

June 26, 1934.

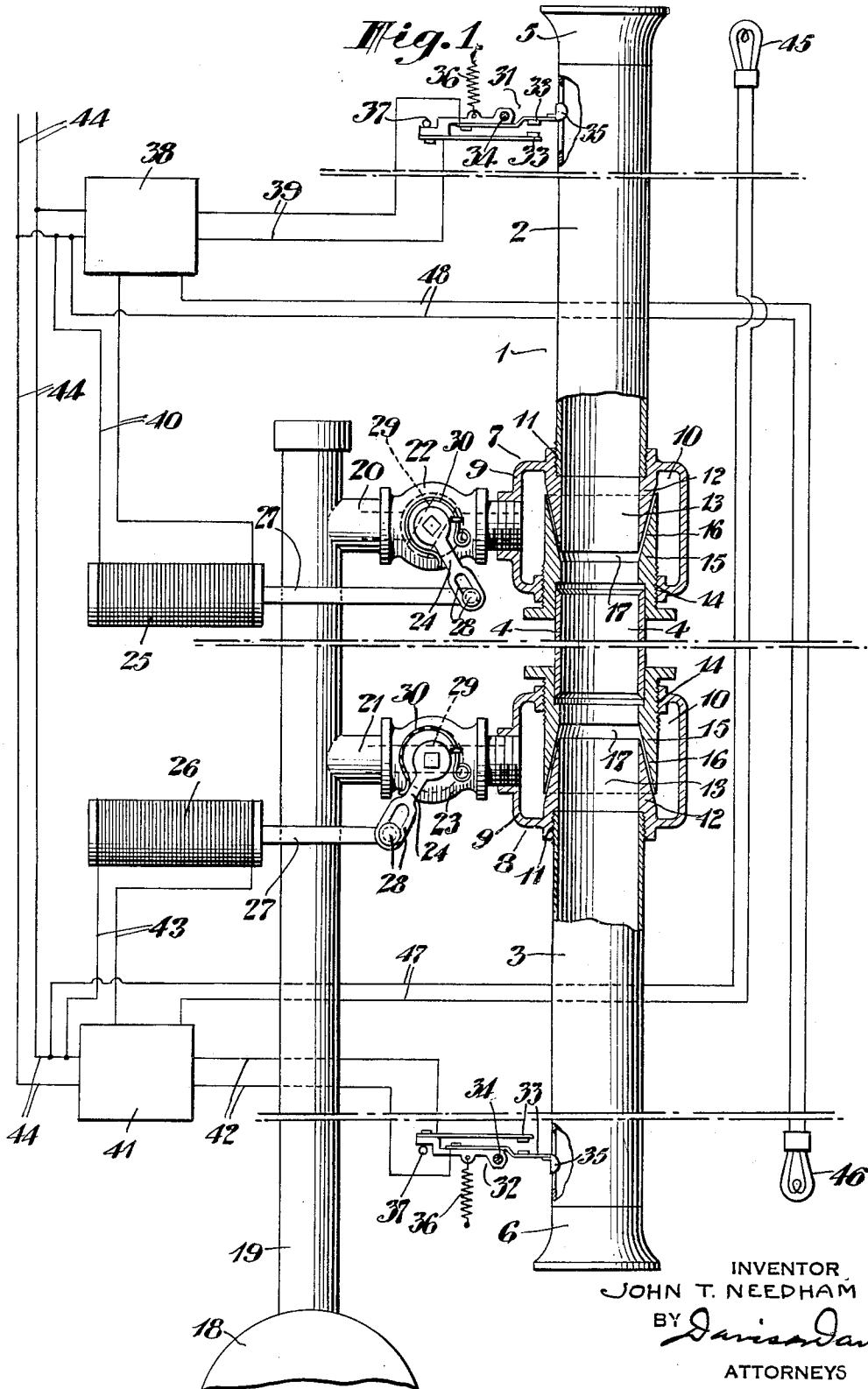
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1,964,167

PNEUMATIC DISPATCH TUBE APPARATUS

Filed Feb. 16, 1931

3 Sheets-Sheet 1



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Fig. 2.

