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

(11) **EP 1 720 665 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.01.2008 Bulletin 2008/02

(21) Application number: **04800233.1**

(22) Date of filing: **22.11.2004**

(51) Int Cl.:
B07C 5/36 *(2006.01)* ***A24C 5/34*** *(2006.01)*

(86) International application number:
PCT/PL2004/000093

(87) International publication number:
WO 2005/049235 (02.06.2005 Gazette 2005/22)

(54) **METHOD OF DEFINING, TRACING AND REMOVING OF THE PORTION OF DEFECTIVE ROD-SHAPED ELEMENTS TRANSPORTED BY TOBACCO INDUSTRY PRODUCTION LINE CONVEYOR AND A SYSTEM WHICH ALLOWS DEFINING, TRACING AND REMOVING OF THE PORTION OF DEFECTIVE ROD-SHAPED ELEMENTS FROM THE CONVEYOR AT TOBACCO INDUSTRY PRODUCTION LINE**

VERFAHREN ZUR DEFINITION, VERFOLGUNG UND ENTFERNUNG EINES TEILS VON FEHLERHAFTEN STANGENFÖRMIGEN ELEMENTEN, DIE ÜBER EINE TABAKINDUSTRIE-FERTIGUNGSSTRASSENFÖRDEREINRICHTUNG BEFÖRDERT WERDEN, UND SYSTEM, DAS DIE DEFINITION, VERFOLGUNG UND ENTFERNUNG EINES TEILS VON FEHLERHAFTEN STANGENFÖRMIGEN ELEMENTEN VON DER FÖRDEREINRICHTUNG AN DER TABAKINDUSTRIE-FERTIGUNGSSTRASSE GESTATTET

PROCEDE POUR DEFINIR, REPERER ET ELIMINER LA PARTIE D'ELEMENTS DEFECTUEUX EN FORME DE TIGE TRANSPORTES PAR UN CONVOYEUR D'UNE CHAINE DE PRODUCTION DE L'INDUSTRIE DU TABAC, ET SYSTEME PERMETTANT DE DEFINIR, DE REPERER ET D'ELIMINER LA PARTIE D'ELEMENTS DEFECTUEUX EN FORME DE TIGE SE SITUANT SUR LEDIT CONVOYEUR

(84) Designated Contracting States:
DE GB IT

(30) Priority: **24.11.2003 PL 36367403**

(43) Date of publication of application:
15.11.2006 Bulletin 2006/46

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Description

[0001] The subject of the invention is a method used to determine the volume of a portion of defective rod-shaped elements manufactured by a producing machine, which are located on variable-length conveyor and transported towards receiving device, with reference to a portion of elements being stored in variable-volume buffer magazine of a type "first in-first out", including removal of the mentioned portion prior to be entered into the receiving device, moreover, allowing the defining and tracing of the defective rod-shaped elements and their removal from the conveyor prior to be entered into the receiving device, from variable-volume buffer magazine of the type "first in - first out", which is located between producing machine and receiving device.

[0002] In Tobacco Industry it often happens that during production of rod-shaped elements, some of these elements should not be used in the further processing, and the elements should be rejected. For example, a German invention DE 10216069 describes a method and device used in tobacco processing. A product, especially a cigarette, when manufactured by the machine, comes through several different processing phases, which can be checked or controlled with use of appropriate sensors and actuators. The sensor-collected information about cigarettes can be used by the cigarette making machine control system, for example for rejection of defective elements. According to this method, the sensor-collected information is gathered synchronously, where the machine pulse is assigned to a product asynchronously to the machine pulse, whereas depending on this information appropriate action to a product is executed with use of an actuator, synchronously to the machine pulse. From the other side, another optical method of observation of external surface of rod-shaped elements during production process in Tobacco Industry, including description of the working stand, is known from a patent USA No. US 4644176. In case of both mentioned inventions, both defining the rod-shaped elements end their rejection take place within the area of the machine producing the elements in question. In case of production lines producing rod-shaped elements, where a variable-volume conveyor working with system "first in - first out" is placed between product making machine and receiving device, the quality of rod-shaped elements delivered from the machine is controlled quantitatively with use of commonly known control or measuring devices. Portion of defective elements on the conveyor is marked manually, depending on reflex and experience of the machine operator. Likewise, removal of the marked portion prior to be entered into the receiving device is made manually, by consequent switching the valve 'ON' and 'OFF', and it also depends on individual skills of the machine operator. It should be mentioned that at the production rate of about 14 000 pieces of rod-shaped elements per minute, even a minor time inaccuracy of the manual marking and removing the defective elements can generate great loses, related both to rejection of good elements and transferring defective elements to further processing.

[0003] According to the present invention, a significant feature of the method of defining, tracing and rejection of defective elements found on the tobacco industry production line conveyor, particularly elements manufactured by the producing machine and occurring on the variable-length conveyor, in variable-volume buffer magazine of the type "first in - first out" located between producing machine and receiving device, where quality of rod-shaped elements is determined within this zone after they leave producing machine but before they enter the receiving device, where defective rod-shaped elements are removed from the conveyor within this zone prior to be entered into receiving device, is related to assigning the information about the defectiveness to the first and last defective rod-shaped element detected by the control-measuring device within a portion which was delivered to the in-feed station, and tracing of the marked information takes place within a zone extending from the control-measuring device to the rejecting device, with use of special in-feed counter located in the out-feed station, whereas signals corresponding to the information about initial and final part of the portion of defective elements, which when processed in the machine control system are then transferred to the rejecting device, in order to remove determined portion of the defective rod-shaped elements. Information about defectiveness of the rod-shaped element is assigned by means of appropriate marking of this element, whereas this activity is executed after the element leaves control-measuring device, while in rejection device all rod-shaped elements located on the conveyor, derived from quality measurement in control-measuring device, prior to detection of the defective elements, up to the last detected defective element, are removed. In alternative option of the invention, information related to the defectiveness of the rod-shaped element is gathered by assigning the element to a corresponding segment of the conveyor, whereas the conveyor is divided into finite number of identical segments. Each segment can be marked electronically with a record allowing identification of this element by in-feed counter located within the in-feed station and out-feed counter located within the out-feed station. Alternatively, tracing of the portion of defective elements can be done by means of counting the number of pulses equivalent to the segments by the in-feed counter located within the in-feed station and the out-feed counter located within the out-feed station, whereas at the same time, a correction of the counters indication is made by means of calibration of the temporary length of the conveyor, between in-feed and out-feed stations, and corrected signal assigned to the first and the last defective element is sent to the rejection device, which removes all rod-shaped elements located on the conveyor, within a time period from the quality measurement made by the measuring device up to the last detected defective element. Calibration of the temporary length of the conveyor is made

