

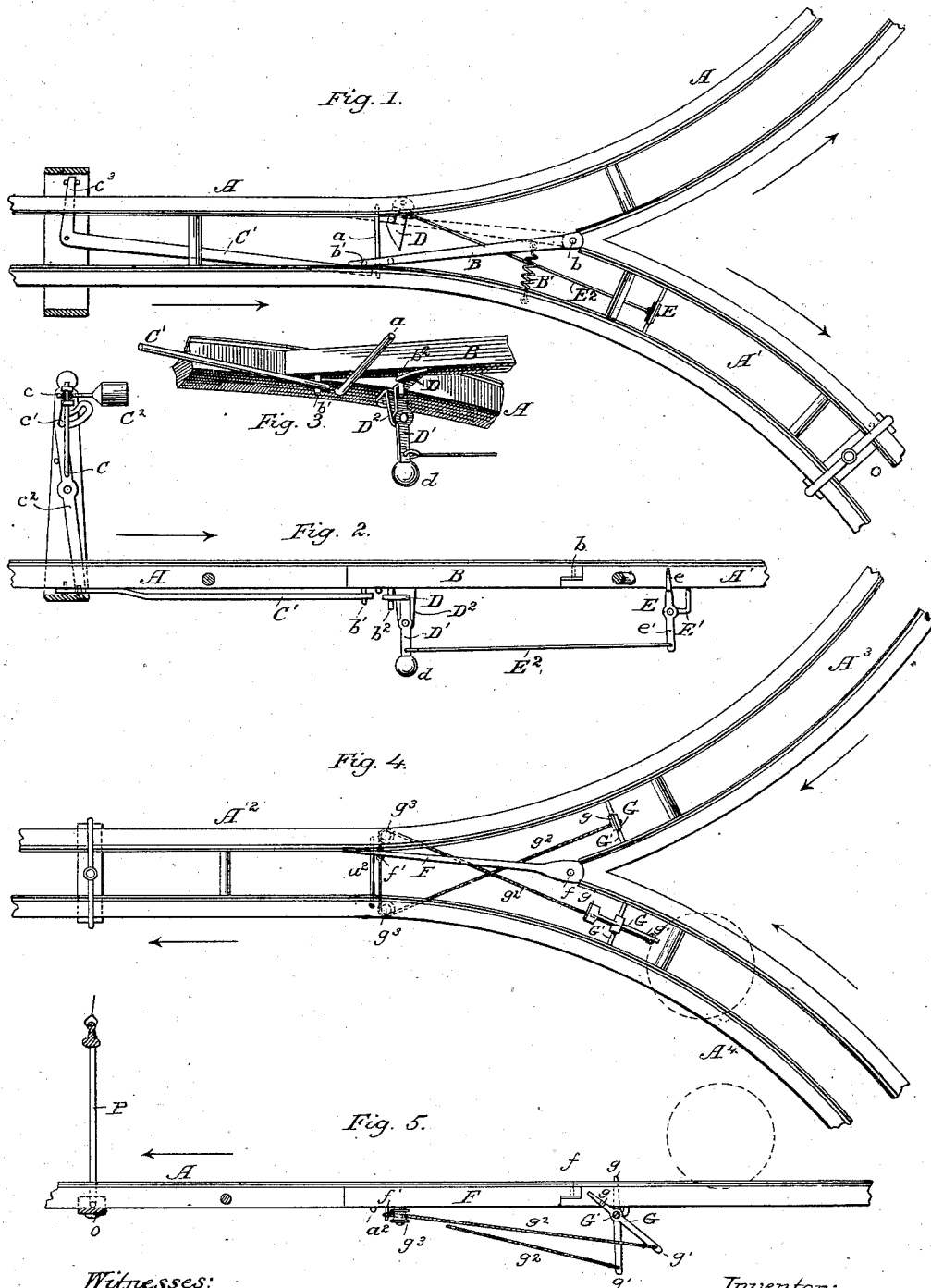
(No Model.)

