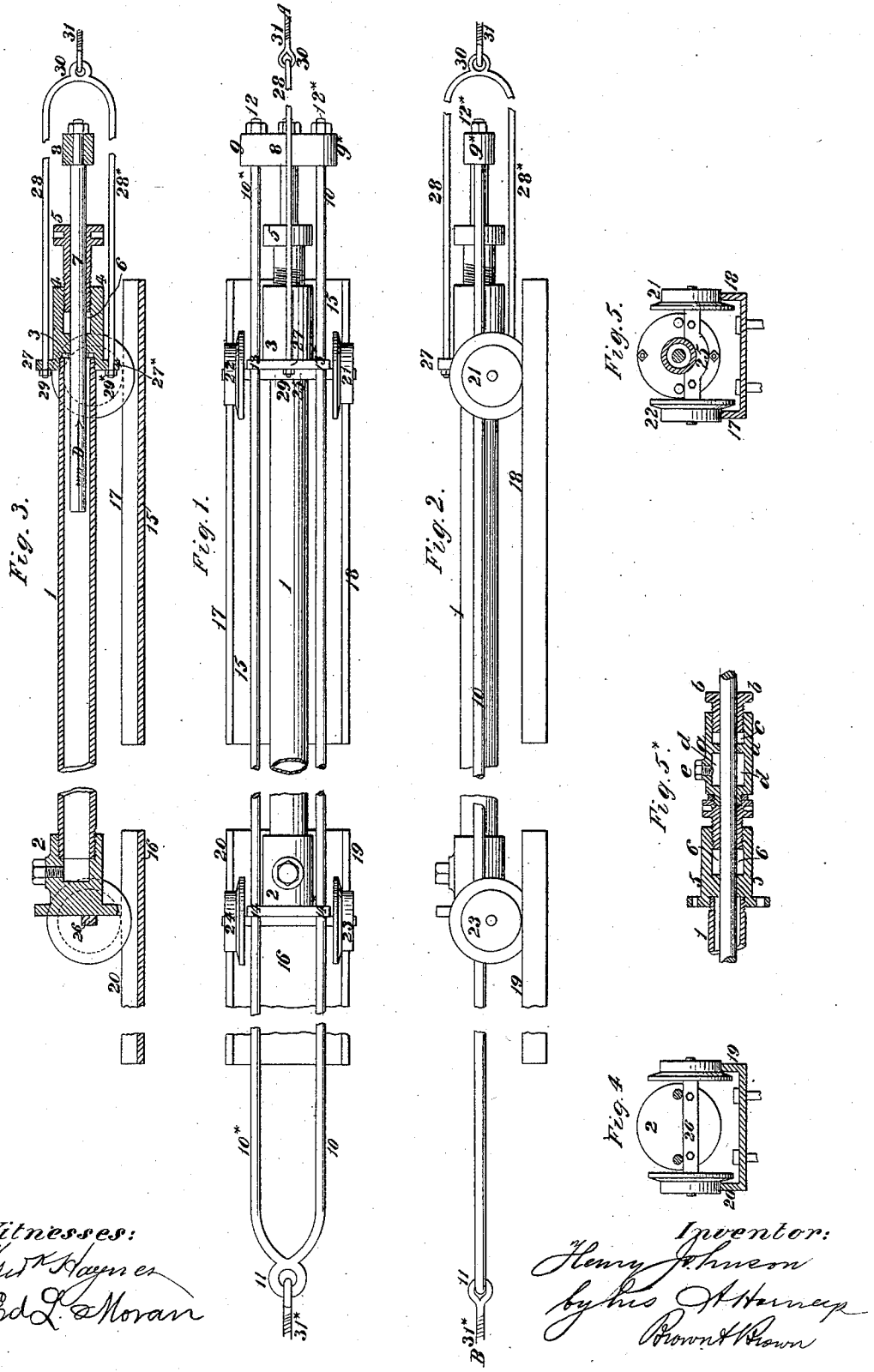
(No Model.) 4 Sheets—Sheet 1.

