May 31, 1955 W. SCHRODER 2,709,555

CARRIER SEPARATING DEVICE

Filed Sept. 19, 1952 3 Sheets-Sheet 1

Fig. I

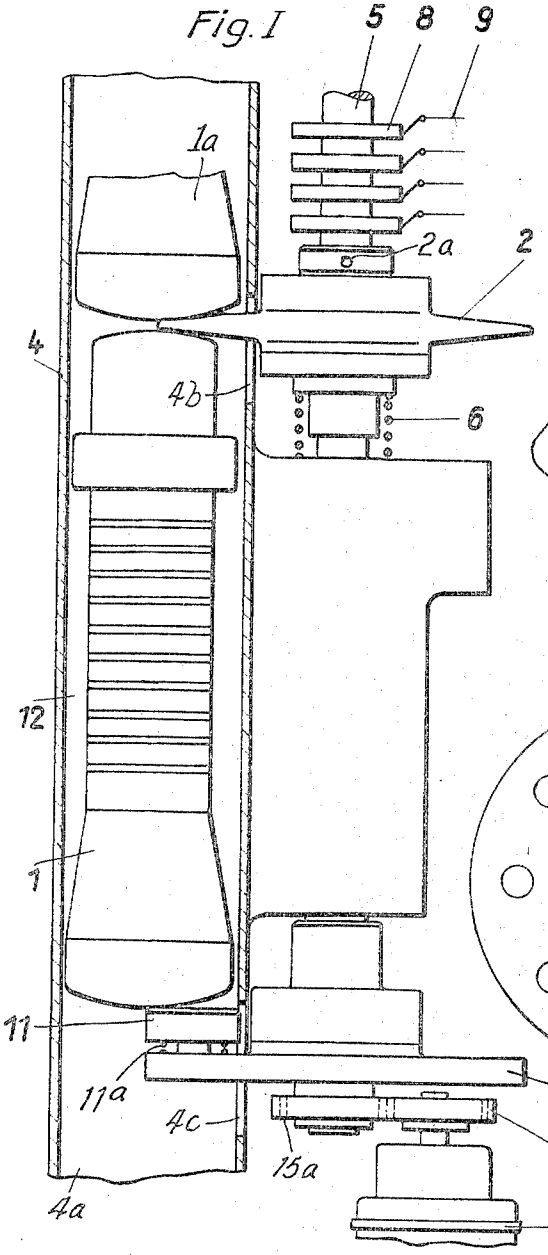


Fig. Ib

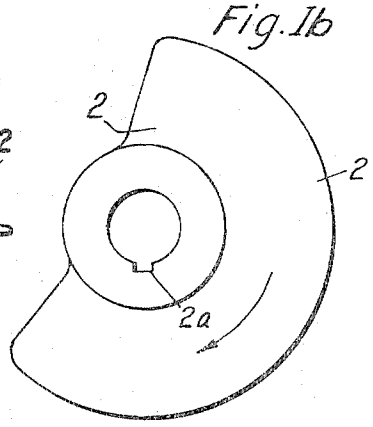
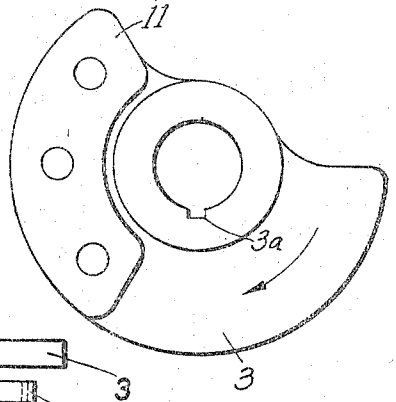