2 Sheets—Sheet 1.

Z. S. HOLBROOK.
AUTOMATIC CASH CARRIER.

No. 282,320.

Patented July 31, 1883.



Witnesses:

C. Clarence Poole
J. W. Adams

Inventor:

Zephaniah S. Holbrook
per W. E. Dayton
Attorney

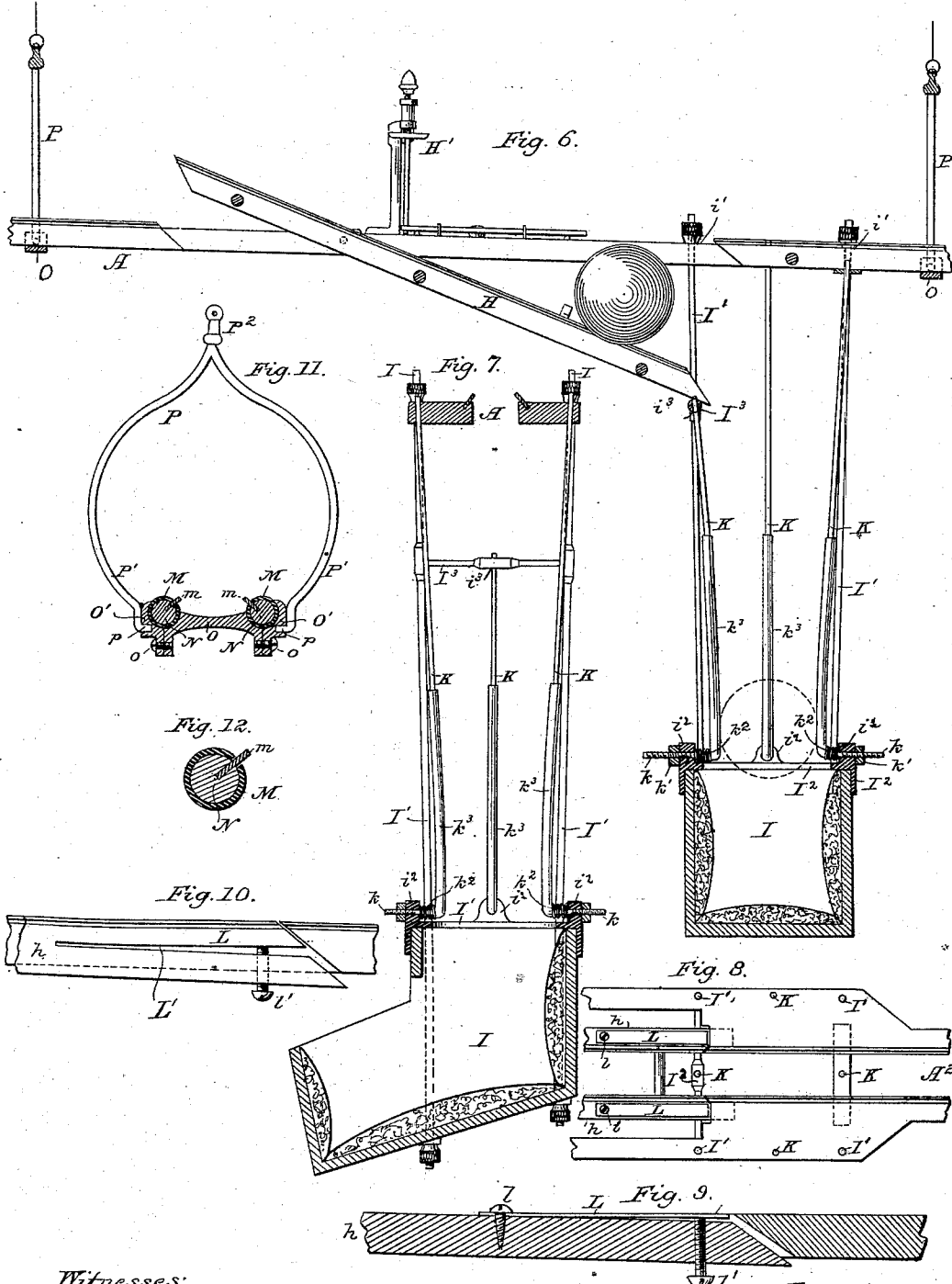
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C. Clarence Poole
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Inventor:
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per W. E. Dwyer
Attorney

UNITED STATES PATENT OFFICE.