H. JOHNSON.

APPARATUS FOR OPERATING POINTS ON RAILWAYS.

No. 305,196. Patented Sept. 16, 1884.



Witnesses:
Fred K. Haynes
Ed L. Moran

Inventor:
Henry Johnson
by his Attorneys
Brown & Brown

(No Model.) 4 Sheets—Sheet 2.

H. JOHNSON.

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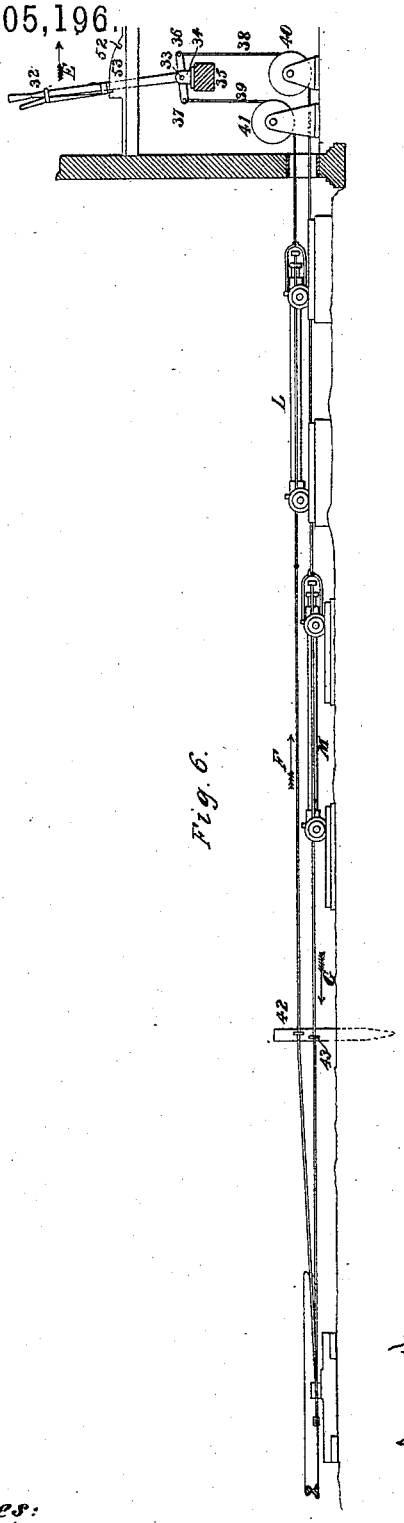

Fig. 6.

