

July 12, 1966

U. BUZZI
TRANSIT WHEEL FOR ROTOR WITH STATIONARY
AND RADIAL MOVABLE CONTACTS
Filed Jan. 10, 1964

3,260,804

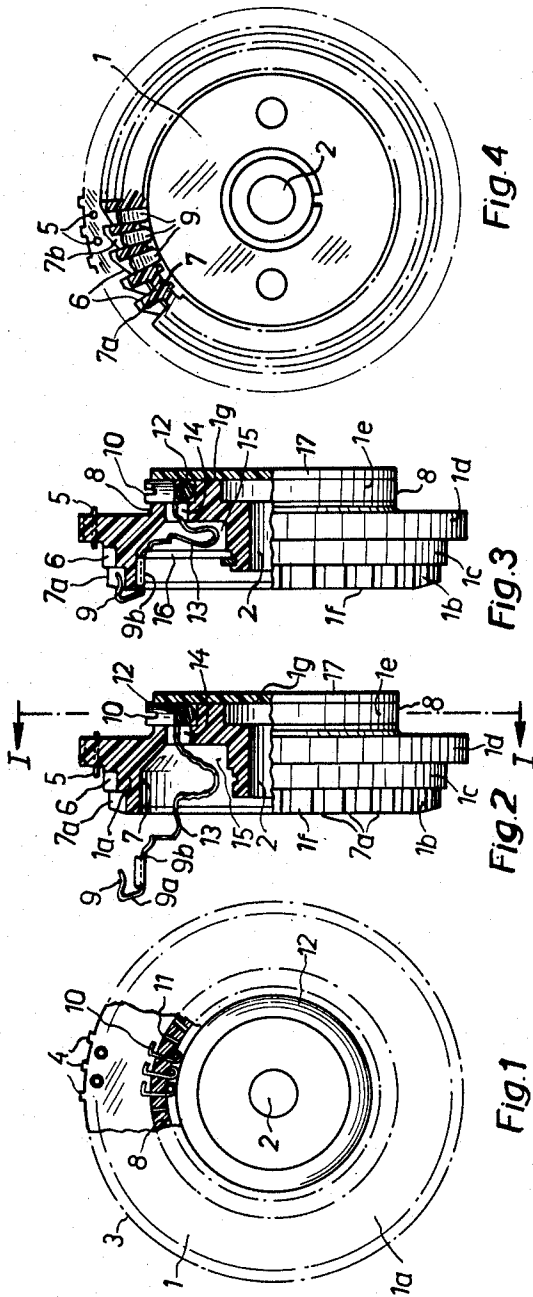


Fig. 4

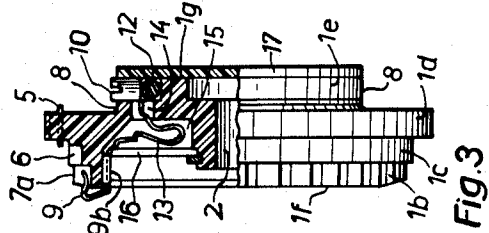


Fig. 3

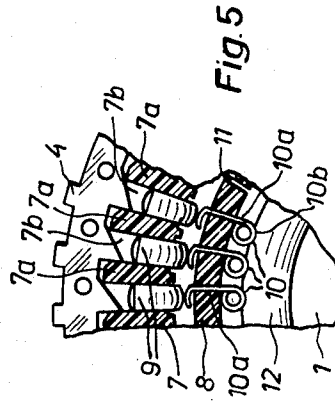


Fig. 5

INVENTOR:
Ugo Buzzi
By *Thomas W. Kleeman*
His Attorney

1

2

3,260,804

TRANSIT WHEEL FOR ROTOR WITH STATIONARY AND RADIAL MOVABLE CONTACTS

Ugo Buzzi, Zug, Switzerland, assignor to Anstalt Europäische Handelsgesellschaft, Vaduz, Liechtenstein, a corporation of Liechtenstein

Filed Jan. 10, 1964, Ser. No. 337,080

Claims priority, application Switzerland, Jan. 16, 1963, 523/63

12 Claims. (Cl. 200—8)

The present invention broadly has reference to improvements in a transit or transfer wheel for rotors of the type employed in conjunction with enciphering apparatus.

Transit or transfer wheels for rotors are employed in enciphering apparatus in order to encipher or code the conductors associated with the individual letters of the alphabet for example. For this purpose, each transit wheel carries contacts at each side which are operatively connected with one another according to a predetermined schedule or pattern. The contacts at the output side of a transit wheel engage or make contact with the contacts at the input side of a neighboring transit wheel. The engagement of the transit wheels can be changed in accordance with the number of contacts.