ZEPHANIAH S. HOLBROOK, OF CHICAGO, ILLINOIS.

AUTOMATIC CASH-CARRIER.

SPECIFICATION forming part of Letters Patent No. 282,320, dated July 31, 1883.

Application filed November 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, ZEPHANIAH S. HOLBROOK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Cash-Carriers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to automatic cash-carriers for store service, having oppositely-inclined ways, spherical carriers of varying sizes, and graduated stops upon the return-way for discharging such carriers at their appropriate stations.

It relates more particularly to improvements in devices for switching the balls from one track to another in the same horizontal plane; to devices for lessening the momentum of the carriers in falling into a drop-box after they have been discharged from the return-way at any station; to improvements in the traps or vertically-moving switches for discharging the carriers from the return-way, and to improvements in the construction of the tracks, and devices for supporting them.

The general object of my invention is to provide improvements in the details of a store-service system and to increase its efficiency and utility; and it consists in the matters hereinafter described, and pointed out in the claims.

Horizontal switches upon the return-way have heretofore been constructed with a pivoted tongue, which normally is in position to close the entrance to the branch track and make the main track continuous. The free end of the tongue is adapted to be moved by a lever actuated by a stop adjusted so as to be tripped by all carriers that are to be switched to the branch track, the stop mechanism being provided with a weight which tends to keep the end of the tongue in its normal position. When a carrier strikes the stop mentioned, the end of the tongue is swung to the opposite side of the main track an instant before the said carrier reaches it, and is held in such position by the weight of the carrier until such carrier has passed over it. The tongue

then returns to its normal position by the action of the weight mentioned. This method of operating the switch has been found to be objectionable, on account of the liability of the carrier to strike the end of the tongue before it is in proper place, or when it is swinging back into its normal position. In either case the carrier is liable to be stopped or thrown from the track. For the purpose of remedying this difficulty, my invention consists in the combination, with a weight or spring for retaining the tongue in its normal position, of means for holding the end of the tongue after it is thrown into position for switching, and also an automatic device operated by the carrier for releasing the end of said tongue after said carrier has passed over it.

In the direct way, or way from the salesman to the cashier, a switching device has heretofore been used for allowing carriers on the branch track to enter the main track, consisting of a loosely-pivoted tongue which is intended to be thrown from one side to another by the side pressure of the spherical carriers approaching on the main or branch track or on the tongue itself. This construction is found defective, for the reason that the carrier often fails to throw the tongue over properly, causing the carrier to be derailed, and from the fact that if two carriers approach the switch at about the same time they will interfere with each other and become wedged thereon. To obviate these objections my invention consists in providing means for throwing the switch-tongue from one side to another as the carrier approaches on either branch, consisting of a device operated automatically by the carrier before it reaches such tongue, and which will also prevent the approach of a carrier on the other branch until the carrier first operating the switch-tongue has passed from the end thereof.

It has been customary to provide at each salesman's station on the return-way a vertical tube or chute having a padded receptacle or drop-box at its lower end, into which the carrier is discharged by a vertically-swinging switch or trap. When the distance through which the carrier falls into the drop-box is considerable, injury to the carriers and unpleasant noise is occasioned by the force with

which they fall. To avoid these results my invention consists in providing means for lessening the momentum of the carrier in its downward passage through the chute.

