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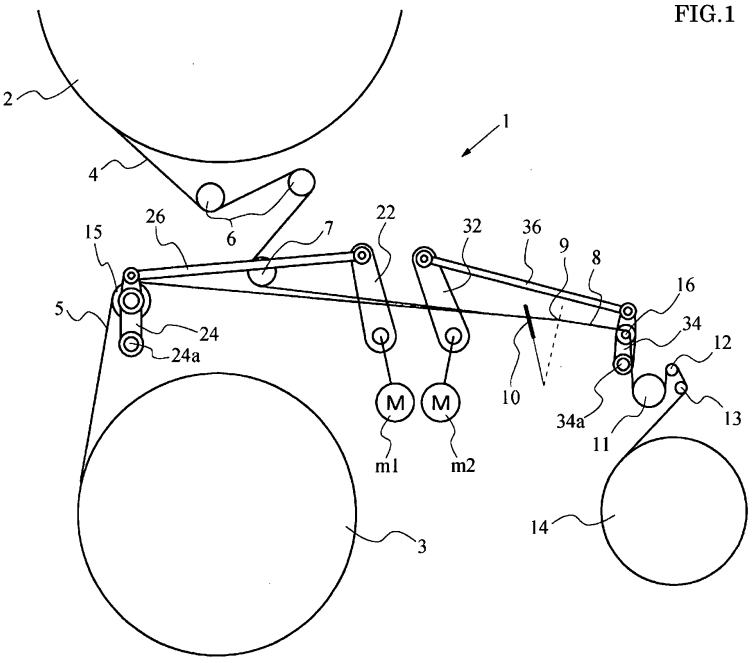
(54) Method for driving terry motion members in cloth-shifting-type pile loom

(57) In a cloth-shifting-type pile loom (1) in which let-off-side and take-up side terry motion members (15, 16) are driven via a driving mechanism by at least one designated driving motor (m1, m2) independent of a main driving motor of the pile loom (1), at least one of the terry motion members (15, 16) is driven in a first driving mode by at least one driving motor (m1, m2) for a predetermined period. The first driving mode is different from a second driving mode performed under a steady operation of the pile loom (1). The predetermined period starts from a point at which the pile loom (1) is activated after the pile loom (1) is stopped.

FIG.1



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to methods for driving terry motion members, and particularly, to a method for driving at least one of let-off-side and take-up side terry motion members in a cloth-shifting-type pile loom with designated driving means.

[0002] In the description below, a side from which woven cloth is taken up will be referred to as front or forward, and a side from which warp yarns are fed will be referred to as rear or backward. Furthermore, the term "activation period" used in the present invention refers to a period extending from a point at which the pile loom is activated to a point at which the rotational speed of the pile loom reaches a steady rotational speed.

2. Description of the Related Art

[0003] Japanese Unexamined Patent Application Publication No. 2-47334, for example, discloses a cloth-shifting-type pile loom in which a back roller defining a let-off-side terry motion member and a breast beam defining a take-up-side terry motion member are driven by single driving means or are driven individually by a plurality of designated driving means. The single driving means or the plurality of designated driving means is independent of a main driving motor of the pile loom and may be, for example, a driving motor or driving motors.

[0004] In a pile loom of a cloth-shifting type in which one of or each of the terry motion members is driven by a designated driving motor, when the pile loom is stopped and is activated again, the height of piles (pile length) formed in the activation period is different from the height of piles formed under steady operation of the pile loom. This leads to an uneven thickness in the pile height of the woven cloth and thus reduces the quality of the cloth.

[0005] Such a difference in pile heights may be caused by a low rotational speed of the pile loom during the activation period. In other words, due to the fact that the rotational speed of the pile loom in the activation period is lower than that in the steady operation period, the shifting rate of a reed driven by the main shaft of the pile loom is also low in the activation period. For this reason, an inertia force acting upon, for example, a driving mechanism of the reed during a beating motion of the reed (i.e. a force acting in a reverse direction of the shifting direction of the reed) and the bending amount of the reed itself in the activation period are lower than those in the steady operation mode. As a result, the most advanced position of the reed in the activation period becomes located posterior to that in the steady operation mode.

[0006] Accordingly, when a loose-pick beating operation (i.e. a beating operation in which the inserted weft yarn is not completed beaten against the cloth fell) is performed in the activation period in which the rotational speed of the pile loom is lower that that in the steady operation mode, the distance between the cloth fell and the beating position is longer than the distance between the two in the steady operation mode. As a result, the height of piles formed in the activation period becomes larger than the height of piles formed under steady operation. On the other hand, when a fast-pick beating operation (i.e. a beating operation in which the inserted weft yarn is completely beaten against the cloth fell) is performed in the activation period, since the cloth fell in the activation period is positioned posterior to the position of the cloth fell in the steady operation mode, the height of piles formed in the activation period becomes smaller than the height of piles formed under steady operation even if the subsequent loose pick is properly beaten to the regular position.

[0007] Furthermore, in a pile loom that performs two loose-pick beating operations, in a case where the second loose-pick beating operation is performed in the activation period, the second loose-pick weft yarn is not completely beaten against the first loose-pick weft yarn, such that the two weft yarns are separated from each other by a certain distance. Consequently, when a new weft yarn is shifted towards the cloth fell in the subsequent fast-pick beating operation, incomplete piles are formed since the restraining force of the pile warp yarns by the weft yarn is weak. This may result in a low height of the piles.

[0008] Japanese Unexamined Patent Application Publication No. 7-173743 discloses a technique for preventing the height of piles formed in the activation period from being different from the height of piles formed under steady operation.

[0009] According to a pile loom disclosed in Japanese Unexamined Patent Application Publication No. 7-173743, the distance between the beating position and the cloth fell is adjusted by changing the shifting distance of the reed. Thus, the target beating distance for the activation period of the pile loom is set different from that for the steady operation mode.

[0010] According to the pile loom disclosed in Japanese Unexamined Patent Application Publication No. 7-173743, the shifting distance of the reed is adjusted in order to correct the height of piles formed in the activation period, or more specifically, to correct the distance between the beating position and the cloth fell for the activation period. However, this is problematic in that the setting process for a new target beating distance is difficult.

