

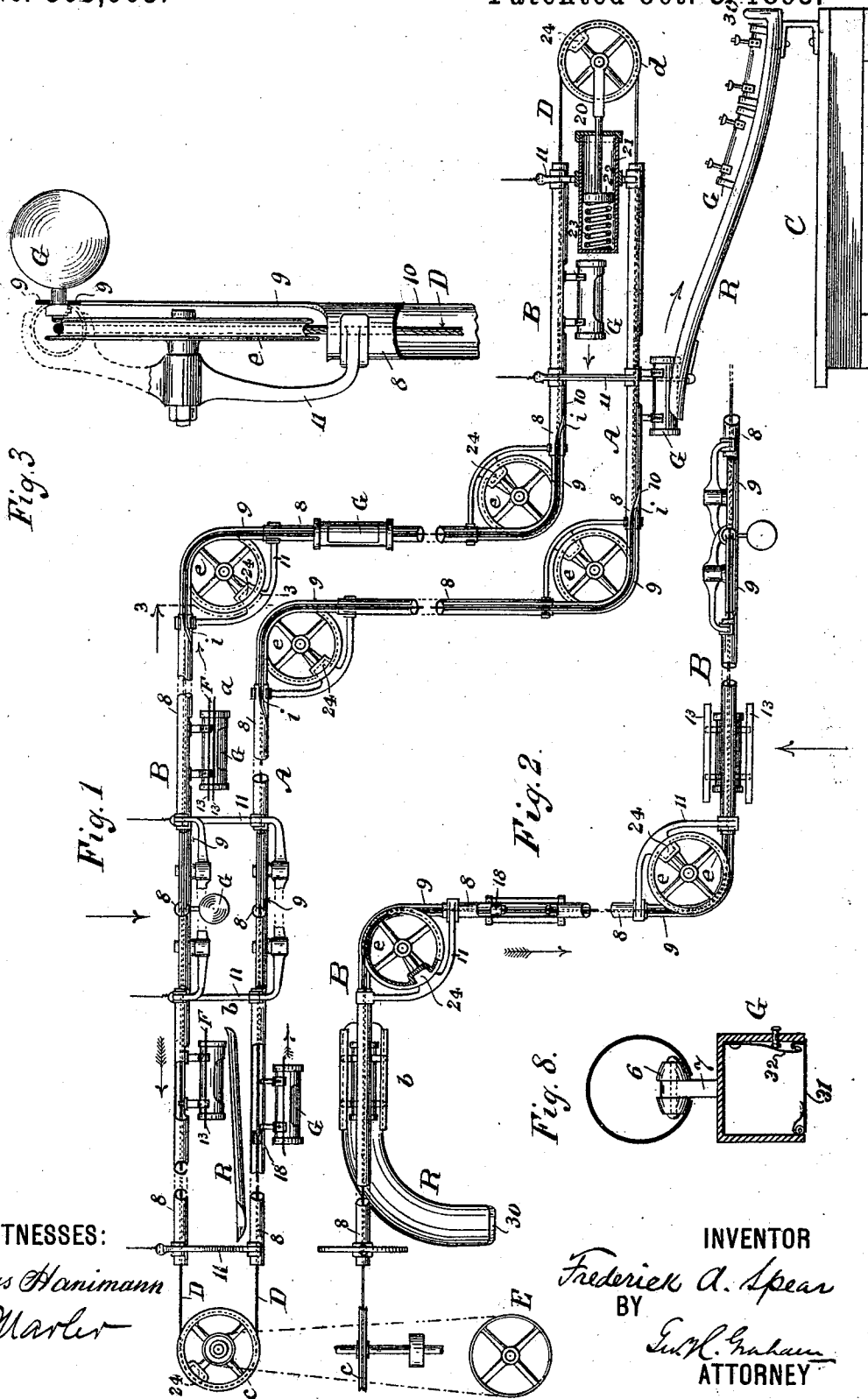
(No Model.)

3 Sheets—Sheet 1.

F. A. SPEAR.
STORE SERVICE APPARATUS.

No. 505,905.

Patented Oct. 3, 1893.