Fig. Ia



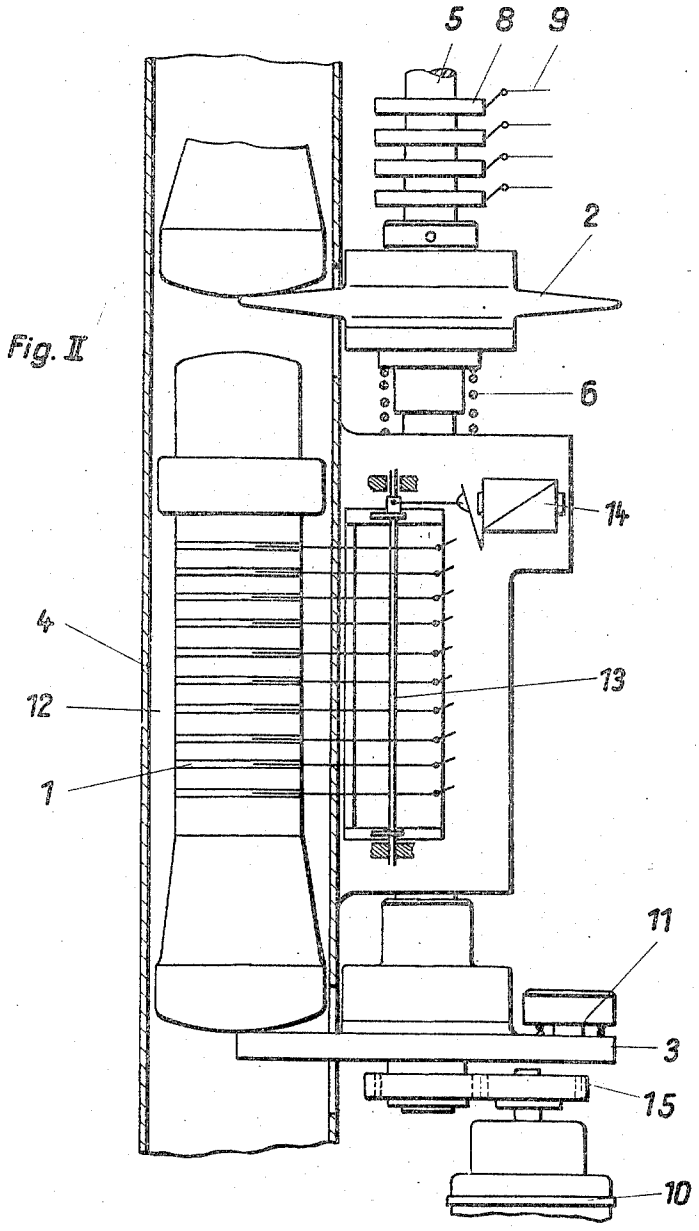
INVENTOR
W. SCHRODER
BY Robert Harding Jr.
ATTORNEY