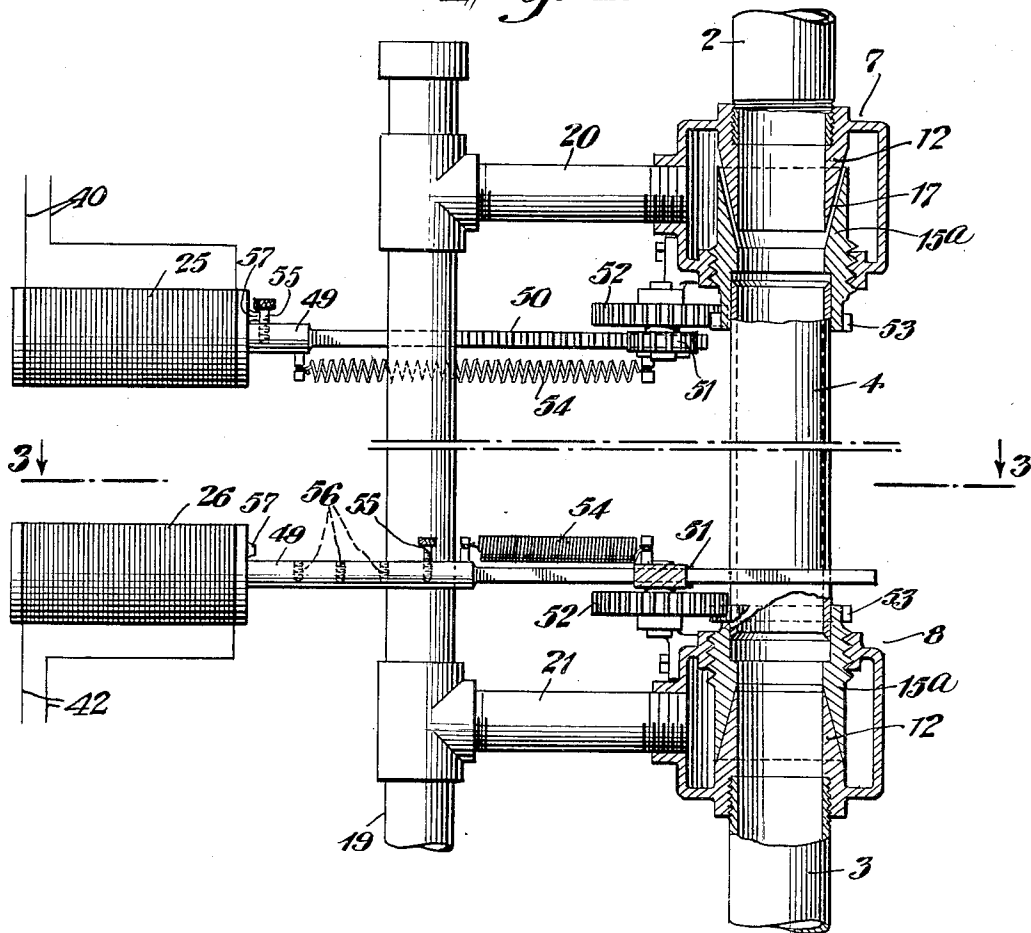
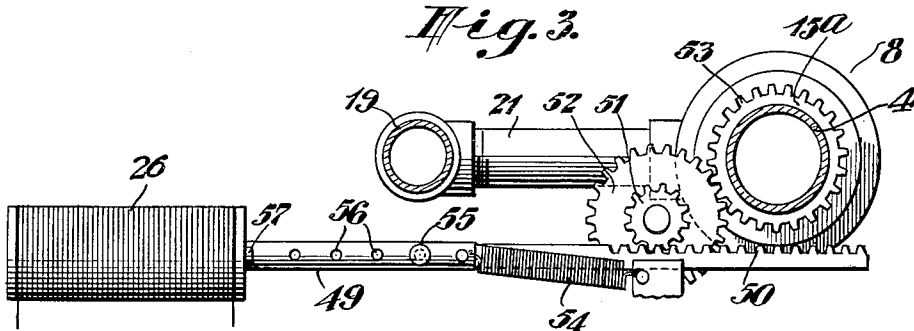


Fig. 3.



