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(54) **EXCHANGABLE MACHINE COMPONENTS OF A SPINNING MACHINE WITH IDENTIFICATION RECONGNITION AND A SYSTEM FOR QUALITY CONTROLS**

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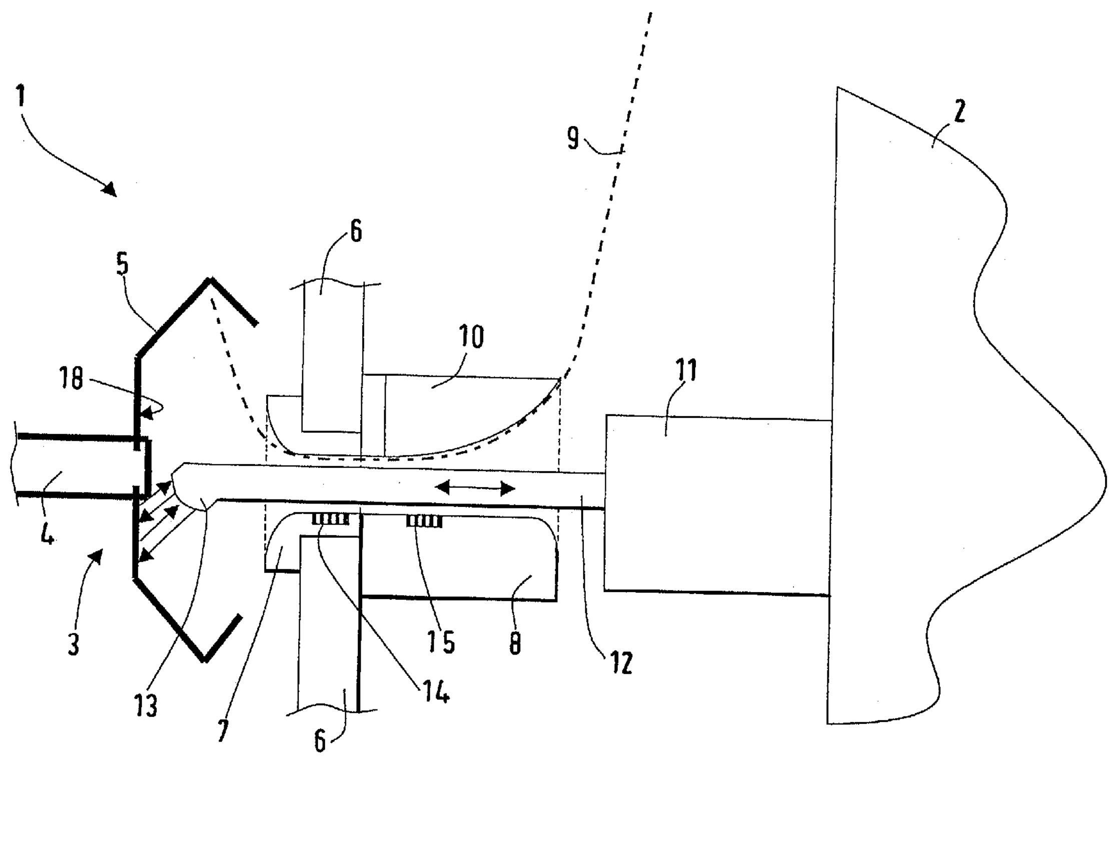
(57) **ABSTRACT**

The invention concerns exchangeable machine components **(20, 30, 40, 50)** of a spinning machine in a spinning works, upon each, in accord with the invention, a corresponding identification recognition symbol **(21, 31, 41, 51)** is placed, in such a manner that said symbol is in a location of simple accessibility for reading. By means of sensors **(22, 32, 42, 52)** the identification recognition symbol **(21, 31, 41, 51)** is automatically detectable, and stored so that the configuration of a spinning station can be immediately called up. The configuration data are thus available for a monitoring and service system, such as, for instance, a remote diagnostic system.



