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

(11) **EP 0 930 233 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
12.03.2014 Bulletin 2014/11

(51) Int Cl.:
B65B 9/20 *(2012.01)* ***B65B 51/30*** *(2006.01)*
B65B 57/08 *(2006.01)*

(21) Application number: **99300156.9**

(22) Date of filing: **13.01.1999**

(54) **Method of and device for adjusting position for cutting bags and packaging machine incorporating same**

Verfahren und Vorrichtung zum Einstellen der Schneideposition von Beuteln und mit diesen ausgestattete Verpackungsmaschine

Méthode et dispositif pour régler la position de coupe de sacs et machine d'emballage comportant ceux-ci

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **20.01.1998 JP 2275098**

(43) Date of publication of application:
21.07.1999 Bulletin 1999/29

(73) Proprietor: **ISHIDA CO., Ltd.**
Kyoto 606-8392 (JP)

(72) Inventors:
- **Nakagawa, Yukio,**
  Ishida Co.,Ltd.,
  Shiga Factory
  Kurita-gun,
  Shiga 520-3026 (JP)
- **Kondo, Masashi,**
  Ishida Co.,Ltd.,
  Shiga Factory
  Kurita-gun,
  Shiga 520-3026 (JP)

(74) Representative: **Skone James, Robert Edmund**
Gill Jennings & Every LLP
The Broadgate Tower
20 Primrose Street
London EC2A 2ES (GB)

(56) References cited:
EP-A- 0 083 912
EP-A- 0 274 849
EP-A- 0 348 065
EP-A- 0 718 196

EP 0 930 233 B1

Description

[0001] This invention relates to a packaging machine of the so-called form-fill-seal type adapted to concurrently form a bag from a film, to fill it with articles and to seal it to obtain individual packaged products. More particularly, this invention relates to a method of and a device for adjusting the position on the film at which it is cut ("cut-position") to produce separated bags. The invention also relates to a packaging machine adapted to automatically adjust the cut-position according to an inputted size of the bags to be produced.

[0002] Packaging machines adapted to concurrently bend a film into a tubular form, to fill it with articles to be packaged and to clamp it between a pair of sealing members ("seal jaws") to simultaneously seal the top part of a filled bag and the bottom of the next bag to be filled have been known. If the bags are formed from a film with a design printed thereon corresponding to each bag to be formed, marks (hereinafter referred to as the "eye marks") which are detectable by a light sensor are printed on the film at longitudinal intervals corresponding to the length of the bags to be made such that the film can be accurately sealed over and cut at boundary areas between portions of the film corresponding to two mutually adjacent bags as the packaging machine is operated to repeat a cyclic motion.

[0003] Prior art methods of determining the cut-position of the bags or the clamping position by seal jaws can be roughly divided into those of adjusting the interval between the time when an eye mark on the film as a reference is detected and the time at which the film is cut (such as adjusting the dislocation of the cut-position while changing the time set on a timer by operating a dial) and those of displacing the position of the sensor for the eye marks (that is, to move the eye mark sensor by a distance corresponding to the displacement of the cut-position). The methods of the former kind are not desirable because repeated trials and errors tend to increase the wasted amount of the film. The methods of the latter kind are advantageous in that one has only to displace the eye mark sensor but it is a cumbersome operation to make the position adjustment while watching the markings of a dial.

[0004] EP-A-0274849 describes an intermittent form-fill packaging machine in which a film is supplied in an intermittent manner to a transverse sealing position. The film is stopped at a position which is determined by an index controller having sensed a registration mark on the film. Thereafter, a separate, master controller activates the sealing and stripping mechanism which will then strip and seal a bag which is then cut.

[0005] In the case of packaging machines of a continuously operated type having a linearly moving transverse sealing mechanism, in particular, the cut-position of the film also changes whenever the stripping distance is changed according to the kind of the articles to be packaged or the pattern of motion (such as the time of sealing) for the transverse sealing jaws. Thus, the operator had to adjust the cut-position whenever such a change had to be made. This also contributed to increase the waste of the film material.

[0006] In accordance with one aspect of the present invention, a packaging machine comprises:

a pull down belt for causing an elongated film having detectable eye marks thereon to travel continuously along a path, a belt driving motor operating the pull down belt, a pair of seal jaws for moving cyclically to clamp and cut the film transversely to form separated bags, arms for rotatably supporting the seal jaws, an arm-rotating motor rotating the arms, and a detector for detecting the eye marks, a cut position adjusting device comprising:

a memory for storing a travel condition defining a distance of travel by the film along the path or a time of travel by the film along the path, from when one of the eye marks is detected by the detector until the seal jaws are to start moving;
input means for inputting the position along the film where the film was cut between the seal jaws; and
control means for controlling movement of the seal jaws so as to start movement of the seal jaws when the travel condition is satisfied, and is characterised in that
the control means is adapted to count a pulse number corresponding to a number of rotations or a number of pulses of the belt driving motor based on a distance of travel of the film by the pull-down belt;
to count a pulse number based on an angle of rotary motion by the arms for supporting the seal jaws;
to convert a displacement of the cut-position inputted through the input means into a corresponding pulse number;
and to adjust the travel condition by adding or subtracting correction values based on the distance of the displacement.

[0007] In accordance with a second aspect of the present invention, a method of operating a packaging machine comprising a pull down belt for causing an elongated film having detectable eye marks thereon to travel continuously along a path, a belt driving motor operating the pull down belt, a pair of seal jaws for moving cyclically to clamp and cut the film transversely to form separated bags, arms for rotatably supporting the seal jaws, an arm-rotating motor rotating the arms, and a detector for detecting the eye marks, a cut position adjusting device comprising:

a memory for storing a travel condition defining a distance of travel by the film along the path or a time

of travel by the film along the path, from when one of the eye marks is detected by the detector until the seal jaws are to start moving;
input means for inputting the position along the film where the film was cut between the seal jaws; and
control means for controlling movement of the seal jaws so as to start movement of the seal jaws when the travel condition is satisfied comprises operating the control means to count a pulse number corresponding to a number of rotations or a number of pulses of the belt driving motor based on a distance of travel of the film by the pull-down belt;
to count a pulse number based on an angle of rotary motion by the arms for supporting the seal jaws;
to convert a displacement of the cut-position inputted through the input means into a corresponding pulse number;
and to adjust the travel condition by adding or subtracting correction values based on the distance of the displacement.

[0008] This invention provides an improved device for automatically adjusting and controlling the cut-position of a bag-making film material in response simply to an input of a displacement of the cut-position obtained, for example, from a dummy bag formed for testing.

[0009] According to a method embodying this invention, the motion of a pair of seal jaws is started after the film has been pulled over a specified length or for a specified length of time (both referred to as "the travel condition") from the moment when an eye mark on the film is detected by a detector to thereby obtain a dummy bag for examining whether the film was cut at a right position. If not, the displacement from the intended cut-position is measured and used to correct the initially specified travel condition. Alternatively, the correction of the initially specified travel condition may be effected on the basis of displacement of the clamping position due to changes in various parameters for determining the pattern of the motion of the seal jaws.

[0010] A device embodying this invention may be characterized as comprising a memory for storing the aforementioned travel condition such as the distance by which the film is initially caused to travel between the time when an eye mark on the film is detected and the time when the motion of the seal jaws is to be started, an input means through which the displacement of the position on the film where it is actually cut and the intended cut-position is inputted, and calculating means for adjusting the aforementioned travel condition according to the displacement inputted through the input means.

[0011] A packaging machine of this invention may be characterized as comprising film transporting means such as pull-down belts for moving a film along a specified path, a detector for detecting an eye mark on the film, a transverse sealer operating cyclically and having a pair of sealing jaws for clamping the film from opposite sides and cutting it to form a bag, a memory for storing certain data such as desired length of the bags to be made, and means for using these data to calculate a distance or time of travel by the film and controlling the motion of the seal jaws and hence the timing of clamping the film thereby.

[0012] Since the initial motion of the film (expressed either by the distance or time of its travel) is corrected by preliminarily producing a dummy bag as a test and measuring the displacement of the actually cut from where the cutting was intended, the cutting position of the film can be automatically and easily adjusted without wasting a large amount of film.

[0013] The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings:

Fig. 1 is a schematic diagonal view of a part of a form-fill-seal packaging machine incorporating a device for cutting bags according to this invention;
Fig. 2 is a schematic block diagram of a control system for the packaging machine of Fig. 1;
Fig. 3 is a block diagram of a computer which may be used in the control system shown in Fig. 2;
Fig. 4 in a flow chart for the operation of the packaging machine of Fig. 1 with control system shown in Figs. 2 and 3;
Fig. 5 is a diagram for showing a pattern of the motion of a seal jaw;
Fig. 6 is a plan view of a portion of the film used in this invention;
Fig. 7 is another view of a portion of the film for explaining a method embodying this invention; and
Fig. 8 is a time chart for the operation of packaging machine according to a method of this invention.

[0014] For the purpose of reference, there is schematically shown in Fig. 1 a form-fill-seal packaging machine of the so-called vertical pillow type which may incorporate the present invention. For convenience, Fig. 1 shows only relevant parts of such a machine related to its forming, filling and sealing operations. U. S. patent 5,279,098 issued January 18, 1994, for example, may be referenced for a detailed account of general structure and operations of such a machine. Fig. 2 shows schematically a control system including a computer 20 broadly described here only as having a data storing means ("memory" 21) and means for performing various operations ("operating means" 22), which may be used for such a packaging machine. A control system according to one particular embodiment of the invention is described next with reference to Fig. 3 showing its computer 10 more in detail. Figs. 1, 2 and 3 will be referenced next to explain this embodiment of the invention generally.