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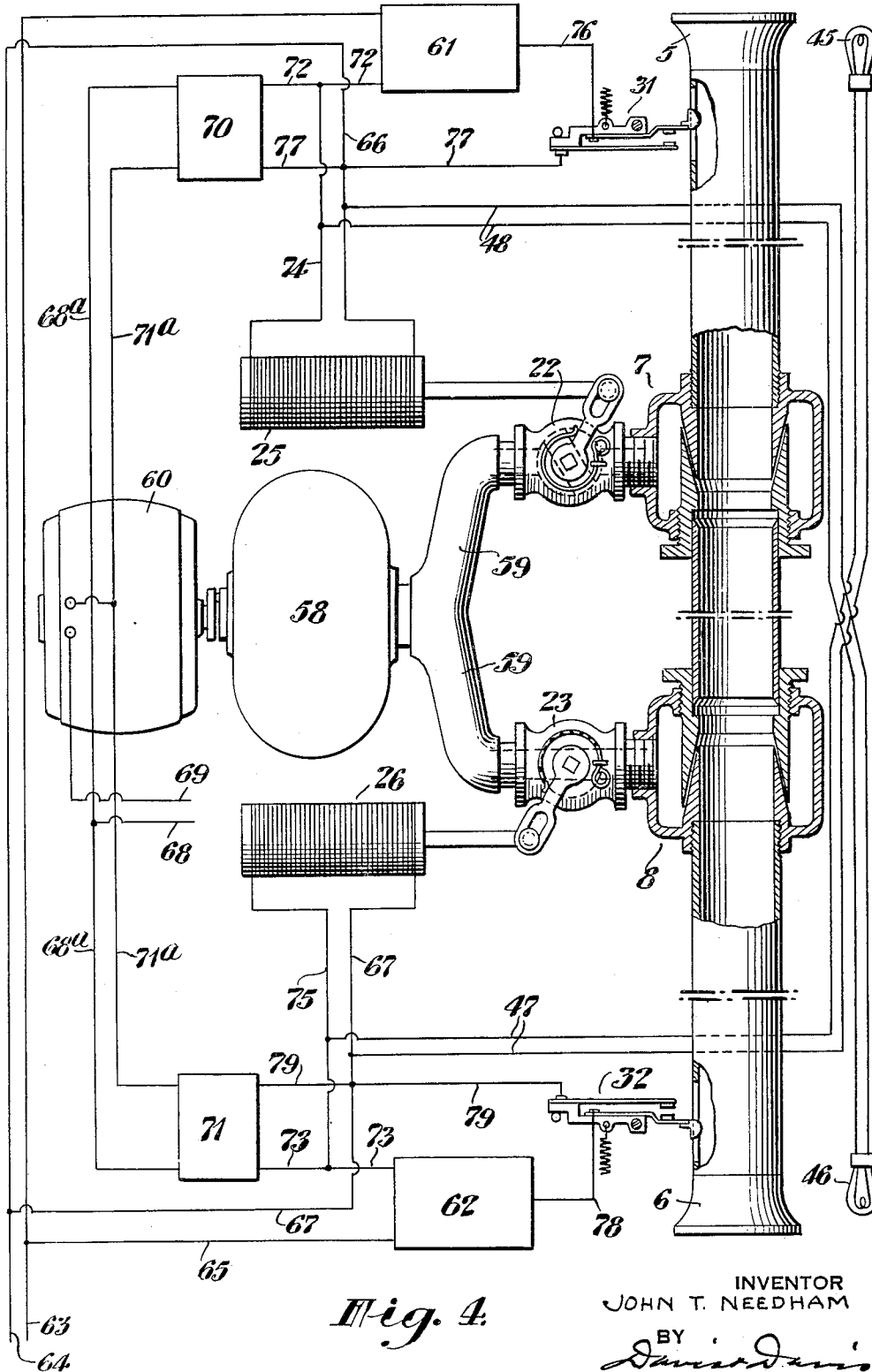


Fig. 4.

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PNEUMATIC DISPATCH TUBE APPARATUS

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Application February 16, 1931, Serial No. 516,040

36 Claims. (Cl. 243—13)

Important objects of the present invention are, to provide an improved pneumatic dispatch tube apparatus wherein a dispatch tube line is provided with simple, efficient means for causing a carrier-propelling flow of air in either direction along the tube line to render the line a two-way dispatch line; to accomplish this purpose by means of oppositely directed injector devices located at intermediate points in the tube line; to provide satisfactory means for selectively operating the injector devices from the terminals of the tube line according to the direction of carrier transmission; and to provide signal means to indicate at either terminal the approach of a carrier from the other terminal. Other objects of the invention will appear hereinafter.

In the drawings, Fig. 1 is an elevation of my dispatch tube apparatus, partly in section;

Fig. 2 a fragmentary sectional elevation of a portion of the apparatus showing a modified means for operating the injector devices;

Fig. 3 a section taken on the line 3—3 of Fig. 2; and

Fig. 4 a view similar to Fig. 1 showing a modified means for supplying air to the injectors.

The apparatus includes a dispatch tube line 1, in the present instance comprising two end tube sections 2 and 3 and an intermediate tube section 4. The outer end of tube section 2 has a bell mouth 5 and forms a constantly open terminal. Similarly the outer end of tube section 3 is provided with a bell mouth 6 and forms a constantly open terminal. Each of these terminals serves as both a sending terminal and a receiving terminal. While in the present instance the terminals are formed by the open tube ends, terminal heads or devices of any suitable form may be employed. An injector device 7 connects together the tube sections 2 and 4 and a similar injector device 8 connects together the sections 3 and 4. These devices are oppositely directed longitudinally of the tube line. They may be located quite close together or spaced far apart along the line, according to the requirements of the service.

Each injector device comprises a box-like casing 9 forming an air chamber 10. One of the connected tube sections is screwed into one wall of said casing, as at 11, and said wall is formed with a conical, nozzle-like projection 12 alining with the connected tube sections and formed with a bore 13 forming part of the carrier passage in the tube line. A threaded aperture 14, alining with nozzle 12, is formed in the opposite wall of the casing and has a threaded sleeve 15 screwed

into it. Said sleeve is formed at its inner end with an annular, conical, internal surface 16 which telescopes over the nozzle 12 and cooperates with the conical surface of the latter to form an annular injector port 17 leading from the chamber 10 obliquely into the tube line. The opposed port-forming surfaces are of material length longitudinally of the tube line, correspondingly tapered, and their taper makes quite a low angle with the tube line in order to give positive longitudinal direction to the air injection. The sleeve receives and rotatably fits an end of one of the connected tube sections and is formed with a bore forming part of the carrier passage. By turning the sleeve the space between the tapering port walls may be varied to change the size of the port and to entirely close the port when required. The port of injector device 7 tapers toward the terminal 6 while the port of device 8 tapers toward the terminal 5.

