

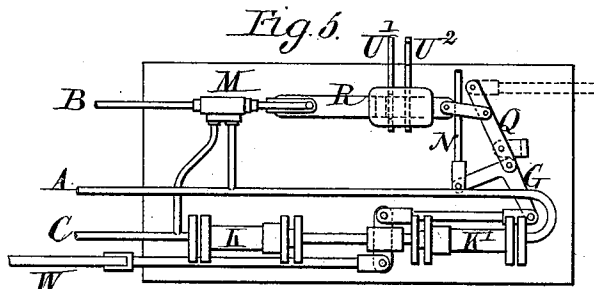
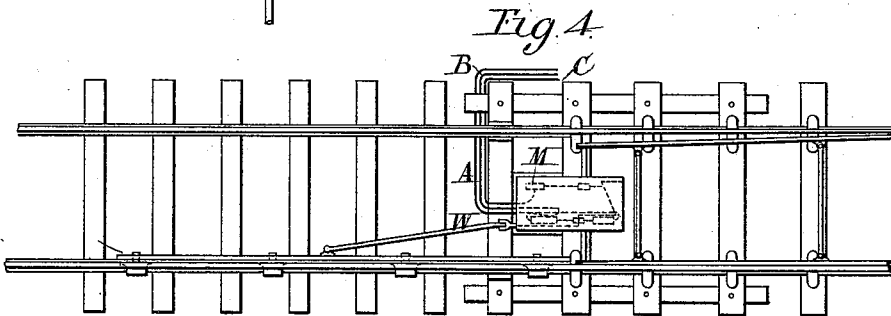
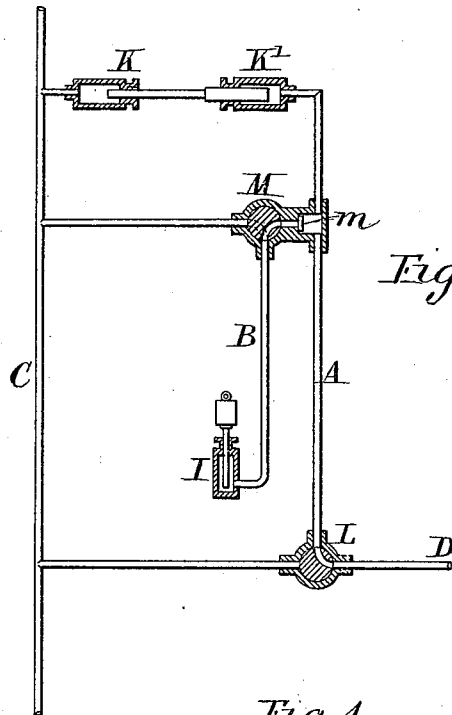
(No Model.)

4 Sheets—Sheet 1.

G. SERVETTAZ.
SWITCH AND SIGNAL APPARATUS.

No. 466,190.

Patented Dec. 29, 1891.



Witnesses:
J. A. Rutherford.
Robert Everett,

Inventor:
Giovanni Servetaz.
By James L. Norris.
Attorney.