5 The vertically-swinging switches used for discharging the carriers from the return-way, when constructed of wood, are liable to twist or warp by the effect of the hot air present near the ceiling of stores, or from other causes, 10 so that the ends thereof will not remain in perfect alignment with the stationary ends of the track, and carriers passing over such switch to a station beyond are liable to be retarded or stopped by the irregularity thus occasioned. 15 In case of a metal switch warping does not occur; but it is sometimes necessary to adjust the ends of the switch to the ends of the track, either in placing the parts of the switch together or on account of the wearing of the 20 bearings or other parts by use. To avoid this difficulty I propose to make the bearing-surfaces upon which the carriers rest adjustable near the ends of the switch, so that they can be brought into exact alignment with the corresponding bearing-surfaces on the ways. 25

My invention consists, also, in providing an improved construction for the track or way, and an improvement in the devices for supporting it, whereby the track may be more 30 readily connected with or detached from its supports.

In the drawings, Figure 1 is a plan view of a horizontal switch upon the return-way. Fig. 2 is a vertical longitudinal section of the same. 35 Fig. 3 is a fragmentary perspective view of the device for holding the end of the tongue. Fig. 4 is a plan view of a horizontal switch on the way from the salesman to the cashier. Fig. 5 is a vertical longitudinal section of the same. Fig. 6 is a vertical longitudinal section 40 of a portion of the return-way at a station, showing a vertically-movable switch and drop-box. Fig. 7 is a transverse section through the track and drop-box. Fig. 8 is a fragmentary plan view of a portion of the track and the end of a switch. Fig. 9 is a longitudinal section of the same. Fig. 10 is a modification of the device shown in Fig. 9. 45 Fig. 11 is a transverse section through the track, showing an improved track structure and stirrup for supporting the same. Fig. 12 is an enlarged cross-section of one of the rails of the track shown in Fig. 11.

The switching devices upon the return-way, 50 as proposed by my invention, are illustrated in Figs. 1, 2, and 3 of the drawings.

A is a portion of the return track or way which is intersected by a branch track, A', as shown. B is a switch-tongue, as ordinarily 60 constructed, which is pivoted on a pin, b, at the intersection of the two adjacent rails of the main and branch tracks, and is supported at its free end on a cross-wire, a, placed between the rails of the track. The end of the 65 tongue B is held normally in position, so as to make the main track continuous, by means

of a coiled spring, B', and is adapted to be thrown to the other side of the main track, and in a position to switch the carrier to the main track by the action of the carriers on a graduated stop, C. (Shown more clearly in 70 Fig. 2.) The stop C is adapted to be moved by all carriers which are to be switched to the branch track, and by suitable intermediate devices actuates a pivoted lever, C', the end 75 of which acts upon a pin, b', on the lower edge of the tongue B, near its free end.

The devices for operating the lever C' are those heretofore used, and consist of the arm or stop C, attached to a rock-shaft, c, which, 80 through the medium of the arm c' on the said rock-shaft and the lever c'', moves the short arm c' of the lever C' and throws the end of the tongue to the other side of the track. A weight, C'', is attached to the extremity of an 85 arm upon the rock-shaft c, which tends to keep the lever C' normally in the position shown in Fig. 1.

In order to retain the tongue B in position for the passage of a carrier to the main branch, 90 after it has been thrown into such position by the carrier striking the stop C, I provide a swinging catch or detent, D, which is pivoted in suitable position for the purpose beneath the track, and is adapted to engage a pin, b'', 95 upon the under side of the tongue B, near its free end. The detent D is attached to a vertical arm, D', which is pivoted to a bracket, D'', attached to the under side of the rail, the arm D' being provided with a weight, d, to re- 100 tain it in a vertical position.

