(19) Europäisches Patentamt / European Patent Office / Office européen des brevets

(11) EP 2 562 112 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.02.2013 Bulletin 2013/09

(51) Int Cl.:
B65H 54/28 *(2006.01)* ***B65H 54/38*** *(2006.01)*

(21) Application number: **12181169.9**

(22) Date of filing: **21.08.2012**

(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 MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **25.08.2011 CZ 20110525**

(71) Applicants:
- **VÚTS, a.s.**
  461 19 Liberec (CZ)
- **Rieter CZ s.r.o.**
  56201 Ústí nad Orlicí (CZ)

(72) Inventors:
- **Foune, Frantisek**
  56206 Ústí nad Orlicí (CZ)
- **Pustka, Martin**
  46001 Liberec (CZ)
- **Sidlof, Pavel**
  46014 Liberec (CZ)
- **Skop, Petr**
  46001 Liberec (CZ)

(74) Representative: **Musil, Dobroslav**
Cejl 38
602 00 Brno (CZ)

(54) Device for traversing of yarn wound-up on the bobbin

(57) The invention is related to a device for traversing yarn wound-up on a spool located in a winding system of a textile machine's workplace, including a longitudinal traversing rod (2) common for numerous workplaces and coupled with a drive providing it with longitudinal reverse motion and a controlling mechanism determining the position of the dead points of the traversing rod (2). The longitudinal traversing rod (2) is parallel to the longitudinal winding shaft intended for numerous workplaces. Further on, the device includes at least two magnetic pairs, each of them comprising repelling poles of magnets (11, 21; 12, 22; 11, 20; 12, 20), of which one magnet (11, 12) is always located on the machine frame (1) and the other magnet (21, 22, 20) is located on the traversing rod (2). At the same time at least two magnetic pairs (11, 21; 12, 22; 11, 20; 12, 20) are located in the area of the loose end of the traversing rod (2).

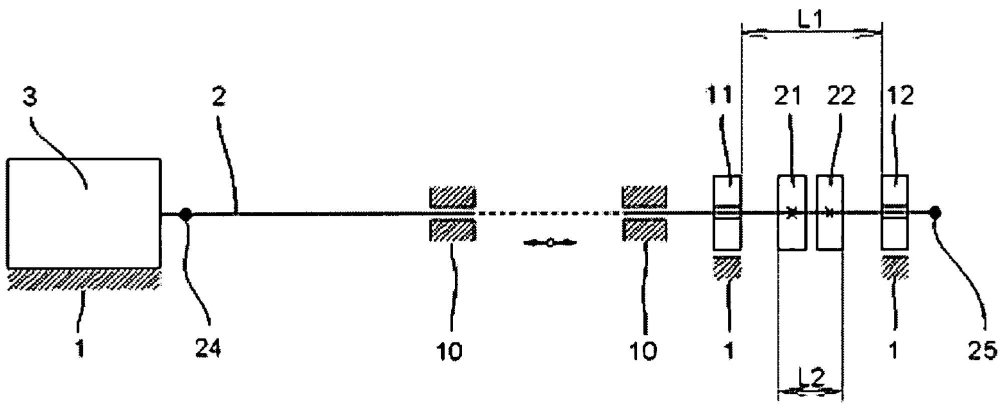

FIG. 2

EP 2 562 112 A1

Description

Field of the Invention

[0001] A device for traversing of yarn wound-up on a spool fitted into the workplace of a textile machine comprising a longitudinal traversing rod common for multiple workplaces and coupled with a drive imparting straight reverse motion to it and a controlling system determining the position of the rod dead points, whereas the longitudinal traversing rod is parallel with a longitudinal winding shaft intended for numerous workplaces, further comprising at least two magnetic pairs, one of the magnets of which is always located on the frame of the machine, whereas the other magnet is located on the traversing rod.

