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(54) **WEAVING LOOM WITH A TUCK-IN DEVICE WITH TRAVELING OPERATING HEAD COMPRISING  
A CONTROL LEVERAGE MECHANISM**

WEBMASCHINE MIT EINER EINSCHLAGVORRICHTUNG MIT VERFAHRBAREM  
BEARBEITUNGSKOPF UMFASSEND EINEN STEUERUNGSHEBELMECHANISMUS

MÉTIER À TISSER COMPRENANT UN DISPOSITIF DE RENTRAGE AVEC TÊTE  
D'EXPLOITATION MOBILE COMPRENANT UN MÉCANISME DE LEVIER DE COMMANDE

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## Description

**[0001]** The present invention refers to a control leverage mechanism for tuck-in devices meant for weaving machines and in particular to tuck-in devices the operating head of which alternately moves in the warp direction, during each weft insertion cycle.

## FIELD OF THE INVENTION

**[0002]** The selvedge-forming devices, briefly referred to in the sector as "tuck-in devices" consist of mechanical, electric, pneumatic devices, or combinations thereof, which are used in shuttle-less weaving looms for forming a false selvedge (thus defined in opposition to the true selvedge which is formed in shuttle weaving looms) along the lateral edge of the fabric being woven, steadily fastening the weft tails which laterally protrude from the cloth being woven, after the insertion and cutting of the weft yarns.

**[0003]** This operation is performed through an operating head of the tuck-in device which, in various possible operating modes, of a mechanical, electronic, pneumatic or mixed type, grabs the free weft tail of the last inserted weft, immediately after the closing of the shed and the beating of the reed against such weft, and immediately inserts it back into the shed, thus anticipating both shed closing and the reed beating-up on the subsequent weft, so that said weft tail is steadily retained in position among the warp yarns together with said subsequent weft, thus causing selvedge forming, as an alternative to the free fringe of weft tails, with remarkable advantages in terms of stability and resistance of the fabric edges during the subsequent processing and handling of the fabric.

**[0004]** Tuck-in devices are more frequently provided with a fixed operating head and they are positioned at the two sides of the cloth being woven next to the reed. Since one or more pieces of a reduced width are often simultaneously woven on the loom width, in order to allow the positioning of the tuck-in devices with fixed operating head within the loom shed, it is of course necessary to shorten or cut the reed into two or more segments, since, in the contrary, a mechanical interference would occur between the reed and the tuck-in device during reed movement.

**[0005]** Tuck-in devices with travelling operating head solve this problem due to the fact that the travelling head thereof is provided with an alternate movement in the direction of the warp yarns, which movement allows the backward travel of said operating head during reed beating-up and the subsequent quick forward travel of the same in the immediately subsequent step. It is hence possible to operate with these tuck-in devices with a whole reed, that is, a reed which extends across the entire loom width, regardless of the size and of the number of cloths simultaneously processed on the loom.

## STATE OF THE PRIOR ART

**[0006]** Tuck-in devices with a fixed head of a different structure and actuating system are disclosed for example in EP 0286443, US 4905740 and US 2006/0207676.

**[0007]** Well-known in the field is then a tuck-in device with a travelling head manufactured by SULTEX AG, which does not seem having been patented, wherein the movement of the operating head of the tuck-in device, travelling along linear sliding guides, was derived from the main movement of the loom (and in particular from the movement of the sley) through a kinematic mechanism comprising an articulated quadrilateral and a cam apt to determine the particular desired motion law of the operating head of the tuck-in device.

**[0008]** To the travelling head of the above disclosed tuck-in device, a weft-cutting device was furthermore made integral, according to an arrangement already known for a long time, so that said device follows the head of the tuck-in device in the alternate movement thereof in a longitudinal direction, to be able to perform weft cutting at the selected time, after the insertion of said weft into the shed. The control of the above-said cutting device was independent from the control of the travelling head of the tuck-in device and was normally entrusted to a pneumatic or electric device.

## BRIEF DESCRIPTION OF THE INVENTION

**[0009]** The technical solution disclosed by the Sultex travelling-head tuck-in device, briefly described above, has some mechanical drawbacks which the present invention aims at overcoming.

**[0010]** A first critical point of the control of the travelling head of the tuck-in device illustrated above consists in the linear guides on which the travelling head of the tuck-in device slides. As a matter of fact, these guides are sensitive components which generally require, in order to provide regular performances and a satisfactory life duration, a lubrication system or, at least, regular greasing operations, in order to avoid too quick a wear with the forming of plays which reduce the reliability of the device.

**[0011]** A second critical point can be identified in the cam system per se, linked to the need to provide a suitable lubrication, or at least a regular greasing of the cam-follower rollers. Such rollers then present serious reliability problems in this type of applications.

**[0012]** Finally, a third drawback is linked to the necessary provision of a separate control for the weft cutting device. As a matter of fact, pneumatic cutting devices have response delay problems which complicate the management of such devices; this problem does not arise in the case of the employment of an electrical servocontrol, which, however has high costs and is demanding from the point of view of the hardware and software implementation.

**[0013]** A first object of the present invention is hence

to offer a travelling-head tuck-in device provided with a new-concept control which does not require the use of cylindrical guides to obtain the alternate translation movement of the travelling head.

**[0014]** A second object of the present invention is the removal of a system which provides the use of any cam system for generating the alternate motion of the travelling head.

**[0015]** A third object of the present invention is then to offer a tuck-in device wherein the execution of the weft cut may be performed without the use of pneumatic or electric actuators and hence allows a simpler, more effective and cheaper construction.

**[0016]** All these objects are achieved, according to the present invention, through a weaving loom comprising a sley and a travelling-head tuck-in device comprising a control leverage mechanism having the features defined in claim 1. Other preferred features of such control leverage mechanism of a tuck-in device are defined in the dependent claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0017]** Further features and advantages of the control leverage mechanism of a tuck-in device according to the present invention will in any case be more evident from the following detailed description of a preferred embodiment of the same, provided purely as a non-limiting example and illustrated in the attached drawings, wherein:

- fig. 1 illustrates schematically and in a front view the leverage mechanism of the invention wherein the sley - and the reed integral therewith - is in a weft beating-up position and the travelling head of the tuck-in device is in a forward position;
- fig. 2 is a similar view to fig. 1 wherein the sley and the travelling head of the tuck-in device are a backward position, to bring the travelling head in alignment with the just introduced weft;
- fig. 3 is a view similar to fig. 2 during the operation of the weft cutting device; and
- fig. 4 is a front view of a preferred embodiment of the leverage mechanism of the invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0018]** In the following description, when the terms forward and forward movement are used it is meant to refer to the progression direction of the fabric on the loom, represented in the drawing by arrow T. The terms backward and backward movement indicate of course the opposite direction.

