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PNEUMATIC SYSTEM CARRIER ARRESTER CONSTRUCTION

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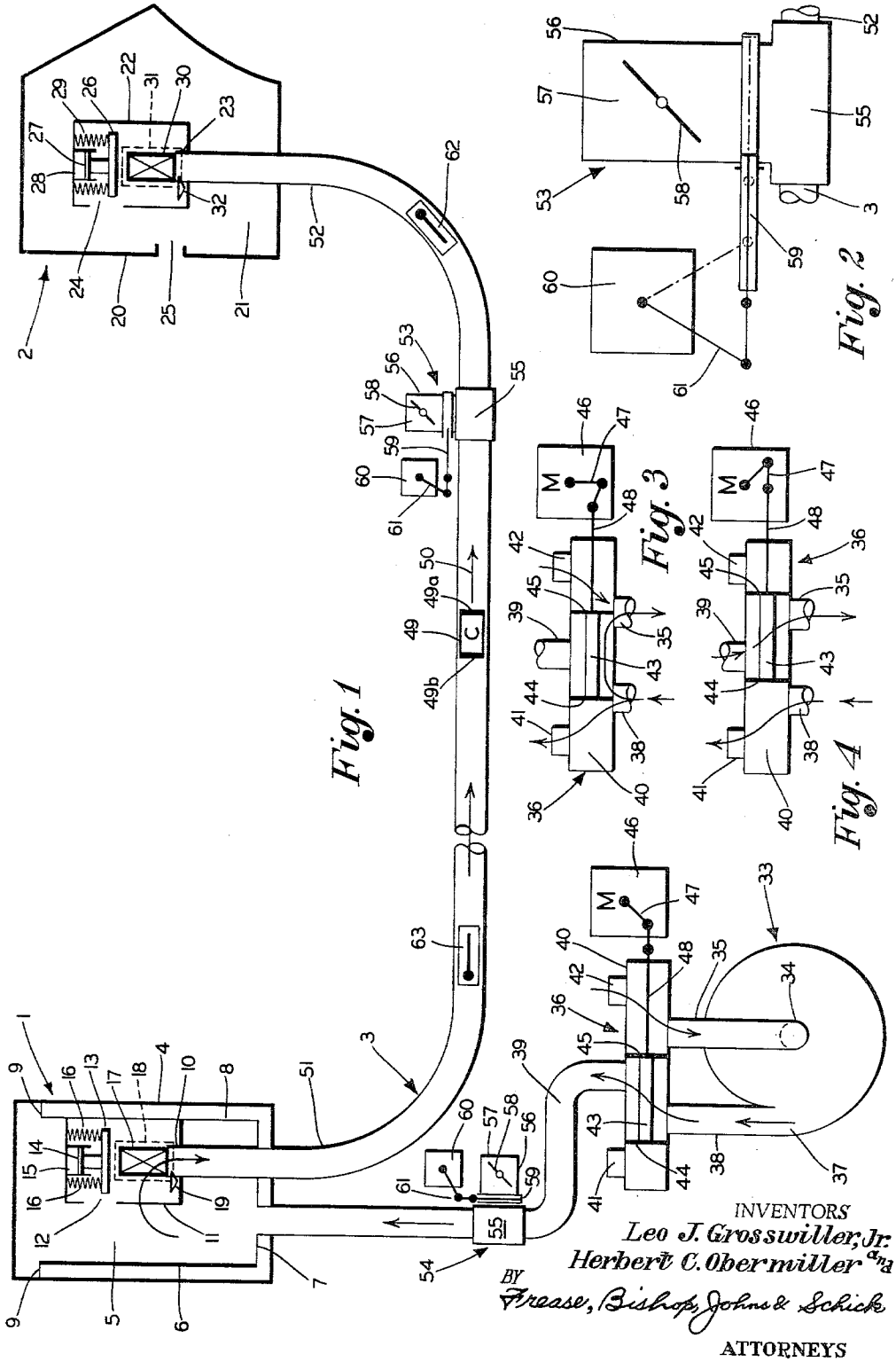


