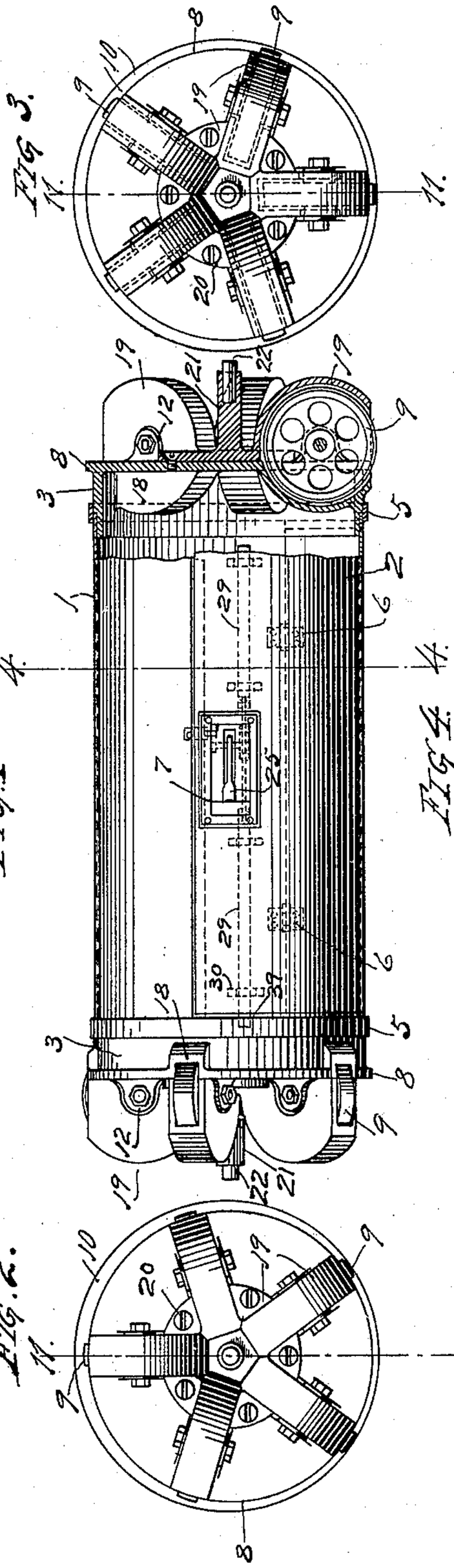
No. 627,181. Patented June 20, 1899.

E. A. FORDYCE.

CARRIER FOR PNEUMATIC DESPATCH TUBES.

(Application filed Jan. 14, 1899.)

(No Model.) 2 Sheets—Sheet 1.



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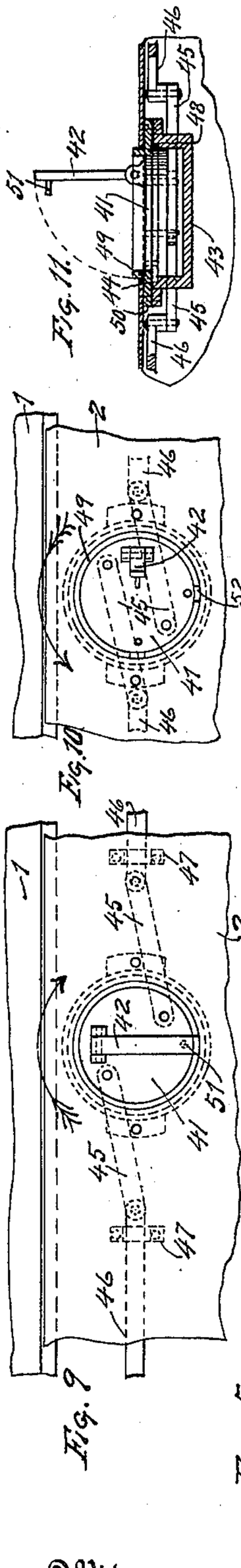

