Aug. 16, 1932. C. S. JENNINGS ET AL 1,871,995

CARRIER DISPATCH SYSTEM

Filed March 4, 1930 6 Sheets-Sheet 1

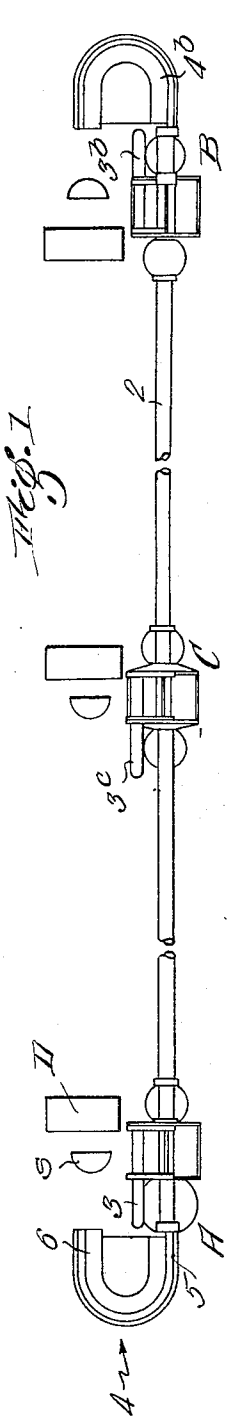


Fig. 1

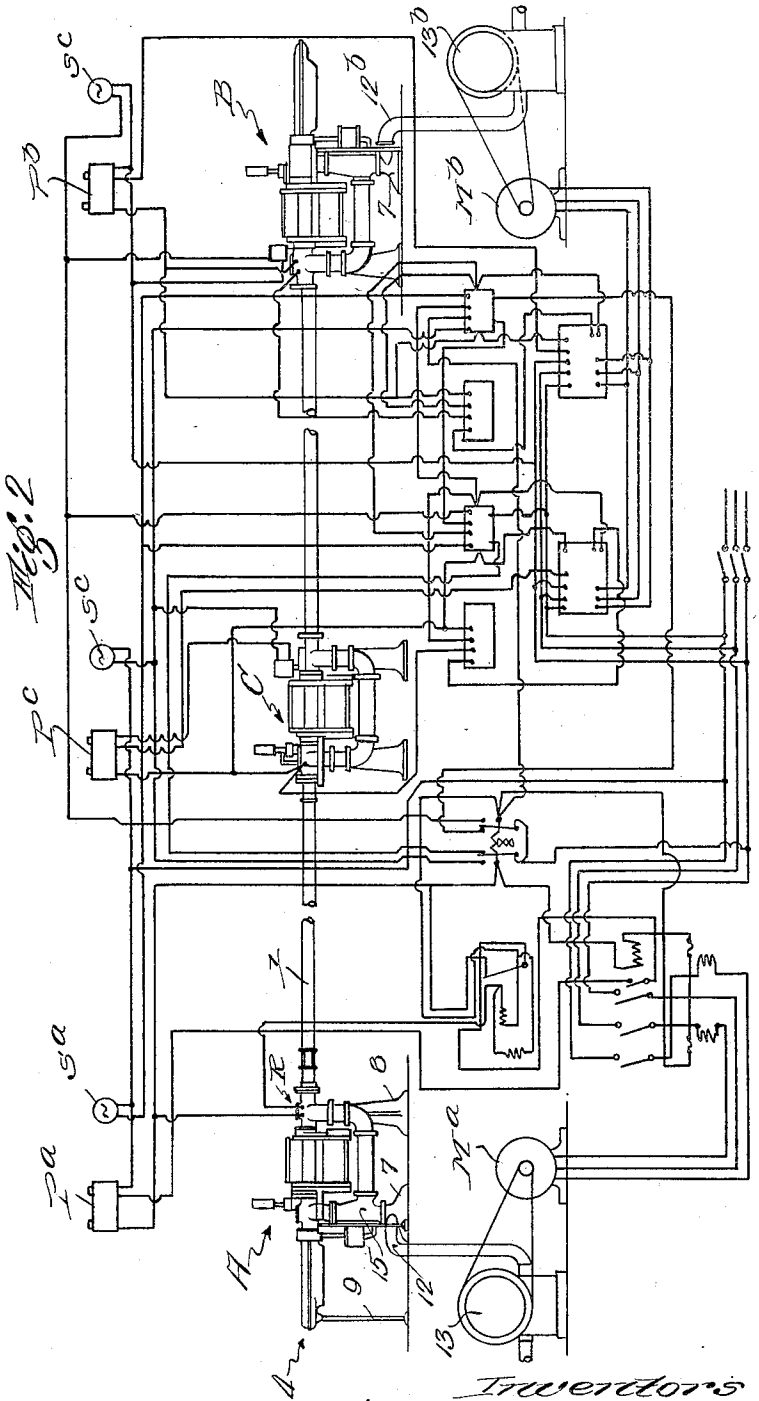


Fig. 2

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CARRIER DISPATCH SYSTEM

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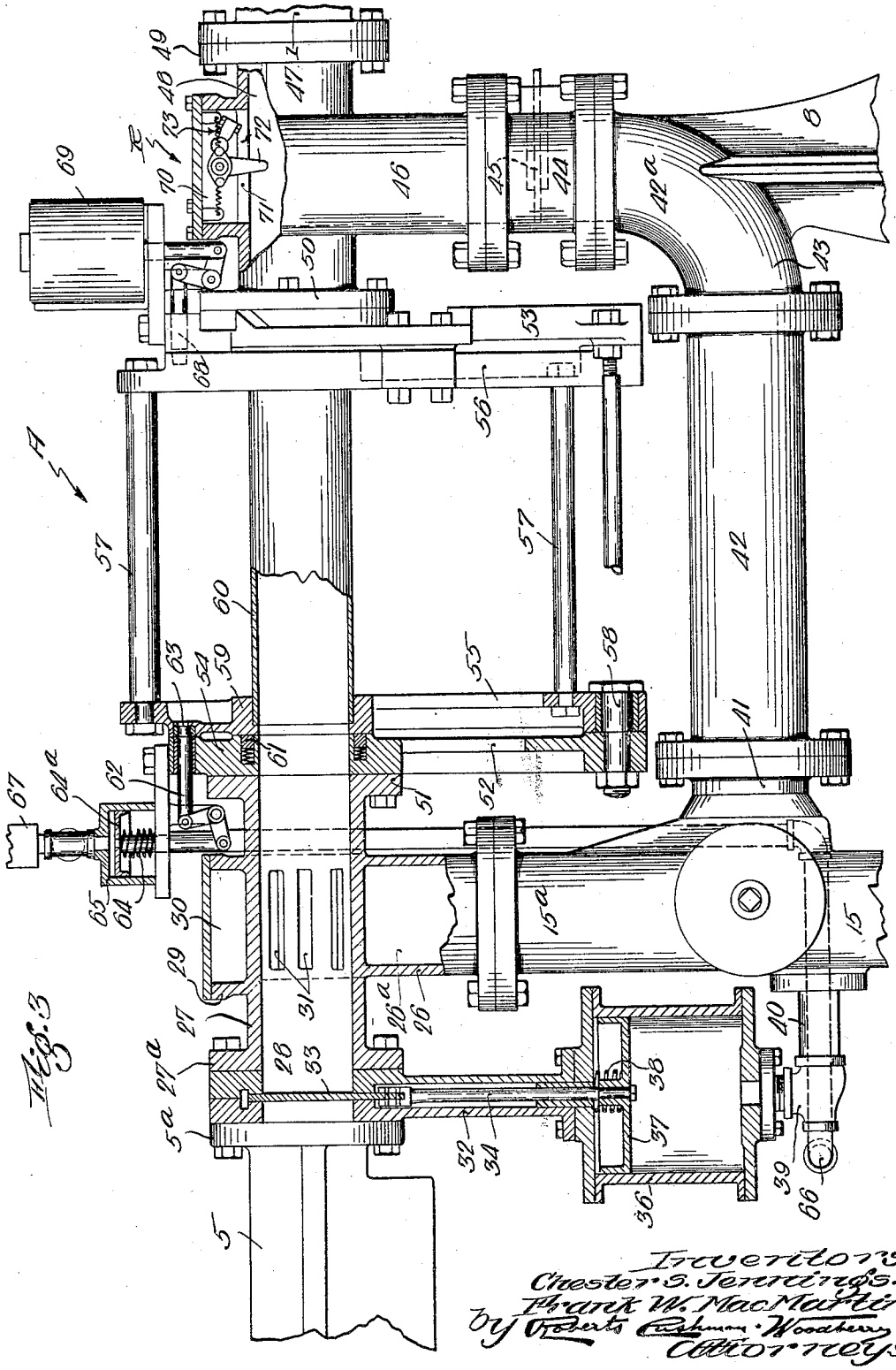


