

Description

This invention relates to a continuous motion converter for converting rotary motion to reciprocatory motion and/or reciprocatory motion to rotary motion.

Known means for effecting conversion of rotary motion to reciprocatory motion have utilised an endless flexible drive member such as a chain around a pair of spaced wheels where the chain supports a carrier which will move with the movement of the chain over the wheels. In most cases the carrier is supported to one side of the chain in order that it does not interfere with the support shafts of the wheels. Where the carrier is supported from both sides of the chain provision must be made to provide support at the side of the wheels to which the shafts are mounted when the position of the carrier fixed to the chain is in alignment with the shafts. This arrangement however, has also been found to be unsatisfactory since the other side of the carrier is not so supported and eccentric loadings are induced on the chain carrier and wheel.

According to the present invention there is provided a continuous rotary to reciprocatory or reciprocatory to rotary motion converter comprising; a pair of wheels in spaced co-planar relationship to each other and having an endless flexible drive member received over them; a carrier located about the outer perimeter of the drive member; a primary slot extending transversely across said carrier; a secondary slot formed in the carrier which intersects said primary slot and is configured to clear a shaft of at least one of said wheels when the carrier is in proximity to said one of said wheels; a slider connected to said drive member, said slider extending across the outer width of said drive member and reciprocating within said primary slot from one side thereof to the other side thereof on movement of the slider with the drive member and consequent transverse movement of the slider relative to an axis extending between the wheels with movement of the drive member over the wheels; said slider traversing said secondary slot as said drive member passes across said one of said wheels; and characterised by both ends of the slider being continuously supported by the carrier, or the slider being continuously supported to each side of the outer width of the drive member by the carrier, when the carrier is in the vicinity of said one of said wheels and when the slider traverses said secondary slot.

Further according to the present invention there is provided a continuous rotary to reciprocatory or reciprocatory to rotary motion converter comprising; a pair of wheels in spaced co-planar relationship to each other and having an endless flexible drive member received over them; a carrier located about the outer perimeter of the drive member; a primary slot extending transversely across said carrier; a secondary slot formed in the carrier which intersects said primary slot and is configured to clear a shaft of at least

one of said wheels when the carrier is in proximity to said one of said wheels; a slider connected to said drive member, said slider extending across the outer width of said drive member and reciprocating within said primary slot from one side thereof to the other side thereof on movement of the slider with the drive member and consequent transverse movement of the slider relative to an axis extending between the wheels with movement of the drive member over the wheels; said slider traversing said secondary slot as said drive member passes across said one of said wheels; and characterised by said slider being continuously supported at both ends by or from the carrier including when the carrier is in the vicinity of said one of said wheels, a slidable or slidably mounted support means being provided for supporting at least one end of the slider from the carrier as said one end traverses said secondary slot.

German Patent Specification No. 326789 shows a cross head for a crankless piston pump in which a rear bearing, despite having left the slot of the cross-head, is guided by the hub of a chain wheel and by a guide of a pump stand. Thus, one of the sides of the crosshead is slotted so that the crosshead can pass over chain wheels enabling the provision of one roller bearing each to the left and right of the chain.

The invention will be more fully understood in the light of the following description of several specific embodiments. The description is made with reference to the accompanying drawings of which:-

Figure 1 is a schematic representation of a rotary to reciprocatory motion converter according to the first embodiment;

Figure 2 is a side elevation of the second embodiment;

Figure 3 is a cross-section of the second embodiment;

Figures 4A and 4B are series of part sectional elevations of the carrier of the second embodiment illustrating the movement of the slider blocks;

Figure 5 is a plan of one form of shaft mounting of the driven wheel of the second embodiment;

Figure 6 is a sectional view along line 6-6 of figure 5; and

Figure 7 is a sectional view along line 7-7 of figure 6;

Figure 8 is a sectional view along line 8-8 of figure 6.

The first embodiment as shown at figure 1 comprises a pair of wheels 11 and 12 wherein one wheel 11 is driven from a rotary power source through a drive shaft 13 and the other wheel is freely rotatable on an idler shaft. Both wheels 11 and 12 are substantially co-planar and are interconnected by an endless flexible drive member 14 which is engaged with both wheels 11 and 12. The wheels 11 and 12 are associated with a housing body (not shown in figure 1) having a central axis which is substantially parallel with

the perpendicular axis interconnecting the axes of rotation of the wheels 11 and 12. The housing body slidably supports a carrier 15 which extends transversely with respect to the central axis of the housing body and extends to both sides of the flexible drive member 14 to provide two parallel transversely extending side portions 15a and 15b. The opposed faces of the side portions 15a and 15b are formed with a transversely extending track or primary slot 16. In the case of the embodiment the track takes the form of a slot extending through the walls of the side portions 15a and 15b however, if desired the track may be formed as a channel in the opposed faces of the side portions. The flexible drive member 14 supports at a point along its length a slider 17 which takes the form of a fixture with a protruding shaft fixed to the drive member and extending equally to each side of the drive member 14. The shaft supports a pair of rollers one at each end. Each roller is received in the slots 16 in the side portions 15a and 15b of the carrier. The side portion 15a of the carrier which is located to the side of the wheels 11 and 12 having the supports shafts 13 for the wheels is formed with a gap or secondary slot 20 whereby on movement of the carrier 15 past the shaft the side portion can pass over the shaft by the gap moving past the shaft.