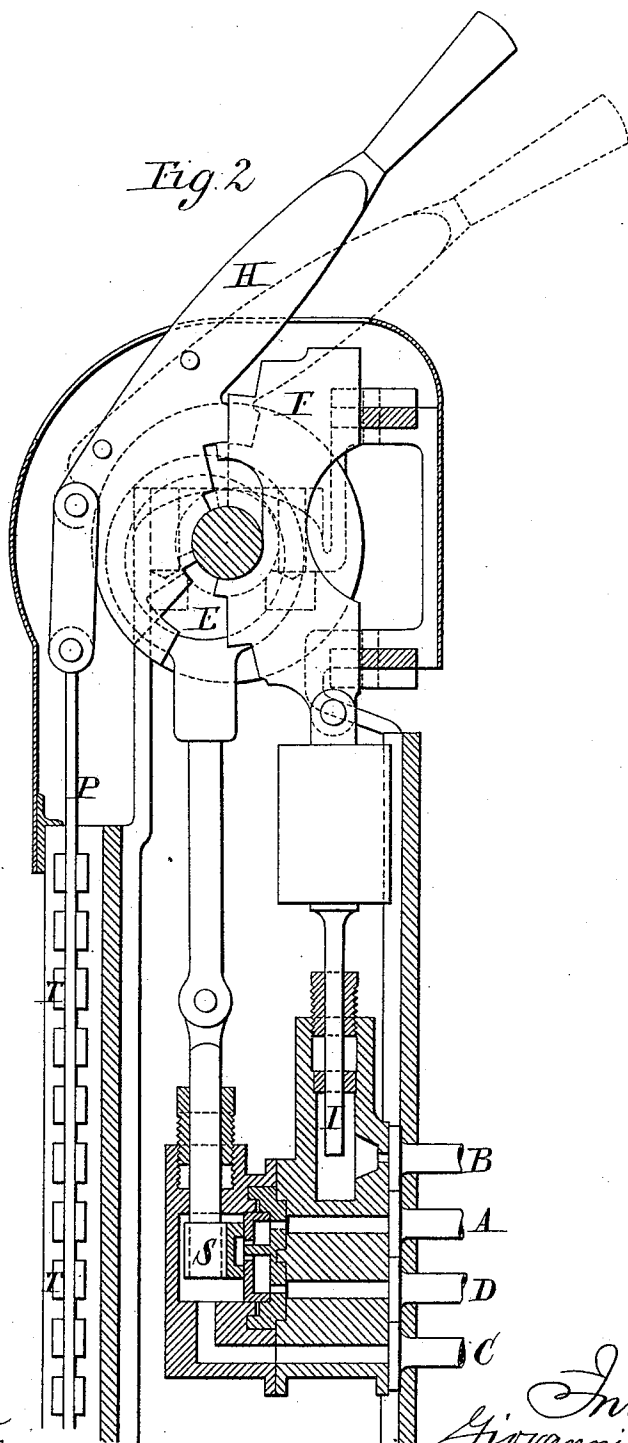
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Attorney.

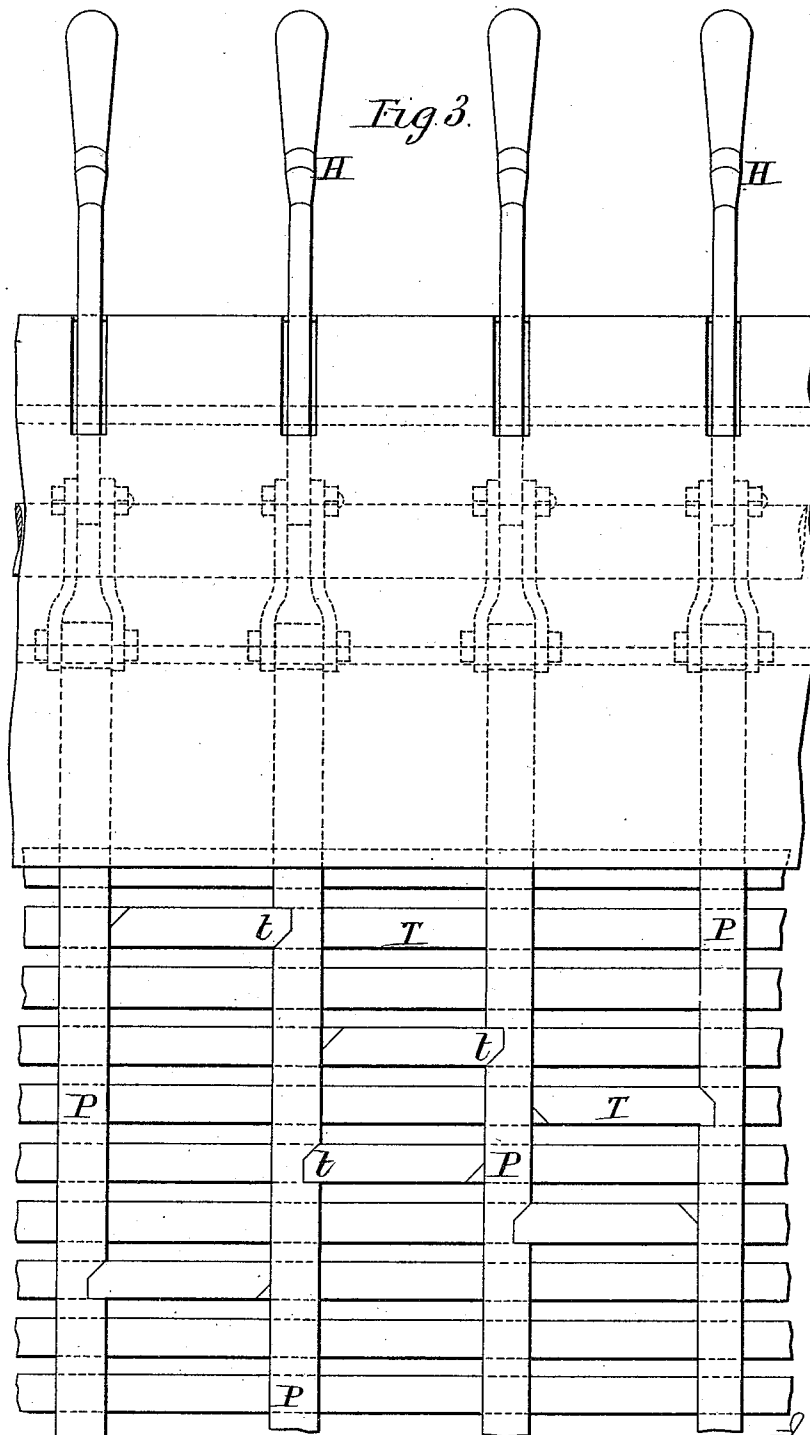
(No Model.)