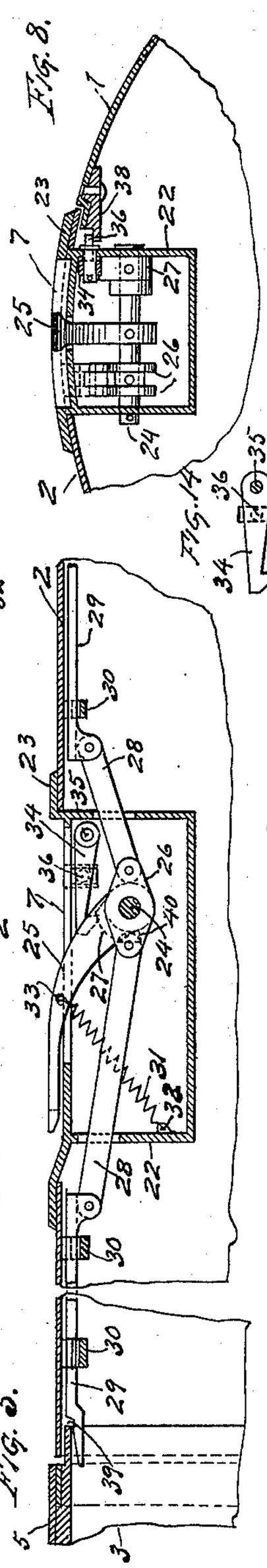

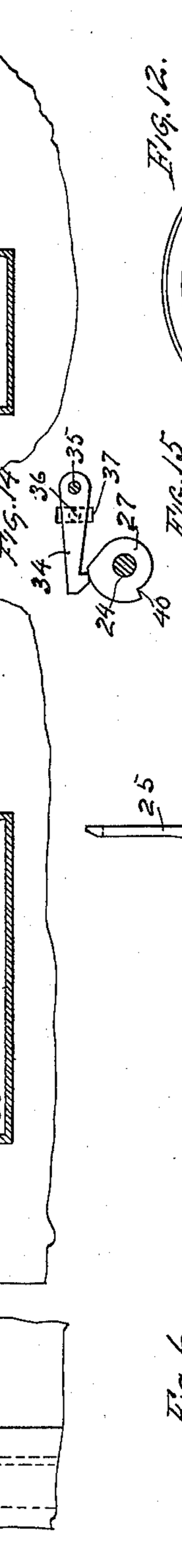

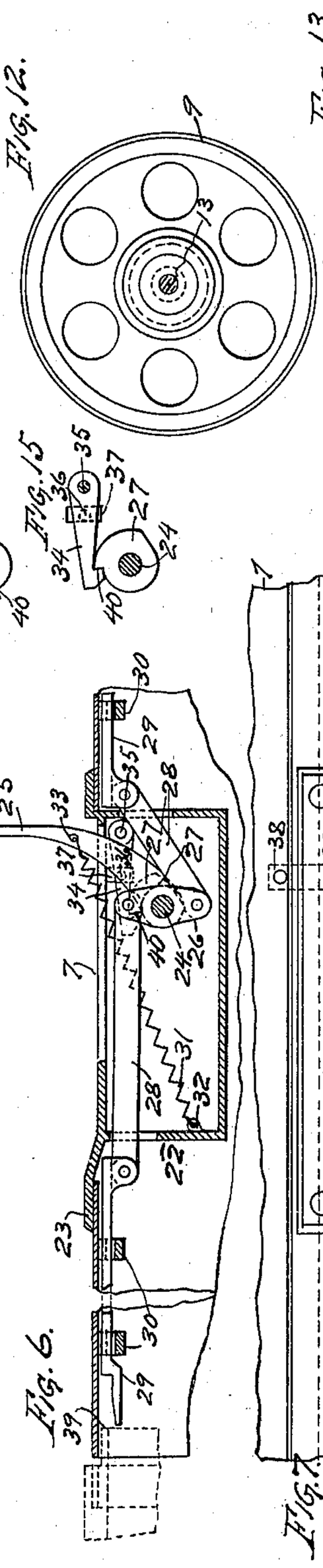

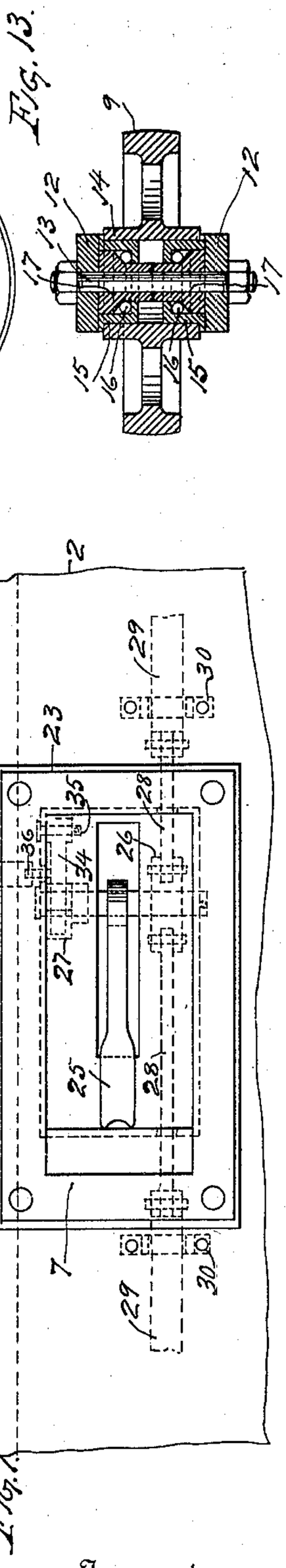

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UNITED STATES PATENT OFFICE.

EDMOND A. FORDYCE, OF CHICAGO, ILLINOIS.

CARRIER FOR PNEUMATIC-DESPATCH TUBES.

SPECIFICATION forming part of Letters Patent No. 627,181, dated June 20, 1899.

Application filed January 14, 1899. Serial No. 702,196. (No model.)

To all whom it may concern:

Be it known that I, EDMOND A. FORDYCE, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carriers for Pneumatic-Despatch Tubes, of which the following is a specification.

This invention relates to improved carriers for pneumatic-despatch apparatus, and more particularly to that class in which the carrier is mounted on wheels, and has for its object the mounting of such wheels so as to diminish the running friction, thereby obtaining increased speed with minimum amount of power, and also the location and arrangement of the wheels on the heads on the opposite ends of the carrier in such a manner as to permit the carrier to follow the natural rotary motion of the air when flowing through the tube.

A further object of the invention is to provide means for locking the door of the carrier through the agency of a lock which will prevent the insertion of the carrier in the tube before the door is closed and locked; and my invention consists in the improved means and mechanism for effecting these objects, as hereinafter described and claimed.

In the accompanying drawings, which illustrate my invention in its preferred forms and in which similar numerals of reference refer to similar parts throughout the several views, Figure 1 is a plan view of the carrier for pneumatic-transit apparatus, a part of the end of the carrier being broken away, showing a section of one head and