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(54) MACHINE COMPENSATING THE WEIGHT OF SECTIONAL GATES

MASCHINE ZUM AUSGLEICH DES GEWICHTS VON SEKTIONALTOREN

MACHINE COMPENSANT LE POIDS DE PORTES EN SECTIONS

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(73) Proprietor: **LARVIVO
2830-302 Barreiro (PT)**

(72) Inventor: **DOS SANTOS NOGUEIRA, Luis Miguel
Fernandes
2665-239 Malveira (PT)**

(74) Representative: **Alves Moreira, Pedro
Raul César Ferreira (Herd.), Lda.
Rua do Patrocinio, 94
1399-019 Lisbon (PT)**

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Description

Technical field of the invention

[0001] This invention is aimed at the area of domestic and industrial vertical and horizontal-opening and high-opening Sectional Gates.

Status of the Technique

[0002] Currently, to compensate the weight of Sectional Gates, steel torsion springs are used, which have different sizes, depending on the weight exerted by the gate. Those springs have a life measured in work cycles, and manufacturers do not give a lifetime guarantee for them as they are considered to be material subject to wear and tear, as there is not usually a way of controlling the number of times the sectional gates are opened, when the springs break, their owners have to acquire new springs to balance the gate and for the latter to be able to operate properly and safely. In some situations, that operation of replacing the springs causes disruptions due to the time it takes to order, receive and fit the new springs, the gate remaining out of motion until that occurs.

[0003] To give an example of wear and tear, in a condominium of 50 users, the gate most probably opens and closes on average 100 times a day, multiplied by 365 days of the year which would mean it opens and closes 36500 times per year, if 15000 cycle springs are fitted, it means that on average springs will have to be replaced every 6 months.

[0004] Patent application CH 671953 A5 discloses a vertical sliding door for the cabin of a lift installation. It discloses a series of counterweights for applying a greater force on the door when the door is closed than when the door is open. However, this document does not disclose a safety system.

[0005] United States patent application US 1863961 discloses a safety device for suspended doors. This device comprises a cogged wheel, a lever acting on the cogged wheel, a dedicated falling weight and a bar actuated by the falling weight in case of a rupture occurs.

[0006] The above documents do not disclose a machine for compensating the weight of sectional gates such as the one claimed in the independent claim 1 of the present application.

Summary of the Invention

[0007] Thus, the machine that is the object of the present invention, is characterised as being a mechanical piece of equipment, conceived specially to compensate the weight of Sectional Gates, whether they have low, high or vertical opening, as well as if they are for domestic or industrial use.

[0008] The present invention is described in detail below, given solely for illustrative purposes and which is in no way limitative, represented in the attached drawings

in which:

- Figures 1/7 and 2/7 are frontal perspective representations of a characterisation of the machine according to the invention.
- Figures 3/7 to 7/7 are representations of details found in the machine according to the invention.

Detailed description of the invention

[0009] With reference to figures 1/7 to 7/7, a detailed description will now be given of the machine that is the object of the present invention, which is comprised of a set of embodiments represented in figures 1/7 to 7/7 and fitted as described below. The structure is comprised of a five-sided, metal plate chassis (9), on the upper side of the chassis, firstly a shaft (1) is applied which supports a first cogged wheel (3), then a second shaft (5) is applied which supports the second cogged wheel (2) which will always have double the number of cogs than the first cogged wheel (3) and a reel (4) for the steel cable (8), both shafts (1,5) are fitted horizontally and parallel to the chassis (9), the second and first cogged wheels (2,3) must be aligned and slotted into one another, the reel (4) will be fitted in the centre of the shaft (5). Following this, two metallic pieces bent at 90 degrees must be fixed to the chassis (9) and which look similar to a ladder with a minimum of three horizontal steps (14,15,16). After the said steps (14,15,16) have been fixed to the vertical and lateral sides of the chassis (9), the weights (10,11,12,13) must be fitted to the steel cable (8), to start placing the weights on the steel cable (8) we must start with weight (13) which is the narrowest of all the weights, then weight (12) is placed on top of weight (13), followed by weight (11) and finally, weight (10) which is the widest, weights (10,11,12,13) having been placed, the machine will then be tested to confirm that weights (10,11,12,13) work perfectly, to do so, the shaft (1) will be coupled to the shaft of the gate and the gate will be moved upwards, manually (not illustrated in the figures), in a complete opening cycle, simultaneously weights (10,11,12,13) move downwards and when weight (10) approaches the step (14) weight (10) stops on top of the said step (14), the remaining weights (11,12,13) continue suspended and moving downwards, then weight (11) will stop on top of the step (15) and next weight (12) will also stop on top of the step (16), only weight (13) always remaining suspended, being the only weight (13) to complete the entire downward path. Having completed the test described above and confirmed the proper mechanical functioning of the invention, the safety system must be set up, which is situated on the lower end of the chassis (9), to do so a lever (17) will be fitted that looks more like a pedal, that lever (17) is joined to a bar (7) and whenever the lever (17) is pressed, the bar (7) moves upward and as its upper side ends in the shape of a tooth, it will slot into the third cogged wheel (6) which is fitted on the shaft (1) on the upper end of the chassis, i.e. should the steel cable (8) break, the

weights (10,11,12,13) fall and press the lever (17), thus the bar (7) will engage the third cogged wheel (6) which in turn stops the shaft (1), immediately stopping all the embodiments in the present machine, finally the front covers (18/19) are fitted, sealing the entire interior of the present machine.

