

(19)



(11)

EP 4 741 250 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.05.2026 Bulletin 2026/20

(51) International Patent Classification (IPC):
B61L 5/02 ^(2006.01) **B61L 5/06** ^(2006.01)

(21) Application number: **25212830.1**

(52) Cooperative Patent Classification (CPC):
B61L 5/02; B61L 5/06

(22) Date of filing: **31.10.2025**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
GE KH LA MA MD TN

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(30) Priority: **11.11.2024 CZ 20240436**

(54) A RAILWAY SWITCHGEAR DEVICE

(57) A device for adjusting a railway switch, in particular a device for manual two-stage control of a switchgear when manually adjusting a railway switch during emergency adjustment and when returning back to the central point adjustment, which includes an electromotive switch (2) with a switchgear (1), where the switchgear (1) includes a first shaft (5) and the electromotive switch (2) includes an electric motor (4) with a second shaft (8),

where a latch (6) is mounted on the first shaft (5) of the switchgear (1), on which a gear-less mechanism (7) is mounted, where the latch (6) in the switched on state of the switchgear (1) covers the second shaft (8) of the electric motor (4) and prevents access to it, and where the latch (6) in the switched off state is tilted so that it ensures free access to the second shaft (8) of the electric motor (4) for inserting the hand crank (9).

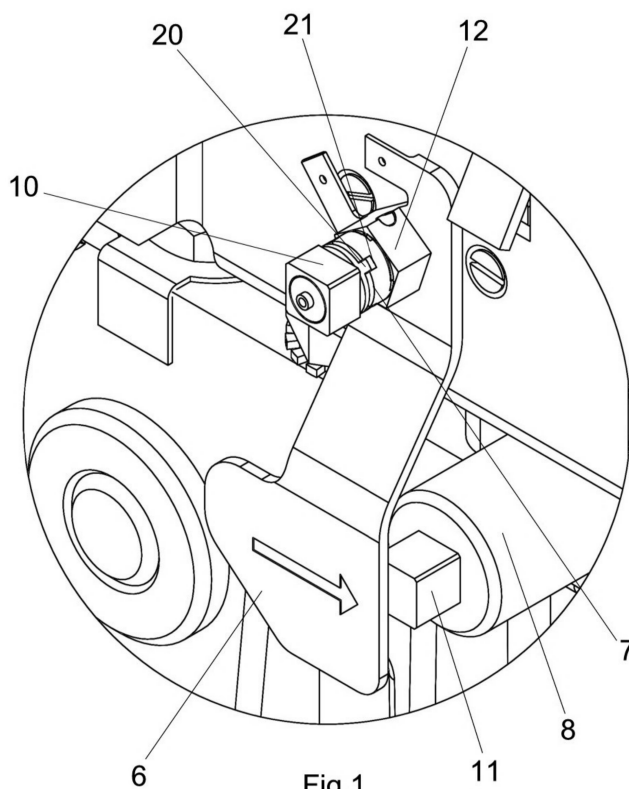


Fig.1

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Description

Technical Field

[0001] The invention relates to a device for adjusting railway switches, specifically to a device for manually operating a switchgear when manually adjusting a railway switch during emergency adjustment and when returning back to the central point setting.

State of the Art

[0002] Currently, a number of design solutions for switchgear devices are known.

[0003] These devices, which are called electromotive switches, are electromechanical or electro-hydraulic machines that provide adjustment, holding, protection and control functions as well as the function of manual emergency control for a railway switch. Part of such a switch is a motor that ensures the adjustment of the railway switch using electrical energy to power the switch in the central point adjustment of the switchgear system.

[0004] In the case that for whatever reason electrical power is not available, most often due to an external fault, and at the same time the switch needs to be adjusted, the switches are equipped with the option of their emergency control, which is carried out by a hand crank. This crank, which is not a permanent part of the switch, is placed on the motor shaft or the mechanism connected to it and by rotating the motor shaft, the switch and the switch connected to it are adjusted. In order to prevent the operator from being injured during manual adjustment in the event of a sudden connection of the power supply, the switch is also equipped with a safety, or so-called crank switch, which is mechanically designed to prevent the manual adjustment crank from being used when the point is switched on. Its switching off before using the crank for manual adjustment and subsequent switching on, which reconnects the switch to the central electrical control, is solved in various ways.

[0005] One of these methods is to raise the latch preventing the crank from being fitted onto the motor shaft using a suitable crank attachment method that lifts the latch and thus disconnects the motor power supply before the crank is put in place. The latch is directly connected to the crank switch. After the crank is pulled out, the latch automatically returns and allows the central setting of the point again.

[0006] Another possible method is to first turn off the switchgear with a crank or spanner from another place on the switch and, after manually adjusting the point, turn the crank switch back on, thus enabling central point adjustment.

[0007] A variant of this method of operating the switchgear is the method used mainly in the countries of the former Soviet Union, where the tool for turning off the switchgear is different from the tool for turning the switchgear back on. This allows an operator with lower rights to

turn the point off from the central adjustment and to manually adjust it. Usually, a single tool, the crank, is sufficient for these activities. However, after completing the manual adjustment, this operator can no longer return the point back to its central adjustment. This option and authorisation is available to an operator with higher rights, who is equipped with a spanner of a different shape.

[0008] For example, from patent document CS 200758 an electromotive switch is known, especially intended for switches with high switching resistance, equipped in the transmission chain with a protective friction clutch with an internal friction circuit with an expansion spring, with the friction surface of the internal friction ring of the clutch being shaped in the form of a helix with a prismatic thread profile and the expansion spring, inserted between the open ends of the expanders, is made of disc springs, with the width of the friction surface of the internal friction ring being identical to the width of the gaps within the helix.

