
Appendix no. 1

Installation manual of

modular spiral stairs CARLA



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Table of changes

No.	NAME	DEPT	DATE OF CHANGE	SCOPE OF CHANGE	REMARKS
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1. General safety rules

The assembly manual is a part of operation and maintenance documentation of modular spiral stairs CARLA. The stairs consist of elements fitting the specification added to the delivery.

Prior to the assembly works and operation, one should read this manual. The wrong assembly and usage can lead to health and life threatening danger.

Due to high dimensions of particular components, one should act cautiously during transport, assembly and use of the stairs.

Keep this manual as an information source for stairs users and a service team.

1. Assembly and use of stairs incompatible with the manual can result in a product malfunction and may become a source of a danger.
2. The manufacturer takes no responsibility for any damage that resulted from the improper product assembly or misuse.
3. It is forbidden to modify any of the stairs components.
4. The stairs are intended to be used in industrial conditions i.e. to be used by adults, who consider health and safety rules, are trained and sober.
5. It is forbidden to stand under the stairs when they are being used.
6. It is forbidden to use the stairs by a number of people whose combined weight exceeds the weight allowed on the stairs.
7. The stairs are designed to allow movement of people to lower levels of deep excavations and vice versa. Standing on the steps as well as putting objects which are not the components of the stairs is against the rules of use.
8. The stairs should not be used to transport other objects than tools, devices etc.
9. Due to the fact that in most cases the stairs are assembled on unpaved ground, one should consider the risk of ground sliding/ wetting which can affect stairs stability.
10. If there's a risk of falling from a height, one should always use safety harness while assembling and disassembling the stairs.

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2. Components

The basic components of CARLA stairs are landings and a stairway with railings. The stairs are available with a maximum height of 6000mm and a radius of 900, 1000, 1100mm. The structure of the CARLA modular stairs system provides for the right and left versions of the stairs and the installation of the upper landing in two configurations shown below. The stair system allows step height adjustment in the range from 160mm to 200mm, the step height is determined at the ordering stage.

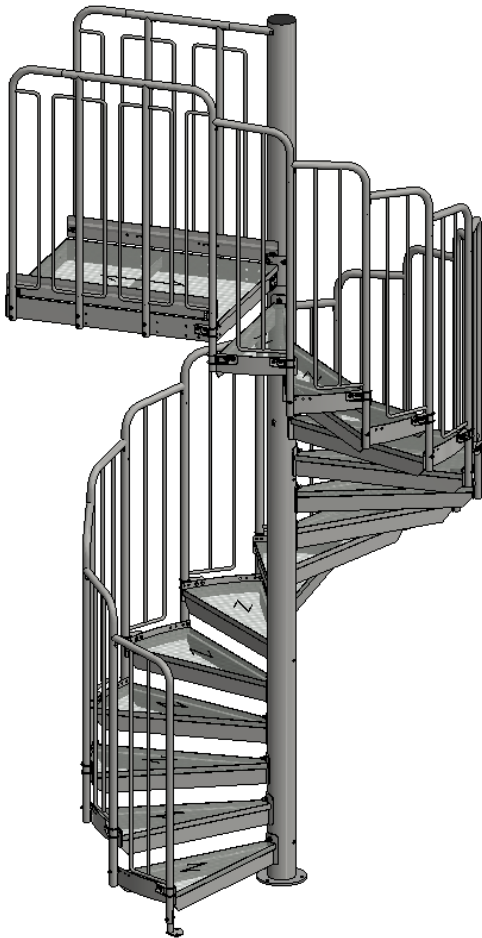


Figure 1. Landing with straight exit

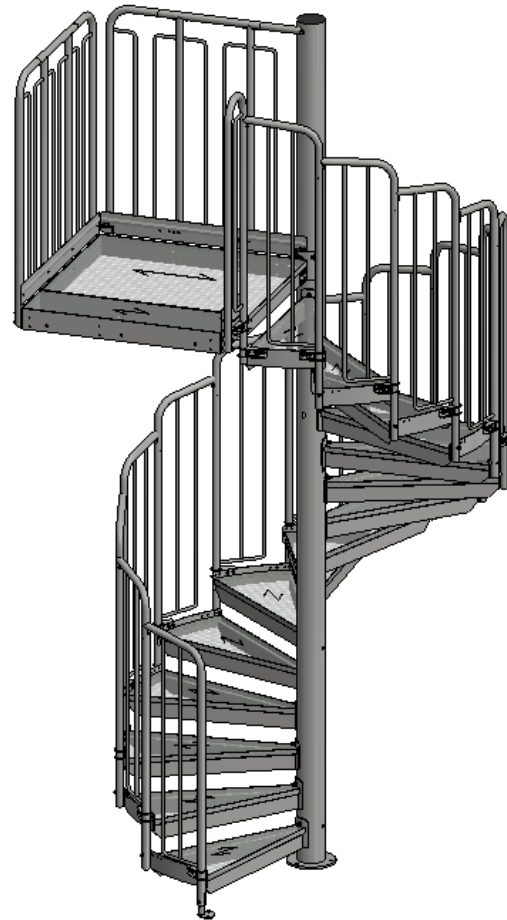


Figure 2. Landing with side exit

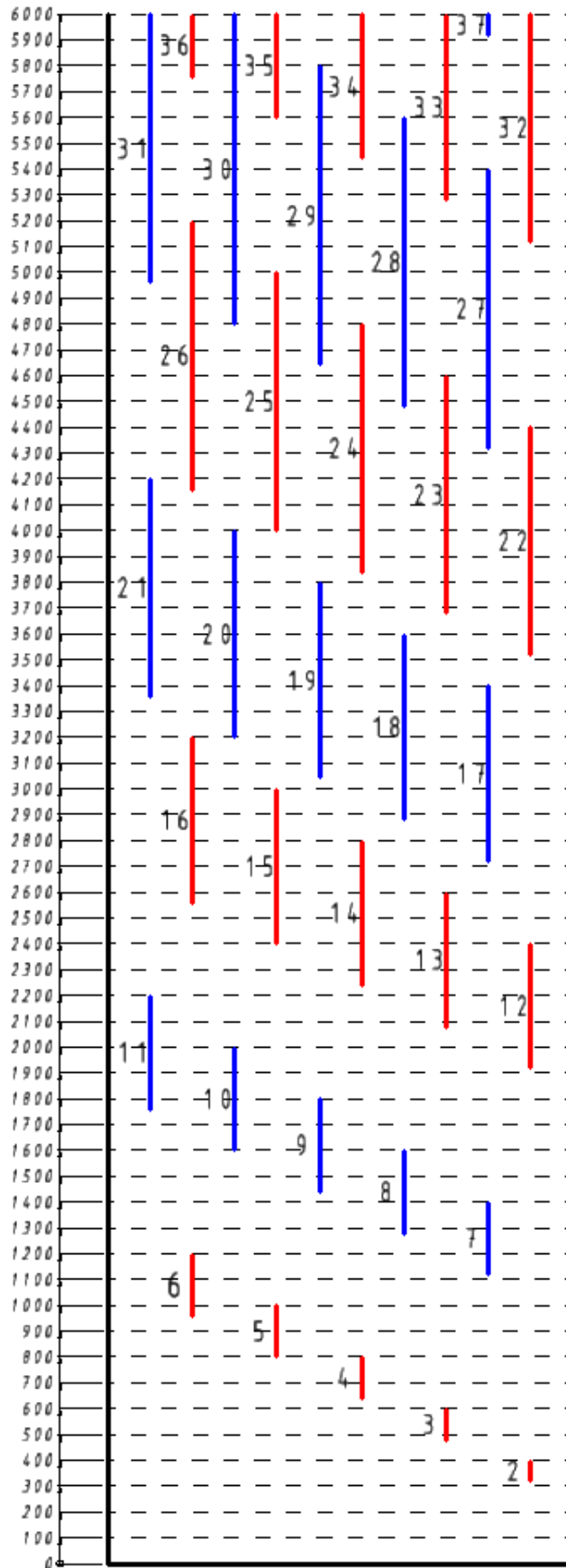


Figure 3. Height of stairs diagram



Amount of steps	R900	Amount of steps	R1000	Amount of steps	R1100
2	23,23	2	21,29	2	19,50
3	46,46	3	42,58	3	39,00
4	69,69	4	63,87	4	58,50
5	92,92	5	85,16	5	78,00
6	116,15	6	106,45	6	97,50
7	139,38	7	127,74	7	117,00
8	162,61	8	149,03	8	136,50
9	185,84	9	170,32	9	156,00
10	209,07	10	191,61	10	175,50
11	232,30	11	212,90	11	195,00
12	255,53	12	234,19	12	214,50
13	278,76	13	255,48	13	234,00
14	301,99	14	276,77	14	253,50
15	325,22	15	298,06	15	273,00
16	348,45	16	319,35	16	292,50
Full turn		17	340,64	17	312,00
17	371,68	Full turn		18	331,50
18	394,91	18	361,93	19	351,00
19	418,14	19	383,22	Full turn	
20	441,37	20	404,51	20	370,50
21	464,60	21	425,80	21	390,00
22	487,83	22	447,09	22	409,50
23	511,06	23	468,38	23	429,00
24	534,29	24	489,67	24	448,50
25	557,52	25	510,96	25	468,00
26	580,75	26	532,25	26	487,50
27	603,98	27	553,54	27	507,00
28	627,21	28	574,83	28	526,50
29	650,44	29	596,12	29	546,00
30	673,67	30	617,41	30	565,50
31	696,90	31	638,70	31	585,00
Full turn		32	659,99	32	604,50
32	720,13	33	681,28	33	624,00
33	743,36	34	702,57	34	643,50
34	766,59	Full turn		35	663,00
35	789,82	35	723,86	36	682,50
36	813,05	36	745,15	37	702,00
37	836,28	37	766,44		

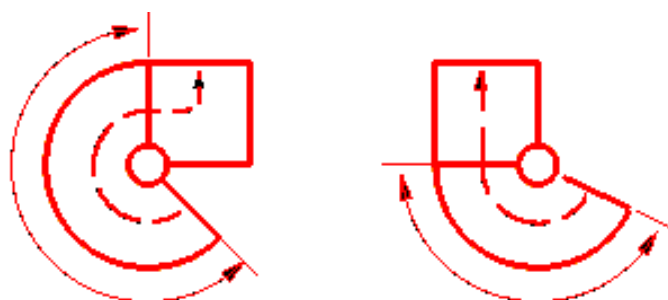



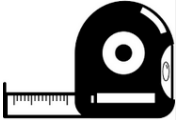



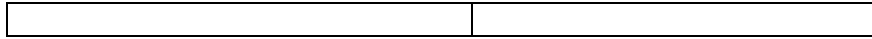


Table 1. Angular position of landing in staircase

3. CARLA modular stairs installation – list of tools.

Table 2. List of tools

	<p>Wrenches: 19, 17, 13</p>
	<p>Phillips PH2 screwdriver</p>
	<p>Level</p>
	<p>Measuring tape</p>
	<p>Lifting crane min. 1 t (when assembling higher staricases)</p>
	<p>Hammer drill</p>
	<p>Concrete drill, 13 mm</p>