WITNESSES:

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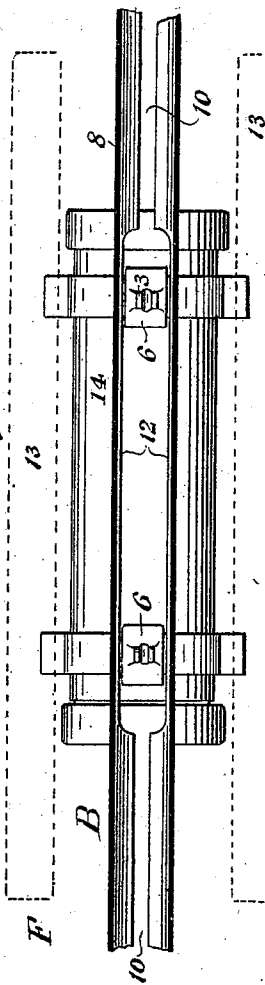
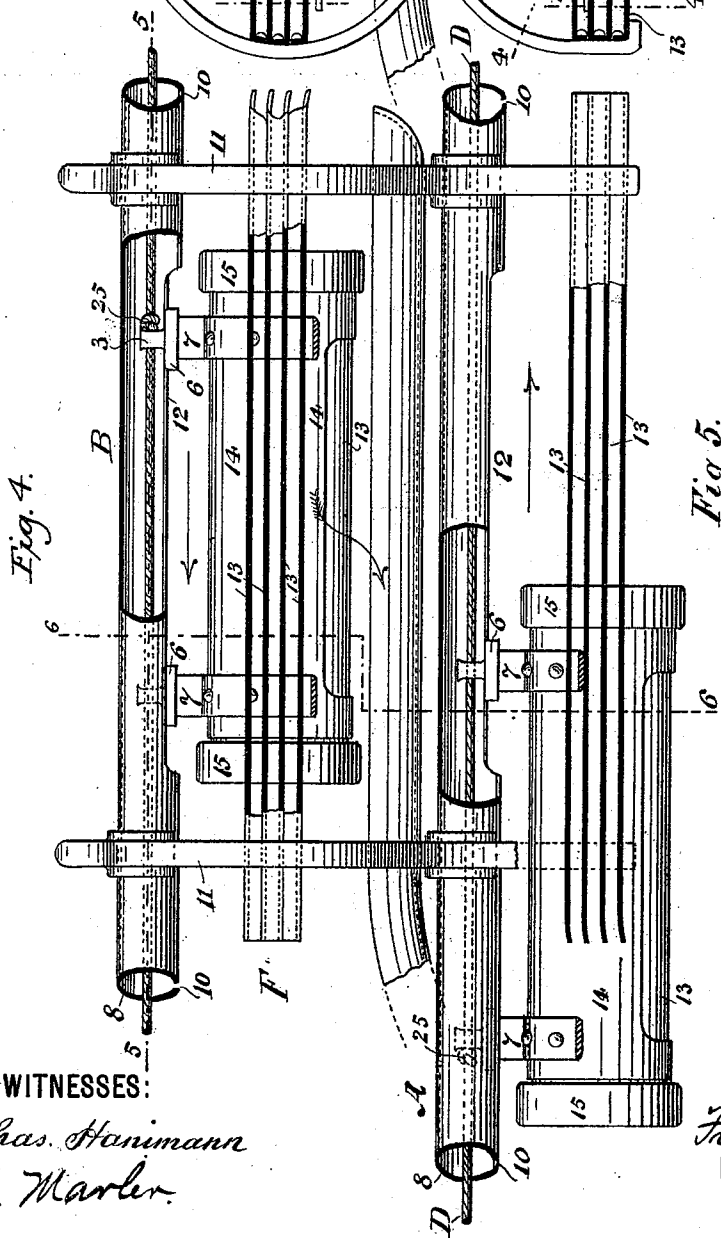
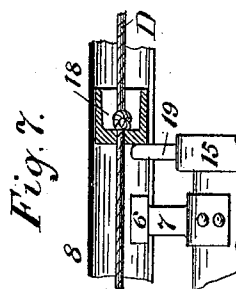
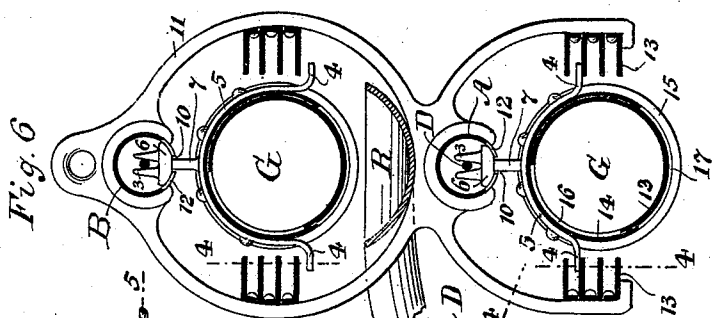
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3 Sheets—Sheet 2.