[0009] From another patent document CS219468 an electromotive switch is known with a contact switch of the setting and control circuits, with the switching system of the contact switch consisting of linearly arranged pairs formed by a fixed contact bracket attached to the contact plate and a movable contact bracket mounted in the axial bearings of the contact plate.

[0010] It is clear from the known technologies above that the biggest problem of current technology is that there is no simple and safe design solution that would enable easy, fast and safe adjustment of a railway switch at the moment when there is a failure of electrical energy for driving the electromotive switchgear.

[0011] The aim of the invention is the design of a railway switchgear device, which would have a simple design and which would enable safe and fast adjustment of a railway switch at the moment when there is a failure of electrical energy for driving the electromotive switchgear.

Principle of the Invention

[0012] The above-mentioned shortcomings are largely eliminated and the objectives of the invention are fulfilled by a railway switchgear device, specifically a device for manual two-stage control of a switchgear when manually adjusting a railway switch during emergency adjustment and when returning back to the central point adjustment, which comprises an electromotive switch with a switchgear, with the switchgear including a first shaft and the electromotive switch including an electric motor with a second shaft, according to the invention, characterised by that a latch is mounted on the first shaft of the switchgear, on which a gear-less mechanism is mounted, with the latch in the engaged state of the switchgear covering the second shaft of the electric motor and preventing access to the second shaft and with the latch in the disengaged state of the switchgear being tilted so that it provides free access to the second shaft for inserting the hand crank. The advantage is that a simple design

arrangement can ensure simple and highly safe control of the switch in the event of a power failure.

[0013] To advantage, the second shaft of the electric motor includes a second square for inserting a hand crank, with the connection dimensions of it being the same as the connection dimensions of the first square. This greatly simplifies the operation of the device for adjusting the railway switchgear when it is operated manually.

[0014] It is to advantage if the latch consists of an arm and a latch body, by which it is mounted on the first shaft. The latch body, which is a fixed part of the gear-less mechanism, is thus securely connected to the latch arm.

[0015] It is further to advantage if a pentagon is arranged on the latch body for operating the switchgear in both directions without slipping. By using a second tool, which is a pentagonal spanner, which can be placed all the way to the rear of the latch body behind the gear-less mechanism and which allows direct control of the switchgear in both directions without slipping, it is easy to ensure safe switching on of the switch when it is put back into operation.

[0016] It is advantageous if the latch body has projections that can fit into the projections of the gear-less mechanism ring.

[0017] It is also advantageous if the gear-less mechanism is mounted on the body of the latch.

[0018] The gear-less mechanism advantageously comprises a first square for fitting on the hand crank, a ring and a compression spring, where the ring with its projections for unidirectional movement of the ring along the body of the latch rests on the projections of the latch body when rotated in one direction and slides along them when rotated in the opposite direction, with the first square being movably mounted in the groove of the ring by at least one projection, and an inner fitting being arranged in the cavity of the first square, while a compression spring is arranged between the inner fitting of the first square and the ring, which presses the ring away from the first square onto the body of the latch. The advantage is that when attempting to turn on the switchgear by rotating the gear-less square with the same crank but in the opposite direction, the gear-less one slips and does not allow the switchgear to be turned on.

[0019] It is further to advantage if the first square is simultaneously mounted with an inner fitting on the latch body.

[0020] The compression spring is also advantageously mounted on the latch body.

[0021] It is also to advantage if the first square has an outer fitting in its rear part for supporting the hand crank.

[0022] It is to further advantage if the first square is secured against displacement by a flat washer fixed at its end to the latch body.

[0023] It is to further advantage if the latch body is attached to the first shaft simply and firmly by means of a pin.

[0024] The main advantage of the invention is that its

design allows for simple, fast and, above all, safe adjustment of the switch at the moment of a power failure for driving the electromotive switch. Its overall design allows for the aforementioned two-stage control of the crank switch in a spatially and simple to produce manner. It is to further advantage that one single tool, which is a crank, can control both the switching off of the switchgear and the control of the switch.

10 Overview of the Figures

[0025] The invention will be further explained with the help of drawings, in which fig. 1 shows a spatial view of the device for adjusting a railway switch at the moment when the switchgear is turned on, fig. 2 shows a spatial view of the device for adjusting a railway switch at the moment when the switchgear is turned off, fig. 3 shows a spatial view of the gear-less mechanism, fig. 4 shows a side sectional view of the device for adjusting a railway switch, fig. 5 shows a detailed side sectional view of the gear-less mechanism, fig. 6 shows a spatial view of the completely covered device for adjusting a railway switch at the moment when the crank is put on the first shaft and the crank switch is turned off, and fig. 7 shows a spatial view of a detail in section of the covered device for adjusting a railway switch at the moment when the crank is put on the second shaft and the manual adjustment of the railway switch is carried out.

30 Examples of the Performance of the Invention

[0026] A device for manual two-stage control of a switchgear (fig. 1, fig. 2, fig. 3, fig. 4, fig. 5, fig. 6, fig. 7) when manually adjusting a railway switch during emergency adjustment and when returning to the central point adjustment of the switch contains an electromotive switch 2 with a switchgear 1. The switchgear 1 includes a first shaft 5 and the electromotive switch 2 includes an electric motor 4 with a second shaft 8.

[0027] On the first shaft 5 of the switchgear 1 a latch 6 is mounted on which a gear-less mechanism 7 is mounted.

[0028] The latch 6, in the closed state of the switchgear 1, covers the second shaft 8 of the electric motor 4 and prevents access to it. The latch 6 is tilted in the off state of the switchgear 1 so that there is free access to the second shaft 8 of the electric motor 4 for inserting the hand crank 9.