Fig. 3

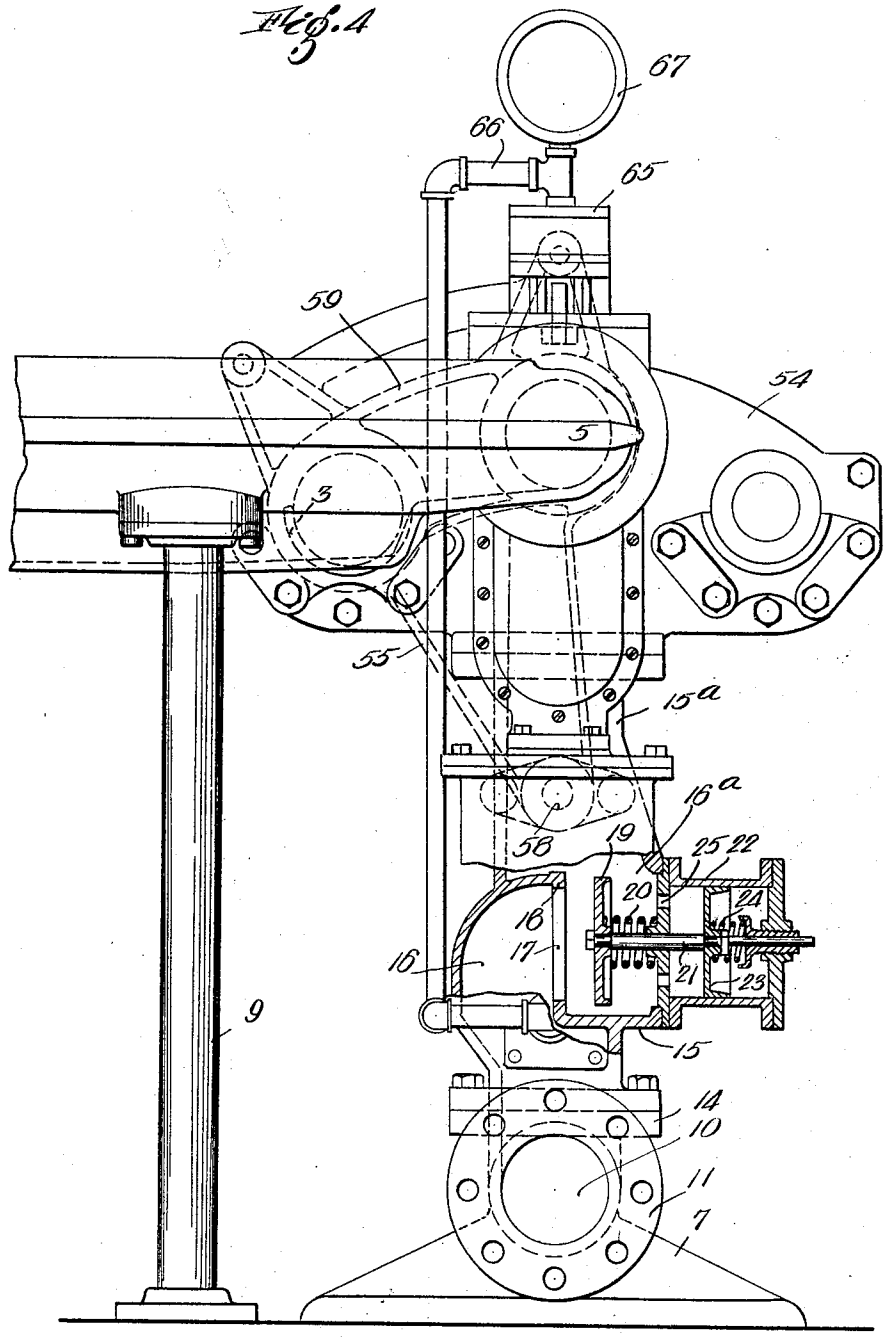
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CARRIER DISPATCH SYSTEM

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Fig. 4



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CARRIER DISPATCH SYSTEM

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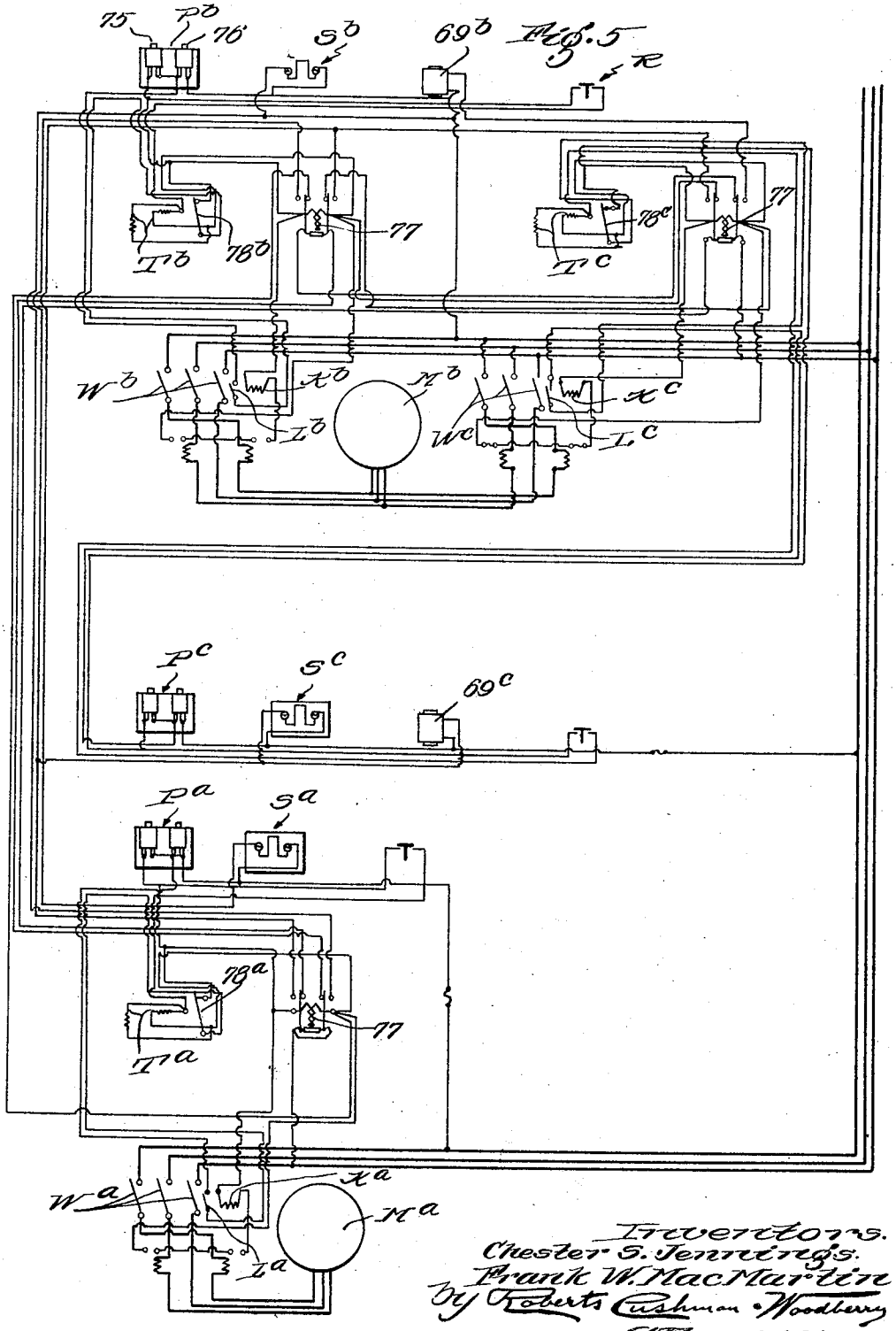