[0015] As shown in Fig. 1, an elongated web of flexible thermoplastic material (herein referred to as "the film") 100 unwinds from a supply roll 90, being pulled by a pair

of pull-down belts 81, and is guided by a plurality of guide rolls 91 towards a former 98 which serves to bend the film 100 into a tubular form. The pull-down belts 81 are operated by a belt-driving motor 83. A pulse generator 84 is attached to the drive shaft of this belt-driving motor 83, and the output pulse from this pulse generator 84 is adapted to be received by a film motion counter 11 of the computer 10.

[0016] After the mutually overlapping side edges of the tubularly formed film 100 is thermally sealed together by a longitudinal sealer 82 as the film 100 is pulled vertically downward along a specified film path, the tubular film 100 is sealed transversely (or horizontally) by a transverse sealer 50 which in disposed below the pull-down belts 81 and includes a pair of seal jaws 51. The pair of seal jaws 51 of the transverse sealer 50 is disposed on mutually opposite sides of the film path and is adapted to move on generally D-shaped trajectories in mutually opposite directions so as to clamp the film 100 therebetween. Each of the seal jaws 51 is rotatably supported at one end of an elongated member (referred to as "the arm") 52 adapted to rotate around an axis 59 at its other end such that both seal jaws 51 are always oriented in the same direction as they rotate around the axes 59 (for example, by means of a Schmidt coupling as illustrated in aforementioned U. S. patent 5,279,098).

[0017] The arms 52 are rotated by means of a servo motor (referred to as "the arm-rotating motor") 53, and their axes 59 are adapted to be moved horizontally towards each other or away from each other by means of another servo motor (referred to as "the axis-shifting motor") 55. Control units for these servo motors 53 and 55 are indicated by numerals 54 and 56, respectively. The computer 10 serves to control the rotary motion of the arms 52 and the distance between their axes of rotation 59 such that the seal jaws 51 undergo a rotary motion of a prescribed pattern on generally D-shaped trajectories in mutually opposite directions.

[0018] A shutter plate 57, biased horizontally by a spring, is attached to the upper surface of each seal jaw 51, and a stripping plate 58, similarly biased horizontally by a spring, is attached to the bottom surface of each seal jaw 51. After the tubular film 100 is transversely sealed to form the bottom of a bag, articles to be packaged are dropped from a hopper 96 above the former 98. Both the shutter plates 57 and the stripping plates 58 are adapted to approach the film 100, immediately before the seal jaws 51 engage each other in the next cycle to close the top of the bag, such that the film 100 will be stripped while articles belatedly dropping down from above are prevented from entering the bag being about to be clamped and sealed transversely. Although not shown, a blade is provided on one of the seal jaws 51 for cutting the film 100 horizontally across its sealed area immediately after the seal jaws 51 engage each other, thereby separating the bag which has just been filled as a finished product. The sealed area serves also as the bottom edge of the next bag to be filled with articles.

[0019] Next, an example of the method of adjusting the position of cutting the film 100 for separating a finished bag will be outlined. First, the pull-down belts 81 are started such that the film 100 begins to travel along its path, as described above. After one of the eye marks (not shown), provided at equal intervals on the film 100 as reference points, is detected by an eye mark sensor 95, the film 100 is caused by the computer 10 to advance by a provisionally specified distance before the motion of the seal jaws 51 from their provisionally specified initial positions 510 is started. The eye mark sensor 95 may be of a type serving to detect the eye marks by reflection or transmission of light. A detection signal therefrom is inputted to the computer 10 and serves as a starting time for synchronizing the motion of the film 100 and the cyclic motion of the seal jaws 51. When the seal jaws 51 are engaged together at their specified clamping position 511 and the film 100 is thereby cut by the blade to produce a dummy bag, the operation of the packaging machine is stopped and the dummy bag thus produced is examined to see whether or not the film 100 was cut at the desired cut-position. If the film 100 was cut at a position not exactly coinciding with the intended cut-position, the displacement of these two points is measured, and the provisionally set distance is changed by this distance of displacement.

[0020] The pattern of the motion (including the shape of the trajectories) of the seal jaws 51 is determined by many action parameters such as the stripping time (during which stripping is carried out prior to the closing of a bag) and the sealing time (during which a filled bag is transversely sealed). If the user wishes to change any of these action parameters, the position at which the seal jaws 51 come to engage each other, for example, can be easily determined by a calculation from known relationships. Thus, the cut-position can be adjusted also by varying the aforementioned provisionally specified distance.

[0021] As shown schematically in Fig. 3, the distance traveled by the film 100 is calculated by the film motion counter 11 from the number of rotations of the belt-driving motor 83, or the pulses from the pulse generator 84 as described above, and is received therefrom by a matching means 13 to be described below. A distance, which is intended to be traveled by the film 100 from the moment when the eye mark sensor 95 detects one of the eye marks on the film 100 until the motion of the seal jaws 51 from their initial positions 510, is inputted initially as an initial condition (in terms of number of pulses) through an input means 40 and is stored in a memory 12. The aforementioned matching means 13 is for outputting a start signal to the control unit 54 for the arm-rotating motor 53 to start the rotary motion of the seal jaws 51 from their initial positions 510 when the counted pulse number transmitted from the film motion counter 11 matches the pulse number inputted through the input means 40 and stored in the memory 12, as explained above. The angle of rotation by the arms 52 around the axes 59 as the seal

jaws 51 move from their initial positions 510 to the clamping position 511 is measured by a pulse counter 14 by the rotation of the arm-rotating motor 53. The aforementioned distance of displacement obtained by measuring on the test bag is inputted by the user also through the input means 40 and is converted into a corresponding pulse number by a calculating means 16 to be outputted to an adjusting means 17 for adjusting the initially set distance value stored in the memory 12 by adding or subtracting this distance of displacement.

[0022] The input means 40 may be used also to input various action parameters for the operation of the packaging machine as described above. The input means 40 may comprise a touch screen, adapted to selectably display different images for specifying the size of the bags to be produced and the kind of articles to be packaged. It may be adapted to allow the number N of cycles or operation (or the number of bags to be produced per unit time), the stripping distance, the length L_b of the bags to be produced and the distance L_c between an eye mark and a position for cutting the film 100 to be inputted corresponding to the kind of bags to be produced.

[0023] The angular velocity of the seal jaws 51 and their angular positions when they engage each other, calculated by the calculating means 16, are received by a parameter adjusting means 19 which serves to correct the corresponding data already stored in a pattern memory 15 by adding or subtracting corresponding correction values. A control signal is outputted from this pattern memory to the control unit 85 for the belt-driving motor 83 and also to the control unit 56 of the axis-shifting motor 55 to move the axes 59 of rotation of the arms 52 horizontally such that the seal jaws 51 will travel on trajectories of a desired shape as indicated in part by broken lines in Fig. 2.

[0024] Figs. 4 and 5 are referenced next to explain the operations for the adjustment of the cutting position more in detail. The adjustment is started by starting the belt-driving motor 83 while the seal jaws 51 are stopped at their initial positions 510 such that the film 100 begins to move along its path (Step S1). When the eye mark sensor 95 detects an eye mark on the film 100 (YES in Step S2), a detection signal is transmitted to the film motion counter 11 to start measuring the distance of travel by the film 100 thereafter by the number of pulses (Step 3).

[0025] A distance value by which the film 100 is to move during the wait time period from the moment when an eye mark on the film 100 is detected by the eye mark sensor 95 until the seal jaws 51 are to begin their rotary motion is initially stored in the memory 20 as a number of pulses and this pulse number is inputted to the matching means 13. When the pulse number representing the actual distance of travel of the film 100 received from the film motion counter 11 reaches the pulse number stored in the memory 12 (YES in step 4), the matching means 13 outputs a match signal, and the control unit 54 for the arm-rotating motor 53, in response to this match signal, causes the seal jaws 51 to start their rotary motion from their initial positions 510 (step S5). The angle of their rotary motion is monitored similarly by the number of pulses by the pulse monitor 14.

[0026] The trajectory of each seal jaw 51 is determined according to action parameters stored in the pattern memory 15. As shown in Fig. 5, the seal jaw trajectory may be divided into an accelerating part W_a, where the seal jaw 51 accelerate from the initial position 510, a preparatory part W_b where the seal jaw 51 is accelerated or decelerated to be prepared for the following stripping action, a stripping part W_c where the stripping takes place and the seal jaw 51 moves on a straight line at a constant speed twice as fast as the film speed at which the film 100 is caused to travel downward, a sealing part W_d where the film 100 remains clamped while being transversely sealed and the seal jaws travel at the same speed as the film 100, a transition part W_e where the seal jaw 51 is accelerated or decelerated to change its speed and a return part W_f where the seal jaw 51 returns to the initial position 510 at a constant speed. It now goes without saying that the aforementioned clamping position 511 at which the pair of seal jaws 51 come to be engaged with each other will shift if the distance D_1 for effecting stripping and/or the time for sealing (while the seal jaws 51 move the distance indicated by D_2 in Fig. 5) is changed.

[0027] When the seal jaws 51 reach the sealing position 511 (YES in Step S6) at the end of the stripping part W_c, the film 100 is transversely sealed while it travels on the sealing part W_d of the trajectory.

[0028] The motion of the seal jaws 51 as described above is effected according to the action parameter stored in the pattern memory 15 as described above. After a dummy bag is thus formed, the motors 83, 53 and 55 are stopped (step S8) after a specified overrun period during which the film 100 and the seal jaws 51 are allowed to move a certain extra distance before stopping (Step S7). The dummy bag thus formed is removed from the machine and examined to check if the film 100 was cut at the right cut position (Step S9),

[0029] If the user decides that there is a displacement requiring a correction (YES in Step S9), the distance by which the correction is to be made is inputted through the input means 40 to the calculating means 16 to be converted into units of pulses and is added to or subtracted from the provisionally set distance (in units of pulses) traveled by the film 100 between the times when the eye mark is detected and when the motion of the seal jaws 51 starts their motion (Step S10).