[0029] The second shaft 8 of the electric motor 4 contains a second square 11 for inserting the hand crank 9, the connection dimensions of which are the same as the connection dimensions of the first square 10.

[0030] The latch 6 consists of an arm 16 and a body 15 of the latch 6, by which it is mounted on the first shaft 5. On the body 15 of the latch 6 a pentagon 12 is arranged to control the switchgear 1 in both directions without slipping. On the body 15 of the latch 6 a gear-less mechanism 7 is simultaneously mounted.

[0031] The gear-less mechanism 7 includes in its front

part a first square 10 for inserting the hand crank 9, a ring 17 and a compression spring 18. The ring 17 rests on the body 15 of the latch 6 with projections 19 for one-directional movement of the ring 17 along the body 15 of the latch 6. The first square 10 is by means of projections 20, movable in the groove 21 of the ring 17. In the cavity 22 of the first square 10 an internal fitting 23 is arranged. Between the internal fitting 23 of the first square 10 and the ring 17 a compression spring 18 is arranged, which pushes the ring 17 away from the first square 10 onto the body 15 of the latch 6.

[0032] The first square 10 pushes away from the ring 17. The compression spring 18 is simultaneously mounted on the body 15 of the latch 6.

[0033] The first square 10 is simultaneously mounted with its inner fitting 23 on the body 15 of the latch 6. The first square 10 includes in its rear part an outer fitting 24 for supporting the hand crank 9.

[0034] The first square 10 is secured against displacement by a flat washer 25 fixed at the end to the body 15 of the latch 6.

[0035] The body 15 of the latch 6 is attached to the first shaft 5 by a pin 26.

[0036] The device for manual two-stage control of the switchgear further includes a covering 3, which includes a hinged cover 13 for access to the first shaft 5 of the switchgear 1 and to the second shaft 8 of the electromotive switch 2.

[0037] The hinged cover 13 is secured by a closure, which includes a third square 14, the connection dimensions of which being the same as the connection dimensions of the first square 10.

[0038] When rotating the hand crank 9 fit onto the first square 10 to the right, slippage occurs so that the ring 17 resting on the walls of the pentagon 12 moves towards the first square 10, while sliding along the projections 19 between the ring 17 and the pentagon 12 and moving along the groove 21 onto the ring 17 resting on the square 10. When rotating to the left, nothing jumps, and by turning the hand crank 9, including the pentagon 12, the switchgear 1 is switched off and the latch 6 is tilted. The first shaft 5 of the switchgear 1 can thus be rotated back, i.e. to the right, only with a spanner fitted onto the pentagon 12, which is arranged in the rear part of the gear-less mechanism 7.

Industrial Application

[0039] A railway point switching device, according to the invention, can be used for manual control of electromotive switches during emergency adjustment of railway switches and when returning back to their central point adjustment.

List of Reference Marks

[0040]

1 switchgear
2 electromotive switch
3 covering
4 electric motor
5 first shaft
6 latch
7 gear-less mechanism
8 second shaft
9 hand crank
10 first square
11 second square
12 pentagon
13 hinged cover
14 third square
15 latch body
16 latch arm
17 ring
18 compression spring
19 projection for one-way movement of the ring
20 projection
21 ring groove
22 cavity of the first square
23 inner fitting
24 outer fitting
25 flat washerpin
26 pin

Claims

1. A device for adjusting a railway switch, specifically a device for manual two-stage control of a switchgear when manually adjusting a railway switch during emergency adjustment and when returning back to the central point adjustment of the switches, which includes an electromotive switch (2) with a switchgear (1), where the switchgear (1) includes a first shaft (5) and the electromotive switch (2) includes an electric motor (4) with a second shaft (8), **characterised by that** on the first shaft (5) of the switchgear (1) a latch (6) is mounted on which a gear-less mechanism (7) is mounted, when the latch (6) in the switched-on state of the switchgear (1) covers the second shaft (8) of the electric motor (4) and prevents access to it, and when the latch (6) in the switched-off state of the switchgear (1) is tilted so as to provide free access to the second shaft (8) of the electric motor (4) for inserting the hand crank (9).
2. The device for adjusting a railway switch, according to claim 1, **characterised by that** the second shaft (8) of the electric motor (4) includes a second square (11) for inserting the hand crank (9).
3. The device for adjusting a railway switch, according to either one of claims 1 and 2, **characterised by that** the latch (6) consists of an arm (16) and a body (15) of the latch (6), by which it is mounted on the first

shaft (5).

4. The device for adjusting a railway switch, according to claim 3, **characterised by that** on the body (15) of the latch (6) a pentagon (12) is arranged for operating the switchgear (1) in both directions without slipping. 5

5. The device for adjusting a railway switch, according to either one of claims 3 and 4, **characterised by that** the gear-less mechanism (7) is mounted on the body (15) of the latch (6). 10

6. The device for adjusting a switch according to any one of claims 1 to 5, **characterised by that** the gear-less mechanism (7) comprises a first square (10) for inserting a hand crank (9), a ring (17) and a compression spring (18), where the ring (17) rests on the body (15) of the latch (6), while the ring (17) rests with its projections (19) on the projections of the body (15) of the latch (6), for unidirectional movement along the body (15) of the latch (6), with the first square (10) being by at least one projection (20) movably mounted in the groove (21) of the ring (17), and in the cavity (22) of the first square (10) an inner fitting (23) is arranged, while between the inner fitting (23) of the first square (10) and the ring (17) is arranged a compression spring (18), which presses the ring (17) away from the first square (10) onto the body (15) of the latch (6). 15
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7. The device for adjusting a switch, according to claim 6, **characterised by that** the first square (10) is simultaneously mounted with its inner fitting (23) on the body (15) of the latch (6). 35