exposing the interior to view. Figs. 2 and 3 are views in end elevation of the carrier, showing the relative positions of the wheels. Fig. 4 is a transverse section through the line 4 4 of Fig. 1, showing the shell or wall and door of the carrier. Fig. 5 is a longitudinal section through the locking device of the door, it being broken away from the carrier, and showing the parts of the device in the position they occupy when the door of the carrier is locked and the carrier is ready for insertion in the tube or is in transit in the tube. Fig. 6 is a sectional view identical with the section in Fig. 5, with the exception that the parts of the locking device show the lock released, the door being free to open and the carrier being out of the transit-tube. Fig. 7 is a plan of the locking device shown in section in Figs. 5 and 6, the parts of which show the door locked. Fig. 8 is a transverse section through the locking device of the door, it being broken away from the carrier, and showing the parts of the device in a position when the door of the carrier is locked. Fig. 9 is a plan view, broken away from the carrier, of a modified form of locking device and shows the parts in the position they occupy when the door of the carrier is locked. Fig. 10 is a plan view of the modified form of locking device shown in Fig. 9 and showing the parts in the position they occupy when the lock is released and the door is free to be opened. Fig. 11 is a transverse section of the plan of Fig. 10. Fig. 12 is a side elevation of one of the wheels of the carrier, all of which are alike. Fig. 13 is a section through the wheel of the carrier shown in elevation in Fig. 12 and shows in detail the parts of the antifriction-ball bearing, also the lugs supporting the shaft of the bearing. Figs. 14 and 15 are details of a device for holding at certain times the locking mechanism in its unlocking position.