[0030] If the stripping distance D_1 is changed, depending on the kind of the articles to be packaged, or if the sealing time is changed, depending on the kind of the film 100 being used or the speed of packaging, such that the action parameters of the operation are changed (YES in step S11), the angular velocity of the seal jaws 51 between the initial position 510 and the clamping position 511, as well as the clamping position 511 itself will change. Thus, the action parameters of the arm-rotating motor 53 and the axis-shifting motor 55 are appropriately

changed accordingly (step S12).

[0031] Next, Fig. 2 is referenced to describe another aspect of the invention wherein the input means 40 is used to input not only the number N of cycles of operation, the stripping distance, the length L_b of each bag and the distance L_c between an eye mark and a position for cutting the film 100 for each of various kinds of articles to be packaged, but also parameters common to all kinds of bags to be produced, such as the distance L between where an eye mark is detected by the sensor 95 and the clamping position 511 of the seal jaws 51. Although the distance L can theoretically be calculated by the operating means 22 of the computer 20 from the design specifications of the packaging machine, there are always some deviations from the specification and, when a film is actually loaded and the machine is operated, there maybe detected a finite displacement. If this displacement is measured and the distance L is corrected by using this measured displacement value, a more precise operation of the machine becomes possible. The method for this correction is described below.

[0032] Examples of data stored in the memory 21 of the computer 20 include N, L_b and L_c, as defined above, for each kind of articles to be packaged. The distance L between where an eye mark is detected and where the film is clamped (the clamping position 511) is also stored. If the user specifies a kind of articles to be packaged through the input means 40, the corresponding data N, L_b and L_c are retrieved from the memory 21 and may be displayed on a screen (not shown) which may be a part of the input means 40.

[0033] On the basis of these retrieved data, the operating means 22 calculates various control parameters for the seal jaws 51 and the pull-down belts 81 and transmits them to the control units 54, 56 and 85 therefor. Examples of these control parameters include the initial position 510 of the seal jaws 51, their angular velocities in various parts W_a-W_f of their trajectory as they undergo a cyclic motion and the distance between the axes 59 in each of these trajectory parts W_a-W_f. These parameters are calculated according to the selected bag size and the speed of operation.

[0034] The initial position 510 is determined such that the seal jaw 51 starting to move therefrom and the cut-position on the film 100 being transported will come together at the clamping position 511 at the same time. Let T denote the time required for the seal jaw 510 to reach the clamping position after starting to move from the initial position 510 when an eye mark is detected. Since this is also the time during which a cut-position on the film 100 must reach the clamping position 511, the following condition must be satisfied

$$X = TV = L - nL_b + L_c$$

(as shown in Fig. 6 wherein eye marks and cut-positions on the film 100 are indicated by numerals 101 and 102, respectively) where L is as defined above, X is the distance traveled by the film 100 in this time interval T, V is the constant speed at which the film 100 is pulled by the pull-down belts 81, and n is an integer representing the number of bags to be made from the portion of the film 100 of length L. The initial positions 510 of the seal jaws 51 are thus determined.

[0035] If the value or L in the above equation is not known accurately, it can be ascertained as follows. First, the seal jaws 51 are started from provisionally selected starting positions when an eye mark on the film 100 is detected. Let t and x respectively denoted the time required for the seal jaws 51 to reach the clamping position 511 and the distance traveled by the film 100 in the meantime. After the film 100 has traveled by the distance x, it is clamped, sealed and cut to produce a test bag, as shown in Fig. 7. If the position at which the film was cut is displaced from the intended cut-ting position, this displacement e is measured and inputted through the input means 40. Corrections on t and x are made according to the following equations by the operating means 22:

$$T = t \pm e/V,$$

$$X = x \pm e.$$

The value of L is obtained therefrom as follows:

$$L = X - L_c + nL_b$$

and these corrected values are stored in the memory 21.

[0036] The operations described above will be explained next with reference to the timing chart of Fig. 8. When the user specifies a kind of articles to be packaged through the input means 40, the corresponding bag size and conditions for the operation of the packaging machine are retrieved from the memory 21, displayed on a screen of the input means 40 and transmitted to the operating means 22. The operating means 22 use these data to calculate various parameters for the operations of the packaging machine, including the determination of the initial positions 510 for the seal jaws 510.

[0037] After this preliminary preparation is completed, the user presses a start button (not shown) and causes the computer 20 to transmit start signals to the control units 85, 54 and 56. The pull-down belts 81 begin to rotate and the film 100 is advanced along its path. The distance traveled by the film 100 is monitored by the film motion counter 11. As soon as an eye mark 101 is detected by the eye mark sensor 95, a detection signal is outputted therefrom and the film motion counter 11 is thereby reset, starting its counting of pulses from the pulse generator 84. At the same time, the seal jaws 51 begin their rotary

motion and reach the clamping position 511 after time T. In the meantime, a cut-position 103 on the film 101 also reaches the clamping position 511, meeting the seal jaws 51 at the same time, and the film 100 is cut there to form a bag.

[0038] This cycle of operations is repeated every time one of the eye marks 101 ic detected by the eye mark sensor 95.

[0039] The invention was described above more or less in general terms with reference to only a limited number of embodiments. A few specific examples of packaging machines will be described next for better understanding of the invention.

[0040] A first example of packaging machine according to this invention may be characterized as being adapted to cause the seal jaws 51 to clamp the film 100 after the film 100 is caused to travel a specified distance from the moment an eye mark is detected, and the memory 21 stores L_b, L_c and L such that the timing for the clamping by the seal jaws 51 is controlled according to the aforementioned specified distance.

[0041] A second example of packaging machine may characterized as being adapted to cause the seal jaws 51 to clamp the film 100 after the film 100 is caused to travel for a specified length of time from the moment an eye mark is detected, and the memory 21 stores not only L_b, L_c and L but also the number N of bag to be produced per unit time. The speed of the film 100 is obtained as NL_b such that the timing for the clamping by the seal jaws 51 is controlled according to the aforementioned specified length of time.

[0042] A third example of packaging-machine may be characterized as being adapted to cause the seal jaws 51 to clamp the film after the film 100 is caused to travel under a specified condition ("travel condition") such as only over a specified distance or for a specified length of time, and the memory 21 stores for each of various kinds of articles to be packages corresponding values of N, L_b and L_c, as well as L in common for all kinds of articles. The input means 40 allows the user to specify one of these kinds and data corresponding to the specified kind of articles are similarly retrieved from the memory 21 and the operating means 22 uses these data to calculate the aforementioned travel condition, controlling the timing for the clamping by the seal jaws 51 according to this travel condition.

[0043] Any of these examples can be further adapted such that the value of L defined above can be accurately determined even where its value is initially not accurately known, as explained above. They can also be further adapted to adjust the control mode of operation according to a specified mode of stripping or sealing time.

Claims

1. A packaging machine comprising a pull down belt (81) for causing an elongated film (100) having detectable eye marks (101) thereon to travel continuously along a path, a belt driving motor (83) operating the pull down belt (81), a pair of seal jaws(51) for moving cyclically to clamp and cut the film (100) transversely to form separated bags, arms (52) for rotatably supporting the seal jaws (51), an arm-rotating motor (53) rotating the arms (52), and a detector (95) for detecting the eye marks (101), a cut position adjusting device comprising:

a memory (21) for storing a travel condition defining a distance of travel by the film (100) along the path or a time of travel by the film (100) along the path, from when one of the eye marks (101) is detected by the detector (95) until the seal jaws (51) are to start moving;
input means (40) for inputting the position along the film (100) where the film (100) was cut between the seal jaws (51); and
control means (17, 19, 54) for controlling movement of the seal jaws (51) so as to start movement of the seal jaws (51) when the travel condition is satisfied, **characterised in that**
the control means (17,19,54) is adapted to count a pulse number (a) corresponding to a number of rotations or a number of pulses of the belt driving motor (83) based on a distance of travel of the film by the pull-down belt;
to count a pulse number (b) based on an angle of rotary motion by the arms (52) for supporting the seal jaws (51);
to convert a displacement of the cut-position inputted through the input means (40) into a corresponding pulse number;
and to adjust the travel condition by adding or subtracting correction values based on the distance of the displacement.

2. A packaging machine according to claim 1, further comprising:

a former (98) for bending the film (100) into a tubular form;
a longitudinal sealer (82) for sealing together side edges of the tubularly formed film (100) longitudinally; wherein the seal jaws (51) are provided by a transverse sealer (50) operating cyclically and in which the pair of sealing jaws (51) clamp the film (100) from opposite sides of said path at a clamping position (511) and cut the film at a cut-position (102) on the film;
and wherein the memory (21) stores data including a specified length (L_b) of bags to be made, distance (L_c) along the film (100) between the eye mark (101) and the cut-position (102), and film length (L) between said detection position and the clamping position (511); and wherein the control means (17,19,54) is adapted to cal-

culate a travel condition defining a distance of travel by the film (100) along the path or a time of travel by the film (100) along the path from said data and to control timing of motion of said jaws (51) such that the film (100) is clamped by said seal jaws (51) exactly when the film (100) has travelled said calculated travel distance from when said detector detects an eye mark (101) on the film (100) to thereby form a bag with said specified length.

3. The packaging machine of claim 2, wherein said control means (17,19,54) further serves:

to cause a dummy bag to be formed by feeding the film (100) until a provisionally set condition is met after an eye mark (101) is detected by said detector (95);
to correct said provisionally set condition to obtain a corrected condition according to position at which the film (100) was cut to form the dummy bag;
to calculate a revised film length (L) between said detection position and the clamping position (511) from said corrected condition, a number of cycles said transverse sealer (50) is operated per unit time, the specified length (L_b) of bags to be made which length (L_b) is stored in said memory (21) and the distance (L_c) on the film (100) between the eye mark (101) and the cut-position (102) which distance (L_c) is stored in said memory (21); and
to store said revised film length (L) in said memory (21).