May 31, 1955 W. SCHRODER 2,709,555

CARRIER SEPARATING DEVICE

Filed Sept. 19, 1952 3 Sheets-Sheet 2

Fig. II



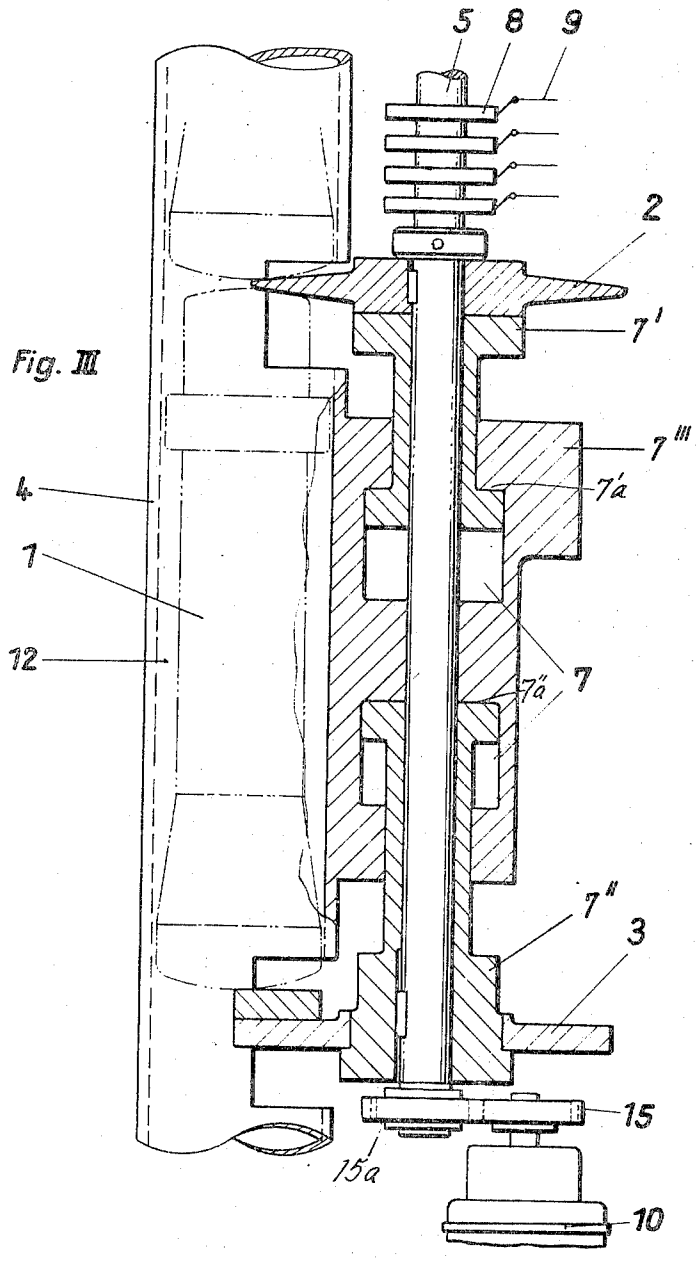
INVENTOR
W. SCHRODER
BY Robert Harding Jr.
ATTORNEY

May 31, 1955 W. SCHRODER 2,709,555

CARRIER SEPARATING DEVICE

Filed Sept. 19, 1952 3 Sheets-Sheet 3

Fig. III



INVENTOR
W. SCHRODER
BY Robert Hardesty Jr.
ATTORNEY

United States Patent Office 2,709,555 Patented May 31, 1955

2,709,555

CARRIER SEPARATING DEVICE

Willi Schroder, Berlin, Germany, assignor to International Standard Electric Corporation, New York, N. Y., a corporation of Delaware

Application September 19, 1952, Serial No. 310,489

Claims priority, application Germany October 2, 1951

5 Claims. (Cl. 243—38)

This invention relates to improvements in pneumatic tube dispatch systems, and more particularly, to carrier separating devices used in connection with such systems. In pneumatic tube systems, in which the routing switches are automatically controlled by the dispatch carriers, separating devices are provided in which the destination-marking of the dispatch carrier is scanned preparatory to the actuation of the necessary automatic routing switches. This necessitates the provision of a tube section wherein a dispatch carrier may be temporarily isolated while the scanning process is being performed. Previous known devices for separating carriers such as the slide and safety catch type employ several levers and springs which must be actuated by a synchronized drive and thus makes for a complicated mechanism.

The present invention provides a carrier separating device wherein the complicated lever mechanism and the prior art is largely avoided. The separation or isolation chamber achieved by applicant is provided by two spaced discs arranged on the common shaft which runs parallel to the pneumatic tube. The discs are adapted to be rotated into a pair of laterally extending slots in the wall of the tube and thereby define a scanning chamber. By a predetermined profiling of the discs they permit entry of a carrier into the chamber and after the scanning, exit therefrom.

Accordingly, it is an object of the invention to provide a simple carrier separating chamber in a pneumatic tube system by the provision of two spaced discs arranged on a common shaft and adapted to be revolved in and out of laterally extending slots within the pneumatic tube.

It is a further object of the invention to provide a flexible mounting of said discs upon a common shaft to absorb the shock of moving dispatch carriers within pneumatic tube systems.

By my invention the rotating discs are provided with cutouts which are arranged in different angular positions with respect to each other and which enable the dispatch carriers to be governed in certain time sequences into and out of the scanning tube section.