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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PNEUMATIC SYSTEM CARRIER ARRESTER CONSTRUCTION

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The invention relates to pneumatic systems in which a carrier is moved rapidly by air pressure or vacuum through a conveyer tube between one station at one end and another station at the other end of the conveyer tube; and more particularly the invention relates to constructions and arrangements of such pneumatic tube systems that retard or arrest carrier movement as the carrier approaches either station to the degree necessary to avoid damage to the carrier and system as the carrier is brought to rest at either station regardless of the size of the load conveyed or transported by the carrier and contained therein.

Pneumatic tube carrier systems have been used advantageously for conducting banking services because of the rapidity with which banking transaction media (such as deposit and withdrawal components which may include coin, paper money, checks, deposit slips and other similar articles) may be moved from a teller's console or station within a bank building at one end or terminal of the pneumatic tube to a customer's station or kiosk at the other end or terminal of the pneumatic tube remote from the teller's console and accessibly located for walk-up or drive-up banking transactions; and in which two-way oral and visual communication is established and maintained between the teller's console and the kiosk.

Equipment for conducting such banking services has included television cameras and receivers for establishing the two-way visual communication at the teller's console and kiosk, and is known as television banking equipment.

There have been problems involved in the construction, operation and use of television banking equipment related to the rapid pneumatic tube movement of a carrier between the terminal stations and the stopping of the carrier at the stations.

These problems involve first, the necessity of assuring that a carrier whose movement has been retarded, arrives at one terminal station after being conveyed rapidly through the pneumatic tube from the other station; second, the requirement of stopping the rapidly moving carrier at either terminal station with a minimum of shock or impact to the structures, mechanisms and components of the equipment located at each station; and third, the weight of the load (including carrier weight) conveyed or transported by the carrier, which varies each time the carrier is pneumatically conveyed from one station to the other.

For instance, for one banking transaction, the carrier may contain merely a deposit slip and a bank check of negligible weight, in which event the carrier load is merely the weight of the carrier itself. For another transaction, the carrier may be filled with coin, either loose or in rolls having substantial weight, in addition to the weight of the carrier, per se.

In the operation of prior television banking equipment, carrier movement has been retarded as the carrier approaches a terminal by reducing the conveying pressure or vacuum a fixed amount at a fixed point in the path of carrier travel and by relying upon the inertia of the carrier to provide carrier movement the remainder of the distance to the terminal destination.

This arrangement, however, is unsatisfactory because if the fixed amount of pressure reduction is such as to

assure arrival at the terminal of a heavily loaded carrier, the carrier when empty or transporting a load of negligible weight may arrive at the terminal at relatively high speed, resulting in severe impact to the equipment even though provided with shock absorber, cushion or resilient bumper means.

Obivously, the noise developed by such severe impact may be objectionable. A more serious difficulty, however, is that the repeated vibration resulting from repeated severe impact or shock may damage delicate television components and other parts of the equipment.

Accordingly, it is the general object of the present invention to provide a new arrester control construction for carrier movement in terminal zones of pneumatic tube systems, which controls the speed of movement of a carrier in such zones to a degree such that regardless of carrier loading, the stopping of the carrier at a terminal does not impart shock, vibration or other damage to terminal equipment.

Furthermore, it is an object of the present invention to provide a new arrester control construction for carrier movement in terminal zones of pneumatic tube systems, which assures that a carrier which has been conveyed rapidly through a pneumatic tube from one tube terminal and whose movement near the other terminal then has been retarded to a degree which will avoid equipment damage, nevertheless will arrive at or reach the other pneumatic tube terminal.

Also, it is an object of the present invention to provide a new arrester control construction for carrier movement in terminal zones of pneumatic tube systems, which, irrespective of carrier loading, controls the maximum carrier speed at a predetermined safe or non-damaging value when the carrier arrives at and is stopped at either terminal of the pneumatic tube system.