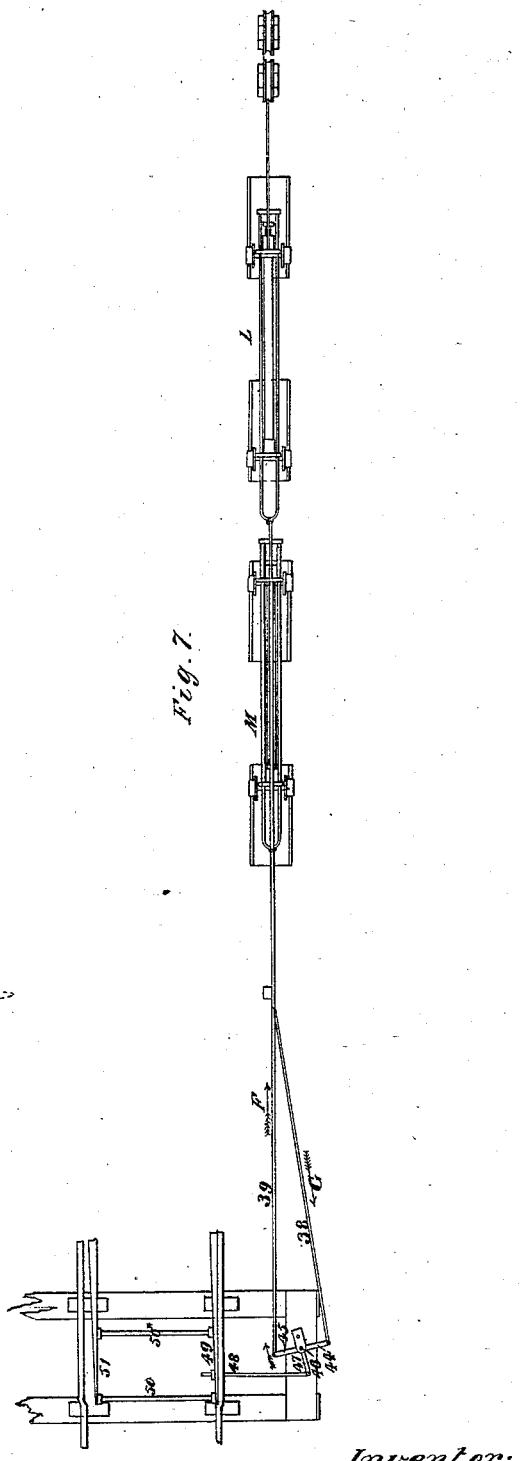

Fig. 7.

Witnesses:
Fred K. Haynes
Ed L. Moran

Inventor:
Henry Johnson
by his Attorneys
Brown & Brown

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H. JOHNSON.

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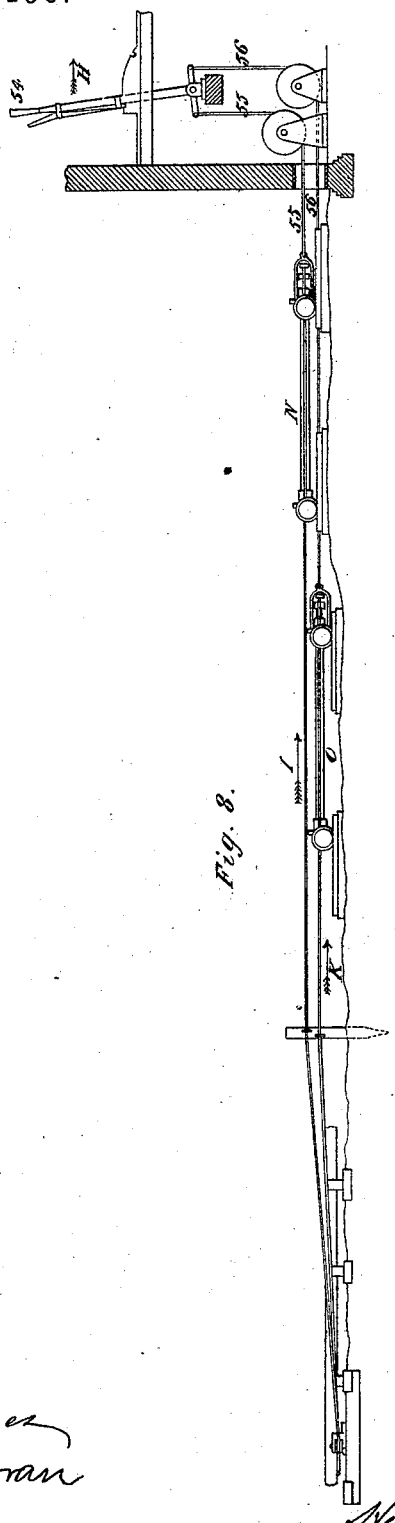

Fig. 8.