F. A. SPEAR.
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No. 505,905.

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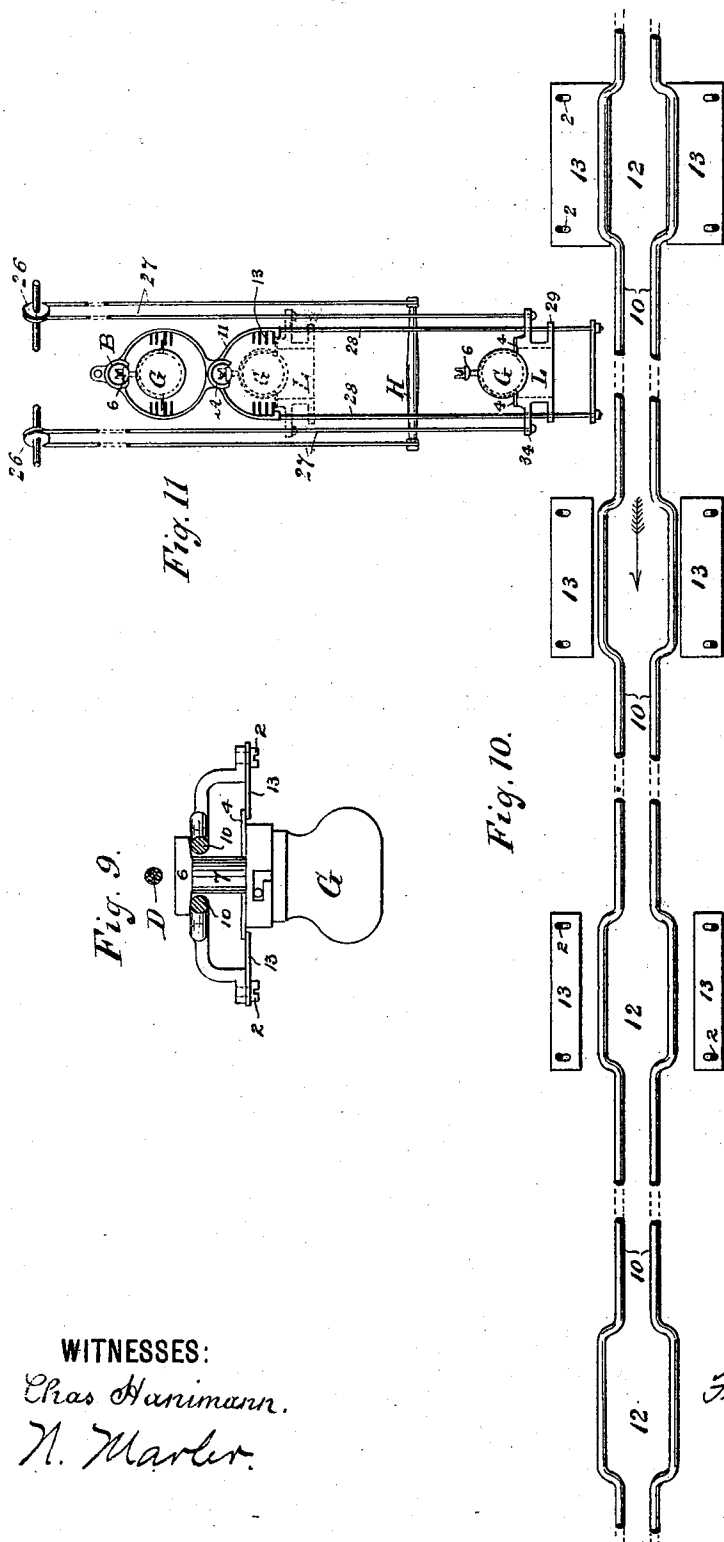
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3 Sheets—Sheet 3.