Background art

[0002] With textile machines, e.g. open end spinning machines, spooling or two-for-one twisting machines, the traversing of yarn at spool winding is commonly performed by means of a through traversing rod passing along one side of the machine's workplaces. With numerous workplaces lined up in rows the traversing rod is as long as 50 metres for instance, which means its weight is substantially high.

[0003] Cross-wound cylindrical or conical spools roll off their wound-up surface against winding rollers, the rotation axis of which is parallel to the axis of the traversing rod and the traversing rod performs straight reverse motion, its travel matching the length of the surface line of the wound spool's package. Regarding the productivity of the machine, the velocity of the yarn driven to the wound-up spool is high, which requires a high frequency of the straight reverse motion of the traversing rod.

[0004] From the point of view of producing the cross-wound build, it would be desirable the curve of the traversing rod motion to be saw-like, i.e. the velocity of the traversing rod to be constant and to change in step at dead points to reach the same velocity of the opposite sense.

[0005] In practice, it is not possible to achieve the ideal state mainly due to the big inertial mass of the traversing rod. The rod's deceleration and acceleration at dead points is limited, the change of the sense of velocity at dead points takes some necessary time. Within that period of time the yarn is not deposited onto the spool in a screw line upon a pitch producing the required cross-wound build, but the pitch decreases to zero at the dead point and the individual yarn coils are deposited onto each other. The yarn accumulates in those spots of the spool and the diameter of the build increases faster locally.

[0006] That is prevented by the modification of the motion of the traversing rod at dead points. With one common solution the travel remains constant and the position of both dead points slowly shifts in one and the other direction concurrently. With another usual solution the size of the travel changes and the positions of the dead points mutually shift in an opposite sense, by means of which the size of the travel increases and decreases in turns. From the point of view of the quality of the build the second solution is more advantageous, although it is not easy to implement with a cam mechanism drive or a mechanism where the servomotor does not change the sense of rotation.

[0007] At the time of the motion of the rod at a constant velocity the necessary output of its driving unit is relatively small as it only makes for overruling passive resistances and deflecting yarns. However, at dead points significant alterations of the output of the driving unit occur, firstly by reason of detracting and subsequently imparting inertia to the mass of the traversing rod. With the first method employing a constant-travel motion, a cam mechanism is usually used and the energy accumulates in the rotation energy of the drive mechanism. With the second method, where the motor performs a reverse motion, the problem is solved either by means of a big nominal driving torque of the servomotor and/or the accumulation of the kinetic energy produced at braking of the inertial mass of the traversing rod before the dead point and a reverse release of the energy accumulated at starting the traversing rod after the dead point. However, the moment of inertia of servomotors with big driving torques is big and it increases the total reduced moving mass, thus the achievable increase in the acceleration of the rod is little or none.

[0008] Another problem besides the provision of the required shape of the spool's build edges is the production of concurrently deposited bands of coils of yarn located close to each other at augmenting the diameter of the wound-up spool. At augmenting the diameter of the spool the axial position of individual successively laid coils of yarn, which near and recede from each other in turns, gradually changes. At the time of nearing the coils, bands are periodically produced breaking the shape of the build and complicating the progress of winding. That is prevented by gradual changes to the frequence of motion of the traversing rod based on certain prescriptions.

[0009] Current solutions of traversing rod drives usually employ cam mechanisms. A first mechanism of a constant travel provides the basic approximately saw-like travel of the traversing rod including velocity changes at dead points. The second superimposed mechanism makes for slow concurrent shifts of the dead points. Both mechanisms are loaded by a total force necessary to induce the motion of the rod. The dissolution of the bands is performed either by means of a controlled variator usually driven by another cam mechanism, or including a frequency converter into the power supply circuit of the driving electric motor. The traversing box comprising those mechanisms is placed on only one of the sides of the machine, thus the long traversing rod is sensitive to production of vibrations. It spreads not only longitudinal waves of deformations, but transverse waves as well, caused by buckling stress of the rod and its deflection from the guide bearings. Furthermore, the deflection results in the increase of frictional forces. Compared to the longitudinal waves, the transverse waves on the rod are of lower velocity and the resulting oscillation of the rod is usually very complex. The motion of the free end of the traversing rod thus differs from the motion of its part located close to the drive mechanism.