**[0019]** In a first embodiment, the control leverage mechanism of a tuck-in device according to the present invention, in order to achieve the first and the second object highlighted above, consists of the following functional groups of levers, highlighted in fig. 2:

- a first articulated quadrilateral Q1, the end hinges of which are fixed to the loom, which takes the alternate movement from the sley S of the loom;
- a connecting rod-crank mechanism G1 which receives on the crank the movement from the first articulated quadrilateral Q1 and transmits it through the connecting rod to the travelling head of the tuck-in device on which the moving end of said crank is hinged; and
- an articulated parallelogram P1 which connects the body of the tuck-in device to the travelling head of the same, for guiding said travelling head of the tuck-in device between a forward home position and a backward operating position maintaining the parallelism thereof.

**[0020]** According to a main feature of the invention, said first rod-crank mechanism G1 lies at the dead point thereof when the travelling head of the tuck-in device is at the backward operating position thereof.

**[0021]** According to another feature of the invention, the connecting rod of said rod-crank mechanism G1 has a longitudinal movement having a direction consistent with the movement of the sley S.

**[0022]** In a second embodiment, the control leverage mechanism of a tuck-in device according to the present invention, in order to achieve the third object highlighted above, furthermore comprises the following functional group of levers:

- a second articulated quadrilateral Q2, the end hinges of which are fixed to the travelling head of the tuck-in device, the control lever of said quadrilateral consisting of an extension of the control end of the connecting rod of the above-said first rod-crank mechanism G1, beyond the hinge connection (in B) with said travelling head of the tuck-in device LC, and the controlled lever being integral with the moving cutting blade of a weft cutting device.

**[0023]** According to a feature of the invention said weft cutting device furthermore comprises a fixed cutting blade, integral with the travelling head of the tuck-in device.

**[0024]** The functional groups of levers defined above will now be described in greater detail with reference to the drawings wherein, for greater clarity the references of the individual levers are indicated in fig. 1 and the references of the functional groups of levers are indicated in fig. 2.

**[0025]** The first articulated quadrilateral Q1 consists of the sley S, of a forward-transmission connecting rod LF and of a lever L1 hinged in A to the body CC of the tuck-in device and hence comprises two hinges 1 and A fixed with respect to the loom, and two moving hinges 2 and 3.

**[0026]** Rod-crank mechanism G1 consists of a lever L2 and of a backward-transmission connecting rod LR hinged in B on the travelling head LC of the tuck-in device

and hence comprises a fixed hinge A and two moving hinges 4 and B. Levers L1 and L2 hinged in A form with each other a suitably determined fixed angle.

**[0027]** Parallelogram P1 consists of a pair of identical and mutually parallel levers LP; said levers are hinged in 5 and 6 to the body CC of the tuck-in device and in 7 and 8 to the travelling head of the tuck-in device, schematised in the figs. 1 to 3 by a body LC.

**[0028]** Finally, the second articulated quadrilateral Q2 consists of a first lever L3, of an upward-transmission connecting rod LH and of a lever L4 integral with a moving cutting blade 9. Said cutting blade 9 forms a weft cutting device together with a fixed cutting blade 10 which is integral with the travelling head LC of the tuck-in device. Lever L3 is integral with backward-transmission connecting rod LR and consists in an extension thereof beyond hinge point B of the same. The second articulated quadrilateral Q2 hence comprises two hinges B and C, fixed with respect to the travelling head LC of the tuck-in device, and two moving hinges 12 and 13.

**[0029]** From the functional point of view, the leverage mechanism of the present invention illustrated above has the features indicated in the following.

**[0030]** The first articulated quadrilateral Q1, which has the function of taking the movement from the sley S for generating the rotation of the lever L1 on hinge A, has a similar structure to that of the known devices mentioned in the introductory part.

**[0031]** Rod-crank mechanism G1 provides to transform the rotary motion of lever L1 into a translation movement of connecting rod LR. The movement of such lever has the feature of being consistent with that of the sley, and can hence be directly used for generating a movement of the travelling head of the tuck-in device synchronous with that of the sley, and furthermore it exploits - through an adequate choice of the angle between levers L1 and L2 - the dead point position of the rod-crank mechanism for generating an almost stationary condition at the point of utmost backward movement, that is an area where, despite continuing the movement of the sley S, the travelling head LC of the tuck-in device is virtually stationary and can hence correctly perform the operation of insertion of the weft tail into the shed.

**[0032]** It must be noticed that the kinematic mechanism described above is an excellent approximation of the ordinary rod-crank mechanism with linear guides of the prior art, since hinge B does not follow a rectilinear motion but moves along an arc determined by parallelogram P1.

**[0033]** In the comparison with the solution of the prior art, the movement of the rod-crank mechanism G1 replaces that of a conjugated cam; a relatively complex and costly mechanism comprising highly critical members from the point of view of reliability, such as cam-follower rollers, is hence replaced by a much simpler and more reliable mechanism.

**[0034]** Articulated quadrilateral Q2 exploits the further rotation of lever L3 on hinge B, during the almost stationary condition step of connecting rod LR along the longitudinal

direction, for generating the rotation of lever L4 on hinge C, which hence operates the moving cutting blade 9.

**[0035]** It must be noticed that the connecting rod LH of articulated quadrilateral Q2 is of an adjustable length, for example through an eccentric, so that it is easily possible to change the initial angular position of lever L4 and hence the adjustment of the cutting instant.

**[0036]** As stated, the rotation of lever L3 on hinge B occurs mostly when rod-crank mechanism G1 is in the dead point area and hence precisely in the time period in which the travelling head LC of the tuck-in device is almost stationary and the cutting device must operate.

**[0037]** Rod-crank mechanism G1 hence performs a twofold function, exploiting in two different ways the dead point area thereof, that is for determining first an almost stationary condition of the travelling head LC of the tuck-in device and, in such step, for continuing the rotation to operate the cutting device through the articulated quadrilateral Q2.

**[0038]** This part of the leverage mechanism of the present invention hence replaces the independent operation of the weft cut, with an obvious and considerable reduction of the complexity and of the cost of the mechanism.