F. A. SPEAR.
STORE SERVICE APPARATUS.

No. 505,905.

Patented Oct. 3, 1893.



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STORE-SERVICE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 505,905, dated October 3, 1893.

Application filed January 13, 1891. Serial No. 377,673. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. SPEAR, a citizen of the United States, residing in the city of Lowell, county of Middlesex, and State of Massachusetts, have invented certain new and useful Improvements in Store-Service Apparatus, fully set forth in the following description and represented in the accompanying drawings.

10 This invention relates generally to a store service apparatus, and more particularly to that class of apparatus in which the carriers are moved along away or from station to station by means of a traveling cable.

15 The object of the present invention is to provide a simple, inexpensive and effective apparatus whereby carriers may be conveniently placed in position upon the way or ways and conducted to their destinations and when at such destination will move from the way or ways so as to not obstruct the passage of following carriers in going to the same destination or to others beyond, as will be fully hereinafter described.

25 The improved apparatus consists essentially of a way extending in some cases past a number of salesmen's stations to a central or cashier's desk, hereinafter termed the forwarding way, and another way leading from the central or cashier's desk to and past the several salesmen's stations, hereinafter termed the return way. Along each of these ways there extends a motor cable traveling along the forwarding way in the direction 30 necessary to move the carriers to the cashier's desk, and along the return way in the direction necessary to move the carriers from that desk to the salesmen's stations. In the preferred form, the motor cable will be an endless one stretched around and guided by suitable pulleys so that one portion of the cable will extend along the forwarding way and the other portion along the return way.

35 The carriers, capacitated either for small or large packages such as cash or merchandise, and of any suitable form, are supported by the way so as to be moved along the latter by the motor cable, and in the construction shown these carriers are suspended from the ways by the heads of projections extending from the carrier body, the heads sliding or rolling along and guided by the ways.

For the purpose of delivering only the previously designated carrier to its proper salesman's station, the way is open or spread at each station to allow the carriers to leave the way, and in conjunction therewith there is provided one or more guards, bridges or auxiliary ways adapted to temporarily support those carriers in passing the open or spread portion that are designed to be delivered at a station farther along the way. And in conjunction with these guards, bridges or auxiliary ways each carrier is provided with projections, flanges or rolls adapted to coact with one or the other of said guards, bridges or the like to temporarily support the carrier and prevent it from being prematurely delivered from the way.

In the preferred construction the way while it may be of any desired form, is shown in the form of a tube of any shape in cross section so that the motor cable and carrier suspending devices are hidden from view, which tube has a slot or opening extending substantially its entire length for the passage of the connection between the carrier and its suspending devices, the walls of which opening will also serve as a means of properly guiding the carrier and enable the latter to be moved in curved and spiral directions. So too in the preferred form of the invention, cable catches, grips or the like are dispensed with and the carrier propelled simply by the contact of a projection formed on or carried by the motor cable bearing against some convenient part of the carrier; yet it is to be understood that so far as the features of the invention are concerned a cable catch or grip may be used either with or in the absence of a projection formed on or carried by the cable. With this general understanding of the nature of the invention, a detailed description thereof will now be given reference being had to the accompanying drawings, in which—

95 Figure 1, is a side elevation of the improved apparatus, broken away and foreshortened at places for economy of space. Fig. 2, is a plan view of the greater portion of the same. Fig. 3, is an enlarged cross section of a portion of the parts shown in Fig. 1 taken on the line 3, 3, thereof. Fig. 4, is an enlarged elevation partly in section on the lines 4 of Fig. 6, showing particularly that portion of the appara-

tus at a salesman's station. Fig. 5, is a horizontal section taken on the line 5, 5, of Fig. 4, the guards, bridges or auxiliary ways being indicated by dotted lines. Fig. 6, is a vertical cross section taken on the line 6, 6, of Fig. 4. Fig. 7, is a sectional detail of one form of devices for imparting the movement of the cable to the carriers. Fig. 8, is a like detail of a different form of carrier and its suspending devices. Fig. 9, is a like detail of another form of carrier and its way. Fig. 10, is a diagram of the form of way and its guards or bridges. Fig. 11, is a cross sectional elevation of the apparatus with an elevator for elevating a carrier to one of the ways.

