PATENT CLAIMS

1. A support chain (20) for supporting a line guide device (1) with a flexible envelope (10), wherein the support chain (20) may adopt extended positions to form extended runs (5, 6) and an arcuate position to form a deflection arc (7) and to this end has a plurality of individual chain links (100; 200) with a longitudinal direction (L) which are connected together in articulated manner, wherein the chain links (100; 200) each comprise a first, front longitudinal portion (101; 201) and comprise a second, rear longitudinal portion (102; 202) complementary thereto with two side parts (102A, 102B; 202A, 202B) and a space (103) therebetween, in which the first longitudinal portion (101; 201) of an adjacent chain link is arranged, and the chain links each have an inside and an outside relative to the deflection arc (7), **characterized in that**
   - in an end region and on the inside, the first longitudinal portion (101; 201) has a projection (105; 205) protruding transversely of the longitudinal direction; and
   - the second longitudinal portion (102; 202) on the inside has an inside cross-bridge (106; 206) connecting the side parts, with an extended stop face (110B) for the extended position, and a recess (107; 207) adjoining the cross-bridge (106; 206) at the front in the longitudinal direction;
   - wherein, in the extended position, the projection (105; 205) of one chain link engages in the recess (107; 207) of the connected following chain link (100; 200) and at the front on the inside cross-bridge (106; 206) thereof.

2. The support chain according to Claim 1, characterized in that at the outside and in a rear end region, the second longitudinal portion (102) has a transverse stop, in

particular an outside cross-bridge (108) connecting the side parts, which lies opposite the outside of the first longitudinal portion (101) of an adjacent chain link as abutment (115B) for the extended position.

3. The support chain according to Claim 1 or 2, characterized in that the projection (105) forms a contact face (111) for resting against the inside cross-bridge (106), which is arranged substantially perpendicular to the longitudinal direction (L).

4. The support chain according to one of Claims 1 to 3, characterized in that the first and second longitudinal portions (101, 102) have stop faces (110A, 110B) which interact in the extended position and in that the projection (105) and the inside cross-bridge (106) have interacting contact faces (111, 112) which lie substantially perpendicular to the extended stop faces (110A, 110B) and are arranged such that the projection (105) of one chain link rests, in the extended position, with its contact face (111) against the contact face (112) of the inside cross-bridge (106) of the following chain link.

5. The support chain according to one of Claims 1 to 4, characterized in that the projection (105; 205) extends over the entire width of the first longitudinal portion cross-sectionally relative to the longitudinal direction and/or the projection projects with a protrusion of at least 5%, preferably at least 10%, of the structural height of the chain link cross-sectionally relative to the longitudinal direction.

6. The support chain according to one of Claims 1 to 5, characterized in that the projection (105; 205) is arranged in the terminal front quarter of the first longitudinal portion (101; 201) and the inside cross-bridge (106; 206) is preferably arranged in the remote rear half of the second longitudinal portion (102; 202).

7. The support chain according to one of Claims 1 to 6, characterized in that the recess (107) forms an opening from the space (103) toward the inside.

8. The support chain according to one of Claims 1 to 7, characterized in that each chain link (100) includes an outside crosspiece (109) on the outside in its second longitudinal portion, wherein cross-bridge and crosspiece connect the side parts, spanning the space, and in that the inside cross-bridge (106) interacts in the extended position with an inside extended stop face (110A) of the first longitudinal portion and the outside crosspiece (109) interacts in the arcuate position with an outside arc stop face (114A) of the first longitudinal portion (101).

9. **A support chain** (20) for supporting a line guide device (1) with a flexible envelope (10), in particular according to Claim 1, wherein the support chain (20) may adopt extended positions to form extended runs (5, 6) and an arcuate position to form a deflection arc (7) and to this end has a plurality of individual chain links (100; 200) with a longitudinal direction (L) which are connected together in articulated manner, wherein the chain links each comprise a first longitudinal portion (101; 201) and a second longitudinal portion (201; 202) complementary thereto with two side parts (102A, 102B; 202A, 202B) and a space (103; 203) therebetween, in which the first longitudinal portion of an adjacent following chain link is arranged, and the chain links (100; 200) each have an inside and an outside, **characterized in that** each chain link (100; 200) includes an outside cross-connection (109; 209) on the outside in its second longitudinal portion (102; 202) and an inside cross-connection (106; 206) on the inside, which span the space (103; 203) and connect the side parts (102A, 102B; 202A, 202B), and in that the inside cross-connection (106; 206) interacts in the extended position with an inside extended stop face (110A, 210A) of the first longitudinal portion and the outside cross-

connection (109; 209) interacts in the arcuate position with an outside arc stop face (114A, 214A) of the first longitudinal portion (101; 201).

