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⑤④ **SWITCH IN A CONVEYOR SYSTEM WITH OVERHEAD CARRIAGES.**

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Description

The present invention generally relates to a switch in a conveyor system with overhead carriages for switching the carriages between a main track and a branch track, and more specifically to a switch of the type defined in the preamble of appended claim 1. A switch of this general structure is disclosed in US-A-3,006,287, on which said preamble is based.

Currently, there are several different types of systems available for conveying, handling, storing and distributing products suspended from trolleys or carriages which are moved along tracks in the system. These tracks may either be driven or undriven. In the latter case, the carriages are generally suspended from the track by means of one or more wheels rolling freely on the track. In such systems with overhead carriages rolling on undriven tracks, it is often desirable to be able to switch the carriages onto different tracks, for instance to different working stations, buffer store or for delivery. For example, it may be desirable to switch certain carriages from several branch tracks onto a main track and thereafter move these carriages to a location where the products placed in the carriage should be packed, stored, loaded or the like. To ensure efficient switching of the carriages between the tracks, a quickly and conveniently operated switching device is required.

Different solutions to the above-mentioned problem have been presented. One solution which is close at hand and often used in practice is the provision of a switch having articulated switch tongues which are shifted between different tracks. However, these switch tongues must be relatively long to make the switch operate satisfactorily, which makes the switch very difficult to operate in its entirety. Switches of this type also suffer from the drawback that the carriages may easily stop in the switch because of the absence of distinct positions of the switch tongues. At worst, the entire carriage may drop from the track. A switch of this type is disclosed in US-A-1,078,945.

Another known solution to the same problem is a switch operating according to the turntable principle. This switch consists of a turntable which is located at the point where switching should be performed between two tracks, and which is mounted on a shaft at right angles to the tracks. The turntable carries two track sections whose length and shape are adapted to the discontinuities in the tracks where switching should be effected. By rotating the shaft, one of the track sections of the turntable is brought to a suitable switching position. However, this switch also suffers from the same shortcomings as the switch mentioned above, i.e. it is difficult to operate and has no distinct, reliable switching positions. Also in this turntable-type switch, the carriages may stop unintentionally and even drop from the tracks.

The object of the present invention therefore is to

provide a quick, reliable and easily operated switch having distinct, reliable switching positions. Another object of the invention is to provide a switch minimizing the risk that the carriages suspended from the tracks may stop or drop from the track.

These and other objects stated hereinafter have now been achieved by means of a switch which is of the type described by way of introduction and which, according to the invention, has the further features stated in the characterising clause of appended claim 1.

Preferred embodiments of the switch according to the invention are stated in the appended subclaims.

The invention and its many advantages will be described in more detail hereinbelow with reference to the accompanying drawings. Fig. 1 illustrates a conveyor system using overhead carriages and including switches according to the invention. Fig. 2 illustrates the switch according to the invention with certain parts removed, when in a first switching position. Fig. 3 illustrates the switch according to the invention with certain parts removed, when in a second switching position.

Fig. 1 shows a conveyor system employing trolleys or carriages 1 which are suspended by means of wheels 3 from an undriven track 2 and which in a known manner are manually, freely rollable on the track 2. Associated with the track 2 are a plurality of branch tracks 4 onto which the carriages 1 can be switched, as desired. A switch, 5 schematically illustrated in this Figure is provided at each point where branch tracks 4 join the track 2, one of said points being marked with a ring.

In Fig. 2, it is shown how the switch 5 according to the invention is arranged in relation to the track 2 and the branch track 4. The carriage 1, of which only part is shown, is suspended from the track 2 by means of the wheel 3 which, as mentioned above, is rolling freely on the track 2. When the switch 5 is in the position shown in Fig. 2, the carriage 1 can be rolled past the switch 5 without being switched onto the branch track 4.

The switch 5, disposed horizontally in the illustrated embodiment, comprises a U-shaped frame 6 located at the side of the track 2. In the frame 6, there is mounted a first switch tongue 7 which is pivotal at a first connecting point 8 and whose free end 9 in the switching position shown is located at a switching point 10. In this switching position, the first switch tongue 7 bridges the space between the first connecting point 8 and the switching point 10 in such a manner that the carriage 1 can be moved through the switch 5 in a direction forming an extension of the track 2.

The switch 5 further comprises a second switch tongue 11 which is pivotally mounted at a second connecting point 12 and whose free end 13 in the switching position shown is raised from the switching point 10.

The end of the switch tongue 7 located at the connecting point 8 is fixedly connected to an L-shaped link element 14 pivotally mounted on one shank 15 of the frame 6 by means of a shaft 16. The end of the switch tongue 11 located at the connecting point 12 is fixedly connected to an L-shaped link element 17 pivotally mounted by means of a shaft 18 on a part 19 of the frame 6. The frame part 19 is spaced from and extends substantially parallel to the shank 15 of the frame 6.