Fig. 5

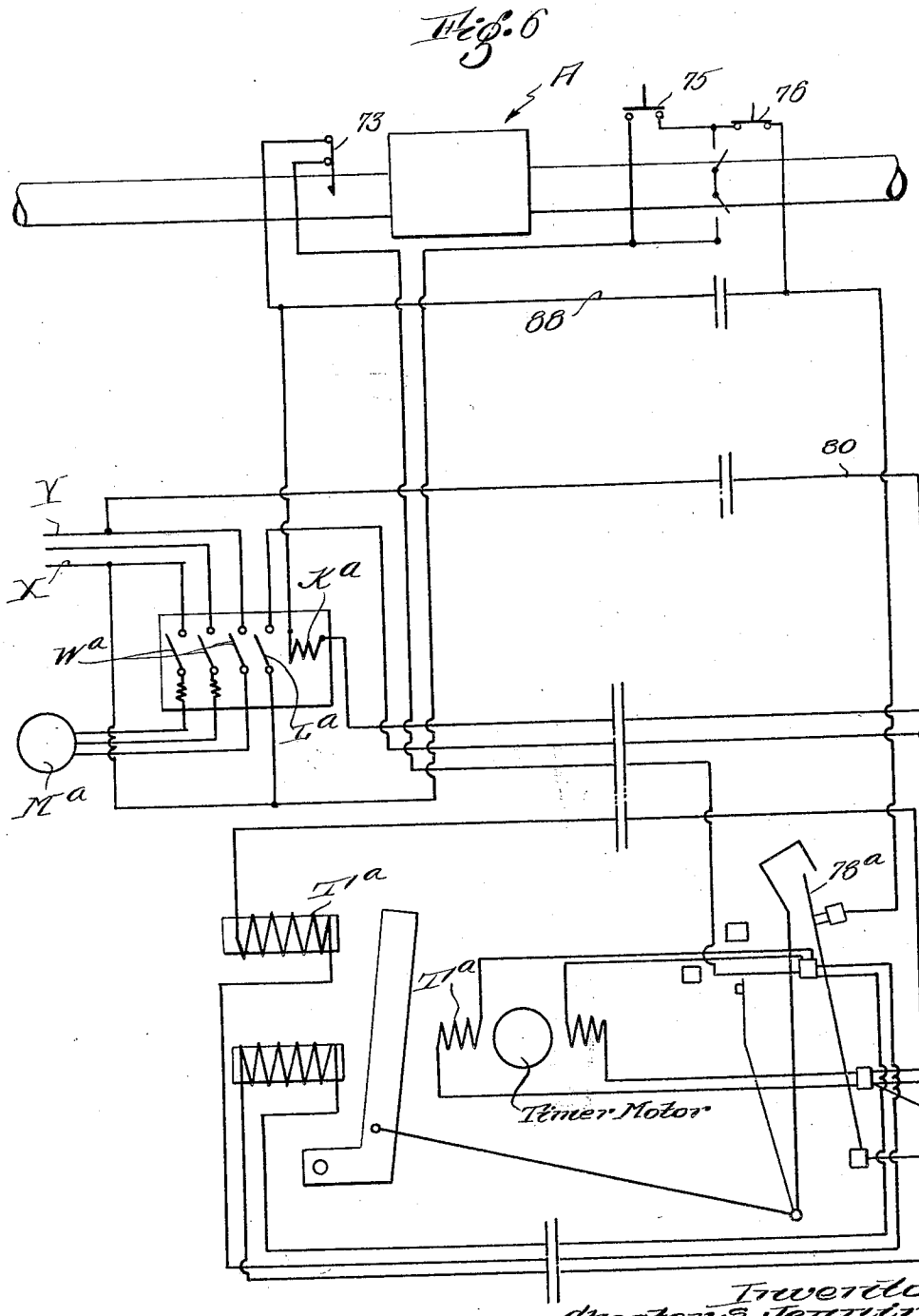
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CARRIER DISPATCH SYSTEM

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Fig. 6



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CARRIER DISPATCH SYSTEM

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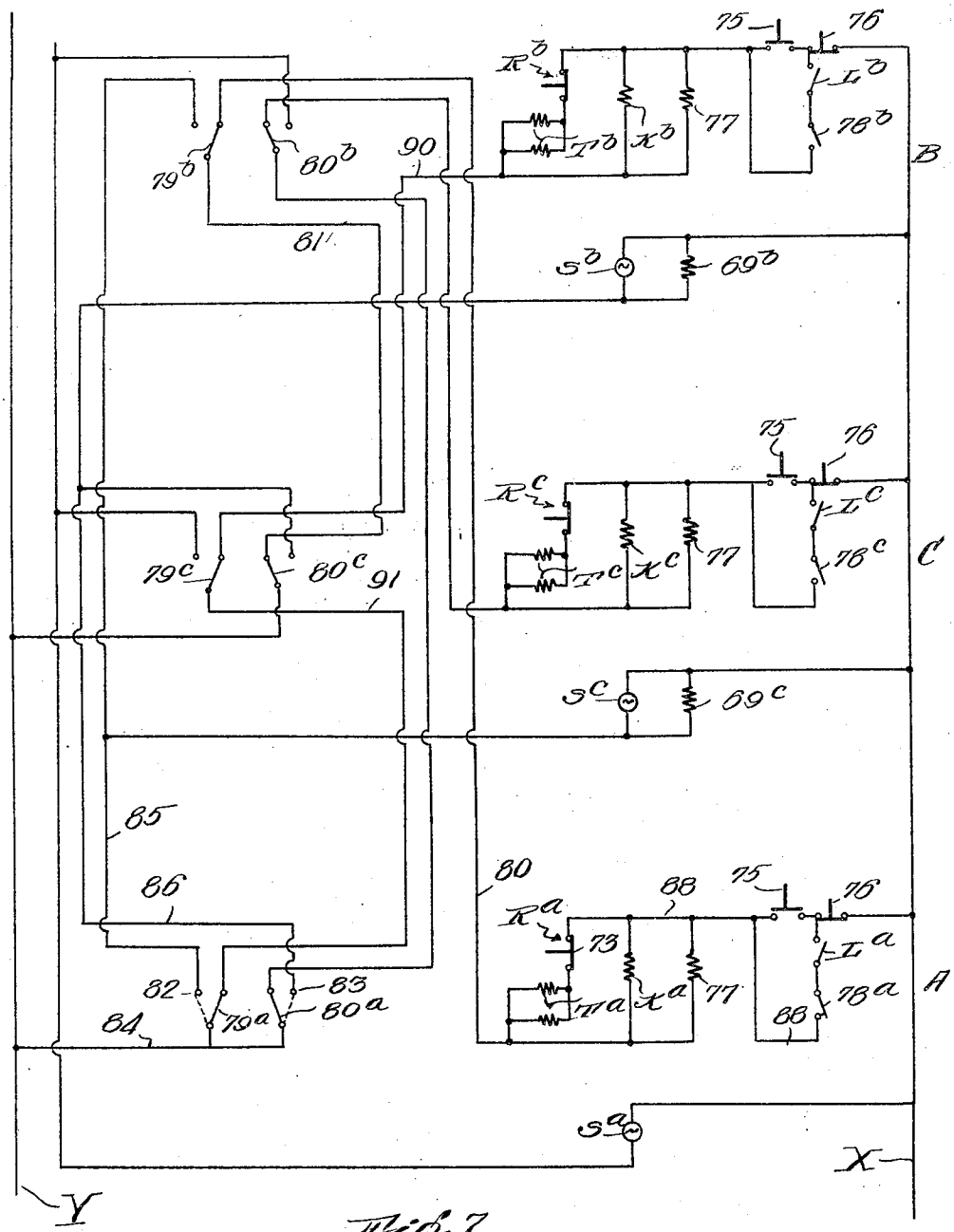


Fig. 7

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UNITED STATES PATENT OFFICE

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CARRIER DISPATCH SYSTEM

Application filed March 4, 1930. Serial No. 433,048.