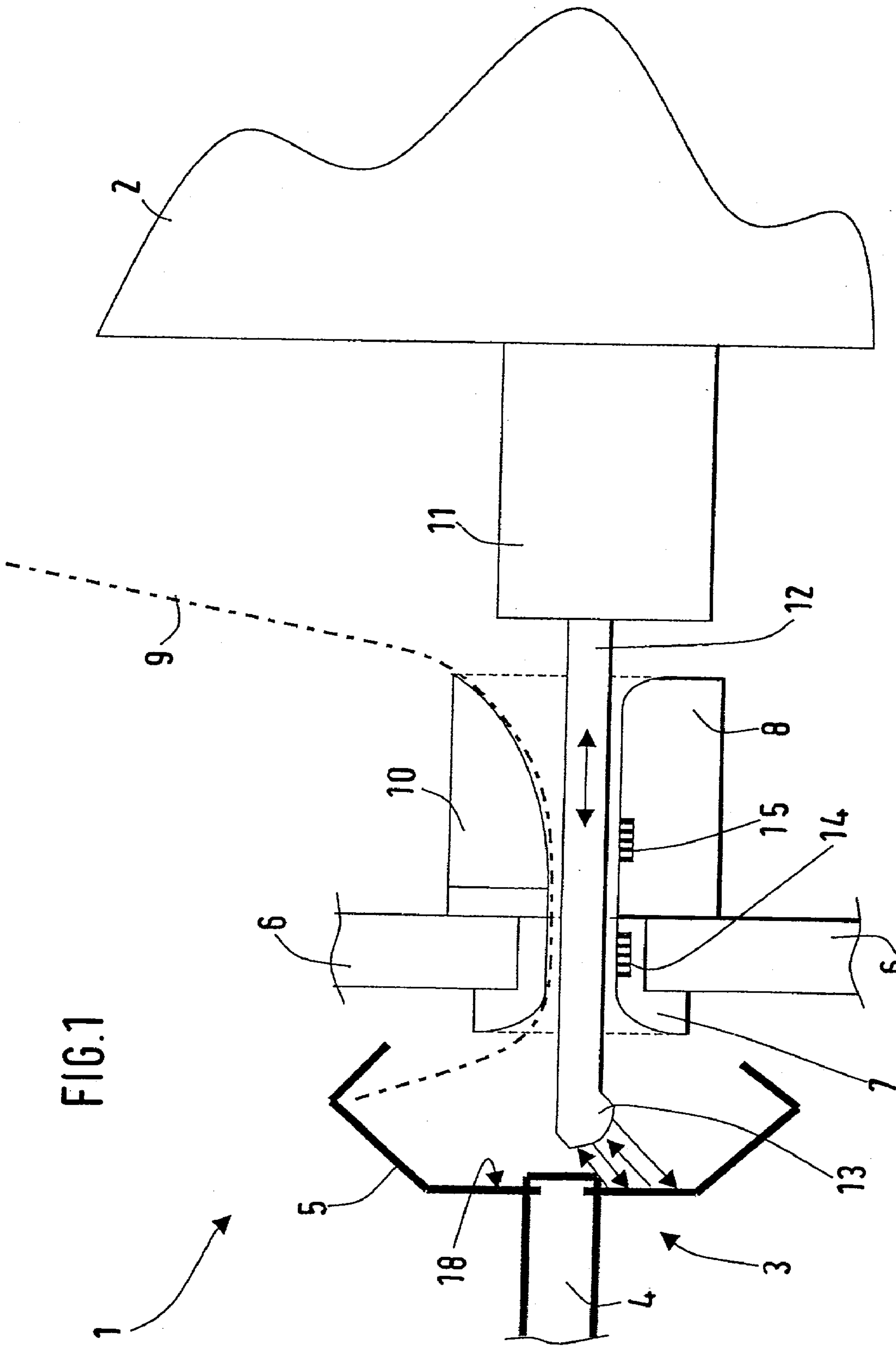


FIG.1

FIG.2A

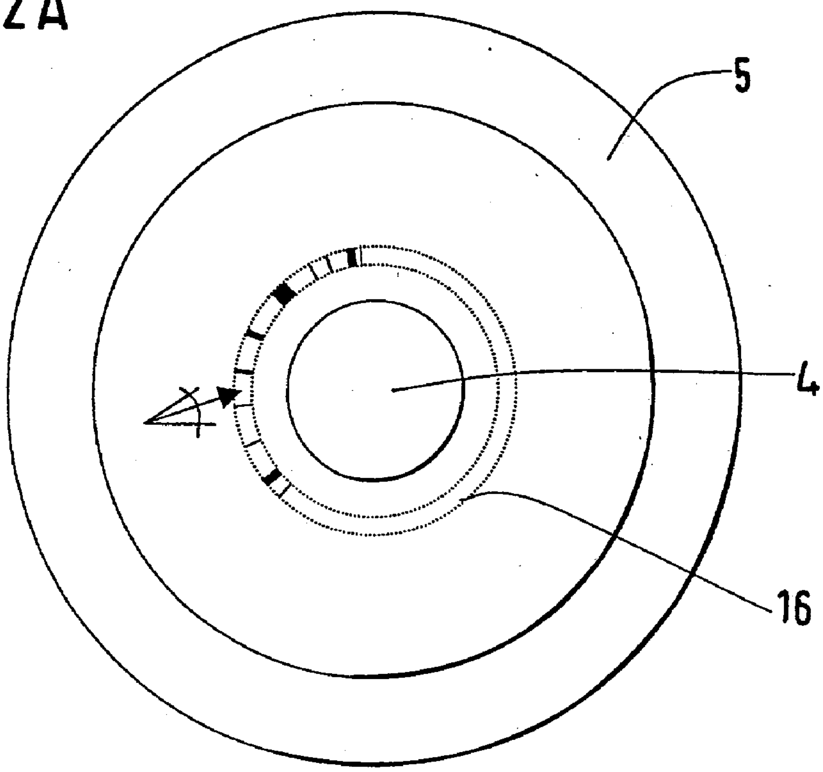