by means of counting the number of pulses by out-feed counter within the out-feed station, since the calibrating element enters in-feed station, being detected by in-feed detector, and comparing the real counted pulses with theoretical number of pulses equivalent to the temporary length of the conveyor stored in the control system, whereas, if the numbers of pulses - real and theoretical - are not equal, a reading error of the initial and final part of the portion of defective elements on the conveyor occurs, and the error value is determined by a difference between theoretical number of pulses and number of pulses really counted, as well. The control system automatically corrects the number of pulses related to the temporary length of the conveyor, and the corrected, new value, as a theoretical number of pulses assigned to temporary length of the conveyor, is introduced to the machine control system, and in case of repetition of the error, counters must be checked manually by the operating personnel. Constant number of pulses between calibration cycles is assigned to the same length of the conveyor, and the calibration is made automatically and continuously, whereas each detection of the calibration element by in-feed detector located within the in-feed station commences new calibration process. In the machine control system, signal of the beginning of portion of the defective elements delivered by the control-measuring device is assigned to the theoretical temporary conveyor length, and out-feed counter located within the out-feed station starts counting the pulses corresponding to temporary, theoretical conveyor length, whereas total number of counted number of pulses indicate, that portion of defective elements entered the out-feed station. Signal of final part of the portion of defective elements is sent from the control-measuring device to the machine control system, where a difference of pulses between initial and final part of the defective elements red by the in-feed counter located within the in-feed station is determined, and the determined number of pulses is counted by the out-feed counter located within the out-feed station. Co-operation of the conveyor with the in-feed and out-feed stations is slip-less. Described optional methods guarantee automatic removal of the defective, rod-shaped elements, what eliminates loses related to manual control of the rejecting device.

[0004] Out-feed station comprising the out-feed counter and the out-feed detector, which is installed at the side of the producing machine within the constant length area of the conveyor, and out-feed station comprising the out-feed counter and the out-feed detector installed at the side of the receiving device contribute substantial solutions of the present invention, as the system allows determining, tracing and removing of the rod-shaped elements from the conveyor installed within the tobacco industry production line, particularly elements manufactured by the producing machine which are present on the variable-length conveyor, within variable-volume buffer magazine of the type "first in - first out", which is located between the producing machine and the receiving device, equipped with a control-measuring device installed also within the area between the producing machine and receiving device, including rejection device installed before the receiving device, whereas the conveyor is built of identical segments and equipped with a calibration element, which is assigned to suitably marked segment of the conveyor. The described system allows precise determining of the initial and final part of the portion of effective rod-shaped elements, which is transferred from the producing machine onto the conveyor, and the portion is traced along whole, variable length of the conveyor, and removing definite portion of the elements before they enter the receiving machine, moreover, the system also allows automatic correction of the signal activating the rejecting device in case of improper reading of the in-feed/out-feed counter.

[0005] The idea of the invention is schematically shown in a sample Fig. 1, and individual options of the invented method are explained by the described examples.

Example of the system

[0006] Conveyor 1 is located between producing machine and receiving device - not shown in the Fig. 1, particularly variable-volume buffer-type magazine of a type "first in - first out", for example magazine described of Polish patent No. PL 186270, which consists of transport sector 2 conveying multi-layered stack 3 of rod-shaped elements 4 and return sector 5. In-feed station 6 is located at the in-feed part of the transport sector 2, and out-feed section 7 is located at the out-feed part of the transport sector 2. Conveyor 1. consists of identical segments 8, whereas one of the segments 8, differently marked, is used as a calibration element 9. In-feed counter 10 and in-feed detector 11 reading information from the conveyor 1 within area of co-operation with discs 12 equipped with scale 13 which corresponds to a distance between segments 8, are located within the in-feed station 6; whereas, control-measuring device 14 is installed before the in-feed station 6. Out-feed counter 15 and out-feed detector 16 reading information from the conveyor 1 within the area of co-operation with scaled disc 17 equipped with scale 18 corresponding to segments 8, are located within the out-feed station 7; whereas, rejecting device 19 is installed behind out-feed station 7, for example valve-type device described in Polish patent application No. P-347731. In-feed counter 10 and out-feed counter 15, in-feed detector 11 and out-feed detector 16, control-measuring device 14 and rejecting device 19, are coupled with the control system 20.

Option I - Example of the method

[0007] Rod-shaped elements 4 manufactured by producing machine are transferred in form of multi-layered stack 3 to transport sector 2 of the variable-length conveyor 1. Control-measuring device 14 takes, with as-

sumed frequency, samples of elements 4 for quality test. In case when a defective element 4 is detected, information about its defectiveness is assigned to the element 4 and sent to the machine control system 20. If one of the sequent tests made by the control-measuring device 14 proves that the element 4 is no longer defective, that is assumed as a final part of portion of defective elements 4, and appropriate information is sent to the control system 20. Information about defectiveness is assigned to the defective element 4 by means of appropriate marking of the element 4, after it leaves the control-measuring device 14. Stack 3 of elements 4 moving along the conveyor 1 is tracked by in-feed counter 10 located within in-feed station 6 and by out-feed counter 15 located within out-feed station 7, and signals informing about presence of initial and final part of the defective elements 4 are suitably processed in the machine control system 20 and then transferred to the rejecting device 19 in order to remove the elements from moving stack 3, whereas rejecting device removes all elements 4 located on the conveyor 1, since quality measurement is made by the control-measuring device14, prior to measurement detecting the defective element 4, up to the last element 4, before the proper quality element 4 is detected.