The invention will now be described particularly with reference to the preferred embodiments thereof represented in Figures 1 to 3 in the accompanying drawings in which:

Figure 1 shows the carrier separating device in cross-section with a dispatch carrier within the scanning tube section prior to reaching its actual scanning position;

Fig. 1*a* is a plan view of the lower separating disc which is a part of the device shown in Fig. 1;

Fig. 1*b* is a plan view of the upper separating disc which is a further part of the device shown in Fig. 1;

Figure 2 shows the carrier separating device with a dispatch carrier in scanning position;

Figure 3 shows a carrier separating device, at which the separating discs are furnished with springs in a pneumatic or hydraulic manner.

Referring now to Figure 1, my unique carrier separating device comprises a portion 4 of the pneumatic tube

4*a* which is connected to the pneumatic tube system. The portion 4 is provided for scanning the dispatch carrier, and in which tube chamber 12 will be defined as will be hereinafter explained. I provide a pair of spaced discs 2, 3 which are mounted on a common shaft 5 which is positioned outside of and parallel to the pneumatic tube section 4. The tube section 4 is provided with a pair of spaced laterally extending slots cut through the wall thereof indicated at 4*b* and 4*c*, respectively. The discs 2 and 3 are spaced apart a distance substantially equal to the spacing of the slots 4*b* and 4*c*. It will be observed that this distance is somewhat greater than the length of a dispatch carrier 1. The discs 2 and 3 as shown in Figs. 1*b* and 1*a*, respectively, are each provided with a keyway 2*a* and 3*a*, respectively which is adapted to cooperate with a spline portion of shaft 5 which is not shown since it is well known in the art. Disc 2 is adapted to be axially movable on shaft 5. By mounting the discs on the spline of shaft 5, the discs will constantly occupy a certain angular position with respect to each other. As appears from Figs. 1*a* and 1*b*, a portion of the periphery of the discs is cut away. Shaft 5 is adapted to be rotated by motor 10 by means of cooperating gears 15 and 15*a*. Upon rotation of the shaft, the uncut portions of discs 2 and 3 will be introduced in the slots 4*b* and 4*c* in accordance with the angular displacement of said discs. As shown in Figure 1, the discs define a chamber wherein carrier 1 may be lodged.

The disc 3 is provided with a step portion 11, which portion is resiliently mounted on said disc.

The device operates as follows:

It is assumed that both discs 2 and 3 are rotated by shaft 5 so that their uncut portions extend into the slots 4*b* and 4*c* of tube 4, respectively. The approaching dispatch carrier 1*a* which is preceding in the direction of the arrow strikes disc 2 as shown in the drawing of Figure 2. In order to absorb the shock occasioned thereby, disc 2 is resiliently mounted on shaft 5 by means of a helical spring 6 extending between disc 2 and disc 3. The impact of carrier 1*a* will cause the driving motor 10 to be energized and thereupon shaft 5 will rotate. Upon the rotation of the separating discs 2 and 3, the dispatch carrier falls through the cutout portion of disc 2 into the chamber 12 and strikes against the step portion 11 of disc 3 which is still in the tube. This is the position shown in Figure 1. As stated before, dispatch carrier 1 now rests upon step 11. Step 11 has the function of preventing vibration within chamber 12 during the scanning process of a dispatch carrier and which vibration may be caused by a dispatch carrier such as 1*a* striking against disc 2. Vibration of the carrier 1 during scanning might cause a false signal to be sent and an error in switching. Therefore, I have arranged that the step 11 upon further rotation of the disc 3 will be retracted from the slot 4*c* and the carrier 1 will then drop a distance equal to the thickness of step 11. The step 11 is resiliently mounted on the main surface of disc 3 by means of helical spring 11*a* which is inserted between the step 11 and the surface of disc 3. This spring absorbs the shock of the falling carrier 1 after its release by disc 2 into the chamber 12.