10. The support chain according to Claim 9, characterized in that the outside cross-connection is embodied as a crosspiece (109; 209) and the inside cross-connection is embodied as a cross-bridge (106; 206);
and preferably each chain link (100; 200) includes, in its second longitudinal portion, the crosspiece (109; 209) on the outside in the front region and an outside cross-bridge (108; 208) in a rear end region; wherein the first longitudinal portion (101; 201) includes a protruding region (116; 216) on the outside which engages in the arcuate position between the crosspiece (109; 209) and the outside cross-bridge (108; 208), and wherein the first longitudinal portion preferably wedges together with the second longitudinal portion in the arcuate position (116A, 116B).

11. The support chain according to one of preceding Claims 1 to 10, in particular according to Claim 9, characterized in that the first longitudinal portion (101; 201) is insertable into the space (103; 203) in the second longitudinal portion (102; 202) of an adjacent following chain link in the longitudinal direction (L).

12. The support chain according to one of preceding Claims 1 to 11, in particular according to Claim 11, wherein the longitudinal portions are embodied to form a latched connection against detachment in the longitudinal direction, each chain link having, in the one longitudinal portion, two opposing pins (117A, 117B) projecting laterally relative to the longitudinal direction, wherein each pin is latchable together with a corresponding cut-out (118A, 118B) in the other longitudinal portion, characterized in that the pins (117A, 117B) have insertion bevels tapering obliquely in the longitudinal direction L, preferably wherein each chain link

includes insertion grooves (119A, 119B) for the pins (117A, 117B) opening into the cut-outs (118A, 118B) and extending substantially in the longitudinal direction.

13. **A support chain** (20) for supporting a line guide device (1) with a flexible envelope (10), wherein the support chain (20) may adopt extended positions to form extended runs (5, 6) and an arcuate position to form a deflection arc (7) and to this end has a plurality of individual chain links (100) with a longitudinal direction (L) which are connected together in articulated manner, wherein the chain links (100) each comprise a first, front longitudinal portion (101) and a second, rear longitudinal portion (102) complementary thereto with two side parts (102A, 102B) and a space (103) therebetween, in which the first longitudinal portion (101) of an adjacent following chain link is arranged, and
both side parts (102A, 102B) of the second longitudinal portion each include a front end face (121) and a rear end face (122), which lie opposite one another in the case of adjacent chain links,
characterized in that
the front end face (121) forms a joint region (123A) and the rear end face (122) forms a complementary joint region (123B), such that the respective joint regions of the front end face (121) of one chain link and the rear end face (102) of an adjacent chain link interact for articulated connection of these two chain links (100) and, in the event of shear loading of the support chain, define a swivel axis for swiveling the two chain links,

preferably furthermore characterized

- in that the joint region (123A) of the front end face (121) is convexly configured and the joint region (123B) of the rear end face is concavely configured, and/or

- in that the joint regions are embodied for a swivelable articulated connection with a swivel axis perpendicular to the longitudinal direction.

14. The support chain according to Claim 13, characterized in that the end faces in each case form in the heightwise direction at least on one side, preferably on both sides of the joint region, a contact face (124A, 124B), preferably a curved contact face, for the arcuate or extended position.

15. The support chain according to one of preceding Claims 1 to 14, in particular according to Claim 14, wherein, in the one longitudinal portion, each chain link includes two opposing pins (117A, 117B) projecting laterally relative to the longitudinal direction, wherein each pin is latchable together with a corresponding cut-out (118A, 118B) in the other longitudinal portion, characterized in that the cut-outs (118A, 118B) run in arc of a circle-shaped manner in the side parts in a longitudinal plane.

16. The support chain according to one of Claims 1 to 15, characterized in that the chain link is produced in one piece from plastics material, in particular using the injection molding method.

17. A line guide device (1), in particular for cleanroom applications, for protected guidance of supply lines (3) such as cables, hoses or the like between two connection points (2, 4), at least one of which is mobile relative to the other, wherein the line guide device has a longitudinal direction (L) and is displaceable to-and-fro forming two runs (5, 6) and a deflection arc (7), comprising:
- a flexible envelope (10) with a number of receiving ducts (12) arranged next to one another and extending in the longitudinal direction, in each case for at least one supply line (3), and

at least one support chain (20), which is arrangeable in a receiving duct (12) to support the line guide device (1), wherein the at least one support chain is a support chain according to one of the preceding claims.