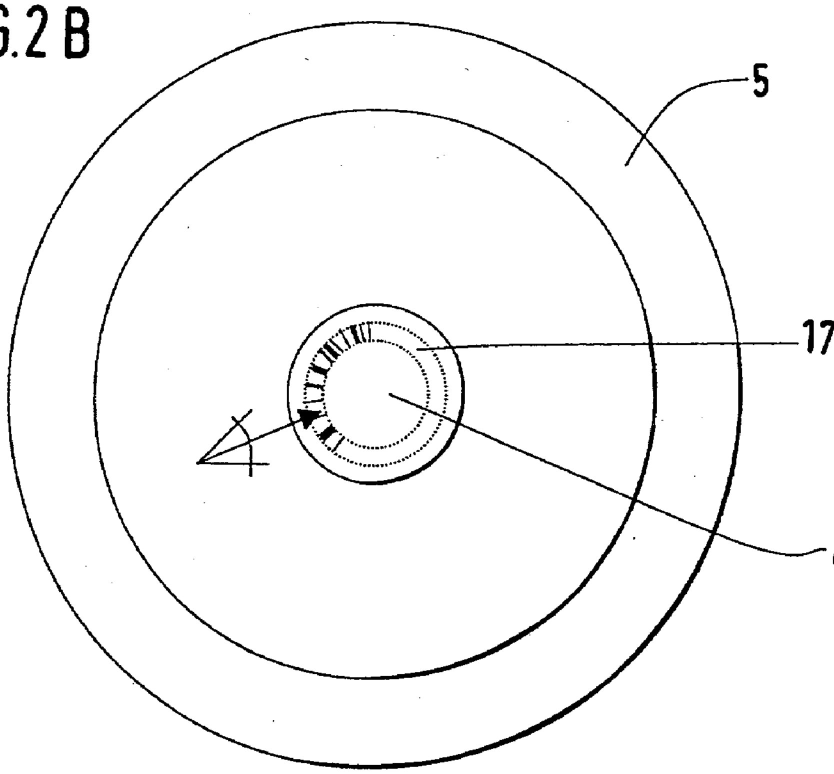
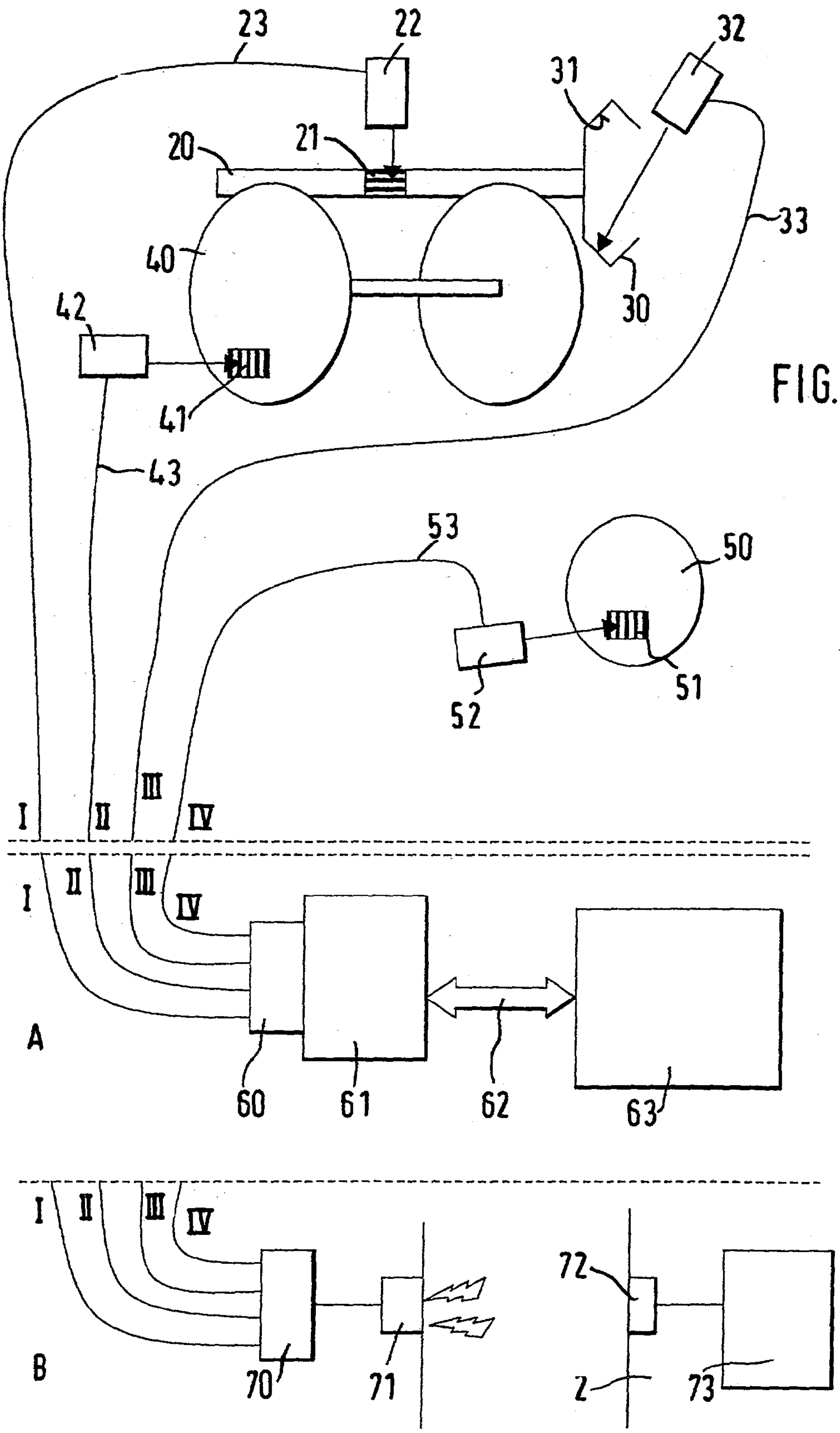