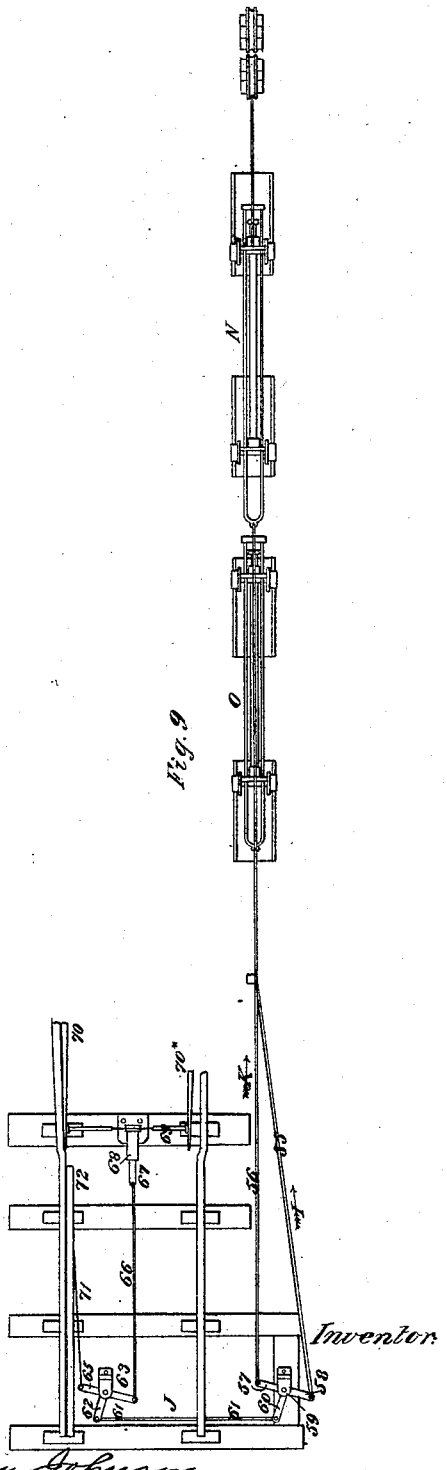

Fig. 9.

Witnesses:
Jno. F. Haynes
Ed. L. Moran

Inventor.
Henry Johnson
by his Attorneys
Brown & Brown

(No Model.) 4 Sheets—Sheet 4.

H. JOHNSON.

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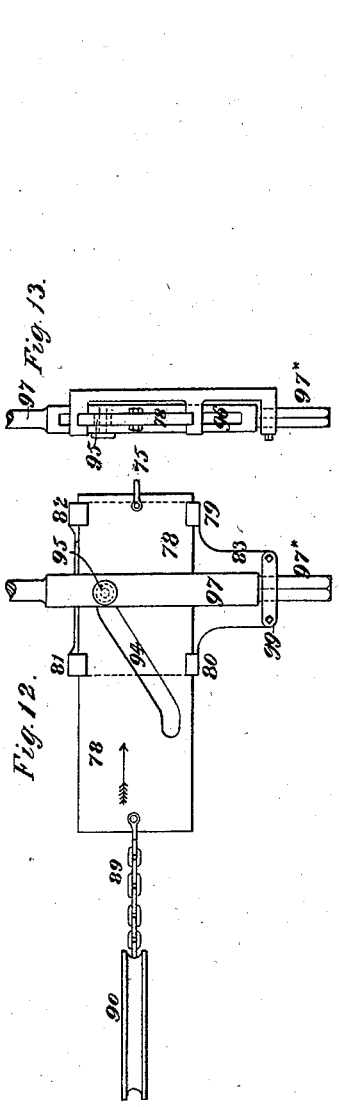