Description of the Invention

[0010] The structure of the machine which is the object of the present invention is comprised of a chassis with a five-sided metallic plate, on the top end of the chassis two metallic shafts are fitted, on the first shaft a cogged wheel with a smaller diameter will be fitted, on the second shaft a cogged wheel with a larger diameter will be fitted and a steel cable reel, both shafts are situated horizontally and parallel, both cogged wheels must be aligned and engaged and the steel cable reel centred in relation to the machine's chassis. Next, bent metallic plate pieces are fitted to each of the side walls of the chassis, said metallic plate pieces having vertical sides and horizontal sides, looking similar to a ladder with small horizontal steps, the minimum number of horizontal steps to be applied will be three steps on each side of the machine's chassis. After concluding the fitting of the above-mentioned bent metallic pieces, four weights of different widths will be fitted on the steel cable, the first weight to be installed on the steel cable will always be the narrowest one, then the next widest to the one already fitted and so on successively, when all the weights have been fitted the invention will have to be tested to confirm if the narrowest weight carries out the entire path that the steel cable must make without touching any horizontal step and if the remaining three, wider weights duly stop on the existing respective three horizontal steps. After checking the correct functioning of all the embodiments described above, a lever will be fitted on the lower end of the chassis, which when pressed by the weights transmits an upward movement to the bar fitted on the outer side of the chassis, the bar in question ends at the upper end in the form of a tooth and whenever the lever is pressed the tooth existing on the upper end of the bar will slot into a cogged wheel fitted on the first shaft on the upper end of the chassis, whenever that occurs, all the embodiments present will be immediately immobilised for safety reasons, finally the front covers will be fitted, sealing the entire interior of the machine that is the object of the present invention.

Index of the figures

[0011]

1/7 - Front perspective

2/7 - Front perspective

3/7 - Front perspective

4/7 - Front perspective

5/7 - Upper end perspective

5 6/7 - View from the top of the upper end

7/7 - View from the top of the lower end

Description of the figures

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[0012] Figure 1

This is a front perspective showing all the components of the present invention duly identified by numbers in order to better identify them. This figure aims to demonstrate the positioning of the components duly fitted on the chassis of the machine that is the object of the present invention.

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[0013] Figure 2

This is a Front perspective of the duly sealed machine that is the objective of the present invention, this figure aims to demonstrate the aspect of the machine after placing the front covers duly identified by numbers.

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[0014] Figure 3

This is a front perspective of the machine that is the object of the present invention where the aspect of the front covers is highlighted and the way they are placed on the machine's chassis.

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[0015] Figure 4

This is a front perspective of the machine that is the object of the present invention which aims to give relevance to the details related to the metal pieces bent in the shape of steps. We can see how the pieces are placed on the chassis, and also how the steps that are on the said pieces are positioned in relation to the weights. We can also see details related to the safety lever situated on the lower end of the machine.

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[0016] Figure 5

This is an Upper end perspective of the machine that is the object of the present invention, which aims to show the way the shafts and all their components operate.

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[0017] Figure 6

This is a view from the top of the upper end of the machine that is the object of the present invention, which aims to show the functioning of the steel cable and also the details situated on the outside of the chassis, which shows how the bar engages the cogged wheel which exists on one of the shafts.

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[0018] Figure 7

This is a view from the top of the upper end of the machine that is the object of the present invention, which aims to show details related to the safety lever.

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Claims

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1. Machine for compensating the weight of sectional gates, having a chassis (19) with a lower end, which chassis (19) supports:

- a first shaft (1) where a first and third cogged wheels (3, 6) are situated,
- a second shaft (5) parallel to the first shaft (1), the second shaft (5) supporting a second cogged wheel (2) and a reel (4) for winding and unwinding a steel cable (8), the steel cable (8) supporting weights (10,11,12,13) for compensating the weight of the gate, and the steel cable (8) being moveable upwards and downwards,
- steps (14,15,16) arranged for stopping respectively the weights (10,11,12) when steel cable (8) moves downwards,

characterized in that the chassis (19) further comprises a safety system situated on the lower end thereof, the safety system comprising a lever (17) connected to and configured to action a bar (7), which bar (7) comprises a tooth-shaped upper end engageable to the third cogged wheel (6) for stopping the first shaft (1), such that, upon rupture of the steel cable (8), the weight (13) is arranged to fall on and action the lever (17) for stopping the first shaft (1) by upwards movement of the bar (7).

2. Machine according to claim 1, **characterized in that** said weights (10,11,12,13) carry out a downward movement and when the weight (10) approaches the step (14) the weight (10) stops on top of said step (14), the remaining weights (11,12,13) continue to be suspended and to move downwards, following which it will be weight (11) that stops on top of the step (15) and then also weight (12) will stop on top of the step (16), only weight (13) always remaining suspended, being the only weight (13) to complete the entire downward path.
3. Machine according to claim 1, **characterized in that** said cogged wheel (2) always has double the number of cogs of cogged wheel (3).
4. Machine according to claim 1, **characterized in that** shafts (1,5) are fitted horizontally and parallel to the chassis (9).
5. Machine according to claims 1, 3 and 4 **characterized in that** said cogged wheels (2,3) must be aligned and slotted into with one another.
6. Machine according to claims 1 and 4, **characterized in that** said reel (4) is fitted in the centre of the second shaft (5).