FIG.2B

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41
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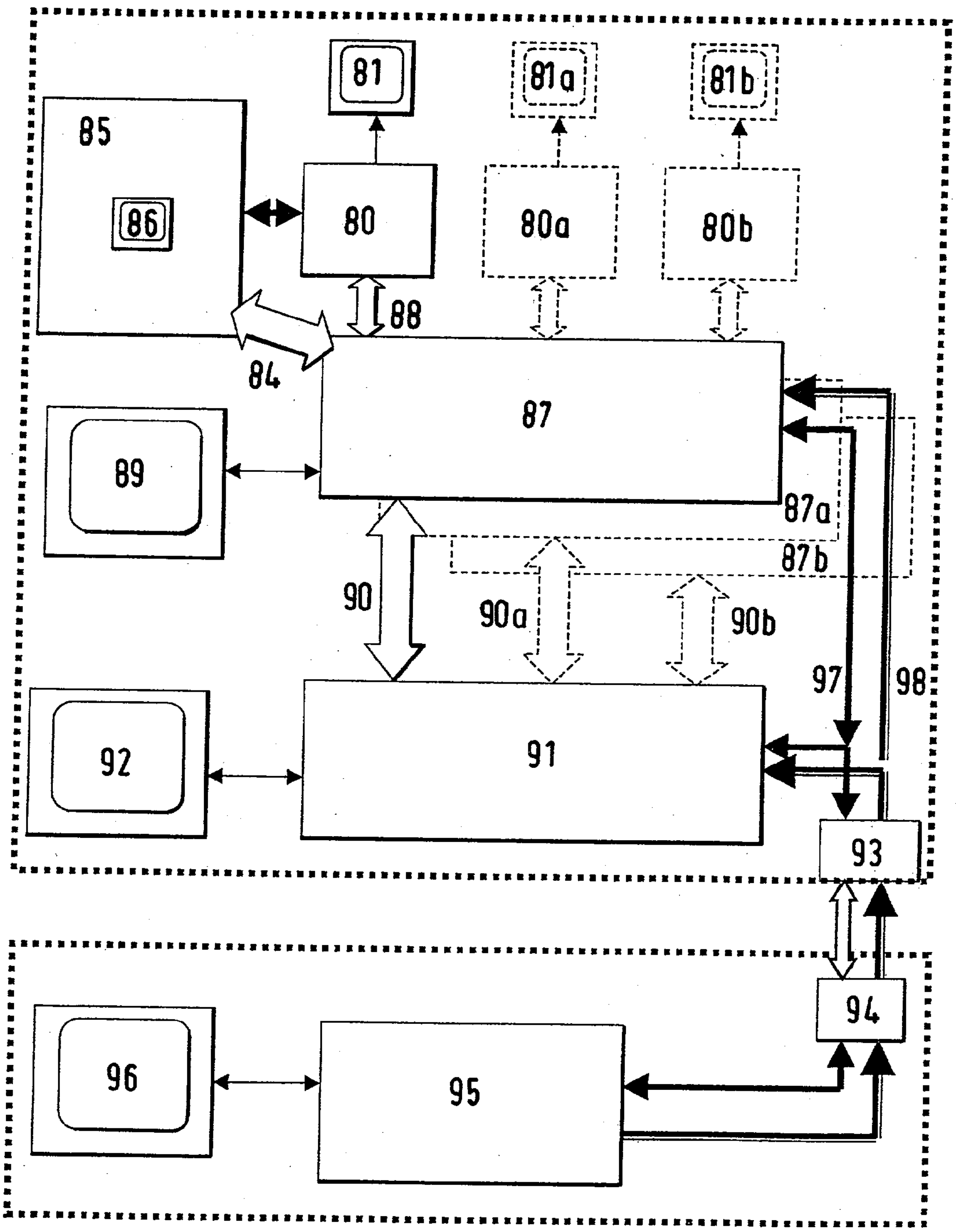
I
II
III
IV
A
60
61
62
63
B
70
71
72
Z
73

FIG.3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81a
81b
85
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80
80a
80b
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84
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87a
87b
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90a
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FIG.4

EXCHANGABLE MACHINE COMPONENTS OF A SPINNING MACHINE WITH IDENTIFICATION RECONGNITION AND A SYSTEM FOR QUALITY CONTROLS

DESCRIPTION

[0001] The invention concerns, at the least, one exchangeable machine component, that is to say, a replaceable part of a spinning machine, which component possesses an identification recognition symbol for automatic detection by a sensor apparatus.

[0002] EP 0 922 797 A2 discloses a spin rotor for an open end spinning machine, in which an identification marking is placed at the outer circumferential rim of the rotor bowl. The identification marking is read in a non-contact manner by a sensor on a service unit. This signal, which is captured by the sensor apparatus with the aid of the identification marking, is compared with data in a control arrangement. The service unit can delay a resumption of spinning, if the signal from the identification marking does not coincide with the pre-input data of comparison. By this means, assurance is provided, that only technically safe, fully qualified spin rotors are allowed to be installed. Identification markings have been proposed which take the form of a bar code or of a transponder. The sensor apparatus can also detect an identification marking either optically or by induction. For the detection of the identification marking, the covering of a spin-box, in which the spin rotor is placed, must be opened and the spin rotor driven by an auxiliary power wheel, so that the identification marking is rotated in proximity to the sensor apparatus.

[0003] EP 1 035 241 A1 likewise makes known a spin rotor, in the case of which, on the outside of the outer circumference of the rotor bowl, a recognition symbol is placed, which, upon stillstand of the spin rotor can be visually recognized by a person. This system, however, excludes any automatic control of the spin rotor.

[0004] Thus it is the purpose of the invention, to develop an exchangeable component of a spinning machine in such a manner, that an automated control and/or quality control system can be converted to use on the said machine.

[0005] This purpose is achieved by the features of the Claims 1, 24, 28 or 35.

[0006] In accord with Claim 1, an identification recognition statement for the automatic capture of the of the recognition by means of a sensor apparatus is placed on the inner circumference and/or on the bottom of a bowl of a spin rotor. The placement of the identification symbol on the inside of the rotor bowl makes possible an automatic reading of the marking (or recognition symbol) during either the turning or the stillstand of the spin rotor. Advantageously, for the said reading, the spin box, under which the rotor is housed, does not have to be opened. For example, although the rotor box is closed, by means of entry through a thread withdrawal nozzle and a thread withdrawal tube, a detector can be inserted into the spin box and positioned to survey the inner surface of the rotor bowl. The advantage is that when this is done it is not necessary that changes to a conventional spin box need be made. Such detection can, for example, be carried out with an apparatus similar to an endoscope, as is described in the following.