Option II - Example of the method

[0008] Manufactured by the producing machine rod-shaped elements 4 are transferred in form of multi-layered stack 3 into transport sector 2 of the variable-length conveyor 1. Control-measuring device 14 takes, with assumed frequency, samples of elements 4 for quality test. When a defective element 4 is detected, the information about defectiveness is assigned to segment 8 of the conveyor 1, where element 4 is located, whereas, the conveyor is divided into finite number of identical segments 8. If one on sequent tests made by the control-measuring device 14 proves that the element 4 is no longer defective, it means that this is the final part of the portion of defective elements, and information about this fact is sent to control system 20. Each segment 8 is electronically marked, for example with a bar code allowing identification of the segment 8 by in-feed counter 10 located within in-feed station 6, and by out-feed counter 15 located within out-feed station 7. Signals about appearance of segments 8 corresponding to initial and final part of the portion of defective elements 4 are processed in the machine control system 20 and sent to rejecting device 19 in order to remove moving stack 3, whereas, rejecting device 19 removes all elements 4 which are located on the conveyor 1, since quality control measurement made by control-measuring device 14, prior to measurement detecting defective element 4, up to the last element 4, before proper element 4, is detected.

Option III - Example of the method

[0009] Manufactured by the producing machine rod-shaped elements 4 are transferred in form of multi-layered stack 3 into the transport sector 2 of the variable-length conveyor 1. Control-measuring device 14, with assumed frequency, takes samples of elements 4 for quality test. When a defective element 4 is detected, the information about defectiveness is assigned to segment 8 of the conveyor 1, where element 4 is located, whereas, the conveyor is divided into finite number of identical segments 8. If one on sequent tests made by the control-measuring device 14 proves that the element 4 is no longer defective, it means that this is the final part of the portion of defective elements, and information about this fact is sent to the machine control system 20. Tracing of the portion of defective elements 4 is made by means of counting the number of pulses corresponding to segments 8 by in-feed counter 10 located within in-feed station 6, and by out-feed counter 15 located within out-feed station 7, whereas, synchronous correction of readings of the counters 10, 15 by means of calibration of the temporary length of the conveyor 1, between in-feed station 6 and out-feed station 7, and corrected to real value signal corresponding to the first and last defective element 4 is sent to the rejecting device 19, which removes all rod-shaped elements located on the conveyor 1, since quality measurement made by control-measuring device 14, prior to measurement detecting defective element 4 up to the last element 4 before measurement detecting proper element 4. Co-operation of the conveyor 1 with in-feed station 6 and out-feed station 7 is slip-less. Meeting this condition is allowed by installation of similarly scaled discs 12, 17 located respectively within in-feed station 6 and out-feed station 7, equipped with identical scale 13, 18 corresponding to the length section between segments 8 of the conveyor 1. Calibration of temporary length of the conveyor 1 is made by means of counting pulses by out-feed counter 15 located within out-feed station 7, in the period since the calibrated element 9, detected by in-feed detector, enter in-feed station 6, and then comparing the number of really counted pulses with theoretical number of pulses corresponding to temporary length of the conveyor 1 within transport sector 2, stored within the machine control system 20, whereas, if the mentioned numbers of pulses - real and theoretical - are not identical at the moment when the calibrating element 9 is detected by out-feed detector 16 located within out-feed station 7, a reading error of initial and final part of portion of defective element 4 present on the conveyor 1 occurs, and error magnitude is determined by difference between theoretical number of pulses and number of really counted pulses. Control system 20 automatically corrects a number of pulses corresponding to temporary length of the conveyor 1, introducing the new corrected value as a theoretical number of pulses for temporary length of the conveyor 1, and in a case of the error repetition, machine operator is obliged to check the counters, whereas, constant number of pulses between calibration cycles is assigned to the same length of the conveyor 1. The calibration is made automatically and

continuously, and each detecting of the calibrating element 9 by in-feed detector 11 located within on-feed station 6 commences next calibration process. Signal announcing the initial part of portion of defective elements 4 delivered by control-measuring device 14 is assigned by the machine control system 20 to temporary length of the conveyor 1, and out-feed counter 15 located within out-feed station 7 commences counting pulses corresponding to number of pulses corresponding to temporary, theoretical length of the conveyor 1, whereas, total counting of the mentioned number of pulses indicates that portion of defective elements 4 reached out-feed station 7. Signal announcing that final part of portion of defective elements 4 is detected by control-measuring device 14, corresponding to the first good quality element 4, is sent to the machine control system, where the difference between number of pulses red by in-feed counter 10 located within in-feed station 6 and final part of portion of defective elements is determined, and mentioned number of pulses is counted by out-feed counter 15 located within out-feed station 7.

[0010] Within single production line, the mentioned options can be superimposed or they can be mutually complemented, moreover, there is a possibility to define, track and remove several different portions of rod-shaped defective elements 4 located within transport sector 2 of the variable-length conveyor 1.

Claims

1. Method of defining, tracing and removing of portion of defective, rod-shaped elements (4) being transported on a tobacco industry production line conveyor (1), particularly elements (4) manufactured by producing machine which are located on variable-length conveyor (1), within variable-volume buffer magazine of the type "first in - first out", which is located between producing machine and receiving device, where quality of the rod-shaped elements (4) is checked after they leave the producing machine but before they enter the receiving device, and the defective rod-shaped elements (4) are removed from the conveyor (1) within the area before they enter the receiving device, **characterized in that** the first and the last defective rod-shaped element (4) in a portion which is delivered to the in-feed station, carries assigned information about its defectiveness, and tracing of the moving portion carrying this information take place within the section from the control-measuring device (14) up to rejecting device (19), with use of in-feed counter (10) located within in-feed station (6) and out-feed counter (15) located within out-feed station (7), whereas signals corresponding to the information about initial and final part of a portion of defective elements (4), after processed by the machine control system (20), are sent to rejecting device (19), in order to remove only that portion of rod-shaped elements (4), which carries an information about its defectiveness.