Patentansprüche

1. Maschine um das Gewicht von Abschnittstoren auszugleichen, umfassend ein Gestell (19) mit einem unterem Ende, dessen Gestell (19)

- eine erste Welle (1), wo ein erstes und ein drittes Zahnräder (3, 6) angeordnet sind,
- eine zweite Welle (5) parallel der ersten Welle (1), wobei die zweite Welle (5) ein zweites Zahnrad (2) abstützt und ein Haspel (4) um ein Stahlkabel (8) auf- und abzuwickeln, das die Gewichte (10, 11, 12, 13) abstützende Stahlkabel (8) um das Gewicht des Tores auszugleichen, und das auf- und abwärts sich bewegendes Stahlkabel (8),
- Stufen (14, 15, 16) so angeordnet, um jeweils die Gewichte (10, 11, 12) zu halten, als das Stahlkabel (8) abwärts sich bewegt, abstützt,

dadurch gekennzeichnet, dass das Gestell (19) ferner ein auf dem unteren Ende davon angeordnetes Sicherungssystem umfasst, wobei das Sicherungssystem einen mit einer Stange (7) verbundenen und dafür betätigenden Hebel (17) umfasst, wobei diese Stange (7) ein im dritten Zahnrad (6) einrastbares, erste Welle (1) haltendes, zahnförmiges Oberende umfasst, so dass, bei einem Bruch des Stahlkabels (8), ist das Gewicht (13) so angeordnet, dass es fällt und so den Hebel (17), um die erste Welle (1) durch Aufwärtsbewegung der Stange (7) zu halten, betätigt.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** besagte Gewichte (10, 11, 12, 13) eine Abwärtsbewegung durchführen und als das Gewicht (10) der Stufe (14) sich nähert (10), hält sich das Gewicht auf der besagten Stufe (14), bleiben die übrigen Gewichte (11, 12, 13) weiter hängend und sich abwärts bewegen, wonach wird das Gewicht (11) auf der Stufe (15) sich gehalten und dann wird auch das Gewicht (12) auf der Stufe (16) sich gehalten, dann bleibt nur das Gewicht (13) weiter hängend, wobei es das einzige Gewicht (13), die die ganze Abwärtsstrecke vollständig zurücklegt, ist.
3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** besagtes Zahnrad (2) immer zweimal die Zähnezahle des Zahnrades (3) hat.
4. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Wellen (1, 5) waagrecht und parallel dem Gestell (9) angeordnet sind.
5. Maschine nach Ansprüchen 1, 3 und 4, **dadurch gekennzeichnet, dass** besagte Zahnräder (2, 3) miteinander ausgerichtet und geschlitzt werden müssen.
6. Maschine nach Ansprüchen 1 und 4, **dadurch gekennzeichnet, dass** besagter Haspel (4) in der Mitte der zweiten Welle (5) angeordnet ist.

Revendications

1. Machine pour compenser le poids de portes à sections, ayant un châssis (19) avec un côté inférieur, lequel châssis (19) appuyant : 5
 - Un premier arbre (1), sur lequel se trouvent une première et une troisième roues (3, 6) dentées,
 - Un deuxième arbre (5) parallèle au premier arbre (1), le deuxième arbre (5) appuyant une deuxième roue (2) dentée et un dévidoir (4) pour enrouler et dérouler un câble (8) en acier, le câble (8) en acier appuyant des poids (10, 11, 12, 13) pour compenser le poids de la porte et le câble (8) en acier se déplaçant vers le haut et vers le bas, 10
 - Des échelons (14, 15, 16) disposés pour arrêter respectivement les poids (10, 11, 12), lorsque le câble (8) en acier se déplace vers le bas, 15 20

caractérisée en ce que le châssis (19) comprend en plus un système de sécurité placé sur le côté inférieur dudit châssis, le système de sécurité comprenant un levier (17) lié à une barre (7) et réalisé pour sa mise en marche, laquelle barre (7) comprend un bout supérieur en forme de dents, pouvant s'encclencher sur la troisième roue (6) dentée pour arrêter le premier arbre (1), de telle façon qu'en cas de rupture du câble (8) en acier le poids (13) est disposé pour tomber sur le levier (17) et ainsi mettre celui-ci en marche pour arrêter le premier arbre (1), par un déplacement de la barre (7) vers le haut. 25 30
2. Machine selon la revendication 1, **caractérisée en ce que** lesdits poids (10, 11, 12, 13) accomplissent un déplacement vers le bas et lorsque le poids (10) s'approche de l'échelon (14) le poids (10) s'arrête sur ledit échelon (14), les autres poids (11, 12, 13) restant suspendus et se se déplaçant vers le bas, après cela c'est le poids (11) qui s'arrêtera sur l'échelon (15) et puis le poids (12) s'arrêtera aussi sur l'échelon (16), seul le poids (13) restera toujours suspendu, le poids (13) étant le seul à accomplir la trajectoire toute entière vers le bas. 35 40 45
3. Machine selon la revendication 1, **caractérisée en ce que** ladite roue (2) dentée a toujours le double du nombre de dents de la roue (3) dentée. 50
4. Machine selon la revendication 1, **caractérisée en ce que** les arbres (1, 5) sont montés horizontalement et parallèlement au châssis (9). 55
5. Machine selon les revendications 1, 3 et 4 **caractérisée en ce que** lesdites roues (2, 3) dentées devront être alignées et rainurées l'une par rapport à l'autre.

6. Machine selon les revendications 1 et 4, **caractérisée en ce que** ledit dévidoir (4) est monté au centre du deuxième arbre (5).