[0011] Specifically, as mentioned above, the difference in pile heights between the activation period and the steady operation period is mainly caused by the inertia force generated in response to the shifting process of the reed and the bending of the reed itself. If the shifting distance of the reed is changed in order to solve this problem, the inertia force and the bending of the reed also change. This means that if the shifting distance of

the reed is adjusted simply in view of the change in the pile height, the beating position will not reach its target position. As a result, the piles cannot be formed to a desired height, that is, the same height as the piles formed under steady operation. Moreover, numerous tests must be performed in order to obtain the setting value for the desired pile height.

SUMMARY OF THE INVENTION

[0012] Accordingly, it is an object of the present invention to provide a driving method for a pile loom, which prevents the height of piles formed during an activation period from being different from the height of piles formed under steady operation, and which also allows for a simple and easy setting process.

[0013] In order to achieve the aforementioned object, the present invention provides a method for driving at least one of a let-off-side terry motion member and a take-up-side terry motion member of a cloth-shifting-type pile loom with designated driving means. The method includes one of the steps of driving at least one of the let-off-side terry motion member and the take-up-side terry motion member in a first driving mode for a predetermined period using the driving means, the first driving mode being different from a second driving mode performed under a steady operation of the pile loom, the predetermined period starting from a point at which the pile loom is activated after the pile loom is stopped; and driving the driving means prior to the activation of the pile loom in the stopped state so that a cloth fell in the stopped state of the pile loom is shifted towards a let-off-side of warp yarns, and subsequently activating the pile loom.

[0014] Furthermore, each of the first and second driving modes is preferably defined by a driving distance of at least one of the let-off-side terry motion member and the take-up-side terry motion member driven by the driving means.

[0015] Furthermore, a driving operation of the driving means may be controlled in a manner such that a position of the cloth fell at the time of a loose-pick beating operation performed in an activation period of the pile loom is closer towards the let-off-side of the warp yarns than a position of the cloth fell at the time of a loose-pick beating operation performed under steady operation of the pile loom, or may be controlled in a manner such that a position of the cloth fell at the time of a fast-pick beating operation performed in the activation period of the pile loom is different from a position of the cloth fell at the time of a fast-pick beating operation performed under steady operation of the pile loom.

[0016] According to the present invention, even if the beating position and the cloth-fell position in the activation period of the pile loom are different from those in the steady operation mode, at least one of the terry motion members is driven in a mode different from the mode performed under steady operation of the pile loom. Specifically, since at least one of the terry motion members is driven so that the distance between the reed and the cloth fell at the time of a beating operation in the activation period is substantially equal to that in the steady operation mode, the height of piles formed in the activation period is prevented from being different from the height of piles formed under steady operation. Moreover, since the driving distance of at least one of the terry motion members may be set and adjusted based on, for example, the difference in beating positions between the activation period and the steady operation period, the adjustment of the driving distance does not adversely affect the beating position, as in the conventional techniques. Accordingly, an easy setting process is achieved.

[0017] Furthermore, by driving at least one of the terry motion members prior to the activation of the pile loom so that the cloth fell is shifted towards the let-off-side of the warp yarns and subsequently activating the pile loom in this state, a weaving process can be properly performed even if the most advance position of the reed at the time of the fast beating operation after the activation point is located posterior to the most advance position of the reed for steady operation of the pile loom.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 is a side view illustrating a cloth-shifting-type pile loom according to a first embodiment of the present invention;

Fig. 2 illustrates a terry motion member in a steady operation mode;

Figs. 3A and 3B illustrate a driving mode of the terry motion member according to the first embodiment of the present invention;

Figs. 4A and 4B illustrate a driving mode of the terry motion member according to an alternative embodiment of the present invention; and

Figs. 5A and 5B illustrate a driving mode of the terry motion member according to another alternative embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] Embodiments of the present invention will now be described with reference to the drawings.

First Embodiment

[0020] Figs. 1 to 3 illustrate a first embodiment according to the present invention. A pile loom 1 shown in Fig. 1 to which the present invention is applied is a cloth-shifting type which shifts the cloth fell during a pile-weaving operation in order to form a pile fabric.

[0021] The cloth-shifting-type pile loom 1 includes an upper pile-warp beam 2 around which a plurality of pile warp yarns 4 are wound in a sheet-like manner, and a lower ground-warp beam 3 around which a plurality of

ground warp yarns 5 are wound in a sheet-like manner.

[0022] The pile warp yarns 4 are fed from the pile-warp beam 2 and are wound around two guide rollers 6, 6 and a pile-warp tension roller 7 disposed at a downstream side of the guide rollers 6, 6 so as to be supplied to a cloth fell 9 of cloth 8 via a heald (not shown) and a reed 10. On the other hand, the ground warp yarns 5 are fed from the ground-warp beam 3 and are wound around a ground-warp tension roller 15, which defines a let-off-side terry motion member. Similar to the pile warp yarns 4, the ground warp yarns 5 guided by the tension roller 15 are then supplied to the cloth fell 9 of the cloth 8 via the heald and the reed 10.

[0023] Together with each inserted weft yarn (not shown), the pile warp yarns 4 and the ground warp yarns 5 form the cloth 8. The cloth 8 is subsequently guided by a cloth guide roller 16, which defines a take-up-side terry motion member, towards a take-up roller 11 and guide rollers 12, 13 so as to be finally taken up by a cloth roller 14.

[0024] As shown in Fig. 1, according to the pile loom 1 in the first embodiment, the let-off-side terry motion member (i.e. the ground-warp tension roller 15) and the take-up-side terry motion member (i.e. the cloth guide roller 16) are driven individually by designated driving motors, such as servomotors and stepping motors, defining driving means.

[0025] Specifically, opposite ends of the ground-warp tension roller 15 are supported by a pair of supporting levers 24 (only one of which is shown in Fig. 1). The supporting levers 24 are respectively supported by opposite side frames of the pile loom 1 in a rocking manner. The supporting levers 24 are linked with a rocking lever unit 22 via a linking rod 26. The rocking lever unit 22 is driven in a rocking motion by a driving motor m1. When the driving motor m1 drives the rocking lever unit 22 in a rocking motion, the supporting levers 24 become rocked around a rocking shaft 24a, whereby the tension roller 15 moves in a rocking motion in a front-back direction.