The injector devices 7 and 8 are supplied with air under pressure from a source indicated at 18, and from said source a pipe 19 leads to points opposite the injector devices. A branch pipe 20 leads from pipe 19 to the chamber 10 of injector device 7 and a branch pipe 21 leads from pipe 19 to the chamber of injector device 8. In the form of the invention shown in Fig. 1 a valve 22 is connected into branch pipe 20 and a valve 23 is connected into branch pipe 21. Fixed to the stem of each valve is a radial operating arm 24. Electrical means including two solenoids 25 and 26 are provided for operating said radial arms and their connected valves. In practice said solenoids will be mounted in any suitable manner in fixed positions. Each solenoid has an elongated core rod 27 which has a pin and slot operative connection 28 with one of the valve-operating arms. When either solenoid is energized by an electric current its rod 27 is drawn inward and the connected valve is rotated to bring its port 29 into position to open communication between the pipe 19 and one of the injector devices. When the current is cut off, a spring 30 operates upon the valve arm 24 to rotate the valve to normal position, closing communication between pipe 19 and the injector device and retracting the core rod of the solenoid.

At the terminals 5 and 6 there are switches 31 and 32 respectively for causing the operation of the solenoids and the operation of signal means, to be described hereinafter. Each switch comprises a pair of normally separated spring contact fingers 33 and is pivoted as at 34 to swing bodily. One of the spring fingers carries a cam-like in-

sulation projection 35 which extends inward through an aperture in the dispatch tube and slightly into the carrier path. A spring 36 yieldably holds the switch in normal position with a tail portion thereof in contact with a stop 37. When a carrier is inserted into the terminal it strikes the projection 35 and flexes the finger which carries the projection to close the switch. A carrier approaching the terminal for discharge from the tube, however engages said projection and merely rocks the switch out of the way against the spring resistance without closing the switch. When the switch is released the spring returns it to normal position. A timer, indicated at 38, has a circuit 39 controlled by switch 31. This timer controls a circuit 40 for the solenoid 25. Another timer 41 has a circuit 42 controlled by switch 32 and in turn controls a circuit 43 for the solenoid 26. Line wires 44 lead to both timers.

Signal means are provided to indicate to an operator at either end of the dispatch line that a carrier has been inserted into the opposite end of the line and thereby warn the operator against the insertion of a carrier. Said signal means includes an electric lamp 45 located near the terminal 5 and an electric lamp 46 located near the terminal 6. The timer 41 controls a circuit 47 for the lamp 45 and the timer 38 controls a circuit 48 for the lamp 46.

The apparatus operates as follows: When a carrier is inserted into the terminal 5, for example, the switch 31 is closed by the carrier and the timer 38 set into operation. In turn, said timer closes the circuit of solenoid 25 and the latter, through its operative connection with valve 22, effects the opening of the valve. Thereby air is admitted from pipe 19 through branch pipe 20 to the chamber 10 of the injector device 7 and is injected into the tube line toward the terminal 6 with considerable force and speed through the annular, restricted injector port 17. The injection of air into the tube line at an intermediate point between terminals 5 and 6 and away from the former causes a suction in the tube section 2. Thereby the inserted carrier is drawn rapidly inward along the line from terminal 5 until it passes the injector port 17 of the injector device 7 whereupon it is subjected to the thrust of the injected air and is propelled rapidly along the tube line to the terminal 6 the switch 32 being rocked out of the way by the carrier.

When a carrier is inserted into the terminal 6 it closes the switch 32 and the timer 41 is set into operation. Said timer in turn closes the circuit of solenoid 26 and the latter through its operative connection with valve 23 effects the opening of said valve. Air is thereby admitted from pipe 19 through branch pipe 21 to the injector device 8 for the propulsion of the carrier to the terminal 5 by suction inward from terminal 6 and by the thrust of the injected air as previously described. Each timer keeps the valve controlled thereby open for the required time and then the spring 30 closes the valve to cut off the injection.

Operation of timer 38 by insertion of a carrier into terminal 5 causes illumination of the lamp 46 at terminal 6 and signals the approach of a carrier toward the latter terminal so that an operator is warned against the insertion of a carrier into terminal 6. Similarly, operation of timer 41 by insertion of a carrier into terminal 6 causes illumination of lamp 45 to indicate the approach of the inserted carrier toward terminal 5. Each timer keeps the signal lamp controlled

thereby illuminated for the required length of time and then breaks the lamp circuit.