2. Method as in claim 1, **characterized in that** assigning the information about defectiveness to a defective, rod-shaped element (4) is made by means of physical marking of the mentioned element (4).

3. Method as in claim 2, **characterized in that** marking of the first and the last defective element (4) takes place after the element (4) has already left the control-measuring device (14).

4. Method as in claim 1 or 3, **characterized in that** in the rejecting device (19) all rod-shaped elements (4) being present on the conveyor (1) are removed from the moment of quality test made by the control-measuring device (14), prior to measurement which detects defective element (4), up to the last element (4) before the first proper element (4) is detected.

5. Method as in claim 1, **characterized in that** assigning the information about defectiveness to a defective element (4) is made by assigning this element (4) to that segment (8) of the conveyor (1), which was the closest in a distance to the element (4) before of the element (4) was taken to measurement, whereas whole conveyor (1) is divided into finite number of identical segments (8).

6. Method as in claim 5, **characterized in that** each segment (8) is marked with electronic record allowing identification of the segment (8) by in-feed counter (10) located within the in-feed station (6) and out-feed counter (15) located within the out-feed station (7).

7. Method as in claim 6, **characterized in that** in rejecting device (19), all rod-shaped elements (4) being present on the conveyor (1) during the period from the measurement made by control-measuring device (14) preceding measurement detecting defective element (4) up to the last defective element (4), before the measurement which detects the first proper element (4).

8. Method as in claim 5, **characterized in that** tracing of portion of defective elements (4) is made by means of counting the number of pulses corresponding to segments (8) with use of in-feed counter (10) located within in-feed station (6) and the out-feed counter (15) located within the out-feed station (7), whereas contemporary correction of the counters (10), (15) indication is made by means of the calibration of temporary length of the conveyor (1) section extending between in-feed (6) and out-feed station (7), and signal corrected into real value corresponding to the first and the last defective element (4) is sent to the

rejecting device (19).

9. Method as in claim 8, **characterized in that** in rejecting device (19), all rod-shaped elements (4) present on the conveyor (1) during a period from quality control measurement made by control-measuring device (14) preceding measurement of the defective element (4) up to the last element (4), before measurement detecting the defective element (4), are detected.

10. Method as in claim 8, **characterized in that** calibration of temporary length of the conveyor (1) is made by means of counting the number of pulses by out-feed counter (15) within out-feed station (7) during a period from the calibrating element (9) enters the in-feed station (6), being detected by in-feed detector (11), and comparison of real and theoretical number of pulses corresponding to temporary conveyor (1) length, stored in the machine control system (20) memory, whereas if the mentioned numbers of pulses - real and theoretical - are not equal, when calibrating element (9) is detected by out-feed detector (16) within out-feed station (7), reading error of the initial/final position of portion of rod-shaped defective elements (4) occurs, and the magnitude of the error is defined by the difference between the theoretical number of pulses and number of pulses really counted.

11. Method as in claim 9, **characterized in that** the control system (20) automatically makes a correction of the number of pulses corresponding to temporary conveyor (1) length by means of introducing new, corrected value being equivalent to theoretical number of pulses for temporary conveyor (1) length, thus in case of the error re-occurrence, checking of counters (10), (15) by the operating personnel is required.

12. Method as in claim 11, **characterized in that** for the same conveyor (1) length a constant number of pulses between calibration cycles is assigned.

13. Method as in claim 12, **characterized in that** calibration is conducted automatically and continuously, whereas each detection of calibrating element (9) by in-feed detector (11) within the in-feed station (6) commences the next calibration process.

14. Method as in claim 13, **characterized in that** signal announcing initial part of the defective elements (4) portion which is delivered by the control-measuring device (14) is assigned within machine control system (20) to temporary, theoretical length of the conveyor (1), and out-feed counter (15) located within the out-feed station (7) starts counting pulses corresponding to number of pulses of temporary, theoretical length of the conveyor (1), whereas total number of mentioned pulses indicates that the initial part of defective elements (4) reached the out-feed station (7).

15. Method as in claim 14, **characterized in that** signal announcing the final part of the portion of defective elements (4) sent from the control-measuring device (14) is then transferred into the machine control system (20), where a difference between initial and final parts of the defective elements (4) red by the in-feed counter (10) located within the in-feed station (6) is defined, and mentioned number of pulses is counted by out-feed counter (15) located within out-feed station (7).

16. Method as in claim 8, **characterized in that** co-operation of the conveyor (1) with the in-feed station (6) and out-feed station (7) is slip-less.

17. System which allows defining, tracing and removing the portion of defective rod-shaped elements (4) from the conveyor (1) installed within the tobacco industry production line, particularly elements (4) manufactured by the producing machine located on variable-length conveyor (1), within variable-volume buffer magazine of the type "first in - first out" located between producing machine and receiving device, equipped with control-measuring device (14) installed also within the zone between producing machine and receiving device, including rejecting device (19) installed before the receiving device, whereas control-measuring device (14) and rejecting device (19) are coupled with the machine control system (20), **characterized in that** within the area of transport sector (2) of the conveyor (1), in-feed station (6) comprising in-feed counter (10) and in-feed detector (11) is located at the side of producing machine, whereas out-feed station (7) comprising of out-feed counter (15) and out-feed detector (16) is located at the side of the receiving device, whereas conveyor (1) consists of identical segments (8), moreover, conveyor (1) is equipped with calibrating element (9), while in-feed counter (10) and in-feed detector (11) located within in-feed station (6) and out-feed counter (15) and out-feed detector (16) located within out-feed station (7), are coupled with the machine control system (20).

18. System as in claim 17, **characterized in that** calibrating element (9) creates distinctively marked segment (8) of the conveyor (1).