[0010] It is obvious that the main reason limiting the traversing velocity and complicating the action of the drive mechanism of the traversing rod are the inertia forces at dead points produced as a result of insufficient compensation of the effects of substantive decelerations and accelerations of the moving masses.

[0011] Some devices based on the prior art use springs-to absorb the energy of the moving mass forces. It is advantageous such spring to have non-linear characteristic, matching the force necessary to achieve the required motion of the rod much better. With mechanical or pneumatic springs the provision of such parameters is difficult. In some cases, rubber or plastic bumpers acting on the traversing rod in the area of its dead points are used to load off the cam mechanisms. However, such springs cause strokes and oscillations of the rod and their service life is rather low.

[0012] Furthermore, those devices usually do not allow setting the travel of the traversing rod and thus changing the width of the build on the spool. The traversing rod is stressed by big compression forces requiring a respective increase of the cross-section of the rod, which results in subsequent increase in the weight of the traversing rod and thus increasing undesirable inertia forces. Even with substantial cross-sections of the traversing rod the oscillation usually results in a different course of the travel of the rod on different spots of the machine.

[0013] Another option is to perform braking and start-ups of the traversing rod by means of magnets. Their advantage is based on their effect to a theoretically infinite distance as well as the smooth course of the dependence of the force value on distance, the result of which is the stroke-free effect on the traversing rod. As another advantage, there is the strongly non-linear dependence of the force value on distance (approximately at mat cube), significantly contributing to dampening the vibrations and resonance elimination. As far as the construction and economic point of view is considered, it is more advantageous to use permanent magnets instead of electromagnets. The solution according to CZ PV 2007-214 is schematically presented in Fig. 1. Two pairs of magnets **101-201** and **102 - 202** are used within it, the first magnets **101, 102** of both pairs of magnets are placed in an adjustable way on the machine frame **100** and spaced mutually. The second magnets **201, 202** of both pairs of magnets are fixed to the traversing rod **200** placed in the machine frame **100** by means of a guide **10.** At the traversing motion of the rod **200** the magnet **201, 202** fixed to the traversing rod **200** approximates and recedes the magnet **101, 102** placed on the machine frame **100** in turns, the same poles of the magnets of each cooperating pair are directed towards each other. At the approximation of the magnets of one pair, the magnets repel each other, the maximum repelling force matching the least mutual distance of the magnets' fronts achieved at the traversing rod's dead points. The minimum distance is set by means of shifting the magnet located on the machine frame, which is performed by axial servomotors not represented in the figure.

[0014] The magnets' repelling force value is selected based on the type of the wound-up yarn considering its thickness and flexibility. Thereat, it is necessary to respect the thermal expandability of the rod, the resistances acting against the motion of the rod and, of course, the operation of the superimposed mechanism controlling the shifts of the traversing rod's dead points by reason of overlaying the edges of the build. Thus, setting the mutual minimum distance of the magnets of one pair, which is a value of tenths of millimetres, and fixing the adjusting magnet against the machine frame require a high level of accuracy. However, it is not commonly achieved with solutions according to the prior art.

[0015] Another disadvantage of placing the magnets according to CZ PV 2007-214 is the fact that the magnets attenuate the longitudinal oscillation of the traversing rod only with motions in direction away from the drive mechanism of the rod for traversing. Even though such attenuation is significant as it is performed at the moment of the traversing rod is disadvantageously buckle-stressed and the aim of CZ PV 2007-214 is achieving exactly that effect, the absence of attenuation of the longitudinal oscillation of the traversing rod at its motion in the opposite direction proves that the solution is not ideal as all sources of vibrations, noise and increased loading and wear have not been completely dealt with.