With rotation of the drive shaft 13 the driven wheel 11 is caused to rotate and the idler wheel 12 is caused to rotate through the presence of the flexible drive member 14. As a result of the movement of the flexible drive member 14 the slider 17 is carried in the direction of movement of the flexible drive member causing the carrier also to be moved. On the slider reaching one of the wheels it will be caused to move from one side of the wheel to the other, with continued rotation of the wheels and this transverse movement of the slider 17 is accommodated through the engagement of the rollers of the slider in the tracks 16 in each side portion 15a and 15b of the carrier. On the slider 17 reaching the other side of the wheel it will be carried in the opposite direction to that previously produced to take the carrier with it.

To prevent disengagement of the slider 17 from the track 16 of the one side portion 15a a pair of spaced guide members 18 are supported adjacent to each of the wheels 11 and 12 which serve to fill the gap 20 provided in the one side portion 15a when the carrier is at either of its end positions and provide a continuation of the track 16 in the one side portion 15a when the carrier 15 reaches its endmost positions and at the point that the slider 17 is located in the opening 20. In addition the guide members 18 are slidably supported from the housing body support (not shown) to be capable of limited axial movement. A biasing means 21 biases the guide member 18 to a position slightly innermost of the end position of the carrier whereby on engagement by the carrier it will be carried to the end position. In addition in the event

of there being some movement of the carrier beyond the end position as a result of inertial forces the guide member 18 is able to move accordingly with the carrier to ensure the slider is supported substantially equally to both sides of the drive member 14. In this case, the inward spring bias temporarily clamps the guides to the carrier and would accommodate any axial movement of the carrier as a result of inertial and/or gravitational forces and/or other forces in the end regions of the travel of the carrier which may cause the carrier to move axially away from the perimeter of the wheel. It should be appreciated that the biasing means 21 may take any desired form.

The second embodiment as shown at figures 2, 3 and 4 comprises a pair of wheels 111 and 112 whereby one wheel 111 is driven from a rotary power source through a drive shaft 113 and the other wheel is freely rotatable on an idler shaft. Both wheels 111 and 112 are associated with a housing body 119 having a central axis which is substantially parallel with the axis interconnecting the axes of rotation of the wheels 111 and 112. The housing body 119 comprises a rectangular channel section having obliquely inwardly directed flanges 131 at the edges. A cover plate (not shown) may be fixed to its open face if desired. The housing body supports a carrier 115 which extends transversely across the support and which substantially lies to both sides of the drive member 114 to provide two parallel transversely extending side portions 115a and 115b. The opposed faces of the side portions 115a and 115b are each formed with a track 116 which extends along both side portions and which is formed as a channel in the opposed faces of the side portions 115a and 115b. The drive member 114 supports at a point along its length a slider 117 which takes the form of a fixture with a protruding shaft fixed to the flexible drive member and which extends equally over the flexible drive member transverse thereto. The shaft supports a slider block 121 at each end. The slider blocks 121 are received in the channels 116 in the side portions 115a and 115b. The one side portion 115a which is located to the side of the wheels 111 and 112 having the shafts fixed thereto is formed with a gap 120 transverse to the axis of the track whereby on movement of the carrier 115 past the shafts, the shafts are received in the gap 120. The length of the slider blocks are such that on the slider block moving along the track when the portion of the drive member 114 engages either of the wheels 111 or 112, and the slider block engages the opening in the one transversely extending portion the portion of the slider carrying the shaft does not enter the opening until the leading edge of the slider is engaged with the opposite side of the slot as shown at figures 4A and 4B. As a result both sides of the shaft are constantly supported by the tracks 116 and subjected to the same forces which counteract any inertial forces and/or gravitational forces and/or other for-

ces exerted thereon. If desired guide members similar to the guide members 18 of the first embodiment may be provided at each end position of the carrier to fill the gap 120 on the carrier reaching its end position.

With rotation of the drive shaft 113 the wheel 111 is caused to rotate and the idler wheel 112 is caused to rotate through the presence of the flexible drive member 114. As a result of the movement the flexible drive member 114 the slider 117 is carried in the direction of movement of the drive member causing the carrier also to be moved. On the slider reaching one of the wheels 111 it will be caused to move from one side of the wheel to the other side with further rotation of the wheels and this transverse movement of the slider 117 is accommodated through the engagement of the slider blocks 121 of the slider in the tracks 116 in each side portion 115a and 115b of the carrier whereby on the slider reaching the other side of the wheel it will be carried in the opposite direction to that previously produced to take the carrier with it.

The carrier 115 of the second embodiment is supported to facilitate its axial movement in the housing body 119 by a set of rollers. The rollers comprise a first set of four rollers 122 located on the outer face of the carrier adjacent the open face of the housing body. The rollers are positioned at the corners of the outer face of the carrier and are directed obliquely from the carrier to be received against the flanges 131 provided at the open face of the housing body innerfaces.