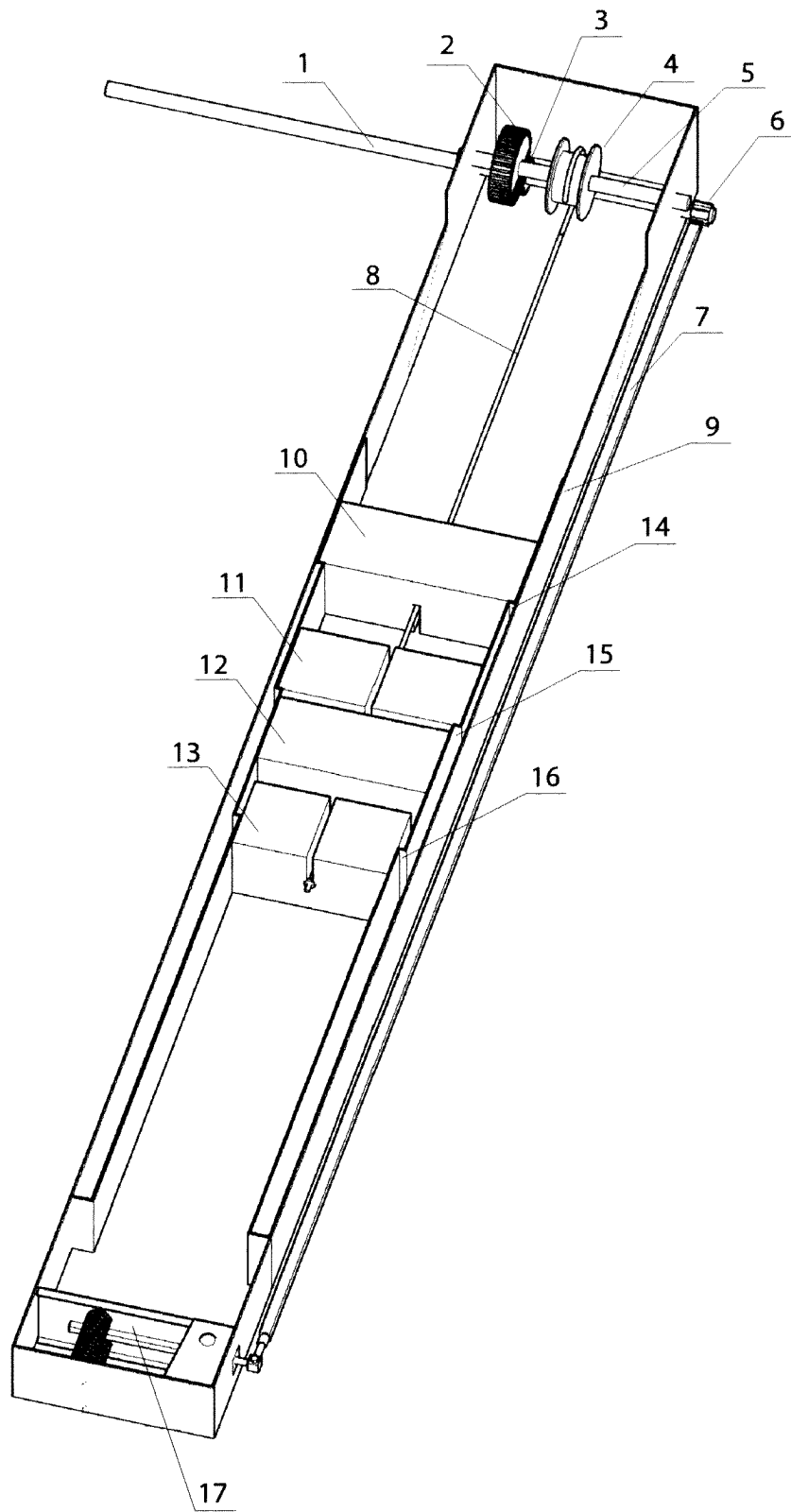


Fig.1