In order to disengage the detent D and allow the tongue B to return to its normal position when the carrier has passed to the branch track, a pivoted lever, E, is provided, which 105 is hung centrally on a cross-wire, E', below the branch track A', and the upper arm, e, of which projects upwardly into the path of the carrier. The end of the lower arm, e', of the lever E is connected, by means of a wire, E'', to the arm D' of the detent D, so that when 110 a carrier passes over the upper arm of the lever E and depresses it the detent-arm D' will be swung on its pivot, the detent thrown back and the tongue released, so as to be thrown 115 back to its original position by the spring B'.

It will be observed that the lever C', which moves the tongue, is not attached thereto, but merely rests against the pin b', and, when said 120 lever is moved by the contact of a carrier with the stop C, throws the tongue over until said tongue is caught by the detent D, and then returns to its normal position by the action of the weight C''. The end of the lever C' may be 125 attached to the end of the tongue by passing it through an eye placed thereon, in which case the spring B' could be dispensed with, as the weight C'', acting upon the lever C', would suffice to throw the tongue back to its normal position. 130

In Figs. 4 and 5 a switch at the intersection of two branches of the inclined way or track

from the salesman to the cashier is represented. In these figures A^2 is the main track or way, and $A^3 A^4$ are branches intersecting it at equal angles. In this case all the carriers approach the switch from the branch tracks in the direction indicated by arrows in the drawings. F is the switch-tongue, which is constructed in the same manner as those heretofore in use, and which is pivoted upon a pin, f , at the intersection of the adjacent rails of the branch tracks in such a manner that its free end can be moved from one side to the other of the main track, so as to make the rails of either branch continuous with said main track. The free end of the tongue F is supported by and slides upon a cross-wire, a^2 , between the rails of the main track.

In order to set the tongue F in a position for the passage of a carrier from either of the branches to the main track before such carrier reaches the said tongue, I have provided upon each of the branches $A^3 A^4$, near their point of intersection, a device to be operated automatically by the carriers approaching the switch. This device consists of levers G G, which are pivoted near their center upon cross-wires $G^1 G^1$, beneath the branch tracks, and are so placed that when the levers are in a vertical position the upper arms, $g g$, thereof will project upwardly into the paths of the carriers. To the extremities of the lower arms, $g^1 g^1$, of the levers G are attached cords or flexible wires g^2 , which extend from the end of each lever to the opposite sides of the main track and pass over pulleys or rollers g^3 upon the under sides of the rails of the said track, and are attached to an eye, f' , on the lower edge of the tongue F, near its free end. The cords $g^2 g^2$ cross each other, as shown in the drawings, Fig. 4, such arrangement being necessary in order to draw the end of the tongue to the side of the main track opposite the branch upon which the carrier is approaching. The lever G upon the branch A^3 being in a vertical position, as shown in the drawings, and the tongue F in a position for the passage of a carrier from the branch A^4 to the main track, the passage of a carrier approaching the switch on the branch A^3 over the upper arm of the lever G on that track will throw the lower arm of said lever backward, and through the medium of the cord g^2 move the end of the tongue F to the opposite side of the main track and in position for the passage of said carrier from the branch A^3 . When the lever G upon the branch A^3 is depressed and the tongue thrown over, as described, the corresponding lever upon the branch A^4 will be thrown into a vertical position and will stop a carrier which may be approaching upon that branch and retain it until the carrier first reaching the switch has passed from the end of the tongue F. A means is thus provided for preventing the approach of more than one carrier to the switch at a time, so that any interference of the carriers thereon will be effectually prevented.

One of the levers G G may be made with one of its arms longer above its pivotal point and the other longer below its pivotal point, by which means a greater leverage is obtained by a carrier acting on one lever than the other, so that if two carriers strike the levers at the same time one will be held back until the other has passed the switch.

