May 26, 1959 A. KÜHN 2,888,218

PNEUMATIC DISPATCH CARRIER

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Fig. 1

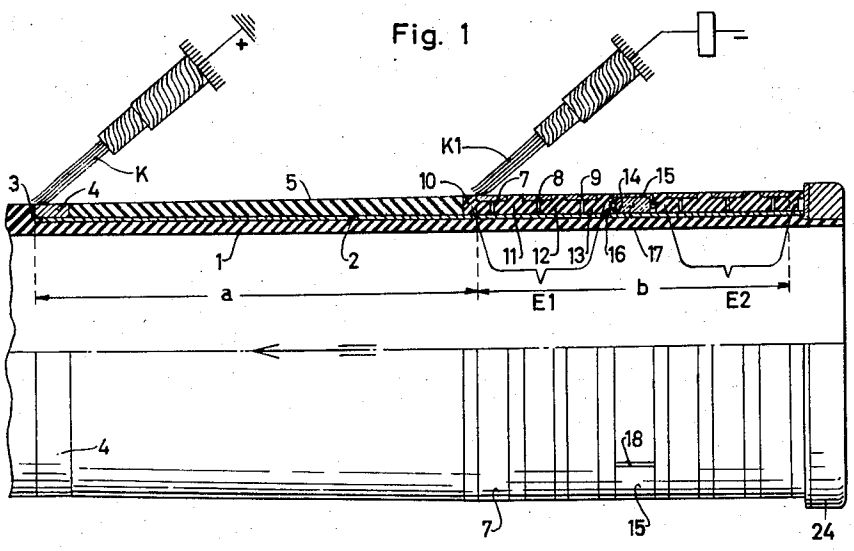


Fig. 2

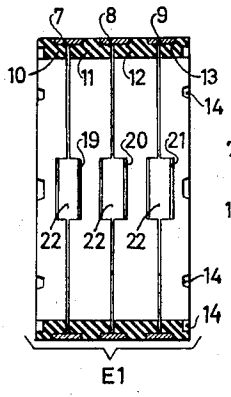


Fig. 3

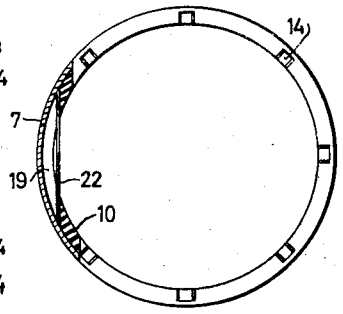
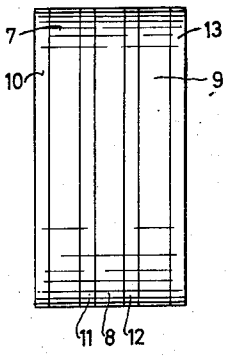


Fig. 4



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Fig. 5

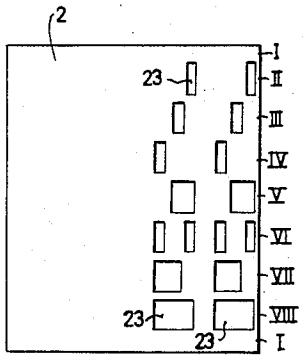


Fig. 6

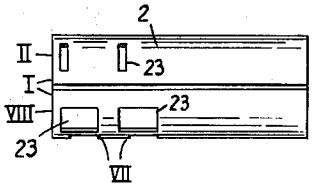


Fig. 7

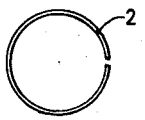
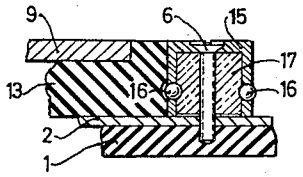


Fig. 8



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PNEUMATIC DISPATCH CARRIER

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6 Claims. (Cl. 243—32)

The present invention relates to a pneumatic dispatch carrier with adjustable contact rings which, for the selective control of the pneumatic tube switches, are connected in an electrically conductive manner in various combinations with a stationary contact ring by means of a rotary adjustment, so that the corresponding control circuit for the setting of the switches is produced at the scanning place in the travel tube by the contact rings by way of contact wipers which are arranged in the travel tube at a distance apart equal to the spacing of the contact rings.