**[0039]** Parallelogram P1, used about the quadrature thereof, allows to the travelling head LC of the tuck-in device a movement along a sufficiently wide arc which can be approximated to a rectilinear movement. This part of the leverage mechanism hence replaces the cylindrical guides of the known devices, with an evident construction simplification and a dramatic reduction of maintenance interventions.

**[0040]** As a matter of fact, even assuming to provide the leverage mechanism with a guide apt to eliminate the possible modest lateral displacements of the levers, such guide could be used in the absence of any lubrication since, in the face of a null theoretical load, there is a very low actual load.

**[0041]** In designing the leverage mechanism of the present invention, the lengths and the positioning of the various levers have been optimised so as to obtain the desired movement of the leverage mechanism. In particular and in extreme synthesis:

- the length of lever L1 is calculated so as to cause the same to perform a suitable angular travel around hinge A;
- the length of lever L2 is calculated so as to generate the desired travel of the travelling head LC of the tuck-in device;
- the angle formed by levers L1 and L2 is calculated so as to bring the rod-crank mechanism G1 into the dead point area at the initial time of the operating cycle of the tuck-in device;
- the ratio between the lengths of levers L3 and L4 is calculated so as to cause moving blade 9 to perform the desired travel.

**[0042]** The entire leverage mechanism is structured so as to allow the removal of the bearings, due to generally rather modest angular travels. This allows to further reduce the costs of the device and to further simplify the maintenance thereof.

**[0043]** However, it is understood that the invention must not be considered limited to the special arrangements illustrated above, which make up only exemplifying embodiments thereof, but that different variants are possible, all within the reach of a person skilled in the field, without departing from the scope of protection of the invention, which is exclusively defined by the following claims.

## Claims

1. A weaving loom comprising a sley (S) and a travelling-head tuck-in device comprising a control leverage mechanism, **characterised in that** said control leverage mechanism comprises the following functional groups of levers:

- a first articulated quadrilateral (Q1), the end hinges of which (1, A) are fixed to the loom, which takes the alternate movement from said sley (S);

- a connecting rod-crank mechanism (G1) which receives on a crank (L2) the movement from the first articulated quadrilateral (Q1) and transmits it via a connecting rod (LR) to a travelling head (LC) of the tuck-in device on which the moving end of said connecting rod (LR) is hinged (in B); and

- an articulated parallelogram (P1) which connects a body (CC) of the tuck-in device to the travelling head (LC) of the same, for guiding said travelling head (LC) of the tuck-in device between a forward home position and a backward operating position, along an arc wide enough to approximate a rectilinear movement.

2. Weaving loom with a control leverage mechanism of a tuck-in device as in claim 1, wherein said rod-crank mechanism (G1) lies at the dead point thereof when the travelling head (LC) of the tuck-in device is at the backward operating position thereof.
3. Weaving loom with a control leverage mechanism of a tuck-in device as in claim 2, wherein the connecting rod (LR) of said first rod-crank mechanism (G1) has a longitudinal movement having a direction consistent with the sley (S) movement.
4. Weaving loom with a control leverage mechanism of a tuck-in device as in claim 3, wherein said rod-crank mechanism (G1) lies at the dead point thereof before said sley (S) has reached its most backward

position.

5. Weaving loom with a control leverage mechanism of a tuck-in device as in claims from 1 to 4, furthermore comprising the following functional group of levers:

- a second articulated quadrilateral (Q2), the end hinges of which (B, C) are fixed to the travelling head (LC) of the tuck-in device, the control lever (L3) of said quadrilateral consisting of an extension of the control end of the connecting rod (LR) of the first rod-crank mechanism (G1), beyond the hinge connection (B) with the travelling head (LC) of the tuck-in device, and the controlled lever (L4) being integral with the moving cutting blade (9) of a weft cutting device, said weft cutting device furthermore comprising a fixed cutting blade (10), integral with the travelling head (LC) of the tuck-in device.

6. Weaving loom with a control leverage mechanism of a tuck-in device as in claim 5, wherein said first articulated quadrilateral (Q1) consists of said sley (S), of a forward-transmission connecting rod (LF) and of a lever (L1) hinged (in A) to the body (CC) of the tuck-in device.

7. Weaving loom with a control leverage mechanism of a tuck-in device as in claim 6, wherein the fixed angle formed by levers (L1) and (L2) is calculated so as to bring the rod-crank mechanism (G1) into the dead point area thereof at the starting time of the operating cycle of the tuck-in device.

8. Weaving loom with a control leverage mechanism of a tuck-in device as in claim 7, wherein said parallelogram (P1) consists of a pair of identical and parallel levers (LP), said levers being hinged at one end (in 5 and 6) to the body (CC) of the tuck-in device and at the opposite end (in 7 and 8) to the travelling head (LC) of the tuck-in device.

9. Weaving loom with a control leverage mechanism of a tuck-in device as in any one of the preceding claims, wherein the angular travels of the levers at the hinges are small and the hinges are devoid of bearings and lubrication.

10. Control leverage mechanism of a travelling-head tuck-in device for a weaving loom **characterised in that** it comprises the following functional groups of levers:

- a first articulated quadrilateral (Q1), the end hinges of which (1, A) are fixable to the loom, to take the alternate movement from a lever thereof;