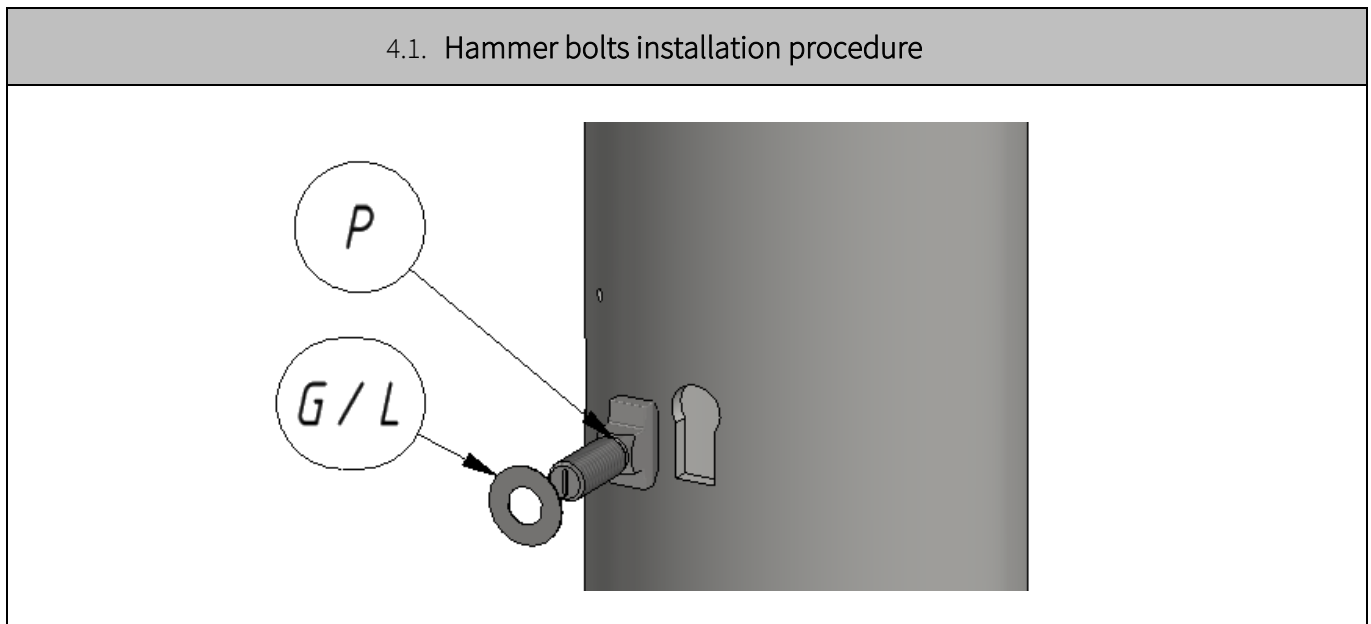


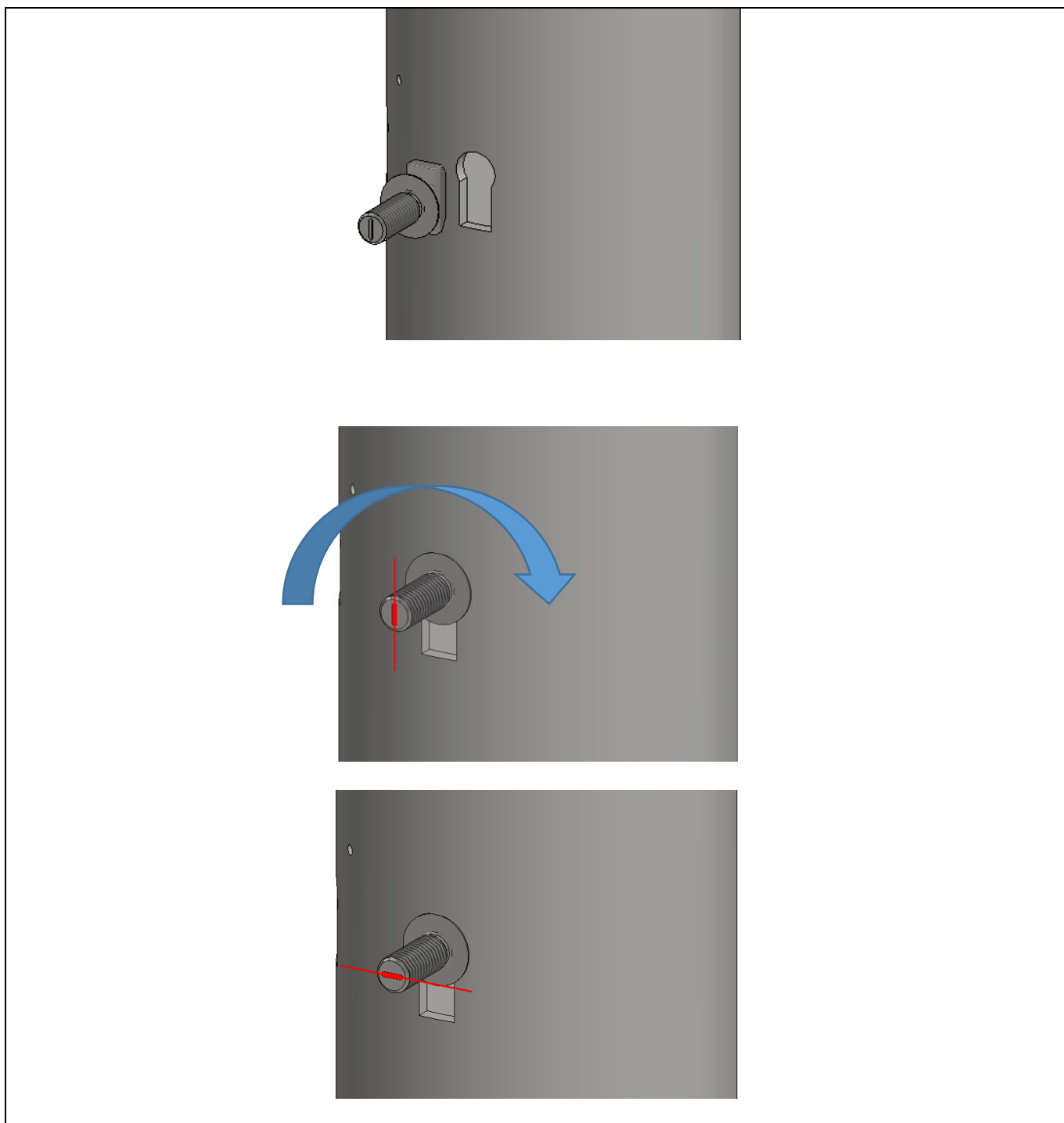
4. CARLA stairs assembly operations

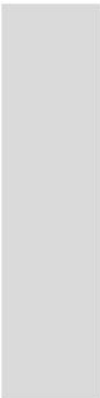
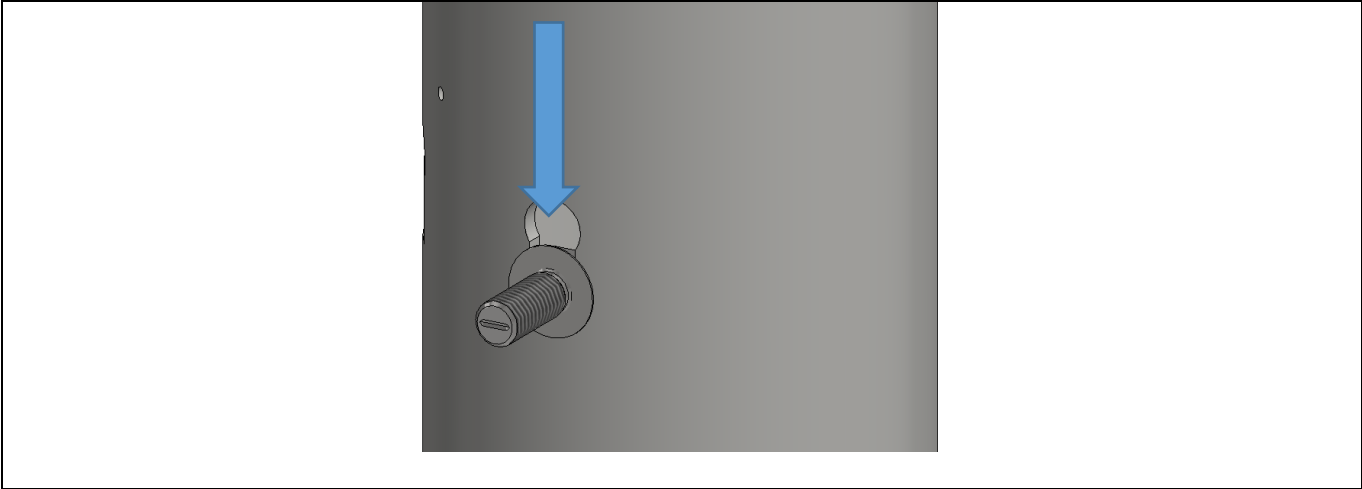
The stairs should be installed with the participation of at least two qualified personnel and a lifting device.

1. Before starting the assembly, determine the location of the stairs and designate the assembly zone so that it does not interfere with ongoing construction works, and staying in it will not pose a threat,
2. Prepare the place for the foundation of the stairs,
3. Tighten all bolted connections with the tightening torque approximately 60% of the nominal torque for the given size and class of the fastener,
4. The stairs should be anchored to the ground and to the structure using M12 anchors or, in the case of anchoring to steel structures, M12 bolts of min. 8.8 class.

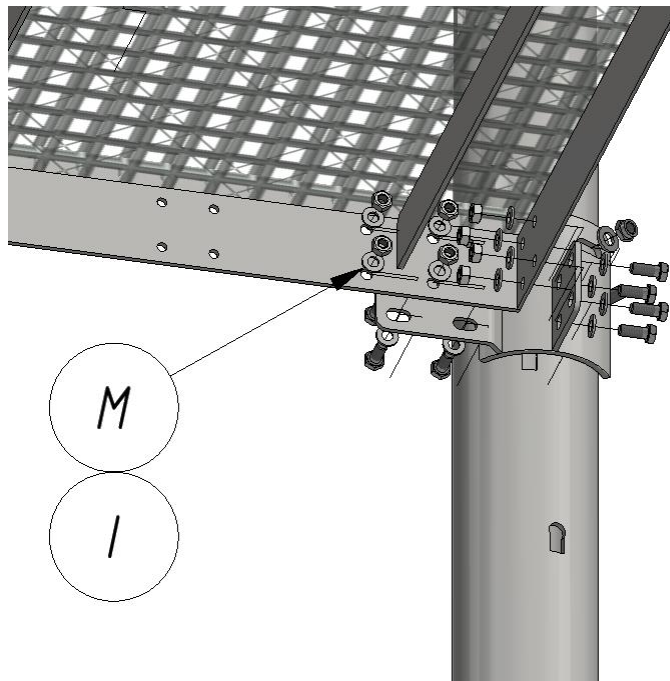
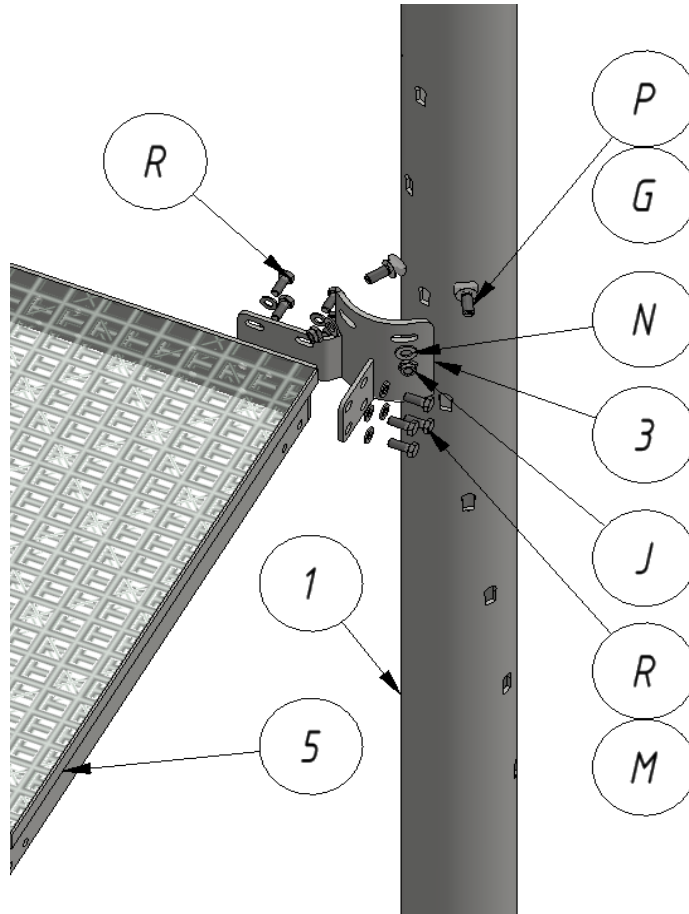
The method and sequence of CARLA stairs assembly are presented below.