Patentansprüche

1. Verfahren zur Definition, Verfolgung und Entfernung eines Anteils von fehlerhaften stangenförmigen Ele-

menten (4), die über eine Tabakindustrie-Fertigungsstrassenfördereinrichtung (1) befördert werden, insbesondere der durch die an der von verschieder Länge Fördereeinrichtung (1) gelegenen Produktionsmaschinen hergestellten Elemente (4), innerhalb eines mit verschiedenem Volumen Pufferwarenlagers Typ "first in - first out" ("zuerst ein - zuesrst aus"), lokalisiert zwischen Produktionsmaschine und der Annahmevorrichtung, wo die Qualität der stangenförmigen Elemente (4) nach dem Verlassen der Produktionsmaschine aber vor dem Hineinkommen in die Annahmevorrichtung kontrolliert wird, und die fehlerhaften stangenförmigen Elemente (4) von der Fördereinrichtung (1) innerhalb einem Bereich vor dem Hineinkommen in die Annahmevorrichtung entfernt werden, charakteristisch dafür, dass das erste und das letzte fehlerhafte stangenförmige Element (4) in dem zur Eingangsstation gelieferten Anteil eine zugewiesene Information über die Mangelhaftigkeit des Anteils tragen, und die Verfolgung des fortschreitenden Anteils mit dieser Information erfolgt innerhalb des Abschnitts von der Kontroll- und Messeinrichtung (14) bis Rückweisungseinrichtung (19), mit Hilfe des in der Eingangsstation (6) lokalisierten Eingangszählers (10) und des in der Ausgangsstation (7) lokalisierten Ausgangszählers (15), wobei die Signale über die Informationen über den Anfang und Ende des Anteils der fehlerhaften Elemente (4) nach der Datenverarbeitung in dem Maschinensteuersystem (20) in die Rückweisungseinrichtung (19) gesandt werden, um nur den Anteil der stangenförmigen Elemente (4) zu entfernen, der die Information über die Fehlerhaftigkeit trägt.

2. Verfahren gemäß Anspruch 1 charakteristisch dafür, dass die Zuweisung der Information über die Fehlerhaftigkeit eines stangenförmigen Elementes (4) durch physikalisches Markieren des erwähnten Elementes (4) durchgeführt wird.

3. Verfahren gemäß Anspruch 2 charakteristisch dafür, dass das Markieren des ersten und des letzten fehlerhaften Elementes (4) schon nach dem Verlassen der Kontroll- und Messeinrichtung (14) durch das Element (4) erfolgt.

4. Verfahren gemäß Anspruch 1 oder 3 charakteristisch dafür, dass in der Rückweisungseinrichtung (19) alle auf der Fördereinrichtung (1) anwesenden stangenförmigen Elemente (4) von dem Moment der Durchführung der Qualitätskontrolle durch die Kontroll- und Messeinrichtung (14) weggeschafft werden, vor der Messung, welche das fehlerhafte Element (4) ermittelt, bis zum letzten Element (4) eher das erste richtige Element (4) ermittelt wird.

5. Verfahren gemäß Anspruch 1 charakteristisch dafür, dass die Zuweisung der Information über die Fehlerhaftigkeit zu dem fehlerhaften Element (4) durch die Zuweisung von diesem Element (4) zu dem Segment (8) der Fördereinrichtung (1), das sich am nächsten zum Element (4) befindet, erfolgt, eher das Element (4) zur Messung gebracht wird, wohingegen die ganze Fördereinrichtung (1) in eine endliche Anzahl von gleichen Segmenten (8) geteilt wird.

6. Verfahren gemäß Anspruch 5 charakteristisch dafür, dass jedes Segment (8) durch einen elektronischen Datensatz markiert wird, der die Identifizierung des Segments (8) durch den Eingangszähler (10) lokalisiert in der Eingangsstation (6) und den Ausgangszähler(15) lokalisiert in der Ausgangsstation (7) ermöglicht.

7. Verfahren gemäß Anspruch 6 charakteristisch dafür, dass in der Rückweiseeinrichtung (19) alle auf der Fördereinrichtung (1) anwesenden stangenförmigen Elemente (4) während des Zeitraums von der Messung durch die Kontroll- und Messeinrichtung (14), vorhergehend der das fehlerhafte Element (4) ermittelnden Messung bis zum letzten fehlerhaften Element (4), vor der Messung, die das erste richtige Element ermittelt.

8. Verfahren gemäß Anspruch 5 charakteristisch dafür, dass die Verfolgung des Anteils von fehlerhaften Elementen (4) durch die Zählung der Anzahl der den Segmenten (8) entsprechenden Impulsen, mit Benutzung des Eingangszählers (10) lokalisiert in der Eingangsstation (6) und des Ausgangszählers (15) lokalisiert in der Ausgangsstation (7) durchgeführt wird, während gleichzeitige Korrektur der Anzeigen der Zähler (10), (15) mit Hilfe der Kalibrierung der zeitweiligen Länge der Fördereinrichtung (1) in der Sektion zwischen der Eingangsstation (6) und der Ausgangsstation erfolgt, und das zum Realwert korrigierte Signal, das dem ersten und dem letzten fehlerhaften Element (4) entspricht, zur Rückweiseeinrichtung (19) gesandt wird.

9. Verfahren gemäß Anspruch 8 charakteristisch dafür, dass in der Rückweiseeinrichtung (19) alle stangenförmigen Elemente (4) anwesenden auf der Fördereinrichtung (1) während des Zeitraums von der Kontrolle und Messung der Qualität mit der Kontroll- und Messeinrichtung (14) vorhergehend die Messung vom fehlerhaften Element (4) bis zum letzten Element (4), vor Messung mit Ermittlung des fehlerhaften Elementes (4), ermittelt werden.

10. Verfahren gemäß Anspruch 8 charakteristisch dafür, dass die Kalibrierung der zeitweiligen Länge der Fördereinrichtung (1) durch das Zählen der Anzahl der Impulse des Ausgangszählers (15) in der Ausgangsstation (7) während des Zeitraums vom Eingang des Kalibrierelements (9) in die Eingangsstation (6)

durch den Eingangsermittler (11) ermittelt wird und der Vergleich der realen Anzahl und der theoretischen Anzahl der Impulse entsprechend der zeitweiligen Länge der Fördereinrichtung (1) in dem Speicher des Maschinensteuersystems (20) gespeichert wird, wohingegen wenn die erwähnte Anzahl von Impulsen - realen und theoretischen - nicht gleich ist, wenn das Kalibrierelement (9) durch den Ausgangsermittler (16) in der Ausgangsstation (7) ermittelt wird, Lesefehler der Anfangs- und Endposition des Anteils von stangenförmigen fehlerhaften Elementen (4) erscheint, und die Größe des Fehlers durch die Differenz zwischen der theoretischen Anzahl der Impulse und der wirklich gezählten realen Anzahl der Impulse ermittelt wird.