Finally, it is an object of the present invention to provide a new arrester control construction for carrier movement in terminal zones of pneumatic tube systems which eliminates difficulties heretofore encountered in the art; eliminates complicated mechanisms, and assembly and maintenance and repair problems heretofore involved; avoids damage to pneumatic tube system television banking equipment resulting from repeated and continued use of the equipment; achieves the stated objects in a simple, effective and inexpensive manner; and solves problems and satisfies needs existing in the art.

These and other objects and advantages apparent to those skilled in the art from the following description and claims may be obtained, the stated results achieved, and the described difficulties overcome, by the apparatus, combinations, parts, elements, subcombinations, arrangements, constructions and controls which comprise the present invention, the nature of which is set forth in the following general statement, a preferred embodiment of which—illustrative of the best mode in which applicants have contemplated applying the principles—is set forth in the following description and shown in the drawing, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the improved carrier arrester control construction for pneumatic tube conveyer systems may be stated in general terms as including in a pneumatic tube conveyer system in which a carrier is conveyed or moved in either direction from one to the other terminal of a pneumatic tube by motive pressure supplied through the tube to the carrier, and in which a source of motive pressure communicates with the tube; the combination of deceleration valve means communicating with the tube adjacent each terminal, a valve control switch associated with the tube adjacent each terminal and operable by carrier movement through the tube in a direction toward the terminal to which such switch is adjacent; each decelera-

tion valve means including orifice means communicating between the tube and the atmosphere, preferably means for adjusting the effective size of the orifice means, a closure member for the orifice means, motor means controlled by one of said valve control switches for moving the closure member when in orifice-open position to close the orifice means at a predetermined controlled rate; and the carrier operated switch adjacent each terminal controlling the operation of the deceleration valve means communicating with the tube adjacent such terminal and actuating the deceleration valve means controlled thereby when such switch is operated by a carrier moving through a zone of said tube adjacent such terminal; whereby such deceleration valve means when open and in communication with the source of motive pressure establishes motive pressure communication through the orifice means with the atmosphere to reduce the effective motive pressure upon and to retard to substantially zero the speed of movement through the tube of a carrier moving through said terminal zone of the tube and approaching such terminal; and whereby subsequent movement of the closure of such deceleration valve means at said predetermined rate of closing of the orifice means applies increased motive pressure to the carrier to move the carrier at minimum speed throughout the remainder of said terminal zone until carrier arrival at such terminal.

By way of example, an embodiment of the improved carrier arrester control construction is illustrated diagrammatically in the accompanying drawing forming part hereof in which:

FIGURE 1 is a diagrammatic view of a pneumatic tube carrier system for television banking equipment having the improved carrier arrester control construction for each tube terminal incoporated therein;

FIG. 2 is an enlarged diagrammatic fragmentary view one of the deceleration valve means;

FIG. 3 is a fragmentary diagrammatic view of the shifter means for the source of motive pressure shown in FIG. 1 with the shifter means in neutral position; and

FIG. 4 is a view similar to FIG. 3 showing the shifter means in a position to apply vacuum to the pneumatic tube system.

Similar numerals refer to similar parts throughout the drawing.

A pneumatic tube carrier system for conducting banking services is illustrated diagrammatically in FIG. 1 and includes a teller's console or station indicated generally at **1** and a kiosk or customer's station indicated generally at **2** with a pneumatic tube indicated generally at **3** connecting stations **1** and **2**.

Telle's console **1** is placed at a convenient location within a bank building, while kiosk **2** is at a location remote from console **1** outside the bank building adjacent a street or sidewalk or parking lot and conveniently accessible for a customer to conduct a walk-up or drive-up banking transaction at the kiosk. Console **1** and kiosk **2** may be provided with sound and televsion equipment (not shown) for establishing and maintaining two-way oral and visual communication between the console **1** and kiosk **2**.