4. The packaging machine of claim 2 or claim 3, wherein said control means (17,19,54) further serves to change said calculated travel condition according to inputted action data including time length for sealing and distance over which stripping is carried out.

5. A packaging machine according to any of claims 2 to 4, wherein:

the memory (21) is adapted to store data for each of different kinds of articles to be packaged, said data including a number of cycles said transverse sealer (50) is operated per unit time, a specified length (L_b) of bags to be made, and distance (L_c) on the film (100) between the eye mark (101) and the cut-position (102), said memory (21) further serving to store film length (L) between said detection position and the clamping position (511);
the input means (40) allowing any of said different kinds of articles to be specified; and the control means (17,19,54) being adapted to calculate the travel condition from the data corresponding to one of the kinds of articles specified through said input means (40) and the stored film length in said memory (21) and to control timing of said jaws (51) such that the film (100) is clamped by said seal jaws (51) exactly when the film (100) has travelled until said travel condition becomes satisfied after said detector (95) detects an eye mark (101) on the film (100) to thereby form a bag with said specified length.

6. The packaging machine of claim 1, wherein the distance of displacement is a distance between the intended cut position and an actual cut position obtained by forming and measuring a dummy bag.

7. The packaging machine of claim 1, wherein the control means is adapted to output a signal to the arm-rotating motor (53) for starting rotary motion of the seal jaws (51) from an initial position, when a counted pulse number (a) based on a distance actually traveled by the film (100) matches a pulse number (a) based on the distance traveled by the film stored in the memory (12).

8. The packaging machine of claim 1, wherein the control means is adapted to measure pulse numbers (b) based on an angle of rotation by the arms (52) as the seal jaws (51) move from the initial position to a clamping position by the rotation of the arm-rotating motor (53).

9. The packaging machine of claim 4, wherein the control means is adapted to control the clamping position (511) and an angular velocity of the sealing jaws between the initial position (510) and the clamping position (511) based on the travel condition.

10. The packaging machine of claim 1, further comprising an axis-shifting motor (55) for moving horizontally towards each other or away from each other axes about which the arms (52) are rotated, wherein the control means is adapted to control the arm-rotating motor (53) and the axis-shifting motor (55) such that the seal jaws (51) undergo a rotary motion on D-shaped trajectories in mutually opposite directions.

11. A method of operating a packaging machine comprising a pull down belt (81) for causing an elongated film (100) having detectable eye marks (101) thereon to travel continuously along a path, a belt driving motor (83) operating the pull down belt (81), a pair of seal jaws (51) for moving cyclically to clamp and cut the film (100) transversely to form separated bags, arms (52) for rotatably supporting the seal jaws (51), an arm-rotating motor (53) rotating the arms (52), and a detector (95) for detecting the eye marks (101), a cut position adjusting device comprising:

a memory (21) for storing a travel condition defining a distance of travel by the film (100) along the path or a time of travel by the film (100) along the path, from when one of the eye marks (101) is detected by the detector (95) until the seal jaws (51) are to start moving;
input means (40) for inputting the position along the film (100) where the film (100) was cut between the seal jaws (51); and
control means (17, 19, 54) for controlling movement of the seal jaws (51) so as to start movement of the seal jaws (51) when the travel condition is satisfied, the method comprising operating the control means (17,19,54) to count a pulse number (a) corresponding to a number of rotations or a number of pulses of the belt driving motor (83) based on a distance of travel of the film by the pull-down belt;
to count a pulse number (b) based on an angle of rotary motion by the arms (52) for supporting the seal jaws (51);
to convert a displacement of the cut-position inputted through the input means (40) into a corresponding pulse number;
and to adjust the travel condition by adding or subtracting correction values based on the distance of the displacement.

Patentansprüche

1. Verpackungsmaschine mit einem Herunterziehband (81) zum Bewirken, dass eine gestreckte Folie (100) mit erfassbaren Augenmarkierungen (101) darauf fortlaufend entlang eines Pfads fährt, einem Bandantriebsmotor (83), der das Herunterziehband (81) betreibt, einem Paar von Dichtbacken (51) zum zyklischen Bewegen, um die Folie (100) quer einzuklemmen und zu schneiden, um getrennte Beutel auszubilden, Armen (52) zum drehenden Stützen der Dichtbacken (51), einem armdrehenden Motor (53), der die Arme (52) dreht und einem Erfassungsgerät (95) zum Erfassen der Augenmarkierungen (101), einer Vorrichtung zum Anpassen einer Schneideposition mit:

einem Speicher (21) zum Speichern einer Fahrtbedingung, die eine Fahrstrecke von der Folie (100) entlang dem Pfad oder eine Fahrzeit von der Folie (100) entlang dem Pfad definiert, von wenn eine der Augenmarkierungen (101) von dem Erfassungsgerät (95) erfasst ist bis die Dichtbacken (51) beginnen sollen sich zu bewegen;
einer Eingabeeinrichtung (40) zum Eingeben der Position entlang der Folie (100), wo die Folie (100) zwischen den Dichtbacken (51) geschnitten wurde; und
einer Steuerungseinrichtung (17, 19, 54) zum Steuern einer Bewegung der Dichtbacken (51), so dass sie eine Bewegung der Dichtbacken (51) beginnt, wenn die Fahrbedingung erfüllt ist,
dadurch gekennzeichnet, dass
die Steuerungseinrichtung (17, 19, 54) angepasst ist, eine Pulszahl (a) zu zählen, die einer Zahl von Umdrehungen oder einer Zahl von Pulsschlägen des Bandantriebsmotors (83) basierend auf einer Fahrstrecke der Folie durch das Herunterziehband entspricht;
eine Pulsschlagzahl (b) basierend auf einem Winkel einer Rotationsbewegung von den Armen (52) zum Stützen der Dichtbacken (51) zu zählen;
einen Versatz von der durch die Eingabeeinrichtung (40) eingegebene Schneideposition in eine entsprechende Pulsschlagzahl umzuwandeln;
und die Fahrbedingung durch Addieren oder Subtrahieren von Korrekturwerten basierend auf der Strecke des Versatzes anzupassen.

2. Verpackungsmaschine nach Anspruch 1, ferner mit:

einem Former (98) zum Krümmen der Folie in eine Röhrenform;
einem länglichen Dichter (82) zum länglichen zusammendichten von Seitenrändern der rohrförmigen Folie (100); wobei die Dichtbacken (51) von einem Querdichtgerät (50) bereitgestellt sind, der zyklisch in Betrieb ist und in dem das Paar von Dichtbacken (51) die Folie (100) von entgegengesetzten Seiten des Pfads an einer Klemmposition (511) klemmen und die Folie an einer Schneideposition (102) auf der Folie schneiden;
und wobei der Speicher (21) Daten speichert, die eine bestimmte Länge (Lb) von herzustellenden Beuteln, eine Strecke (Lc) entlang der Folie (100) zwischen der Augenmarkierung (101) und der Schneideposition (102) und eine Folienlänge (L) zwischen der Erfassungsposition und der Klemmposition (511) enthalten; und wobei die Steuerungseinrichtung (17, 19, 54) angepasst ist, eine Fahrbedingung zu berechnen, die eine Fahrstrecke von der Folie (100) entlang dem Pfad oder eine Fahrzeit von der Folie (100) entlang dem Pfad von den Daten definiert, und einen Bewegungszeitpunkt der Bakken (51) zu steuern, so dass die Folie (100) von den Dichtbacken (51) geklemmt ist, genau wenn die Folie (100) die berechnete Fahrstrecke gefahren ist, von wenn das Erfassungsgerät eine Augenmarkierung (101) auf der Folie (100) erfasst, um dadurch einen Beutel mit der bestimmten Länge auszubilden.

3. Verpackungsmaschine nach Anspruch 2, wobei die

Steuerungseinrichtung (17, 19, 54) ferner dazu dient:

zu bewirken, dass ein Dummybeutel ausgebildet wird, indem die Folie (100) zugeführt wird bis eine provisorisch festgesetzte Bedingung erfüllt ist, nachdem eine Augenmarkierung (101) von dem Erfassungsgerät (95) erfasst ist;
die provisorisch festgesetzte Bedingung zu korrigieren, um eine korrekte Bedingung entsprechend einer Position zu erhalten, an der die Folie (100) geschnitten wurde, um den Dummybeutel auszubilden;
eine überprüfte Folienlänge (L) zwischen der Erfassungsposition und der Klemmposition (511) von der korrigierten Bedingung, eine Zahl von Zyklen, die das Querdichtgerät (50) pro Zeiteinheit betrieben wird, die bestimmte Länge (Lb) von herzustellenden Beuteln, welche Länge (Lb) in dem Speicher (21) gespeichert ist, und die Strecke (Lc) auf der Folie (100) zwischen der Augenmarkierung (101) und der Schneideposition (102), welche Strecke (Lc) in dem Speicher (21) gespeichert wird, zu berechnen; und
die überprüfte Folienlänge (L) in dem Speicher (21) zu speichern.

4. Verpackungsmaschine nach Anspruch 2 oder Anspruch 3, wobei die Steuerungseinrichtung (17, 19, 54) ferner dazu dient, die berechnete Fahrbedingung entsprechend eingegebenen Aktionsdaten, einschließlich einer Zeitdauer zum Dichten und einer Strecke, über die ein Abziehen ausgeführt wird, zu ändern.