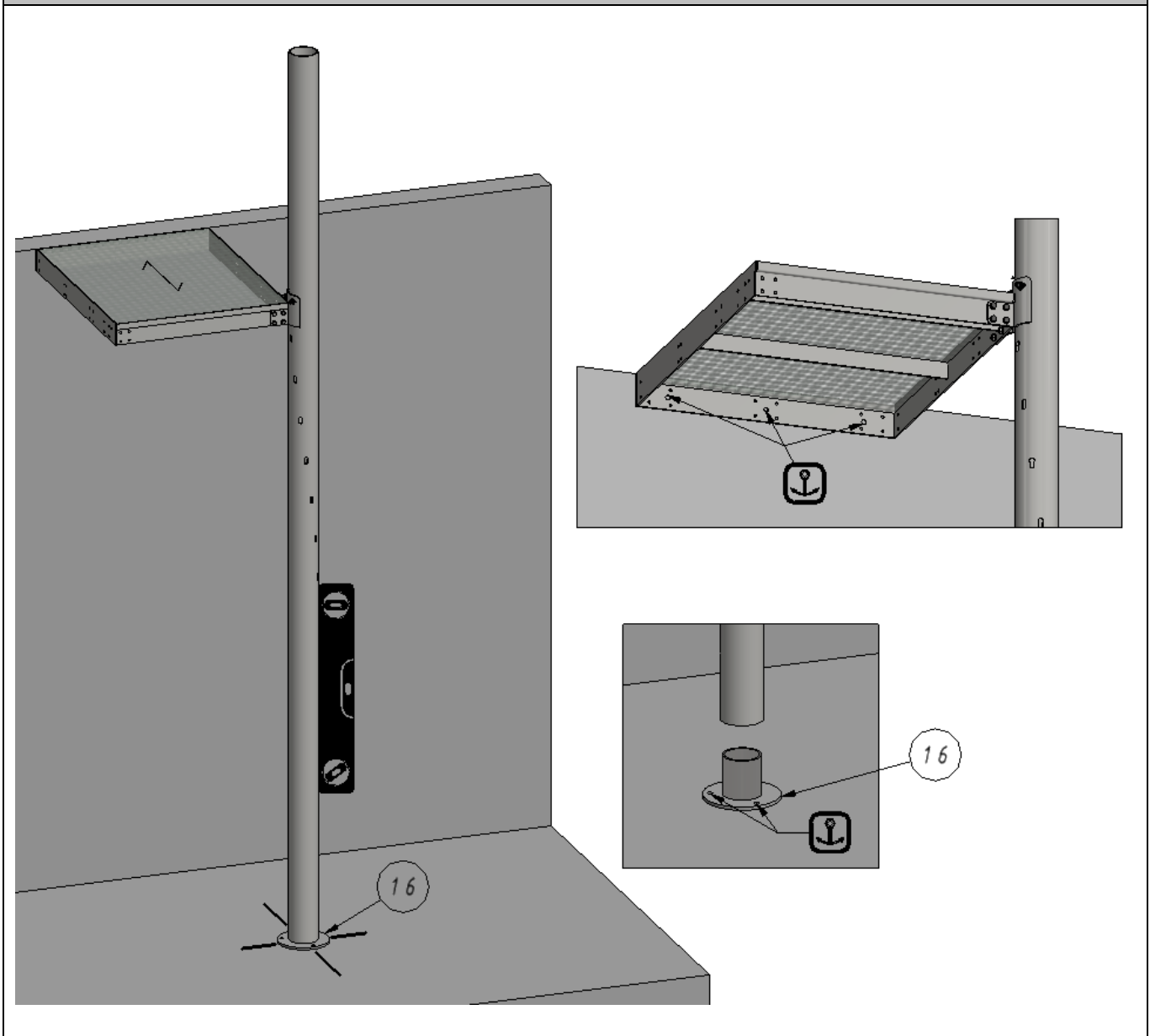




4.1. Landing installation

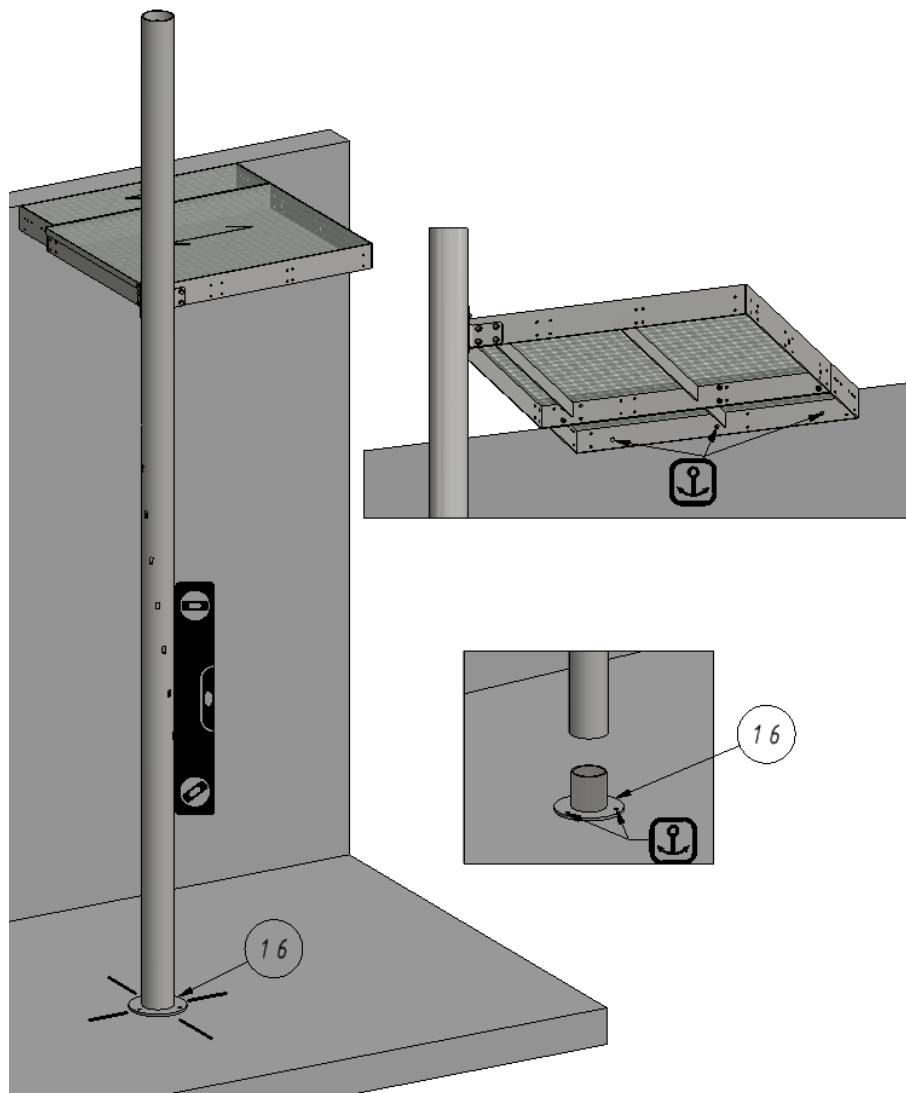
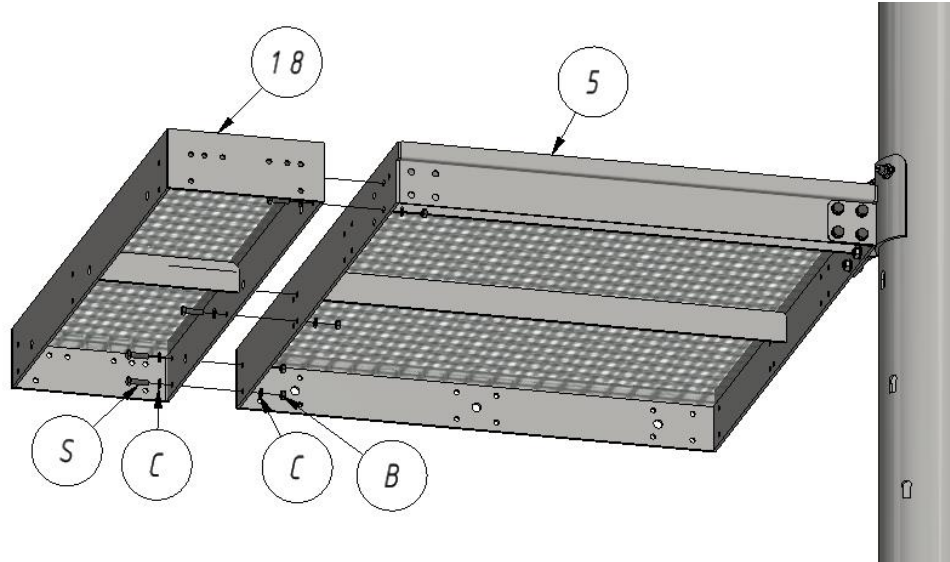


4.2. Installation of the platform and the central pipe to the structure – straight exit variant

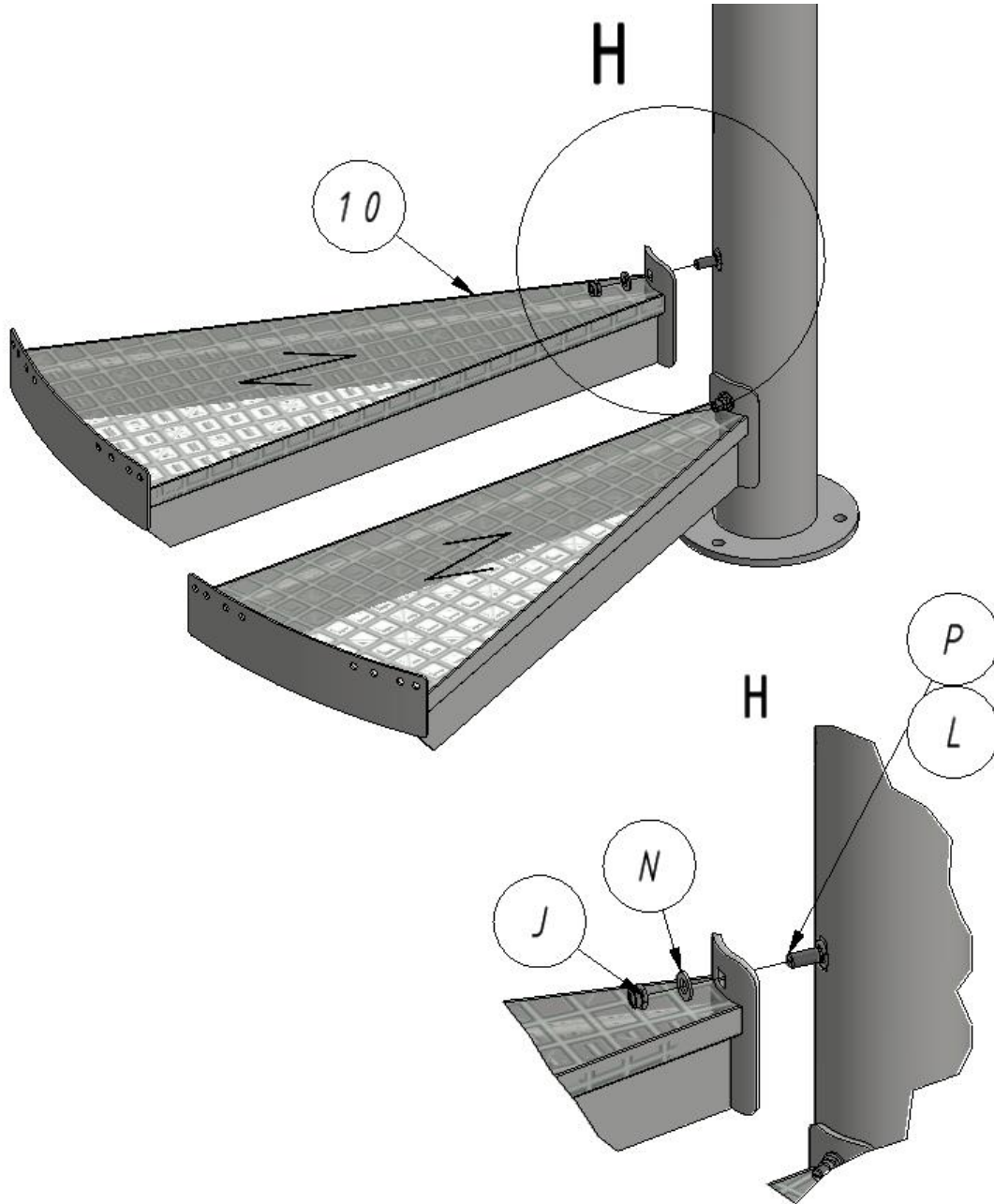


Represents anchoring points to existing structure or to the floor

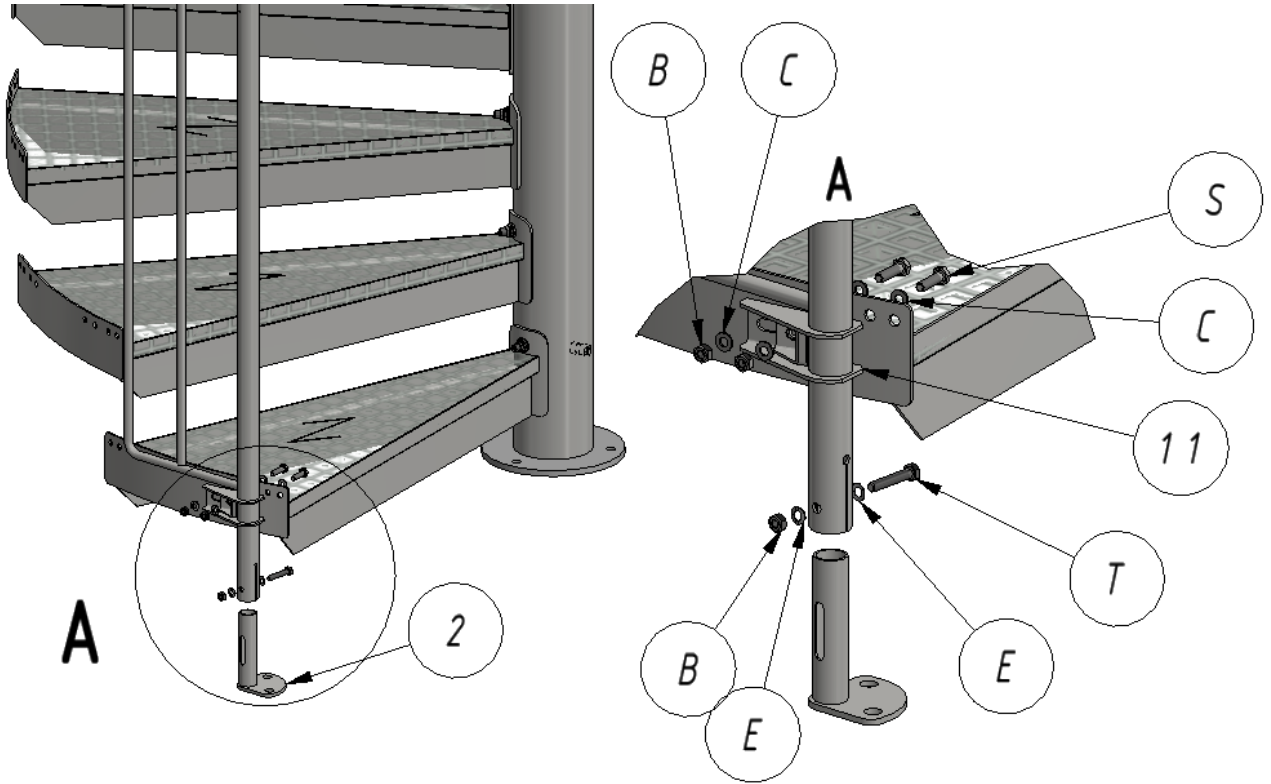
4.3. Installation of the platform and the central pipe to the structure – side exit variant