Console **1** includes a main housing **4** having a compartment **5** therein formed by the housing **4** and walls **6**, **7**, **8** and **9**. One open terminal end **10** of pneumatic tube **3** is located within subhousing **11** formed within compartment **5**. An opening **12** communicates between the interior of subhousing **11** and compartment **5**.

A cushioning device including a pad member **13** mounted on piston **14** movable in cylinder **15** is preferably located in subhousing **11** spaced above open end **10** of tube **3**. Compression springs **16** also may be provided normally pushing pad **13** downward toward open tube end **10**, as shown.

A door **17** closes an opening formed in main housing **4** to provide access to the open terminal end **10** of tube **3** when the door is open. Door **17** when closed may be sealed, as indicated by dotted lines **18**, in airtight relation around the opening served by door **17**. A latch **19** is provided adjacent open end **10** of tube **3** and adjacent door **17**.

Kiosk **2** includes a main housing **20** forming a compartment **21** containing a subhousing **22** in which the other open terminal end **23** of pneumatic tube **3** is located. An opening **24** communicates between the interior of subhousing **22** and compartment **21**, and an opening **25** communicates between compartment **21** and the atmosphere.

A cushioning device including a pad member **26** mounted on piston **27** movable in cylinder **28** preferably is located in subhousing **22** spaced above open end **23** of tube **3**. Compression springs **29** also may be provided normally pushing pad **26** downward toward tube end **23** as shown.

A door **30** closes an opening formed in main housing **20** to provide access by a customer to the open terminal end **23** of tube **3** when door **30** is open. Door **30** when closed may be sealed, as indicated by dotted lines **31**, in airtight relation around the opening served by door **30**. A latch **32** is provided adjacent open end **23** of tube **3** and adjacent door **30**.

Motive pressure for the pnuematic tube system is supplied to tube **3** by blower pump **33**. The air inlet **34** of blower **33** is connected by conduit **35** with an air shifter unit generally indicated at **36**. The blower outlet **37** of blower **33** also is connected by conduit **38** with air shifter unit **36**. Motive pressure supply conduit or pipe **39** communicates between air shifter unit **36** and compartment **5** of console **1**.

Air shifter **36** includes a valve-like body **40** to which conduits **35**, **38** and **39** are connected. Exhaust opening **41** and intake opening **42** also communicate with the interior of valve body **40** and with the atmosphere. A piston **43** having piston heads **44** and **45** is movable in valve body **40**. Piston **43** is moved to and between various adjusted positions by motor means **46** connected by drive linkage **47** with piston rod **48**. Air shifter unit **36** is illustrated in "send-out" position in FIG. 1, in neutral position in FIG. 3, and in "bring-in" position in FIG. 4.

A capsule-like carrier bearing the notation "C" is indicated at **49** in FIG. 1 travelling in pneumatic tube **3** from console **1** toward kiosk **2** as indicated by arrow **50**. Carrier **49** is a captive carrier in that it is retained in the pneumatic tube system at all times and travels through tube **3** by motive pressure between open terminal tube end **10** in console **1** and open terminal tube end **23** in kiosk **2**. When carrier **49** is at rest in console **1**, it is located in subhousing **11** behind door **17** and held by latch **19**. Carrier **49** at rest in kiosk **2** is located within subhousing **22** behind the door **30** and held by latch **32**.

Carrier **49** is provided with suitable door means, not shown, so that when carrier **49** is located at rest in either console **1** or kiosk **2**, upon opening either door **17** or **30**, the carrier door means may be opened for placing banking transaction media in or removing it from carrier **49**.

As illustrated in FIG. 1, a terminal zone **51** of tube **3** extends upwardly into console main housing **4** and subhousing **11**, and a terminal zone **52** at the other end of tube **3** extends upwardly into kiosk housing **20** and subhousing **22**. The remainder of tube **3** between upwardly extending terminal zones **51** and **52** preferably extends below ground level. Any direction changes in the extent of tube **3** necessary to connect console **1** with kiosk **2** are taken care of by suitable tube bends.