Referring now particularly to Figs. 1 and 2, the ways, consisting of the forwarding way A and the return way B, extend from and to a central or cashier's desk C, along and past several salesman's stations *a*, *b*, and the endless motor cable D is stretched around suitable pulleys so as to extend in alignment with each of the ways in position to propel the carriers along the forwarding way from the several salesman's stations to the cashier's desk, and along the return way from the cashier's desk to the salesman's stations. The motor cable is shown as stretched around a grooved wheel *c*, mounted at one end of the ways, which wheel in the present instance is driven from any suitable motor located for instance at E; and at the opposite end the motor cable passes around a similar wheel *d*, that is mounted to keep a constant strain upon the cable to hold it taut. Thus, the axle of said grooved wheel is journaled in the end of a rod 20 extending through and guided by the head of a cylinder 21 and having at its inner end a piston 22 that is borne upon by a spring 23 tending to move the piston toward one end of the cylinder and to thus hold the motor cable taut against yielding pressure. The ways are shown as extending horizontally from the cashier's desk for a short distance, then by a suitable curve are extended vertically and then by another curve extended horizontally, and then, as best seen in Fig. 2, by a lateral curve horizontally and by another similar curve for the remainder of their extent in the same direction but in a higher plane to the portion mediate the cashier's desk; and at each of these curves in the ways there is provided a grooved wheel *e*, for guiding the motor cable and for holding it in alignment with the curve of the way.

In the preferred construction each of the ways consists substantially of a tube or tubular structure 8 shown of circular form in cross section, which tube adjacent to the different curves merges into a pair of rails 9, forming, however, with the tubular portion a practically continuous way for the carriers from one terminus to the other. Throughout the length of each of the ways they are provided with a slot or opening 10, in the present instance upon the lower side of the tube, which

continues along the portions where the tubes merge into the rail portions 9; and so long as the ways extend in a horizontal plane, said slot may be located always upon the same side of the tube; but at the points where the ways are about to be curved to merge into the vertical portion, as shown in Fig. 1, said slot is continued in a spiral direction so that instead of occupying a position upon the lower side of the tube it will curve into and occupy a side position with respect to that tube as shown at the points *i*, whence it will continue in a direct line along the curve formed by the rails 9, thence into the tube portion, and thence into another curve formed by the rails 9, and again by a spiral will return to its original position at the under side of the tube. The purpose of changing the position of the slot is to adapt the carrier to pass the grooved wheels located at the points where the horizontal portion of the ways merges into the vertical portion so that so far as the movement of the carrier up the vertical portion is concerned its connection with the cable will be unbroken.

The ways are shown as located one beneath the other in a vertical plane and are held together and supported at suitable points by brackets 11 which in turn may be supported from any suitable point as for instance by wire from the ceiling or by rigid connections with some side support as the shelving or posts in a store or warehouse; and the grooved wheels may be supported by extensions from these brackets 11, as shown in Fig. 1, as is also the stretching device for the cable formed partially by the cylinder 21.

At each of the salesman's stations, the slot or opening 10 is enlarged, as at 12, best shown in Figs. 4 and 5, sufficient to permit the suspending devices for the carriers hereinafter described, to pass entirely from the return way and to be inserted in position in the forwarding way. And in connection with these enlarged openings 12, with the exception of the salesman's station farthest removed from the cashier's desk, there is provided a guard, bridge or auxiliary way F, which, according to the number of stations employed in a single apparatus, will consist of one or more pairs of plates 13 of a little greater length than the opening for a purpose to be hereinafter described. These guards will preferably be supported by one or more of the brackets 11 and will extend inwardly toward each other a sufficient distance to be engaged by suitable projections from the carrier and yet permit the free passage of the carriers between the pair or pairs of plates, as shown in Fig. 6.