11. Verfahren gemäß Anspruch 9 charakteristisch dafür, dass das Maschinensteuersystem (20) automatisch die Anzahl der der zeitweiligen Länge der Fördereinrichtung (1) entsprechenden Impulse mittels Einführung vom neuen korrigierten Wert, gleich der theoretischen Anzahl der der zeitweiligen Länge der Fördereinrichtung (1) entsprechenden Impulse, korrigiert, so im Falle eines wiederholten Vorkommens des Fehlers Kontrolle der Zähler (10), (15) durch Betriebspersonal nötig wird.

12. Verfahren gemäß Anspruch 11 charakteristisch dafür, dass für dieselbe Länge der Fördereinrichtung (1) eine konstante Anzahl der Impulse zwischen den Zyklen der Kalibrierung zugewiesen wird.

13. Verfahren gemäß Anspruch 12 charakteristisch dafür, dass die Kalibrierung automatisch und ununterbrochen geführt wird, wobei jede Ermittlung eines Kalibrierelements (9) durch den Eingangsermittler (11) in der Eingangsstation (6) einen neuen Kalibrierprozess anfängt.

14. Verfahren gemäß Anspruch 13 charakteristisch dafür, dass das Signal, das den Anfangsteil der fehlerhaften Elemente (4), der von der Kontroll- und Messeinrichtung (14) geliefert wurde, ankündigt, ist in dem Maschinensteuersystem (20) der zeitweiligen theoretischen Länge der Fördereinrichtung (1) zugewiesen, und der in der Ausgangsstation (7) lokalisierte Ausgangszähler (15) beginnt das Zählen der der zeitweiligen theoretischen Länge der Fördereinrichtung (1) entsprechenden Impulse, wobei die Gesamtzahl der erwähnten Impulse zeigt, dass der Anfangsteil der fehlerhaften Elemente (4) die Ausgangsstation (7) erreicht hat.

15. Verfahren gemäß Anspruch 14 charakteristisch dafür, dass das Signal mit der Ankündigung des Endteils der fehlerhaften Elemente (4) gesandt von der Kontroll- und Messeinrichtung (14) dann in das Maschinensteuersystem (20) übergeführt wird, wo die Differenz zwischen dem Anfangs- und Endteil der fehlerhaften Elemente (4), gelesen von dem Eingangszähler (10) in der Eingangsstation (6) definiert wird, und die erwähnte Zahl der Impulse durch den Ausgangszähler (15) in der Ausgangsstation (7) gezählt wird.

16. Verfahren gemäß Anspruch 8 charakteristisch dafür, dass die Zusammenarbeit der Fördereinrichtung (1) mit der Eingangsstation (6) und der Ausgangsstation (7) rutschfrei ist.

17. System, das das Definieren, Verfolgen und Entfernen eines Teils von fehlerhaften stangenförmigen Elementen (4) von der durch die Tabakindustrie in der Produktionslinie installierten Fertigungsstrasse-fördereinrichtung (1) ermöglicht, insbesondere der durch die an der von verschiedener Länge Fördereinrichtung (1) lokalisierte Produktionsmaschine hergestellten Elemente (4), innerhalb eines von verschiedenem Volumen Pufferwagenlagers Typ "first in - first out" ("zuerst ein - zuerst aus") lokalisiert zwischen der Produktionsmaschine und der Annahmevorrichtung, ausgestattet in eine auch innerhalb der Zone zwischen der Produktionsmaschine und der Annahmevorrichtung installierte Kontroll- und Messeinrichtung (14), einschließlich der vor der Annahmevorrichtung installierten Rückweiseeinrichtung (19), wobei die Kontroll- und Messeinrichtung (14) und die Rückweiseeinrichtung (19) mit dem Maschinensteuersystem (20) gekoppelt sind, charakteristisch dafür, dass im Bereich des Transportsektors (2) der Fördereinrichtung (1) die Eingangsstation (6) mit eingeschlossenen Eingangszähler (10) und Eingangsermittler (11) an der Seite der Produktionsmaschine lokalisiert ist, während die Ausgangsstation (7) mit eingeschlossenen Ausgangszähler (15) und Ausgangsermittler(16) an der Seite der Annahmevorrichtung lokalisiert ist, wobei die Fördereinrichtung (1) aus gleichen Segmenten (8) besteht, überdies ist die Fördereinrichtung (1) mit Kalibrierelement (9) usgestattet, während der Eingangszähler (10) und der Eingangsermittler (11) lokalisiert in der Eingangsstation (6) und der Ausgangszähler (15) und der Ausgangsermittler (16) lokalisiert in der Ausgangsstation (7) mit dem Maschinensteuersystem (20) gekoppelt sind.

18. System wie im Anspruch 17, charakteristisch dafür, dass Kalibrierelement (9) schafft spezifisch markiertes Segment (8) der Fördereinrichtung (1).

Revendications

1. Le procédé pour définir, repérer et éliminer la partie d'éléments défectueux en forme de tige (4) transportés par un convoyeur (1) d'une chaîne de produc-

tion de l'industrie du tabac, en particulier éléments (4) produits par la machine de production, situés sur un convoyeur de longueur variable à l'entrepôt de tampon type "première entrée - première sortie" qui se trouve entre la machine de production et le dispositif de réception, où la qualité des éléments en forme de tige (4) est contrôlée après leur sortie de la machine de production mais avant l'entrée dans le dispositif de réception, et les éléments en forme de tige (4) sont éliminés du convoyeur (1) à la zone avant leur entrée dans le dispositif de réception, caractéristique par ce que le premier et le dernier élément défectueux en forme de tige (4) de la partie délivrée à la station d'entrée, portent l'information attribuée sur la défectuosité et le mouvement de la partie portant cette information est repéré à partir du dispositif de mesure-controle (14) jusqu'au dispositif de rejet (19), à l'aide du compteur d'entrée (10) situé à la station d'entrée (6) et du compteur de sortie (15) situé à la station de sortie (7), pendant que les signaux correspondant à l'information sur la partie initiale et la partie finale d'éléments défectueux (4), après la transformation par la machine de système de contrôle (20), sont transmis au dispositif de rejet (19), pour éliminer seulement cette partie d'éléments en forme de tige (4) qui porte l'information sur sa défectuosité.