Known contact-ring switches for the selective connection of the individual contact rings with the stationary contact ring, comprise a metal sleeve surrounding the casing of the dispatch tube carrier, the sleeve being connected to the stationary contact ring and having correspondingly distributed recesses through which the contact springs of a contact-spring ring rotatable about the metal sleeve are brought out of engagement with the associated contact ring when the contact spring fastened at one end in the spring ring has its offset middle portion drop into the recess of the metal sleeve. Between the contact rings which are combined into a group and the contact spring ring there is a ring of insulating material which is rigidly connected mechanically with the contact rings and the contact-spring ring and has recesses for the passage of the contact springs of the contact spring ring. This ring member consisting of the contact rings, the insulating ring and the contact spring ring and effecting, by its rotation, the desired setting of the destination of the pneumatic dispatch carrier is an expensive structural part as compared to the other parts of the pneumatic dispatch carrier. Depending on whether two, three or four contact rings are combined to form a group, different molds are necessary into which the contact rings are placed and combined with the insulating ring upon suitable forming. In an additional operation the contact spring ring, which also requires a number of tools for its manufacture, must then be rigidly connected with the insulating ring by a suitable crimping.

The object of the present invention is to substantially simplify the production of the contact-ring switches, which make the manufacture of dispatch tube carriers with adjustable contact rings expensive, and to reduce the cost thereof. Another advantage of the invention is that the structural parts of the contact-ring switch which are subject to wear can be readily replaced at any time, while in the known contact-ring switch, the setting ring, which consists of a plurality of parts, had to be replaced in its entirety.

These advantages are obtained in accordance with the invention by effecting the selective connection of the rotatable contact rings with the fixed contact ring serving for the feeding of the current, via a sheet metal sleeve provided with corresponding cutouts and leaf springs which slide on the sheet metal sleeve, such springs being each inserted in a separate cutout of the insulating rings

bearing the contact rings, and being in contact with the associated contact ring, this cutout being formed from every two adjacent insulating rings so that the leaf spring is at the same time the mechanical coupling member for the adjacent insulating rings and effects the simultaneous rotating of the contact rings combined into a group. With such a development of the contact ring switch, it is possible to push the individual parts of the contact ring switch individually, one after the other, over the dispatch tube carrier and to build up the insulating ring of individual identical rings so that only a single die is necessary for the manufacture of the insulating ring since the shaping of the insulating ring is no longer dependent on the number of contact rings which are to be combined to form a group.

The arrangement of the rotatable contact rings and of the stationary contact ring is accordingly such that the dispatch tube carrier is suitable both for so-called "flying" scanning and for "stationary" scanning. In flying scanning, as is known, the destination characteristic set is ascertained as the carrier travels past the contact wipers arranged in fixed position in the travel tube. The arrangement must be such that the carrier passes the contact wipers in sliding engagement therewith at least in the region of the contact rings as the carrier travels past without causing the wipers to swing back and forth. The carrier must therefore have a surface which is as even as possible so that the wipers after passing over the head of the carrier can come to rest as rapidly as possible and are not again caused to swing upon passing over the contact rings. In the dispatch tube carriers having adjustable contact rings which have been known up to the present time this requirement was only imperfectly met.

In the stationary scanning of the destination characteristic of the carrier, the dispatch tube carrier, as is known, is brought to a stop at the scanning place and thereupon the scanning wipers are applied by a drive to the contact rings of the dispatch tube carrier. The dispatch tube carrier in accordance with the invention is so developed that it is suitable both for flying scanning and for stationary scanning. The present invention also differs advantageously from the known embodiments of dispatch tube carriers with adjustable contact rings by the fact that in connection with the setting of the contact rings there is a dependable notch-stopping which requires no special stop springs.