This invention pertains to carrier despatch systems and in its broader aspects is of utility in systems of any usual type irrespective of the means employed for transmitting the carriers from point to point, although it is particularly valuable in connection with single tube pneumatic systems wherein carriers are caused to move alternatively in opposite directions through the same tube. As here illustrated the invention is shown as embodied in a single tube system of the pressure type, and in its more specific features the invention finds especial value in a system in which three or more stations are arranged along the same carrier way (for example a pneumatic tube) and wherein it is essential to avoid interference between carriers despatched in opposite directions. To this end the invention provides an interlocking control of the despatching means at the several stations; means for timing the operation of the carrier-impelling means so that it shall not cease operation until the last carrier despatched from a given station has been delivered; and improvements in the structural characteristics of the sending and receiving terminals.

While we have here chosen to illustrate the invention as embodied in a pressure system having but a single intermediate station, it is to be understood that in its broader aspects the invention may be found useful in systems of other types and whether or not provided with more than two stations, the arrangement shown in the accompanying drawings being by way of example and without intent to limit the scope of the invention thereby.

In the drawings,

Fig. 1 is a fragmentary (more or less diagrammatic) plan view illustrating a single tube pneumatic system having terminal stations and a single intermediate station;

Fig. 2 is a side elevation of the apparatus of Fig. 1, together with a diagrammatic representation of interlocking control means and electrical connections therefor;

Fig. 3 is a side elevation, to larger scale and partly in vertical section, illustrating a desirable construction for a despatching and receiving terminal;

Fig. 4 is an end elevation, partly in vertical section, of the apparatus of Fig. 3;

Fig. 5 is a wiring diagram, employing conventional means of illustration, showing the complete arrangement of the interlocking control circuits;

Fig. 6 is a wiring diagram to larger scale, showing in detail certain desirable connections for a timing apparatus; and

Fig. 7 is a wiring diagram of skeleton form showing the essential circuits of the interlocking control.

Referring first to Figs. 1 to 4, the system herein used for illustrative purposes is shown as having a carrier way comprising the two pneumatic tubes 1 and 2 disposed in alignment and in effect constituting a single continuous tube. This carrier way, comprising the aligned tubes 1 and 2, connects the stations A and B which for convenience may hereinafter be referred to as "terminal" or "main" stations and an intermediate station C which may be representative of any such number of intermediate stations as may be desired.

While, as shown, the tubes 1 and 2 are substantially straight, and have been stated to be in alignment, it will ordinarily be found in practice that such tubes will embody curves and bends, and that they need not be in actual alignment except possibly where their ends are opposed to each other at the station C.

Each of the stations may, if desired, comprise a seat S for an operator, and a desk D for the operator's use, as well as a carrier despatching table 3. The terminal stations A and B have a receiving device, here shown as a gooseneck 4 having one end 5 aligned

with the carrier way and the other end 6 disposed conveniently to the operator seated at S.

Except for certain details hereinafter more fully pointed out, the terminal apparatus at each of the stations A, B, and C is substantially alike, and it is thus sufficient to describe that at the station A, for example, and with particular reference to Figs. 2, 3, and 4.

Thus the terminal apparatus A comprises suitable supports 7, 8, and 9, the latter holding the gooseneck 4 in proper position.

The support 7 (Figs. 3 and 4) is conveniently formed as a casting having a passage 10 comprising a horizontal part ending at the flange 11, the latter forming a connection for an air pipe 12 (Fig. 2) leading to the blower 13. This blower, as here shown, is directly driven by an electric motor M^a. The passage 10 in support 7 also has a vertical portion treminating at the flange 14 (Fig. 4), the latter constituting a support for a valve casing 15. This valve casing has an inlet or plenum chamber 16 and an outlet chamber 16^a, the inlet chamber communicating at all times with the passage 10 and being separated from chamber 16^a by a septum provided with an orifice 17 defined by the valve seat 18. A valve 19 normally engages the seat 18 to close the orifice 17, being urged toward its seat by a spring 20. A cylinder 22 is secured to the outer surface of the casing 15 in axial alignment with the stem 21 of the valve 19. This cylinder 22 is closed at its outer end, but at its inner end communicates with the chamber 16^a by means of openings 25. A piston 23 secured to the stem 21 of valve 19, slides in the cylinder 22.

The outlet 16^a extends upwardly through the upper part 15^a of the valve casing and communicates with the interior of the substantially T-shaped hollow member 26 (Fig. 3) secured to the upper part 15^a of the valve casing. This T-shaped member comprises a horizontal portion 27 provided with a passage 28 which is aligned with the end 5 of the gooseneck with the tube 1. The chamber 26^a in the lower leg of the part 26 communicates with an annular space 30 formed in a ring-like enlargement 29 of the horizontal portion 27, and this space 30 communicates with the passage 28 by means of slots 31.

The part 27 is provided with a flange 27^a and the part 5 is furnished with a flange 5^a, and between these flanges there is bolted a gate housing 32. This gate housing provides guides for a sliding gate 33 which is normally in a depressed position where it leaves the passage 28 wholly unobstructed. This gate is actuated by a pneumatic motor comprising a rod 34 secured to a piston 37 which slides in a cylinder 36, and a spring 38 above the piston assists the weight of the parts in causing the piston and the gate to move downwardly when the air pressure is relieved from below the piston. The lower end of the cylinder 36 communicates with a pipe connection 39 which is connected by a pipe 40 to the casing 15 at a point such that the interior of the cylinder 36 is always in communication with the inlet chamber 16. With this arrangement, it may be noted that if air under pressure is admitted through the pipe 12 to the chamber 16, it will tend to lift the piston 37 and also to unseat the valve 19, but the strength of the springs 20 and 38 is so chosen that before the valve 19 can be unseated, the piston 37 will have been moved upwardly so as to close the gate 33, thus shutting off the passage 28 from the outer atmosphere. As soon as the gate has closed and the piston has stopped its upward movement the air pressure builds up in the chamber 16 and eventually opens the valve 19, permitting the air to pass upwardly into the chamber 30 and thence through the slots 31 into the passage 28.