4.4. Steps assembly

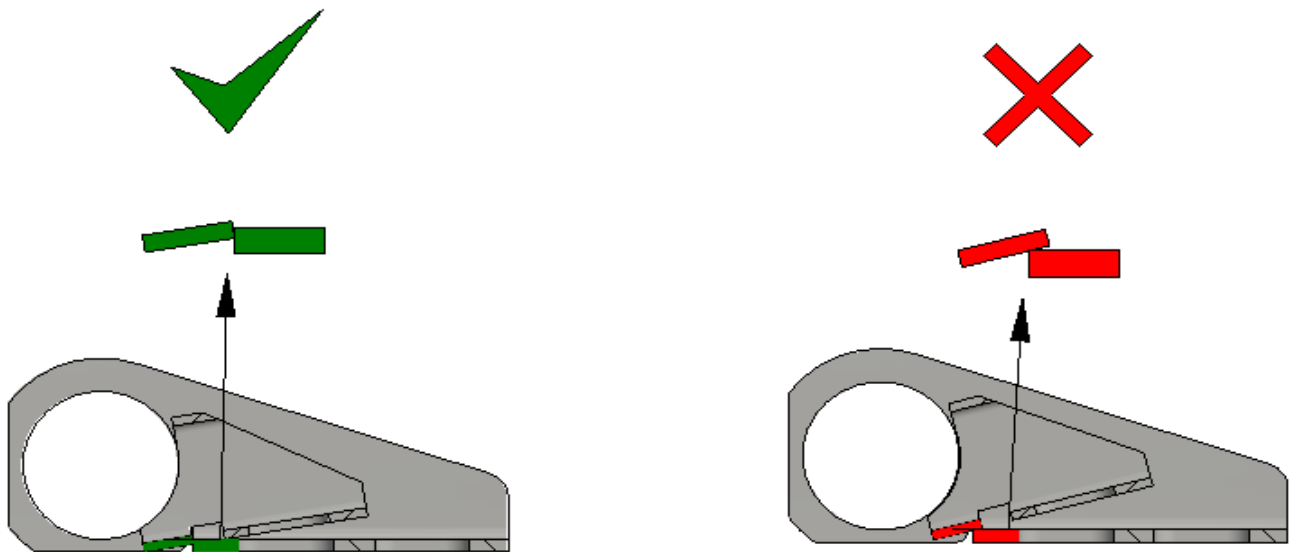


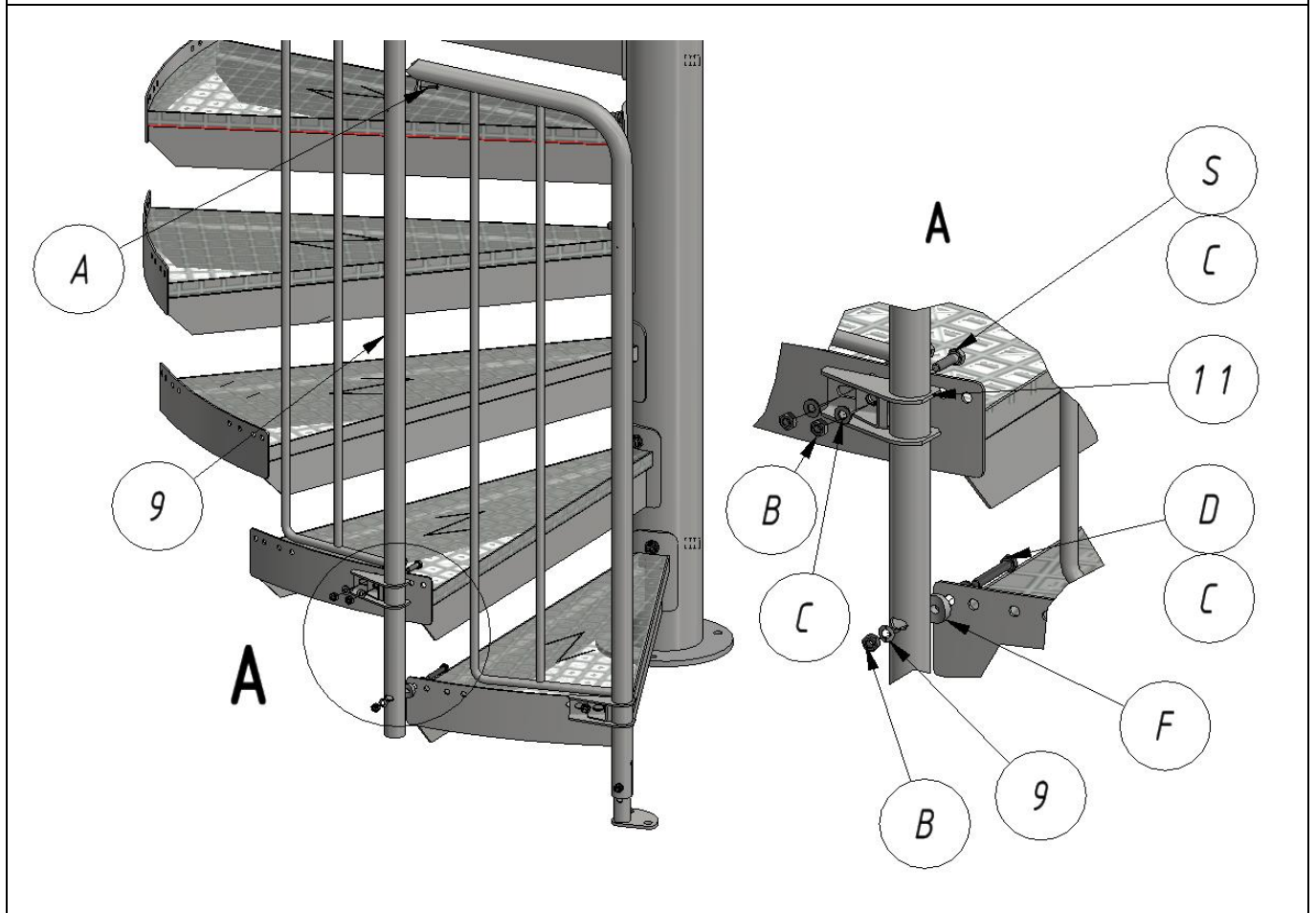
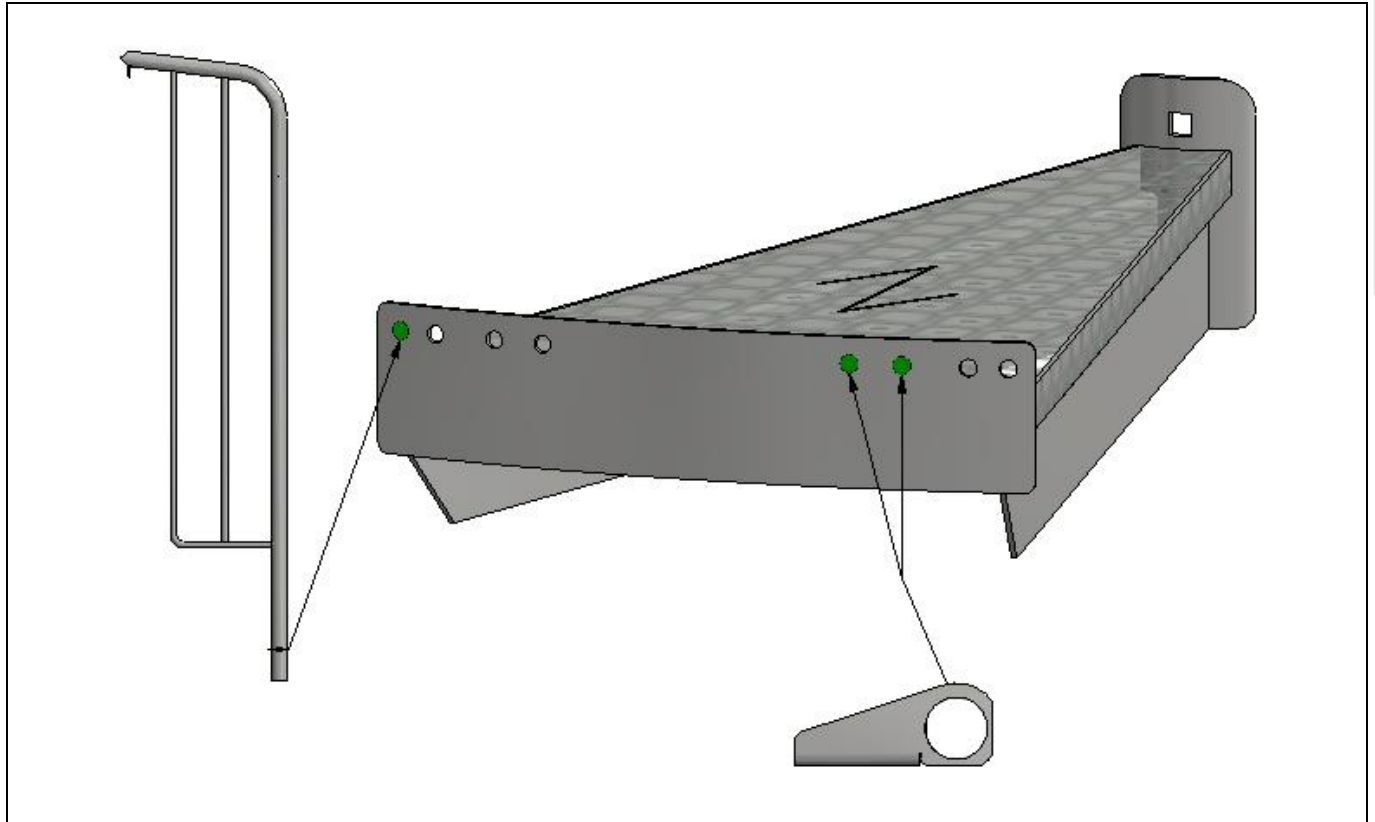
4.5. Assembly of railings on stair flight