[0026] On the other hand, similar to the ground-warp tension roller 15, the cloth guide roller 16 is supported between the opposite side frames of the pile loom 1 via a pair of supporting levers 34. The supporting levers 34 are linked with a rocking lever unit 32 via a linking rod 36. The rocking lever unit 32 is driven in a rocking motion by a driving motor m2. When the driving motor m2 drives the rocking lever unit 32 in a rocking motion, the supporting levers 34 become rocked around a rocking shaft 34a, whereby the cloth guide roller 16 moves in a rocking motion in the front-back direction.

[0027] During a weaving operation, the two driving motors m1, m2 are driven in the same rotational direction in synchronization with a main shaft of the pile loom 1 (i.e. a main driving motor which is not shown). In response to the rotation of the driving motors m1, m2, the ground-warp tension roller 15 and the cloth guide roller 16 are rocked forward or backward at a predetermined timing in each pile formation cycle, whereby the cloth fell 9 of the cloth 8 is shifted at the predetermined timing.

[0028] According to the pile loom 1, since the let-off-side terry motion member and the take-up-side terry motion member are driven respectively by the designated driving motors m1, m2, the two terry motion members can be driven in an asynchronous manner. In other words, the two terry motion members can be driven at different drive-start timings and different drive-end timings and by different driving distances. For example, the ground-warp tension roller 15 may be driven in a manner such that the fluctuation of the ground warp tension is moderate during each cycle of the pile loom 1.

[0029] In this embodiment, during an activation period of the pile loom 1, the take-up-side terry motion member (i.e. the cloth guide roller 16) is driven in a mode that is different from a driving mode performed under a steady operation of the pile loom 1. This is intended to prevent the height of piles formed in the activation period from being different from the height of piles formed under steady operation. Such a difference in pile heights between the two periods is caused when the most advanced position of the reed 10 in the activation period is posterior to the most advanced position of the reed 10 in the steady operation period. Furthermore, according to the pile loom 1 in this embodiment, each pile formation cycle consists of two loose-pick beating operations and one fast-pick beating operation. In other words, one pile formation cycle includes three sub-cycles.

[0030] Referring to Fig. 2, during a steady operation of the pile loom 1, the cloth guide roller 16 is driven forward or backward at a predetermined timing in each pile formation cycle, such that the cloth guide roller 16 is driven back and forth between a position F (i.e. a most retreated position) indicated by a dotted line in Fig. 2 and a position L (i.e. a most advanced position) indicated by a solid line in Fig. 2. In the state shown in Fig. 2, the reed 10 is located at its most advanced position. At the time of a loose-pick beating operation, the cloth guide roller 16 is located at the position L, and in this state, the cloth fell 9 of the cloth 8 is located at a position 9L. On the other hand, at the time of a fast-pick beating operation, the cloth guide roller 16 is located at the position F, and in this state, the cloth fell 9 is located at a position 9F. When a loose-pick beating operation is performed, the pile warp yarns 4 between the reed 10 and the cloth fell 9 at the position 9L form the piles. Accordingly, for every loose-pick beating operation, a distance P between the position 9L of cloth fell 9 and the most advanced position of the reed 10 is directly related to the height of piles that are formed. In other words, the pile height is large when the distance P is long, whereas the pile height is small when the distance P is short.

[0031] In a case where the operation of the pile loom 1 is aborted due to a certain reason, the pile loom 1 is stopped at a predetermined crank angle, and is reactivated from that crank angle (activation angle) when the pile loom 1 is ready to be activated again. Fig. 3B illustrates an example in which the activation angle is set

near the end of a second sub-cycle of one pile formation cycle. In this case, the cloth guide roller 16 is located at its most advanced position, that is, the position L at the time of a loose-pick beating operation. The rotational speed of the pile loom 1 increases from this activation point and then reaches a steady rotational speed after a second beating operation from the activation point.

[0032] Fig. 3A illustrates a state in which the reed 10, whose most advanced position is normally located at a position indicated by a dashed line during the steady operation of the pile loom 1, only reaches a position indicated by a solid line during the activation period due to the low rotational speed of the pile loom 1. In this case, for example, if the position of the cloth fell 9 in the first loose-pick beating operation performed after the activation point is the same as the position 9L in the steady operation mode, a distance P' between the position 9L of the cloth fell 9 and the most advanced position of the reed 10 is greater than the distance P in the steady operation mode. As a result, the height of piles to be formed becomes larger or smaller in comparison with the height of piles formed under steady operation.

[0033] Therefore, according to the first embodiment, prior to the activation of the pile loom 1, the cloth guide roller 16 is shifted backward to a position L', and the pile loom 1 is subsequently activated in this state. The shifting distance of the cloth guide roller 16 may be set based on the difference between the most advanced position of the reed 10 in the activation period and the most advanced position of the reed 10 under steady operation. Specifically, such a difference may be determined by performing, for example, test weaving. Alternatively, a mathematical function may be preliminarily determined from the relationship between the rotational speed of the pile loom 1 and the most advanced position of the reed 10, and the shifting distance may be derived from the mathematical function based on the rotational speed of the pile loom 1 at the point of a beating operation performed in the activation period.

[0034] Accordingly, by shifting the cloth guide roller 16 prior to the activation of the pile loom 1, the cloth fell 9 in the activation period becomes located at a position 9L', which is posterior to the position 9L of the cloth fell 9 in the stopped state of the pile loom 1. Consequently, in the first loose-pick beating operation performed after the activation point, the most advanced position of the reed 10 and the position 9L' of the cloth fell 9 are separated from each other by a distance P'', which is substantially equal to the distance P in the steady operation mode. In this case, instead of being located at the most advanced position L, the cloth guide roller 16 during the activation period is located at the position L', which is posterior to the position L. Consequently, for the subsequent fast-pick beating operation, the shifting distance of the cloth guide roller 16 towards the position F, namely, the driving distance of the cloth guide roller 16 by the driving motor m2, is smaller than that in the steady operation.

[0035] Furthermore, referring to Fig. 3B, according to the first embodiment, the cloth guide roller 16 is driven in a manner such that the cloth guide roller 16 at the time of the fast-pick beating operation following the first loose-pick beating operation after the activation point is positioned posterior to the position of the cloth guide roller 16 at the time of a fast-pick beating operation performed under steady operation of the pile loom 1.