The casing 15 is provided with a flanged boss 41 at one side, to which is secured a by-pass comprising a pipe section 42 and a quarter turn bend 42^a carried by or forming an integral part of the support 8. To the upper end of this bend there is secured a valve housing 44 carrying a regulating valve 45, and above this valve housing is mounted a T-shaped section 46. The section 46 comprises the horizontal part 47 having the passage 48 which is aligned with the passage 28 in part 27, and also with the end of the tube 1. The part 47 may conveniently be furnished with a flange 49 for attaching it to a flange on the end of the tube 1, and at its other end the part 47 is furnished with an attaching flange 50. The part 27 is furnished with a similar flange 51, the flanges 50 and 51 being spaced horizontally, thus providing what in effect may be considered as an opening in the transmission line, this opening being designed for the reception of the carrier transmitting means now to be described. The flange 51 supports a fixed end frame member 52 (Fig. 3) which may be of more or less T-shape, and the flange 50 supports a similar fixed end frame 53. Each of the frames 52 and 53, which are substantially alike, has an upper horizontally elongate portion 54, the inner faces of the horizontal portions 54 of the two frames being smoothly finished and accurately parallel. Between these end frames is arranged a carrier cradle support comprising end members 55 and 56 which are held in properly spaced relation by means of bars 57. The members 55 and 56 are pivotally mounted at their lower ends upon studs 58 carried by the lower ends of the fixed frames 52 and 53, respectively, and the carrier cradle support is capable of oscillating to a limited extent about these pivot studs 58. The end members

55 and 56 of this oscillating support are furnished with pairs of aligned openings preferably formed in bosses 59, and these aligned openings receive the carrier cradles 60, each consisting of a short length of tube securely fixed at its opposite ends in the openings in the end members. Preferably, spring pressed packing material 61 is interposed between the faces of the parts 54 and the adjacent surfaces of the members 55 and 56 so as to avoid leakage of air at this point.

The fixed frame member 52 is provided with guides for a locking bolt 62 whose end is adapted to enter an opening 63 in the member 55 so as to hold the cradle support rigidly in selected position with one of the cradles 60 in alignment with the passages 28 and 48. This bolt is actuated by a pneumatic motor, being normally held in locking position by means of a spring 64 pressing upwardly against a piston 64^a arranged within a cylinder 65. The space above this piston is connected by a pipe 66 (Fig. 4) to the chamber 16 so that when air under pressure is admitted to the latter, it passes upwardly through the pipe 66 and forces the piston 64^a downwardly, thus retracting the bolt 62 and permitting the cradle support to be swung about its pivots 58. Under certain conditions, as for example, at the stations C and B, as hereinafter noted, it may be desirable to provide auxiliary locking means for the cradle supporting frame and to this end a second bolt 68 may be provided (as here shown for convenience at the station A, Fig. 3), such bolt normally being retracted, but being advanced to locking position by the action of electromagnetic means such as a solenoid 69.

In order that all carriers despatched successively from a station may reach their destinations before the carrier actuating force ceases, the apparatus is provided with a retiming device R (Fig. 3) here shown as comprising a housing mounted upon the top of the part 47 and providing a chamber 70 communicating with the passage 48 by means of a slot 71. Within this housing there is mounted a movable detector 72 which is engageable by carriers moving along the passage 48 and which when engaged by a carrier momentarily breaks an electric circuit through a switch device 73.

Referring to Fig. 4, it may be noted that the despatching table 3 is downwardly concave and of substantially cylindrical curvature with its axis in alignment with the axis of that one of the cradles 60 which is in receiving position. When a carrier is to be despatched it is first laid upon the table 3 and the cradle supporting frame being positioned as shown in Fig. 4 with one of the cradles 60 in alignment with the table 3, the carrier is pushed endwise into the cradle 60 through a suitable opening in the fixed frame 52. To despatch the carrier, the supporting frame is swung to the right by hand or any suitable mechanical means until the cradle is brought into alignment with the passages 28 and 48. Air is now caused to enter the passage 28 through slots 31 and drives the carrier before it out of the cradle 60 through the passage 48 and into the end of the tube 1. The carrier then continues on its way until it arrives at the station B. In the same way a carrier may be despatched from the station B to the station A or from the station C to the station A, the following described devices being provided to avoid interference between carriers despatched from the several stations.

Referring first to Figs. 2 and 5, each station comprises a push button panel P^a, P^b, P^c, respectively, each such panel being provided with a starting push button 75 and with an emergency stop push button 76; likewise at each station there is preferably arranged a signal S^a, S^b, S^c, respectively, here shown as an electric lamp, although other suitable form of signal may be employed. The equipment at each station comprises a starter circuit actuable by the push button 75, a relay comprising electromagnetic means for closing the motor control switch for the appropriate blower, a maintaining switch and circuit which keeps the motor controlling switch closed after the release of the push button 75, signal relay means which keeps the signals in operation at all other stations than the sending station during the transit of a carrier, as well as means to prevent interference in the operation of the several stations and timing means to insure proper delivery of all carriers.

Referring now to Figs. 5, 6, and 7, and asumng that it is desired to send a carrier from the station A to the station B, and that a carrier has been loaded into the cradle at the left-hand position of Fig. 4, the operator first presses the push button 75 which, as shown in Fig. 7, closes a circuit leading from the supply main X, through the normally closed emergency stop button 76, through the wire 88 and the normally closed circuit breaker switch 73, to the coils T^a of the timing mechanism at the station A. This circuit also includes the wire 80 leading to the normally closed signal relay switch 79^b at the station B, thence through the wire 81 to the normally closed signal relay switch 80^c at the station C, and thence to the main Y. In parallel with this circuit is the coil 77 of the signal relay at station A comprising the switch arms 79^a and 80^a, and as soon as this coil 77 is energized the arms 79^a and 80^a are caused to move into contact with the switch points 82 and 83 respectively, as indicated in dotted lines in Fig. 7. A circuit is thus closed between the main Y through the wire 84, the switch 79^a, the switch point 82, the wire 85, the signal S^c at the station C, and

thence to the main X. Likewise current from the main Y flows through the line 84, the arm 80^a, the switch point 83, the wire 86, through the signal lamp S^b at the station B, and thence to the wire X. The signal lamps at the stations B and C are thus lighted as soon as the operator at the station A prepares to despatch a carrier from this station.

When the push button 75 is actuated, as above described, the relay coil K^a is also energized, immediately closing the switch arms W^a (Fig. 5) for the motor M^a. As soon as the motor circuit is closed, the motor starts, thus operating the blower 13 and delivering air under pressure into the chamber 16. The first result is to close the gate 33 and concomitantly therewith to depress the piston 64 and retract the latch 62, thus freeing the cradle supporting frame so that the loaded cradle can be moved into the alignment with the passages 28 and 48. By this time the air pressure has forced the valve 19 from its seat, and when the carrier comes into alignment with the passage 28 it is expelled from the cradle through the passage 48 into the transmission tube. The cradle support is now restored to receiving position. As the carrier moves through the passage 48 it actuates the detector 72, momentarily breaking the circuit at the switch 73, the result of which will be described hereinafter.

When the coil K^a closes the motor switches W^a, it also actuates the maintaining switch arm L^a (Fig. 7) to close a maintaining circuit which receives current from the main X, such circuit including the normally closed emergency stop button 76, the switch arm L^a, the normally closed timer switch arm 78^a, and the conductor 88. Thus when the push button 75 is released the circuit is maintained as before through the timer coils T^a, the relay coil K^a and the signal relay coil 77.

The timer may be of any usual type, adapted, after starting, to perform certain cycle of operations at the end of which it opens the switch 78^a and breaks the circuit through the relay K^a, the relay 77, and the actuating coils of the timer itself. This timer is also of the type which is reset to its starting point whenever the circuit through its actuating coils is broken, and thus whenever the circuit is again closed, the timer starts from the beginning of its cycle. As above noted, the switch 73 is operated by the detector 72 every time a carrier is despatched. Thus as the first carrier despatched passes the detector 72, the circuit is momentarily broken at the switch 73 and through the timer coils T^a, so that the timer is reset to its initial position to perform its predetermined complete cycle. However, the breaking of the circuit through the switch 73 does not break the circuit through the relay K^a and thus the maintaining circuit is not broken at the switch L^a. The motor and blower thus continue to operate under normal conditions until the carrier has been delivered at the station B, it being understood that the timer is so set that it performs its cycle in the period necessary for the complete traverse of the carrier to its delivery point. When the timer completes its cycle the switch 78^a is opened; the maintaining circuit is thus broken, the coils K^a and 77 are deenergized, the motor and blower come to rest, and the air escapes from the cylinders 36 and 65 through the by-pass afforded by the pipe 42, etc. Thereupon the gate 33 is opened, while the locking bolt 62 is advanced so that the carrier supporting cradle at the station A can not be moved out of its proper position. If, before the first carrier has reached its destination, a second carrier be despatched from station A, the detector finger 72 is again operated to break the circuit at the switch 73 and thus, without affecting the operation of the motor and signal lamps, the timer is reset to repeat its cycle so that the safe passage of the carrier to its destination is assured.