This result is achieved in accordance with a further feature of the invention by the provision on the face side of the outer insulating ring of one or more depressions or recesses into which correspondingly distributed steel balls held by a stationary cage ring engage, these balls being resiliently supported against the face of a rubber ring held by the cage ring. This cage ring, which is rigidly arranged between two groups of contact rings, is provided with a setting mark which characterizes the switch positions, and is held in position after the assembly of the entire contact-ring switch, by a screw which clamps it against the carrier sleeve. Since an electric connection is made by this screw which the metal sleeve telescoped over the body of the carrier, this cage ring may be used for the feeding of the current in stationary scanning.

The foregoing and further objects and features of the invention will appear from the description of an embodiment which will be described below with reference to the accompanying drawings.

In the drawings:

Fig. 1 shows a portion of the dispatch tube carrier, partially in section and in elevation;

Fig. 2 is section through a setting ring comprising contact rings and insulating rings;

Fig. 3 shows an end view of the setting ring, partially in section and partially in elevation;

Fig. 4 shows the setting ring in side elevation;

Fig. 5 shows the development of the sheet-metal sleeve for effecting the selective electrical connecting of the individual contact rings with each other;

Fig. 6 is a side elevation of the sheet-metal sleeve;

Fig. 7 is an end view of the sheet-metal sleeve; and

Fig. 8 shows the notch place for the setting ring, in section.

As may be seen from Fig. 1, on the tubular carrier body 1, made of insulating material, there is arranged a metal sleeve 2 which can be shoved upon or telescoped over the carrier body 1 from the end thereof up to the stop 3, against which there also rests the stationary contact ring 4 which is also shoved-on from the end of the carrier. Another sleeve of insulating material 5, which can also be shoved-on, serves as spacer between the contact ring 4 and the first setting ring E1, shown separately in Fig. 2 which comprises contact rings 7, 8, 9 and insulating rings 10, 11, 12, 13. These parts also can be shoved onto the metal sleeve 2, one after the other, from the end of the carrier. The insulating ring 13 has recesses or cavities 14 formed on its face side, as may be noted from Figs. 2 and 3. Steel balls 16 held by the cage ring 15 engage in these recesses 14, as is shown on a larger scale in Fig. 8. The cage ring 15 is of U-shaped cross-section and contains a rubber ring 17 against the face surface of which the steel balls 16 are resiliently supported. The cage ring 15 is fastened to the carrier body 1 by means of a screw 6 omitted in Fig. 1. The cage ring 15 is provided with a setting mark 18 (Fig. 1) with reference to which the setting rings E1 and E2 are set. The setting ring E2 is developed in the same manner as the setting ring E1 and comprises corresponding insulating rings and contact rings which may be pushed one after the other onto the dispatch tube carrier from the end of.

Each contact ring 7, 8, 9 is held by two insulating rings. Thus, for instance, the contact ring 7 is held by the insulating rings 10 and 11. The insulating rings 10 to 13 are of such shape that their outer annular surface adjoins and is flush with the outer annular surface of the contact ring. Each insulating ring is provided on one or both face sides with a cutout of chord shape as may be noted from Fig. 3, which does not extend over the entire width of the ring. Upon assembling the individual insulating rings 10 to 13 there are therefore produced cutouts 19, 20, 21 which are respectively covered by the overlying corresponding contact rings 7, 8, 9; thus for instance the cutout 19 corresponds to the contact ring 7. In each of these cutouts 19—21 there is inserted a leaf spring 22 which rests against the contact ring 7 associated with it and at the same time forms a mechanical coupling member between two adjacent insulating rings. The assembling of the contact rings and of the insulating rings with the inserted leaf springs 22 may be effected before being shoved onto the body of the carrier since the contact rings, as a result of their seat on the insulating rings, connect the latter with each other so that the setting rings E1 and E2 each form a structural unit which can be shoved onto the body of the carrier after completion thereof. The leaf springs may be inserted in a very simple manner upon placing the individual insulating rings and contact rings into position one after the other, no fastening members being required therefor. The leaf springs 22 are so dimensioned that they curve radially inwardly with a slight arch, when placed in the corresponding cutouts 22. These leaf springs 22 slide continuously on the metal sleeve 2 upon the turning of the setting ring E1 or of the setting ring E2. This metal sleeve 2 is provided with cutouts 23, as shown in Fig. 5 which are dimensioned and distributed according to the individual switch positions I—VIII of the contact ring switch.