[0007] At the same time, because of the placement of the identification recognition symbol on an inner surface of the rotor bowl, a contamination of the bowl can be detected. Such a contamination occurs, for example, during a long run of the spin rotor, when unclean materials secrete themselves in the start materials of the fiber band. Contamination can also occur, when individual fibers are not bound into the withdrawn yarn but accumulate, for example, near to the rotor grooving or it the center at the axis of rotation. The impurities degrade the yarn quality and lead, for example, to a thread monitor giving a fault signal. In spite of automatic rotor cleansing, before a resumption of spinning, such contamination can remain behind and leads then, after the spinning has begun, once again to a deterioration of the yarn quality, which finally results in a creeping lessening of the value of the yarn. Such difficulties can, from a statistical standpoint, only be recognized and determined after a long period of time.

[0008] By means of the placement of the identification symbol on an inner surface of the rotor, then such contamination coats over an area close to or on the identification symbol, so that this becomes illegible for the automatic detection apparatus. By means of the identification symbol, the contamination is detected because, the identification symbol cannot be read or the strength of the signal from the identification symbol falls below a specified set value. In this way, before the generation of a gradual deterioration of the yarn, by means of the detection of the identification symbol, such a contamination is discovered in good time. After the recognition of such a contamination, a fault announcement is emitted, which then signals to the operating personnel, that the rotor must be changed or cleaned.

[0009] The rotor bowl is, in this exercise, a machine element, that is a component of a rotor spinning machine, which is changeable, dependent on the desired product characteristics or if subject to wear. For example, the rotor diameter is chosen because of the desired speed of production of the yarn. Likewise, the type of rotor, that is to say, the make-up of its surface and its shaping, has an influence on the quality of the yarn. Or the type of rotor depends on what kind of threads are intended to be to be spun to a particular yarn. All of the pertinent information for these data can be extracted from the identification symbol and subsequently can be transmitted to a machine control mechanism. In this way, for example, data evaluation can take place, as to whether or not the desired kind of yarn, which was input to the machine control is compatible with the detected, exchangeable machine component. That is, as to whether or not the desired kind of yam can be produced with the type of an exchangeable machine component which is in use at that particular spinning station. In this way, an automatic configuration determination for each single spinning station on a spinning machine is made possible. This advantageous determination is an assist to the quality control sector.

[0010] Besides the rotor bowl, a spinning station of a rotor spring machine possesses additional, exchangeable components and machine parts which, likewise, have influence on the kind of yarns produced and their quality. Other than quality control factors, the automatic detection of the identification mark and the comparison of these with the allowable components for the spinning machine, provide a possible way for increasing the operational safety and the protection of the operating personnel of the spinning machine.

[0011] The above advantages to the rotor bowl are also correspondingly valid for many exchangeable components, which my directly or indirectly have an effect on the type of yarn and its quality, which means also affecting the type and quality of the products of a textile operation. The exchangeable components are, for example, insofar as a rotor spinning machine is concerned: a disintegrator roll, a rotor shaft of the spin rotor, a support disk for the bearing system of the spin rotor, a withdrawal nozzle, a thread out-take tube, a feed hopper or a fiber beard support or a sensor for the quality of yarn.

[0012] In general, the range of spinning machines includes a rotor spinning machine, a friction spinning machine, a ring machine, a carding machine, a stretch works, a air-jet spinning machine and the like, which respectively possess at least one exchangeable component or replaceable part, which either directly or indirectly has an influence on the product quality.

[0013] Advantageously, the identification recognition symbol is the same, in construction or application, in all exchangeable components, so that for the reading of the identification symbol a uniform, identical capture system with, for example, the same detection equipment can be installed.

[0014] If the identification symbol is a spectral identifiable color marking, then, for example, for the construction type of the exchangeable component, for each construction type, a characteristic base color can be used. If the base color lies in the visual perception area, then the operational person can recognize by the different colors alone—that is the different base colors representing the different construction types—what construction type is involved and which construction type has actually been installed in the spinning station. In this case, the color marking is easily detected and can be assigned without failure by the operational personnel. It is of advantage, if, for a specific kind of the yarn to be produced, all exchangeable components are provided with the same color markings, so that the operational personnel on a spinning works machine need only to monitor the agreement of the colors. In this way, the safety is increased in regard to the furnishing of a spinning machine (or spinning station) and the automatic detection system would, on this account have fewer fault-displays as a result.

[0015] If, in the case of the color markings, different color portions are employed, then the complex recognition pattern, possesses a higher degree of information input, than by means of one color area, because of the several spectral colors which can be differentiated.

[0016] When this is done, the information density over the same surface available for the marking, need not call for too great a spatial optical separation, i.e., resolution. For instance, in such a case, the colors could be overlapped, and, by means of the sensor element (for which the resolution is in the spectral realm) the colors could still be differentiated. Especially, in the case of spin rotors which are rotating at an extremely great RPM, it is not necessary to call for a high spatial separation of the marking by means of the sensor element. Because of the relative speed of the identification marking, relative to the sensor element, by exclusively spatial marking, such as a bar code, a likewise extremely high scanning rate of the sensor would be required.