By reference to Fig. 7 it may be noted that when the circuit is closed at the station A through actuation of the push button 75, and the signal relay coil 77 has been energized to move the switch arms 79^a and 80^a over into the dotted line positions, it is impossible to complete useful circuits by actuation of the push buttons 75 at either of the stations B or C. Thus, for example, if the push button 75 at the station B be actuated, the circuit, which comprises the main X, the push buttons 76 and 75, the coils T^b of the timer, the wire 90, the relay switch 79^c, and the wire 91, is broken at the open relay switch 79^a so that it can not be completed to the main Y; thus so long as the relay coil 77 at the station A is energized it is impossible to start the motor M^b by actuation of the push button 75 at the station B. In the same way it is impossible under similar circumstances to accomplish any results by depression of the button 75 at the station C since the circuit which would normally be closed by actuation of this push button is now open at the switch 80^a.

What has been said as to the operation of station A applies equally to the operation of station B, and when a carrier is first despatched from the latter it is then impossible to start the motor at the station A.

As shown in the drawings the station C has no receiving terminal and has no motor or blower of its own, but when the push button 75 at this station is depressed for despatching a carrier from the station C to the station A, the wiring connections are such as to start the motor M^b and to light signal lamps at the stations B and A. However, when the motor M^b at the station B is started and pres-

sure is built up in the pipe 12^b at the station B, and the gate at this station is closed, the locking bolt corresponding to the bolt 62 of Fig. 3 is retracted and thus the carrier supported cradle at this station might be moved to despatch a carrier which would interfere with the operation of the station C unless provision were made to prevent this. For this reason the station B is provided with a solenoid actuated locking bolt, the coils 69^b (Fig. 7) of the solenoid being in parallel with the signal lamp at this station so that when this lamp is lighted the bolt 68 is moved into locking position, thus effectually preventing the improper sending of a carrier from the station B while the station C is in operation. In the same way, since the delivery of air through the pipe from the station B would normally build up pressure sufficient to retract the bolt 62 at the station C, the latter station is likewise provided with a solenoid actuated bolt, the coils 69^c (Fig. 7) of the solenoid being in parallel with the lamp S^c. Thus when a carrier is to be despatched from station B, the cradle supporting frame at station C is locked so that it can not be moved out of alignment with the transmission tube. Since the motor and blower at the station A are independent in their operation, it is unnecessary to provide a solenoid lock at this station, as the pressure can not be built up at this point by operation of blower 13^b sufficient to release the bolt 62 when the carriers are being despatched from the other stations, the open end of the terminal at the station A permitting free escape of air.

When, during the despatch of a carrier from the station A, for example, the motor is first started and pressure is built up in the passages 26^a and 30, it is desirable to relieve this pressure to a certain extent during the movement of the carrier cradle support from its loading to its delivery position, and the by-pass 42 provides for escape of air around the despatching mechanism during this movement of the cradle support, the amount of such escaping air being regulated by the controlling valve 45.

In the arrangement herein specifically disclosed the station C is adapted to send carriers only to the station A, but it is evident that by a substantial duplication of the wiring arrangements shown as interconnecting the stations C and B, the apparatus may readily be adapted for sending carriers from the station C to both of the stations A and B, and it is likewise evident that the same principles of control may be applied within the scope of the invention to a system in which more than one station is arranged intermediate the end stations of the system. Moreover, while the stations A and B have been referred to in some cases as end stations of the system, this term has been used merely for convenience, since it is readily possible that the system might be extended beyond these stations if circumstances should so demand. Moreover, the motor driven blowers may be of suction or pressure type, and in general may be considered as representative of any force releasing or creating means, whether pneumatic, mechanical or electrical for impelling carriers along a way.

As above noted, the actuation of the starter push button at any station (which is necessary preliminary to the despatch of a carrier from such station) makes it impossible to complete useful circuits by actuation of the push button at any other station. Thus, the operator who is first to press the starter button at his station, even though he may be but a fraction of a minute earlier than an operator at another station, reserves the right of way for the carrier which he is about to despatch, and this interlocking system of control makes it impossible to despatch carriers from different stations in such a way that the carriers will collide or interfere with one another.

While certain desirable arrangements of electrical switches and connections, as well as of mechanical appliances have been shown, it is to be understood that these have been described merely as illustrative of the general principles of the invention and that changes in size, relative arrangement of parts, and the substitution of equivalents all fall within the scope of the invention.

We claim:

1. A carrier despatch system comprising a conveyor way spaced main stations each having receiving and despatch terminals on said way and an intermediate station, means for conducting carriers along the way from either main station to the other and from the intermediate station to one at least of the main stations, means for initiating movement of a carrier from one station to another, and means to prevent despatch of a carrier from any other station so long as said first carrier is in transit.

2. A carrier despatch system comprising a conveyor way, spaced main stations and an intermediate station along said way, means for moving carriers along said way in either direction, a starting device at each station for initiating operation of said carrier moving means whereby to despatch a carrier from one station to another station, and means to prevent effective operation of the starting device at any other station so long as said carrier is in transit.

3. A carrier despatch system comprising three stations and pneumatic tubes connecting one station to each of the other stations, each station having a carrier despatch terminal, means for creating carrier impelling air flow in said tubes, a starter device at each station for initiating air flow for transmitting a carrier despatched from such station,

and means to prevent effective operation of the starter devices at any other station during transmission of said carrier.

4. A carrier despatch system comprising end stations and an intermediate station, pneumatic tube lines connecting the intermediate station with each end station, each station having carrier despatch means, means for creating carrier impelling air in either direction through said lines, a starter device at each station for initiating air flow in proper direction to transmit a carrier despatched from said station, and means to prevent effective operation of other starter devices during transmission of said carrier.

5. A carrier despatch system comprising main stations and an intermediate station, pneumatic tube lines connecting the intermediate station with each main station, each station having carrier despatch means, means associated with each main station for creating a carrier impelling air flow in the line in a direction leading from said station, a starter device at each main station for initiating the operation of the flow creating means associated with such station, and starter means at the intermediate station also operative to initiate the operation of at least one of said flow creating means.

6. A carrier despatch system comprising main stations and an intermediate station, pneumatic tube lines connecting the intermediate station with each main station, each station having carrier despatch means, a blower associated with each main station for delivering air under pressure to the tube line leading from such station, a starter device at each main station for initiating the operation of the blower at such station, and starter means at the intermediate station for initiating operation of one at least of such blowers.

7. A carrier despatch system comprising main stations and an intermediate station, pneumatic tube lines connecting the intermediate station with each main station, each station having carrier despatch means, the tube lines having normally open delivery terminals at each main station, means for delivering air under pressure to the tube line at each main station, means at each main station for closing the corresponding delivery terminal, a starter device at each main station for initiating the delivery of air to the tube at said station, and starter means at the intermediate station for closing the delivery terminal and initiating the delivery of air at one at least of the main stations.

8. A carrier despatch system comprising at least three stations, a way connecting said stations, motor means at two of said stations adapted to furnish force necessary to move a carrier along the way, means at one station to start one motor means into operation, and independent means at each of two other stations for starting the other motor means into operation.