[0036] The purpose of driving the cloth guide roller 16 in this manner is to prevent the pile height from becoming smaller. Specifically, as shown in Figs. 3A and 3B, this is caused by the rotational speed of the pile loom 1 not reaching the steady rotational speed at the time of the fast-pick beating operation in the activation period, meaning that the most advanced position of the reed 10 in this fast-pick beating operation has not yet reached the most advanced position of the reed 10 for the steady operation. Thus, the cloth guide roller 16 is driven by the driving motor m2 in a manner such that the cloth guide roller 16 at the time of this fast-pick beating operation of the activation period is positioned posterior to the position of the cloth guide roller 16 at the time of a fast-pick beating operation under steady operation. Consequently, the position 9F of the cloth fell 9 is shifted towards the rear so that the position of the cloth fell 9 after this fast-pick beating operation becomes substantially equivalent to the position of the cloth fell 9 at the time of a fast-pick beating operation under steady operation. Accordingly, the pile height is prevented from becoming smaller.

[0037] In the above description, although the cloth guide roller 16 is driven in a manner such that the cloth guide roller 16 is positioned posterior to the position corresponding to the steady operation for both the loose-pick beating operation and the fast-pick beating operation performed in the activation period, the rotational speed of the pile loom 1 is different between the first loose-pick beating operation performed after the activation point and the fast-pick beating operation following the first loose-pick beating operation. Specifically, the rotational speed at the time of the fast-pick beating operation is higher than the rotational speed at the time of the first loose-pick beating operation. Consequently, the difference in the most advanced position of the reed 10 between the activation period and the steady operation period is smaller for the fast-pick beating operation, which similarly means that the difference in the position of the cloth guide roller 16 between the activation period and the steady operation period is smaller for the fast-pick beating operation. As a result, the driving distance of the cloth guide roller 16 during the activation period is different from (smaller than) the driving distance of the cloth guide roller 16 under steady operation.

[0038] According to the first embodiment, when the pile loom 1 is to be reactivated after the operation of the pile loom 1 is aborted, the cloth guide roller 16 defining the take-up-side terry motion member is driven by the driving motor m2 prior to the activation so that the cloth fell 9 is shifted towards the let-off-side of the warp yarns. Moreover, the driving distance of the cloth guide roller 16 within

a predetermined period, i.e. the activation period, is set different from (smaller than) the driving distance of the cloth guide roller 16 under steady operation. Accordingly, this advantageously prevents the height of piles formed in the activation period from being different from the height of piles formed under steady operation, which is caused by the most advanced position of the reed 10 during the activation period being posterior to the most advanced position of the reed 10 under steady operation due to the pile loom 1 operating at a lower rotational speed in the activation period than in the steady operation period. As a result, the quality of the cloth 8 is prevented from deteriorating.

Other Embodiments

[0039] Although the above embodiment is directed to an example in which the cloth guide roller 16 defining the take-up-side terry motion member is driven in different driving modes between the activation period and the steady operation period, the present invention is not limited to the first embodiment. For example, the ground-warp tension roller 15 defining the let-off-side terry motion member may also be driven in a similar manner. Specifically, the let-off-side terry motion member may be shifted towards the rear prior to the activation so that the let-off-side terry motion member in the activation period is driven by a driving distance different from the driving distance in the steady operation mode. In that case, the take-up-side and the let-off-side terry motion members may each be driven in different driving modes between the activation period and the steady operation period, or only the let-off-side terry motion member may be driven in different driving modes between the activation period and the steady operation period.

[0040] Furthermore, although the take-up-side terry motion member is driven prior to the activation so that the cloth fell 9 is shifted towards the rear in the first embodiment, this driving process may be omitted depending on, for example, the activation angle. Specifically, for example, in a case where the first beating operation to be performed after the activation point is a fast-pick beating operation, this driving process prior to the activation is not necessary, and therefore, only the driving distance after the activation point may be set different from the driving distance in the steady operation mode.

[0041] On the other hand, referring to Fig. 4A, even if the first beating operation to be performed after the activation point of the pile loom 1 is a loose-pick beating operation, the abovementioned driving process prior to the activation may alternatively be omitted. In that case, before the loose-pick beating operation is performed in the activation period, one of or each of the terry motion members may be shifted to a desired position by driving the corresponding driving motor after the activation point. In a case where the rotational speed of the pile loom 1 reaches the steady rotational speed before the subsequent fast-pick beating operation, as shown in Fig. 4B, and the terry motion member is set at a position that is the same as the position in the steady operation mode, the driving distance of the terry motion member driven by the driving motor between the activation point and the fast-pick beating operation is the same as the driving distance of the terry motion member under steady operation. In this case, even if the driving distance is the same, the terry motion member is driven at different drive-start timings and different driving patterns between the activation period and the steady operation period. Such a driving mode is included in the scope of the present invention.

[0042] Furthermore, although the take-up-side terry motion member in the above embodiment is driven such that the cloth fell 9 at the time of the fast-pick beating operation performed in the activation period is positioned posterior to the position of the cloth fell 9 at the time of a fast-pick beating operation under steady operation, one of or each of the terry motion members may alternatively be driven such that the cloth fell 9 at the time of the fast-pick beating operation performed in the activation period is positioned in front of the position of the cloth fell 9 at the time of a fast-pick beating operation under steady operation.

[0043] Generally, when a fast-pick beating operation is performed, the cloth fell 9 of the cloth 8 is pushed forward from its original position in response to a beating force generated by the beating motion. Due to a repulsive force of the cloth fell 9, the cloth fell 9 returns to its original position simultaneously with a retreating motion of the reed 10. However, since the beating force is weak during the activation period, the repulsive force of the cloth fell 9 pushed forward is also weak. In some cases, the position of the cloth fell 9 after a fast-pick beating operation in the activation period may be located in front of the position of the cloth fell 9 located after a fast-pick beating operation performed under steady operation. This may cause the height of subsequent piles to be larger than the height of piles formed under steady operation. Therefore, in order to prevent this, one of or each of the terry motion members may be driven such that the position of the cloth fell 9 at the time of the fast-pick beating operation in the activation period is located in front of the position of the cloth fell 9 for a fast-pick beating operation under steady operation and that the most advanced position of the reed 10 is located posterior to the position of the cloth fell 9.