4 Sheets—Sheet 3.

G. SERVETTAZ.
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Witness:
J. R. Rutherford.
Robert L. Smith

Inventor:
Giovanni Servetaz.
By James L. Norris.
Attorney

(No Model.)

4 Sheets—Sheet 4.

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Fig. 6.

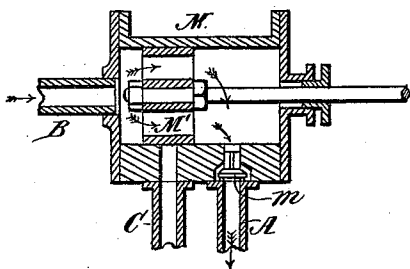


Fig. 7.

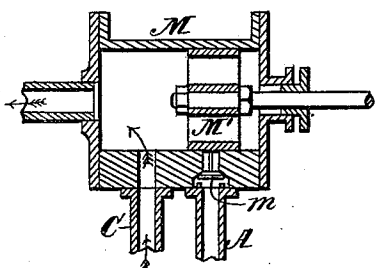


Fig. 8.

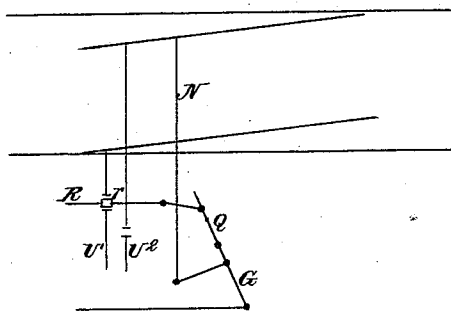


Fig. 9.

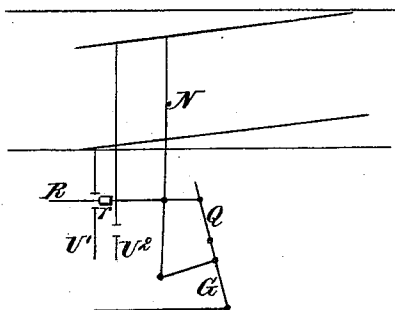
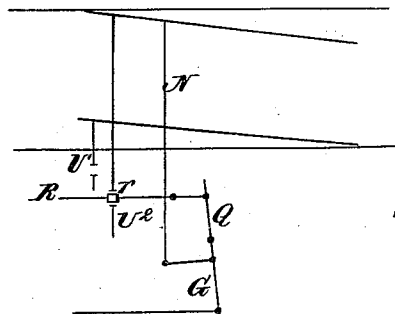


Fig. 10.