The second set of rollers comprise a pair of rollers 123 located to each side of the carrier and extending from the innermost face. One roller is located uppermost on the carrier while the other roller is located lowermost on the carrier. Both of the rollers substantially engage the internal face of the housing body 119.

The housing body may comprise a formed channel section formed from mild steel sheeting. The rollers 122 and 123 are mounted to be adjustable in their radial movement to accommodate dimensional tolerances of the housing. In the event of there being any discontinuities in the dimensions of the housing body such discontinuities are accommodated by the resilience of the channel section. In addition such resilience can be used to provide some preloading on the rollers in the carrier to eliminate lateral movement of the carrier in the housing body. If desired the housing body may be formed as a box section.

The mounting for the shafts of the embodiment is shown at figure 5, 6, 7 and 8. Each shaft 213 is supported in the housing member 220 by a first internal bearing 224 supported within a bearing housing 225 extending from the rear face and has a pulley wheel 227 fixed to it. The inner end 218 of the shaft 213 has a wheel 211 fixed thereto and is supported from the housing member by an internal bearing 229 located

in a bearing housing 231 located at the end of a boss 230 extending from the internal face of the housing member 220. The boss comprises a pair of vertically spaced portions 230a and 230b which define between themselves a journal space shaped to accommodate the shaft 213. The transverse dimension of the boss is substantially equal to the diameter of the shaft resulting in the sides of the shaft being exposed. The lower portion 230b of the boss is formed as a downwardly extending gusset between the housing member 220 and the second bearing 229. The upper portion 230a has a profiled upper portion conforming to the path of the most adjacent portion of the slider block 232 as it moves around the boss as shown at figure 6 with movement of the shaft supported thereby around the wheel 211.

A suitable application of the invention relates to a pump utilising a piston. An advantage of the embodiment resides in the capacity to supply motion for long stroke pumps utilising a piston.

It should be appreciated that the scope of the present invention need not be limited to the particular scope of the embodiment described above. In particular the invention need not be limited to a rotary to reciprocatory motion converter but is equally applicable to a reciprocatory to rotary motion converter. In addition the engagement between the wheels and endless flexible member may take any suitable form and need not be limited to a chain and toothed wheel relationship described in relation to the embodiment. In addition the housing body may take any suitable form to support the carrier in its reciprocation between the wheels. In its support by the housing body the carrier can be slidably supported by any suitable means. Furthermore if desired both shafts may be driven to provide the reciprocatory movement of the carrier or may both be driven as a result of reciprocation by the carrier.

Claims

1. A continuous rotary to reciprocatory or reciprocatory to rotary motion converter comprising; a pair of wheels (11,12;111,112) in spaced co-planar relationship to each other and having an endless flexible drive member (14;114) received over them; a carrier (15;115) located about the outer perimeter of the drive member (14;114); a primary slot (16;116) extending transversely across said carrier (15;115); a secondary slot (20;120) formed in the carrier (15;115) which intersects said primary slot (16;116) and is configured to clear a shaft (13;113) of at least one of said wheels (11,12;111,112) when the carrier (15;115) is in proximity to said one of said wheels (11,12;111,112); a slider (17;117) connected to said drive member (14;114), said slider (17;117)



ces exerted thereon. If desired guide members similar to the guide members 18 of the first embodiment may be provided at each end position of the carrier to fill the gap 120 on the carrier reaching its end position.

With rotation of the drive shaft 113 the wheel 111 is caused to rotate and the idler wheel 112 is caused to rotate through the presence of the flexible drive member 114. As a result of the movement the flexible drive member 114 the slider 117 is carried in the direction of movement of the drive member causing the carrier also to be moved. On the slider reaching one of the wheels 111 it will be caused to move from one side of the wheel to the other side with further rotation of the wheels and this transverse movement of the slider 117 is accommodated through the engagement of the slider blocks 121 of the slider in the tracks 116 in each side portion 115a and 115b of the carrier whereby on the slider reaching the other side of the wheel it will be carried in the opposite direction to that previously produced to take the carrier with it.

The carrier 115 of the second embodiment is supported to facilitate its axial movement in the housing body 119 by a set of rollers. The rollers comprise a first set of four rollers 122 located on the outer face of the carrier adjacent the open face of the housing body. The rollers are positioned at the corners of the outer face of the carrier and are directed obliquely from the carrier to be received against the flanges 131 provided at the open face of the housing body innerfaces.

The second set of rollers comprise a pair of rollers 123 located to each side of the carrier and extending from the innermost face. One roller is located uppermost on the carrier while the other roller is located lowermost on the carrier. Both of the rollers substantially engage the internal face of the housing body 119.

The housing body may comprise a formed channel section formed from mild steel sheeting. The rollers 122 and 123 are mounted to be adjustable in their radial movement to accommodate dimensional tolerances of the housing. In the event of there being any discontinuities in the dimensions of the housing body such discontinuities are accommodated by the resilience of the channel section. In addition such resilience can be used to provide some preloading on the rollers in the carrier to eliminate lateral movement of the carrier in the housing body. If desired the housing body may be formed as a box section.