After the scanning has been completed and following further rotation of the shaft 5, the cutout periphery portion disc 3 will be retracted from the slot 4*c*. Figs. 1*a* and 1*b* show the cut out portions of both discs 2 and 3 and the angular position thereof with respect to each other as mounted on the common shaft 5. The scanned dispatch carrier 1 will leave the chamber 12 and the chamber will then be free for the reception of carrier 1*a*.

Figure 2 discloses how the scanning process of the dispatch carrier is carried out in the chamber 12 by the set of contact springs which sense the ring contacts

spaced about the circumference of the carrier **1**. The springs **13** are controlled by electromagnet **14** which in turn is synchronized to the angular position of shaft **5** under the aegis of cam contacts **8** and **9**. It will be observed in Figure 2 that during the scanning process the dispatch carrier **1** is resting upon the main surface disc **3**, the step **11** being rotated outside the slot *4c*.

In the foregoing embodiment, the upper disc is cushioned mechanically by a spiral spring **6**. A modification of the damping mechanism is shown in Figure 3. In the embodiment, the discs **2** and **3** are similarly mounted on the shaft **5** but in addition to the discs a pair of sleeves **7'** and **7''** are located on the shaft between the two discs. These sleeves each have one end thereof positioned against respective of the discs and have their other ends located within a cavity **7** defined by an external housing **7'''** which surrounds the shaft and portions of the sleeve **7'** and **7''**. It will be observed that the ends of sleeves **7'** and **7''** constitute pistons within the chambers **7** and that an air cushion is created by such an arrangement. Both sleeves may yield in the downward direction against the air cushion and the vacuum created at the surface of *7'a* of sleeve **7'**, and the vacuum created at the surface **7''** *a* of sleeve **7''** when the sleeves yield, will cause both sleeves to be returned to the initial position shown in Fig. 3 after the initial shock of being struck by the carrier **7**. The chamber **7** may contain any fluid useful for damping and may even contain a liquid. By the structure shown damping in the actual direction of both discs may be achieved.

It will be apparent that carrier separating devices such as here disclosed may be used in semi-automatic tube systems as well as fully automatic tube systems. It will also be understood that my device may be useful as a terminal device or may be used in any portion of a system wherein it is desired to control the spacing of the dispatch carriers.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is hereby reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by U. S. Letters Patent is:

1. A carrier separating device for pneumatic dispatch tube systems comprising a length of pneumatic tube in said system, said tube having a pair of spaced laterally extending slots in the wall thereof, a common rotatable shaft situated outside of and parallel to said tube, rotating means coupled to said shaft, a pair of spaced discs, each having a selected portion of its periphery profiled, means for resiliently mounting at least one of said discs upon said shaft, each of said discs adapted to have its periphery extend laterally within the slots in said tube upon rotation of said shaft to define a separating chamber within said tube.

2. A carrier separating device for pneumatic dispatch tube systems as claimed in claim 1, wherein the profiling of each of said discs is in a predetermined angular relation with respect to the other.

3. A carrier separating device for pneumatic dispatch tube systems as claimed in claim 1, wherein said resilient mounting means comprises a spring disposed between said discs and said shaft to permit axial movement of one of said discs along said shaft.

4. A carrier separating device for pneumatic dispatch tube systems as claimed in claim 1; wherein said resilient mounting means comprises a step portion and a spring coupling said portion to one of said discs.

5. A carrier separating device for pneumatic dispatch tube systems as claimed in claim 1, wherein said resilient mounting means comprises a pair of sleeve members disposed about said shaft and intermediate said discs, each of said members having one end in contact with a respective of said discs, a closed housing disposed about said shaft and said sleeve members, said housing having a pair of spaced cavities therein, the other end of each of said sleeve members disposed within respective of said cavities in damping relation, whereby each of said discs is resiliently axially mounted on said shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

809,563	Hansen	Jan. 9, 1906
1,776,697	McGuinness et al.	Sept. 23, 1930
2,052,597	Beckmann	Sept. 1, 1936