- a connecting rod-crank mechanism (G1) which receives on the crank (L2) the movement from the first articulated quadrilateral (Q1) and transmits it via the connecting rod (LR) to the travelling head (LC) of the tuck-in device on which the moving end of said connecting rod (LR) is hinged (in B); and
  - an articulated parallelogram (P1) which connects the body (CC) of the tuck-in device to the travelling head (LC) of the same, for guiding said travelling head (LC) of the tuck-in device between a forward home position and a backward operating position, along an arc wide enough to approximate a rectilinear movement.
11. Control leverage mechanism of a tuck-in device as in claim 10, wherein said rod-crank mechanism (G1) lies at the dead point thereof when the travelling head (LC) of the tuck-in device is at the backward operating position thereof.
12. Control leverage mechanism of a tuck-in device as in claims 10 and 11, furthermore comprising the following functional group of levers:
- a second articulated quadrilateral (Q2), the end hinges of which (B, C) are fixed to the travelling head (LC) of the tuck-in device, the control lever (L3) of said quadrilateral consisting of an extension of the control end of the connecting rod (LR) of the first rod-crank mechanism (G1), beyond the hinge connection (B) with the travelling head (LC) of the tuck-in device, and the controlled lever (L4) being integral with the moving cutting blade (9) of a weft cutting device, said weft cutting device furthermore comprising a fixed cutting blade (10), integral with the travelling head (LC) of the tuck-in device.
13. Control leverage mechanism of a tuck-in device as in claim 12, wherein said first articulated quadrilateral (Q1) consists of a driving lever (S), of a forward-transmission connecting rod (LF) and of a lever (L1) hinged (in A) to the body (CC) of the tuck-in device.
14. Control leverage mechanism of a tuck-in device as in claim 13, wherein the fixed angle formed by levers (L1) and (L2) is calculated so as to bring the rod-crank mechanism (G1) into the dead point area thereof at the starting time of the operating cycle of the tuck-in device.
15. Control leverage mechanism of a tuck-in device as in claim 14, wherein said parallelogram (P1) consists of a pair of identical and parallel levers (LP), said levers being hinged at one end (in 5 and 6) to the body (CC) of the tuck-in device and at the opposite end (in 7 and 8) to the travelling head (LC) of the

tuck-in device.

16. Control leverage mechanism of a tuck-in device as in any one of the claims 10 to 15, wherein the angular travels of the levers at the hinges are small and the hinges are devoid of bearings and lubrication.

## Patentansprüche

1. Webmaschine mit einem Schlitten (S) und einer Einsteckvorrichtung für einen Bewegungskopf, die einen Steuerhebelmechanismus umfasst, **dadurch gekennzeichnet, dass** der Steuerhebelmechanismus die folgenden Funktionsgruppen von Hebeln, umfasst:

- ein erstes gelenkiges Viereck (Q1), wobei dessen Endgelenke (1, A) an der Webmaschine befestigt sind, die die alternierende Bewegung des Schlittens (S) aufnimmt;
- einen Stangenkurbelmechanismus (G1), der an einer Kurbel (L2) die Bewegung von dem ersten gelenkigen Viereck (Q1) aufnimmt und sie über eine Pleuelstange (LR) auf einen Bewegungskopf (LC) der Einsteckvorrichtung überträgt, an dem das bewegliche Ende der Pleuelstange (LR) gelagert ist (in B); und
- ein gelenkiges Parallelogramm (P1), das einen Körper (CC) der Einsteckvorrichtung mit dem Bewegungskopf (LC) desselben verbindet, um den Bewegungskopf (LC) der Einsteckvorrichtung zwischen einer vorderen Ausgangsposition und einer hinteren Betriebsposition entlang eines Bogens zu führen, der breit genug ist, um eine geradlinige Bewegung anzunehmen.

2. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 1, wobei der Stangenkurbelmechanismus (G1) an seinem Totpunkt liegt, wenn sich der Bewegungskopf (LC) der Einsteckvorrichtung in dessen hinterer Betriebsposition befindet.

3. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 2, wobei die Pleuelstange (LR) des ersten Stangenkurbelmechanismus (G1) eine Längsbewegung in einer Richtung aufweist, die mit der Bewegung des Schlittens (S) übereinstimmt.

4. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 3, wobei der Stangenkurbelmechanismus (G1) an seinem Totpunkt liegt, bevor der Schlitten (S) seine hinterste Betriebsposition erreicht.

5. Webmaschine mit einem Steuerhebelmechanismus

einer Einsteckvorrichtung nach Anspruch 1 bis 4, ferner umfassend die folgende Funktionsgruppe von Hebeln:

- ein zweites gelenkiges Viereck (Q2), dessen Endgelenke (B, C) an dem Bewegungskopf (LC) der Einsteckvorrichtung befestigt sind, wobei der Steuerhebel (L3) des Vierecks aus einer Verlängerung des Steuerendes der Pleuelstange (LR) des ersten Stangenkurbelmechanismus (G1) über die Schwenkverbindung (B) mit dem Bewegungskopf (LC) der Einsteckvorrichtung hinaus besteht und wobei der gesteuerte Hebel (L4) mit dem beweglichen Schneidmesser (9) einer Schussfadenschneidvorrichtung integral ist, wobei die Schussfadenschneidvorrichtung ferner ein festes Schneidmesser (10) umfasst, das mit dem Bewegungskopf (LC) der Einsteckvorrichtung integral ist.
- 6. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 5, wobei das erste gelenkige Viereck (Q1) aus dem Schlitten (S), einer Vorwärtsübertragungspleuelstange (LF) und einem Hebel (L1) besteht, der schwenkbar (in A) an den Körper (CC) der Einsteckvorrichtung gelagert ist.
- 7. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 6, wobei der durch Hebel (L1) und (L2) gebildete Festwinkel so berechnet ist, dass der Stangenkurbelmechanismus (G1) zu dem Startzeitpunkt des Arbeitszyklus der Einsteckvorrichtung in den Totpunktbereich derselben gebracht wird.
- 8. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 7, wobei das Parallelogramm (P1) aus einem Paar identischer und paralleler Hebel (LP) besteht, wobei die Hebel mit einem Ende (in 5 und 6) an dem Körper (CC) der Einsteckvorrichtung und mit dem gegenüberliegenden Ende (in 7 und 8) an dem Bewegungskopf (LC) der Einsteckvorrichtung angelenkt sind.
- 9. Webmaschine mit einem Steuerhebelmechanismus einer Einsteckvorrichtung nach einem der vorhergehenden Ansprüche, wobei die Winkelverfahrwege der Hebel an den Gelenken klein sind und die Gelenke keine Lager und Schmierung aufweisen.
- 10. Steuerhebelmechanismus einer Einsteckvorrichtung für einen Bewegungskopf einer Webmaschine, **dadurch gekennzeichnet, dass** er die folgenden Funktionsgruppen von Hebeln umfasst:
  - ein erstes gelenkiges Viereck (Q1), dessen Endgelenke (1, A) an der Webmaschine befestigbar sind, um die alternierende Bewegung von dessen Hebel aufzunehmen;
  - einen Stangenkurbelmechanismus (G1), der an der Kurbel (L2) die Bewegung von dem ersten gelenkigen Viereck (Q1) aufnimmt und über die Pleuelstange (LR) auf den Bewegungskopf (LC) der Einsteckvorrichtung überträgt, an dem das bewegliche Ende der Pleuelstange (LR) angelenkt ist (in B); und
  - ein gelenkiges Parallelogramm (P1), das den Körper (CC) der Einsteckvorrichtung mit dem Bewegungskopf (LC) desselben verbindet, um den Bewegungskopf (LC) der Einsteckvorrichtung zwischen einer vorderen Ausgangsposition und einer hinteren Betriebsposition entlang eines Bogens zu führen, der breit genug ist, um eine geradlinige Bewegung anzunehmen.
- 11. Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 10, wobei der Stangenkurbelmechanismus (G1) an dessen Totpunkt liegt, wenn sich der Bewegungskopf (LC) der Einsteckvorrichtung in seiner hinteren Betriebsposition befindet.
- 12. Steuerhebelmechanismus einer Einsteckvorrichtung nach Ansprüchen 10 und 11, ferner die folgenden Funktionsgruppe an Hebeln umfassend:
  - ein zweites gelenkiges Viereck (Q2), dessen Endgelenke (B, C) an dem Bewegungskopf (LC) der Einsteckvorrichtung befestigt sind, wobei der Steuerhebel (L3) des Vierecks aus einer Verlängerung des Steuerendes der Pleuelstange (LR) des ersten Stangenkurbelmechanismus (G1) über die Schwenkverbindung (B) mit dem Bewegungskopf (LC) der Einsteckvorrichtung hinaus besteht und wobei der gesteuerte Hebel (L4) mit dem beweglichen Schneidmesser (9) einer Schussfadenschneidvorrichtung integral ist, wobei die Schussfadenschneidvorrichtung ferner ein fixiertes Schneidmesser (10) umfasst, das mit dem Bewegungskopf (LC) der Einsteckvorrichtung integral ist.
- 13. Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 12, wobei das erste gelenkige Viereck (Q1) aus einem Antriebshebel (S) einer Pleuelstange (LF) für die Vorwärtsübertragung und einem Hebel (L1) besteht, der (in A) mit dem Körper (CC) der Einsteckvorrichtung verbunden ist.
- 14. Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 13, wobei der durch Hebel (L1) und (L2) gebildete Festwinkel so berechnet ist, dass er den Stangenkurbelmechanismus (G1) zu einem Startzeitpunkt des Arbeitszyklus der Einsteckvorrichtung in den Totpunktbereich bringt.

