that actuation of one trip and shaft to set the signals at "danger" shall adapt the trip upon the opposite side of the crossing, when actuated in the same direction, to rotate the signals to "safety," and means of adjustment of the length of said cables, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

JOHN his × mark BOUCHER.

Witnesses:
D. BECHARD,
MARION A. REEVE.