5. Verpackungsmaschine nach einem der Ansprüche 2 bis 4, wobei:

der Speicher (21) angepasst ist, Daten für jede von verschiedenen Arten von zu verpackenden Artikeln zu speichern, wobei die Daten eine Zahl an Zyklen, die das Querdichtgerät (50) pro Zeiteinheit betrieben wird, eine bestimmte Länge (Lb) von herzustellenden Beuteln und eine Strecke (Lc) auf der Folie (100) zwischen der Augenmarkierung (101) und der Schneideposition (102) einschließt, wobei der Speicher (21) ferner dazu dient, eine Folienlänge (L) zwischen der Erfassungsposition und der Klemmposition (511) zu speichern;
die Eingabeeinrichtung (40) es erlaubt, dass jeder von den verschiedenen Arten von Artikeln bestimmt wird; und die Steuerungseinrichtung (17, 19, 54) angepasst ist, die Fahrbedingung von den Daten zu berechnen, die einem von den Arten von Artikeln entsprechen, die durch die Eingabeeinrichtung (40) und die gespeicherte Folienlänge in dem Speicher (21) bestimmt sind, und einen Zeitpunkt der Backen (51) so zu steuern, dass die Folie (100) von den Bakken (51) geklemmt wird, genau wenn die Folie (100) gefahren ist, bis die Fahrbedingung erfüllt wird, nachdem das Erfassungsgerät (95) eine Augenmarkierung (101) auf der Folie (100) erfasst, um dadurch einen Beutel mit der bestimmten Länge auszubilden.

6. Verpackungsmaschine nach Anspruch 1, wobei die Strecke eine Versatzes eine Strecke zwischen der beabsichtigten Schneideposition und der eigentlichen Schneideposition, die durch Ausbilden und Messen eines Dummybeutels erhalten wird, ist.

7. Verpackungsmaschine nach Anspruch 1, wobei die Steuerungseinrichtung angepasst ist, ein Signal zu dem armdrehenden Motor (53) auszugeben, um eine Drehbewegung der Dichtbakcen (51) von einer Anfangsposition zu starten, wenn eine gezählte Pulszahl (a), basierend auf eine Strecke, die eigentlich von der Folie (100) gefahren ist, mit einer Pulszahl (a), basierend auf die in dem Speicher (12) gespeicherte Strecke, die von der Folie gefahren ist, übereinstimmt.

8. Verpackungsmaschine nach Anspruch 1, wobei die Steuerungseinrichtung angepasst ist, Pulszahlen (b) zu messen basierend auf einem Drehwinkel von den Armen (52), sobald die Dichtbaken (51) sich von der Anfangsposition zu einer Klemmposition mittels der Drehung des Armdrehmotors (53) bewegen.

9. Verpackungsmaschine nach Anspruch 4, wobei die Steuerungseinrichtung angepasst ist, die Klemmposition (511) und eine Winkelgeschwindigkeit der Dichtbacken zwischen der Anfangsposition (510) und der Klemmposition (511) basierend auf die Fahrbedingung zu steuern.

10. Verpackungsmaschine nach Anspruch 1, ferner mit einem Achsenschaltmotor (55) zum horizontalen Bewegen zueinander oder voneinander weg Achsen, um die die Arme (52) gedreht werden, wobei die Steuerungseinrichtung angepasst ist, den armdrehenden Motor (53) und den Achsenschaltmotor (55) so zu steuern, dass die Dichtbacken (51) eine Drehbewegung auf D-förmigen Bahnen in gegenseitig entgegengesetzten Richtungen durchlaufen.

11. Betriebsverfahren einer Verpackungsmaschine mit einem Herunterziehband (81) zum Bewirken, dass eine gestreckte Folie (100) mit erfassbaren Augenmarkierungen (101) darauf fortlaufend entlang eines Pfads fährt, einem Bandantriebsmotor (83), der das Herunterziehband (81) betreibt, einem Paar von Dichtbacken (51) zum zyklischen Bewegen, um die Folie (100) quer einzuklemmen und zu schneiden,

um getrennte Beutel auszubilden, Armen (52) zum drehenden Stützen der Dichtbakken (51), einem armdrehenden Motor (53), der die Arme (52) dreht und einem Erfassungsgerät (95) zum Erfassen der Augenmarkierungen (101), einer Vorrichtung zum Anpassen einer Schneideposition mit:

einem Speicher (21) zum Speichern einer Fahrtbedingung, die eine Fahrstrecke von der Folie (100) entlang dem Pfad oder eine Fahrzeit von der Folie (100) entlang dem Pfad definiert, von wenn eine der Augenmarkierungen (101) von dem Erfassungsgerät (95) erfasst ist bis die Dichtbacken (51) beginnen sollen sich zu bewegen;
einer Eingabeeinrichtung (40) zum Eingeben der Position entlang der Folie (100), wo die Folie (100) zwischen den Dichtbacken (51) geschnitten wurde; und
einer Steuerungseinrichtung (17, 19, 54) zum Steuern einer Bewegung der Dichtbacken (51), so dass sie eine Bewegung der Dichtbacken (51) beginnt, wenn die Fahrbedingung erfüllt ist, wobei das Verfahren ein Betreiben der Steuerungseinrichtung (17, 19, 54) aufweist, um eine Pulszahl (a) zu zählen, die einer Zahl von Umdrehungen oder einer Zahl von Pulsschlägen des Bandantriebsmotors (83) basierend auf einer Fahrstrecke der Folie durch das Herunterziehband entspricht;
eine Pulsschlagzahl (b) basierend auf einem Winkel einer Drehbewegung von den Armen (52) zum Stützen der Dichtbacken (51) zu zählen;
einen Versatz von der durch die Eingabeeinrichtung (40) eingegebene Schneideposition in eine entsprechende Pulsschlagzahl umzuwandeln;
und die Fahrbedingung durch Addieren oder Subtrahieren von Korrekturwerten basierend auf der Strecke des Versatzes anzupassen.

Revendications

1. Machine d'emballage comprenant une courroie de descente (81) pour faire se déplacer un film de forme allongée (100) portant des repères détectables (101) de façon continue le long d'un chemin, un moteur d'entraînement de courroie (83) qui actionne la courroie de descente (81), une paire de mâchoires de scellement (51) destinées à se déplacer de façon cyclique pour pincer et couper le film (100) transversalement afin de former des sachets séparés, des bras (52) pour supporter à rotation les mâchoires de scellement (51), un moteur de rotation de bras (53) qui fait tourner les bras (52), et un détecteur (95) pour détecter les repères (101), un dispositif de réglage de position de coupe comprenant :

une mémoire (21) pour stocker une condition de déplacement définissant une distance de déplacement par le film (100) le long du chemin ou un temps de déplacement par le film (100) le long du chemin, de l'instant où l'un des repères (101) est détecté par le détecteur (95) jusqu'au moment où les mâchoires de scellement (51) doivent commencer à se déplacer ;
un moyen d'entrée (40) pour entrer la position le long du film (100) où le film (100) a été coupé entre les mâchoires de scellement (51) ; et
un moyen de commande (17, 19, 54) pour commander le mouvement des mâchoires de scellement (51) afin de démarrer le mouvement des mâchoires de scellement (51) quand la condition de déplacement est satisfaite, **caractérisée en ce que**
le moyen de commande (17, 19, 54) est adapté pour compter un nombre d'impulsions (a) qui correspond à un nombre de rotations ou à un nombre d'impulsions du moteur d'entraînement de courroie (83) basé sur une distance de déplacement du film par la courroie de descente ;
pour compter un nombre d'impulsions (b) basé sur un angle de mouvement rotatif des bras (52) pour supporter les mâchoires de scellement (51) ;
pour convertir un déplacement de la position de coupe entré par l'intermédiaire du moyen d'entrée (40) en un nombre d'impulsions correspondant ;
et pour ajuster la condition de déplacement en ajoutant ou en soustrayant des valeurs de correction basées sur la distance de déplacement.

2. Machine d'emballage selon la revendication 1, comprenant en outre :

une forme (98) pour donner au film (100) une forme tubulaire ;
un dispositif de scellement longitudinal (82) pour sceller ensemble longitudinalement les bords latéraux du film mis sous forme tubulaire (100) ;
dans lequel les mâchoires de scellement (51) sont fournies par un dispositif de scellement transversal (50) qui agit de façon cyclique et dans lequel les deux mâchoires de scellement (51) pincent le film (100) depuis des côtés opposés dudit chemin en une position de pincement (511) et coupent le film en une position de coupe (102) sur le film ;
et dans laquelle la mémoire (21) stocke des données comprenant une longueur précisée (L_b) de sachets à réaliser, une distance (L_c) le long du film (100) entre le repère (101) et la position de coupe (102), et une longueur de film (L) entre ladite position de détection la position de pincement (511) ; et dans laquelle le moyen de com-

mande (17, 19, 54) est adapté pour calculer une condition de déplacement qui définit une distance de déplacement du film (100) le long du chemin ou un temps de déplacement du film (100) le long du chemin à partir desdites données et pour commander le minutage du mouvement desdites mâchoires (51) de telle manière que le film (100) est pincé par lesdites mâchoires de scellement (51) exactement quand le film (100) a parcouru ladite distance de déplacement calculée à partit du moment où ledit détecteur détecte un repère (101) sur le film (100) pour former de ce fait un sachet ayant ladite longueur précisée.

3. Machine d'emballage selon la revendication 2, dans laquelle ledit moyen de commande (17, 19, 54) sert en outre :

à provoquer la formation d'un sachet factice en faisant avancer le film (100) jusqu'à ce qu'une condition établie au préalable soit vérifiée après la détection d'un repère (101) par ledit détecteur (95) ;
à corriger ladite condition établie au préalable pour obtenir une condition corrigée selon la position à laquelle le film (100) a été coupé pour former le sachet factice ;
à calculer une longueur de film révisée (L) entre ladite position de détection et la position de pincement (511) à partir de ladite condition corrigée, un nombre de cycles où ledit dispositif de scellement transversal (50) est actionné par unité de temps, la longueur précisée (L_b) de sachets à réaliser, laquelle longueur (L_b) est stockée dans ladite mémoire (21) et la distance (L_c) sur le film (100) entre le repère (101) et la position de coupe (102), laquelle distance (L_c) est stockée dans ladite mémoire (21) ; et
à stocker ladite longueur de film révisée (L) dans ladite mémoire (21).