The leaf springs 22 which slide on the sheet-metal sleeve therefore come out of contact with the sheet-metal sleeve 2 at the cutouts 23 and then slide on the insulating body 1 of the pneumatic dispatch carrier so that the electric connection between the corresponding contact ring of the setting ring and the metal sleeve 2 is interrupted. The contact rings of each setting ring E1 and E2 can therefore be connected in eight different combinations with the stationary contact 4 via the metal sleeve 2.

Referring to Fig. 5 which shows the metallic sleeve 2 in developed view, such sleeve being in conductive engagement with the stationary contact ring 4 (Fig. 1), and being provided with the cutouts 23. Having assumed that there are provided two groups E1 and E2 of contact rings, there are accordingly two groups of cutouts 23. The cutouts for the group E1 are in Fig. 5 at the left, including the small cutout marked 23 at the top down to and including the large cutout marked 23 at the bottom. Similar cutouts for the contact ring group E2 are provided at the right. The eight different switch combinations or positions are marked I to VIII. The contact ring group E1 may be provided for the setting of group switches and the contact ring group E2 for the setting of station switches.

There are no cutouts, in the metallic sleeve 2, for position I of the contact ring groups E1 and E2. Accordingly, the leaf springs 22, for example, of the contact rings 7, 8, 9 of the group E1 (Figs. 1 and 2) will engage the metallic sleeve 2 and will thus be conductively connected therewith and with the stationary contact ring 4 (Fig. 1). The group E2 will establish similar contact engagement in position I.

In position II, contact rings 7 and 8 will be connected with the metallic sleeve 2; contact ring 9 will be disconnected therefrom since its leaf spring 22 will extend through the corresponding cutout and will be in engagement with the inner insulating member 1.

In position III, contact rings 7 and 9 will be electrically conductively connected with the metallic sleeve 2 while contact ring 8 will be connected with the insulating member 1 over the corresponding leaf spring.

The various settings in positions IV to VI may easily be derived from Fig. 5. Positions VII and VIII will be briefly explained below.

In position VII, the leaf springs associated with the contact rings 7 and 8 will extend through a cutout in the metallic sleeve 2 into engagement with the insulating member 1. Contact ring 9, however, will be conductively connected with the metallic sleeve 2 and thus with the stationary contact ring 4.

In position VIII, all three leaf springs of the three contact rings 7, 8, 9 will extend through the large cutout into engagement with the insulating member 1 and will thus be electrically disconnected from the metallic sleeve 2 and, therefore, from the stationary contact ring 4. In such case, no current will flow, at the scanning point, by way of wipers, such as the wiper K1, and over the stationary contact ring 4 and wiper K to ground. This means, that no switching operation is to be effected in position VIII, this being assumed to be a station at the end of a tube carrier run, calling for discharge without effecting any switching.

What has been said above with reference to the contact ring groups E1 (contact rings 7, 8 and 9) also applies to contact ring group E2 comprising similar contact rings.

It will be seen from the forging explanations, that it is possible to distinguish by means of the contact ring groups E1 and E2, between 8 times 8=64 stations. In the case of larger installations, having more than 64 stations, the respective contact ring groups may each comprise, for example, four contact rings, thus making it possible to provide for $2^4=16$ switching combinations, that is, to distinguish between 16 times 16=256 stations. It is, of course, also possible to provide one group with

four contact rings and another group with three contact rings, resulting in the possibility to distinguish between 16 times 8=128 stations.