Witnesses,
Robert Everett,
J. Harry Daly.

Inventor,
Giovanni Servetaz.
By *James L. Norris,*
Atty.

UNITED STATES PATENT OFFICE.

GIOVANNI SERVETTAZ, OF SAVONA, ITALY.

SWITCH AND SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 466,190, dated December 29, 1891.

Application filed May 26, 1891. Serial No. 394,193. (No model.) Patented in Belgium April 30, 1888, No. 81,490; in England May 8, 1888, No. 6,870; in Italy June 21, 1888, XXII, 23,341; in France August 1, 1888, No. 190,788; in Austria-Hungary October 10, 1888, No. 16,977 and No. 32,875, and in Germany April 15, 1889, No. 46,838.

To all whom it may concern:

Be it known that I, GIOVANNI SERVETTAZ, a citizen of France, residing at Savona, in the Kingdom of Italy, have invented a new and useful improvement in working and controlling points, signals, traversers, turn-tables, crossing-gates, and like railway appliances, (for which I have obtained patents in Great Britain, dated May 8, 1888, No. 6,870; in Belgium, dated April 30, 1888, No. 81,490; in France, dated August 1, 1888, No. 190,788; in Italy, dated June 21, 1888, Vol. XXII, 23,341; in Austria-Hungary, dated October 10, 1888, No. 16,977 and No. 32,875, and in Germany, dated April 15, 1889, No. 46,838,) of which the following is a specification.

My invention relates to apparatus for working points, signals, and other railway appliances and controlling their movements by fluid-pressure transmitted by pipes from an accumulator or elevated reservoir. The fluid employed may be water; but in cold climates it should be mixed with ingredients to prevent congelation—such, for instance, as glycerine.

The chief objects which I have in view are to dispense with the rods, cords, or wires, levers, and other mechanical connections from the signal-cabin to the point, signal, or other more or less distant object that has to be moved; to lessen the labor of the operator by relieving him of all the work necessary for effecting the movements of the points, signals, or other objects; to inform the operator by automatic repeating action whether the object intended to be moved has really moved or not, and by this same action to unlock or to keep locked such other parts of the system as might in the one case or should not in the other case be moved consistently with safety. I shall describe apparatus for this purpose constructed and arranged according to my invention, referring to the accompanying drawings.

Figure 1 is a diagrammatic plan illustrating the arrangement of pipes, valves, and connections of the controlling and the working apparatus. Fig. 2 is a vertical section, partly in elevation, showing one of the handles of the controlling apparatus and its valve and

locking gear. Fig. 3 is a front view showing several of the handles and part of their locking-gear. Fig. 4 is a plan of a pair of points and the gear for moving and locking them. Fig. 5 is a plan to an enlarged scale of part of Fig. 4. Figs. 6 and 7 are detail longitudinal sectional views of the three-way cock or valve M, showing the piston-valve in different positions. Figs. 8, 9, and 10 are diagrams, hereinafter explained, to illustrate bolting of the points.

Referring first to Fig. 1, which shows diagrammatically the working of a pair of points, K and K' are two connected plungers, of which K' is larger than K, preferably having about double the area. These plungers work in hydraulic cylinders, of which the smaller is always in connection with a pipe C, supplying the fluid under pressure. The larger cylinder is connected by a pipe A to a valve L, which, merely for the purpose of illustration, is shown as a three-way cock, and which can be moved by the operator in the signal-cabin to put the pipe A in communication either with a discharge-pipe D or with the pressure-supply pipe C. The point-motor being connected to the plungers K K', the points are moved the one way when by moving the valve L the pipe A is put in communication with D, and they are moved the other way when A is put in communication with C. Near the points themselves there is another valve, which is also indicated as a three-way cock M, with a check-valve *m*, by which a pipe B can be put in communication with C to receive pressure-fluid, or with A for discharge, but not for supply, the check-valve *m* permitting flow from B to A, but preventing flow from A to B. The pipe B leads to a cylinder I, fitted with a loaded plunger. The valve M is so connected to the point-motor that it is moved by it, as will hereinafter be explained, when the points complete their stroke, but not till then, and the plunger of I so acts on interlocking gear acting on other handles that the handle cannot complete its stroke in the one direction or the other until the plunger I has completed its stroke, and the locking-gear being so arranged that in order to unlock the handle must complete its

stroke, no unlocking can until then be effected by the handle that works the valve L.