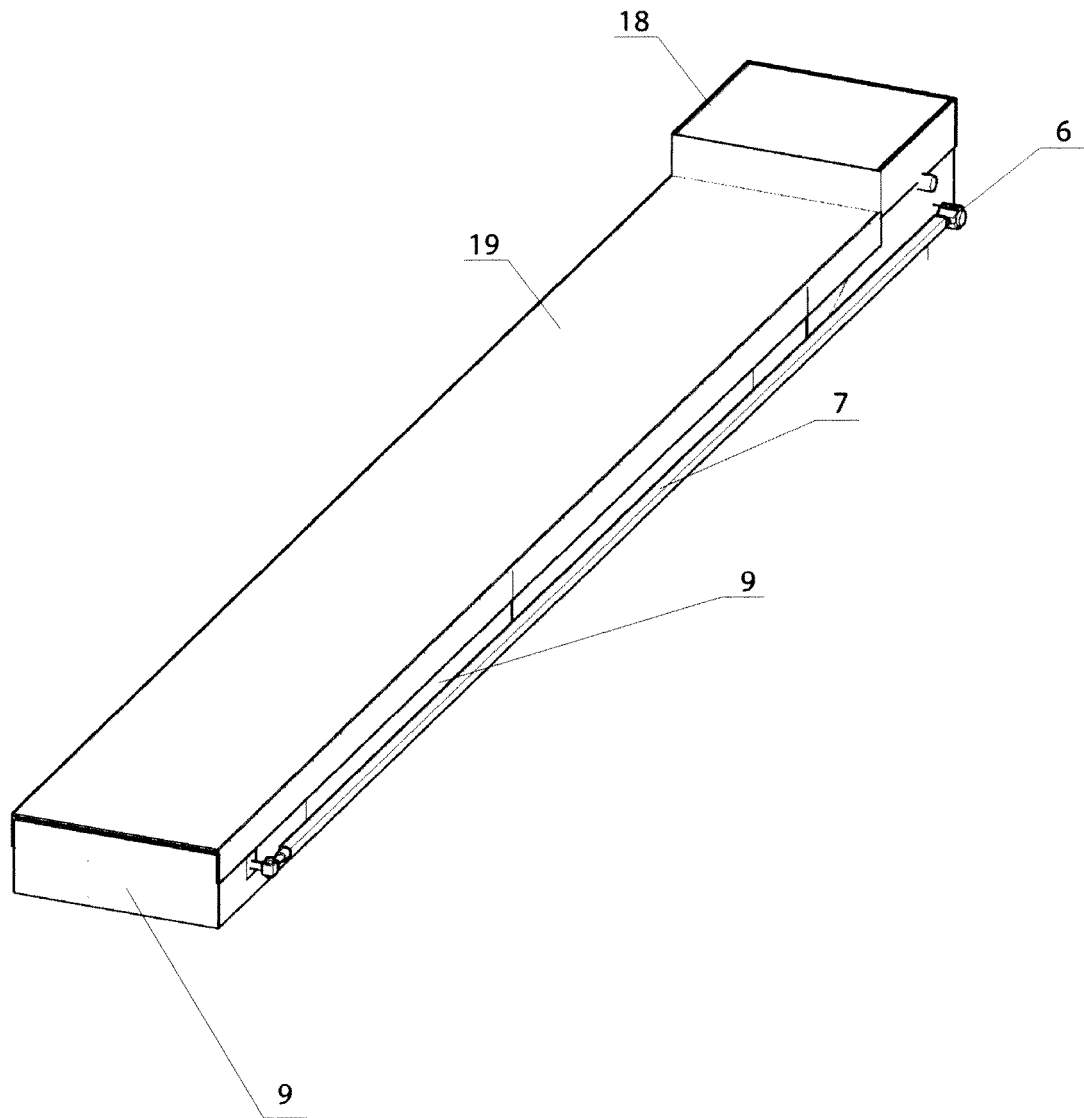


Fig.2

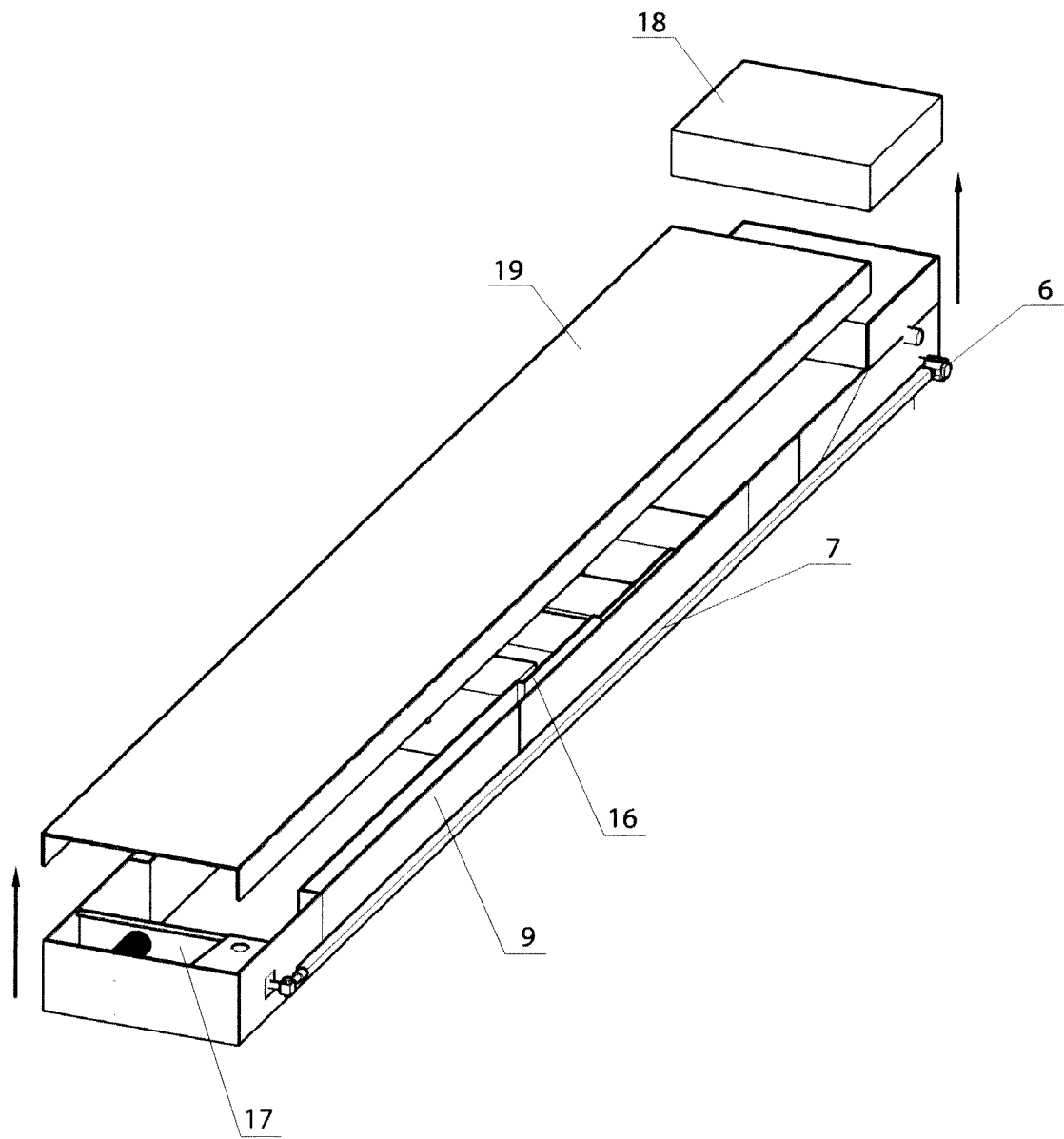