4. Machine d'emballage selon la revendication 2 ou 3, dans laquelle ledit moyen de commande (17, 19, 54) sert en outre à changer ladite condition de déplacement calculée selon des données d'action entrées incluant une durée pour sceller et une distance sur laquelle un enlèvement est effectué.

5. Machine d'emballage selon l'une quelconque des revendications 2 à 4, dans laquelle :

la mémoire (21) est adaptée pour stocker des données pour chacune de différentes sortes d'articles à emballer, lesdites données comprenant un nombre de cycles où ledit dispositif de scellement transversal (50) est actionné par unité de temps, une longueur précisée (L_b) de sachets à réaliser, et la distance (L_c) sur le film (100) entre le repère (101) et la position de coupe (102), ladite mémoire (21) servant en outre à stocker la longueur de film (L) entre ladite position de détection et la position de pincement (511) ;
le moyen d'entrée (40) permettant à n'importe laquelle des différentes sortes d'articles d'être précisée ; et le moyen de commande (17, 19, 54) étant adapté pour calculer la condition de déplacement à partir des données correspondant à l'une des sortes d'articles précisées par l'intermédiaire dudit moyen d'entrée (40) et la longueur de film stockée dans ladite mémoire (21) et pour commander le minutage desdites mâchoires (51) de telle manière que le film (100) est pincé par lesdites mâchoires de scellement (51) exactement quand le film (100) s'est déplacé jusqu'à vérifier ladite condition de déplacement après la détection d'un repère (101) sur le film (100) par ledit détecteur (95) pour former de ce fait un sachet ayant ladite longueur précisée.

6. Machine d'emballage selon la revendication 1, dans laquelle la distance de déplacement est une distance entre la position de coupe voulue et une position de coupe réelle obtenue en formant et en mesurant un sachet factice.

7. Machine d'emballage selon la revendication 1, dans laquelle le moyen de commande est adapté pour transmettre un signal au moteur de rotation de bras (53) pour démarrer le mouvement de rotation des mâchoires de scellement (51) à partir d'une position initiale, quand un nombre d'impulsions comptées (a) basé sur une distance réellement parcourue par le film (100) est égal à un nombre d'impulsions (a) basé sur la distance parcourue par le film stockée en mémoire (12).

8. Machine d'emballage selon la revendication 1, dans laquelle le moyen de commande est adapté pour mesurer des nombres d'impulsions (b) basés sur un angle de rotation des bras (52) pendant que les mâchoires de scellement (51) se déplacent de la position initiale vers une position de pincement par la rotation du moteur de rotation de bras (53).

9. Machine d'emballage selon la revendication 4, dans laquelle le moyen de commande est adapté pour commander la position de pincement (511) et une vitesse angulaire des mâchoires de scellement entre la position initiale (510) et la position de pincement (511) basée sur la condition de déplacement.

10. Machine d'emballage selon la revendication 1, comprenant en outre un moteur de décalage d'axes (55) pour rapprocher ou éloigner horizontalement l'un de

l'autre des axes autour desquels on fait tourner les bras (52), dans laquelle le moyen de commande est adapté pour commander le moteur de rotation de bras (53) et le moteur de décalage d'axes (55) de telle manière que les mâchoires de scellement (51) subissent un mouvement de rotation sur des trajectoires en D dans des directions mutuellement opposées.

11. Procédé de mise en oeuvre d'une machine d'emballage comprenant une courroie de descente (81) pour faire se déplacer un film de forme allongée (100) portant des repères détectables (101) de façon continue le long d'un chemin, un moteur d'entraînement de courroie (83) qui actionne la courroie de descente (81), une paire de mâchoires de scellement (51) destinées à se déplacer de façon cyclique pour pincer et couper le film (100) transversalement afin de former des sachets séparés, des bras (52) pour supporter à rotation les mâchoires de scellement (51), un moteur de rotation de bras (53) qui fait tourner les bras (52), et un détecteur (95) pour détecter les repères (101), un dispositif de réglage de position de coupe comprenant :

une mémoire (21) pour stocker une condition de déplacement définissant une distance de déplacement par le film (100) le long du chemin ou un temps de déplacement par le film (100) le long du chemin, de l'instant où l'un des repères (101) est détecté par le détecteur (95) jusqu'au moment où les mâchoires de scellement (51) doivent commencer à se déplacer ;
un moyen d'entrée (40) pour entrer la position le long du film (100) où le film (100) a été coupé entre les mâchoires de scellement (51) ; et
un moyen de commande (17, 19, 54) pour commander le mouvement des mâchoires de scellement (51) afin de démarrer le mouvement des mâchoires de scellement (51) quand la condition de déplacement est satisfaite, le procédé comprenant l'utilisation du moyen de commande (17, 19, 54) pour compter un nombre d'impulsions (a) qui correspond à un nombre de rotations ou à un nombre d'impulsions du moteur d'entraînement de courroie (83) basé sur une distance de déplacement du film par la courroie de descente ;
pour compter un nombre d'impulsions (b) basé sur un angle de mouvement rotatif des bras (52) pour supporter les mâchoires de scellement (51) ;
pour convertir un déplacement de la position de coupe entré par l'intermédiaire du moyen d'entrée (40) en un nombre d'impulsions correspondant ;
et pour ajuster la condition de déplacement en ajoutant ou en soustrayant des valeurs de correction basées sur la distance de déplacement.

Fig.1.

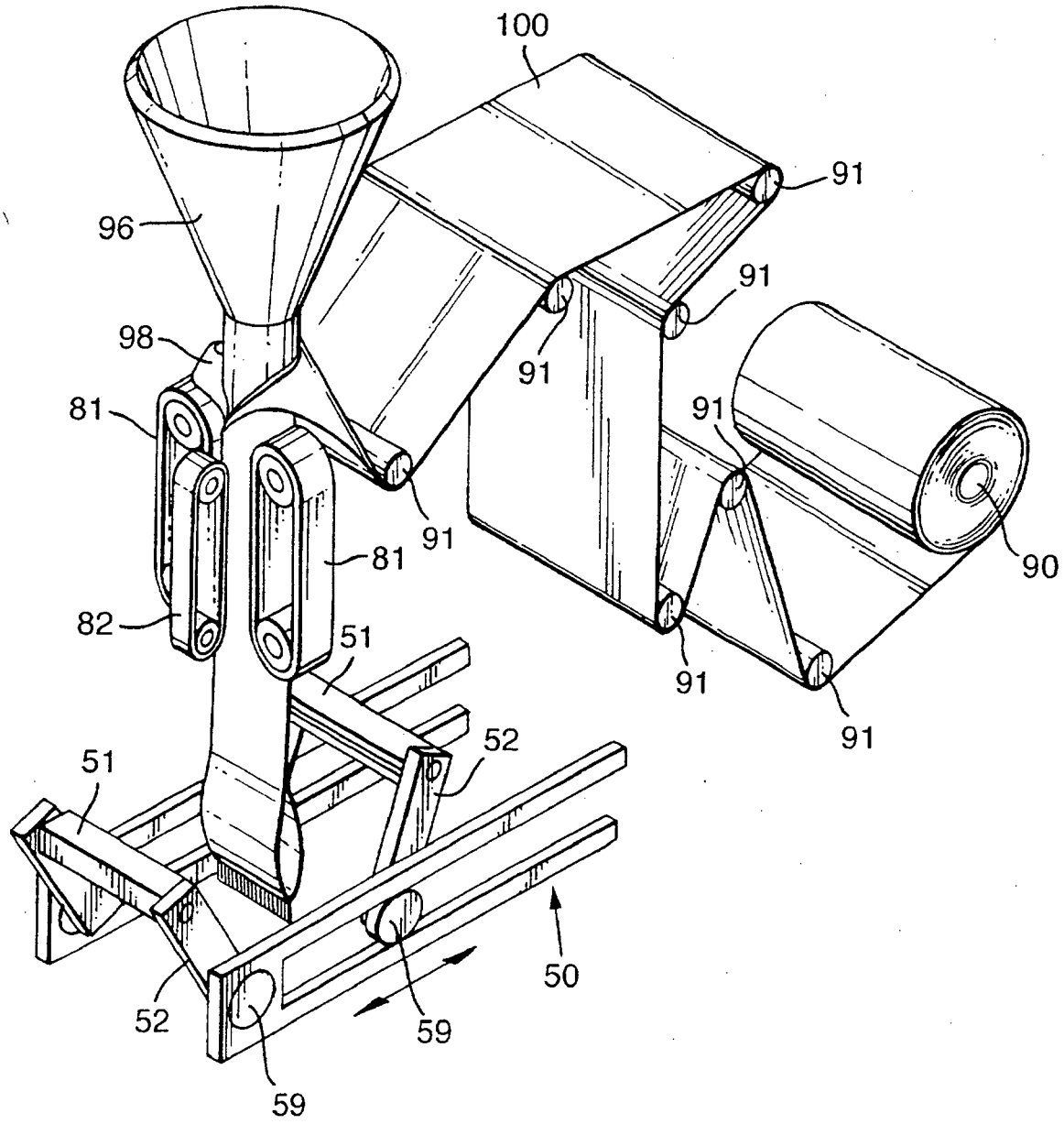


Fig.2.