[0017] By means of the application of the ultraviolet and/or the infrared bands of the spectrum at the color markings, the relevant information content increases with thereby achieved extension of the spectral band. The use of the infra red spectral band allows the sensor to be relatively free of disturbances due to dirt accumulation thereon during the measurement. On the other hand, a measurement in the UV spectral band, brings about a greater spatial resolution.

[0018] If the identification recognition marking is provided in an area on the exchangeable component, which is subject to abrasive attack, simultaneously, along with the identification, this can become a test of the degree of wear. For instance abrasive wear to an intolerable degree is in effect as soon as the identification symbol is so far worn away, that this can no longer be read, or as soon as the signal threshold of the detector sensor drops below a specified set value. For instance, the spectral sample of the coating on the teeth on a disintegrator of a fiber band disassociation apparatus is in itself useful as an identification recognition symbol. As soon as the abrasion protection coating wears, at the same time the failure to read the identification recognition symbol, is also a measurement of the degree of wear.

[0019] If the periodicity of the signals obtained from the identification recognition symbol is monitored, then, from this, in the case of a rotatably, bearing set, component, the RPM thereof can be measured. This makes possible a comparison of the actual RPM with a specified RPM input into the machine control. In the case of a deviation of the RPM from a given tolerance range, a fault-announcement can be made. In this way, a recognition of failure and a preventive quality control put in action.

[0020] If the identification recognition symbol is marked in the form of a profile on a surface of an exchangeable component, then, for example, by means of scanning by a propinquity sensor, or by recognition of a pattern of the said surface profile, the recognition can be carried out. For example on the covering of a support disk, by means of the number and the type of the aeration ridges on the running surface of the said support disk, the type of the disk can be recognized.

[0021] Likewise, for example, with the aid of the diameter of the rotor bowl, the type of the spin rotor can be determined, when, at the spin box of a rotor spinning machine, rotors of different diameters are used.

[0022] Where the identification is concerned for an exchangeable machine component, in accord with Claim 24, by the capture of the identification recognition symbol, each individual machine component can be individually recognized and identified. This enables Quality Control to determine that the complete operating life of the so determined component is in normal progress. Thereby, the sequence of use in production of the machine component, which, possibly is put to use in various machines. Further, a record can be made of later tracking of the applications of the said machine component. This is of value, if a spin rotor is run for a certain period at the spinning station, and then, for the purpose of the production of another yarn, is taken out and inventoried for a particular interim. At a later point in time, then this spin rotor is again installed and used further. With an identifying recognition for its individuality, it is possible to protocol and evaluate the entire life of a single spin rotor and upon need, therewith also the achieved degree of quality.

[0023] Alternatively to, or in addition to, the individualized identification recognition symbol, the production batch number for the exchangeable machine component can be obtained.

[0024] With the aid of the component-batch recognition, it is possible, with a parallel record of thread production, to correlate with this batch recognition, such fault announcements as have been registered, or yarn quality determinations, with the production batch number, and thereby to determine, in a preventive manner, whether, and which batch could have possibly led to an operation running outside of the a tolerance limit. With such information, the Quality Control is allowed to select the complete batch of the exchangeable machine components in question from the total inventory of the similarly made machine components. Additionally, one obtains in regard to the source of said component, information about its manufacture and by which production method optimal or less than optimal machine components were made.

[0025] In the case of the spinning station in accord with Claim 28, the measurement/sensor head is particularly assigned to one particular spinning station. The measurement head, on this account, is securely installed proximal to the exchangeable machine component, which is to be monitored, and, for its scanning, need not be brought in to the neighborhood of the said machine component by a mechanism appropriate for such movement. This is particularly of advantage, where machine components, such as support disks or a disintegration roll are concerned, which are placed at difficulty accessible locations in the spin box.

[0026] The sensor head, in such operations, can be an active or a passive element of the sensor apparatus, such as being, for instance, an electrical or a electromagnetic signal receiver/sender apparatus, or an objective lens for an optical detector, or yet a CCD element with spectral-resolving optical elements for color scanning or the like.

[0027] On a cost-reduction basis, it is of advantage, to switch the measured or detected signals from a plurality of exchangeable components, through a multiplexer and the transducer/evaluator unit, before they are transduced and before the evaluation of such signals as must be evaluated. Then, in spite of a multiplicity of measurement points, in this way, only one transducer or evaluator unit need be provided.

[0028] A particularly fault-free transmission occurs in the case of light fiber lines, in which the transmitted optical signals are subjected to no electromagnetic disturbances. If the identification recognition symbol is read off optically, then, in the simplest case, a single measurement head will suffice, if one end of the light fiber line of the identification recognition lies facing a machine component.

[0029] The central detection apparatus and/or evaluation unit, in these operations, can be installed in one of the spinning station supporting service units, that is, in a service robot for the resumption of spinning of a spinning station, so that, in spite of a multiplicity of spinning stations to be monitored, only one detection and/or evaluation unit is required.

[0030] Advantageously, for a signal transmission connection between the spinning station and the supporting service unit, a contact-free, optical send/receive apparatus is provided. This can advantageously be infrared transmission. Alternative thereto, the available communication interface which in any event is between the machine control and the service vehicle can be put to use.

[0031] For the monitoring of the technical furnishings of a spinning station, where at least one exchangeable machine component is present, for each spinning station, in accord with Claim 35, a display and/or interrogation device is provided. This can be, for instance, an LCD-display with one or more lines or a monitor, which, for the interrogation apparatus is equipped with an appropriate input touch provision or a computer key-board. With such equipment, it is then possible for an operator to call up the actual configuration at the spinning station and to oversee the same.

[0032] The display or interrogation, in this matter, as need calls for it, can be located at each spinning station, centrally placed at the spinning machine, at a decentralized control point for the spinning machine, in the central principal control for the spinning works, or externally installed in a central service location.