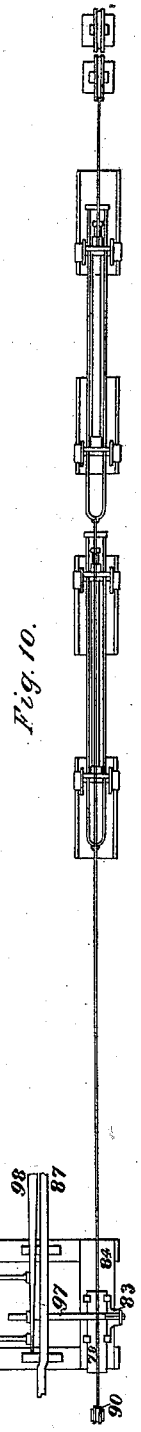

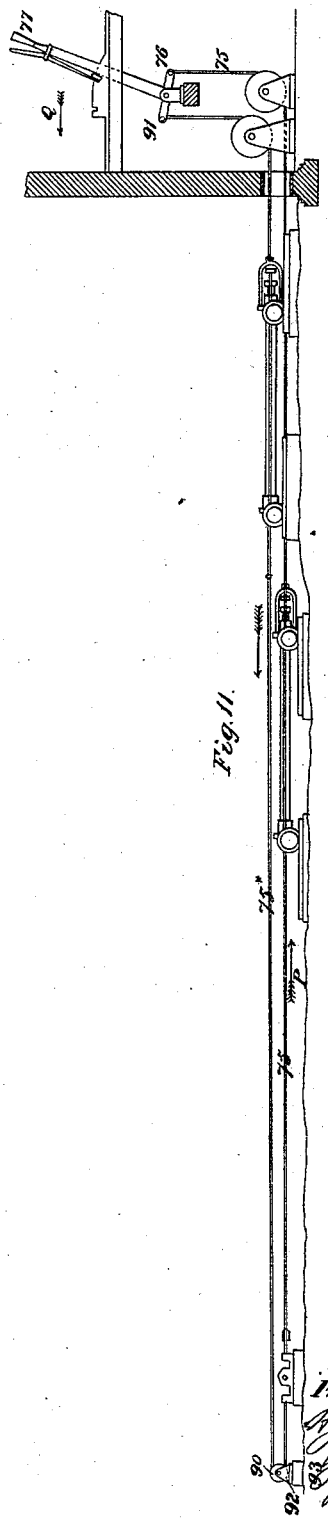

Witnesses:
Chas. Wayne
Ed L. Moran

Inventor:
H. Johnson
by his Attys
Pennt Brown

UNITED STATES PATENT OFFICE.

HENRY JOHNSON, OF ECCLES, COUNTY OF LANCASTER, ENGLAND.

APPARATUS FOR OPERATING POINTS ON RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 305,196, dated September 16, 1884.

Application filed July 20, 1882. (No model.) Patented in England June 22, 1880, No. 2,539; in France July 3, 1880, No. 137,595; in Belgium July 19, 1880, No. 52,064, and in Germany July 20, 1880, No. 14,147.

To all whom it may concern:

Be it known that I, HENRY JOHNSON, of Eccles, in the county of Lancaster, Great Britain, have invented certain Improvements in Apparatus for Operating Points Used on Railways, of which the following is a specification, reference being had to the accompanying drawings.

The invention consists in the combination, with railway-points or point-locking devices and a hand-lever for operating the same, of two connections extending between said points or point-locking devices and said hand-lever, and each composed of sections, and a compensating device in each connection consisting of a liquid-cylinder and a ram capable of movement relatively to each other, and to which the sections of the connection are respectively attached, all organized substantially as hereinafter described, whereby the uniform length of the two connections will be maintained by the expansion and contraction of liquid in the two cylinders, and whereby said connections will act by tension only to shift said points or point-locking devices when said hand-lever is moved in one direction or the other.

In order that my invention may be more fully understood, I will now proceed to more particularly describe the same, and for that purpose I shall refer to the several figures on the annexed sheets of drawings, the same letters of reference indicating corresponding parts in all the figures.

Figures 1, 2, 3, 4, and 5 show my apparatus for compensating the variations in the length (arising from variations in the atmospheric temperature) of the wire or wires connecting the points with the actuating-lever. Fig. 1 is a plan, Fig. 2 a side elevation, Fig. 3 a vertical section, on the line A B of Fig. 1. Figs. 4 and 5 are end views, partly in section. Fig. 5* is a sectional view of a modification. Figs. 6 and 7 are respectively an elevation and plan showing the application of my invention in connection with an apparatus for shifting points. Figs. 8 and 9 are respectively an elevation and plan showing the application of my invention in connection with a point-locking apparatus. Figs. 10 and 11 are respectively a plan and elevation showing a modification in the application of the invention. Figs. 12 and 13 are respectively a plan and elevation, showing on a larger scale some of the parts of Figs. 10 and 11.