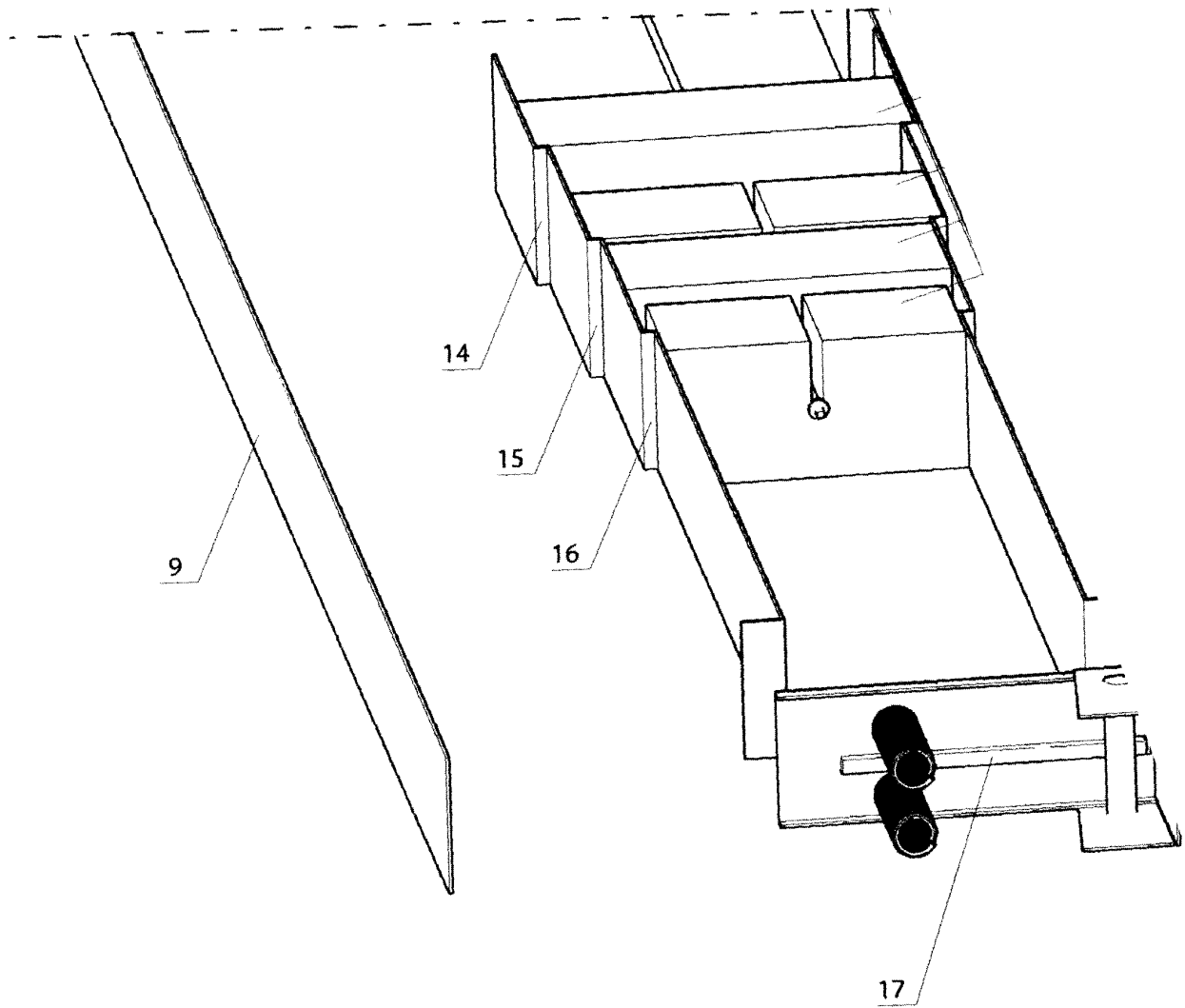