The mounting for the shafts of the embodiment is shown at figure 5, 6, 7 and 8. Each shaft 213 is supported in the housing member 220 by a first internal bearing 224 supported within a bearing housing 225 extending from the rear face and has a pulley wheel 227 fixed to it. The inner end 218 of the shaft 213 has a wheel 211 fixed thereto and is supported from the housing member by an internal bearing 229 located

in a bearing housing 231 located at the end of a boss 230 extending from the internal face of the housing member 220. The boss comprises a pair of vertically spaced portions 230a and 230b which define between themselves a journal space shaped to accommodate the shaft 213. The transverse dimension of the boss is substantially equal to the diameter of the shaft resulting in the sides of the shaft being exposed. The lower portion 230b of the boss is formed as a downwardly extending gusset between the housing member 220 and the second bearing 229. The upper portion 230a has a profiled upper portion conforming to the path of the most adjacent portion of the slider block 232 as it moves around the boss as shown at figure 6 with movement of the shaft supported thereby around the wheel 211.

A suitable application of the invention relates to a pump utilising a piston. An advantage of the embodiment resides in the capacity to supply motion for long stroke pumps utilising a piston.

It should be appreciated that the scope of the present invention need not be limited to the particular scope of the embodiment described above. In particular the invention need not be limited to a rotary to reciprocatory motion converter but is equally applicable to a reciprocatory to rotary motion converter. In addition the engagement between the wheels and endless flexible member may take any suitable form and need not be limited to a chain and toothed wheel relationship described in relation to the embodiment. In addition the housing body may take any suitable form to support the carrier in its reciprocation between the wheels. In its support by the housing body the carrier can be slidably supported by any suitable means. Furthermore if desired both shafts may be driven to provide the reciprocatory movement of the carrier or may both be driven as a result of reciprocation by the carrier.

Claims

1. A continuous rotary to reciprocatory or reciprocatory to rotary motion converter comprising; a pair of wheels (11,12;111,112) in spaced co-planar relationship to each other and having an endless flexible drive member (14;114) received over them; a carrier (15;115) located about the outer perimeter of the drive member (14;114); a primary slot (16;116) extending transversely across said carrier (15;115); a secondary slot (20;120) formed in the carrier (15;115) which intersects said primary slot (16;116) and is configured to clear a shaft (13;113) of at least one of said wheels (11,12;111,112) when the carrier (15;115) is in proximity to said one of said wheels (11,12;111,112); a slider (17;117) connected to said drive member (14;114), said slider (17;117)



extending across the outer width of said drive member (14;114) and reciprocating within said primary slot (16;116) from one side thereof to the other side thereof on movement of the slider (17;117) with the drive member (14;114) and consequent transverse movement of the slider (17;117) relative to an axis extending between the wheels (11,12;111,112) with movement of the drive member (14;114) over the wheels (11,12;111,112); said slider (17;117) traversing said secondary slot (20;120) as said drive member (14;114) passes across said one of said wheels (11,12;111,112); and characterised by both ends of the slider (17;117) being continuously supported by the carrier, or the slider (17;117) being continuously supported to each side of the outer width of the drive member (14;114) by the carrier (15;115), when the carrier (15;115) is in the vicinity of said one of said wheels (11,12;111,112) and when the slider (17;117) traverses said secondary slot (20;120).

2. A motion converter as claimed in Claim 1 in which one end of the slider (17;117) is supported by the carrier (15;115), or the slider (17;117) is supported at one side of the outer width of the drive member (14;114) by the carrier (15;115), through a slidable or slidably mounted support means (18;121) when the carrier (15;115) is in the vicinity of said one of said wheels (11,12;111,112) as said slider (17;117) traverses the secondary slot (20;120).

3. A motion converter as claimed in Claim 1 wherein the slider (17) is engageable with the carrier (15) through at least one roller rotatably supported from the slider (17) and received in the primary slot (16) of the carrier (15) for said transverse movement.

4. A motion converter as claimed in Claim 1 wherein the slider (117) is engageable with the carrier (115) through at least one slider block (121) slidably supported in the primary slot (116) of the carrier (115) for said transverse movement.

5. A motion converter as claimed at Claim 3 comprising a support means (18) in the form of a guide member (18) supported adjacent to each wheel (11,12) said guide member (18) being receivable in said secondary slot (20) to be fully supported by the carrier (15) on said carrier (15) moving past said shaft (13) to its respective end position, said guide member (18) being formed with a channel to receive the slider (17) in its passage across the secondary slot.

6. A motion converter as claimed at Claim 5 wherein

the guide member (18) is capable of resilient movement with the carrier (15) in the direction of said axis when engaged with the carrier (15).

7. A motion converter as claimed at Claim 4 wherein said slider blocks (121) are of sufficient length that the distance between the mounting of the slider (117) to the slider blocks (121) and each end of the slider block (121) is greater than the width of the secondary slot (120).