[0044] Although the term "predetermined period" in the above description refers to the activation period, that is, a period extending from the activation point of the pile loom 1 to a point at which the rotational speed of the pile loom 1 reaches the steady rotational speed, the term "predetermined period" according to the present invention is not limited to the activation period, and may alternatively be directed to any desired period, such as a period extending between the point at which the rotational speed of the pile loom 1 reaches the steady rotational speed and a point at which one or more picks are woven.

[0045] Specifically, in the first embodiment shown in Figs. 3A and 3B, the take-up side terry motion member (cloth guide roller 16) is driven such that the cloth fell 9 at the time of the fast-pick beating operation in the activation period is positioned posterior to the position of the cloth fell 9 for a fast-pick beating operation under steady operation. This is intended to prevent the height of piles formed in the activation period from becoming smaller, which is caused by the most advanced position of the reed 10 at the time of the fast-pick beating operation in the activation period being posterior to the most advanced position of the reed 10 for a fast-pick beating operation under steady operation. On the other hand, Figs. 5A and 5B illustrate an alternative embodiment to the first embodiment. In detail, in this alternative embodiment, the cloth fell 9 at the time of the fast-pick beating operation in the activation period may be located at the same position as in the steady operation mode. In this case, one of or each of the terry motion members may be driven such that the cloth fell 9 at the time of the first loose-pick beating operation performed after the rotational speed of the pile loom 1 reaches the steady rotational speed is positioned posterior to the usual position of the cloth fell 9 in the steady operation mode.

[0046] On the other hand, the position of the cloth fell 9 may at times be unstable shortly after the activation period even when the rotational speed of the pile loom 1 has reached the steady rotational speed. If such unstableness can be found preliminarily by test weaving, the position of the cloth fell 9 may be adjusted for several picks after the point at which the rotational speed has reached the steady rotational speed by driving one of or each of the terry motion members by, for example, a driving distance different from the usual driving distance in the steady operation mode.

[0047] In the above embodiments, the pile loom 1 to which the present invention is applied is a type in which the let-off-side terry motion member and the take-up-side terry motion member are driven individually by the designated driving means (driving motors) independent of the main driving motor of the pile loom 1. However, the present invention is not necessarily limited to this type of a pile loom, and may alternatively be directed to a type in which the two terry motion members are driven with a single driving motor (for example, the pile loom disclosed in Fig. 9 of Japanese Unexamined Patent Application Publication No. 2-47334).

[0048] Furthermore, as an alternative to the above example in which the let-off-side and the take-up-side terry motion members are both driven by the designated driving means, at least one of the let-off-side and the take-up-side terry motion members may be driven by the designated driving means. In that case, however, the terry motion member that is driven in different driving modes between the activation period and the steady operation period must be driven by the designated driving means. Furthermore, although the designated driving means is defined by one or more driving motors, such as servomotors and stepping motors, in the above embodiments, the driving means according to the present invention may alternatively be, for example, one or more rotary actuators, such as rotary solenoids. As a further alternative, the driving means may be one or more direct-acting actuators, such as linear motors.

[0049] Although the above description explains that the height of piles formed just after the activation point is different from the height of piles formed under steady operation due to the most advanced position of the reed 10 during the activation period being posterior to the most advanced position of the reed 10 in the steady operation mode, such a difference in pile heights may also be due to stretched warp yarns in the stopped state of the pile loom 1, which could lead to a positional change in the cloth fell 9 itself. Thus, the driving distance for the driving process of one of or each of the terry motion members performed prior to the activation and the driving distance during the activation period may be set in view of the stretched condition of the warp yarns. For example, these driving distances may be set in accordance with a period of time in which the pile loom 1 is stopped.

[0050] One of the reasons the warp yarns are stretched in the stopped state of the pile loom 1 is because tension is constantly applied to the warp yarns during the stopped state of the pile loom 1. In order to prevent this, the warp tension may be loosened in the stopped state of the pile loom 1. This can be achieved by applying a known technique in which the warp beams are rotated forward and/or the cloth roller is rotated backward when the pile loom 1 is stopped. On the other hand, instead of driving the warp beams and/or the cloth roller, the let-off-side terry motion member and/or the take-up-side terry motion member may be driven towards each other when the pile loom 1 is stopped so as to effectively utilize the characteristic of the present invention in that at least one of the let-off-side terry motion member and the take-up-side terry motion member can be driven by the designated driving means. Accordingly, the warp tension can be loosened.

[0051] The technical scope of the present invention is not limited to the above embodiments, and modifications are permissible within the scope and spirit of the present invention.

Claims

1. A method for driving at least one of a let-off-side terry motion member (15) and a take-up-side terry motion member (16) of a cloth-shifting-type pile loom (1) with designated driving means (m1, m2), the method comprising one of the steps of:

   driving said at least one of the let-off-side terry motion member (15) and the take-up-side terry motion member (16) in a first driving mode for a predetermined period using the driving means (m1, m2), the first driving mode being different

from a second driving mode performed under a steady operation of the pile loom (1), the predetermined period starting from a point at which the pile loom (1) is activated after the pile loom (1) is stopped; and