Referring now to Figs. 2 and 3, H is one of the motor-handles moved by the operator for working a valve, which may be a three-way cock, such as indicated at L, Fig. 1, or a simple slide-valve, such as indicated at S, Fig. 2, and so moving the points or signals. It, as well as the other handles, is linked to a vertically-sliding bar P, and across these bars there are fitted to slide a number of other bars T, having fixed on them at suitable places projecting pieces or locks *t*, which can engage in notches in the edges of the bars P and so lock the bars, or, as both the notches and the locks are sloped, when a lock is free it can be thrust out of the notch by the movement of the bar. This form of interlocking apparatus, known as the "tappet" or "plunger" interlocking apparatus, is shown in connection with the handles H by way of example. It is to be understood, however, that any other known kind of interlocking gear may be applied to the handle, provided it be such that all necessary locking is effected by the first part of the movement of a handle and that no unlocking is effected until the handle makes the last part of its movement. To the handle H is attached an eccentric E, which is linked to a slide-valve S within a case, which is supplied by the pipe C with the fluid under pressure. The slide-valve S, when it is moved down, opens a passage to the pipe A, leading to the distant apparatus for working a pair of points or a signal. When the slide-valve S is moved up to the position shown in Fig. 2, it puts the pipe A in communication with a discharge-pipe D. It is thus to be understood that the slide-valve S operates as the three-way cock L, (indicated in Fig. 1,) putting the pipe A in communication with the pressure-supply pipe C or with the discharge-pipe D, according as the handle H in Fig. 2 is moved over to the right or to the left. The handle H has stops formed on the face next its fulcrum, and beyond the fulcrum there is a sliding piece F, presenting counterpart stops linked to a loaded plunger I, which works in a cylinder communicating with the pipe B, Fig. 1.

When the plunger I is raised, as shown in Fig. 2, by the pressure of the fluid in the pipe B, the handle H cannot be moved fully over to the right, because the stops on H do not fit the stops of F when F is in that position; but when the pipe B is in communication through A with the discharge-pipe D the plunger I descends, lowering the sliding piece F, and so bringing its stops into correspondence with those of H, and thus H can now be moved fully over to the right, as indicated by the dotted lines in Fig. 2. In like manner the handle H cannot be moved fully over to the left unless the plunger I and sliding piece F are raised where the pipe B is put in communication with the pressure-supply. As no

unlocking of others of the handles H can take place until the particular handle H which is for the time operating completes its stroke, and as the stroke cannot be completed unless the slide F is in proper position, it follows that the unlocking of others of the handles, such as H, is determined by the condition of the pipe B—that is to say, when the one handle H is moved to the right it cannot unlock any other handle unless B be open to discharge, and when H is moved to the left it cannot unlock any other handle unless B be open to pressure-supply.

Referring now to Figs. 4 and 5, in which the pipes marked A, B, and C and the plungers K K' are to be understood as corresponding with those similarly marked in Fig. 1. The cross-head connecting the two unequal plungers K K' is linked to one arm of a bell-crank lever G, the other arm of which is linked by a rod N to the point-rails. The bell-crank lever G is pivoted on the short arm of the lever Q, the long arm of which is linked to a slide R, which crosses the sliding bars U' U², attached to the point-rails. The slide R is extended to work a slide-valve M, which in its one extreme position, as shown in Fig. 5, puts the pipe B in communication past a check-valve *m* with the pipe A, and which if moved to its other extreme position would put B in communication with C.

In Figs. 6 and 7 the piston-valve M' of the cock or valve M is shown in two different positions. In Fig. 6 the position of the piston-valve is such that the fluid can flow from the pipe B past the check-valve *m* into the pipe A. In Fig. 7 the position of the piston-valve M' is such that the fluid can flow from the pipe C into the pipe B.