8. A motion converter as claimed at any one of Claims 1 to 7 wherein the wheels (111,112) are supported at spaced locations on an elongate base (119) and said carrier (115) is guided by the base (119) for axial movement thereon.

9. A motion converter as claimed at Claim 8 wherein the elongate base (119) is formed of a channel shaped section having inwardly directed flanges (131) at the edges.

10. A motion converter as claimed at Claim 9 wherein the channel shaped section (119) comprises a formed sheet metal section.

11. A motion converter as claimed at Claim 10 wherein the channel shaped section comprises an extruded section.

12. A motion converter as claimed at any one of Claims 9, 10 or 11 wherein the carrier (115) is guided by the inner face of the channel shaped section by wheels (122,123) mounted to the carrier (115).

13. A motion converter as claimed at Claim 12 wherein the wheels (122,123) are adjustable on the carrier (115) to vary the degree of outward extension from the carrier (115).

14. A continuous rotary to reciprocatory or reciprocatory to rotary motion converter comprising; a pair of wheels (11,12;111,112) in spaced co-planar relationship to each other and having an endless flexible drive member (14;114) received over them; a carrier (15;115) located about the outer perimeter of the drive member (14;114); a primary slot (16;116) extending transversely across said carrier (15;115); a secondary slot (20;120) formed in the carrier (15;115) which intersects said primary slot (16;116) and is configured to clear a shaft (13;113) of at least one of said wheels (11,12;111,112) when the carrier (15;115) is in proximity to said one of said wheels (11,12;111,112); a slider (17;117) connected to said drive member (14;114), said slider (17;117) extending across the outer width of said drive



member (14;114) and reciprocating within said primary slot (16;116) from one side thereof to the other side thereof on movement of the slider (17;117) with the drive member (14;114) and consequent transverse movement of the slider (17;117) relative to an axis extending between the wheels (11,12;111,112) with movement of the drive member (14;114) over the wheels (11,12;111,112); said slider (17;117) traversing said secondary slot (20;120) as said drive member (14;114) passes across said one of said wheels (11,12;111,112) and characterised by said slider (17;117) being continuously supported at both ends by or from the carrier including when the carrier (15;115) is in the vicinity of said one of said wheels (11,12), a slidable or slidably mounted support means (18;121) being provided for supporting at least one end of the slider (17;117) by or from the carrier as said one end traverses said secondary slot (20;120).

15. A motion converter as claimed in Claim 14 in which said support means (18;121) is engageable with and movable with the carrier (15;115).

Patentansprüche

1. Umwandler für eine kontinuierliche Drehbewegung in eine hin- und hergehende Bewegung und umgekehrt, umfassend:
ein Paar Räder (11, 12; 111, 112), die koplanar voneinander beabstandet sind und ein endloses, flexibles Antriebsglied (14; 114) aufweisen, das über diese verläuft; einen den Außenumfang des Antriebsgliedes (14; 114) umgebenden Mitnehmer (15; 115); einen sich quer durch den Mitnehmer (15; 115) erstreckenden Primärschlitz (16; 116); einen in dem Mitnehmer (15; 115) ausgebildeten Sekundärschlitz (20, 120), welcher den Primärschlitz (16, 116) schneidet und so ausgebildet ist, daß eine Welle (13; 113) wenigstens eines der Räder (11, 12; 111, 112) vorbeigelassen wird, wenn der Mitnehmer (15; 115) sich in der Nähe eines der Räder (11, 12; 111, 112) befindet; ein an dem Antriebsglied (14; 114) befestigtes Gleitstück (17; 117), das sich quer zur Außenbreite des Antriebsgliedes (14; 114) erstreckt und sich in dem Primärschlitz (16; 116) von dessen einer Seite zu dessen anderer Seite bei seiner Bewegung mit dem Antriebsglied (14; 114) und der sich ergebenden Querbewegung des Gleitstücks (17; 117) relativ zu einer Achse hin- und herbewegt, die sich zwischen den Rädern (11, 12; 111, 112) bei einer Bewegung des Antriebsgliedes (14; 114) über die Räder (11, 12; 111, 112) erstreckt, wobei das Gleitstück (17; 117) den Sekundärschlitz (20; 120) überquert, wenn das Antriebs-

glied (14; 114) eines der Räder (11, 12; 111, 112) passiert, dadurch gekennzeichnet, daß beide Enden des Gleitstücks (17; 117) kontinuierlich durch den Mitnehmer abgestützt sind oder das Gleitstück (17; 117) kontinuierlich auf jeder Seite der Außenbreite des Antriebsgliedes (14; 114) durch den Mitnehmer (15; 115) abgestützt ist, wenn sich der Mitnehmer (15; 115) in der Nähe eines der Räder (11, 12; 111, 112) befindet und das Gleitstück (17; 117) den Sekundärschlitz (20; 120) überquert.