[0033] Particularly of advantage, is that the interrogation facility allows the configuration of each spinning station on a spinning machine to be called up and these so acquired data then be correlated through the said interrogation facility or through an evaluation unit with other data available from the spinning station.

[0034] For example, the measured degree of quality of the produced yarn can be correlated with the appurtenances of the station, or the total life expectancy of an exchanged machine component monitored, so that, from these data statistical quality analyses can be carried out. If, for instance, the yarn quality at one spinning station lies frequently outside of the accepted tolerance thresholds, then first, a determination may be made as to whether or not the configuration of exchangeable machine components at that particular spinning station is appropriate for the desired quality, or second, if with the aid of other values based on experience, it may be determined if the quality of the yarn, as a matter of data history, can be traced back to a special machine component.

[0035] In accord with the control system as set forth in Claim 44, the so determined and evaluated data from the spinning station are used to optimize control parameters for the spinning machine, or the spinning station, and accordingly input corresponding, optimized parameters at the spinning machine or at the spinning station. With the aid of the acquired results from the quality control, in this way, active measures can be undertaken, in order to increase the quality of the spun yarn.

[0036] The display and/or the interrogation apparatus and the control system are not for installation in only one spinning station of one spinning machine, but are appropriate for the detection, monitoring and control of other types of spinning machinery in a spinning works. Examples for such spinning machines with at least one exchangeable component would be, for instance, a carding machine, a stretch machine or a ring machine.

[0037] Embodiment examples of the invention are, in the following, more closely described with the aid of the drawing:

[0038] There is shown in:

[0039] **FIG. 1**: a partial sectional view of a spinning station and an accompanying robot with an endoscope-like sensor apparatus,

[0040] **FIG.** 2A and **FIG. 2B** a first and a second embodiment example for the placement of a recognition symbol in the rotor bowl of a spin rotor to be read by a sensor,

[0041] **FIG. 3 a** schematic arrangement for the detection of the recognition symbol of exchangeable machine elements, and

[0042] **FIG. 4 a** schematic presentation of a diagnostic system for the monitoring of machine equipment, which said system can be either on-site or remote.

[0043] **FIG. 1** shows a partial sectional view of a spinning station **1** of a rotor spinning machine and the partial profile view of one of the robots **2** which accompany the spinning station **1**. In the spin box of the spinning station **1**, in a conventional manner, a spin rotor **3** is set in bearings and driven.

[0044] The rotor bowl **5** is secured on the forward end of a shaft **4** of the rotor **3**. Opposite to the open side of the rotor bowl **5**, in a cover **6** of the spin box is placed a tread withdrawal nozzle **7**. An the outside of the cover **6**, a small thread withdrawal tube **8** connects with the withdrawal nozzle **7**.

[0045] During thread production, the span product, shown in **FIG. 1** by a dashed line, is pulled from the groove of the rotor bowl **5** through the thread withdrawal nozzle **7** and removed through the thread withdrawal tube **8**. The start of the spinning of the thread **9** is accomplished in a conventional manner by means of the robot **2**. The thread **9**, after the start of spinning, is brought through a withdrawal roll pair in a normal procedure and subsequently wound on a continually driven spool (not shown).

[0046] In the thread withdrawal tube **8** is inserted from above a disklike twist preventer **10**, which is resistant to the abrasion connected with the friction of the thread in withdrawal motion and which possesses a surface structuring, which communicates to the thread a desired number of turns per threads per unit thread length. The passage of the thread withdrawal tube **8** is designed to be slotlike in cross-section, whereby the entry slot proximal to the thread withdrawal nozzle **7** corresponds to the cross section of the boring for the thread withdrawal nozzle **7** and at the thread output side has a funnel-like opening. The free cross section of the thread withdrawal nozzle **7** is thus coaxially extended through the thread withdrawal tube **8** and widens as it opens upward. Upon the withdrawal of the thread **9** the thread lies on an arc segment of the twist preventer **10**.

[0047] On the robot **2** is a movably placed detector unit, which, upon demand, is run into a position opposite to the thread withdrawal tube **8**. In the detector unit is placed an extendible detector tube **12**, which, as said, can be run out of the housing of the detector unit **11** for the detection of the marking. Upon the said extension, the detection tube **12** travels through the thread withdrawal tube **8** and the thread withdrawal nozzle **7** until it is proximal to the rotor bottom **18**.

[0048] In the detector tube, are run light fibers, which extend to the forward end of the tube **12** and are there connected with the imaging system **13**. In the detector unit **11**, is located an illumination source, the light of which is directed through the light fibers in the tube **12** to the said image system, and radiates from that point, i.e., emanates from the image system, which can be, for instance, a lens. The reflected light from the object to be measured is again collected through the imaging system **13** and coupled back over the light fibers into the detector unit **11**, where it is captured by an optical-electronic sensor. If the object to be measured exhibits a color marking, then the detector unit **11** will include also a frequency band filter and a spectral resolution element, the characters of which are dependent upon the illumination source, the background light, and the spectral range of the object.

[0049] On the inner surface of the thread withdrawal tube **8**, is placed an optical marking **15** (shown only schematically), which is detected and read by the imaging system as the tube **12** moves through the withdrawal tube **8**. Correspondingly, on the inner side of the boring of the thread withdrawal nozzle **7** is situated an optical marking **15**, which, again, upon the inward travel of the tube **12** into the spin box, is detected and read. As soon as the detector tube **12** is in its end position, an optical marking on the bottom of the rotor bowl **5** can be read.