In Figs. 6 and 7 is shown a portion of the return-way A adjacent to a station, a switch or trap, H, and one of the graduated stops, H', for tripping the switch and discharging a carrier from the track. I is one of the padded drop boxes or receptacles adapted to receive the carriers after they have been discharged from the track, which is supported by rods I' I' at each corner from the track structure above it. In the center of each side of the top of the box, and between the supporting-rods I' I', are placed vertical rods K K, which are adjustably attached to the metal rim I² of the box I at their lower ends, and are held in place at their upper ends by passing through apertures $i' i'$ in the track structure. The upper end of the rod K, which is upon the side of the box adjacent to the switch H, is passed through an aperture, i^3 , in a cross-bar, F³, placed between the rods I' I' at such a distance below the track as to allow the end of the switch sufficient room to swing. The lower ends, k , of the rods K are bent outwardly at right angles and pass through lugs $i^2 i^2$ upon the metal rim I² of the drop-box. These ends k are threaded, and provided with nuts k' upon the outside of the lugs i^2 . Between the rods K and the lugs i^2 , on the ends k , are coiled springs k^2 , which tend to force the lower ends of the rods K toward a common center. The upper ends of the rods K are placed at a sufficient distance apart to freely admit the carrier between them, as shown in Figs. 6 and 7, and are bent inwardly together at their lower ends, so that a carrier descending between them will come in contact with the lower portion of said rods and be retarded by frictional contact therewith. The springs k^2 are sufficiently elastic to allow the lower ends of the rods K to yield and permit the passage of the descending carrier between them, but act with sufficient force to retard the motion of such carrier, so that it will fall easily and noiselessly into the drop-box.

The distance between the lower ends of the rods K may be adjusted, by means of the nuts k' , to adapt them to the passage of carriers of different sizes, and so that the rods will act with more or less pressure, in order to adapt their retarding effect to the weight of the carriers and the height from which they fall.

The lower portions of the rods K are preferably covered with a rubber tube, k^3 , or a coating of other yielding material, to prevent injury to the carriers and to act by its friction to more effectually retard their motion.

In Figs. 8, 9, and 10 are illustrated the de-

vices for adjusting the ends of the vertically-moving switches, so as to bring them in line with the adjacent ends of the track. In Figs. 8 and 9 a device for this purpose is shown, consisting of a metal strip, L, which is attached at one end to the top of the switch-rail *h*, by a screw, *l*, at some distance from the extremity of such rail. The opposite or free end of the strip L is coincident with the end of the said switch-rail, and is adapted to be adjusted by means of an abutting screw, *l'*, which is tapped vertically through the track from beneath. The strips L are placed upon both rails of the switch and at one or both ends of the same. When, on account of the warping of the wood, if the switch is constructed of that material, or other causes, either in case of wood or metal rails, the end of one of the rails of the switch does not coincide with the adjacent end of the track, the strip L on the rail is elevated until it coincides with the end of the track, as shown in Fig. 9, and the bearing-surfaces upon which the carriers rest will be thus made continuous.

In case of a wooden track, a preferable mode of constructing the adjusting device described is shown in Fig. 10, in which the end of the switch is provided with a slit, *L'*, parallel with and near its top surface. A flexible strip or tongue, L, is thus formed, which can be adjusted by means of a screw, *l'*, passing through the lower larger, and consequently more rigid, part of the switch and abutting against the under side of said strip. This construction presents the advantage that the flexible bearing-strip upon the edge of the rail upon which the carriers run will be moved with the strip L, and, when its end is brought in alignment with the end of the corresponding strip upon the stationary track, will be made continuous.

Metal ways for single-track carrying devices and for suspended carriers have heretofore been made of metal tubing; but double tracks provided with inwardly-projecting elastic bearing-strips adapted for spherical carriers have been heretofore constructed of wood, and the strips attached thereto by being inserted in a longitudinal groove formed therein. In order to provide a track of metal tubing adapted to spherical carriers, I construct such track as shown in Figs. 11 and 12 of the drawings, in which M M are the metal tubes which compose the rails of the track, said tubes being slotted longitudinally to allow the insertion of the flexible bearing-strip *m*, which is made of leather or other suitable substance. In order to secure the inner edge of the strip *m*, an interior filling, N, of wood may be used, which is provided with a groove, *n*, into which the strip may be fastened by gluing, or in any other suitable manner.