Broadly speaking, the transit or transfer wheel constructed according to the teachings of the present invention possesses movable contacts and is generally manifested by the feature that similar, exchangeable elements formed of a single or unitary piece and having contacts which are insertable at both sides of an insulating body member of the transit wheel are provided for the individual through-conductors, whereby those contacts mounted for movement in radial direction at one side of the insulating body member are subjected to the spring or resilient action of a ring member formed of elastic material. More specifically, and in accordance with a preferred embodiment of the invention such elements incorporate movable conductors provided with rigidly connected contacts at their ends. The insulating body member of the transit wheel is provided with an annular compartment or chamber in which the movable conductors are accommodated and which are then covered by a disk or plate member, the aforesaid plate member serving at the same time to secure those contacts which are stationarily arranged in position. The transit wheel is advantageously constructed such that the movable contacts are guided in radial slots provided at the insulating body member and are seated upon the aforesaid ring formed of elastic material. The movable contacts and the ring of elastic material can advantageously be secured against axial displacement by means of a further disk or cover member.

It is, therefore, an important object of the present invention to provide an improved transit wheel of the type described permitting of rapid and easy replacement and/or positional-alteration of the individual through-connections extending from one side to the other of the transit wheel.

Another important object of the present invention resides in the provision of an improved construction of transit wheel for rotors, particularly for use in enciphering apparatus, including an improved construction of the through-connections providing electrical communication from one side of the transit wheel to the other, such that it is possible to quickly change from one through connection pattern to another.

Still another important object of the present invention is to provide an improved transit wheel assembly which is, relatively simple in construction, relatively lightweight so that it can operate at high speeds, highly reliable in

operation, and renders it possible to provide positive electrical contact between the contacts at the output side of one transit wheel with the contacts at the input side of a neighboring cooperating transit wheel.

While the new and improved physical structure of the transit wheel of the present invention provides many noteworthy advantages, as will be noted hereinafter, one of the major advantages afforded by the invention is that the transit- or through-connections from one side to the other of the transit wheel can be changed in relatively simple manner. Additionally, the transit wheel is constructed to possess a small mass, resulting in higher permissible working speeds. Furthermore, by virtue of the use of a ring of elastic material it is possible to guarantee for sufficient contact pressures with small spring deflection or movement. Finally, the aforesaid through-connections can easily be exchanged if a defect or malfunction should occur. The feature of the stationary or rigidly arranged contacts provides for good protection against dust and other foreign particles, such favorably influencing contact reliability.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific example, while indicating a preferred embodiment of the invention, is given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

In the drawing:

FIGURE 1 is a cross-sectional view of the inventive transit or transfer wheel depicted in FIGURE 2, and taken along lines I—I thereof;

FIGURE 2 is a side view, partly in section, of the transit wheel of the present invention, depicting a partially inserted transfer- or through-connection;

FIGURE 3 is a view similar to FIGURE 2 with completely inserted transfer- or through-connection;

FIGURE 4 is an end view of the device of FIGURE 3 as viewed from the left side; and

FIGURE 5 is an enlarged, fragmentary view, partly in section, and taken through two transit wheels designed according to the invention which are in physical contact with one another and at a location of engagement of the radially movable contacts at the output side of one transit wheel with the stationary contacts at the input side of a neighboring transfer wheel, the latter of which has been inserted onto the aforesaid one transit wheel.

Describing now the drawing, and with attention initially directed to FIGURES 1 to 4, it should be recognized that the inventive transit or transfer wheel 1 comprises a body member or housing 1a formed of suitable electrical insulating material. This insulating body member 1a is provided with a central bore or opening 2 permitting mounting of the transit wheel 1 upon a suitable shaft member (not shown). In this instance, the insulating body member 1a is shown to incorporate the stepped portions 1b, 1c, 1d and 1e. Further, a plurality of ribs 4 are located at the rim or periphery 3 of the stepped portion 1d and enable manual adjustment of the transit wheel 1 to be carried out. Additionally, pins or bolts 5 mounted to be displaceable into two positions are provided at the region of the rim 3 and permit reverse control at the program mechanism. At the peripheral surface of the stepped portion 1c of the transit wheel 1 there are provided teeth 6 serving to permit driving thereof from externally.