The carriers G may obviously be of any of the well known forms, but as shown in Figs. 1 to 6 are formed of two telescopic tubes 13, 14, of metal or other material each tube terminating in a head 15 forming the ends of the carriers, the whole structure adapted to permit the rotation of one tube with respect to

the other so as to bring the openings 16, 17, in the respective tubes in alignment to gain access with the interior of the carrier. To the outer tube 14 there are secured suitable suspending devices through which the carrier is held to and guided along the ways. In the preferred form, they consist of a pair of heads 6 of greater width than the slot or opening 10 along the ways, but slightly smaller than the enlarged openings 12 at the salesman's stations. Each head 6 is formed at the upper end of a shank 7 adapted to pass through the slot or opening 10 and secured by means of a curved strap or plate 5 to the outer tube of the carrier by rivets as shown. Two of such suspending devices are shown with each carrier, but it is obvious that the same effect will be had by employing only one, connected with substantially the center of the carrier body. The connection between the motor cable and the carrier, so that the latter is propelled, may be varied considerably. Thus, as shown in Figs. 1, 2 and 7, the cable is provided at many points along its length with heads 18 adapted to lie loosely within the tube, forming the way, immediately in front of a knot or projection in the cable. This head provides a convenient support for the cable between the several grooved wheels guiding the cable or between the points where it is deflected from one direction into another so that it is prevented from sagging, and is held from contact with the heads of the carrier suspending devices. The head 18 may bear directly against the head of one or the other of the suspending devices, or it may bear against an independent projection as 19, see Fig. 7, extending from the head of the carrier; and when the heads 18 are employed, the several pulleys around which the cable passes will be provided with one or more pockets 24, see Figs. 1 and 2, to receive the head as it passes the wheel. In lieu of the head 18, a simple knot 25 in the cable, as shown in Fig. 4, may bear against a projection from the carrier, as for instance the projection 19, or a projection 3 from the head 6 of the suspending device. So too, the knot 25 may be omitted and the projection 3 be a forked one, as shown in Fig. 6, with an inclined inner face so as to become wedged to the cable. Of course it is obvious that the projection 3 in the forked form shown may be used either in conjunction with the knot 25 alone or with the head 18 alone, and that instead of being on the head of the suspending device it may be provided at the end of the projection 19; and this projection 19 may be at one or both ends of the carrier.

When there is more than one station along the way or ways of the apparatus, thus employing a plurality of carriers, one or more for each station, each carrier will be provided with a pair of lateral projections 4 which, with respect to the carriers for the different stations in such apparatus, will be graduated in height or position on the body of the carrier. These projections 4 are adapted to en-

gage at certain stations with one or the other of a pair of plates 13 of the guard or bridge F, so that in passing an enlarged opening 12 at the station the carrier is to pass, the carrier will be temporarily supported by its projections resting upon the guard so that the suspending devices will not leave the way and so that the carrier is held in the control of the motor cable. The last station along the return way or that farthest distant from the cashier's desk need not be provided with a guard or bridge F as all carriers designed for that station will be delivered there. Likewise the last station on the forwarding way or that at the cashier's desk will lack any guard or bridge F whereby all the carriers dispatched along said way will be delivered at that point. The first station along the return way, if there be five salesman's stations along that way, will be provided with four pairs of plates 13, each pair constituting a guard or bridge for carriers passing to either of the four stations beyond, and the carrier designed to be delivered at said first station will have its projection 4 low enough below the plane of the lower pair of plates to miss engaging therewith, so that the carrier will be delivered at that station as indicated in Figs. 4 and 6 in connection with the return way B. The next or second salesman's station will be provided with three pairs of plates 13 constituting the guard or bridge, the lower pair of the previous or first station being omitted, so that the carrier with projections that have rested upon said lower pair of plates in passing the first station will, in the absence of a guard at the second station, therefore be delivered at that station; and so on with the remaining stations along the return way, each succeeding station having one less pair of plates, and the carriers with their projections 4 at different heights, the carrier having the farthest distance to go having its projections 4 arranged so that they will rest upon the uppermost pair of plates in passing each of the preceding salesman's stations and there being no guard or bridge at its station will consequently be delivered there. The guards or bridges F for the salesman's stations along the forwarding way are similarly arranged so that the carrier dispatched from the station farthest from the cashier's desk will be supported through its projections 4 along the uppermost pair of plates 13; the carrier from the next succeeding station will be supported in like manner by the second pair of plates, as is shown in Figs. 4 and 6 in connection with the forwarding track A, and so on.