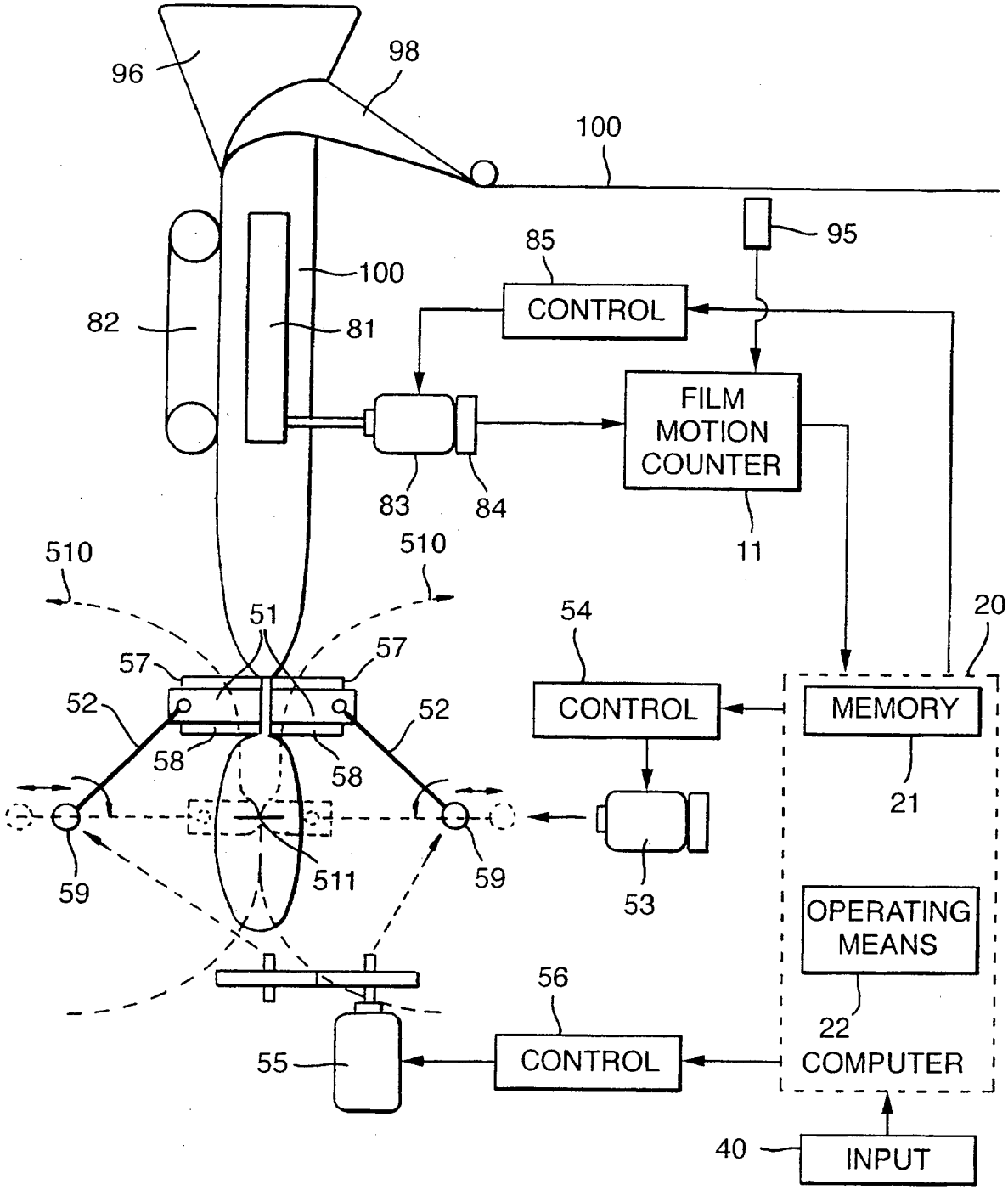

96
98
100
95
85
CONTROL
100
82
81
FILM
MOTION
COUNTER
83
84
11
510
510
51
54
20
57
57
52
52
CONTROL
MEMORY
58
58
21
59
511
59
53
OPERATING
MEANS
56
22
55
CONTROL
COMPUTER
40
INPUT

Fig.3.

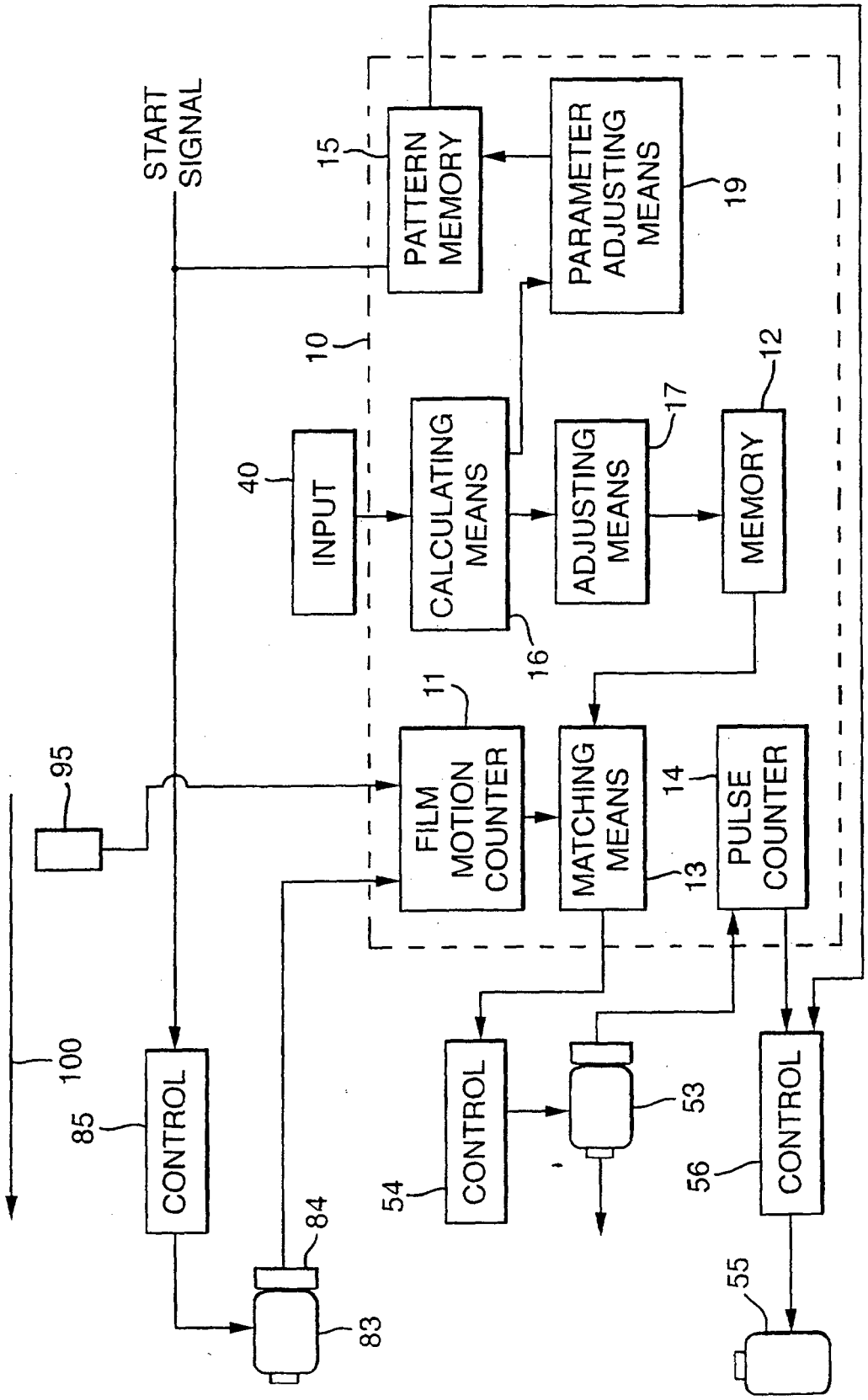

START SIGNAL
PATTERN MEMORY
15
PARAMETER ADJUSTING MEANS
19
10
INPUT
40
CALCULATING MEANS
16
ADJUSTING MEANS
17
MEMORY
12
FILM MOTION COUNTER
11
MATCHING MEANS
13
PULSE COUNTER
14
95
100
85
CONTROL
84
83
54
CONTROL
53
56
CONTROL
55

Fig.4.