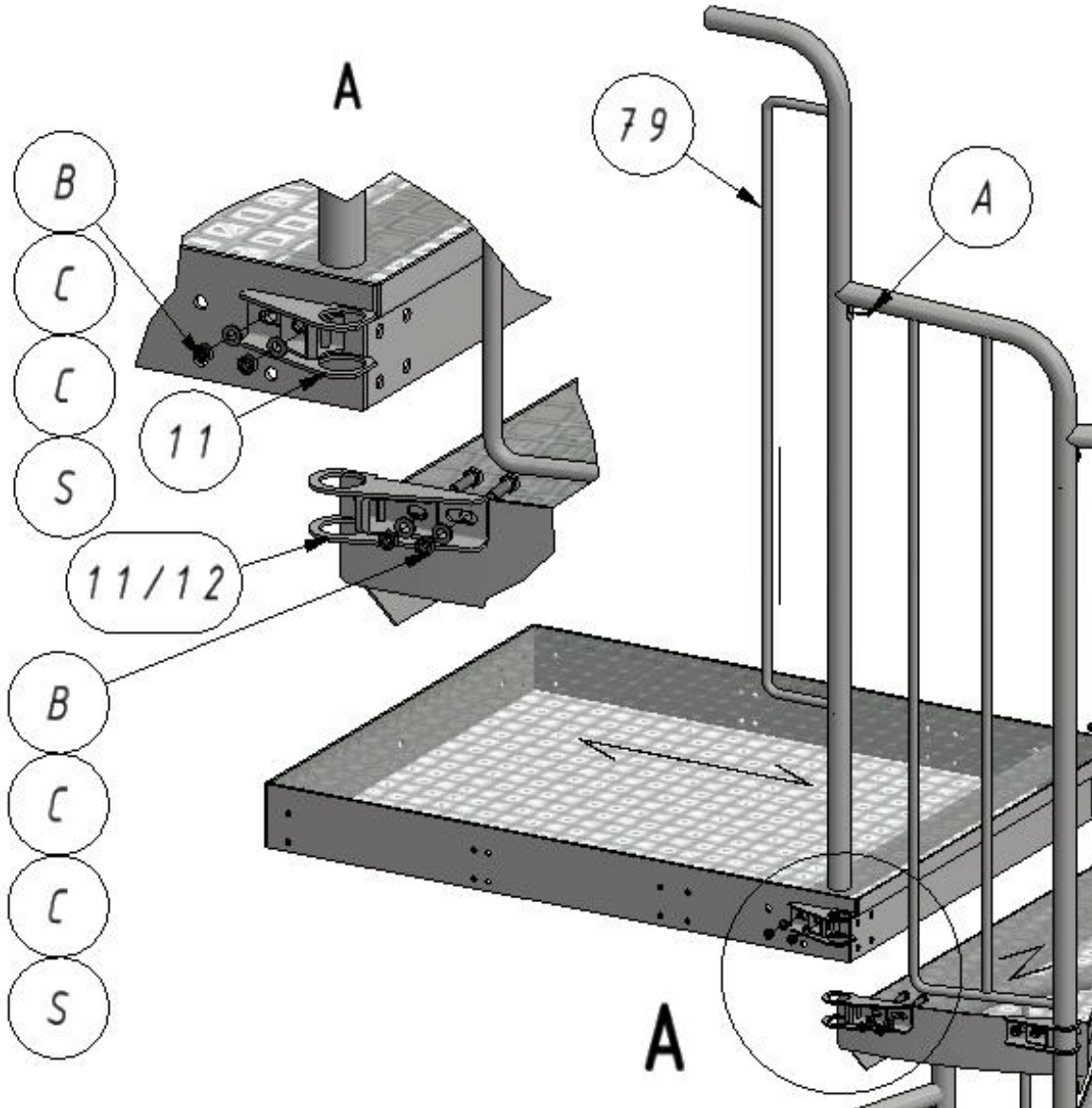
4.6. Assembly of railings clamps

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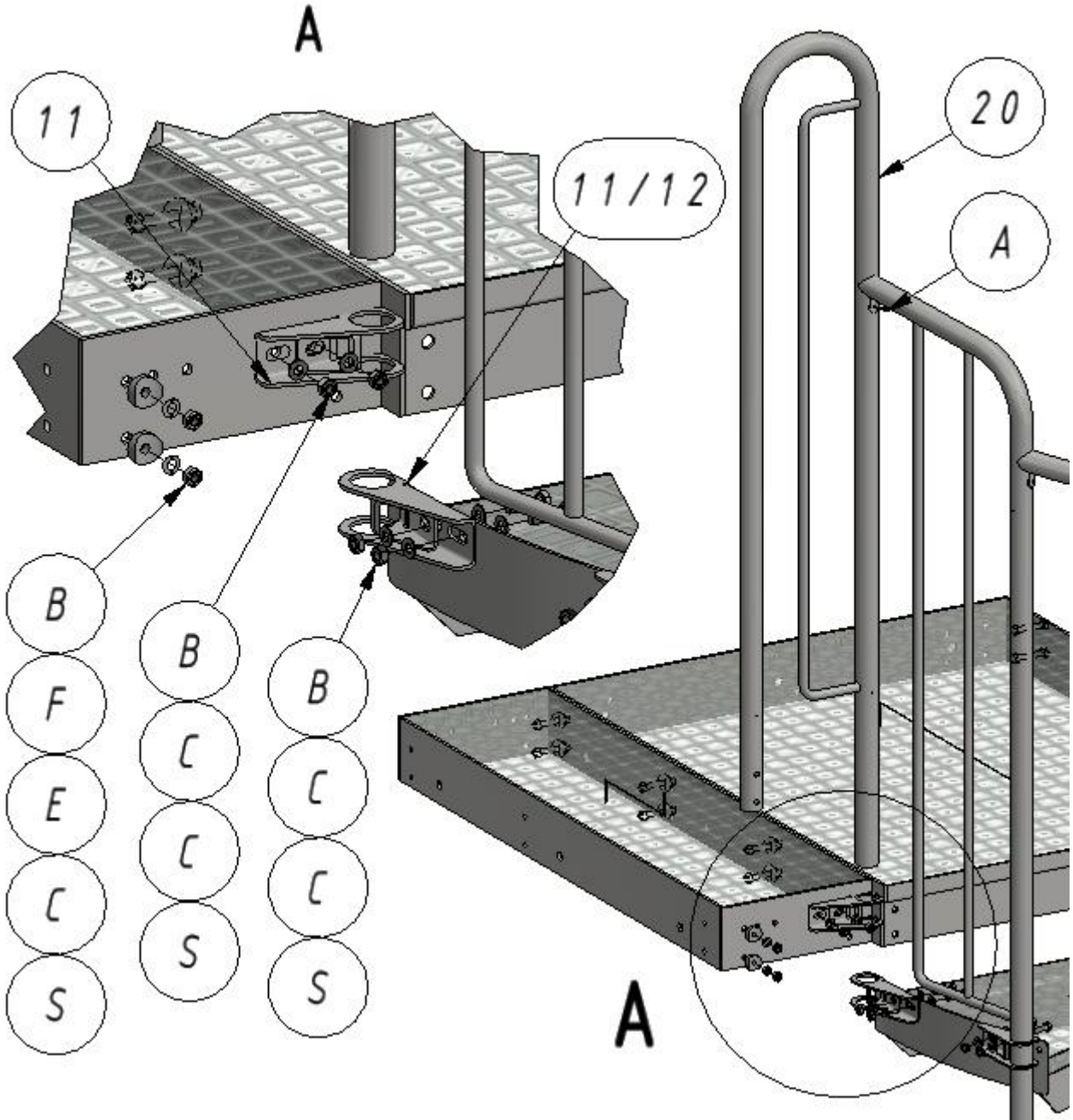




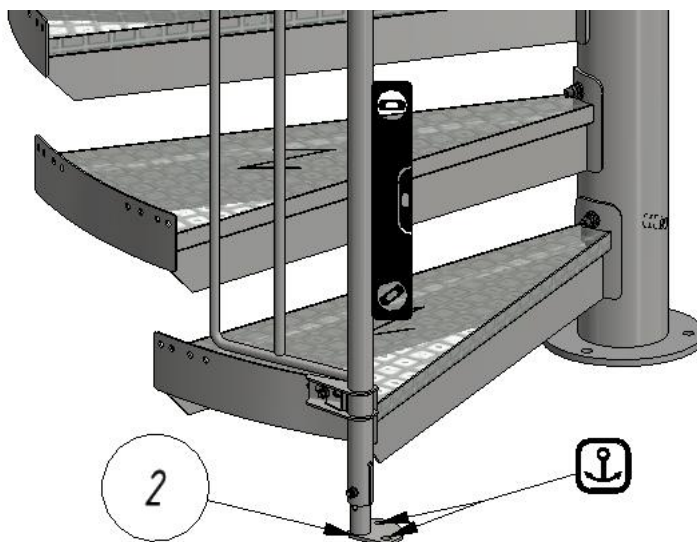
4.7. Assembly of railings on landing - straight exit variant



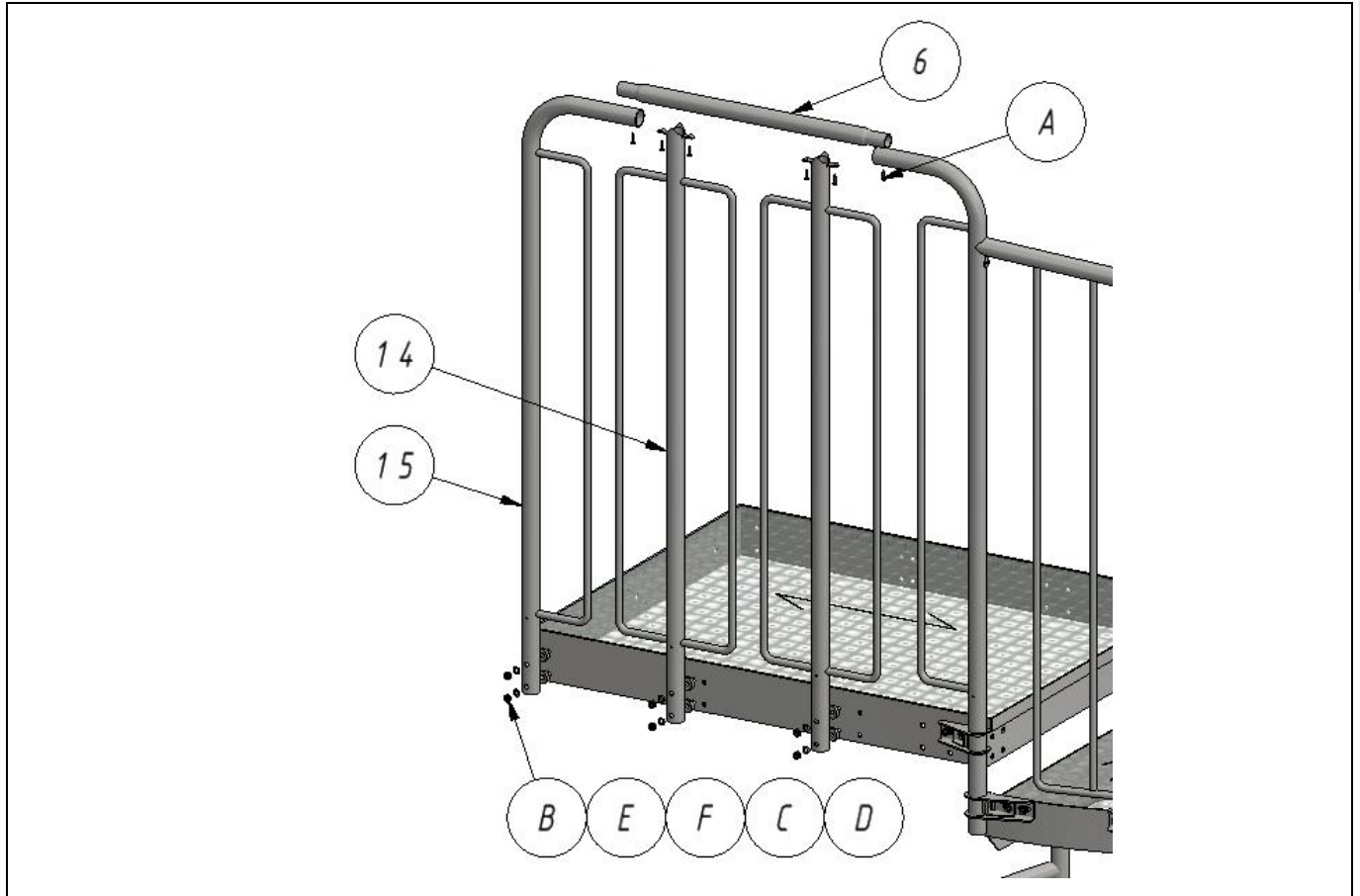
4.8. Assembly of railings on landing – side exit variant