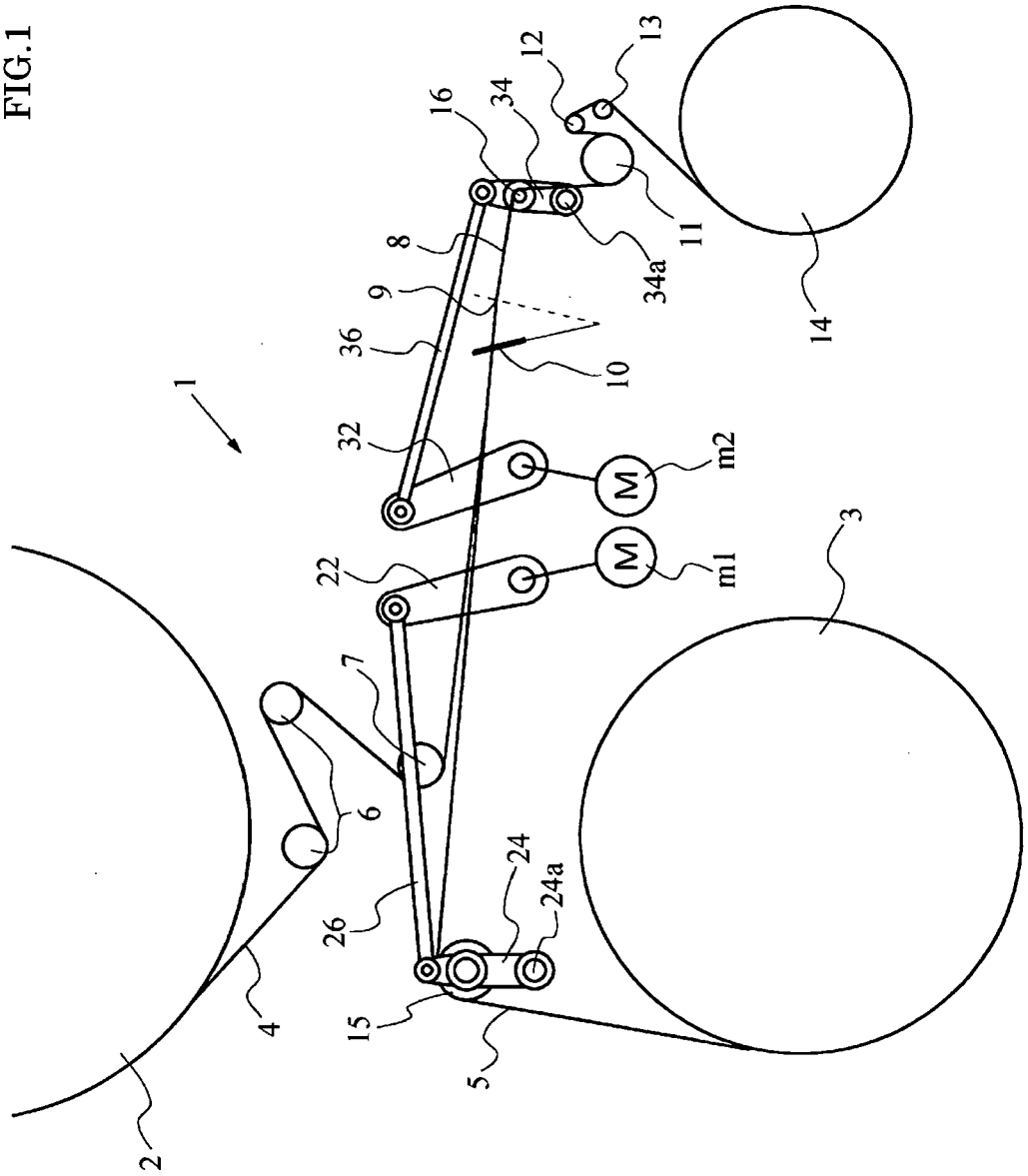
driving the driving means (m1, m2) prior to the activation of the pile loom (1) in the stopped state so that a cloth fell (9) in the stopped state of the pile loom (1) is shifted towards a let-off-side of warp yarns, and subsequently activating the pile loom (1).

2. The method according to Claim 1, wherein each of the first and second driving modes is defined by a driving distance of said at least one of the let-off-side terry motion member (15) and the take-up-side terry motion member (16) driven by the driving means (m1, m2).

3. The method according to one of Claims 1 and 2, wherein a driving operation of the driving means (m1, m2) is controlled in a manner such that a position (9L') of the cloth fell (9) at the time of a loose-pick beating operation performed in an activation period of the pile loom (1) is closer towards the let-off-side of the warp yarns than a position (9L) of the cloth fell (9) at the time of a loose-pick beating operation performed under steady operation of the pile loom (1).

4. The method according to one of Claims 1 and 2, wherein a driving operation of the driving means (m1, m2) is controlled in a manner such that a position of the cloth fell (9) at the time of a fast-pick beating operation performed in an activation period of the pile loom (1) is different from a position (9F) of the cloth fell (9) at the time of a fast-pick beating operation performed under steady operation of the pile loom (1).

FIG.1



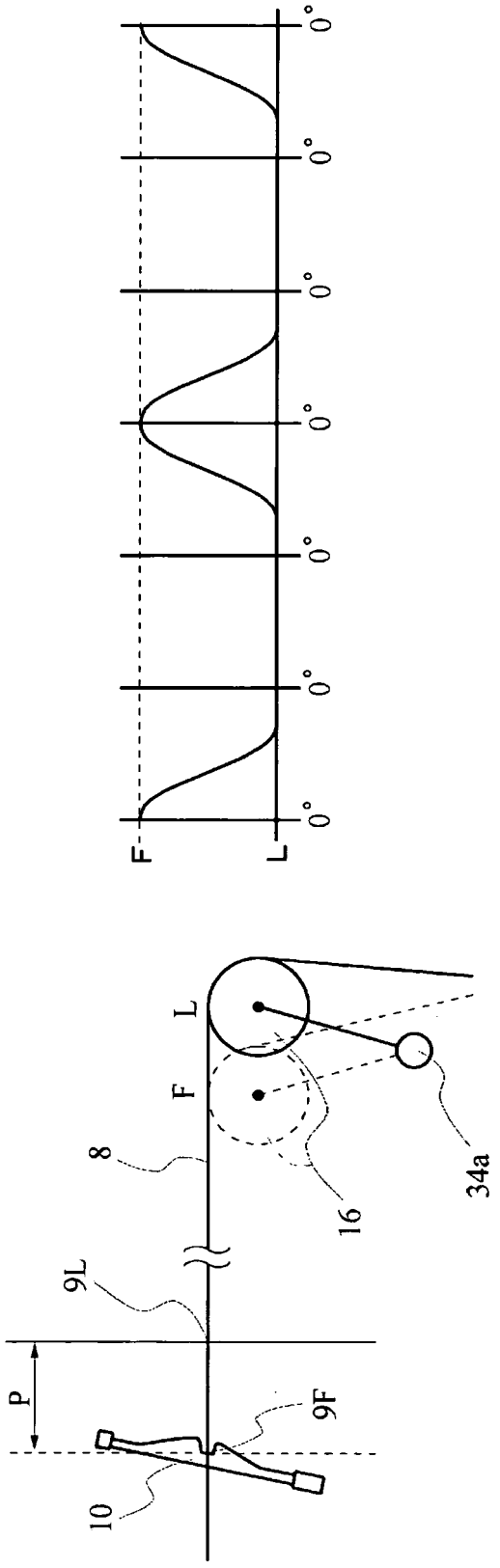
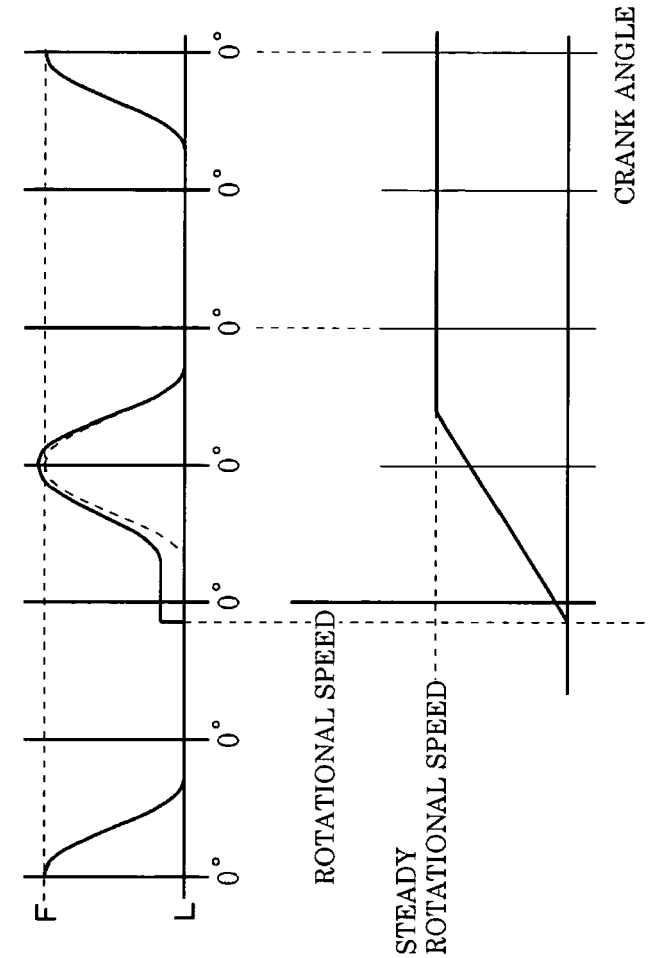