The detection of the destination symbol for which the dispatch tube carrier has been set is affected at the scanning place in the customary manner by the contact wipers K and further wipers of which only contact wiper K1 is shown in Fig. 1. The remaining omitted contact wipers are then, in the position of the pneumatic dispatch carrier shown in the drawing, simultaneously in contact with the contact rings on the setting rings E1 and E2. In other words, there is a wiper such as K1 for each setting ring of each contact ring group E1 and E2. The one pole of the source of current (not shown) is connected in the customary manner to the contact wiper K, while the contact wipers such as K1 are connected to the other pole of the source of current by way of relays respectively associated therewith. These relays are excited in various combinations depending on the position of the setting rings E1 and E2 and control the pneumatic tube switches in the customary manner via a pyramidal switching of the relay contacts.

In the case of flying scanning of the destination characteristic as the pneumatic dispatch carrier travels past the contact wipers K, K1 . . . etc. a switching effect should only be produced when the pneumatic dispatch carrier has the position shown in Fig. 1 with respect to the stationary contact wipers K, K1 . . . etc. This means that the distance *a* between the contact ring 4 and the first adjustable contact ring 7 must be greater than the distance *b* between the contact ring 7 and the last contact ring of the setting ring E2.

Changes may be made within the scope and spirit of the appended claims.

I claim:

1. A pneumatic dispatch carrier comprising a tubular carrier body of insulating material, an annular stationary contact member operatively mounted on said tubular carrier body, a tubular metallic sleeve connected at one end thereof with said stationary contact member, a sleeve of insulating material concentrically mounted with respect to said tubular carrier body and said tubular metallic sleeve; a plurality of insulating rings disposed on said tubular metallic sleeve, metallic contact rings rotatably supported on said insulating rings, said tubular metallic sleeve provided with cutouts providing individual switch positions; a lateral cutout formed in each insulating ring and aligned with a corresponding cutout of the adjoining insulating ring to form a recess therewith extending between adjoining insulating rings, a leaf spring disposed in each recess in coupling relationship with respect to the corresponding adjoining insulating rings to permit common rotation of a plurality of said metallic contact rings, said leaf springs being respectively adapted

to establish responsive to rotation of the corresponding metallic contact rings selective conductive engagement of said metallic contact rings with said tubular metallic sleeve and adapted to come out of contact with said tubular metallic sleeve at said cutouts providing individual switch positions.

2. A pneumatic dispatch carrier according to claim 1, wherein said cutouts formed in said tubular metallic sleeve selectively receive said leaf springs responsive to corresponding rotation of said metallic contact rings for the purpose of disconnecting the corresponding metallic contact rings from said tubular metallic sleeve.

3. A pneumatic dispatch carrier according to claim 1, wherein a predetermined plurality of said metallic contact rings and associated insulating rings form a contact setting unit which is rotatable about said tubular metallic sleeve, and a device for securing said unit in angularly adjusted position, said device comprising a stationary cage ring disposed at one end of said contact setting unit and carrying steel balls resting against a resilient insert contained therein, depressions being formed in a member of said contact setting unit adjoining said stationary cage ring for receiving said steel balls in stop engagement therewith.

4. A pneumatic dispatch carrier according to claim 3, wherein said stationary cage ring is cross-sectional U shaped and electrically conductively interconnected with said tubular metallic sleeve.

5. A pneumatic dispatch carrier according to claim 1, wherein said annular stationary contact member is disposed at a point spaced from the rotatable metallic contact ring nearest thereto by a distance which is greater than the distance between the first and the last rotatable metallic contact ring as seen in the direction of travel of said carrier.

6. A pneumatic dispatch carrier according to claim 1, wherein said tubular metallic sleeve, said sleeve of insulating material, said insulating rings and said metallic contact rings are removably mounted upon said tubular carrier body, and means disposed at one end of said tubular carrier body for securing said tubular metallic sleeve, said sleeve of insulating material, said insulating rings and said metallic contact rings in position and against axial displacement with respect to said annular stationary contact member.

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