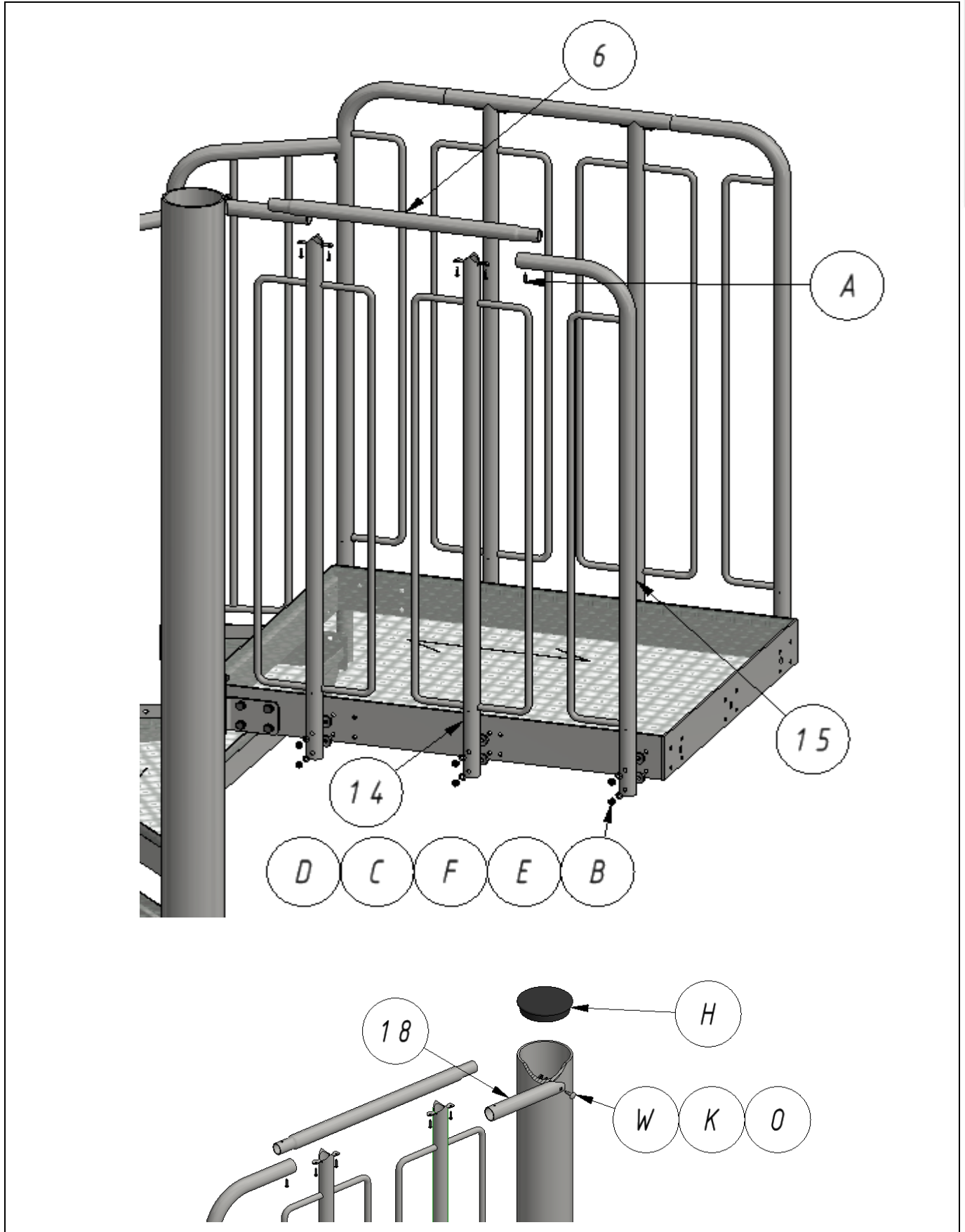


4.9. Anchoring of first rail post

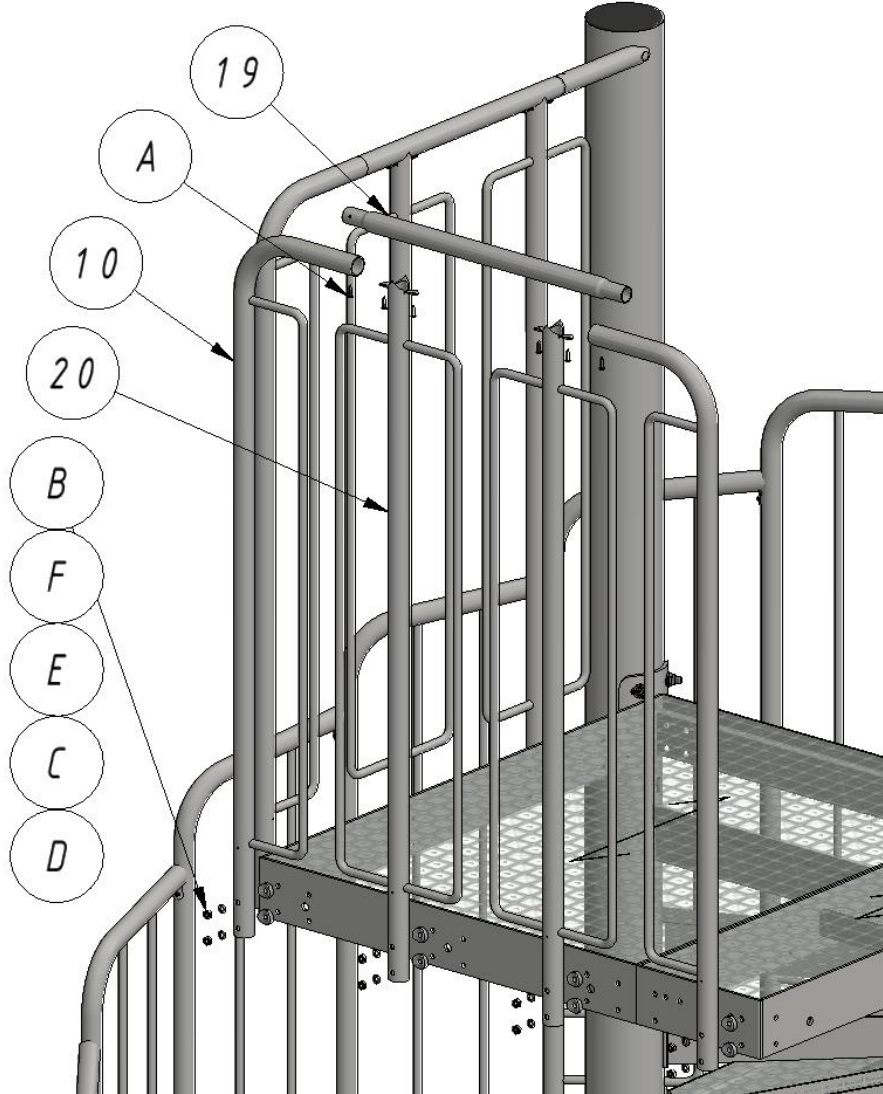


4.10. Assembly of intermediate railings on landing - straight exit variant

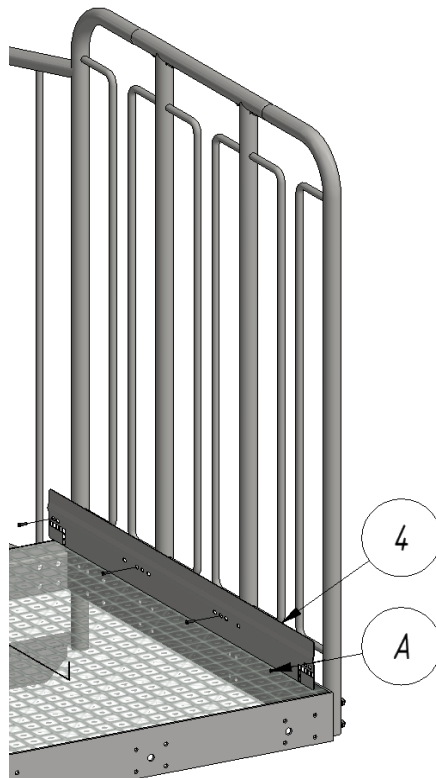
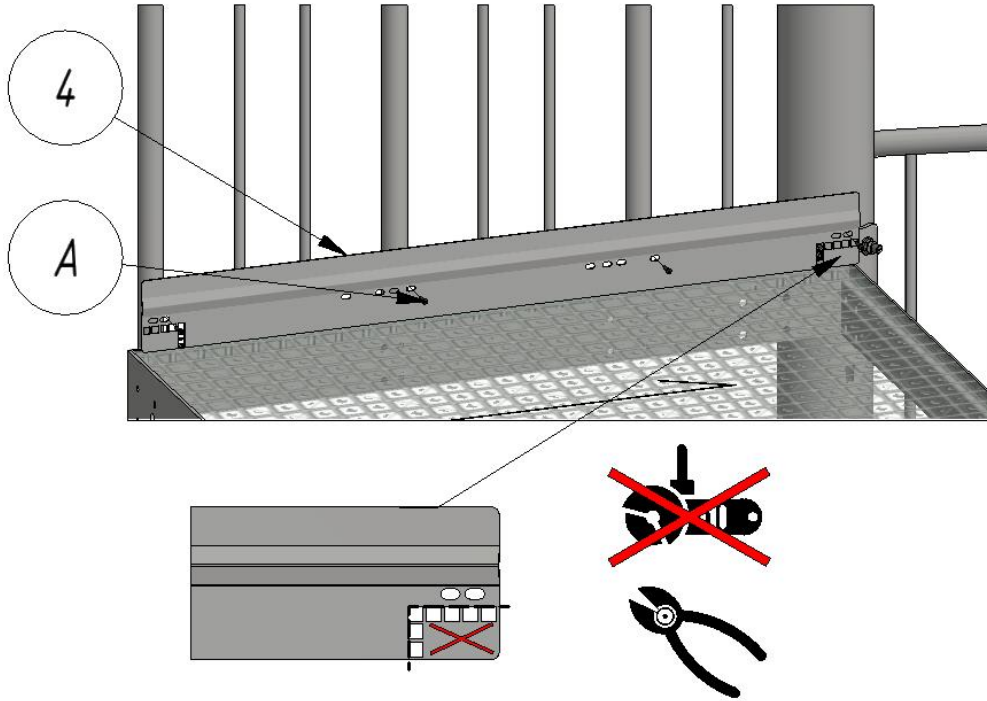


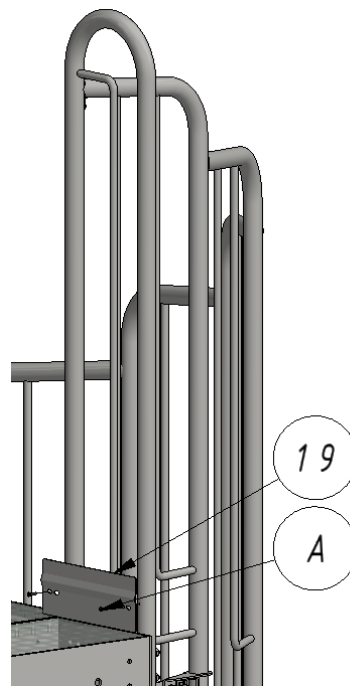
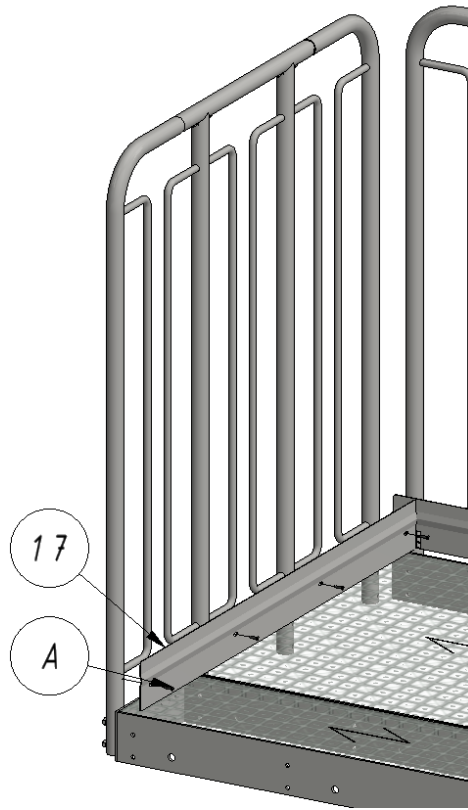