In Figs. 1, 2, and 3 of the drawings is a cylinder screwed at one end into a cap, 2, its other end being screwed into another cap, 3, an extension, 4, of the said cap being formed to receive a screwed gland, 5, for compressing a packing, 6, through which a piston or ram, 7, passes, so as to be capable of sliding therein.

I may here remark that I do not confine myself to the above method of making a joint between the piston or ram 7 and cylinder 1, as others may be substituted.

Upon the end of the piston or ram 7, outside the cylinder, is a cross-head, 8, having projecting arms 9 9*, through which the ends of the rods 10 10* pass. These rods are jointed together so as to form a loop at 11 their other ends being secured to the cross-head 8 by screwed nuts 12 12*. The rods 10 10* pass through ears or lugs 13 13*, formed upon the cap 3, such ears acting as guides or supports to the rods 10 10*. I also form ears or lugs 14 14* upon the cap 2, through which the rods 10 10* pass, such lugs or ears acting as additional supports or guides for the rods 10 10*. 15 16 are plates formed with projecting flanges 17 18 19 20, which consitute rails upon which rest flanged wheels 21 22 23 24, the wheels 21 22 turning loosely upon the ends of a cross-bar, 25, secured to the cap 3 and serving to support one end of the cylinder 1, the other end of the cylinder 1 being carried by the wheels 23 24, which are mounted loosely upon the ends of a cross-bar, 26, secured to the cap 2. The cylinder 1 and its wheels 21 22 23 24 are capable of being moved to and fro along the projecting flanges or rails 17 18 19 20 of the plates 15 16, as will hereinafter be described.

To projecting parts 27 27*, formed upon the cap 3, are secured the ends of the wires or rods 28 28* by means of nuts 29 29*, screwed thereon, the other ends of the said wires or rods be-

ing joined together and forming a loop, 30, the use of which I will hereinafter describe. (These wire or rods are shown as broken for convenience of illustration.)

The wire, rod, or chain 31 (shown broken for convenience of illustration) is secured at one end to the loop 30, and its other end to the usual hand-lever used for actuating the points. The wire, rod, or chain 31* (also shown broken) is attached at one end to the loop 11, its other end being secured to a lever acting upon the points. The length of these wires or rods connecting the hand-lever with the points is well known to expand or contract with variations of atmospheric temperature, and my invention compensates for such variations in the length of the aforesaid connecting wires or rods in the following manner:

The interior of the cylinder 1 is filled with a fluid, and as such fluid expands by increased temperature it will force the piston or ram 7 in the direction of the arrow D, thereby drawing the two portions 31 31* of the wire, rod, or chain, connecting the hand-lever and points nearer to each other, thereby compensating for the increased length of such connecting rods, wires, or chains aforesaid. When the wires or rods aforesaid become contracted by decreasing temperature, the piston or ram 7 will be forced within the cylinder 1 in a direction opposite to that shown by the arrow D, the contraction of the before-named fluid, caused by the decreased temperature, allowing such movement of the piston or ram 7 to take place. The quantity of fluid contained within the cylinder 1 must be proportioned to the length of wire, rod, or chain to be compensated; or the diameter of the piston or ram 7 may be increased or decreased for the like purpose. When the hand-lever is moved to actuate the points, the piston or ram 7, cylinder 1, and other parts of the compensating apparatus move bodily upon the rails 17 18 19 20, such rails also allowing for the alteration in the relative positions of the parts arising from the variations of temperature.

In some cases I use a separate vessel for containing fluid, the expansion of which is to act upon the piston or ram 7. Such separate vessel I form immovable, and connect such vessel to the cylinder containing the piston by means of a flexible tube, such flexible tube allowing for the movement of the cylinder during the working of the points. I have hitherto spoken generally of my mechanism as applied to points; but it will readily be understood by persons conversant with such matters that my invention is also applicable to "point-locking apparatus" or other similar apparatus used in actuating and securing points in any desired position.