Fig.3



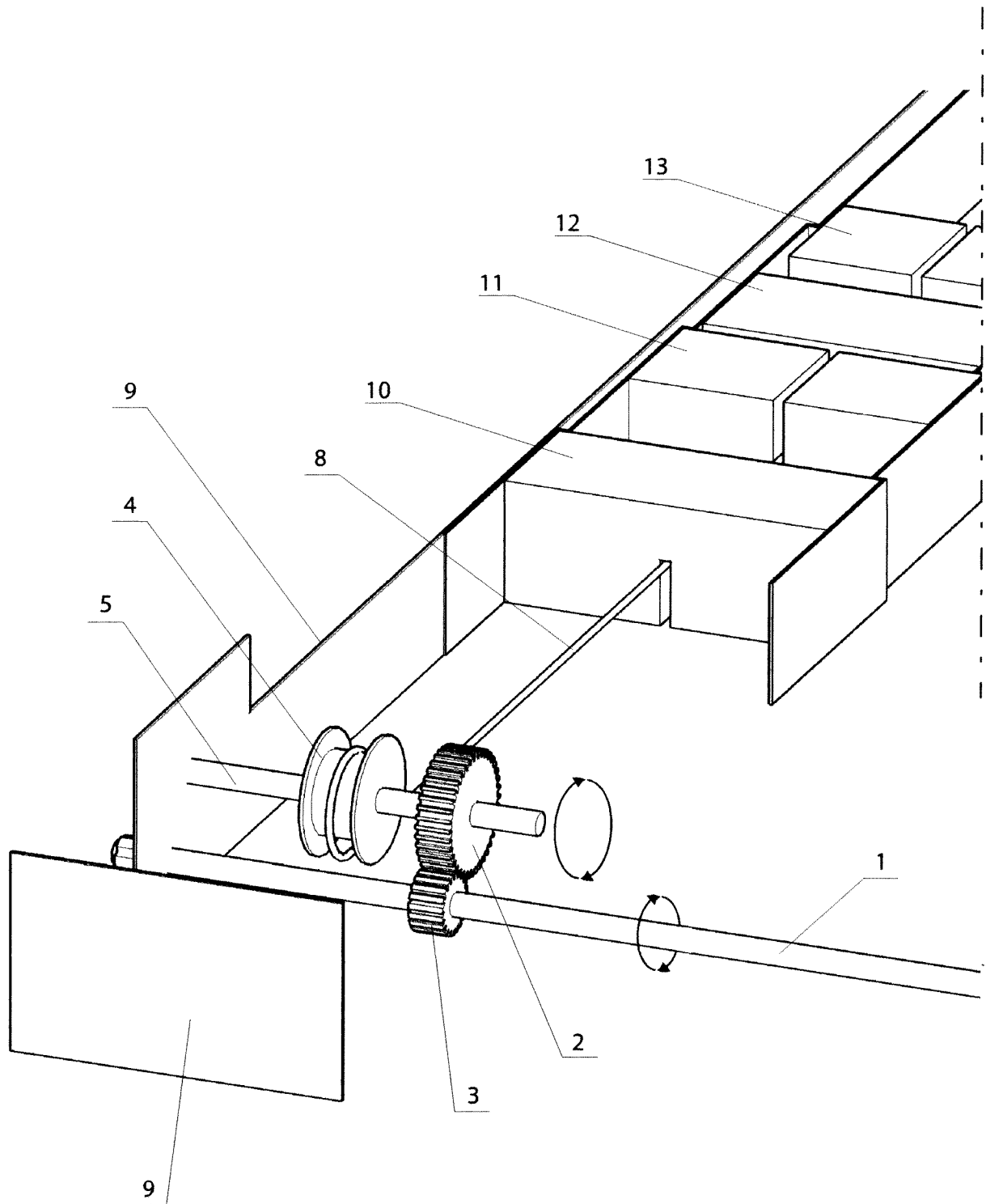


Fig.5

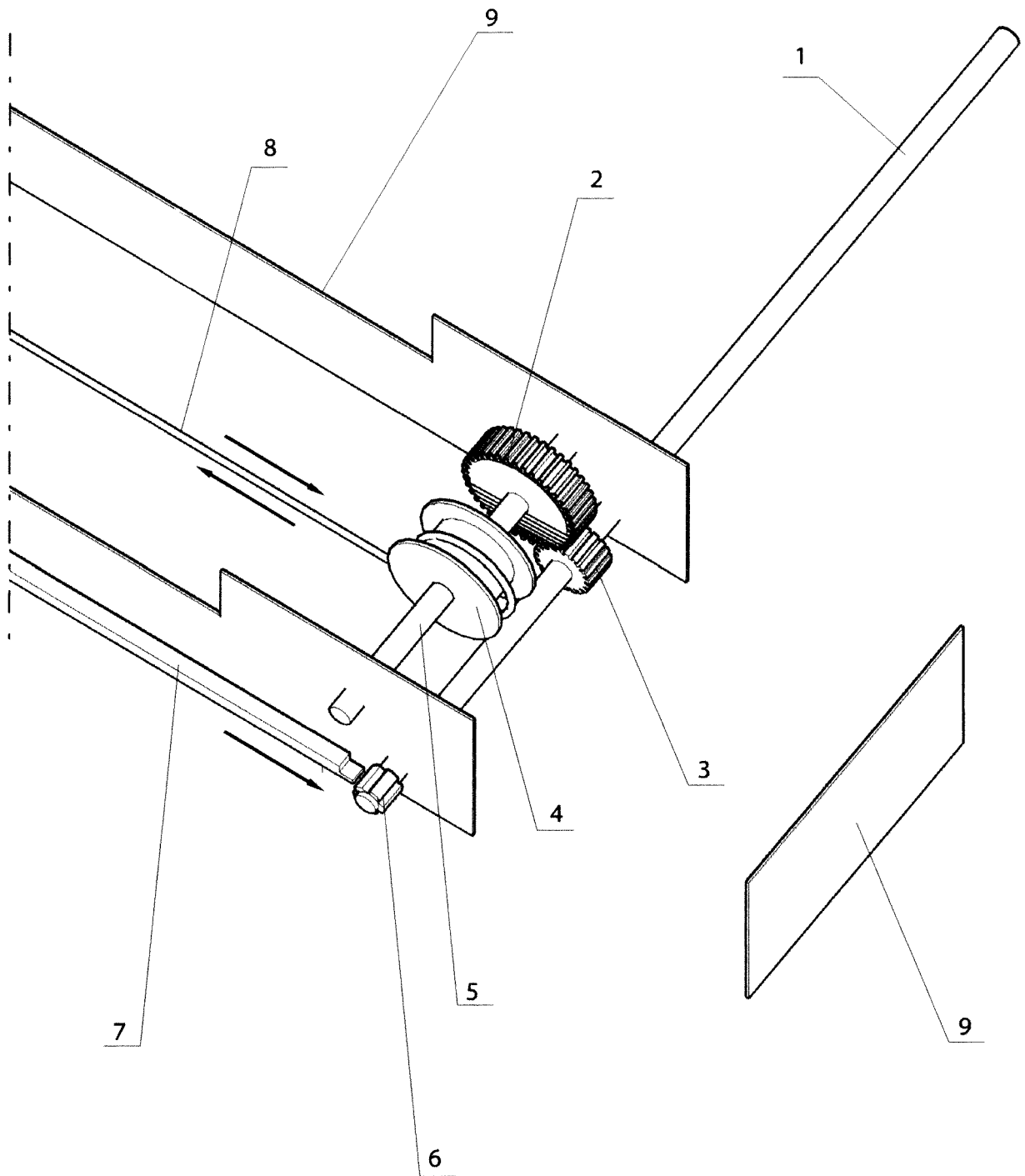


Fig.6