Instead of being fastened in the tube M by the use of a filling, as described, the strip *m* may be clamped between the edges of the slot in the tube by inserting the strip in said slot and clamping it therein by passing the tube between suitable rollers, or in any other manner that may be found desirable.

The use of the filling N is preferable to the mode of fastening last described, for the reason that, besides acting as a support for the strip *m*, it serves also to deaden the sound which would otherwise be caused by the spherical carriers rolling on a metal tube, and is of great utility in the operation of bending the tubes in constructing a curved track, as it serves in the place of the lead filling usually used in such operation in order to retain the cylindrical form in the tube while being bent.

The filling N is not necessary for the purpose of supporting or stiffening the tubular rail, said rail being constructed of metal sufficiently thick to give all necessary rigidity to the track; but its object is to retain the edge of the flexible bearing-strip *m* and support the said strip in proper position. Other fillings may be used for this purpose.

The device for supporting the track or way has heretofore usually consisted of a cast-metal ring or stirrup, upon the lower portion or cross-bar of which the rails are attached, and which is supported from the ceiling of the store by a wire attached to the top thereof. The use of a stirrup composed of a single casting has been found objectionable, from the fact that when it is desired to place an additional support on a track that is already hung it is necessary to take the track apart in order to pass the rails through such stirrup. In order to obviate this difficulty, and at the same time to provide a support that is light and neat in appearance and cheap in construction, I have devised a stirrup in which the upper portion consists of a spring-wire bail, P, which is removably connected to a rigid metal cross-bar, O, attached to the rails of the track, as shown in Figs. 3 and 6 as applied to a wooden track, and in Fig. 11, in detail, as applied to a metal track.

In Fig. 11 are shown the rails M M of the track, which are connected and retained in proper relative position by means of a cross-bar, O, provided at either end with means for attaching the rails thereto. In Fig. 11 such means consist of detached end pieces, O' O', adapted to clasp the tubular rails M, and attached to the bar O by means of screws *o o*. In case a wooden track structure is used, as shown in Figs. 5 and 6, the cross-bar O is secured to the rails by screws passing through the said bar into the said rails.

The supporting ring or bail P is at the lower extremity of its arms P' P' provided with inwardly-projecting pins *p p*, adapted to be inserted into corresponding holes in the ends of the cross-bar O. The arms P' P' of the bail P are secured at their upper ends to a knob, P², to which the wire for suspending the track is attached. The arms P' P' are made sufficiently flexible to be drawn or swung apart, so as to allow the pins *p* to be inserted in the apertures of the cross-bar, where they are held by the pressure of said spring-arms. The bail P may consist of a single piece of wire bent into the proper shape, and with a loop

formed at its upper portion for the attachment of the suspending-wire.

I claim as my invention—

1. In a horizontal switch on the way of a carrying system, the combination, with a pivoted switch-tongue, a spring to retain said tongue normally at one limit of its movement, and means for moving the same, operated by the carriers, of means for holding the end of said tongue in position for the carrier to pass over it, substantially as described.

2. In a horizontal switch on the way of a carrying system, the combination, with a pivoted switch-tongue, a spring to retain said tongue normally at one limit of its movement, and means for moving the same, operated by the carriers, of means for holding the end of said tongue in the position to which it is so moved, and in position for the carrier to pass over it, and means for releasing the end of the tongue, operated by the carrier, after said carrier has passed over it, substantially as described.

3. In a horizontal switch on the way of a carrying system, the combination, with a pivoted switch-tongue, of means operated by the carrier for moving the end of the switch-tongue, means for retaining the end of the switch-tongue in the position to which it is so moved, means for releasing the end of said tongue, operated by the carrier, after said carrier has passed over it, and a spring for restoring the tongue to its original position, substantially as described.