In cases where much dust or grit may accumulate upon the piston or ram 7, I propose to make use of the following arrangement (shown by the detached view, Fig. 5*) for removing such dust and dirt aforesaid from that portion of the ram which is outside the packing 6 and preventing such packing being injured thereby. Within the gland 5, I form a screw, into which I screw a part, *a*, provided with a screw-gland, *b*, for retaining in position a packing, *c*. As the ram 7 passes into the cylinder 1, the packing *c* will strip off any dust or dirt that may be upon the ram 7, thereby cleansing the ram before it passes into the packing 6. Within the part *a*, and around the piston or ram 7, I form an annular cavity, *d*, within which cavity I place material for lubricating the piston or ram 7, such lubricant being inserted within the cavity *d* through an opening formed through the part *a*, such opening being closed by means of a screwed plug, *e*, after inserting the lubricating material.

In Figs. 6 and 7, showing the application of the invention to point-shifting apparatus, 32 is the usual hand-lever by which the points are actuated. This lever turns upon a fulcrum, 33, carried by a bracket, 34, supported by a beam, 35, from which fulcrum extend two levers, 36 37, from the ends of which extend two wires, chains, or other connections, 38 39, passing over guide-pulleys 40 41, then over ordinary supporting-pulleys, 42 43. The other ends of the said wires are connected to the ends of two levers, 44 45, turning upon a fulcrum, 46. To these levers 44 45 is connected another lever, 47, to the end of which is jointed a rod, 48, the other end thereof being connected to one side of the point-rail 49, this rail 49 being connected by rods 50 50* to the other rail, 51, the two rails constituting a set of points or switches. When it is desired to change the position of the points, the hand-lever 32 is moved in the direction of the arrow E. This movement will raise the end of the lever 37, which will draw the wire or chain 39 in the direction of the arrow F. Such movement of the wire will turn the lever 45 and carry with it in the same direction the lever 47, which, acting upon the points through the rod 48, will reverse their position. The movement of the lever 45 will also have turned the lever 44, which will draw the wire 38 in the direction of the arrow G placed thereon, such movement of the wire being allowed by the downward movement of the lever 36, connected with the hand-lever 32. When the hand-lever 32 is pulled over in the direction described, it will be retained in such position by the usual detent falling into the notch 52, formed in the frame 53. When it is desired to again place the points into the position shown in the drawings, the hand-lever 32 is pushed in a direction opposite to that of the arrow E, the effect thereof being to draw the wire 38 in an opposite direction to that of the arrow G shown thereon. This will cause the lever 44 to turn in a direction opposite to that previously described, and the points will be again placed in the position shown in the drawings.

In Figs. 8, 9, showing the invention as applied to point-locking apparatus, 54 is the

usual hand-lever acting upon the two wires, chains, or other connections, 55 and 56, as previously described. These wires or chains are connected, as in the previous instance, to the ends of two levers, 57 58, having a fulcrum at 59. These levers are connected to a lever, 60. Jointed to the end thereof is a rod, 61, its other end being jointed to a lever, 62, having a fulcrum at 63. To this lever are connected two other levers, 64 65. From the outer end of the lever 64 extends a rod, 66, to which is connected a plunger, 67, passing through a guide, 68. To a slot formed in this guide passes a connecting-rod, 69, formed with two slots corresponding with the two positions of the points 70 70*, as is well understood by persons conversant with such apparatus. When it is desired to change the position of the points from that shown, the hand-lever 54 is pulled in the direction of the arrow H. This will draw the wire 55, connecting the lever-points, in the direction of the arrow I thereon. Such movement, causing the lever 58 also to turn, will move the rod 61 in the direction of the arrow J, which, acting through the levers 62 65, will cause the rod 71 to raise and lower the lock-bar 72, and at the same time acting through the lever 64, rod 66, and plunger 67, will lock the connecting-rod 69. By moving the hand-lever 54 in an opposite direction to that previously described the wire 56 will be drawn in the direction of the arrow K thereon. Such movement will cause the lever 57 to be also turned in an opposite direction to that before mentioned, which, acting through the rod 61, levers 64 65, and rods 66 71, will again place the plunger 67 and lock-bar 72 in the position shown in the drawings.