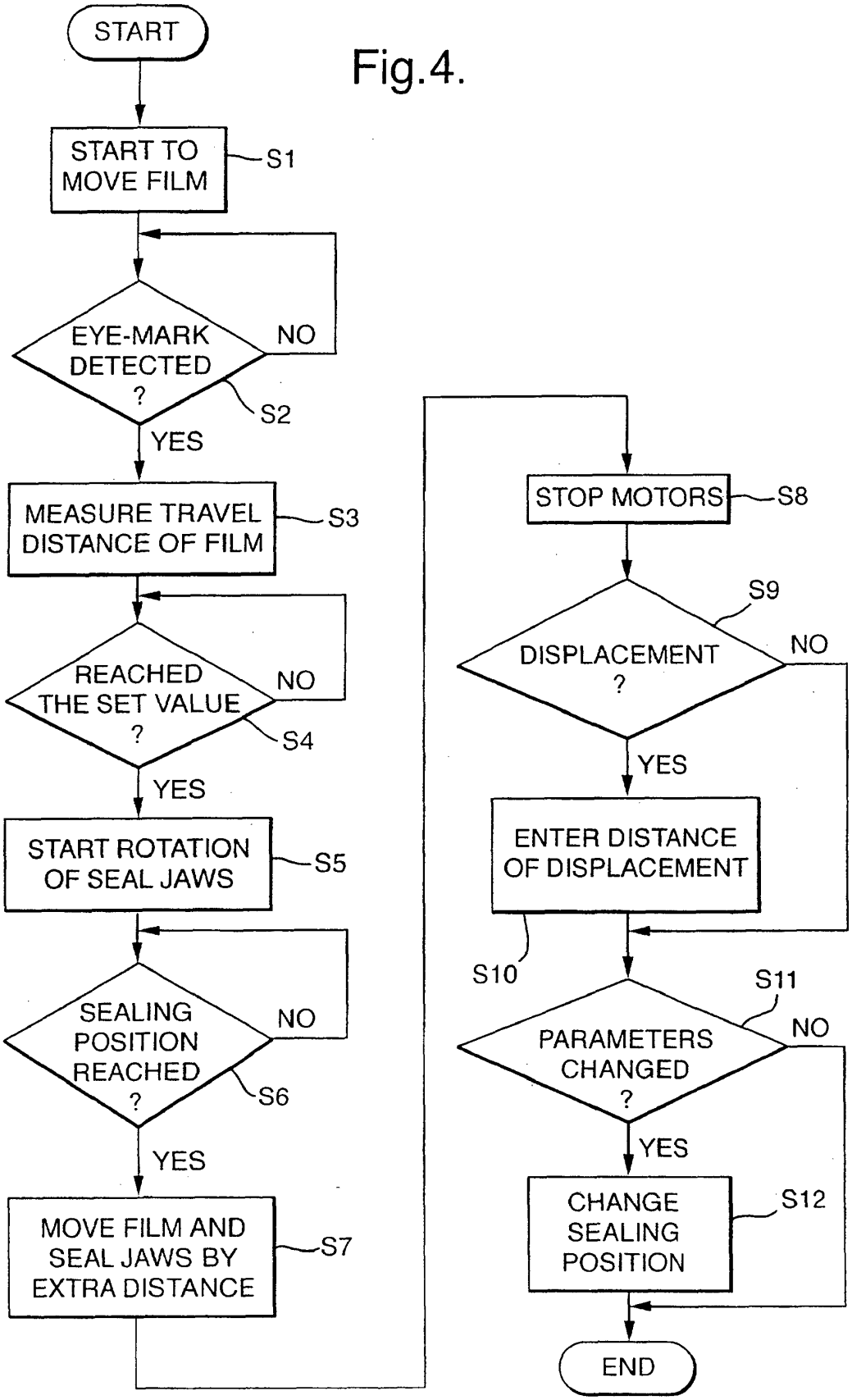

START
START TO MOVE FILM
S1
EYE-MARK DETECTED ?
NO
S2
YES
MEASURE TRAVEL DISTANCE OF FILM
S3
REACHED THE SET VALUE ?
NO
S4
YES
START ROTATION OF SEAL JAWS
S5
SEALING POSITION REACHED ?
NO
S6
YES
MOVE FILM AND SEAL JAWS BY EXTRA DISTANCE
S7
STOP MOTORS
S8
S9
DISPLACEMENT ?
NO
YES
ENTER DISTANCE OF DISPLACEMENT
S10
S11
PARAMETERS CHANGED ?
NO
YES
CHANGE SEALING POSITION
S12
END

Fig.5.

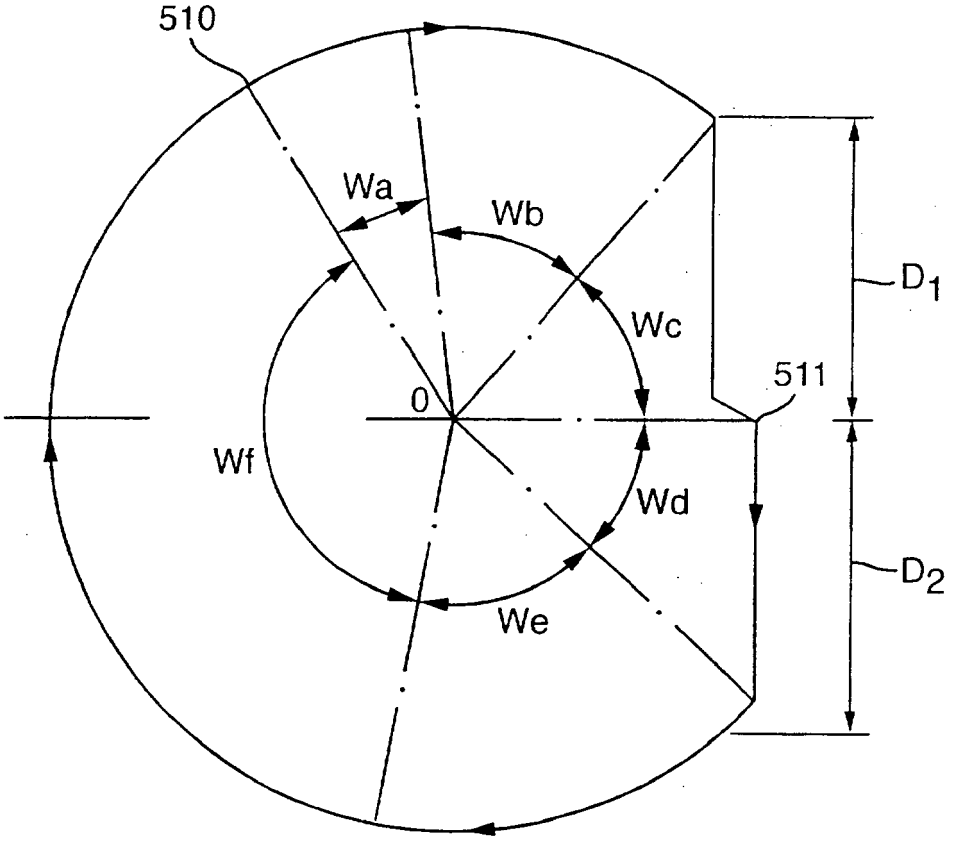


Fig.6.

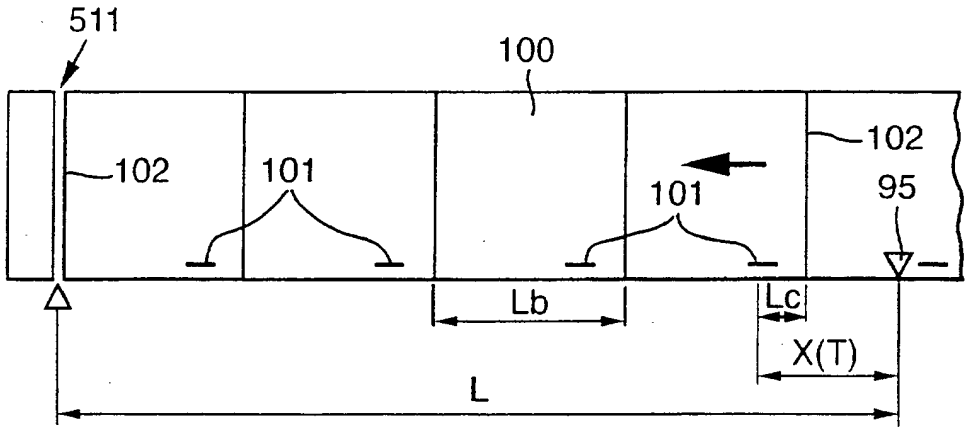


Fig.7.

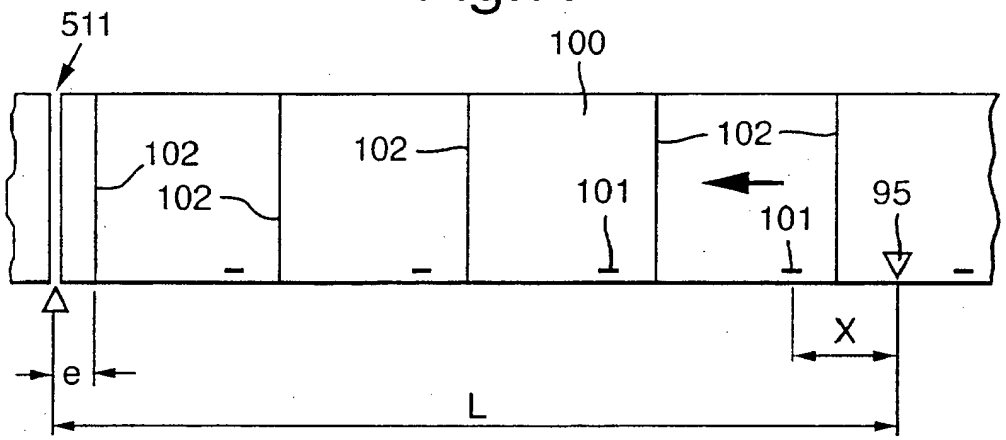
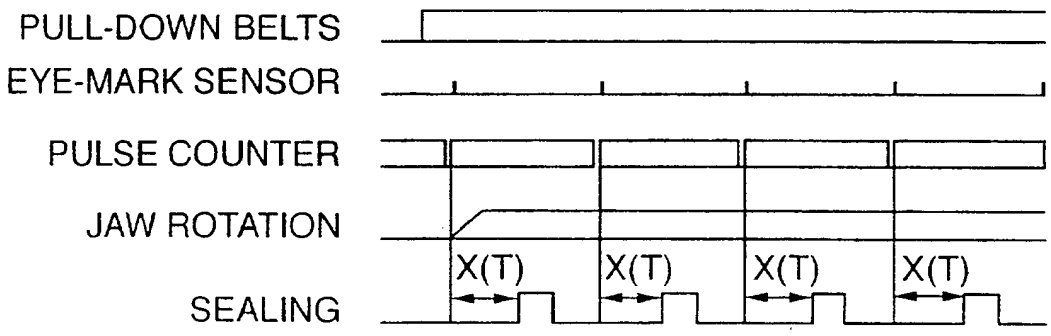


Fig.8.



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0274849 A **[0004]**
- US 5279098 A **[0014] [0016]**