2. Le procédé mentionné à la réserve 1, caractéristique par ce que l'information sur la défectuosité est attribuée à l'élément défectueux en forme de tige (4) à l'aide d'un marquage physique de l'élément en question (4).

3. Le procédé mentionné à la réserve 2, caractéristique par ce que le marquage du premier et du dernier élément défectueux (4) a lieu après la sortie de l'élément (4) du dispositif de mesure-contrôle (14).

4. Le procédé mentionné aux réserves 1 ou 3, caractéristique par ce que le dispositif de rejet (19) élimine tous les éléments en forme de tige (4) présents sur le convoyeur (1) à partir du test de contrôle effectué par le dispositif de mesure-contrôle (14), précédant l'élément défectueux (4) détecté, jusqu'au dernier élément (4) précédant le premier élément (4) correct détecté par le test de contrôle.

5. Le procédé mentionné à la réserve 1, caractéristique par l'attribution de l'information sur la défectuosité de l'élément défectueux (4) à ce segment (8) du convoyeur (1) qui était le plus près de l'élément (4) avant que cet élément (4) ait été pris pour mesure et tout le convoyeur (1) est divisé en nombre défini des segments identiques (8).

6. Le procédé mentionné à la réserve 5, caractéristique par ce que chaque segment (8) est marqué avec un enregistrement électronique facilitant l'identification du segment (8) à l'aide d'un compteur d'entrée (10) situé à la station d'entrée (6) et d'un compteur de sortie (15) situé à la station de sortie (7).

7. Le procédé mentionné à la réserve 6, caractéristique par l'élimination au dispositif de rejet (19) de tous les éléments en forme de tige (4) présents sur le convoyeur (1) à partir du moment de contrôle effectué par le dispositif de mesure-contrôle (14) précédant le contrôle détectant l'élément défectueux (4) jusqu'au dernier élément défectueux (4), avant le contrôle détectant le premier élément correct (4) .

8. Le procédé mentionné à la réserve 5, caractéristique par ce que la partie d'éléments défectueux (4) est repéré par un compte du nombre d'impulsions correspondant aux segments (8) à l'aide du compteur d'entrée (10) situé à la station d'entrée (6) et du compteur de sortie (15) situé à la station de sortie (7), et également une correction des indications des compteurs en question est faite moyennant un calibrage de la longueur momentané de la section du convoyeur (1) entre la station d'entrée (6) et la station de sortie (7), et un signal corrigé à la valeur réelle correspondant au premier et au dernier élément défectueux (4) est envoyé au dispositif de rejet (19).

9. Le procédé mentioné à la réserve 8, caractéristique par ce qu'au dispositif de rejet (19), sont détectés tous les éléments en forme de tige (4) présents sur le convoyeur (1) à partir du test de contrôle de qualité effectué par le dispositif de mesure-contrôle (14) précédant la détection de l'élément défectueux (4) jusqu'au dernier élément (4), avant le test détectant l'élément défectueux (4).

10. Le procédé mentionné à la réserve 8, caractéristique par le calibrage de la longueur momentané du convoyeur (1) moyennant un compte du nombre d'impulsions par le compteur de sortie (15) à la station de sortie (7) durant la période à partir de l'entrée à la station d'entrée (6) de l'élément calibrant (9) détecté par le détecteur d'entrée (11), et une comparaison du nombre d'impulsions comptés réellement au nombre théorique d' impulsions correspondant à la longueur momentané du convoyeur (1), retenu à la mémoire de la machine de système de contrôle (20), mais si les nombres ci mentionnés d'impulsions - réels et théoriques - ne sont pas égaux au moment de la détection de l'élément calibrant (9) par le détecteur de sortie (16) à la station de sortie (7), une erreur a lieu à la lecture de la position initiale et/ou finale de la partie d'éléments défectueux en forme de tige (4) et la valeur de l'erreur est définie par la différence entre le nombre théorique d'impulsions et le nombre d'impulsions comptés réellement.

11. Le procédé mentionné à la réserve 9, caractéristique par ce que le système de contrôle (20) effectue automatiquement une correction du nombre d'impulsions correspondant à la longueur momentané du convoyeur (1) en introduisant une nouvelle valeur corrigée, en tant qu'équivalent du nombre théorique d'impulsions pour la longueur momentané du convoyeur (1), et dans le cas de l'erreur répétée, un contrôle des compteurs (10), (15) par le personnel est requis.

12. Le procédé mentionné à la réserve 11, caractéristique par ce que pour la même longueur du convoyeur (1) est attribué un nombre défini constant d'impulsions entre des cycles du calibrage.

13. Le procédé mentionné à la réserve 12, caractéristique par ce que le calibrage est fait automatiquement et continuellement et chaque détection d'un élément calibrant (9) par le détecteur d'entrée (11) à la station d'entrée (6) commence un nouveau processus du calibrage.

14. Le procédé mentionné à la réserve 13, caractéristique par ce que le signal annonçant la partie initiale d'éléments défectueux (4) donné par le dispositif de mesure-contrôle (14) est attribué dans le système de contrôle (20) à la longueur momentané théorique du convoyeur (1) et le compteur de sortie (15) à la station de sortie (7) commence à compter les impulsions correspondant au nombre d'impulsions de la longueur momentané théorique du convoyeur (1), et le nombre total d'impulsions en question indique que la partie initiale d' éléments défectueux (4) arrive à la station de sortie (7).