The numeral 1 indicates the cylindrical shell of the carrier, which may be made of sheet metal or other suitable material and of any size or shape to conform to its use. Inserted into and closing the ends of the shell 1 are the heads 3 3 of the carrier, which are fastened to the latter by rivets or screws or other suitable means, the joint formed by the shell and the heads being covered by the band 5, which is fastened to the shell and head by rivets or screws or other suitable means. The door 2 is pivotally secured to the shell 1 intermediate of its ends by hinges 6 6 and is of the same contour as the cylinder, so that when secured by the lock 7 the outside of the carrier is a true cylinder in form. The flanges 8 8 on the heads 3 3 are in size slightly less than the inside diameter of the tube, permitting the carrier to pass freely through the tube, the purpose of said cylindrical flanges being to form the largest effective area on the ends of the carrier for the air-pressure to act upon which the inside diameter of the tube will permit, still of a slightly less diameter than a circle drawn around and touching the

wheels 9, journaled in the heads of the carrier, thus permitting the carrier to be carried on the wheels without permitting the flange or other part of the carrier to touch the inside surface of the tube (represented by 10.) A circle drawn around the wheels 9 and touching their extreme circumference is also slightly less in diameter than the inside diameter of the tube, so that the carrier may pass through the tube freely.

The feature of my present invention which I regard as of primary importance is the relative arrangement of the supporting and guiding wheels on the opposite ends of the carrier, as will now be explained.

Referring to Figs. 2 and 3, the line 11 11 is taken vertically across the heads of the carrier and shows that its relation to the wheels on one head differs from its relation to the wheels on the other head in this respect: that where in Fig. 2 two wheels touch the bottom of the inside of the tube, one on each side of the line 11 11, in Fig. 3 one wheel touches the bottom of the tube on the center line, and this relative position, or approximately this relative position, of the wheels on one head to the wheels on the other head I desire to retain for several reasons. It permits the carrier to follow the natural rotary motion of the air-current when flowing through the tube. It distributes the wear of the running carrier over a larger surface when the wheels of the opposed heads do not travel in a common track, and also when the carrier passes around a curve and by centrifugal force is thrown against the outside of the curve then the wheels on the side of the heads before not in use now come into service and carry the carrier without any additional friction, as friction is known to ensue when the wheels are not thus arranged and is due to the lateral sliding of the wheels on the inner surface of the pipe when the carrier changes its position by centrifugal force.

The wheels 9 run on antifriction-ball bearings, as shown in sectional view in Fig. 13.

12 are lugs, located on each side of the wheels, integral with and projecting from the head. Through lugs 12 is passed the shaft 13, fastened solidly in the lugs 12 by nuts or other suitable means. The hub 14 is bored to a uniform diameter, and into each end is pressed a hardened-steel cup 15. Into these cups are placed the steel balls 16, on top of which are inserted into the cups 15 the hardened-steel cones 17. When the steel balls 16 are in contact with the ball-races of said cones and the cups 15, through the center of the cones 17 is passed the shaft 13. Then the nuts which clamp the shaft 13 solidly in lugs 12 also clamp the cones 17 between the lugs 12, thus forming a stationary and solid bearing for the other parts of the ball-bearing and wheel to revolve upon. The wheels 9 are partially enveloped by the pockets 18, integral with the heads 3, and that part of the wheels extending beyond the heads 3 is enveloped by the casing 19, which is fastened to the head 3 by screws 20 or other suitable means, a sufficient space being allowed between the wheels 9 and pockets 18 and casing 19 to enable said wheels to revolve freely.

21 is a lug on the casing 19, projecting a short distance beyond the casing, and into its end is pressed a piece of rubber 22 or other resilient material, which performs the office of a buffer to mitigate any shock due to a collision of the carrier and also to protect the wheels from such collision.

The locking device as an entirety is designated by the numeral 7. It is located in the center, lengthwise, and near the opening edge of the door and consists of several parts, which will now be described.

22 is the lock-casing. It may be of any convenient form, it being here shown as of a rectangular box shape, and is let through an opening in the door cut to fit the body of the lock-casing. The flange 23 thereof rests on the outer surface of the door and is securely fastened thereto by means of rivets, screws, or other suitable means.