[0016] The aim of the invention is to remove or at least significantly reduce the insufficiencies of the prior art and to achieve a decrease in vibrations, noise and wear and achieve higher operational parameters of the traversing mechanism and thus the machine as a whole by means of attenuating the longitudinal vibrations of the rod's motion towards the drive mechanism of the traversing rod as well.

Principle of the Invention

[0017] The aim of the invention is achieved by means of a device for traversing the yarn wound-up on a spool deposited in the winding system of a textile machine's workplace, which comprises at least two magnetic pairs, each of which includes mutually repelling magnetic poles, one of which is always located on the machine frame, the other is located on the traversing rod, the principle of which is based on the fact that at least two magnetic pairs are located in the area of the traversing rod's free end. Even at a travel, at which the traversing rod is being pulled, the longitudinal oscillation of parts of the traversing rod's free end is virtually attenuated with such arrangement.

[0018] Considering constructional simplifications, the magnetic pairs may include two fixed magnets secured in a way allowing rearrangement to the machine frame and at least one common moving magnet fastened to the traversing rod.

[0019] In a different application, each magnetic pair comprises a fixed magnet fastened in a way allowing rearrangement to the machine frame and one magnet secured to the traversing rod.

[0020] In another application, the device includes three magnetic pairs, one of which is located in the area of the traversing rod's end connected to the traversing box. By means of such arrangement the tension in the traversing rod in the area of the right dead point can be influenced.

[0021] It is advantageous to fasten the fixed magnets to the machine frame in an adjustable way by means of servomotors fastened to the frame, the output of the servomotors is a straight shift of the fixed magnets along the traversing rod, the output member of the servomotor is fixed to the frame after performing the straight shift. Thereat, it is especially advantageous to couple the servomotors of the fixed magnets with the control unit determining the position of the traversing rod's dead points. That way, computer control of the traversing system is enabled.

[0022] At least one of the magnetic pairs is formed by a pair of Halbach arrays. The major advantage of the device according to the invention is the significant weight reduction of the arrangement of magnets compared to bipolar magnets, which is particularly important with magnets fastened to the traversing rod and participating in the value of its inertial mass.

Description of the drawing

[0023] The exemplary applications of the device according to the invention are schematically demonstrated in the drawings. For illustrative purposes, Fig. 1 shows the device according to the prior art, Fig. 2a and 2b show two alternative priority designs of the device according to the invention, Fig. 3 shows another design of the device according to the invention, Fig. 4 shows the course of the velocity of the start and end of the traversing rod with the device according to the prior art and Fig. 5 shows a comparison of the courses of the longitudinal position of the start and the end of the traversing rod with a device according to the prior art and according to the invention.

Examples of embodiment

[0024] In the frame **1** of a textile machine designed according to Fig. 2a the traversing rod **2** is arranged by means of a guide **10.** In the exemplary application, the traversing rod **2** is driven by means of a not represented crank or cam mechanism arranged in the traversing box **3.** The mechanism transforms the rotational motion of the driving motor's output shaft to straight reverse motion of the traversing rod **2.** An alternative application uses a linear driving servomotor.

[0025] In the free end area of the traversing rod **2** there are moving magnets **21** and **22,** firmly fastened to the traversing rod **2.** On the machine frame **1** are arranged fixed magnets **11** and **12** in a way allowing their sliding. The magnets are disc-shaped with a central opening and they are arranged coaxially with the traversing rod **2.** The traversing rod 2 passes through the openings of the fixed magnets **11, 12** freely. With another not represented mutual ordering the magnets are arranged outside the traversing rod. The moving magnet **21** and the fixed magnet **11** and the moving magnet **22** and the fixed magnet **12** form cooperating magnetic pairs. The magnets of each pair **11 - 21, 12 - 22** are directed towards each other with their opposite poles so that they repel each other. The fixed magnets **11, 12** are adjustable against the frame, whereas are fixed in positions so that the difference of the L_1 distance of nearing poles of fixed magnets **11, 12** and the L_2 distance of reverse poles of moving magnets **21, 22** fixed to the traversing rod **2** is equal to the sum of the travel of the traversing rod **2** and the required clearances remaining between the nearing poles of one and the other pair of magnets **11 - 21, 12 - 22** at the left and right dead point of the traversing rod 2 and preventing mutual contacts of the magnets of each pair.