If carrier **49** is at rest in console **1** and held by latch **19**, the release of latch **19** permits carrier **49** to drop by gravity into open end **10** of tube **3**. Similarly, when carrier **49** is at rest in kiosk **2** and held by latch **32**, the

release of latch 32 permits carrier 49 to drop by gravity into open end 23 of tube 3.

Assume carrier 49 to be at rest and held by latch 19 in console 1 and that it is desired to send carrier 49 out from console 1 to kiosk 2. This is accomplished by actuating air shifter unit 36 through motor 46 to send-out position illustrated in FIG. 1. Blower 33 is started and latch 19 is released. Air is drawn into valve body 40 through intake opening 42 and thence (by the position of piston head 45 between conduits 35 and 39) through conduits 35 into blower intake 34. Air under pressure is discharged by blower 33 through conduit 38 into valve body 40 and through conduit 39 into console compartment 5, through opening 12 and into subhousing 11. Meanwhile, carrier 49 by release of latch 19 has dropped by gravity into tube end zone 51, and the motive pressure of the air supplied by blower 33 conveys carrier 49 through tube 3 to kiosk 2 where it strikes shock absorber pad 26 and then drops back and is held by latch 32. Pad 26 and compression springs 29 absorb some of the carrier movement force, and air compression between piston 27 and cylinder 28 adds to the cushioning effect, whereby the shock of carrier movement is absorbed and carrier movement is stopped.

As soon as carrier 49 arrives at kiosk 2, motor 46 of air shifter unit 36 moves piston 43 to neutral position shown in FIG. 3 wherein piston head 44 straddles conduit 38, piston head 45 straddles conduit 35, conduit 38 communicates through valve body 40 between piston heads 44 and 45 with conduit 35, and conduit 38 communicates through valve body 40 with exhaust opening 41. Thus, until blower 33 is stopped, blown air circulates back to blower 33 or is exhausted to the atmosphere through exhaust opening 41 as shown by the arrows in FIG. 3, and no motive pressure is supplied to pipe 39.

Now, assume carrier 49 to be held at kiosk 2 by latch 32 and that it is desired to bring the carrier in to the console 1. Air shifter unit 36 is actuated by motor 46 to move its components from the neutral position shown in FIG. 3 to the bring-in position shown in FIG. 4. Blower 33 is started and latch 32 is released. Blower 33 now exhausts air from tube 3 through console compartment 5 and conduit 39 into valve body 40 between piston heads 44 and 45, through conduit 35 into blower 33 and discharges the air to the atmosphere through conduit 38, valve body 40 and exhaust opening 41. Carrier 49 upon release of latch 32 drops by gravity into terminal zone 52 of tube 3 and is conveyed by the exhausting pressure back to console 1. Upon arrival at console 1, carrier motion is stopped by shock absorber pad 13 and carrier 49 drops onto and is held by latch 19. At this time, air shifter unit 36 is moved from bring-in position (FIG. 4) to neutral position (FIG. 3) cutting off motive pressure to tube 3 and blower 33 is stopped.

Carrier 49 is moved to send it out from console 1 to kiosk 2 by greater than atmospheric pressure supplied by blower 33 through tube 3 to the carrier; and carrier 49 is moved to bring it in from kiosk 2 to console 1 by exhausting or less than atmospheric pressure supplied by blower 33 through tube 3 to the carrier 49. The send-out pressure and bring-in exhaust are termed herein "motive pressure," in that differential pressure in each instance is applied to the two ends of carrier 49 to move the carrier in the desired direction through tube 3. That is to say, the end 49*a* of carrier 49 is always subject to atmospheric pressure through openings 25 and 24 at the kiosk end of tube 3; and the end 49*b* of the carrier is subjected to greater than atmospheric pressure or less than atmospheric pressure when blower 33 is supplying air to or exhausting air from the console end of tube 3.