9. A carrier despatch system comprising a way for carriers, a pair of stations each having means for delivering a carrier into the way, motor means adapted to furnish force for moving carriers, received at each station, in the same direction along the way, independent means at each station for starting said motor means into operation, and timing means associated with each starting means for keeping the motor means in operation for a predetermined period of time sufficient to permit the carrier to complete its journey along the way.

10. A carrier despatch system comprising a way for carriers, a motor adapted to furnish the force necessary to move a carrier along the way, means for starting the motor into action when the carrier is to be dispatched, a timer which is set when the motor is started and which keeps the motor in operation until the end of a predetermined period of time sufficient to enable the carrier to complete its journey, and carrier actuated means for automatically resetting the timer for its intitial time period whenever a carrier is despatched before expiration of the period of the previous setting of the timer.

11. A carrier despatch system comprising a conveyor way, spaced main stations and an intermediate station along said way, means for moving carriers along said way, carrier despatch means at each station comprising an element movable laterally into and out of alignment with said way, starter means at each station for initiating the transit of a carrier along said way, and means actuable by said started means for concomitantly locking the movable despatch elements at another station.

12. A carrier despatch system comprising a conveyor way, spaced main stations and an intermediate station along said way, means for moving carriers along said way, carrier despatch means at each station comprising a carrier supporting cradle movable laterally of the conveyor way into and out of alignment with the way, means for locking the cradle in alignment with the way, starter means at each station, means actuable by any starter means for initiating the transit of a carrier along the way and for concomitantly actuating the cradle locking means at another station.

13. A carrier despatch system comprising a pair of main stations, an intermediate station and penumatic tube lines connecting the intermediate station to each main station, each station having despatch means comprising a cradle movable laterally into and out of alignment with the tube line, means for locking the cradle in alignment with the tube line, means for creating carrier impelling air flow in the tube line, and starter means at each

station for initiating such carrier impelling air flow, and for concomitantly actuating the cradle locking means at another station.

14. A carrier despatch system comprising a pair of main stations, an intermediate station, and pneumatic tube lines connecting the intermediate station to each main station, each station having despatch means comprising an oscillatory support provided with a plurality of carrier receiving cradles, any one of which may be aligned with the tube line, means for locking each support with one of its cradles in alignment with the tube, means for creating carrier impelling air flow in the tube lines, and starter means at each station adapted concomitantly to initiate carrier impelling air flow and to actuate the cradle locking means at one other station at least.

15. A carrier despatch system comprising a pair of stations, pneumatic tube lines connecting the stations, each station having a stationary despatching shelf, a support movable laterally of the tube line and having a cradle which may be brought alternatively into carrier receiving relation to the shelf and into alignment with the tube line, respectively, means for locking the cradle in the latter position, and controlling means arranged at each station for initiating carrier impelling air flow and for concomitantly actuating the cradle locking means at the other station.

16. A carrier despatch system comprising a pneumatic tube having a normally open delivery terminal, means for creating a carrier impelling air flow in the tube, means for closing the delivery terminal, and a starter device for concomitantly actuating the terminal closing means and for initiating air flow through the tube.

17. A carrier despatch system comprising a pneumatic tube having a normally open delivery terminal, a closure for said terminal, means for delivering air under pressure into the tube at a point adjacent to said terminal, means for initiating the delivery of air to the terminal and thereby actuating the closure, and means for insuring actuation of the closure prior to delivery of air to the tube.

18. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, and pneumatic means for closing the gate and for causing air to enter said port.

19. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, a pneumatic motor for moving the gate, means for creating a flow of air through said port, and means for timing the operation of the pneumatic motor to cause the gate to close before the initiation of substantial air flow through the port.

20. A carrier despatch system comprising a pneumatic transmission tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, a pneumatic motor for moving the gate, a casing providing a plenum chamber, means for supplying air under pressure to said chamber, a conduit leading from the chamber to the motor, a passage leading from said chamber to the port, a by-pass for air leading around the carrier admission opening, and an adjustable valve in the by-pass.

21. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, means for supplying air under pressure to the port, a movable support disposed in the carrier admission opening, said support having a carrier receiving cradle movable into and out of alignment with the tube, and a by-pass providing communication between the parts of the tube at opposite sides of the carrier admission opening.

22. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, means for supplying air under pressure to the port, a movable support disposed in the carrier admission opening, said support having end plates and a carrier receiving cradle, and a by-pass providing communication between the parts of the tube at opposite sides of the carrier admission opening when the end plates of the support are so positioned as to block the tube at said opening.

23. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, a pneumatic motor for moving the gate, means for supplying air un-

der pressure to the motor and port, and means preventing delivery of such air to the port until after the motor has closed the gate.

24. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, a pneumatic motor for moving the gate, means for supplying air under pressure to the motor and port, and an automatic pneumatically actuated valve for preventing delivery of air to the port until the motor has closed the gate.

25. A carrier despatch system comprising a pneumatic tube through which carriers may pass in either direction, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, a pneumatic motor for moving the gate, a casing providing a plenum chamber, means for supplying air under pressure to said chamber, a conduit leading from the chamber to the motor, a passage leading from said chamber to the port, and a spring loaded valve normally closing said passage.

26. A carrier despatch system comprising a pneumatic tube, a gate for closing the passage through the tube, the tube having an opening spaced from the gate for admitting a carrier to the tube, a port intermediate the gate and carrier admission opening for admitting air to the tube, a pneumatic motor for moving the gate, a casing providing a plenum chamber, a means for supplying air under pressure to said chamber, a conduit leading from the chamber to the motor, the chamber having a delivery orifice provided with a valve seat, said orifice providing communication between the plenum chamber and a passage leading to the port, a valve normally closing said orifice and means to prevent sudden movement of said valve.

27. A carrier despatch system comprising two stations and a pneumatic tube connecting the stations, means at one station for creating a carrier impelling air current through the tube, carrier despatch means at each station comprising a movable element, a pair of locking members for each of said movable elements, one member of each pair normally being in locking position and the other member of each pair being normally in unlocking position, a starter at each station for initiating air flow through the tube, means responsive to the operation of the starter at either station for causing the normally operative locking members at each station to become inoperative, and means also responsive to the actuation of either starter to cause the normally inoperative locking member at the other station only to become operative.

28. A carrier despatch system comprising a plurality of stations, a pneumatic tube connecting the stations, means at each station for delivering a carrier to the tube for despatch therethrough, said means including a movable support having a carrier receiving cradle which may be moved into and out of alignment with the tube, means normally locking the support with the cradle in alignment with the tube, a starter device at each station for initiating a carrier propelling air flow in the tube, and means responsive to the actuation of the starter device at either station for unlocking the cradle support at said station.

29. A carrier despatch system comprising a plurality of stations, a pneumatic tube connecting the stations, means at each station for delivering a carrier to the tube for despatch therethrough, said means including a movable support having a carrier receiving cradle which may be moved into and out of alignment with the tube, means normally locking the support with the cradle in alignment with the tube, a pneumatic for operating the locking means at each station, means for supplying air under pressure to the pneumatic and to the tube, and means to prevent access of the air to the tube until after the pneumatic has been actuated to release the locking means.

30. A carrier despatch system comprising a plurality of stations, a pneumatic tube connecting the stations, means at each station for delivering a carrier to the tube for despatch therethrough, said means including a movable support having a carrier receiving cradle which may be moved into and out of alignment with the tube, means normally locking the support with the cradle in alignment with the tube, a motor at each station for operating the locking means at each station, means for creating carrier impelling air flow in the tube, and means operative to energize said motor for releasing the locking means and thereafter to initiate the flow of air through the tube.

31. A carrier despatch system comprising a plurality of stations, a pneumatic tube connecting the stations, means at each station for delivering a carrier to the tube for despatch therethrough, said means including a movable support having a carrier receiving cradle which may be moved into and out of alignment with the tube, means normally locking the support with the cradle in alignment with the tube, normally inoperative locking means at one of said stations, at least, adapted to lock the cradle support with the cradle in alignment with the tube, a starter device at each station for initiating a carrier propelling air flow in the tube, and means responsive to the actuation of the starter device at one

station for actuating the locking means at another station to hold the cradle support at each latter station immovable during transit of a carrier.