2. Bewegungsumwandler nach Anspruch 1, dadurch gekennzeichnet, daß ein Ende des Gleitstücks (17; 117) durch den Mitnehmer (15; 115) abgestützt ist oder das Gleitstück (17; 117) an einer Seite der Außenbreite des Antriebsgliedes (14; 114) mit Hilfe des Mitnehmers (15; 115) durch eine verschiebbare oder gleitend abgestützte Trägereinrichtung (18; 121) abgestützt ist, wenn sich der Mitnehmer (15; 115) in der Nähe eines der Räder (11, 12; 111, 112) befindet und das Gleitstück (17; 117) den Sekundärschlitz (20; 120) überquert.

3. Bewegungsumwandler nach Anspruch 1, dadurch gekennzeichnet, daß das Gleitstück (17) mit dem Mitnehmer (15) über wenigstens eine drehbar am Gleitstück (17) gehaltene Rolle in Eingriff steht und für die Querbewegung in dem Primärschlitz (16) des Mitnehmers (15) aufgenommen ist.

4. Bewegungsumwandler nach Anspruch 1, dadurch gekennzeichnet, daß das Gleitstück (117) mit dem Mitnehmer (115) durch wenigstens einen Gleitklotz (121) in Eingriff steht, der in dem Primärschlitz (116) des Mitnehmers (115) für die Querbewegung verschiebbar gehalten ist.

5. Bewegungsumwandler nach Anspruch 3, dadurch gekennzeichnet, daß eine Trägereinrichtung (18) in Form eines Führungsgliedes (18) nahe jedes Rades (11, 12) gehalten ist, wobei das Führungsglied (18) zwecks vollständiger Abstützung durch den Mitnehmer (15) in dem Sekundärschlitz (20) aufnehmbar ist, wenn der Mitnehmer (15) sich an der Welle (13) vorbei bis in seine jeweilige Endposition bewegt, und wobei das Führungsglied (18) eine Rinne zum Aufnehmen des Gleitstücks (17) bei dessen Durchgang quer über den Sekundärschlitz aufweist.

6. Bewegungsumwandler nach Anspruch 5, dadurch gekennzeichnet, daß das Führungsglied (18) in der Lage ist, mit dem Mitnehmer (15) eine federnde Bewegung in Richtung der Achse auszuführen, wenn es mit dem Mitnehmer (15) in Ein-



griff steht.

7. Bewegungsumwandler nach Anspruch 4, dadurch gekennzeichnet, daß die Gleitklötze (121) eine ausreichende Länge derart aufweisen, daß der Abstand zwischen der Aufnahme des Gleitstücks (117) an den Gleitklötzen (121) und jedem Ende des Gleitklotzes (121) größer ist als die Breite des Sekundärschlitzes (120).
8. Bewegungsumwandler nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die Räder (111, 112) in beabstandeter Anordnung an einem länglichen Basisteil (119) gehalten sind und der Mitnehmer (115) durch das Basisteil (119) bei seiner Axialbewegung auf diesem geführt ist.
9. Bewegungsumwandler nach Anspruch 8, dadurch gekennzeichnet, daß das längliche Basisteil (119) einen kanalförmigen Abschnitt mit an den Kanten nach innen gerichteten Rändern (131) aufweist.
10. Bewegungsumwandler nach Anspruch 9, dadurch gekennzeichnet, daß der kanalförmige Abschnitt (119) einen Formblechabschnitt aufweist.
11. Bewegungsumwandler nach Anspruch 10, dadurch gekennzeichnet, daß der kanalförmige Abschnitt einen spritzgegossenen Abschnitt aufweist.
12. Bewegungsumwandler nach einem der Ansprüche 9, 10 oder 11, dadurch gekennzeichnet, daß der Mitnehmer (115) mittels daran befestigter Räder (122, 123) auf der Innenfläche des kanalförmigen Abschnitts geführt ist.
13. Bewegungsumwandler nach Anspruch 12, dadurch gekennzeichnet, daß die Räder (122, 123) an dem Mitnehmer (115) einstellbar sind, um das Maß der Erstreckung aus dem Mitnehmer (115) zu verändern.
14. Umwandler für eine kontinuierliche Drehbewegung in eine hin- und hergehende Bewegung und umgekehrt, umfassend:
ein Paar Räder (11, 12; 111, 112), die koplanar voneinander beabstandet sind und ein endloses, flexibles Antriebsglied (14; 114) aufweisen, das über diese verläuft; einen den Außenumfang des Antriebsgliedes (14; 114) umgebenden Mitnehmer (15, 115); einen sich quer durch den Mitnehmer (15; 115) erstreckenden Primärschlitz (16; 116); einen in dem Mitnehmer (15; 115) ausgebildeten Sekundärschlitz (20, 120), welcher den