FIG. 2


F
L
0°
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ROTATIONAL SPEED
STEADY
ROTATIONAL SPEED
ACTIVATION ANGLE
CRANK ANGLE

FIG. 3 B

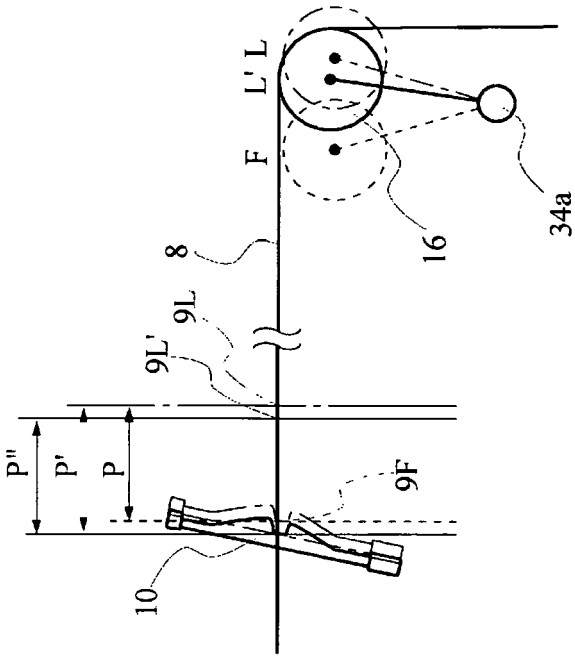
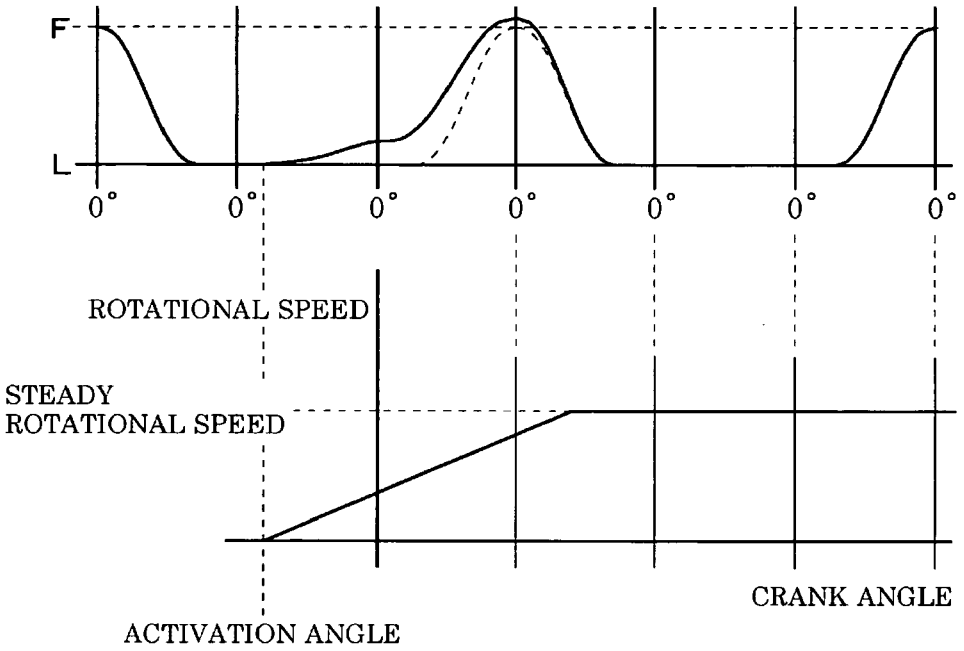