15. Steuerhebelmechanismus einer Einsteckvorrichtung nach Anspruch 14, wobei das Parallelogramm (P1) aus einem Paar identischer und paralleler Hebel (LP) besteht, wobei die Hebel mit einem Ende (in 5 und 6) an dem Körper (CC) der Einsteckvorrichtung und mit dem gegenüberliegenden Ende (in 7 und 8) an dem Bewegungskopf (LC) der Einsteckvorrichtung angelenkt sind.
16. Steuerhebelmechanismus einer Einsteckvorrichtung nach einem der Ansprüche 10 bis 15, wobei die Winkelverfahrwege der Hebel an den Gelenken klein sind und die Gelenke frei von Lagern und Schmierung sind.

## Revendications

1. Métier à tisser comprenant un peigne diviseur (S) et un dispositif de rentrage à tête mobile comprenant un mécanisme de levier de commande, **caractérisé en ce que** ledit mécanisme de levier de commande comprend les groupes de leviers fonctionnels suivants :

- un premier quadrilatère articulé (Q1) dont les charnières d'extrémité (1, A) sont fixées sur le métier, qui permet le mouvement alterné dudit peigne diviseur (S) ;
- un mécanisme de bielle-manivelle (G1) qui reçoit sur une manivelle (L2), le mouvement du premier quadrilatère articulé (Q1) et le transmet via une bielle (LR) à la tête mobile (LC) du dispositif de rentrage sur lequel l'extrémité mobile de ladite bielle (LR) est articulée (en B) ; et
- un parallélogramme articulé (P1) qui raccorde un corps (CC) du dispositif de rentrage à la tête mobile (LC) de ce dernier, pour guider ladite tête mobile (LC) du dispositif de rentrage entre une position initiale vers l'avant et une position de fonctionnement vers l'arrière, le long d'un arc assez large pour se rapprocher d'un mouvement rectiligne.

2. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 1, dans lequel ledit mécanisme de bielle-manivelle (G1) est à son point mort lorsque la tête mobile (LC) du dispositif de rentrage est dans sa position de fonctionnement vers l'arrière.
3. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 2, dans lequel la bielle (LR) dudit premier mécanisme de bielle-manivelle (G1) a un mouvement longitudinal ayant une direction cohérente avec le mouvement du peigne diviseur (S).

4. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 3, dans lequel ledit mécanisme de bielle-manivelle (G1) est à son point mort avant que ledit peigne diviseur (S) n'ait atteint sa position la plus en arrière.

5. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon les revendications 1 à 4, comprenant en outre les groupes de leviers fonctionnels suivants :

- un second quadrilatère articulé (Q2) dont les charnières d'extrémité (B, C) sont fixées à la tête mobile (LC) du dispositif de rentrage, le levier de commande (L3) dudit quadrilatère se composant d'une extension de l'extrémité de commande de la bielle (LR) du premier mécanisme de bielle-manivelle (G1), au-delà du raccordement de charnière (B) avec la tête mobile (LC) du dispositif de rentrage, et le levier commandé (L4) étant solidaire de la lame de coupe mobile (9) d'un dispositif de coupe de trame, ledit dispositif de coupe de trame comprenant en outre une lame de coupe fixe (10), solidaire de la tête mobile (LC) du dispositif de rentrage.

6. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 5, dans lequel ledit premier quadrilatère articulé (Q1) se compose dudit peigne diviseur (S), d'une bielle de transmission vers l'avant (LF) et d'un levier (L1) articulé (en A) au corps (CC) du dispositif de rentrage.

7. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 6, dans lequel l'angle fixe formé par les leviers (L1) et (L2) est calculé afin d'amener le mécanisme de bielle-manivelle (G1) dans sa zone de point mort au début du cycle de fonctionnement du dispositif de rentrage.

8. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 7, dans lequel ledit parallélogramme (P1) se compose d'une paire de leviers identiques et parallèles (LP), lesdits leviers étant articulés, au niveau d'une extrémité (en 5 et 6), au corps (CC) du dispositif de rentrage et au niveau de l'extrémité opposée (en 7 et 8) à la tête mobile (LC) du dispositif de rentrage.