24 is a shaft or pivot-bolt passing through the lock-casing. It is journaled in the sides thereof, and securely fastened thereto is the arm 25, by means of which the locking device is operated. On the same shaft 24 are also fixedly secured the rocking bar 26 and the cam 27, (the latter being shown in detail in Figs. 14 and 15.) To the ends of bar 26 are pivotally attached the inner ends of links 28, the outer ends of said links being pivotally attached to the locking-bolts 29, which freely slide back and forth in the cleats 30, which are secured to the under surface of the door of the carrier by rivets, screws, or any suitable means. The coil-spring 31, one end of which is attached to the inside of the lock-casing at 32 and the other end to the arm 25 at 33, is used to hold the arm shut down, as shown in Fig. 5, when the door 2 is locked. The pawl 34 is pivoted to the inside of the lock-casing 22, as shown at 35, and its free end rests on the cam 27 and has a pin 36 projecting laterally therefrom and protruding through a slot 37 in the side of the lock-casing 22 of sufficient size to permit the pin 36 to move freely back and forth when the pawl 34 is shifted.

38, Fig. 8, is a bracket riveted or otherwise suitably fastened on the inside of the shell 1 opposite the location of the pin 36 on the pawl 34 and protruding into the door-opening of the carrier and under the pin 36.

I will now describe the operation of the locking device, the different stages of operation being illustrated in Figs. 5 and 6. In Fig. 5 the locking device 7 is shown in its position when door 2 is locked and the carrier is ready to be inserted in the transit-tube or is in transit. Fig. 6 shows the locking device unlocked and the door 2 free to open. To unlock the door, the arm 25 is pulled up. This action partially rotates the shaft 24, to

which are fastened the cam 27 and the rocking bar 26. The arm 25, cam 27, and bar 26 are now in the position shown in Fig. 6, and the bar 26, the ends of which are pivotally connected to the bolts 29 29 by means of the links 28 28, has pulled the bolts 29 29 toward the shaft 24, so that their ends are drawn away from under the end edges 39 of the doorway, as shown in Fig. 6, whereupon the door 2 is released. It will be noticed that when the arm 25 thus turns the shaft 24 the cam 27 assumes the position shown in Figs. 6 and 15 and the pawl 34 drops into engagement with the offset 40 in the periphery of the cam 27, which prevents the arm 25 from being pulled back by the extended spring 30 to its position, as shown in Fig. 5. Thus when the arm 25 is raised and the door 2 is simultaneously pulled open the arm 25 is automatically held up and the lock held released. The door 2 is automatically locked by closing it, when the pin 36 in the pawl 34 strikes against the protruding bracket 38, (shown best in Fig. 8,) which knocks the pawl 34 away from the offset 40 in the cam 27, and the cam being thus released the spring 31 pulls the arm 25 down to its position, as shown in Fig. 5, thereby sliding the bolts 29 out through the medium of the shaft 24, the rocking bar 26, and connecting-links 28, so that the ends of the bolts 29 engage under the end edges 39 of the doorway, whereby the door is securely locked and the carrier is ready to be inserted in the tube 10.