4.11. Assembly of intermediate railings on landing - side exit variant



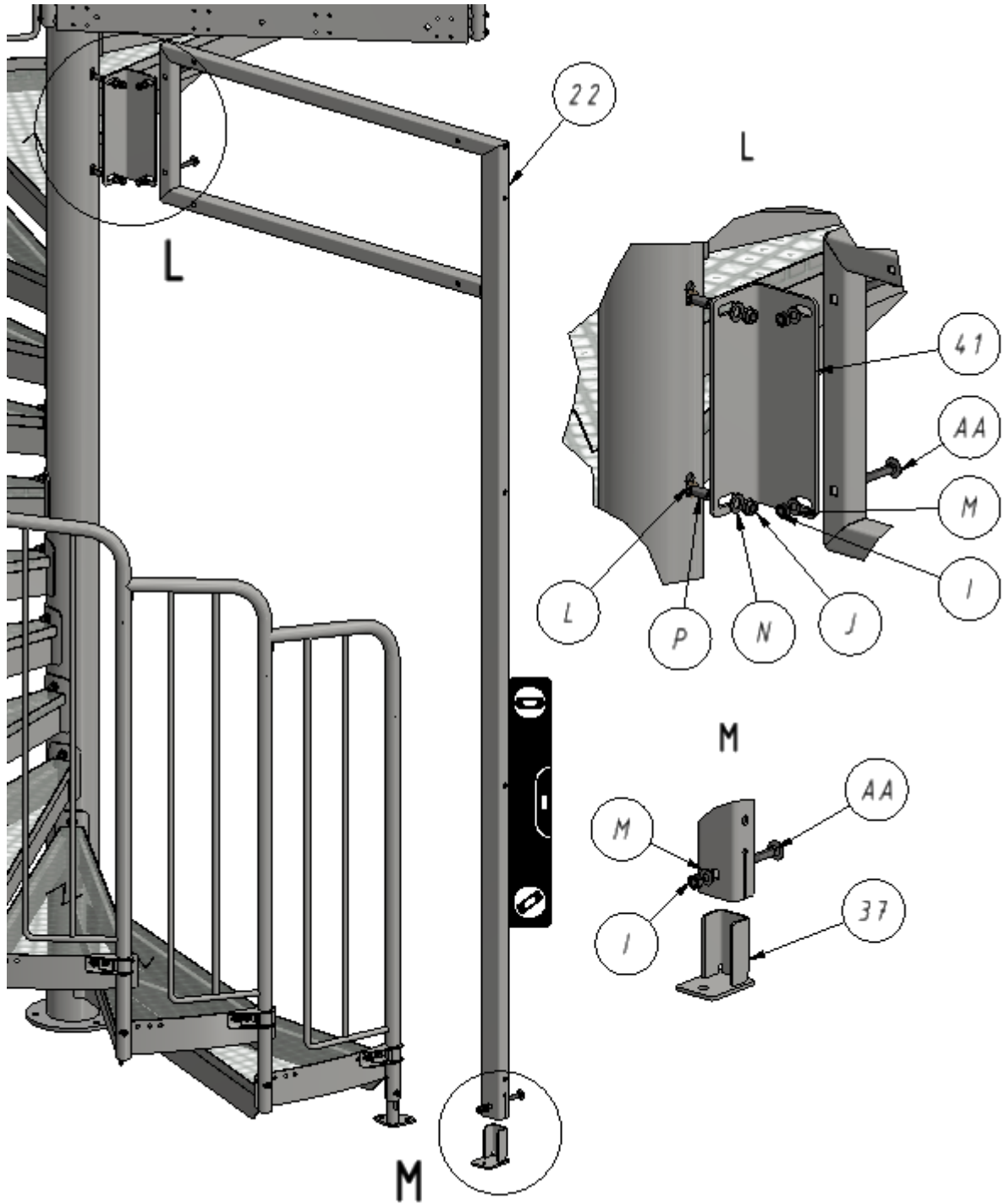
4.12. Kickplates assembly

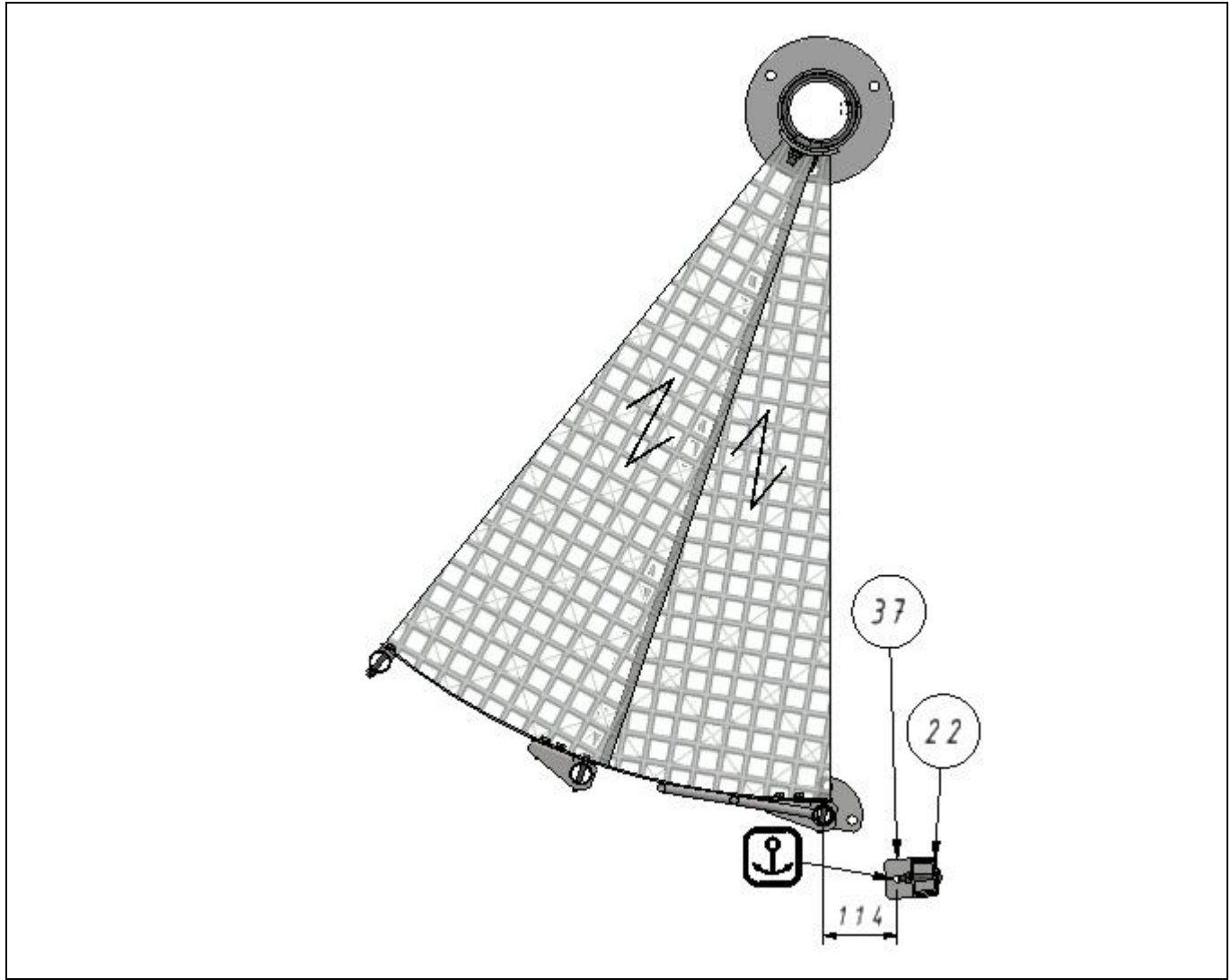




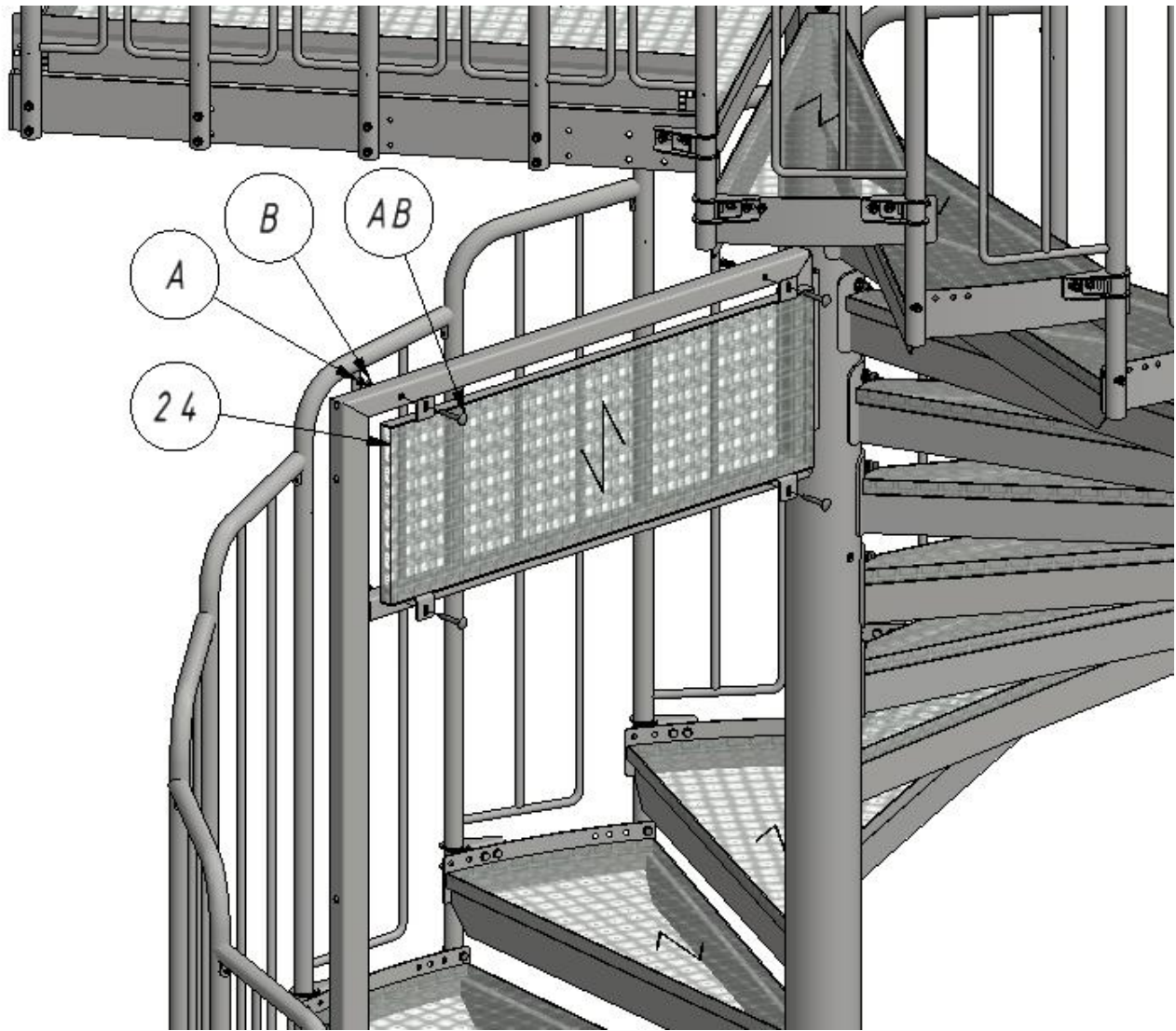
5. Grating cage assembly

6.1. Door frame installation

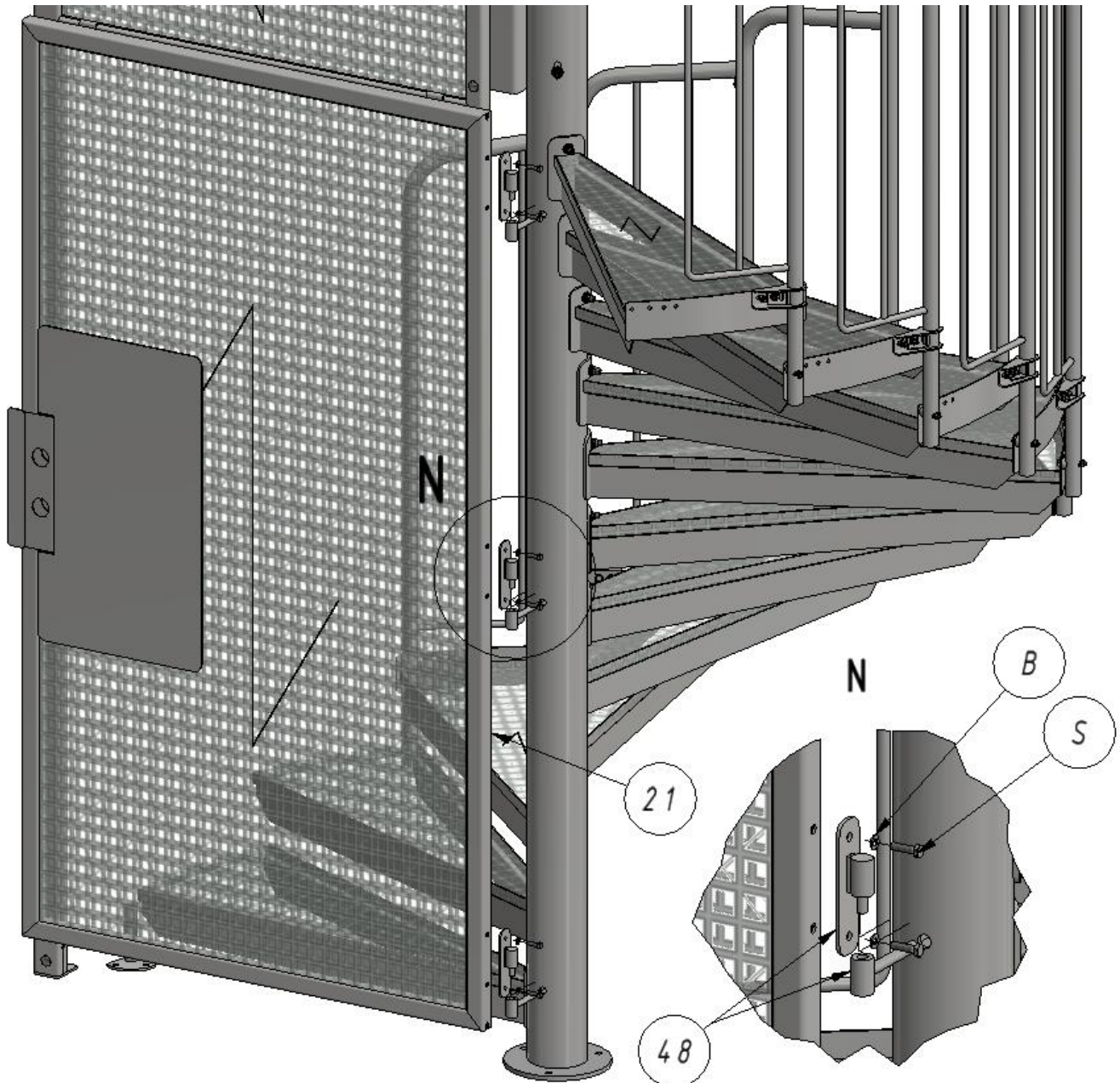




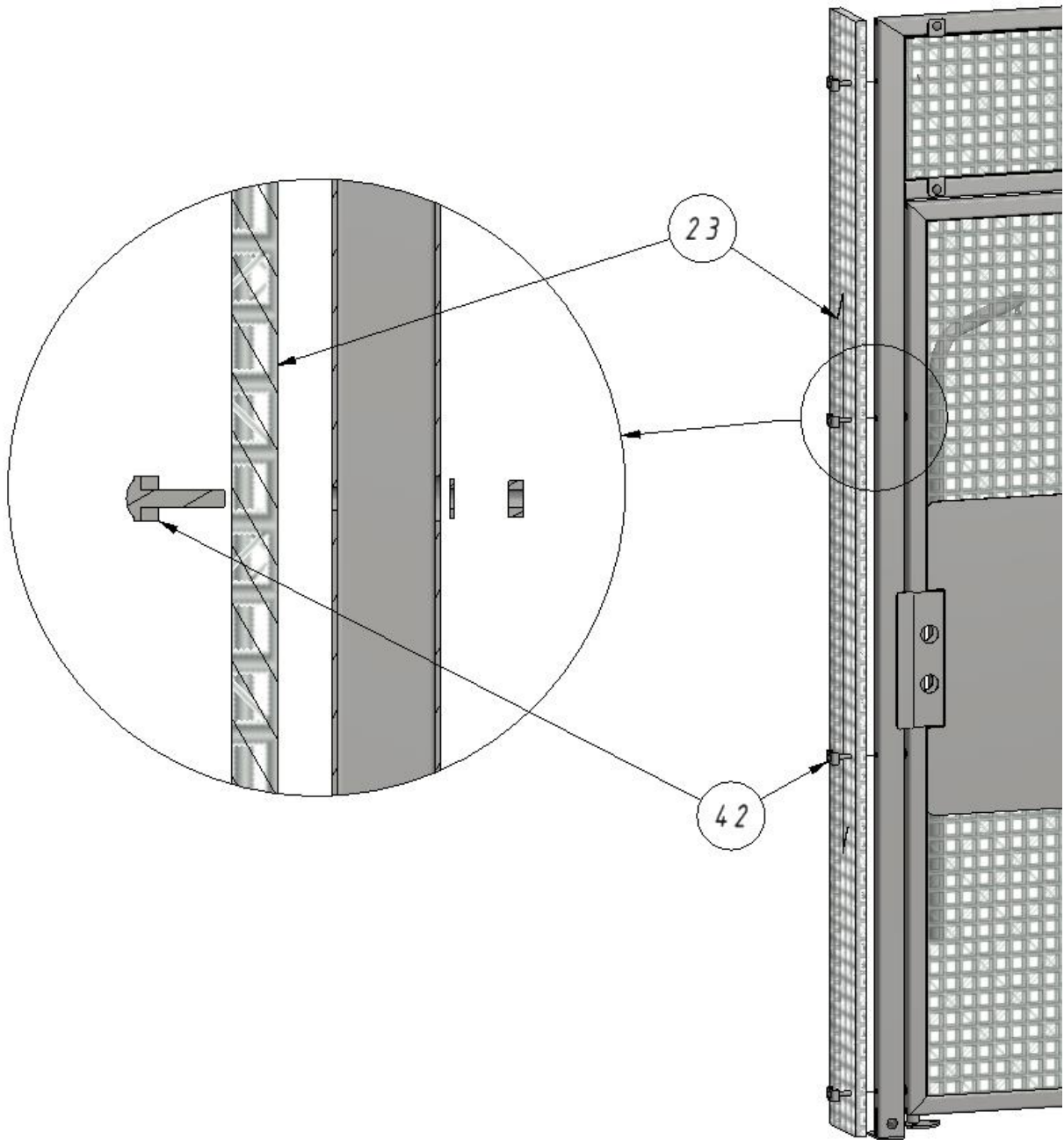
6.2. Door head installation



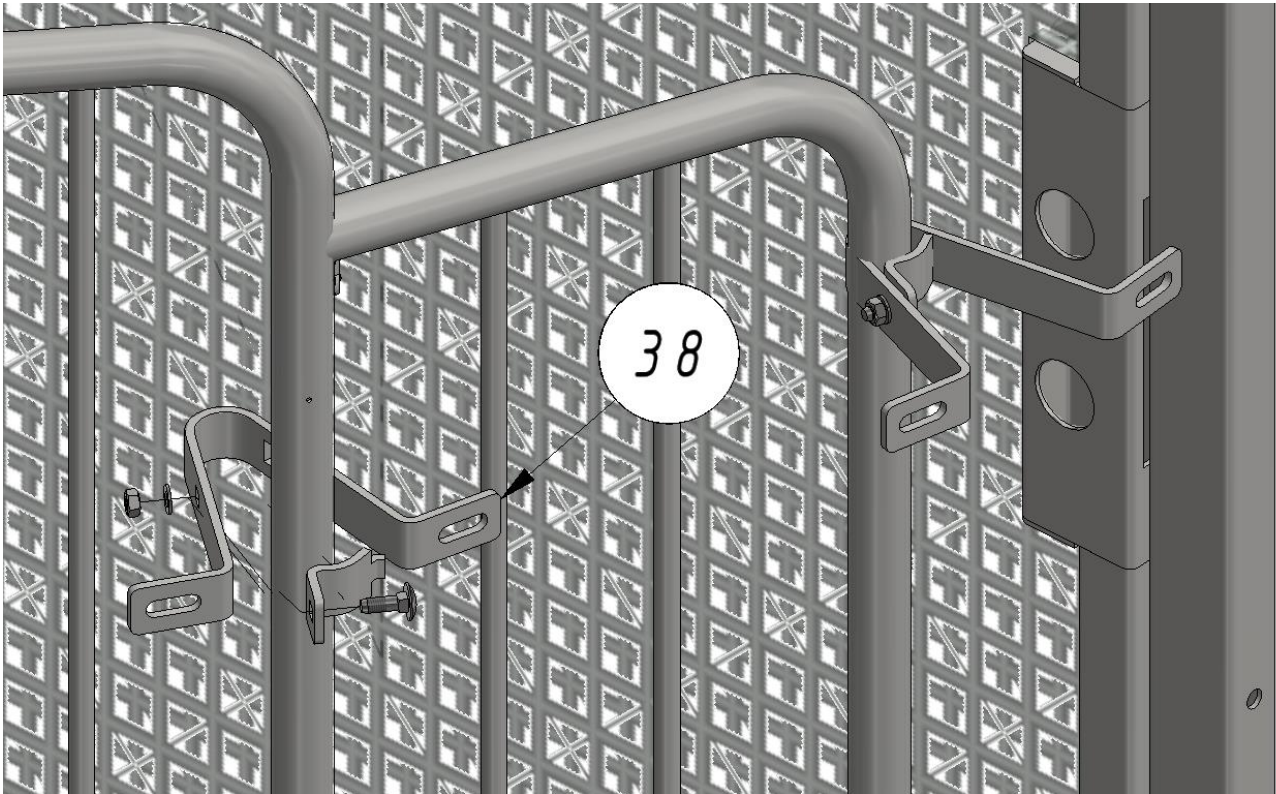
6.3. Door leaf installation



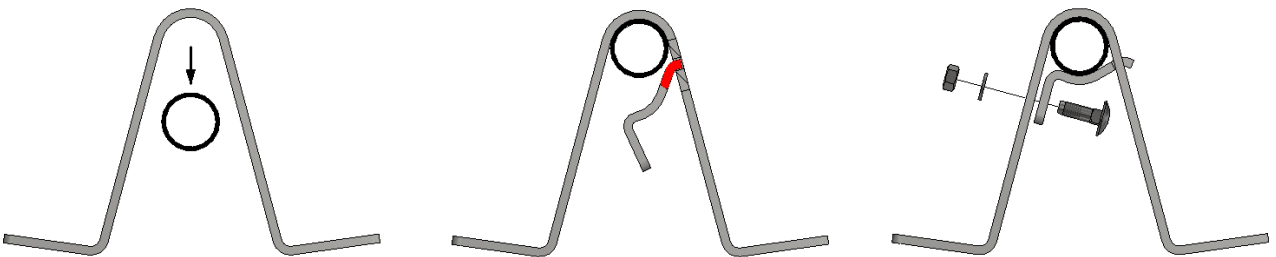
6.4. Supplementary grating installation

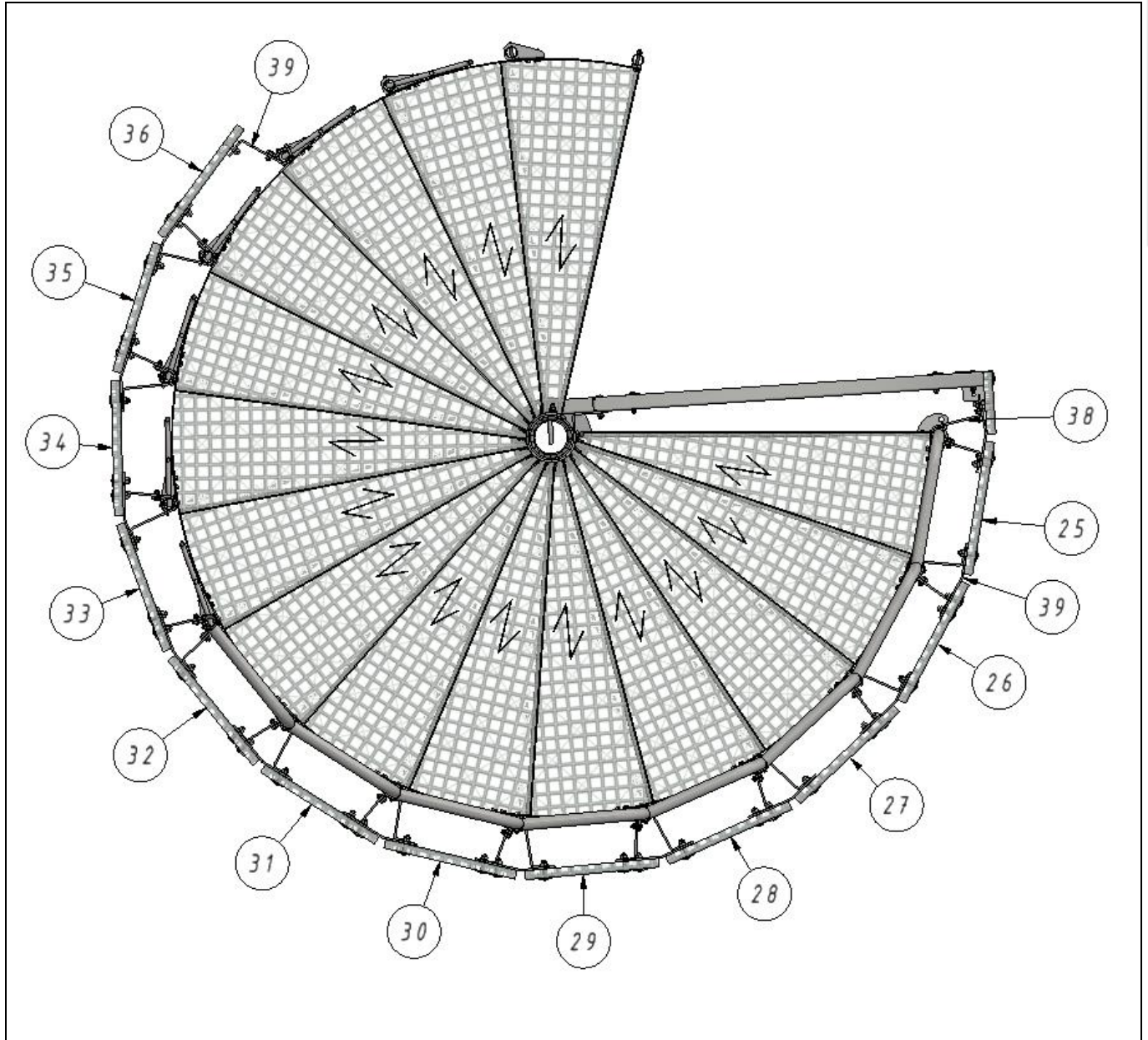


6.5. Brackets for gratings installation



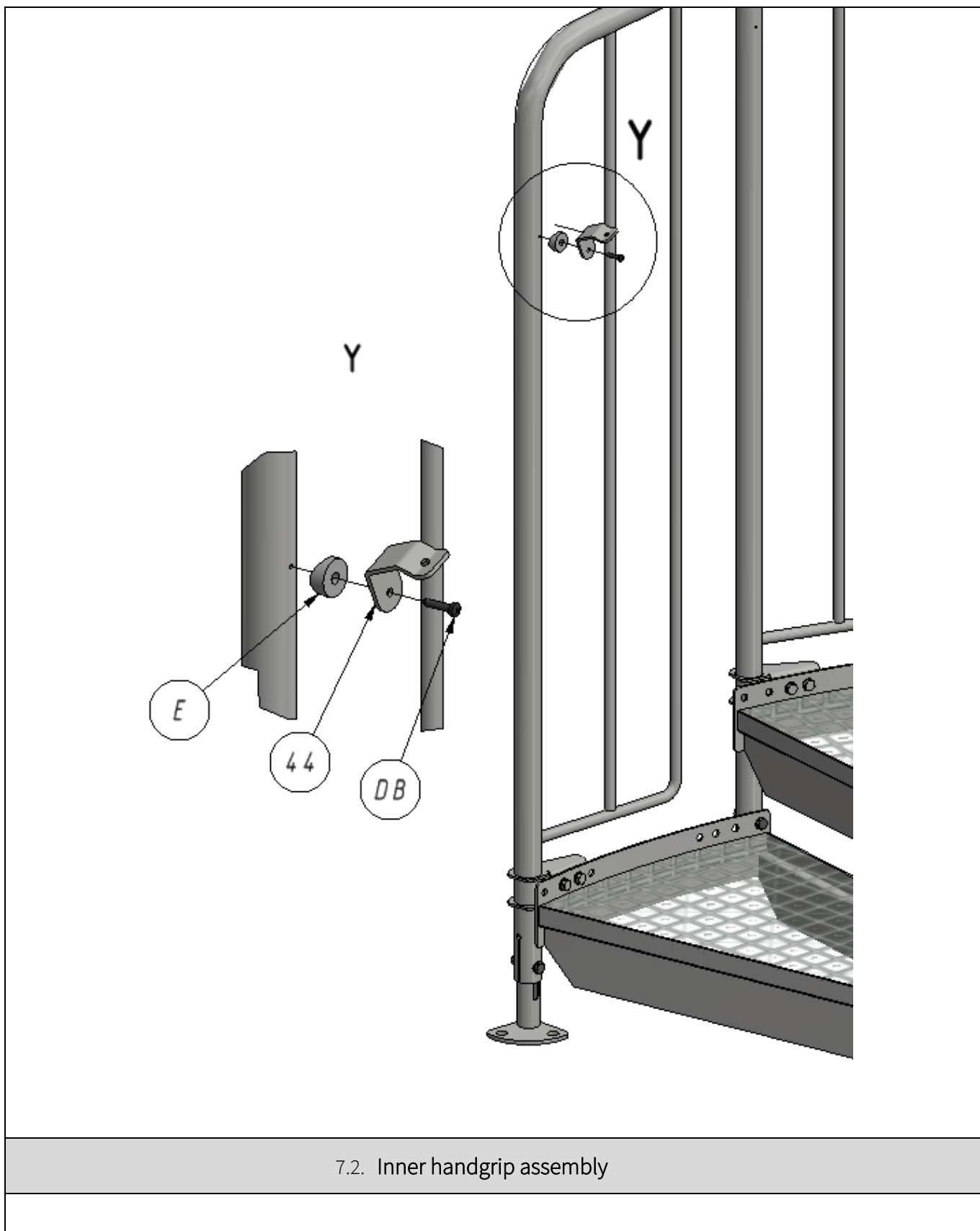
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6. Inner handgrip assembly