In Figs. 2 and 3 is shown a modified means for operating the injector devices 7 and 8. Here the air valves are omitted and the injection is controlled by opening and closing the injector ports 17. This is accomplished by rack and gear trains which operatively connect the solenoids 25 and 26 to the injector sleeves 15^a for rotating the latter. Each solenoid has a core rod 49 provided with a rack 50. Said rack meshes with a pinion 51 which is fixed to a gear 52 for rotating with it. The gear 52 meshes with gear teeth 53 formed upon the outwardly projecting end of the threaded injector sleeve 15^a. The solenoids are controlled by the switches and timers as previously described and when a solenoid is energized it draws the rod 49 inward and the rod through its gearing with the injector sleeve 15 rotates the latter to open the injector port 17. Connected to the rod 49 and to a fixed point upon the rack mounting is a spring 54 which resists by tension the shifting of the rod by the solenoid. Consequently when the timer controlling the solenoid breaks the circuit thereof the spring automatically retracts the rod and causes the rotation of the injector sleeve for closing the port 17.

The degree to which the injector port of either injector device is opened by its solenoid is adjustable by means including a threaded stop 55. Said stop is engageable in any one of a number of threaded apertures 56 longitudinally spaced along the case rod 49 of the solenoid and is adapted to engage a fixed stop 57 upon the end of the solenoid. Thereby the port-opening movement of rod 49 is limited according to the position of the stop screw 55.

Fig. 4 shows a dispatch tube apparatus similar to that of Fig. 1 provided with a motor driven compressor for supplying the injector devices with air, together with electrical means for starting said compressor from either terminal of the dispatch tube and causing the air to be directed from the compressor to the appropriate injector device. The outlet of the compressor 58, is connected with the injector valves 22 and 23 by two branch pipes 59, and the compressor is driven by an electric motor 60. There are two timers 61 and 62 operable by the terminal switches 31 and 32 respectively. Each of said timers serves to start and control the motor, while timer 61 independently controls the valve-operating solenoid 25 and timer 62 independently controls the solenoid 26.

For supplying the timers with current there are two line wires 63 and 64. Wire 63 leads to timer 61, and is also connected to timer 62 through a conductor 65. A conductor 66 leads from wire 64 to the solenoid 25 and another conductor 67 leads from said wire to solenoid 26. For supplying current to the motor there are two line wires 68 and 69. Wire 68 is connected to a conductor 68^a leading to two motor starters 70 and 71 and wire 69 is directly connected to one terminal of the motor. Another conductor 71^a connects both motor starters and is directly connected to the other terminal of the motor. A conductor 72 connects the timer 61 to motor starter 70 and a conductor 73 connects timer 62 to motor starter 71. The solenoid 25 is connected to conductor 72 by a conductor 74 and a conductor 75 connects solenoid 26 to conductor 73. Switch 31 is connected by a conductor 76 to the timer 61 and by a conductor 77 to the motor starter 70 and the conductor 66. Similarly switch 32 is connected by a conductor 78 to the timer 62 and by a con-

ductor 79 to the motor starter 71 and the solenoid conductor 67. The conductors 47 for signal lamp 45 lead from the solenoid conductors 67 and 75 while the conductors 48 for signal lamp 46 lead from the solenoid conductors 66 and 74.

Insertion of a carrier into terminal 5 closes switch 31 and closes the timer circuit which includes the line wires 63 and 64 and conductors 66, 77 and 76 for the operation of the timer 61. Said timer closes the circuit of motor starter 70 which includes conductors 72, 66 and 77, and the motor circuit is closed by the starter to start the motor and drive the compressor. The timer also closes the circuit of the solenoid 25, which circuit includes the conductors 66, 72 and 74, and the solenoid opens valve 22. Thereby, air from the compressor is admitted to the injector device 7 for the propulsion of the inserted carrier to the terminal 6. Closure of the solenoid circuit also closes the circuit of signal lamp 46 which is illuminated to indicate the approach of the carrier to terminal 6.

Insertion of a carrier into terminal 6 closes switch 32 and closes the circuit of timer 62 which circuit includes the line wires 63 and 64 and conductors 65, 67, 79 and 78. The timer then operates the motor starter 71 through the circuit of the latter which includes the conductors 67, 79 and 73, and the motor starter closes the motor circuit to start the motor and drive the compressor. Timer 62 also closes the circuit of solenoid 26 which circuit includes the conductors 73, 75 and 67. The solenoid then opens valve 23, valve 22 having been previously closed by its spring, and air from the compressor is admitted to injector 8 for the propulsion of the inserted carrier to terminal 5. Closure of the solenoid circuit also closes the circuit of lamp 46 to indicate the approach of the carrier to terminal 5. When either of the switches 31 and 32 is operated the other is open so that only one of the timers and one of the solenoids is operated at a time. The closure of either switch, however, causes the motor to operate.

What I claim is:

1. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device to inject air into said line and cause a flow of air for the propulsion of a carrier in one direction along the line; an oppositely directed injector device to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; and means to render said injector devices operative independently.

2. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device for injecting air into the tube line at an intermediate point in the line and causing a flow of air for the propulsion of a carrier in one direction; and an oppositely directed injector device for injecting air into the tube line at an intermediate point in the line and causing a flow of air for the propulsion of a carrier in the opposite direction along the line.

3. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device to inject air into said line and cause a flow of air for the propulsion of a carrier in one direction along the line; and an oppositely directed injector device to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line.

4. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device for injecting air into the tube line at an inter-

mediate point in the line and causing a flow of air for the propulsion of a carrier in one direction; an oppositely directed injector device for injecting air into the tube line at an intermediate point in the line and causing a flow of air for the propulsion of a carrier in the opposite direction along the line; and means to render said injector devices operative independently.

5. A pneumatic dispatch tube apparatus comprising a dispatch tube line provided with longitudinally spaced terminals each serving for sending and discharging carriers; an injector device for injecting air into said tube at an intermediate point in the line and causing a flow of air for the propulsion of a carrier along the line in one direction; an oppositely directed injector device for injecting air into the tube line at an intermediate point in the line for the propulsion of a carrier in the opposite direction; means for supplying air under pressure to said injector devices; means to admit the air under pressure to said devices independently; and electric signal means to indicate at either terminal the approach of a carrier from the opposite terminal.

6. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device to inject air into said line and cause a flow of air for the propulsion of a carrier in one direction along the line; an oppositely directed injector device to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; and adjustable means for varying the injection of air by said devices.

7. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device to inject air into said line and cause a flow of air for the propulsion of a carrier in one direction along the line; an oppositely directed injector device to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; and adjustable means for varying the injection by said devices independently.

8. A pneumatic dispatch tube apparatus comprising a dispatch tube line; an injector device to inject air into said line and cause a flow of air for the propulsion of a carrier in one direction along the line; an oppositely directed injector device to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; and means for cutting either of said injector devices out of service.

9. A pneumatic dispatch tube apparatus comprising a dispatch tube line open at longitudinally spaced points for admission and discharge of air; an injector device to inject air into the said line at an intermediate point between said admission and discharge points in the line and cause a flow of air for the propulsion of a carrier along the line in one direction; and an injector device to inject air into the tube line at an intermediate point in the line between said admission and discharge points and cause a flow of air for the propulsion of a carrier in the opposite direction along the line.

10. A pneumatic dispatch tube apparatus comprising a dispatch tube line open at both ends for ingress and egress of air; an injector device to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier along the line in one direction; an injector device to inject air into the tube line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; and means

to render said injector devices operative independently.

11. A pneumatic dispatch tube apparatus comprising a dispatch tube line provided with longitudinally spaced terminals each serving for sending and discharging carriers; an injector device having an injector port to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in one direction along the line; an injector device having an oppositely directed injector port to inject air into the line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; electrical means operable by the insertion of a carrier into either terminal to render the appropriate injector device operative for the propulsion of a carrier to the other terminal; timing means to control the duration of operation of either injector device; means to automatically render either injector device inoperative subject to the timing means; and electric signal means operable by the insertion of a carrier into either terminal to indicate said insertion at the opposite terminal.

12. A pneumatic dispatch tube apparatus comprising a dispatch tube line provided with terminals at longitudinally spaced stations serving for sending and discharging carriers; an injector device to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in one direction along the line; an injector device to inject air into the line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; and electrical means operable at either station to render the appropriate injector device operative for the propulsion of a carrier to the other station.

13. A pneumatic dispatch tube apparatus comprising a dispatch tube line connecting longitudinally spaced carrier sending and discharging stations; an injector device having an injector port disposed and directed to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in one direction along the line; means for opening and closing said port; an injector device having an oppositely directed injector port to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; means for opening and closing the latter port; and means operable at either station to open the appropriate injector port for the propulsion of a carrier to the other station.

14. A pneumatic dispatch tube apparatus comprising a dispatch tube line connecting longitudinally spaced carrier sending and discharging stations; an injector device having an injector port disposed and directed to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in one direction along the line; means for opening and closing said port; an injector device having an oppositely directed injector port to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; means for opening and closing the latter port; means operable at either station to open the appropriate injector port for the propulsion of a carrier to the other station; and means to automatically close the opened port after a predetermined time.

15. A pneumatic dispatch tube apparatus comprising a dispatch tube line connecting longitudinally spaced carrier sending and discharging sta-

tions; an injector device having an injector port disposed and directed to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in one direction along the line; means for opening and closing said port; an injector device having an oppositely directed injector port to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; means for opening and closing the latter port; and electrical means operable at either station to open the appropriate injector port for the propulsion of a carrier to the other station.

16. A pneumatic dispatch tube apparatus comprising a dispatch tube line connecting longitudinally spaced carrier sending and discharging stations; an injector device having an injector port disposed and directed to inject air into said line at an intermediate point in the line and cause a flow of air for the propulsion of a carrier in one direction along the line; means for opening and closing said port; an injector device having an oppositely directed injector port to inject air into the line and cause a flow of air for the propulsion of a carrier in the opposite direction along the line; means for opening and closing the latter port; means operable at either station to open the appropriate injector port for the propulsion of a carrier to the other station; and adjustable means to vary the degree to which the injector ports are opened.