The slide R carries on it a bolt or piece projecting from its face, which can slide into and out of notches in the bars U' U², these notches being so situated that the bolt enters the one or the other only when the point-rails are home to the stock-rails in the one attitude or the other, and it serves as a bolt to prevent them from moving. The smaller plunger K is always subject to the pressure in C and holds the parts in the position shown in Fig. 5, the bolt of the slide R being then engaged in the notch of U', and the slide-valve M making communication from B to A. If now it be desired to shift the points, the operator moves the appropriate handle H, Fig. 2, over to the right as far as the slide F permits. He thus moves the slide-valve S, putting the pipe A in communication with the pressure-pipe C. The pressure then acting on the larger plunger K', Fig. 5, tends to move the bell-crank G; but as the points are bolted by the projections of the slide R being engaged in the notch of U', the first action is to draw the slide R to the right, withdrawing its bolt out of the notch of U' and bringing the bolt against U², which stops the further movement of R; but the points being now free the

bell-crank G moves them over, bringing the notch of U^2 to face the bolt on R, and the point-rails being now incapable of moving farther, the continued movement of the plunger K' draws the bolt of R into the notch of U^2 , thus bolting the points. At the same time it moves the slide-valve M, thus putting the pipe B in communication with the pressure-pipe C. The pressure then acting on the loaded plunger I, Fig. 2, raises it, lifting the slide F, and thereupon the operator can move the handle H to the end of its stroke, completing the movement of the bar P, causing one or more of the tappet locks T to leave the notch or notches of P and so to unlock some one or more of the other bars P. In this manner it is made certain that such unlocking cannot take place till the points have been moved fully over in the one direction, and a similar action taking place for moving them in the other direction insures equivalent safety against unlocking antagonistic handles. The plungers $K K'$ may, as shown, be connected to the safety-bar W, usually applied to prevent points from being moved during passage of a train. Although I have described the apparatus and operation for moving a set of points from their one position to the other it is obvious that signals, gates at crossings, and other railway appliances capable of being moved to either of two positions can have their movements effected and controlled in a similar way.

In Figs. 8, 9, and 10 I illustrate by diagrams the bolting of the points. Fig. 8 shows the point-rails home to the one side and bolted by the projection r on the slide R being engaged in a notch of the bar U' . Fig. 9 shows the first part of the movement to shift the points, whereby the projection r is drawn out of the notch in bar U' and brought against the bar U^2 , which stops it. Fig. 10 shows the last part of the movement, the points being now moved home to the other side and the projection r drawn into the notch of the bar U^2 to bolt the points. The foregoing description, in connection with the diagrams, is

deemed sufficient to fully explain the point-bolting gear.

Having thus described the nature of this invention and the best means I know for carrying the same into practical effect, I claim—

1. In fluid-pressure apparatus for working and controlling points, signals, and other railway appliances, the combination of a motor-handle and interlocking gear connected to it, also an eccentric and slide-valve governing communication of a pipe supplying fluid under pressure and of a discharge-pipe with a pipe leading to a distant hydraulic cylinder, the plunger of which is connected to the working and locking gear of the point, signal, or other appliance, a slide-valve connected to the said working and locking gear and arranged to govern communication of the pipe leading to the hydraulic cylinder and of the pipe supplying fluid under pressure, with a return-pipe leading to a near hydraulic cylinder having a loaded plunger connected to a slide, which presents stops for the motor-handle toward each end of its stroke, substantially as and for the purposes set forth.

2. In fluid-pressure apparatus for working and controlling points, signals, and other railway appliances, the combination of the valves L and M, the pipes A, B, C, and D, the differential hydraulic plungers $K K'$, and the point moving and bolting gear, substantially as described.

3. In fluid-pressure apparatus for working and controlling points, signals, and other railway appliances, the combination of the loaded plunger I and stop-slide F with the motor-handle H and the plunger and tappet interlocking gear P and T, substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 6th day of May, A. D. 1891.

GIOVANNI SERVETTAZ.

Witnesses:

EPRICO BAGHNO,
E. V. DOBRILOVICH.