8. The for adjusting a switch, according to either one of claims 6 and 7, **characterised by that** the compression spring (18) is simultaneously mounted on the body (15) of the latch (6). 40

9. The device for adjusting a switch according to any one of claims 6 to 8, **characterised by that** the first square (10) comprises in its rear part an outer fitting (24) for supporting a hand crank (9). 45

10. The device for adjusting a switch according to any one of claims 6 to 9, **characterised by that** the first square (10) is secured against displacement by a flat washer (25) fixed at the end to the body (15) of the latch (6). 50

11. The device for adjusting a switch according to any one of claims 6 to 10, **characterised by that** the body (15) of the latch (6) is attached to the first shaft (5) by a pin (26). 55

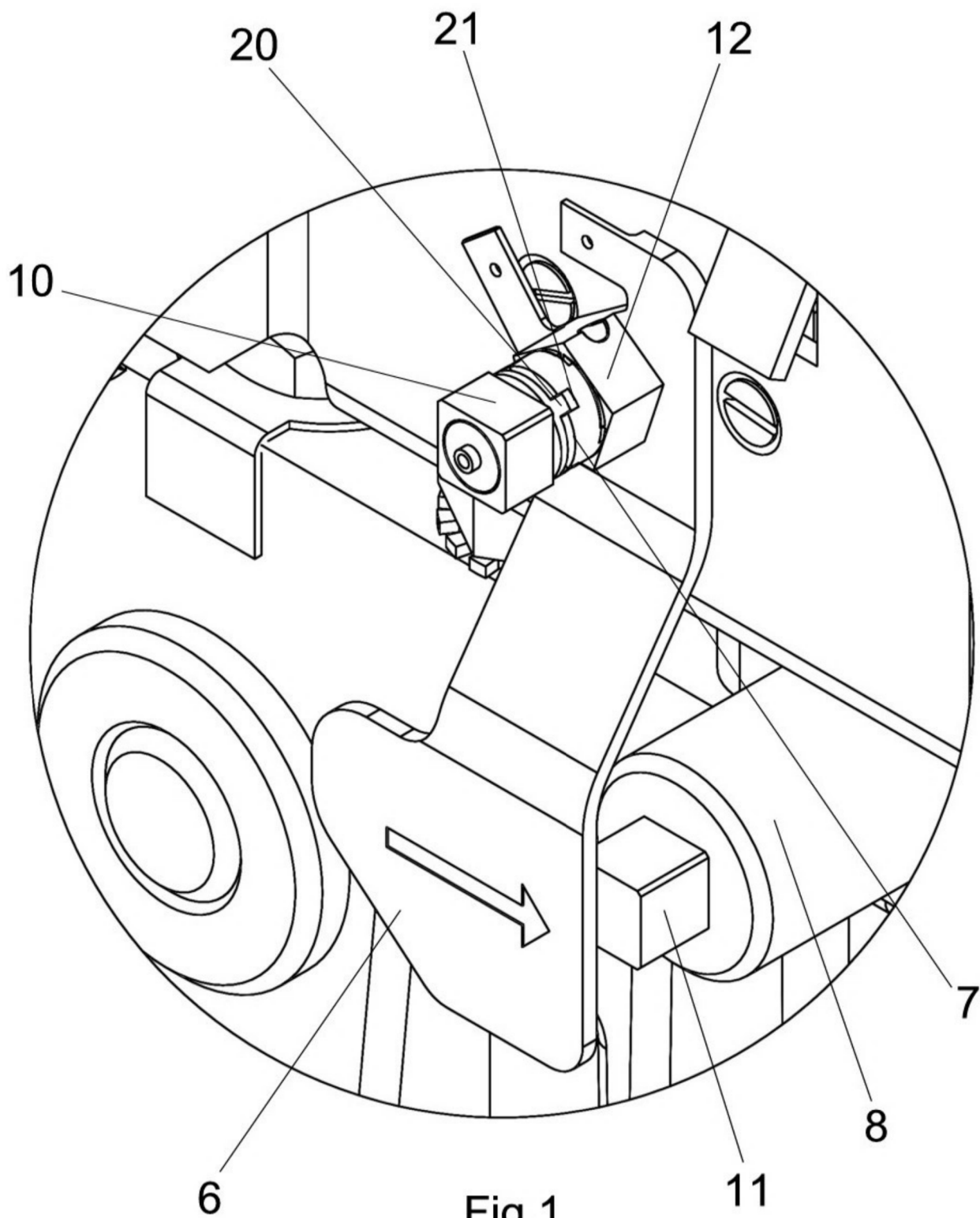


Fig.1

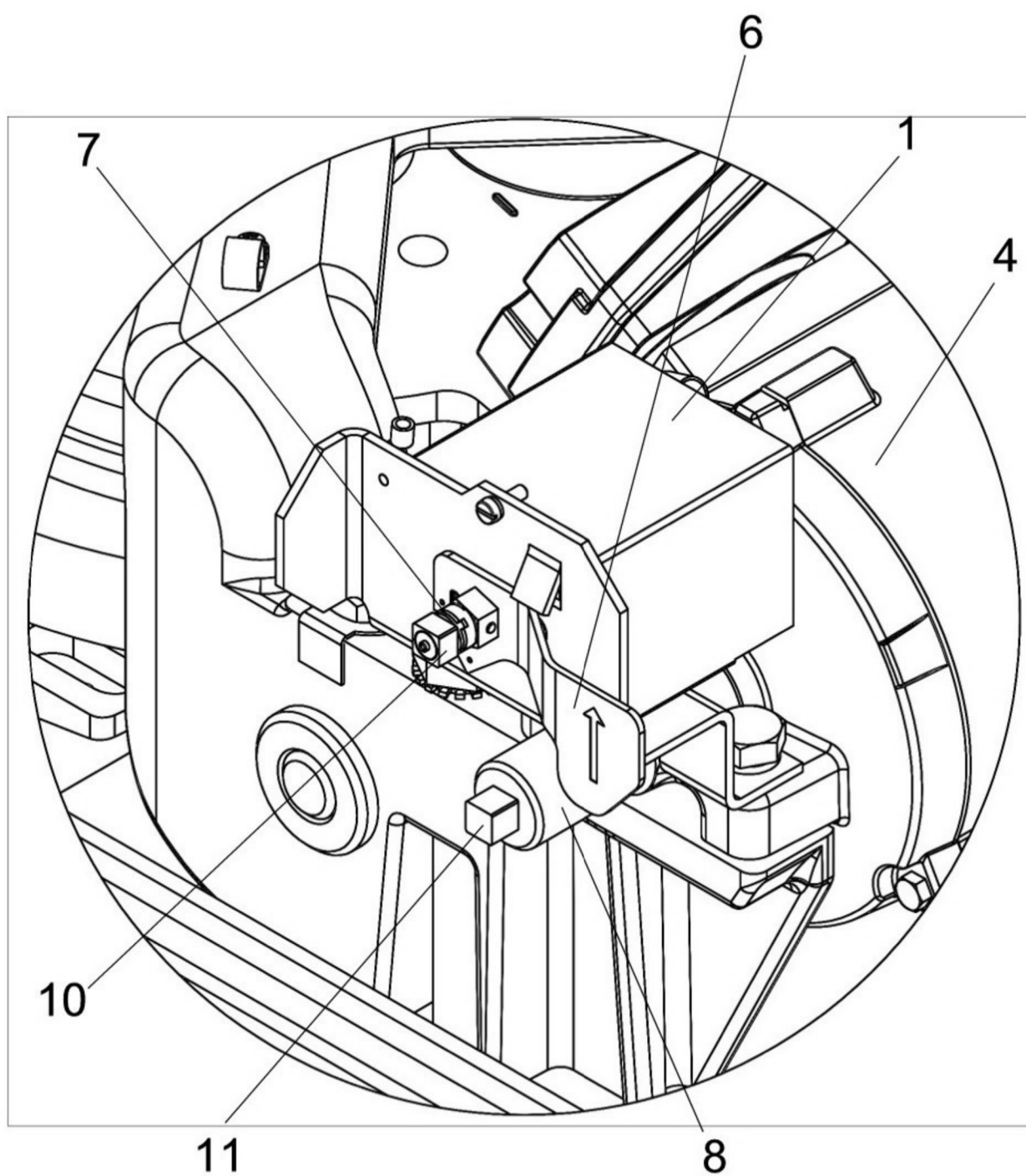


Fig.2

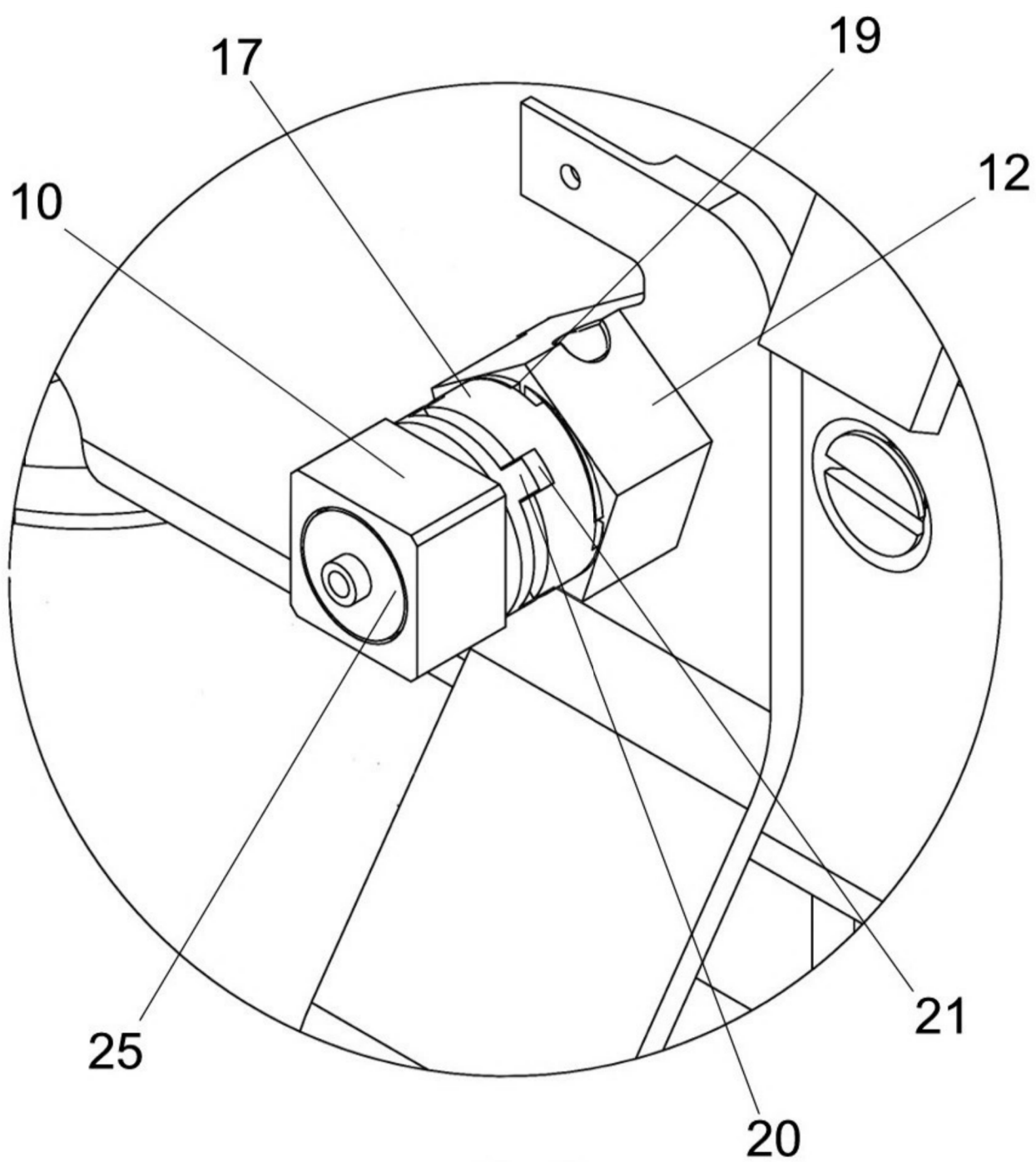


Fig.3

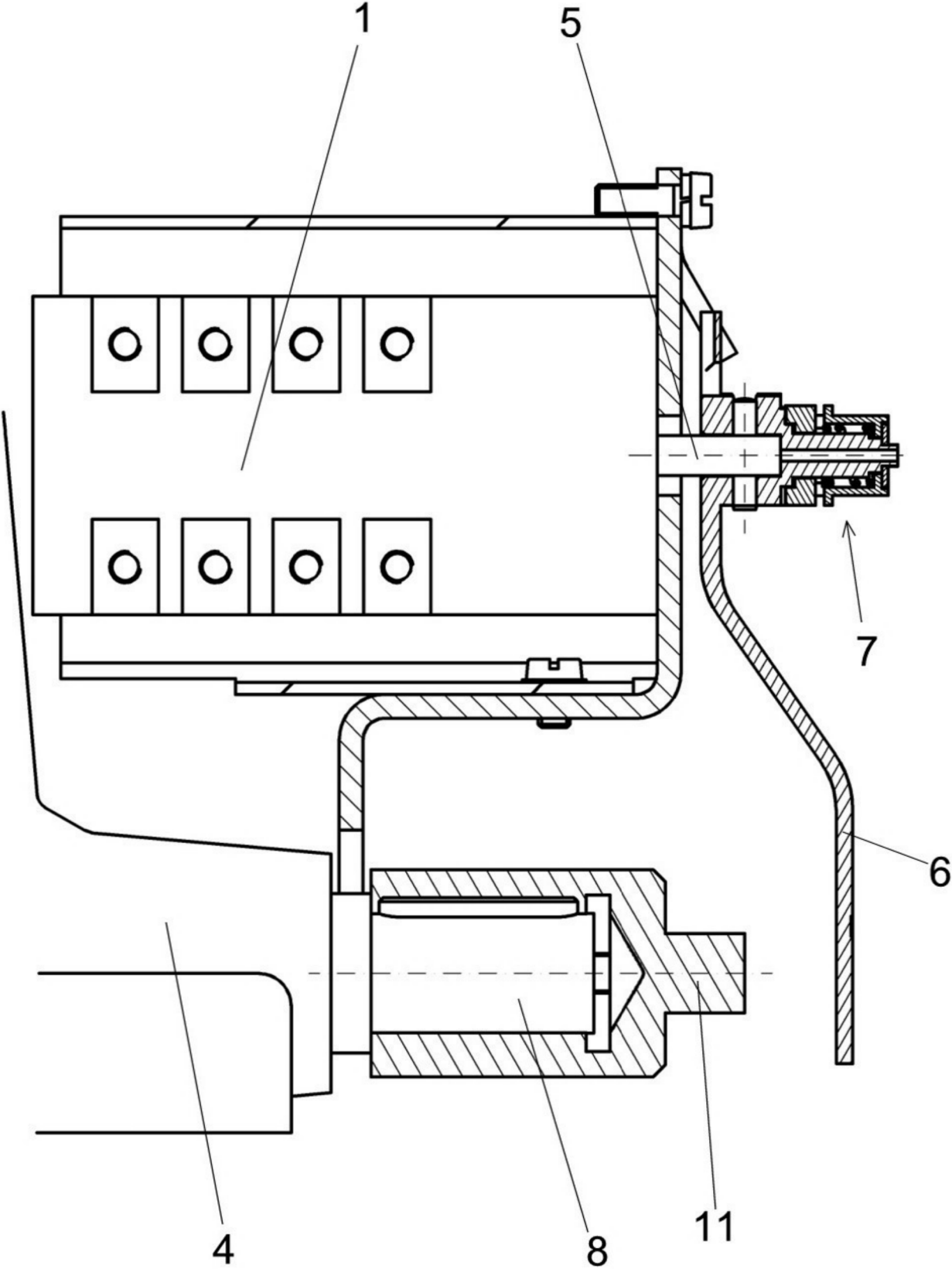
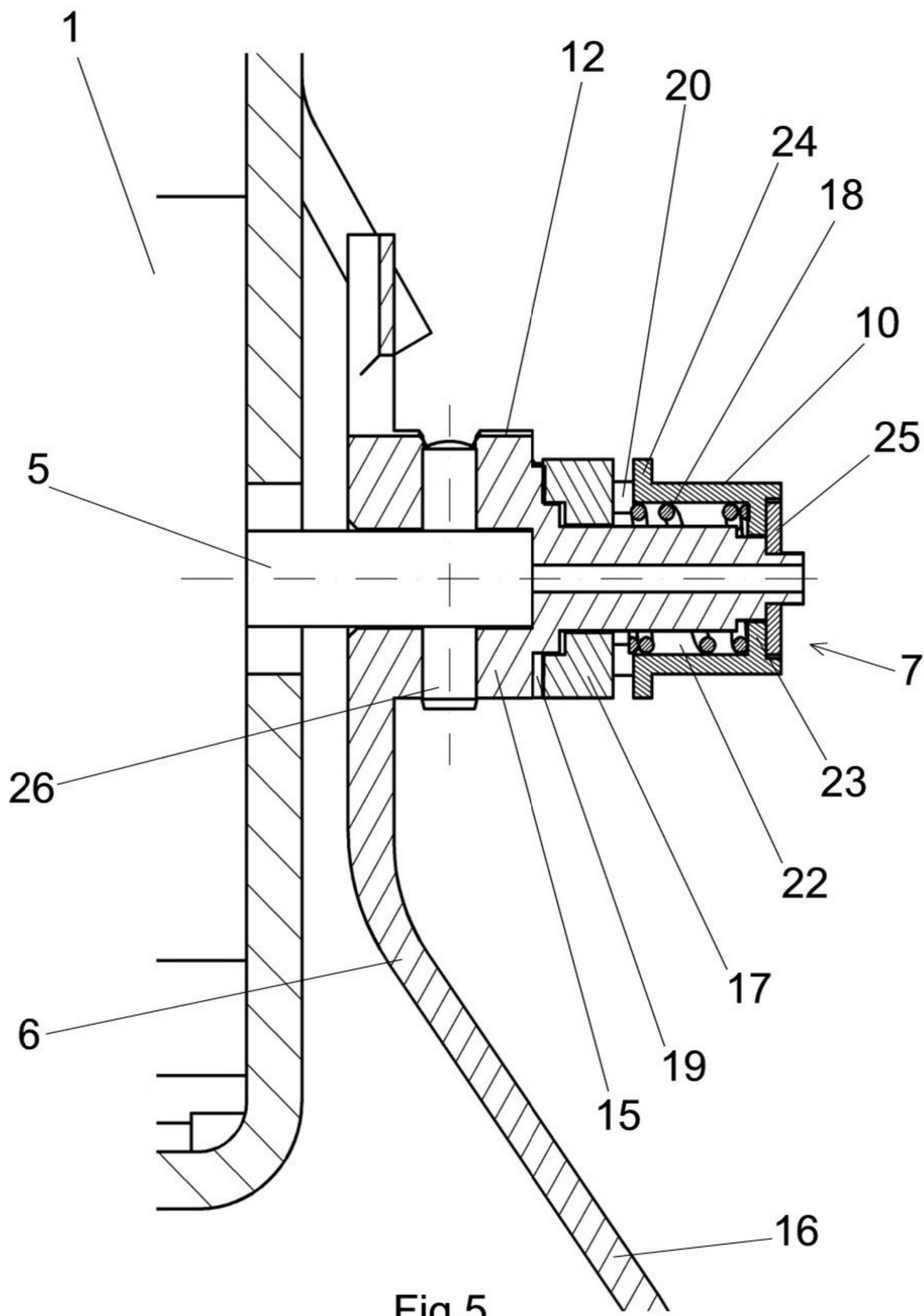