17. A pneumatic dispatch tube apparatus comprising a dispatch tube line connecting longitudinally spaced carrier sending and receiving stations; an injector device to inject air into said tube line at an intermediate point between said stations to cause a flow of air through said tube line for the propulsion of a carrier in one direction along the line; an injector device to inject air into the tube line at an intermediate point between said stations to cause a flow of air through the tube line for the propulsion of a carrier in the opposite direction along the line; and means operable by the insertion of a carrier into the line at either station to render the appropriate injector device operative.

18. A pneumatic dispatch tube apparatus comprising a dispatch tube line provided with longitudinally spaced terminals each serving for sending and discharging carriers; an injector device for injecting air into said tube line at an intermediate point in the line and causing a flow of air for the propulsion of a carrier along the line in one direction; an oppositely directed injector device for injecting air into the tube line at an intermediate point in the line for the propulsion of a carrier in the opposite direction; an air compressor having fluid connections with said injectors; and means operable from either terminal to start the compressor and direct air therefrom to the appropriate injector device for the propulsion of a carrier toward the other terminal.

19. A pneumatic dispatch tube apparatus comprising a dispatch tube line provided with longitudinally spaced terminals each serving for sending and discharging carriers; an injector device for injecting air into said tube line at an intermediate point in the line and causing a flow of air for the propulsion of a carrier along the line in one direction; an oppositely directed injector device for injecting air into the tube line at an intermediate point in the line for the propulsion of a carrier in the opposite direction; an air compressor having fluid connections with said injectors; a motor for driving said compressor; elec-

trical means operable from one of the tube terminals to start the motor and compressor and direct air from the compressor to the appropriate injector device; electrical means operable from the other terminal to start the motor and compressor and direct air from the compressor to the other injector device; and timing means to control the duration of the motor operation.

20. A pneumatic dispatch tube apparatus comprising a dispatch tube line having terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of the terminals for carrier propulsion thereto; valve means to control the introduction of air at said intermediate point; means operable at the other of said terminals for controlling said valve means; means to automatically hold said valve open for a predetermined period; and spring means to automatically close said valve at the conclusion of said period.

21. A pneumatic dispatch tube apparatus comprising a dispatch tube line having terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of the terminals for carrier propulsion thereto; valve means to control the introduction of air at said intermediate point; means operable at the other of said terminals for controlling said valve means; electrical timing means to hold said valve open for a predetermined period; and spring means to automatically close said valve at the conclusion of said period.

22. A pneumatic dispatch tube apparatus comprising a dispatch tube line having terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point in the line between said terminals and directing it toward one of the terminals for carrier propulsion thereto; and means operable at the other terminal to control the admission of air to the line at said intermediate point.

23. A pneumatic dispatch tube apparatus comprising a dispatch tube line having terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of the terminals for carrier propulsion thereto; valve means to control the introduction of air at said intermediate point; and means operable at the other of said terminals for controlling said valve means.

24. A pneumatic dispatch tube apparatus comprising a dispatch tube line having sending and discharge terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of said terminals for carrier propulsion thereto; means for introducing carrier-propelling air at an intermediate point in the line between said terminals and directing it toward the other of said terminals for carrier propulsion thereto; and means operable at either terminal to render the appropriate one of said air introduction means operative for the propulsion of a carrier to the other terminal.

25. A pneumatic dispatch tube apparatus comprising a dispatch tube line having sending and discharge terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of said terminals for carrier propulsion thereto; means for introducing carrier-propelling air at an interme-

diate point in the line between said terminals and directing it toward the other of said terminals for carrier propulsion thereto; means operable at either terminal to render the appropriate one of said air introduction means operative for the propulsion of a carrier to the other terminal; and means to automatically render either of said air introduction means inoperative when the other is operative.

26. A pneumatic dispatch tube apparatus comprising a dispatch tube line having sending and discharge terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of said terminals for carrier propulsion thereto; means for introducing carrier-propelling air at an intermediate point in the line between said terminals and directing it toward the other terminal for carrier propulsion thereto; means operable at either terminal to render the appropriate one of said air introduction means operative for the propulsion of a carrier to the other terminal; and adjustable means to vary the degree of air introduction.

27. A pneumatic dispatch tube apparatus comprising a dispatch tube line having sending and discharge terminals spaced therealong; means for introducing carrier-propelling air into said line at an intermediate point between said terminals and directing it toward one of said terminals for carrier propulsion thereto; means for introducing carrier-propelling air at an intermediate point in the line between said terminals and directing it toward the other of said terminals for carrier propulsion thereto; means operable at either terminal to render the appropriate one of said air introduction means operative for the propulsion of a carrier to the other terminal; and adjustable means to vary the degree of air introduction by said two introducing means independently.