Typical motive pressure and carrier speeds may be of the order of 500 cubic feet per minute of air blown into or exhausted from tube 3 imparting carrier movement in the tube 3 ultimately at a rate as high as 30 feet per second.

A carrier striking shock absorber pad 13 or 26 at such speed will impart destructive forces to the console or kiosk equipment. Thus, its speed must be reduced in terminal zones 51 and 52 of the system to eliminate the destructive effect. Prior attempts to retard carrier movement by reducing the motive pressure a fixed amount at a fixed point in the path of carrier travel, and by relying upon the inertia of the carrier to provide carrier movement the remainder of the distance to destination have not been satisfactory. If the fixed amount of motive pressure reduction is such that an empty carrier will arrive at destination at a non-destructive speed, then the same carrier heavily loaded will not reach destination. If the fixed amount of motive pressure reduction is such that a carrier with maximum load will just arrive by inertia movement at destination, then the same carrier empty will arrive at destination at a destructive speed.

In accordance with the invention, carrier arrester control devices are incorporated in the system. These control devices include a deceleration valve unit 53 incorporated in tube 3 adjacent the terminal zone 52 and a similar deceleration valve unit 54 incorporated in conduit 39 to communicate with terminal zone 51 of tube 3 adjacent the open terminal tube end 10. Each valve unit 53 and 54 (FIG. 2) comprises a tubular T-shaped housing 55 with the head of the T connected in line either with tube 3 or conduit 39 and with the stem 56 of the T open at its outer end 57. The opening through stem 56 of housing 55 forms orifice means communicating between tube 3 and the atmosphere. The effective size of the orifice may be adjusted by butterfly valve 58 which will remain in adjusted position after the initial adjustment is made.

The orifice means is provided with a slide valve closure 59 shown in open position for the unit 53 and in closed position for the unit 54 in FIG. 1. The valve closure 59 is shown in full lines in open position and in dot-dash lines in closed position in FIG. 2.

Orifice closure member 59 is moved between open and closed positions by motor means 60 and connecting linkage 61; and the motor means 60 is equipped with suitable adjustable mechanism so that closure 59 may be moved from open to closed position at a predetermined rate of closing of the orifice means. A valve control switch 62 is incorporated in terminal tube zone 52 adjacent the open terminal end 23 of tube 3. Switch 62 controls operation of motor means 60 for deceleration valve means 53 and is actuated to start motor 60 to move member 59 to closed position when the carrier 49 passes switch 62 and is moving in the direction of the arrow in FIG. 1 from console 1 to kiosk 2. Switch 62 is not actuated when carrier 49 passes the switch moving in the direction from kiosk 2 to console 1.

Another valve control switch 63 is mounted in the wall of tube 3 adjacent terminal zone 51 of tube 3 and controls deceleration valve 54. Switch 63 is only actuated by carrier 49 when carrier 49 passes the switch moving in the direction from the kiosk 2 to console 1.

The operation of the improved carrier arrester control construction is as follows:

Assume carrier 49 at console 1 with the parts in the position shown in FIG. 1, deceleration valve 53 being open and deceleration valve 54 being closed. Latch 19 is released and blower 33 is operated to blow air under pressure into tube 3, driving carrier 49 toward kiosk 2 under maximum motive pressure. When carrier 49 passes through deceleration valve unit 53, some of the air is diverted to the atmosphere through the open orifice of valve 53, say about 30 percent. Carrier movement is slowed down from say 30 feet per second to practically zero because of decreased motive pressure, friction between carrier 49 and tube 3 and gravity acting upon the weight of carrier as carrier 49 moves upward in terminal

zone 52. Meanwhile, carrier in passing valve control switch 62 trips the switch to actuate valve motor 60 to close orifice closure 59 at a predetermined controlled rate which gradually increases motive pressure acting on carrier 49 back to maximum, causing carrier 49 to move upward in terminal zone 52 of tube 3 against the force of gravity and the frictional resistance between the wall of tube 3 and surfaces of carrier 49, so that carrier 49 arrives at the shock absorber pad 26 at slow speed, say about 5 feet per second.