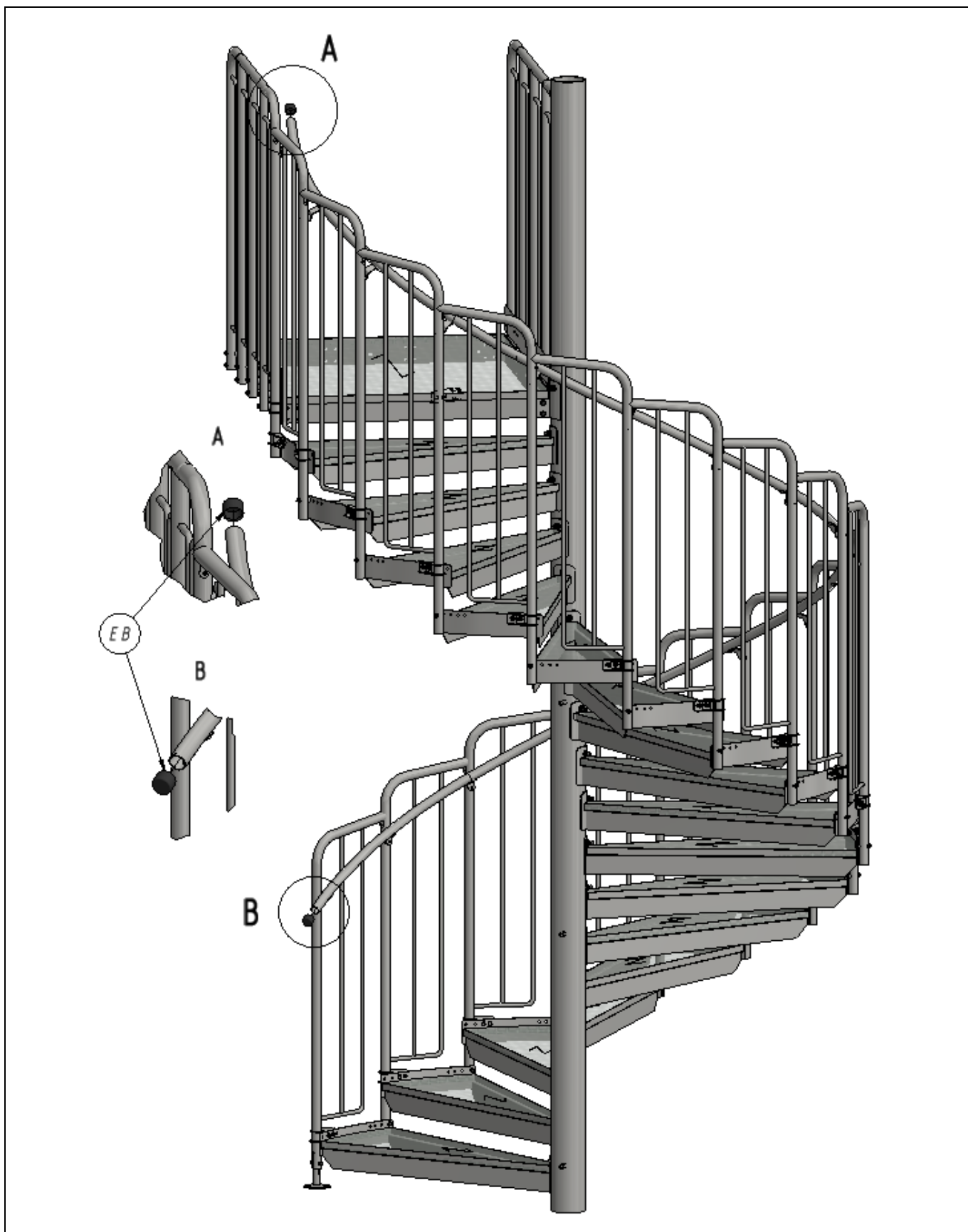
7.1. Brackets installation



7.2. Inner handgrip assembly







7. Operational conditions

The basis for the proper operation of the stairs is their appropriate setting. This primarily concerns the proper levelling of the ground on which the stairs will be placed. Too large deviation from horizontal causes all the steps to be set incorrectly which may cause difficulties in exploitation and the risk of accidents.

Therefore, the stairs should be periodically examined – if the ground has not moved, which would cause stairs deviation, as well as all thread connections.

8. Disposal

Packages and used devices should be stored, managed or disposed of in accordance with the applicable recommendations and requirements.