28. A pneumatic dispatch tube apparatus comprising a dispatch tube line having carrier sending and discharge terminals spaced therealong; an injector device to inject air into said line for propulsion of a carrier toward one of said terminals and including opposed members defining an annular injector port therebetween surrounding the carrier passage of the tube and opening into it, one of said members being mounted to shift toward and from the other member to open and close the port; and means operable at the sending terminal to open the port.

29. A pneumatic dispatch tube apparatus comprising a dispatch tube line having carrier sending and discharge terminals spaced therealong; an injector device to inject air into said line for propulsion of a carrier toward one of said terminals and including opposed members defining an annular injector port therebetween surrounding the carrier passage of the tube and opening into it, one of said members being mounted to shift toward and from the other member to open and close the port; means operable at the sending terminal to open the port; and means to automatically close the port.

30. A pneumatic dispatch tube apparatus comprising a dispatch tube line having carrier sending and discharge terminals spaced therealong; an injector device to inject air into said line for propulsion of a carrier toward one of said terminals and including opposed members defining an annular injector port therebetween surrounding the carrier passage of the tube and opening

into it, one of said members being mounted to shift toward and from the other member to open and close the port; means operable at the sending terminal to open the port; means to automatically maintain the port open for a predetermined period required for the carrier propulsion; and means to automatically close the port at the conclusion of said period.

31. A pneumatic dispatch tube apparatus comprising a dispatch tube line having carrier sending and discharge terminals spaced therealong; an injector device to inject air into said line at an intermediate point between the terminals for propulsion of a carrier toward one of said terminals and including opposed members defining an annular injector port therebetween surrounding the carrier passage of the line and opening into it, one of said port-forming members being rotatable relatively to the other member, and screw means for shifting said rotatable member toward and from the other member as it is rotated in opposite directions, to open and close the port; and means operable at the sending terminal to cause the rotation of the rotatable port-forming member to open the port.

32. A pneumatic dispatch tube apparatus comprising a dispatch tube line having carrier sending and discharge terminals spaced therealong; an injector device to inject air into said line at an intermediate point between the terminals for propulsion of a carrier toward one of said terminals and including opposed members defining an annular injector port therebetween surrounding the carrier passage of the line and opening into it, one of said port-forming members being rotatable relatively to the other member, and screw means for shifting said rotatable member toward and from the other member as it is rotated in opposite directions, to open and close the port; means operable at the sending terminal to cause the rotation of the rotatable port-forming member to open the port; and adjustable means to vary the limit of port-opening rotation of said rotatable member.

33. A pneumatic dispatch tube apparatus comprising a dispatch tube line having longitudinally spaced terminals each serving for sending and discharging carriers; a pair of oppositely directed injector devices at intermediate points in said line between said terminals to inject air into the line for carrier propulsion in opposite directions along the line, and each comprising opposed members defining an annular injector port therebetween surrounding the carrier passage in the line and opening into it, one of said members being rotatable relatively to the other member, and screw means for shifting said rotatable port-forming member toward and from the other port-forming member as the rotatable member is ro-

tated in opposite directions to open and close the port; and means operable at either terminal to cause the rotation of the rotatable port-forming member of the appropriate injector device for propulsion of a carrier toward the other terminal.

34. A pneumatic dispatch tube apparatus comprising a dispatch tube line having longitudinally spaced terminals each serving for sending and discharging carriers; a pair of oppositely directed air injector devices at intermediate points in said line between said terminals to inject air into the line for carrier propulsion in opposite directions along the line, and each comprising opposed members defining an annular injector port therebetween surrounding the carrier passage in the line and opening into it, one of said members being rotatable relatively to the other member, and screw means for shifting said rotatable port-forming member toward and from the other port-forming member as the rotatable member is rotated in opposite directions to open and close the port; means operable at either terminal to cause the rotation of the rotatable port-forming member of the appropriate injector device for propulsion of a carrier toward the other terminal; and adjustable means to vary the limit of port-opening rotation of said rotatable members of the two injector devices independently.

35. A pneumatic dispatch tube apparatus comprising a dispatch tube line having sending and receiving stations spaced therealong; an injector device at an intermediate point on the line between said stations and directed along the line toward one station; an injector device at an intermediate point on the line and directed along the line toward the other station; and means operable at each of said stations to render the appropriate injector device operative for propulsion of a carrier along the line by injection of air into the line toward the receiving station and by suction away from the sending station.

36. A pneumatic dispatch tube apparatus comprising a dispatch tube line having sending and receiving stations spaced therealong; injector means having a restricted injector port at an intermediate point in the line between said stations and directed into and along the line toward one station; injector means having a restricted injector port at an intermediate point in the line and directed into and along the line toward the other station; and means operable at each of said stations to render the appropriate injection means operative for propulsion of a carrier along the line by injection of air into the line toward the receiving station and by suction away from the sending station.

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