In the frame 6, there is also mounted a control shaft 20 comprising a first link system in the form of a link arm 21 one end of which is hingedly connected to the L-shaped link element 14 and the other end of which is hingedly connected to a link 22 fixedly mounted on the control shaft 20. The link system 14, 21, 22 controls the pivotal movement of the first switch tongue 7.

The switch tongue 11 has a similar link system in the form of a link arm 23 one end of which is hingedly connected to the L-shaped link element 17 and the other end of which is hingedly connected to a link 24 fixedly mounted on the control shaft 20. The link system 17, 23, 24 controls the pivotal movement of the second switch tongue 11.

The two link systems 14, 21, 22 and 17, 23, 24 together form a link mechanism which is actuated by the control shaft 20 and by means of which the switch tongues 7, 11 are pivoted about their connecting points 8 and 12, respectively, for performing the switching operation. Thus, it is a matter of alternately bridging the space between the respective connecting point 8, 12 and the common switching point 10. The rotation of the control shaft 20 is brought about manually by means of a control lever 25.

To prevent the carriages 1 from dropping from the track 2 or the branch track 4, a safety rail 26 having the same shape as the switch tongue 11 is provided underneath this tongue. Thus, the rail 26 extends from one location below the switching point 10 to another location below the connecting point 12. Under other conditions, the safety rail 26 may of course instead be located below the switch tongue 7.

In Fig. 3, the switch 5 is shown in its second switching position, i.e. after rotation of the control shaft 20. By means of the link mechanism, the free end 9 of the tongue 7 has been pivoted up from the switching point 10, while the free end 13 of the switch tongue 11 has been pivoted down onto the switching point 10. In this switching position, the carriage, not shown in this Figure, can thus be rolled onto the branch track 4.

From Fig. 3, it also clearly appears that the connecting points 8, 12 and the switching point 10 are arranged in a common, substantially horizontal plane at the corners of an imaginary triangle. It further appears that the control shaft 20 and the connecting points 8, 12 are located in a plane substantially at right

angles to the horizontal plane in which said triangle is contained.

The alternate operation of the switch 5, i.e. the pivotal movements of the switch tongues 7, 11 to and from the common switching point 10, is effected in a quick, simple and highly reliable manner. The distinct switching positions of the switch tongues 7, 11, which have a U-shaped section in the illustrated embodiment, are further ensured by a rod or pin 27 which is provided at the switching point 10 and by means of which the ends 9 and 13 of the switch tongues 7 and 11, respectively, are engaged in the switching position. Similar rods are provided at the connecting points 8, 12.

In the illustrated embodiment, the switch 5 has been described as a manually operable switch, but it is evident that it may as well be automatically operable by means of a schematically illustrated pneumatic or hydraulic unit 28 which is part of the conveyor system and which brings about rotation of the control shaft 20 and is controlled by position transducers 29 arranged along the tracks 2, 4 and sensing the movement of the carriages 1 (see Fig. 1).

The different parts of the switch 5 are preferably of metal so that the parts to be fixedly interconnected can easily be welded together. However, it will be understood that, as an alternative, the different parts may be assembled by screw means and that the parts may wholly or partly consist of plastic.

Claims

1. A switch in a conveyor system with overhead carriages (1) for switching the carriages between a main track (2) and a branch track (4), said tracks each having a connecting point (8 and 12, respectively) in the switch (5) and a common switching point (10) spaced from said connecting points, the space between the respective connecting point and the switching point being alternately bridgeable by means of two switch tongues (7, 11), said connecting points (8, 12) and the switching point (10) being arranged at the corners of an imaginary triangle in a common plane, and each switch tongue (7, 11) being pivotally mounted at the respective connecting point in such a manner that its free end (9 and 13, respectively) can be moved to and removed from the switching point, characterised in that the switch (5) comprises an overhead support element (6, 19) including a first substantially U-shaped support member extending substantially in the direction of the main track (2) and having an overhead web (6), and downwardly extending shanks associated with the main track (2), and a second support member (19) projecting sidewardly from said first support member and disposed above the branch track (4) substantially at the respective connecting point (12); the switch (5) further having a control shaft (20)

mounted in connection with said web (6) substantially transversely of the tracks (8, 12) and being spaced from said common plane and connected both to a first link system (14, 21, 22) for pivoting one switch tongue (7), and to a second link system (17, 23, 24) for pivoting the other switch tongue (11); wherein the first link system comprises a first operating member (14) rotatably mounted on one shank of said first support member and connected to one switch tongue (7) whereas the other link system comprises a second operating member (17) rotatably mounted on said second support member (19) and connected to the other switch tongue (11); the switching of said switch tongues (7, 11) being accomplished by operating the control shaft (20) which via the operating members (14, 17) of the two link systems moves the tongues.