4. In a horizontal switch on the return-way of a carrier system, the combination, with a pivoted switch-tongue and means operated by the carriers for moving said tongue, of a detent, D, and releasing-lever E, connected therewith, substantially as described.

5. In combination with the tongue B and spring B', the detent D, lever E, and connecting-rod E', substantially as shown and described.

6. In combination with the tongue B and spring B', the pivoted detent D, provided with a weight, d, and means for releasing said detent, substantially as shown and described.

7. In a horizontal switch located at the intersection of two branches declining toward their point of intersection, the combination, with a switch-tongue, of means operated by the carriers for setting the switch-tongue in position to permit the passage of a carrier approaching on either branch.

8. In a switch at the intersection of two branches which decline toward the point of intersection, the combination, with a pivoted switch-tongue, of a lever located on each branch, having its upper arm projecting into the path of the carrier, and connected to the said tongue in such manner, as described, that when the tongue is in position for the passage of a carrier from one branch the lever upon the other branch will be held in the path of a carrier on that branch and prevent its ap-

proach to the switch until the first carrier has passed over said tongue, substantially as described.

9. In combination with a pivoted switch-tongue, F, the levers G G, cords $g^2 g^2$ and pulleys $g^3 g^3$, substantially as shown and described.

10. In a carrying system, the combination, with the track or way, means for discharging the carrier from such way, and a receptacle for the carriers located beneath the discharging device, of means for retarding the motion of the falling carriers, substantially as described.

11. In a carrying system, the combination, with the track or way, of means for discharging the carriers vertically from such way, a receptacle for the carriers, a friction device or devices, located between the discharging devices and the receptacle, for retarding the motion of the falling carriers, substantially as shown and described.

12. In a store carrying system, the combination, with a discharging device on the way, and a receptacle beneath the same for the carriers, of yielding converging rods K, substantially as and for the purpose set forth.

13. In a store carrying system, the combination, with a discharging device, and a receptacle beneath the same for the carriers, of converging rods K, provided with stop-nuts k^1 , and springs k^2 , arranged and operating substantially as and for the purpose described.

14. In a store carrying system, the combination, with a discharging device on the way, and a receptacle beneath the same for the carriers, of converging rods K, provided with a covering, k^3 , of elastic material, substantially as and for the purpose set forth.

15. In a carrying system, the combination, with a vertically-swinging switch, of means for adjusting the ends of such switch with reference to the adjacent stationary ends of the way, substantially as shown and described.

16. In combination with a vertically-movable switch, an adjustable part, L, and means for holding the same in alignment with the adjacent track, substantially as shown and described.

17. In combination with the vertically-movable switch H, an elastic metal strip, L, and adjusting-screw l' , substantially as described.

18. In a carrying system, a tubular metal rail provided with a bearing-strip, m, substantially as shown and described.

19. In a carrying system, the combination, with a longitudinally-slotted tubular rail, of a flexible bearing-strip secured in the slot in said rail, substantially as shown and described.

20. In a carrying system, the combination, with a tubular metal rail having a longitudinal slot, of a strip of flexible material projecting through said slot, and means within the tube for holding the strip in place, substantially as described.

21. In a carrying system, the combination,

with a tubular metal rail, of an elastic bearing-strip, *m*, and a filling of wood or other material, having the inner edge of the strip embedded therein, substantially as and for the purpose set forth.

22. In combination with the parallel track-rails of a carrying system, a cross-bar, *O*, and an elastic support or bail, *P*, having its ends constructed to engage the said cross-bar, substantially as shown, and for the purpose stated.

23. In combination with the track or way

of a carrying system, the cross-bar *O*, provided with apertures in its ends, and the bail *P*, having inwardly-turned ends *p p*, substantially as shown and described. 15

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ZEPHANIAH S. HOLBROOK.

Witnesses:

C. CLARENCE POOLE,

JESSE COX, Jr.