In Figs. 9, 10, and 11 I have shown a modified form of locking device, embodying, however, the same mechanical principles as those contained in the device already described. Figs. 9 and 10 are plan views showing the locking device locked and released, respectively, and Fig. 11 is a cross-section of Fig. 10, also showing the locking device released. 1 is a portion of the shell of the carrier broken away. 2 is a portion of the door broken away. 43 is the lock-casing, riveted on the inner surface of the door or otherwise suitably fastened thereto. 44 is a flanged ring, the flange being between the casing 43 and the door 2, and is secured by the same means as the casing 43, the ring 44 protruding through the door 2, as shown in Fig. 11. In the casing 43 is formed an annular groove 48, into which fits easily the circular plate 41, which is free to revolve therein. The said plate 41 carries the arm 42, which is hinged thereto, and has a pin 51 projecting laterally from it near its outer end. To the plate 41 are also pivoted the links 45 45, the other ends of which are pivoted to the locking-bolts 46 46, which slide easily through the cleats 47 47, riveted or otherwise suitably fastened to the inside of the door. The operation of this locking device is as follows: The arm 42 is raised, as shown in Fig. 11, and the plate 41, to which it is hinged, is revolved in the direction shown by the arrow in Fig. 9 to a position as shown in Fig. 10. This act draws the bolts 46 46 inwardly from the position shown in Fig. 9, which shows the door locked, to a position as shown in Fig. 10, when the door is released and can then be opened. The raised arm 42 when the door is unlocked, it should be noted, will not permit the carrier to be inserted into the tube 10. To lock the door 2, the arm 42 is pulled in the direction of the arrow in Fig. 10 until the plate 41 is in a position such that the arm 42 when laid down will fit in the slot 52, cut in the ring 49 of the flanged ring 44, and its pin 51 will fit tightly into a hole drilled in the plate 41, so as to prevent the arm 42 from accidentally lifting. At such time the bolts 46 46 are shoved outwardly, so that their ends will come to rest in under the end edges 39 39, Fig. 5, through their link connections 45 45 to the plate 41, when the door is locked and the carrier is ready to be inserted into the tube 10 for transit.

I do not wish to be understood as limiting my invention to the exact construction described in the above specification and illustrated in the accompanying drawings.

Various changes may be made within the province of mechanical skill without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a carrier adapted for transit in a despatch-tube, the combination with the body of the carrier of a series of guiding and supporting wheels mounted thereon at or near each end, the wheels of the two series being so located and arranged relatively to each other that none of the wheels at one end will be in the same longitudinal plane as any of the wheels at the other end, as and for the purposes described.

2. In a carrier adapted for transit in a despatch-tube, the combination with the shell of the carrier and the heads closing the ends of the same, of a series of guiding and supporting wheels mounted on each head, the wheels of the series on one head of the carrier being so located and arranged relatively to the wheels of the series on the other head that the wheels of each series will contact the inner surface of the tube at points midway laterally of the points of contact of the wheels of the other series, whereby no one of the wheels at either end will travel in the track of any of the wheels at the other end when the carrier is in transit, as and for the purposes set forth.

3. In a carrier adapted for transit in a despatch-tube, the combination with the body of the carrier of a series of guiding and supporting wheels journaled at each end thereof, a protecting-casing secured to the head of the carrier and partially inclosing said wheels, and a yielding buffer projecting centrally from and slightly beyond the outer face of said casing to protect the carrier from injury in case of collision, substantially as described.

4. In a carrier adapted for transit in a despatch-tube, the combination with the shell

of the carrier and the heads closing the ends of the same, of a door hinged to the shell intermediate of its ends, a lock-casing let into the door near its opening edge, and locking mechanism carried by said lock-casing, by the actuation of which the door may be securely fastened to the shell of the carrier before the latter is inserted in the tube, substantially as described.

5. In a carrier adapted for transit in a despatch-tube, the combination with the shell of the carrier and the heads closing the ends of the same, of a door hinged to the shell intermediate of its ends, a lock-casing let into the door near its opening edge, locking mechanism carried by said lock-casing, an arm for actuating said locking mechanism which, when the door is unlocked, projects beyond the circumference of the carrier, and mechanism for preventing the said arm from lying within the circumference of the carrier except when the door is locked, substantially as described.

6. In a carrier adapted for transit in a despatch-tube, the combination with the shell of the carrier and the heads closing the ends of the same, of a door hinged to the shell intermediate of its ends, a lock-casing let into the door near its opening edge, a shaft or pivot-bolt carried by said casing, a rocking bar fixedly secured on said shaft, cleats secured on the under surface of the door, locking-bolts adapted to slide freely in said cleats, links connecting the inner ends of said locking-bolts with the ends of said rocking bar, a cam having an offset secured on the shaft, a pawl to engage said offset when the shaft is turned to withdraw the locking-bolts, a laterally-extending pin in said pawl, a protruding bracket located on the inner surface of the shell and in the path of said pin as the door is closed, an arm secured to and adapted to actuate said shaft in a direction to unlock the door when moved outwardly, and a spring to return said arm and actuate the shaft in a direction to lock the door, all combined and operating substantially as set forth.

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