F
L' L
8
9L
9L'
P"
P'
P
9F
10
16
34a

FIG. 3 A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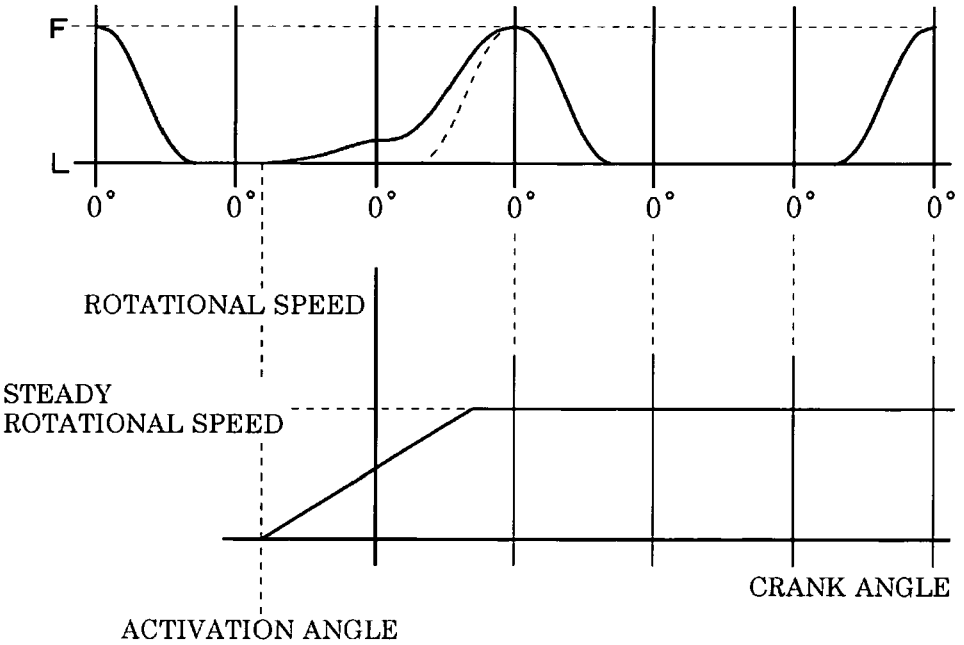
STEADY
ROTATIONAL SPEED
CRANK ANGLE
ACTIVATION ANGLE

FIG. 4 A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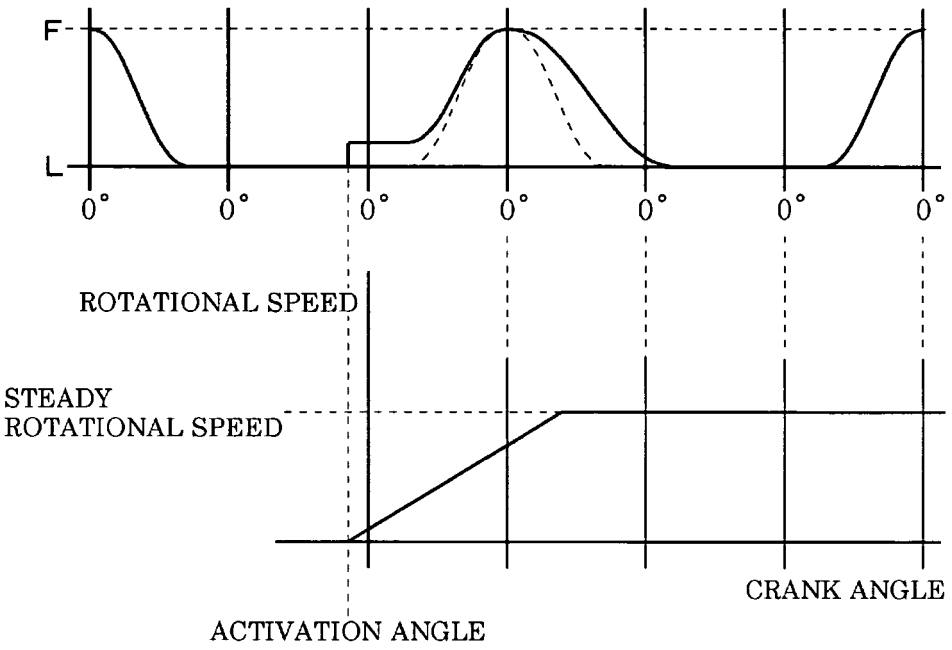
ACTIVATION ANGLE

FIG. 4 B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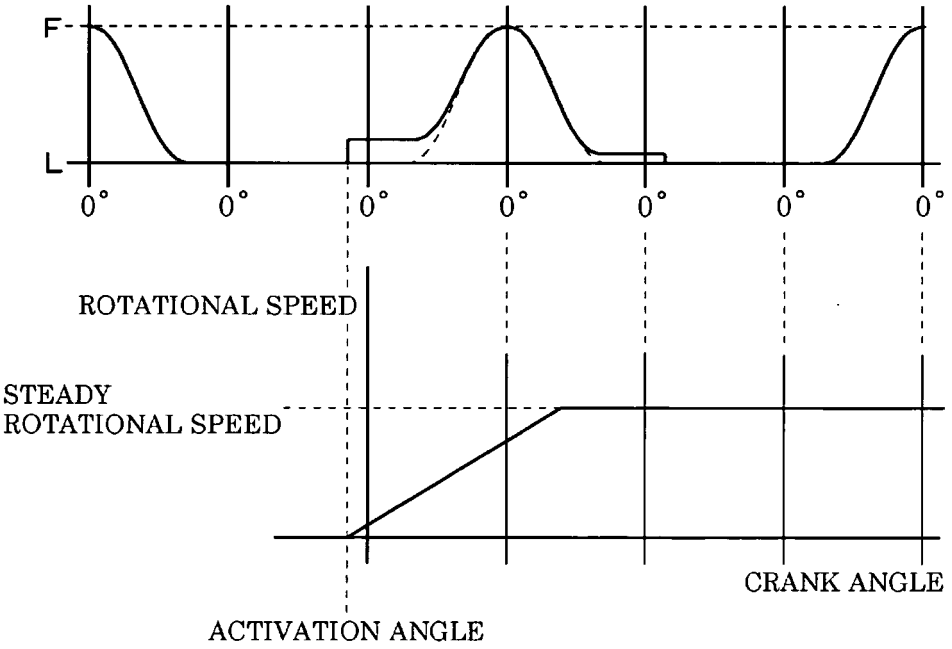
ACTIVATION ANGLE

FIG. 5 A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ROTATIONAL SPEED
STEADY
ROTATIONAL SPEED
CRANK ANGLE
ACTIVATION ANGLE

FIG. 5 B