15. Le procédé mentionné à la réserve 14, caractéristique par ce que le signal annonçant la partie finale d'éléments défectueux (4) envoyé à partir du dispositif de mesure-contrôle (14) est ensuite envoyé au système de contrôle (20) et la différence entre les parties initiale et finale d'éléments défectueux (4) à l'aide du compteur d'entrée (10) localisé à la station d'entrée (6) est définie et le nombre mentionné d'impulsions est compté par le compteur de sortie (15) à la station de sortie (7).

16. Le procédé mentionné à la réserve 8, caractéristique par ce qu'une coopération entre le convoyeur (1) et la station d'entrée (6) et la station de sortie (7) est sans glissement.

17. Le système qui donne la possibilité de définir, repérer et éliminer les parties d'éléments en forme de tige (4) du convoyeur (1) installé dans la chaîne de production de l'industrie de tabac, en particulier éléments (4) produits par la machine de production qui se trouvent sur un convoyeur de longueur variable (1) à l'entrepôt de tampon de volume variable type "première entrée - première sortie" situé entre la machine de production et le dispositif de réception, équipé en dispositif de mesure-contrôle (14) installé également à la zone entre la machine de production et le dispositif de réception, équipé en dispositif de rejet (19) installé avant le dispositif de réception, et le dispositif de mesure-contrôle (14) et le dispositif de rejet (19) sont accouplés au système de contrôle (20), caractéristique par ce qu' une station d'entrée (6) composée du compteur d'entrée (10) et du détecteur d'entrée (11) se trouve à la zone du secteur de transport (2) du convoyeur (1) du côté de la machine de production et une station de sortie (7) composée du compteur de sortie (15) et du détecteur de sortie (16) se trouve du côté du dispositif de réception et le convoyeur est composé des segments identiques (8) et le convoyeur (1) est équipé en élément calibrant (9) et le compteur d'entrée (10) et le détecteur d'entrée (11) à la station d'entrée (6) ainsi que le compteur de sortie (15) et le détecteur de sortie (16) à la station de sortie (7) sont accouplés à la machine du système de contrôle (20).

18. Le système mentionné à la réserve 17, caractéristique par ce que l'élément calibrant (9) est segment (8) du convoyeur (1) marqué distinctement.

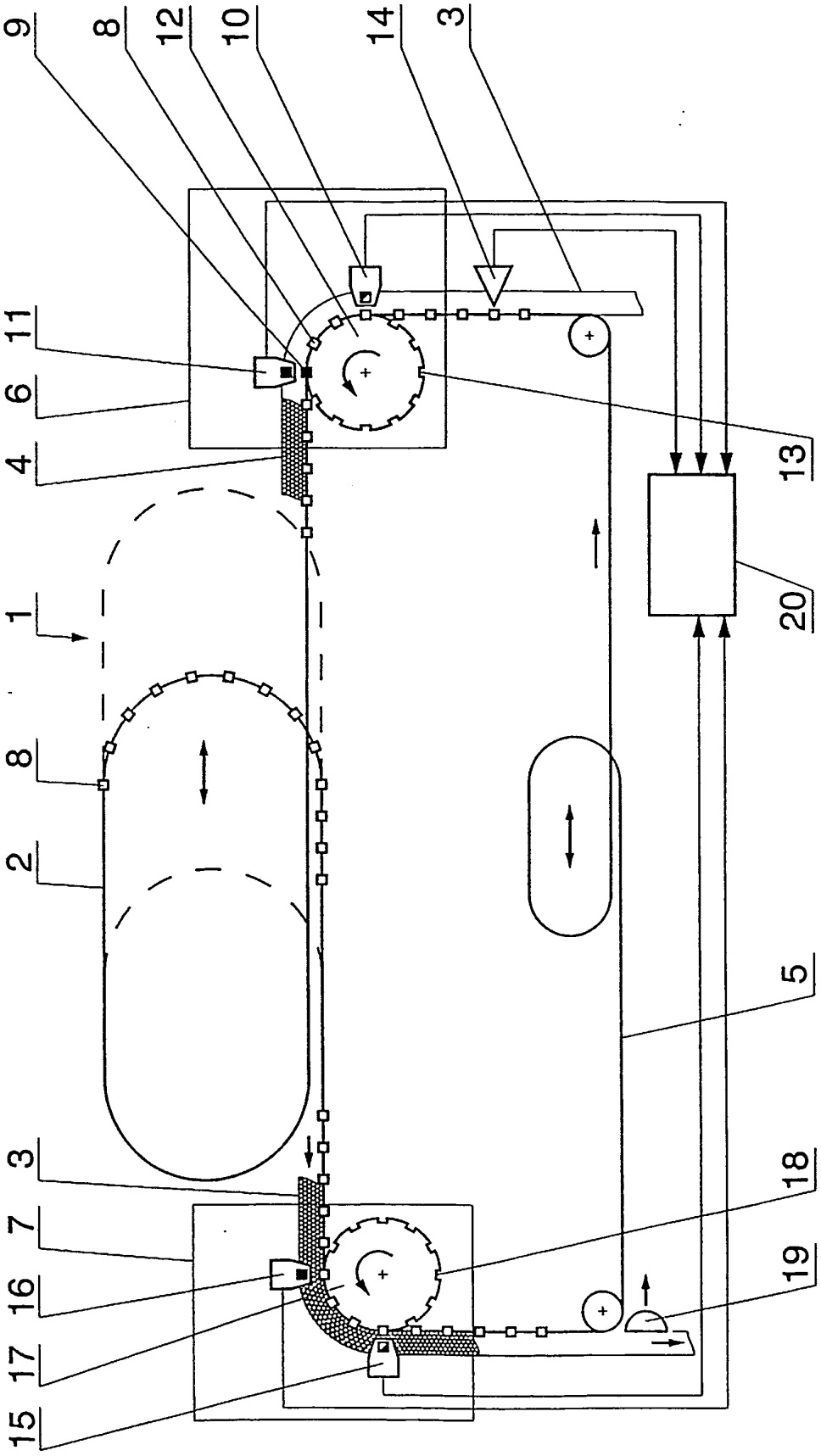

Fig. 1.

REFERENCES CITED IN THE DESCRIPTION

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