The carriers that are to be delivered at each of the salesman's stations may pass from the way into a suitable receptacle within reach of the salesman. In the preferred form, the apparatus is provided at each of the salesman's stations and along the return way, with a receiver R of trough shape underlying the way for a distance to insure the reception of

the carriers therein and curved or turned laterally, as shown in Fig. 2, and if necessary sloped downwardly so that the carriers under the momentum as well as by gravity may pass to the outer end of the receiving trough within reach of the salesman or cashier. The receiving trough will be supported in any suitable manner either by the brackets 11 or by other suitable supports independent of the ways. The receiver will be provided at its outer end with a stop or abutment 30 against which the ends of the carriers may strike to stop their further movement.

It is obvious that the construction of the apparatus may be modified from that shown in many particulars. Thus, instead of locating the forwarding and return ways one immediately above the other they may be separated a distance apart and supported independently, or they may be arranged side by side in the same horizontal planes as is obvious. The head 6, of the suspending devices, instead of being a fixture, as shown, may, as shown in Fig. 8, be in the form of rolls mounted at the end of the shank 7 adapted to roll upon the way during the movement of the carrier. In said Fig. 8 there is also shown a carrier of rectangular form provided at one side with a hinged cover 31, provided with a spring at its hinges so that its normal tendency is to move open, and a catch 32 for holding the cover closed and adapted to be pressed to one side to release the cover so that it will open automatically.

While the tubular form of the way is the preferred one, it is obvious that the invention is not limited thereto as said ways, as shown in Figs. 9 and 10, may consist of a pair of rails supported a suitable distance apart to provide the longitudinal opening 10, and which rails may be spread as shown to form the delivery opening 12 before referred to for the free passage of the head of the carrier suspending devices.

Another form of carrier is also shown in Fig. 9 consisting of a frame to which the suspending device is attached and a removable receptacle connected to the frame by the ordinary bayonet joint. So, too, instead of employing a guard or bridge formed of a number of plates corresponding to the number of stations along the way, less one, and employing carriers with projections at graduated heights corresponding to the position of the plates of the guard or bridge, said coacting projections of the carriers may occupy the same plane and be of the same length or be of graduated lengths adapted to engage with the guard or bridge consisting of a single pair of plates supported at different or equal distances apart at different stations, as best shown in the diagram, Fig. 10. The pair of plates forming the guard or bridge F are arranged adjacent to each of the enlarged or delivery openings 12 in position to form a rest for the projections 4 of the carrier that is to pass one or more of the stations;

each of the plates being provided with slots for the passage of bolts securing them in place so that they may be adjusted to proper position with respect to the projections of the carriers that are to pass or to be delivered at the stations.

From the foregoing it will be understood that the guards or plates are in effect either graduated in height, in which case one or more pairs of plates will be used, or they may be graduated in position with respect to the center line of travel of the carriers varying at each station the distance between their inner edges; and that the projections 4 of the carriers will be either graduated in height upon the carrier body to correspond with the location of the guards or bridges, or be of the same height and length or of the same height and graduated in length, as will be readily understood.

In each of the forms of the guards or bridges F, the enlarged openings 12 along the way provided at each station will be of substantially the same size so that so far as the way is concerned, along which the carriers travel, it will be of uniform construction adapted to any situation and whether one or a large number of stations are provided along its length. So too, the carriers and their suspending device or devices will be of uniform construction with the exception that in one form of the guard or bridge the projections 4 will be of different heights on different carriers. These two features are of considerable importance in practice, as in apparatus employing a large number of stations along a single way, requiring graduated devices for automatically delivering the carrier and preventing the delivery of only the proper carrier at a predetermined station, such graduated devices have to be nicely adjusted and the carrier must work exceedingly true.