5

10

15

20

25

30

35

40

45

50

55

Primärschlitz (16, 116) schneidet und so ausgebildet ist, daß darin eine Welle (13; 113) wenigstens eines der Räder (11, 12; 111, 112) aufgenommen ist, wenn der Mitnehmer (15; 115) sich in der Nähe eines der Räder (11, 12; 111, 112) befindet; ein an dem Antriebsglied (14; 114) befestigtes Gleitstück (17; 117), das sich quer zur Außenbreite des Antriebsgliedes (14; 114) erstreckt und sich in dem Primärschlitz (16; 116) von dessen einer Seite zu dessen anderer Seite bei seiner Bewegung mit dem Antriebsglied (14; 114) und seiner sich ergebenden Querbewegung relativ zu einer Achse hin- und herbewegt, die sich zwischen den Rädern (11, 12; 111, 112) bei einer Bewegung des Antriebsgliedes (14; 114) über die Räder (11, 12; 111, 112) erstreckt, wobei das Gleitstück (17; 117) den Sekundärschlitz (20; 120) überquert, wenn das Antriebsglied (14; 114) eines der Räder (11, 12; 111, 112) passiert, dadurch gekennzeichnet, daß das Gleitstück (17; 117) an beiden Enden durch den oder von dem Mitnehmer kontinuierlich abgestützt wird, und zwar auch dann, wenn der Mitnehmer (15; 115) sich in der Nähe eines der Räder (11, 12) befindet, und eine verschiebbare oder gleitend geführte Trägereinrichtung (18; 121) zum Abstützen wenigstens eines Endes des Gleitstücks (17; 117) durch den oder von dem Mitnehmer vorgesehen ist, wenn das eine Ende den Sekundärschlitz (20; 120) überquert.

15. Bewegungsumwandler nach Anspruch 14, dadurch gekennzeichnet, daß die Trägereinrichtung (18; 121) mit dem Mitnehmer (15; 115) in Eingriff steht und mit diesem bewegbar ist.

Revendications

1. Convertisseur continu de mouvement rotatif/alternatif ou alternatif/rotatif, comprenant ; une paire de roues (11, 12 ; 111, 112) selon une relation coplanaire espacée l'une par rapport à l'autre et sur lesquelles passe un élément d'entraînement souple sans fin (14 ; 114) ; un chariot (15 ; 115) placé autour du périmètre extérieur de l'élément d'entraînement (14 ; 114) ; une fente primaire (16 ; 116) s'étendant transversalement d'un bout à l'autre dudit chariot (15 ; 115) ; une fente secondaire (20 ; 120) formée dans le chariot (15 ; 115) et coupant ladite fente primaire (16 ; 116) et configurée pour laisser passer un arbre (13 ; 113) d'au moins l'une desdites roues (11, 12 ; 111, 112) ; lorsque le chariot (15 ; 115) est à proximité de ladite une desdites roues (11, 12 ; 111, 112) ; un coulisseau (17 ; 117) relié audit élément d'entraînement (14 ; 114), ledit coulisseau (17 ; 117) s'étendant sur la largeur extérieure du-