At each side, that is in the region of each side or end face 1f and 1g of the transit or transfer wheel 1 there are arranged contacts 9 and 10, respectively. More specifically, the contacts 9 are arranged on the one hand at

3

an inner wall or rim 7 of the stepped portions 1b, 1c and, on the other hand, the contacts 10 are arranged at an external or outer rim 8 of the stepped portion 1e. Moreover, the respective diameters of the inner rim 7 and the outer rim 8 are advantageously dimensioned such that the outer rim 8 of any given transit wheel 1 can be inserted or pushed into an annular compartment or chamber 15 bounded by the inner wall or rim 7 of a neighboring transit wheel, whereby the respective contacts 9, 10 of both such transit wheels are placed in contact or engagement with one another. In FIGURE 5 such condition is depicted in fragmentary, sectional view, as taken through two neighboring transit wheels, for example, if it were assumed that the transit wheel of FIGURE 2 has been moved into physical engagement with the transit wheel of FIGURE 3. From FIGURE 5 it can be particularly seen the manner in which there occurs contact-engagement of the stationary contacts 9 arranged at the region of end face 1f of one transit wheel with the radially movable contacts 10 situated at the region of the end face 1g of the other cooperating transit wheel.

Up to the present, the foregoing description has given a rather broad recitation of the general arrangement of each transit or transfer wheel 1, and now further specific physical structure thereof will be considered, in particular details of the through-connection or through-conductor elements including their contacts 9 and 10 as well as the manner of mounting these contacts at the corresponding sides of the transit or transfer wheel. Thus, it can be seen that the contacts 9 disposed in the region of end face or side 1f of the transit wheel 1 each embody a U-shaped band member 9a including a leg portion 9b. The stepped portion 1b of the transit wheel is advantageously provided with a plurality of outwardly directed, upright or radially extending legs or ribs 7a which form a respective pocket or compartment 7b between each two adjacent ribs 7a adapted to receive the U-shaped band member 9a of an associated contact 9. By virtue of this arrangement the contacts 9 can be inserted into the pockets 7b and thereby clamped onto the inner rim 7, as best shown in FIGURE 3. Moreover, each of the contacts 10 situated at the region of the other end face or side 1g of the stepped portion 1e of the transit wheel 1, is retained in a respective radial extending slot 11 provided at the outer or external rim 8 by means of a straight portion 10a of each such contact 10. It will further be seen that a base portion 10b of each contact 10 bears or rests against an elastic support ring 12 or the like which effects the necessary contact pressure.

The conductors 13 are rigidly connected to the contacts 9 and 10 in any suitable manner, as by soldering for example to form the individual through-conductor elements. These conductors 13 each possess such a length that an electrical connection is possible, as desired, between any contact location disposed in the region of one face or side of the transit wheel 1, such as face 1f, with any contact location disposed at the other face or side thereof, such as face 1g. During insertion or exchange of the contacts 10 the conductors 13 are guided through suitable, spaced openings 14 provided at the body member 1a of the transit wheel 1, as shown, so that the conductors need not have to be unsoldered.

The excess portion or "free length" of the conductors 13, as best shown in FIGURE 3, are accommodated in the annular chamber or compartment 15 bounded by inner wall 7 of the transit wheel 1, and such compartment is then obturated by means of a suitable disk or plate 16. It should be apparent when inspecting FIGURE 3 that this disk or plate member 16 not only seals the compartment 15 from dust, foreign particles, etc., but also retains the contacts 9 fixedly seated within their corresponding pockets 7b, since this plate member 16 bears against the lengthwise extending leg 9b of each such inserted contact 9. Finally, a cover member 17 can be threaded or otherwise connected onto the transit wheel 1, effecting

4

that the movable contacts 10 as well as the elastic ring 12 are secured in position.

While there is shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practised within the scope of the following claims.

What is claimed is:

1. A transit wheel, particularly, for rotors for enciphering apparatus, comprising a body member formed of insulating material and having opposed sides, means provided at both of said opposed sides of said body member for supporting individual contacts, said supporting means at one side of said body member being constructed to permit radial movement of each supported contact, at least one element including opposed end portions and formed of a single piece and having a respective contact at each end portion, each said element and associated contacts defining an integral through-conductor for passage of electrical energy from the contact at one end portion of said element to the contact at the other end portion thereof, the contact at each respective end portion of said element being positioned to engage with the respective supporting means provided at a respective side of said body member, and a ring member formed of elastic material carried by said transit wheel at said one side for exerting a resilient action upon each of the radial movable contacts.
2. A transit wheel as defined in claim 1 wherein each element incorporates a movable conductor, to each respective end portion of which there is fixedly connected a contact.
3. A transit wheel as defined in claim 2 wherein said body member includes means internally communicating said one side of said body member with the other side thereof.
4. A transit wheel as defined in claim 3 wherein said communicating means includes a compartment for accommodating each movable conductor, said compartment opening towards said other side of said body member, said supporting means of said other side of said body member stationarily carrying each associated contact of each element, a plate member for sealing said compartment and simultaneously bearing against each contact stationarily carried at said other side to secure each such stationarily carried contact in position.
5. A transit wheel as defined in claim 4 wherein said supporting means at said other side includes a plurality of radial extending, outwardly directed ribs defining a respective contact-receiving pocket between each pair of adjacent ribs.
6. A transit wheel as defined in claim 1 wherein each element defining an individual integral through-conductor is similar to the other elements and is exchangeable.
7. A transit wheel as defined in claim 1 wherein said body member is provided with an external rim at said one side and at the other side with a compartment bounded by an inner rim, the diameter of said external rim being somewhat smaller than the diameter of said inner rim, whereby the external rim of one transit wheel can be inserted into the compartment bounded by said inner rim of an adjacent transit wheel.
8. A transit wheel as defined in claim 1 wherein said supporting means at said one side of said body member includes at least one radial slot for each movable contact which is displaceably carried in said radial slot and bears against said ring member.
9. A transit wheel as defined in claim 8 including a plate member for securing each movable contact and said ring member against axial displacement.
10. A transit wheel of the type described comprising an insulating body member having opposed sides, means provided at both of said opposed sides of said body member for supporting individual contacts, said supporting means at one side of said body member being constructed to permit movement of each supported contact, said sup-

5

porting means at the other side of said body member being constructed to stationarily hold the associated contacts, a plurality of similar exchangeable elements, each said element including opposed end portions and formed of a single piece and having a respective contact in the region of each end portion, each said element and associated contacts defining an integral through-conductor for passage of electrical energy from the contact at one end portion of said element to the contact at the other end portion thereof, the contact at each respective end portion of each said element engaging with the respective supporting means provided at a respective side of said body member, and a resilient ring member carried by said transit wheel at said one side for exerting a spring action against each of the movable contacts.

11. A transit wheel, particularly for rotors for enciphering apparatus, comprising a body member formed of insulating material, said body member having opposed sides and provided with an internal compartment extending from one opposed side towards the other opposed side, said internal compartment being bounded by wall means defining an inner rim portion, said other opposed side having an outer rim portion, said one opposed side of said body member being provided with means which incorporate said inner rim portion for supporting at least one contact at said one opposed side, said other opposed side being provided with means in the neighborhood of said outer rim portion for supporting at least one further contact for radial movement, at least one electrically conductive element having opposed free ends, a contact member affixed to each free end, one such contact member providing said one contact and the other contact member said radial movable further contact, said electrically conductive element together with said pair of associated contact members defining an integral through-conductor for the transmission of electrical energy between said contact members, said one contact member engaging with said supporting means at said one opposed side and bearing against said inner rim portion thereof, said other radially movable contact member engaging with said supporting means of said other opposed side located at the region of said outer rim portion, and a ring member formed of elastic material carried by said body member at said other opposed side for exerting a resilient action upon said other radially movable contact member.

6

12. A transit wheel, particularly for rotors for enciphering apparatus, comprising a body member formed of insulating material, said body member having opposed sides and provided with an internal compartment extending from one opposed side towards the other opposed side, said internal compartment being bounded by wall means defining an inner rim portion, said other opposed side having an external stepped portion providing an outer rim portion, said outer rim portion at said other opposed side possessing a smaller external diameter than the internal diameter of said inner rim portion at said one opposed side, to thereby enable the outer rim portion of a given transit wheel to be telescopically inserted into said internal compartment of a neighboring, similarly constructed transit wheel, said one opposed side of said body member being provided with means which incorporate said inner rim portion for supporting at least one contact at said one opposed side, said other opposed side being provided with means at the region of said outer rim portion for supporting at least one further contact for radial movement, at least one electrically conductive element having opposed free ends, a contact member affixed to each free end, one such contact member providing said one contact and the other contact member said radial movable further contact, said electrically conductive element together with said pair of associated contact members defining an integral through-conductor for the transmission of electrical energy between said contact members, said one contact member engaging with said supporting means at said one opposed side and bearing against said inner rim portion thereof, said other radially movable contact member engaging with said supporting means of said other opposed side located at the region of said outer rim portion, and a ring member formed of elastic material carried by said body member at said other opposed side for exerting a resilient action upon said other radially movable contact member.

References Cited by the Examiner

UNITED STATES PATENTS

3,089,923	5/1963	Wright	200—5
3,105,123	9/1963	DeFina	179—90

ROBERT K. SCHAEFER, *Primary Examiner.*

KATHLEEN H. CLAFFY, *Examiner.*

J. R. SCOTT, *Assistant Examiner.*