32. A carrier despatch system comprising a plurality of stations, a pneumatic tube connecting the stations, means at each station for delivering a carrier to the tube for despatch therethrough, said means including a movable support having a carrier receiving cradle which may be moved into and out of alignment with the tube, means normally locking the support with the cradle in alignment with the tube, normally inoperative locking means at one of said stations, at least, adapted to lock the cradle support with the cradle in alignment with the tube, a starter device at each station for initiating a carrier propelling air flow in the tube, and electromagnetic means responsive to actuation of the starter device at one station for actuating the locking means at another station to hold the cradle support in fixed position during transit of a carrier.

33. A carrier despatch system comprising a plurality of stations, a pneumatic tube connecting the stations, means at each station for delivering a carrier to the tube for despatch therethrough, said means including a movable support having a carrier receiving cradle which may be moved into and out of alignment with the tube, normally operative and normally inoperative cradle support locking means at each station, a starter device at each station for initiating carrier impelling air flow through the tube, and means responsive to the actuation of the starter device at either station for unlocking the normally operative locking means at such station and for locking the normally inoperative locking means at the other station.

34. A carrier despatch system comprising at least three stations, means for transmitting carriers from one station of the system to another, signal means at each station, and means operative, when a carrier is despatched from any station of the system, to energize the signals at all other stations during the transit of the carrier.

35. A carrier despatch system comprising at least three stations and carrier transmitting means connecting the stations, a normally inoperative visual signal at each station, and means responsive to the despatch of a carrier from any station for making operative the signal at that station at least for which the carrier is destined.

36. A carrier despatch system comprising a way for carriers, means adapted to provide force for moving a carrier along the way, a starter operable to set said force providing means into action, automatic means for keeping said force providing means in action after the starter means ceases to function, carrier actuated means, and timing means also set into action by the starter and which is adapted to stop the action of said force providing means at the end of a period of time sufficient to permit the carrier to complete its journey, and reset by the actuation of the carrier actuated means.

37. A carrier despatch system comprising a pneumatic tube, means for causing a carrier impelling air current through the tube, a starter operable to initiate air flow through the tube, automatic means for maintaining such flow after the starter ceases to function, carrier actuated means and timing means adapted to stop the air flow through the tube at the end of a predetermined period of time, said timing means being set into action by the starter and reset upon the actuation of the carrier actuated means.

38. A carrier despatch system comprising a way for carriers, an electric motor for causing movement of a carrier along the way, a motor controlling switch, electromagnetic means for closing the switch, a starter for closing a circuit to engage said electromagnetic means, a circuit maintaining switch which is closed by energization of said electromagnetic means and which keeps the latter energized when the starter ceases to act, carrier actuated means and a timer which is started on closure of the circuit maintaining switch and restarted by the action of the carrier actuated means and which normally breaks the maintaining circuit at the end of a predetermined time after the timer starts.

39. A carrier despatch system comprising a way for carriers, an electric motor for causing movement of a carrier along the way, a motor controlling switch, electromagnetic means for closing the switch, a starter for closing a circuit to engage said electromagnetic means, a circuit maintaining switch which is closed by energization of said electromagnetic means and which keeps the latter energized when the starter ceases to act, a timer adapted when started to perform a predetermined cycle of operations and at the end of such cycle to break the maintaining circuit, and means independent of the starter and operative whenever a carrier passes along the way, before the timer has completed its cycle, for stopping the timer and restarting it at the beginning of its cycle.

40. A carrier despatch system comprising a way for carriers, an electric motor for causing movement of a carrier along the way, a motor controlling switch, electromagnetic means for closing the switch, a starter for closing a circuit to energize said electromagnetic means, a circuit maintaining switch which is closed by energization of said electromagnetic means and which keeps the latter energized when the starter ceases to act, a timer adapted when started to perform a predetermined cycle and at the end of such cycle to break the maintaining circuit, a de-

tector element responsive to the passage of a carrier along said way, and means under control of the said detector element for resetting the timer to the beginning of its cycle whenever a carrier passes the detector element before the timer has completed its cycle.

41. A carrier despatch system comprising a pneumatic tube, a blower for providing carrier impelling air current in the tube, an electric motor for driving the blower, a motor controlling switch, an electromagnetic actuator for the switch, a push button for closing a starter circuit including said actuator, a maintaining switch also operated by the actuator and thereby closing a maintaining circuit including the actuator when the starter circuit is broken, a timing switch in the maintaining circuit, a timer adapted when started to perform a predetermined cycle of operations and at the end of such cycle to operate the timing switch to break the maintaining circuit, the timer being started by closure of the maintaining switch, and means, including a detector, and a switch, independent of the maintaining switch, for stopping the timer and restarting it at the beginning of its cycle whenever a carrier passes the detector prior to completion of the timer cycle.

42. A carrier despatch system comprising a way for carriers, an electric motor for causing movement of a carrier along the way, a starter for closing a circuit to energize the motor when a carrier is to be despatched, automatic means to keep said circuit closed after the starter ceases to function, carrier actuated means, which when actuated breaks said circuit momentarily and timing means which is adapted to stop the motor at the end of a period of time sufficient to permit the carrier to complete its journey.

43. A carrier despatch system comprising a way for carriers, an electric motor for causing movement of a carrier along the way, a motor controlling switch which is closed by actuation of the starter whereby to energize the motor, a maintaining circuit having a switch which is also closed by actuation of the starter and thereby keeps the motor controlling switch closed after the starter ceases to function, a circuit breaking switch in said maintaining circuit, and a timer adapted to actuate said circuit breaking switch and open said maintaining circuit at the end of a predetermined period of time.

44. A carrier despatch system comprising a pair of stations, a blower for producing carrier impelling air flow for despatching a carrier from either station, a motor for operating each blower, a starter at each station for initiating the operation of the corresponding motor, and means responsive to operation of the starter at one station to prevent operation of the motor at the other station in response to the starter at said latter station.

45. A carrier despatch system comprising a pair of stations, carrier despatch means at each station comprising a carrier support movable to and from carrier despatching position, each support normally being locked to prevent its movement, a starter at each station whose normal operation is to unlock its corresponding support, and means responsive to the actuation of the starter at one station for locking the support of the other station to prevent its release by actuation of its respective starter.

46. A carrier despatch system comprising a plurality of stations, carrier despatch means at each station comprising a carrier support movable to and from carrier despatching position, a starter at each station which must be actuated as a preliminary to movement of the carrier support, and means responsive to actuation of the starter at any selected station to make other starters ineffective with reference to the corresponding carrier supports.

47. A carrier despatch system comprising a plurality of stations, carrier despatch means at each station comprising a carrier support movable to and from carrier despatching position, means normally locking said carrier support in one of said positions, a starter at each station, the normal operation of each starter releasing the corresponding carrier support, and means responsive to actuation of any starter to prevent release of all other carrier supports by operation of the corresponding starters.

48. A carrier despatch system comprising means providing a way for carriers, a plurality of gates adapted to move into and out of the carrier path, an actuator for each gate, the operation of any actuator normally initiating movement of the corresponding gate, and means responsive to operation of one actuator to make all other actuators ineffective to initiate movement of their respective gates.

49. A carrier despatch system comprising a pair of stations, a gate at each station adapted to move into and out of the carrier path, a starter at each station, actuation of each starter normally initiating movement of the corresponding gate, and means responsive to operation of one starter to prevent movement of the other gate in response to actuation of its respective starter.

Signed by us at Syracuse, N. Y. this first day of March, 1930.

CHESTER S. JENNINGS.
FRANK W. MacMARTIN.