2. Switch as claimed in claim 1, wherein the control shaft (20) and the connecting points (8, 12) are located in a plane substantially at right angles to said common plane.

3. Switch as claimed in claim 1 or 2, wherein the support member (19) is located in a plane extending substantially at right angles to the branch track (4) at the connecting point (12) of said other switch tongue (11).

4. Switch as claimed in any one of the preceding claims, wherein the control shaft (20) is supported also by the support member (19).

5. Switch as claimed in any one of the preceding claims, wherein it comprises a fixed safety rail (26) extending from a location directly underneath the connecting point (8 or 12) of one switch tongue (7 or 11) to a location directly underneath the switching point (10) and having the same shape as said switch tongue.

6. Switch as claimed in any one of the preceding claims, wherein the the control shaft (20) is manually rotatable by means of an operating lever (25) or the like.

7. Switch as claimed in claims 1-5, wherein the control shaft (20) is automatically rotatable by means of a pneumatic or hydraulic unit (28).

8. Switch as claimed in claim 7, wherein it is remote-controlled by electrical means (29), such as position transducers, which are disposed along the tracks (2, 4) of the conveyor system and which sense the movement of the carriages (1).

Patentansprüche

1. Weiche in einem Fördersystem mit Hängewagen (1) zum Rangieren der Wagen zwischen einer Hauptbahn (2) und einer Zweigbahn (4), welche Bahnen je eine Anschlussstelle (8 bzw. 12) in der Weiche (5) und eine gemeinsame Abzweigstelle (10) im Abstand von den Anschlussstellen haben, wobei der Raum zwischen der jeweiligen Anschlussstelle

und der Abzweigstelle mittels zweier Weichenzungen (7, 11) wechselweise überbrückbar ist, die Anschlussstellen (8, 12) und die Abzweigstelle (10) in den Ecken eines gedachten Dreiecks in einer gemeinsamen Ebene angeordnet sind, und jede Weichenzunge (7, 11) an der jeweiligen Anschlussstelle schwenkbar angebracht ist, derart, dass ihr freies Ende (9 bzw. 13) an die Abzweigstelle herangeführt und von dieser entfernt werden kann, dadurch **gekennzeichnet**, dass die Weiche (5) ein hängendes Traglelement (6, 19), welches ein erstes, im wesentlichen U-förmiges und sich im wesentlichen in der Richtung der Hauptbahn (2) erstreckendes Tragglied mit einem hängenden Steg (6) und sich nach unten erstreckenden, mit der Hauptbahn (2) verbundenen Schenkeln einbegreift, und ein zweites Tragglied (19) umfasst, welches seitwärts vom ersten Tragglied vorragt und oberhalb der Zweigbahn (4) im wesentlichen an der jeweiligen Anschlussstelle (12) untergebracht ist, wobei die Weiche (5) ferner eine in Verbindung mit dem Steg (6) im wesentlichen quer zu den Bahnen (8, 12) angebrachte Steuerwelle (20) aufweist und im Abstand von der gemeinsamen Ebene angeordnet und sowohl mit einem ersten Gelenksystem (14, 21, 22) zum Schwenken der einen Weichenzunge (7) als auch mit einem zweiten Gelenksystem (17, 23, 24) zum Schwenken der anderen Weichenzunge (11) verbunden ist, wobei das erste Gelenksystem ein erstes Betätigungsglied (14) umfasst, das am einen Schenkel des ersten Tragglieds drehbar gelagert und mit der einen Weichenzunge (7) verbunden ist, während das andere Gelenksystem ein zweites Betätigungsglied (17) umfasst, das am zweiten Tragglied (19) drehbar gelagert und mit der anderen Weichenzunge (11) verbunden ist, wobei die Verschiebung der Weichenzungen (7, 11) durch Betätigung der Steuerwelle (20) zustandegebracht wird, welche über die Betätigungsglieder (14, 17) der beiden Gelenksysteme die Zungen bewegt.

2. Weiche nach Anspruch 1, dadurch **gekennzeichnet**, dass sich die Steuerwelle (20) und die Anschlussstellen (8, 12) in einer Ebene im wesentlichen rechtwinklig zur genannten gemeinsamen Ebene befinden.

3. Weiche nach Anspruch 1 oder 2, dadurch **gekennzeichnet**, dass sich das Tragglied (19) in einer Ebene befindet, die sich im wesentlichen rechtwinklig zur Zweigbahn (4) an der Anschlussstelle (12) der anderen Weichenzunge (11) erstreckt.

4. Weiche nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet**, dass die Steuerwelle (20) auch vom Tragglied (19) gestützt ist.