[0026] With the design shown in Fig. 2b the two magnetic pairs are formed from a single moving magnet **20,** replacing two moving magnets **21, 22,** and of two fixed magnets **11, 12.**

[0027] With the design shown in Fig. 3 the device according to the invention includes another pair of magnets comprising a moving magnet **23** fixed on the traversing rod **2** and a fixed magnet **13** located in a way allowing its slide on the machine frame **1,** placed close to the traversing box **3.** The fixed magnet **13** is adjusted against the frame so that the required clearances as mentioned above are present between the nearing poles of pairs of magnets **13 - 23** and **12 - 22** at the right dead point of the traversing rod **2.** Those might be slightly different, whereby the tension in the traversing rod in the area of the right dead point can be influenced.

[0028] In an example of embodiment the magnets **11, 12, 13, 21, 22, 23** are standard bipolar permanent magnets, in another example of embodiment are multi-polar and forming a Halbach array. Not demonstrated servomotors generally known to those skilled in the art are advantageously used for readjusting fixed magnets **11, 12, 13** against the machine frame 1, while the servomotors are stabilized after adjusting the position of the fixed magnets.

[0029] The servomotors of fixed magnets **11, 12, 13** are advantageously coupled with a not demonstrated control unit, used for controlling the positions of the dead points of the traversing rod **2.** Furthermore, the device may include sensors of the axial position of the traversing rod **2** or sensors of the value of the repelling force, which are also not demonstrated.

[0030] Fig. 4 shows the course of velocity **v** of parts of the traversing rod **200** with the device according to the prior art. The lighter curve $\mathbf{v_1}$ is the course of the velocity of parts of the traversing rod **200** on the spot **203** of coupling with the traversing box **300** and the darker curve $\mathbf{v_2}$ is the course of the velocity of parts of the traversing rod **200** on the spot **204** the free end of the traversing rod **200.** At travel $\mathbf{z_1}$ the traversing rod **200** is pushed (it moves from the left to the right dead point), at travel $\mathbf{z_2}$ the traversing rod **200** is pulled (it moves from the right to the left dead point). It is clear that when the traversing rod **200** is pushed, its longitudinal oscillation is significantly reduced. On the contrary, at reverse motion, at which the traversing rod **200** is pulled, major longitudinal vibrations occur.

[0031] By analogy with Fig. 4, the upper part of Fig. 5 shows the course p_s of parts of the traversing rod **200** on the spot **203** of coupling with the traversing box **300** and the spot **204** at the free end of the traversing rod **200** with a device according to the prior art based on Fig. 1, and the lower part of it shows the course $\mathbf{p_v}$ of parts of the traversing rod **2** on the spot **24** of coupling with the traversing box **3** and on the spot **25** at the free end of the traversing rod **2** with a device according to the invention based on Fig. 2 and 3. It is clear that the longitudinal oscillation of parts of the traversing rod **2** on spot **25** at the free end of the traversing rod **2** is virtually dampened even with travel $\mathbf{z_2}$**,** at which the traversing rod **2** is pulled.

[0032] Compared to the mentioned exemplary applications according to the invention the design according to Fig. 2 is more advantageous than the design according to Fig. 3. The lower number of magnets results in a lower weight of the traversing rod **2** and further reduction of costs for each pair of magnets **13-23** and the respective axial servomotor for shifting the fixed magnet **13.** The arrangement of magnets according to Fig. 2a, 2b is advantageously used when the motion of the traversing rod **2** generated by the traversing box **3** is smooth, i.e. without strokes, when the part of the traversing rod **2** near the traversing box **3** is sufficiently stiff and when there is no requirement for dividing the dampening between two pairs of magnets **12 - 22** and **13 - 23** with the same sense of the dampening effect.