In Figs. 6, 7, 8, and 9 I have shown my device for compensating for the expansion and contraction of the wires or rods connecting the hand-lever, and apparatus for opening or closing and locking the points as inserted in the wires at the points L M N O.

Figs. 10, 11, 12, 13 show in elevation and plan an arrangement by which I cause the two wires previously described to act upon the points without the intervention of the levers usually employed and previously described in reference to Figs. 6 and 7. The wire 75, extending from the end of the lever 76, connected to the hand-lever 77, is connected to one end of a plate, 78, mounted so as to be capable of sliding between projecting parts 79 80 81 82, formed upon a base-plate, 83, (shown on an enlarged scale in the detached views Figs. 12 and 13, Fig. 13 being an end view of Fig. 12.) The base-plate 83 is secured to a cross-timber, 84, which cross-timber is fastened to the ends of the sleepers 85 86, carrying the rails 87 88. To one end of the plate 78 is attached a chain, 89, which, after passing around a guide-pulley, 90, is attached to the lever 91, connected to the hand-lever 77 by means of a wire, rod, or chain, 75*, as described in reference to the previous figures. The guide-pulley 90 is carried by a bracket, 92, secured to a piece of timber, 93, let into the earth or fastened to the sleepers supporting the rails 87 88. Within the sliding plate 78, I form an inclined slot, 94, within which, and capable of sliding therein, is a bowl, 95, carried within a slot, 96, formed within a bar, 97. The bar 97 is connected at one end to the rail 98 of the point-rails 98 98*, its other end, 97*, passing through an opening formed within a projecting part, 99, formed upon the base-plate 83, within which it is capable of being slid endwise, but prevented from rotating by being formed of a square section, the aperture through which it passes being of like form. The point-rail 98 is connected to the other point-rail, 98*, by means of the rods 100 100*, the ends of which are secured to the point-rails 98 98*. When the chain or wire 75 is drawn in the direction of the arrow P by the hand-lever 77 being moved in the direction of the arrow Q, as previously described in reference to Figs. 6, 7, the sliding plate 78 will be moved in the direction of the arrow R, and the inclined slot 94, acting against the bowl 95, carried by the rod 97, will cause the points to be moved to their position opposite to that shown. When the hand-lever 77 is again placed in the position shown in the drawings, the sliding plate 78 will be also placed in the position shown, and by means of the inclined slot 94, acting upon the bowl 95, will place the points in the position indicated in the drawings.

The construction of the liquid-cylinder and ram above described is the same as is shown and described in my United States Letters Patent No. 259,865, dated June 20, 1882, and I do not therefore herein claim the construction of the cylinder and ram nor their combination with the two sections of a single wire, rod, or chain, as included in this invention. In operating points or point-locking devices, as herein described, I employ two wires, rods, or chains extending between the hand-lever and the points or point-locking devices, and no matter in which direction the hand-lever is moved the rods, wires, or chains act by tension only to shift the points or point-locking devices in one direction or the other. I must therefore employ a liquid-cylinder and a ram in each wire, rod, or chain, so as to insure the full movement of the points or point-locking devices when the hand-lever is shifted in either direction.

Having now described my invention and the manner of carrying the same into practical effect, I desire it to be understood that I claim as my invention—

The combination, with railway-points or point-locking devices and a hand-lever for operating the same, of two connections extending between said points or point-locking devices and said hand-lever, and each composed of sections, a compensating device in each connection consisting of a liquid-cylinder and

a ram capable of movement relatively to each other, and to which the sections of the connection are respectively attached, all organized substantially as herein described, whereby the uniform length of the two connections will be maintained by the expansion and contraction of liquid in the two cylinders, and whereby the said connections will act by tension only to shift said points or locking devices when said hand-lever is moved in one direction or the other.

H. JOHNSON.

Witnesses:

ARTHUR C. HALL,
U. S. Consulate, Manchester, England.

W. T. CHEETHAM,
Patent Agent, 18 St. Ann's St., Manchester.