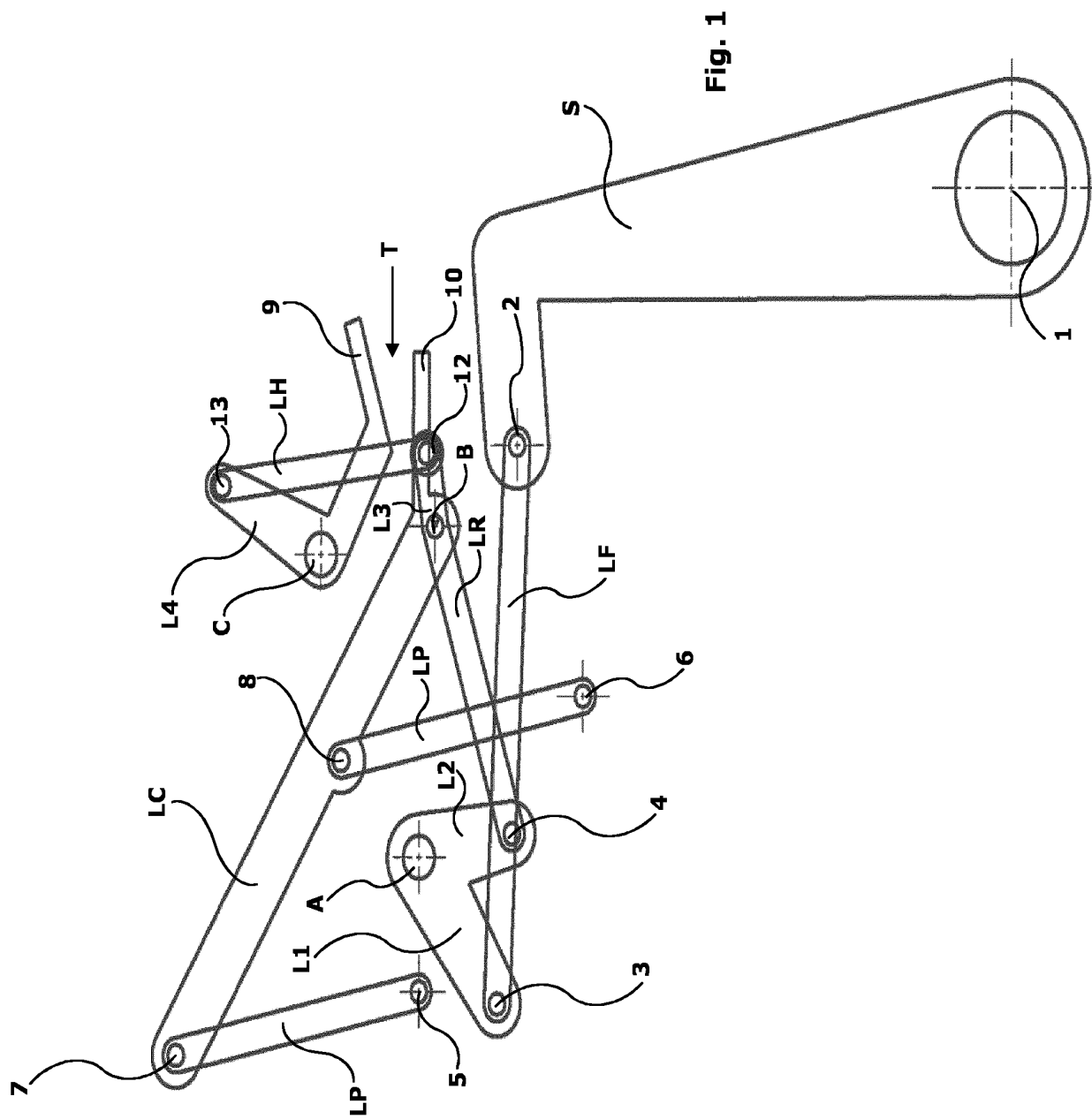
9. Métier à tisser avec un mécanisme de levier de commande d'un dispositif de rentrage selon l'une quelconque des revendications précédentes, dans lequel les déplacements angulaires des leviers au niveau des charnières sont petits et les charnières sont

dépourvues de paliers et de lubrification.

10. Mécanisme de levier de commande d'un dispositif de rentrage à tête mobile pour un métier à tisser, **caractérisé en ce qu'il** comprend les groupes de leviers fonctionnels suivants :
- un premier quadrilatère articulé (Q1), dont les charnières d'extrémité (1, A) peuvent être fixées au métier, pour prendre le mouvement alterné de son levier ;
  - un mécanisme de bielle-manivelle (G1) qui reçoit, sur la manivelle (L2), le mouvement du premier quadrilatère articulé (Q1) et le transmet via la bielle (LR) à la tête mobile (LC) du dispositif de rentrage sur lequel l'extrémité mobile de ladite bielle (LR) est articulée (en B) ; et
  - un parallélogramme articulé (P1) qui raccorde le corps (CC) du dispositif de rentrage à la tête mobile (LC) de ce dernier, pour guider ladite tête mobile (LC) du dispositif de rentrage entre une position initiale vers l'avant et une position de fonctionnement vers l'arrière, le long d'un arc assez large pour se rapprocher d'un mouvement rectiligne.
11. Mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 10, dans lequel ledit mécanisme de bielle-manivelle (G1) est à son point mort lorsque la tête mobile (LC) du dispositif de rentrage est dans sa position de fonctionnement vers l'arrière.
12. Mécanisme de levier de commande d'un dispositif de rentrage selon les revendications 10 et 11, comprenant en outre le groupe de leviers fonctionnels suivant :
- un second quadrilatère articulé (Q2), dont les charnières d'extrémité (B, C) sont fixées à la tête mobile (LC) du dispositif de rentrage, le levier de commande (L3) dudit quadrilatère se composant d'une extension de l'extrémité de commande de la bielle (LR) du premier mécanisme de bielle-manivelle (G1), au-delà du raccordement de charnière (B) avec la tête mobile (LC) du dispositif de rentrage, et le levier commandé (L4) étant solidaire avec la lame de coupe mobile (9) d'un dispositif de coupe de trame, ledit dispositif de coupe de trame comprenant en outre une lame de coupe fixe (10), solidaire avec la tête mobile (LC) du dispositif de rentrage.
13. Mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 12, dans lequel ledit premier quadrilatère articulé (Q1) se compose d'un levier d'entraînement (S), d'une bielle de transmission vers l'avant (LF) et d'un levier (L1) articulé

(en A) au corps (CC) du dispositif de rentrage.

14. Mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 13, dans lequel l'angle fixe formé par les leviers (L1) et (L2) est calculé afin d'amener le mécanisme de bielle-manivelle (G1) dans sa zone de point mort au moment du départ du cycle de fonctionnement du dispositif de rentrage.
15. Mécanisme de levier de commande d'un dispositif de rentrage selon la revendication 14, dans lequel ledit parallélogramme (P1) se compose d'une paire de leviers identiques et parallèles (LP), lesdits leviers étant articulés au niveau d'une extrémité (en 5 et 6) au corps (CC) du dispositif de rentrage et au niveau de l'extrémité opposée (en 7 et 8) à la tête mobile (LC) du dispositif de rentrage.
16. Mécanisme de levier de commande d'un dispositif de rentrage selon l'une quelconque des revendications 10 à 15, dans lequel les déplacements angulaires des leviers au niveau des charnières sont petits et les charnières sont dépourvues de paliers et de lubrification.



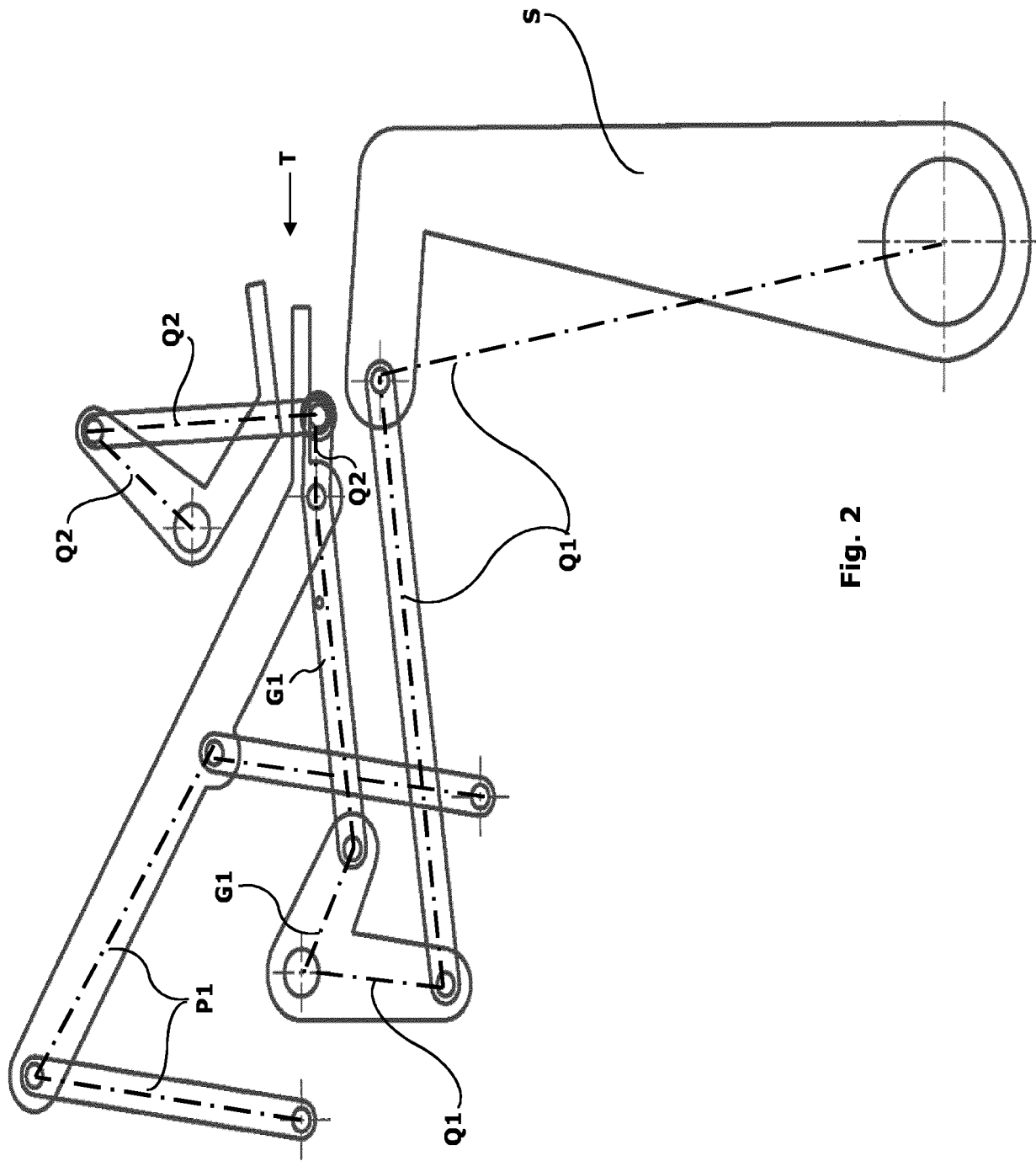
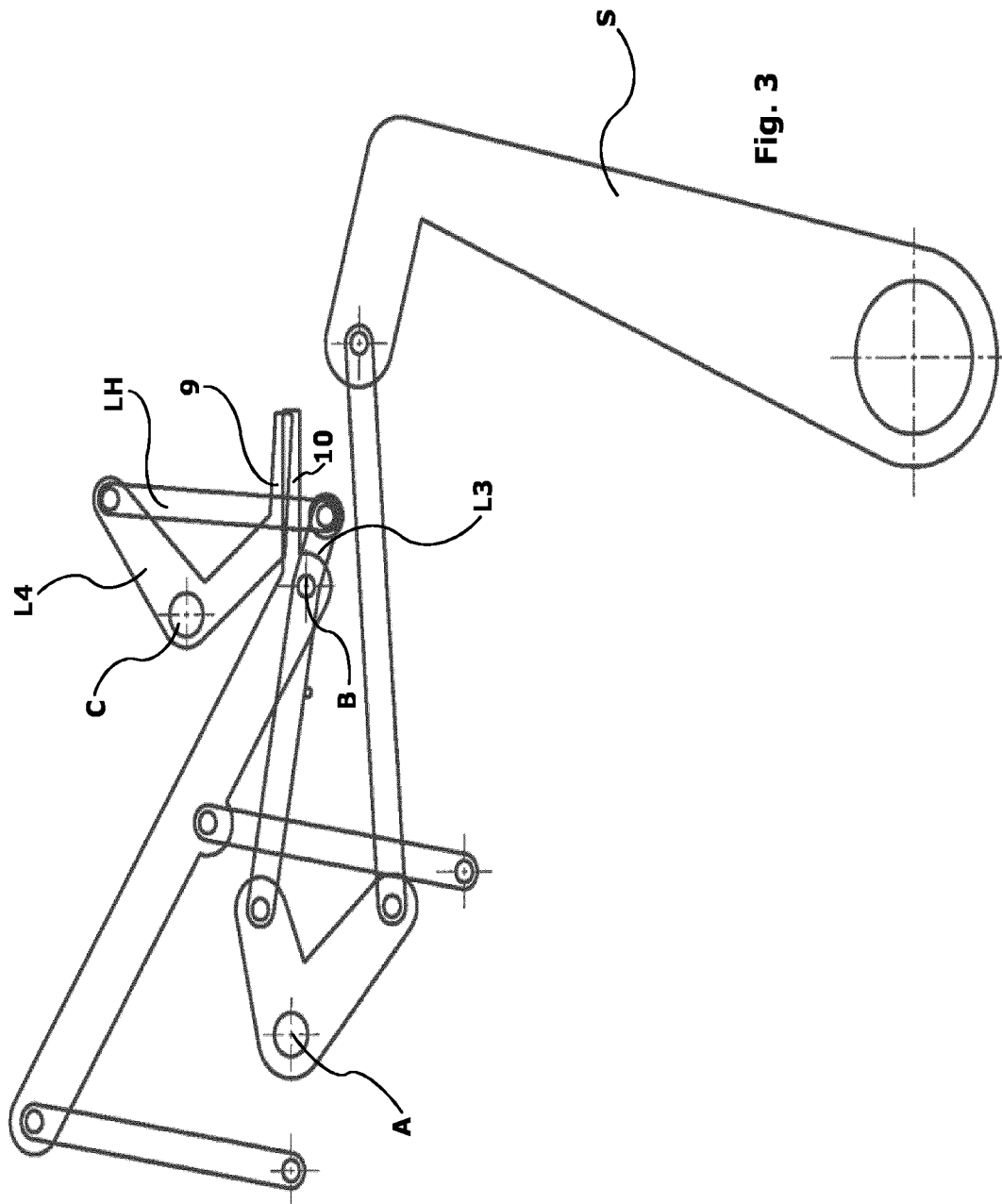
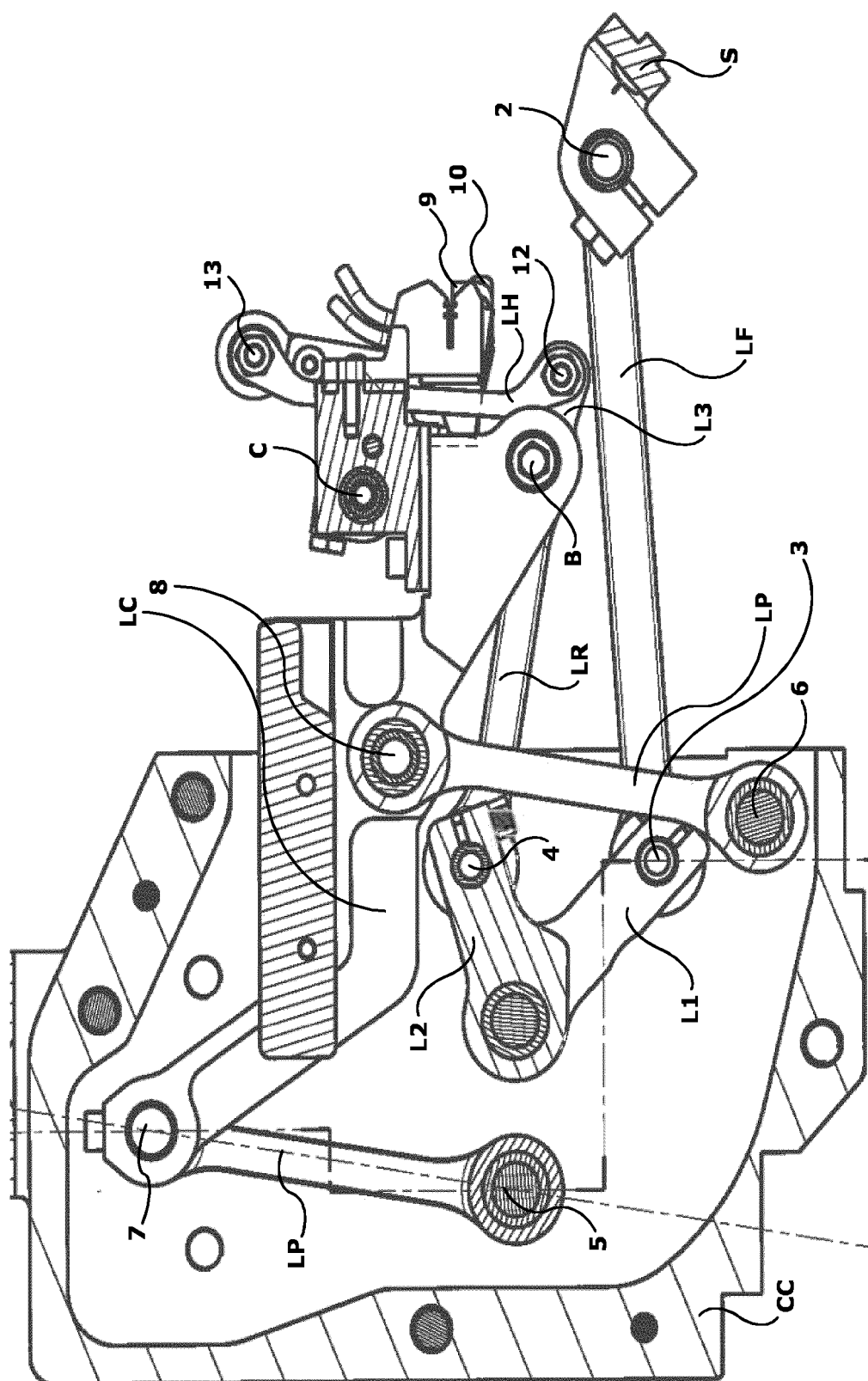


Fig. 2



**Fig. 3**



**Fig. 4**

**REFERENCES CITED IN THE DESCRIPTION**

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