[0033] Compared to the arrangement according to Fig. 2, the arrangement according to Fig. 3 may meet more universal requirements, especially due to the fact that it allows to influence the forces acting on both ends of the traversing rod **2** by means of different distances of magnets **12 - 22** and **13 - 23** and to achieve the occurrence of even tensile stress in the traversing rod **2.** By means of combining the forces of magnets **12 - 22** and **13 - 23,** the distances of which are different, the course of the resulting force can be changed and adapted to the force necessary for starting and braking the traversing rod **2.**

List of reference marks

[0034]

1	machine frame
10	traversing rod lead
11	fixed magnet
12	fixed magnet
13	fixed magnet
2	traversing rod
20	common moving magnet
21	moving magnet
22	moving magnet
23	moving magnet
24	area on traversing rod close to traversing box
25	area on traversing rod at its loose end
3	traversing box
100	machine frame (prior art)
101	fixed magnet (" - ")
102	fixed magnet (" - ")
200	traversing rod (" - ")
201	moving magnet (" - ")
202	moving magnet (" - ")
203	area on traversing rod close to traversing box (" - ")
204	area on traversing rod at its loose end (" - ")
300	traversing box (" - ")
L_1	distance (of nearing fixed magnets fronts)
L_2	distance (of reverse moving magnets fronts)
p_s	position course of spots 203 and 204 of the traversing rod (according to prior art)
p_v	position course of spots 24 and 25 of the traversing rod (according to invention)
v_1	velocity course of traversing rod spot 203 (according to prior art)
v_2	velocity course of traversing rod spot 204 (according to invention)
z_1	traversing rod travel period of the traversing rod being pushed
z_2	traversing rod travel period of the traversing rod being pulled

Claims

1. A device for traversing of yarn wound-up on a spool fitted in a winding system of a textile machine's workplace, comprises a longitudinal traversing rod (2) common for numerous workplaces and coupled with a drive providing it with longitudinal reverse motion and a controlling mechanism determining the position of the dead points of the traversing rod (2), whereas the longitudinal traversing rod (2) is parallel to the longitudinal winding shaft intended for numerous workplaces, whereas further comprising at least two magnetic pairs each of which comprises repelling poles of magnets (11, 21; 12, 22; 11, 20; 12, 20), of which one magnet (11, 12) is always located on the machine frame (1) and the other magnet (21, 22, 20) is located on the traversing rod (2), **characterized in that, the** at least two magnetic pairs (11, 21; 12, 22; 11, 20; 12, 20) are located in the area of the free end of the traversing rod (2).

2. A device according to claim 1, **characterized in that, the** two magnetic pairs comprise two fixed magnets (11, 12) fastened to the machine frame (1) in an adjustable way, and at least one common moving magnet (20) fastened to the traversing rod (2)..

3. A device according to claim 1 or 2, **characterized in that, the** each magnetic pair comprises a fixed magnet (11, 12) fastened to the machine frame (1) in an adjustable way and one magnet (21, 22) fastened to the traversing rod (2).

4. A device according to any of claims 1 to 3, **characterized in that, the** comprises three magnetic pairs (11, 21; 12, 22; 13; 23), of which one magnetic pair (13, 23) is located in the area of the end of the traversing rod (2) coupled with the traversing box (3).

5. A device according to any of claims 1 to 4, **characterized in that, the** fixed magnets (11, 12, 13) are placed on the machine frame (1) in an adjustable way by means of servomotors fastened to the frame (1), whereas the output of the servomotors is the linear shift of the fixed magnets (11, 12, 13) along the traversing rod (2), whereas after performing the linear shift the output member of the servomotor is fixed to the frame (1).