In the construction of the apparatus forming the present invention, such graduated devices being practically independent of the way and not entering into its construction, may be adjusted as circumstances require without disturbing the way and permitting the way and the carriers to be manufactured in large quantities without attention being paid to the number of stations that may ultimately be arranged in an apparatus in which they may be used.

In the apparatus as so far described herein it has been contemplated that the salesman should place the carrier by hand in position on the way A so as to be taken by the cable. It is obvious that in lieu of this, and especially where it is desired to support the apparatus a considerable distance above the floor, a carrying elevator may be employed extending from the track A down to a position within easy reach of the salesman. Such a structure is shown in Fig. 11, wherein one or more of the brackets 11, is provided with two or more depending guide rods 28 on which may slide, vertically, an elevator carriage L, its ears 29

and 34 embracing said rods 28. The shape of the carriage will correspond to the style of carrier G that may be employed. It is shown as recessed to fit the circular under surface of the carrier with its projections 4 resting upon the top of the elevator carriage, so that upon the elevation of the elevator and the carrier it will be held in position for its head 6 to pass through the enlarged opening in the way, and its body or receptacle portion to pass between the bridge plates 13; the lower set of plates forming a stop for limiting the vertical movement of the elevator and of the carrier. The elevator carriage may be elevated by any suitable means as, for instance, by a handle H within reach of the salesman, the opposite ends of which are connected to the ends of a pair of cords 27 which pass upward and around pulleys 23, and down to the ears 34 extending from the elevator carriage to which they are fastened.

What is claimed is—

1. In a store service apparatus, the combination of a way having a lower opening at each station for the passage of the carrier therefrom by gravity, and a guard or bridge located adjacent to said opening and adapted to temporarily support a carrier passing to a station beyond and to allow the delivery of a carrier at that station by gravity, substantially as described.

2. In a store service apparatus, the combination of a way having openings of equal size at each station for the passage of the carrier therefrom by gravity, and guards or bridges located adjacent to one or more of said openings and adapted to temporarily support a carrier passing to a station beyond and to allow the delivery of a carrier at that station, substantially as described.

3. In a store service apparatus, the combination of a way having an opening at each station of uniform size, and a guard or bridge at two or more stations arranged adjacent to said openings, and consisting of two or more pairs of plates mounted at different heights, and carriers with projections of graduated height coacting with said guards or bridges, substantially as described.

4. In a store service apparatus, the combination of a way having an opening at each

station of uniform size for the delivery of the carrier, a guard or bridge arranged adjacent to said opening at one or more stations, and carriers having suspending devices adapted to the way and to pass through said openings, and also having projections coacting with said guard or bridge, substantially as described.

5. In a store service apparatus, the combination of a way having a continuous opening between its tread bearing surfaces, said bearing surfaces being curved from one plane into another in passing from a horizontal position to a vertical one, or vice versa, and a carrier having a head or heads 6 to be suspended from said way, substantially as described.

6. In a store service apparatus, the combination of a way of tubular structure having a continuous opening between its tread bearing surfaces, said tubular structure merging into a rail-form with two separate tread bearing surfaces to pass curves, and a carrier adapted to said way, substantially as described.

7. In a store service apparatus, the combination of a way having a continuous opening between its tread bearing surfaces, the latter being curved from one plane into another in passing from a horizontal position to a vertical one or vice versa, a carrier having a head or heads 6 to be suspended from said way, and a motor cable extending along the way, the latter having supporting or guiding wheels for the cable at the points where deflected, substantially as described.

8. In a store service apparatus, the combination of a way having an opening at each station for the return of the carrier thereto, a guard or bridge located adjacent to said opening to temporarily sustain passing carriers in line with the way, an elevator, a carrier adapted to such elevator and having projections adapted to strike the guard or bridge, substantially as described.

In testimony whereof I have set my hand, this 20th day of August, 1890, in the presence of two witnesses.

FREDERICK A. SPEAR.

Witnesses:

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N. MARLER.