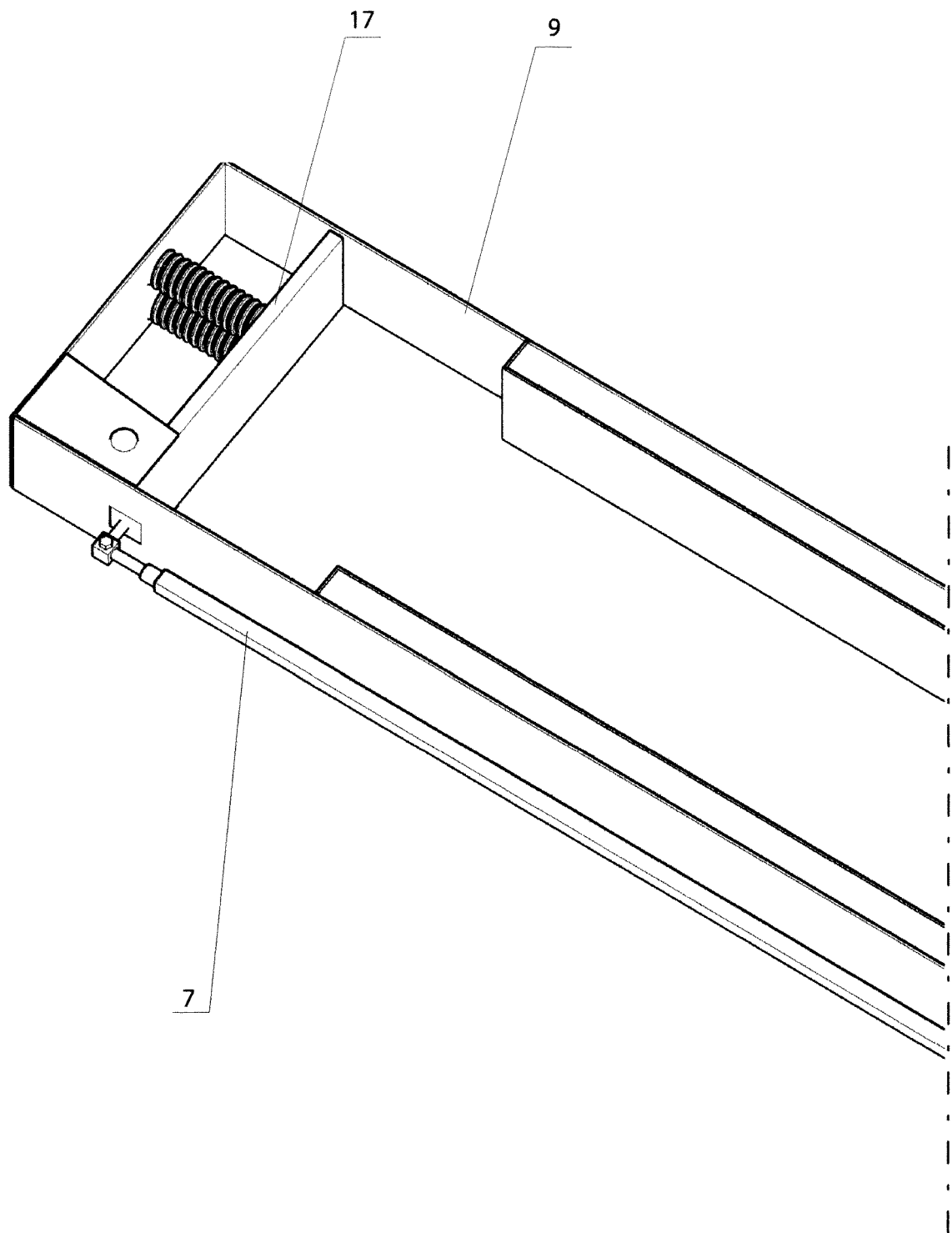


Fig.7

REFERENCES CITED IN THE DESCRIPTION

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