Closure 59 of valve 53 remains closed while carrier 49 is located at kiosk 2. When it is desired to return carrier 49 to console 1, blower 33 is started, air shifter unit 36 is shifted to the position shown in FIG. 4, and latch 32 is released. Blower 33 exhausts air from tube 3 sucking carrier 49 back to console 1. As carrier 49 passes and actuates switch 63, motor 60 for valve 54 immediately opens the valve. This cuts down to about 70 percent the air exhausted from tube 3, the remainder being sucked in through open orifice of control valve 54. The decreased motive pressure, friction and weight of carrier slows carrier movement to practically zero as carrier moves upward in terminal zone 51 of tube 3. At the same time, after the deceleration valve 54 has opened, its motor means moves the closure member from open position to close the orifice at a predetermined controlled rate. Maximum suction is thus re-established, pulling carrier 49 upward in terminal zone 51 against the force of gravity and friction so that it arrives at console shock absorbing pad 13 at a speed of about 5 feet per second.

Upon arrival at console 1, carrier 49 is held at rest by latch 19, the closure of valve 54 remains closed, air shifter means 36 moves to neutral position of FIG. 3, blower 33 is shut off, and the closure 59 of valve 53 is moved to open position ready for the next trip of the carrier from console 1 to kiosk 2.

The improved equipment when originally installed must be balanced. If normal movement of a carrier 49 fails to deliver it to kiosk 2, butterfly valve 58 of deceleration valve 53 is partially closed to cut down the escape of air through the orifice means until the carrier is delivered to kiosk 2. Once this adjustment is made on installation, it becomes a permanent setting. On the other hand, if carrier 49 arrives at kiosk 2 at too high speed, the position of control switch 62 with respect to valve 53 along tube 3 must be shifted on original installation until an empty carrier arrives at kiosk 2 at a non-destructive speed of say about 5 feet per second. Similar adjustments on installation may be made of the location of switch 63 and butterfly valve setting for deceleration valve 54.

The shock of a moving carrier arriving at either shock absorbing pad 13 or 26 and being stopped thereby, at a speed of about 5 feet per second is not harmful to or destructive of related equipment at kiosk 2 or console 1. A fully loaded carrier may arrive at either terminal at a speed somewhat slower than 5 feet per second, but assuming that the proper initial adjustments are made on the installation of the equipment as described, a fully loaded carrier 49 will arrive at either destination when full motive pressure is acting after complete closing of either deceleration valve 53 or 54 at a controlled rate from open position, the open position having caused the deceleration of the carrier as it moves into either tube terminal zone 52 or 51.

Accordingly, the improved carrier arrester control construction for pneumatic tube conveyer systems provides for retarding or arresting carrier movement as the carrier approaches either tube terminal to the degree necessary to avoid damage to the carrier and system as the carrier is brought to rest at either terminal regardless of the size of the load contained and transported by the carrier; provides a construction which eliminates difficulties heretofore encountered in the art, which eliminates complicated maintenance and repair problems, and which avoids damage to pneumatic tube system television banking equipment resulting from repeated and continued use of the equipment; and provides a construction which solves problems that have existed in the art.

In the foregoing description, certain terms have been used for brevity, clearness and understanding; but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the description and illustration of the invention is by way of example and the scope of the invention is not limited to the exact pressures, speeds and distances illustrated or described because these may be varied without departing from the fundamental principles of the invention.

Having now described the features, discoveries and principles of the invention, the assembly, operation, adjustment, use and characteristics of a preferred form hereof, and the advantageous, new and useful results obtained thereby; the new and useful discoveries, principles, apparatus, combinations, parts, elements, sub-combinations, arrangements, constructions, controls, and cooperative relationships, and mechanical equivalents obvious to those skilled in the art are set forth in the appended claims.