- dit élément d'entraînement (14 ; 114) et effectuant un mouvement alternatif à l'intérieur de ladite fente primaire (16 ; 116) d'un côté de celle-ci à l'autre côté de celle-ci lors du déplacement du coulisseau (17 ; 117) avec l'élément d'entraînement (14 ; 114) et du mouvement transversal conséquent du coulisseau (17 ; 117) par rapport à un axe s'étendant entre les roues (11, 12 ; 111, 112) lors du mouvement de l'élément d'entraînement (14 ; 114) sur les roues (11, 12 ; 111, 112) ; ledit coulisseau (17 ; 117) traversant ladite fente secondaire (20 ; 120) lorsque ledit élément d'entraînement (14 ; 114) franchit l'une desdites roues (11, 12 ; 111, 112) ; et caractérisé en ce que les deux extrémités du coulisseau (17 ; 117) sont soutenues en continu par le chariot ou en ce que le coulisseau (17 ; 117) est soutenu en continu de chaque côté de la largeur extérieure de l'élément d'entraînement (14 ; 114) par le chariot (15 ; 115) , lorsque le chariot (15 ; 115) se trouve à proximité de ladite une desdites roues (11, 12 ; 111, 112) et lorsque le coulisseau (17 ; 117) traverse ladite fente secondaire (20 ; 120).
2. Convertisseur de mouvement selon la revendication 1, dans lequel une extrémité du coulisseau (17 ; 117) est soutenue par le chariot (15 ; 115) ou bien le coulisseau (17 ; 117) est soutenu au niveau d'un côté de la largeur extérieure de l'élément d'entraînement (14 ; 114) par le chariot (15 ; 115) par l'intermédiaire d'un moyen de support (18 ; 121) couissant ou monté de manière à coulisser lorsque le chariot (15 ; 115) est à proximité de ladite une desdites roues (11, 12 ; 111, 112) lorsque ledit coulisseau (17 ; 117) traverse la fente secondaire (20 ; 120).
 3. Convertisseur de mouvement selon la revendication 1, dans lequel le coulisseau (17) peut venir en contact avec le chariot (15) par l'intermédiaire d'au moins un galet soutenu, de manière à tourner, à partir du coulisseau (17) et reçu dans la fente primaire (16) du chariot (15) pour ledit mouvement transversal.
 4. Convertisseur de mouvement selon la revendication 1, dans lequel le coulisseau (117) peut venir en contact avec le chariot (115) par l'intermédiaire d'au moins un bloc à coulisse (121), soutenu de manière à coulisser dans la fente primaire (116) du chariot (115) pour ledit mouvement transversal.
 5. Convertisseur de mouvement selon la revendication 3, comprenant un moyen de support (18) sous la forme d'un élément de guidage (18), soutenu adjacent à chaque roue (11, 12), ledit élément de guidage (18) pouvant être reçu dans la dite fente secondaire (20) afin d'être totalement soutenu par le chariot (15) lorsque ledit chariot (15) se déplace au-delà dudit arbre (13) vers sa position finale correspondante, ledit élément de guidage (18) comportant une rainure pour recevoir le coulisseau (17), lors de son passage par la fente secondaire.
 6. Convertisseur de mouvement selon la revendication 5, dans lequel l'élément de guidage (18) est propre à effectuer un mouvement élastique avec le chariot (15) dans le sens dudit axe, lorsqu'il est en prise avec le chariot (15).
 7. Convertisseur de mouvement selon la revendication 4, dans lequel lesdits blocs à coulisse (121) ont une longueur suffisante pour que la distance entre le montage du coulisseau (117) sur les blocs à coulisse (121) et chaque extrémité du bloc à coulisse (121) soit supérieure à la largeur de la fente secondaire (120).
 8. Convertisseur de mouvement selon l'une quelconque des revendications 1 à 7, dans lequel les roues (111, 112) sont soutenues en des emplacements espacés sur une base allongée (119), ledit chariot (115) étant guidé par la base (119) pour un déplacement axial sur celle-ci.
 9. Convertisseur de mouvement selon la revendication 8, dans lequel la base allongée (119) est constituée par un profilé en forme de U comportant, au niveau des bords, des extrémités d'ailles (131) rabattues vers l'intérieur.
 10. Convertisseur de mouvement selon la revendication 9, dans lequel le profilé en forme de U (119) comprend un profilé en tôle métallique façonnée.
 11. Convertisseur de mouvement selon la revendication 10, dans lequel le profilé en forme de U comprend un profilé filé.
 12. Convertisseur de mouvement selon l'une quelconque des revendications 9, 10 ou 11, dans lequel le chariot (115) est guidé par la face interne du profilé en forme de U par des roues (122, 123) montées sur le chariot (115).
 13. Convertisseur de mouvement selon la revendication 12, dans lequel les roues (122, 123) sont réglables sur le chariot (115) afin de modifier le degré de sortie vers l'extérieur à partir du chariot (115).
 14. Convertisseur continu de mouvement rotatif/alternatif ou alternatif/rotatif, comprenant : une paire de roues (11, 12 ; 111, 112) selon une rela-



tion coplanaire espacée l'une par rapport à l'autre, et sur lesquelles passe un élément d'entraînement souple sans fin (14 ; 114) un chariot (15 ; 115) placé autour du périmètre extérieur de l'élément d'entraînement (14 ; 114) ; une fente primaire (16 ; 116) s'étendant transversalement d'un bout à l'autre dudit chariot (15 ; 115) ; une fente secondaire (20 ; 120) formée dans le chariot (15 ; 115) et coupant ladite fente primaire (16 ; 116) et configurée pour laisser passer un arbre (13 ; 113) d'au moins l'une desdites roues (11, 12 ; 111, 112) lorsque le chariot (15 ; 115) est à proximité de ladite une desdites roues (11, 12 ; 111, 112) ; un coulisseau (17 ; 117) relié audit élément d'entraînement (14 ; 114), ledit coulisseau (17 ; 117) s'étendant sur la largeur extérieure dudit élément d'entraînement (14 ; 114) et effectuant un mouvement alternatif à l'intérieur de ladite fente primaire (16 ; 116) d'un côté de celle-ci à l'autre côté de celle-ci lors du déplacement du coulisseau (17 ; 117) avec l'élément d'entraînement (14 ; 114), et du mouvement transversal conséquent du coulisseau (17 ; 117) par rapport à un axe s'étendant entre les roues (11, 12 ; 111, 112) lors du mouvement de l'élément d'entraînement (14 ; 114) sur les roues (11, 12 ; 111, 112) ; ledit coulisseau (17 ; 117) traversant ladite fente secondaire (20 ; 120) lorsque ledit élément d'entraînement (14 ; 114) franchit ladite une desdites roues (11, 12 ; 111, 112), et caractérisé en ce que ledit coulisseau (17 ; 117) est soutenu en continu au niveau des deux extrémités par le chariot, ou à partir de celui-ci, y compris lorsque le chariot (15 ; 115) se trouve à proximité de ladite une desdites roues (11, 12), un moyen de support (18 ; 121) couissant ou monté de manière à coulisser étant prévu pour soutenir au moins une extrémité du coulisseau (17 ; 117) par le chariot, ou à partir de celui-ci, lorsque ladite une extrémité traverse ladite fente secondaire (20 ; 120).

15. Convertisseur de mouvement selon la revendication 14, dans lequel ledit moyen de support (18 ; 121) peut venir en prise avec le chariot (15 ; 115) et être déplacé en même temps que celui-ci.

50

55

9