5. Weiche nach einem der vorhergehenden Ansprüche, **gekennzeichnet** durch eine feste Sicherheitsschiene (26), die sich von einem Punkt direkt unterhalb der Anschlussstelle (8 oder 12) der einen Weichenzunge (7 oder 11) zu einem Punkt direkt unterhalb der Anschlussstelle (10) erstreckt und die-

selbe Form hat wie die Weichenzunge.

6. Weiche nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet**, dass die Steuerwelle (20) mittels eines Bedienungshebels (25) od. dgl. von Hand drehbar ist.

7. Weiche nach den Ansprüchen 1-5, dadurch **gekennzeichnet**, dass die Steuerwelle (20) mittels einer pneumatischen oder hydraulischen Einheit (28) automatisch drehbar ist.

8. Weiche nach Anspruch 7, dadurch **gekennzeichnet**, dass sie durch elektrische Mittel (29), beispielsweise Lagemesswandler, ferngesteuert ist, welche längs der Bahnen (2,4) des Fördersystems untergebracht sind und die Bewegung der Wagen (1) abtasten.

Revendications

1. Aiguille de système de convoyage avec chariots aériens (1) destinée à aiguiller les chariots entre une voie principale (2) et une voie d'embranchement (4), lesdites voies ayant chacune un point de raccordement (8 et 12, respectivement) dans l'aiguille (5) et un point commun d'aiguillage (10) placé à distance des points de raccordement, l'espace entre chaque point de raccordement et le point d'aiguillage étant franchissable en alternance par deux lames d'aiguille (7, 11), lesdits points de raccordement (8, 12) et ledit point d'aiguillage (10) étant situés dans un plan commun aux angles d'un triangle imaginaire, et chaque lame d'aiguille (7, 11) étant montée pivotante au point de raccordement respectif de façon que son extrémité libre (9 et 13, respectivement) puisse être déplacée au point d'aiguillage et en être écartée, **caractérisée** en ce que l'aiguille (5) comprend un élément de support aérien (6, 19) ayant un premier organe de support sensiblement en U qui s'étend essentiellement dans la même direction que la voie principale (2) et comporte une âme aérienne (6) et des ailes dirigées vers le bas et associées à la voie principale (2), ainsi qu'un second organe de support (19) qui fait saillie latéralement dudit premier organe de support et qui est disposé au-dessus de la voie d'embranchement (4) sensiblement à son point de raccordement (12); ladite aiguille (5) comprenant de plus un arbre de commande (20) qui est associé à ladite âme (6) et monté sensiblement transversalement auxdites voies (8, 12) à une distance dudit plan commun et qui est en outre relié non seulement à un premier système articulé (14, 21, 22) prévu pour faire pivoter une lame d'aiguille (7), mais aussi à un second système articulé (17, 23, 24) prévu pour faire pivoter l'autre lame d'aiguille (11); dans laquelle le premier système articulé comporte un premier organe de commande (14) qui est monté pivotant sur une aile dudit premier organe de support et relié à une lame d'aiguille (7), tandis que l'autre système articulé

comporte un second organe de commande (17) qui est monté pivotant sur le second organe de support (19) et relié à l'autre lame d'aiguille (11); l'aiguillage desdites lames (7, 11) étant réalisé par l'actionnement de l'arbre de commande (20) qui déplace lesdites lames à l'aide des organes de commande (14, 17) des deux systèmes articulés.

2. Aiguille selon la revendication 1, dans laquelle l'arbre de commande (20) ainsi que les points de raccordement (8, 12) sont situés dans un plan sensiblement perpendiculaire audit plan commun.

3. Aiguille selon la revendication 1 ou 2, dans laquelle l'organe de support (19) est situé dans un plan qui est sensiblement perpendiculaire à la voie d'embranchement (4) au point de raccordement (12) de ladite autre lame d'aiguille (11).

4. Aiguille selon l'une quelconque des revendications précédentes, dans laquelle l'arbre de commande (20) est supporté aussi par le second organe de support (19).

5. Aiguille selon l'une quelconque des revendications précédentes, laquelle comprend un rail de sûreté fixe (26) s'étendant d'un emplacement immédiatement au-dessous du point de raccordement (8 ou 12) d'une lame d'aiguille (7 ou 11) à un emplacement immédiatement au-dessous du point d'aiguillage (10), et affectant la même forme que ladite lame d'aiguille.

6. Aiguille selon l'une quelconque des revendications précédentes, dans laquelle l'arbre de commande (20) peut être tourné à la main au moyen d'une manette (25) ou analogue.

7. Aiguille selon les revendications 1-5, dans laquelle l'arbre de commande (20) peut être tourné automatiquement au moyen d'un ensemble pneumatique ou hydraulique (28).

8. Aiguille selon la revendication 7, laquelle est commandée à distance par des moyens électriques (29), tels que des capteurs de position, qui sont prévus le long desdites voies (2, 4) du système de convoyage pour détecter les mouvements desdits chariots (1).