We claim:

1. In carrier arrester control construction for pneumatic tube conveyer systems of a type in which a carrier is moved in either direction from one to the other terminal of a pneumatic tube by motive pressure supplied through the tube to the carrier, and in which a source of motive pressure communicates with the tube; the combination of deceleration valve means communicating with the tube adjacent each terminal; each tube terminal being provided with an open end and a terminal zone extending upward to the open end; a valve control switch for each deceleration valve means, the switches being associated with the tube one each adjacent a tube terminal zone and spaced from an open tube end by such terminal zone; and each switch being operable by movement of a carrier past such switch through the tube in a direction toward the terminal to which such switch is adjacent; each deceleration valve means including orifice means communicating between the tube and the atmosphere, a closure member for the orifice means, and motor means for moving the closure member when in orifice-open position to close the orifice means at a predetermined controlled rate; and the carrier operated switch adjacent each terminal controlling the operation of the deceleration valve means communicating with the tube adjacent such terminal and actuating the deceleration valve means controlled thereby from one of the valve open or closed positions to the other when such switch is operated by movement of a carrier past such switch; whereby such deceleration valve means when open and in communication with the source of motive pressure establishes motive pressure communication through the orifice means with the atmosphere to reduce the effective motive pressure upon and to retard to substantially zero the speed of movement of a carrier moving upward through an upwardly extending terminal zone of the tube and approaching the related terminal open end; and whereby subsequent movement of the closure of such deceleration valve means at said predetermined rate of closing of the orifice means applies increased motive pressure to the carrier to move the carrier at minimum speed upward throughout the remainder of said upwardly extending terminal zone until carrier arrival at such terminal open end.

2. The construction defined in claim 1 in which each deceleration valve means includes means for adjusting the effective size of its orifice means separate from the closure member for said orifice means.

3. The construction defined in claim 1 in which a housing is provided forming a sealed compartment into

which one tube terminal extends; in which the source of motive pressure communicating with the tube includes blower means provided with an inlet and an outlet, an air shifter unit connected with said blower inlet and outlet, and a conduit connected with the air shifter unit and said compartment; in which the deceleration valve means communicating with the tube adjacent said one terminal is connected in-line in said conduit; in which said air shifter unit includes means movable selectively to one position connecting the blower outlet with said conduit, to another position connecting the blower inlet with said conduit, and to a neutral position; and in which the deceleration valve means communicating with the tube adjacent the other terminal is connected in-line in said tube between said terminals.

4. Carrier arrester control construction for pneumatic tube conveyer systems including housing means forming a first terminal compartment; housing means forming a second terminal compartment spaced from the first compartment; blower means providing a source of motive pressure; tube means communicating with said first and second terminal compartments and with said blower means; means for reversing the direction of air flow between said blower means and said tube means; first deceleration valve means connected with the tube means between said first compartment and said blower means; second deceleration valve means connected with the tube means between said first and second compartments; a carrier movable in said tube means in either direction between said first and second compartments by motive pressure applied by said blower means; the tube means having a first terminal zone extending upward into said first compartment and having a second terminal zone extending upward into said second compartment; a first valve control switch operably connected with said first deceleration valve means associated with the tube means between the first and second compartments and actuated by a carrier moving past said first switch in said tube means in a direction toward said first terminal zone; a second valve control switch operably connected with said second deceleration valve means associated with the tube means between said first and second compartments and actuated by a carrier moving past said second switch in said tube means in a direction toward said second terminal zone; and each deceleration valve means including orifice means communicating between the tube and the atmosphere, a closure member for the orifice means, and motor means controlled by one of said valve control switches for moving the closure member when in orifice-open position to close the orifice means at a predetermined controlled rate.

5. The construction defined in claim 4 in which the first terminal zone of the tube means is provided with an open end within said first terminal compartment, in which said second terminal zone is provided with an open end within said second terminal compartment, in which a releaseable carrier retainer latch is located adjacent each open end, in which said first compartment is sealed and communicates with the blower means, and in which the second compartment housing means is provided with an opening communicating with the atmosphere.

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