6. A device according to claim 5, **characterized in that, the** servomotors of the fixed magnets (11, 12, 13) are coupled with the control unit determining the position of the dead points of the traversing rod (2).

7. A device according to any of claims 1, 3 to 6, **characterized in that, the** at least one of the magnetic pairs (11, 21; 12, 22; 13; 23) is formed by Halbach arrays.

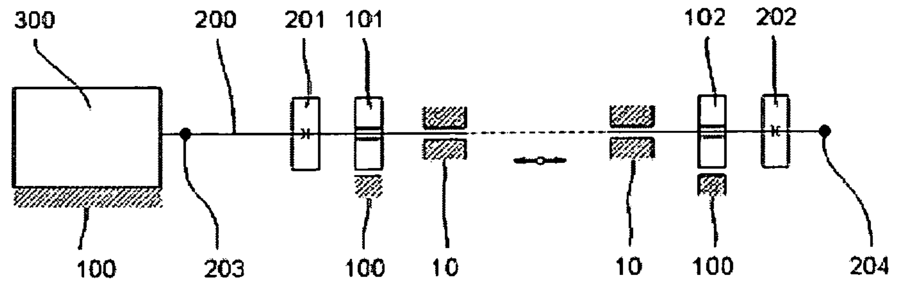

FIG. 1

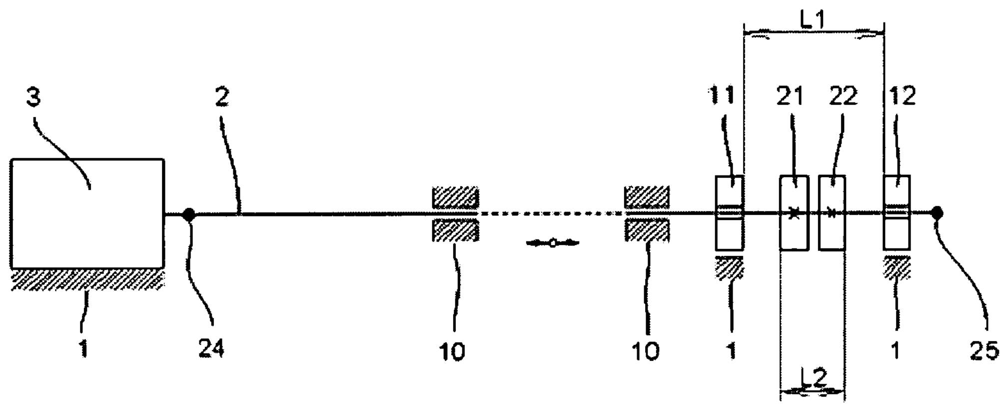

FIG. 2

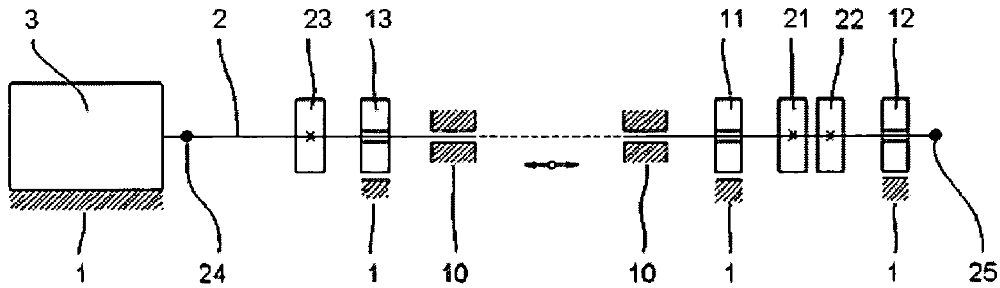

FIG. 3

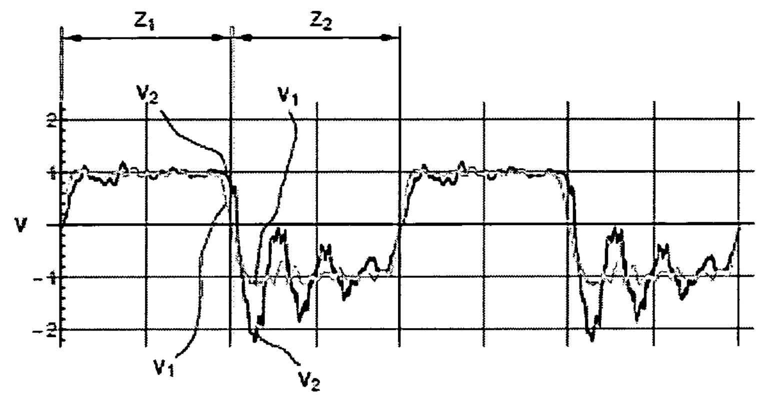

FIG. 4

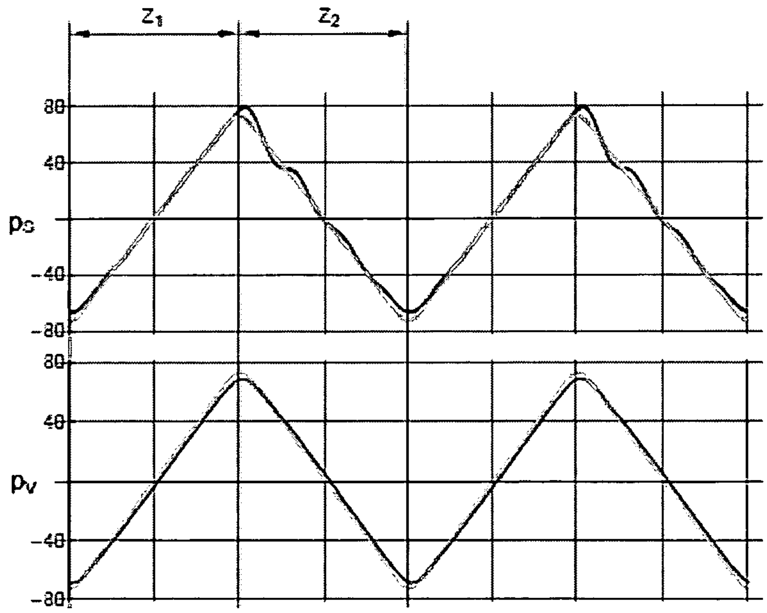

FIG. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 18 1169

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	DE 10 2008 000601 A1 (RIETER CZ AS [CZ]) 25 September 2008 (2008-09-25) * paragraphs [0014], [0018], [0035], [0046], [0047]; figures * -----	1-7	INV. B65H54/28 B65H54/38
Y	NL 6 515 444 A (ALGEMENE KUNSTZIJDE UNIE N.V.) 29 May 1967 (1967-05-29) * page 2, lines 30-33 * * page 4, lines 15-20 * * page 5, lines 1-5 * * page 7, lines 8-17; figure 6 * -----	1-7	
A	DE 197 08 936 A1 (NOVIBRA GMBH [DE]) 10 September 1998 (1998-09-10) * column 2, lines 11-16 * * column 3, lines 36-39 * * column 3, line 65 - column 4, line 2; figures * -----	1-7	
A	WO 2004/031061 A1 (SAURER GMBH & CO KG; SIEWERT RALF [DE]) 15 April 2004 (2004-04-15) * figures 1,3,4 * -----	1-7	TECHNICAL FIELDS SEARCHED (IPC) B65H

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
The Hague	21 January 2013	Lemmen, René

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 18 1169

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-01-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102008000601 A1	25-09-2008	NONE	
NL 6515444 A	29-05-1967	NONE	
DE 19708936 A1	10-09-1998	DE 19708936 A1	10-09-1998
		US 6027065 A	22-02-2000
WO 2004031061 A1	15-04-2004	DE 10244495 A1	08-04-2004
		WO 2004031061 A1	15-04-2004

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82