Fig.4



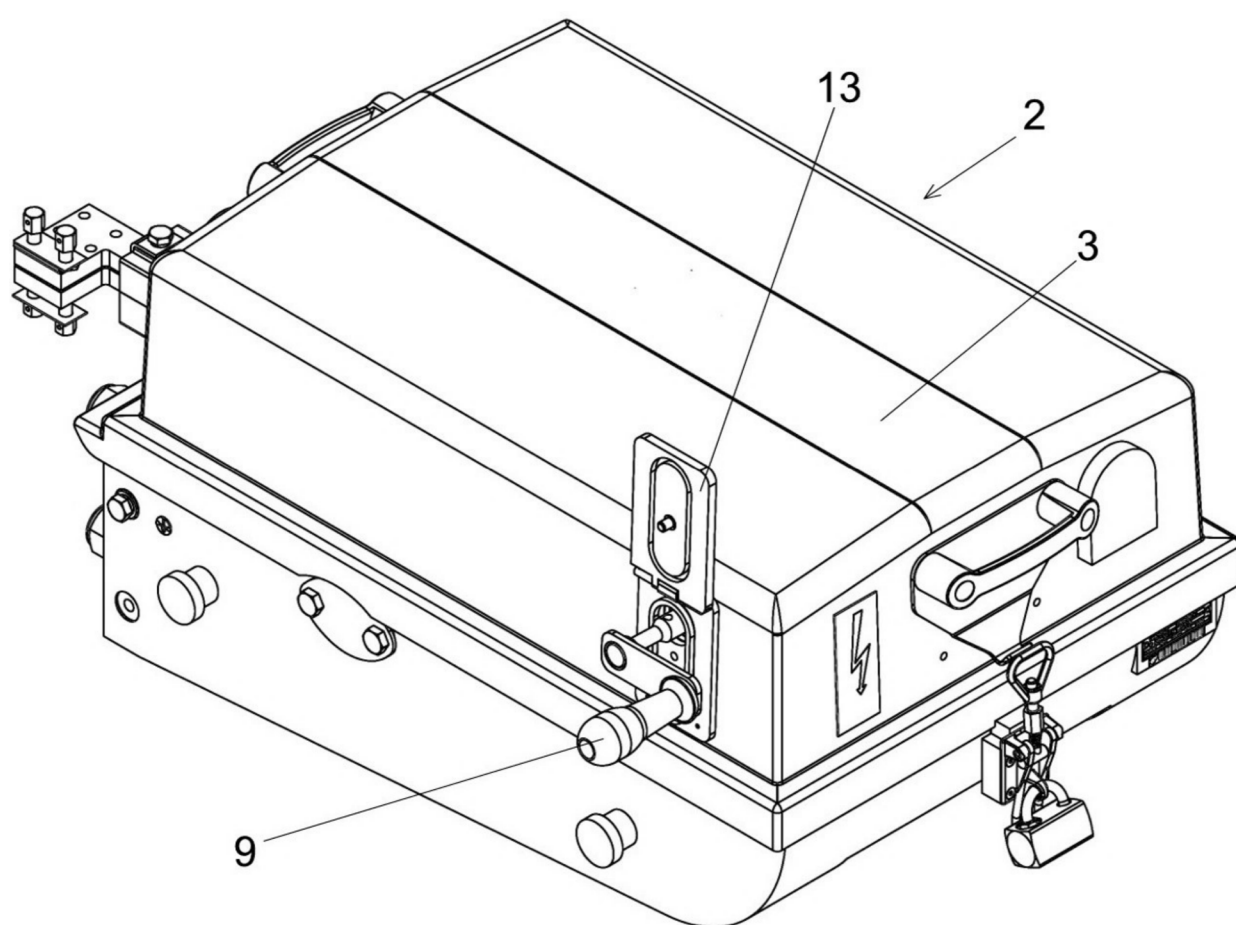
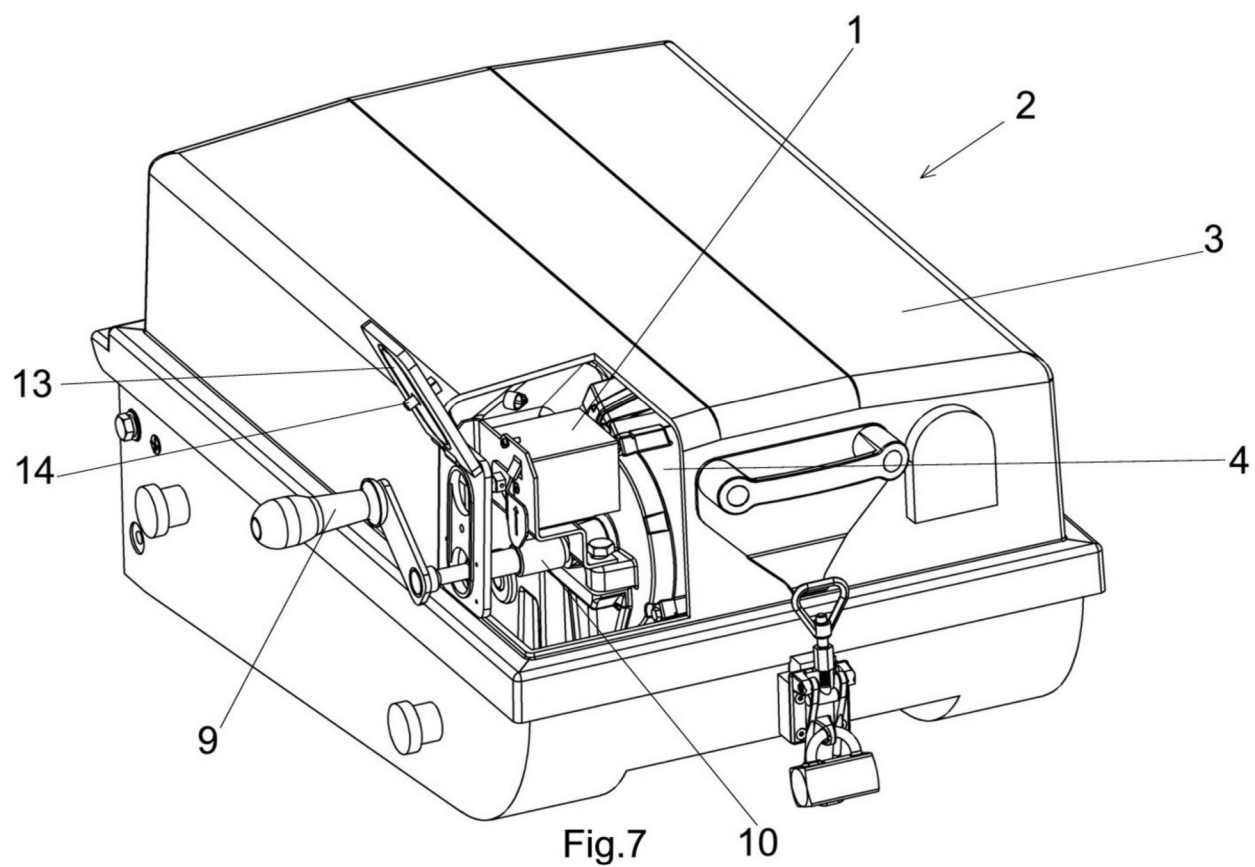


Fig.6





EUROPEAN SEARCH REPORT

Application Number

EP 25 21 2830

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	ACHIM SCHLINK: "Weichenantrieb H715 – Innovative Antriebstechnologie für die Vignolweichen - The H715 point machine – innovative point machine technology for flat-bottom points", SIGNAL + DRAHT : SD / SIGNALLING & DATACOMMUNICATION, vol. 109, no. 4, 10 April 2017 (2017-04-10), pages 6-11, XP055365746, DE ISSN: 0037-4997	1,2,5	INV. B61L5/02 ADD. B61L5/06
A	* Chapter 3.2; page 9 - page 10 * * figure 4 *	3,4,6-11	
A	DE 10 2013 009395 A1 (WOLBER RAINER [DE]; PINTSCH WOLBER GMBH [DE]) 19 December 2013 (2013-12-19) * paragraph [0058] - paragraph [0059] * * figure 2a *	1-11	TECHNICAL FIELDS SEARCHED (IPC) B61L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 March 2026	Examiner Janssen, Axel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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