[0050] A first embodiment form of an optical marking is presented in **FIG. 2***a*. The optical marking **16** is a concentric marking about the axis of rotation of the rotor bowl **5** and is engraved, for instance, by a laser etching means into the rotor bowl **5**. Because of the separations, and the thickness of the individual bars of the marking **16** (bar code), the evaluation unit is enabled to decipher a number value from the optical signal **16**. The forward end face of the rotor shaft **4** extends partly into the rotor bowl as shown in **FIG. 1**.

[0051] For the reading of the optical marking **16**, the spin rotor is driven by means of a known drive mechanism for said rotor, for example, a tangential belt, which loops over the rotor shaft **4** (not shown). Also, upon the stillstand of the rotor **3**, for instance, when the tangential belt is removed from the shaft **4**, it is the detector tube **12** which is rotated. When this is done, during the turning of the tube **12**, the optical axis of the imaging system, which is inclined, in reference to the axis of the tube **12**, is conducted concentrically over the marked surface of the rotor bowl bottom and the information from the optical marking **16** is read.

[0052] **FIG. 2***b* shows a second embodiment example, corresponding to the previously described reading of the optical marking **16**, whereby the optical axis of the imaging system **13** is less acutely inclined in reference to the axis of the detector tube **12**.

[0053] **FIG. 3** shows an optical detection system for the optical capture of exchangeable components on a rotor spinning machine. For a better visual presentation of the construction of the system, the individual elements are only schematically reproduced. The arrangement and the operation of the elements of the rotor spinning machine are carried out in a conventional manner. In this illustration **3**, the reference number:

20	denotes a shaft of the spin rotor,
21	shows an optical marking on the shaft 20,
22	depicts an optical sensor head,
23	represents a signal line,
30	is a rotor bowl,
31	shows an optical marking on the rotor bowl
32	represents an optical sensor head for the reading of the marking 31,
33	is a signal line,
40	designates a support disk for the bearing system of the rotor shaft 20,
41	is an optical marching on the said support disk 40,
42	represents optical sensor head,
43	a signal line,
50	shows a side piece of a disintegrator roll,
51	represents an optical marking on said side piece 50,
52	is am optical sensor head, and
53	is a signal line.

[**0054**] The sensor heads **22, 32, 42, 52** as well as the signal lines **23, 33, 43, 53** are similarly constructed. The sensor heads are either passive receivers for emission and reception of light, which in this case is transmitted by light fibers as signal lines, or the sensor heads are active, optic-electronic components, which themselves illuminate the marking, pick up the reflected light and convert same into electrical signals. In this operation, the signal lines are electrical lines for the transmission of the signals from the sensor heads and serve also for the supply the voltage for the sensor heads.

[**0055**] A first embodiment example of the signal processing is shown in **FIG. 3**, designated as "A". In this case, the signal lines **23, 33, 43, 53** are brought together in an optic-electronic or electronic multiplexer **60**, and from this respectively a signal is relayed to the reception and evaluation unit **61**.

[**0056**] From that point, the evaluated signals are sent on over a data channel **62** to a control unit **63** of the spinning station or the rotor spinning machine.

[**0057**] In a second embodiment, designated as "B" in **FIG. 3**, the signal lines **23, 33, 43, 53** are combined in at optic-electronic or electronic multiplexer **70** and sequentially sent over a line to a sending unit **71**. The sending unit **71** transmits the multiplexed signal onto a optical stretch to the robot **2**, which supports the spinning station **1**. The robot **2** has a receive unit **72** for the reception of the optical signals from the sending unit **71** and channels the received signals to the control unit **73** of the said robot **2**.

[**0058**] **FIG. 4** shows a block circuit diagram of a service system for a rotor spinning machine. In a control unit **80** of a spinning station **1**, the data are available by means of the configuration of the spinning station. These data were made available from an automatic detection system, as it is shown in an exemplary way in **FIG. 3**. Thus, at any time, the actual and true configuration of the spinning station, that means, the types of the installed, replaceable components can be called up. These data, can, for example, be displayed by a display device **81** at the spinning station.

[**0059**] The designations **81***a*, **81***b* and **80***a*, **80***b* denote additional spinning stations and their control unit as well as their display devices which are not shown elsewhere.

[**0060**] The configuration data were optically transmitted, as, for example, was shown in **FIG. 3**"B" to a robot **85**, actually to the control unit of said robot. In this way, the data can be called up on a display device **86** on the robot **85**. Furthermore, the data can be transmitted over a communication bus **88** between the control unit **80** and a central control **87** for the rotor spinning machine. Thus the configuration data are accessible on a display device **89** connected to central control **87**. From this central control **87**, data can also be sent over a communication bus **84** to the robot **85**.

[**0061**] From the central control unit **87** of the spinning machine, the data can be transferred over a communication bus **90** to a works control equipment **91**, where the data likewise can be accessed on a display device **92**. Shown in dotted lines are further control units for spinning machines **87***a*, **87***b* and communication buses **90***a*, **90***b*, which, in like manner, are connected with the works control equipment **91**.

[**0062**] The control unit of the spinning machine **87** or the works control equipment **91** are connected over communication lines **97, 98** with a data transmission unit **93**. The data from the data transmission unit **93** are received by an external data transmission unit **94** and transmitted to a service unit **95**. At that point, the data can be called up on a display device **96**.

[**0063**] Besides the configuration data, by means of the communication channels **84, 88, 90, 93, 94, 97, 98**, operational parameters for the spinning station, the robot and the spinning machine (for instance, RPM, spool data, withdrawal speed of the thread, entry speed of the fiber band, and the like), as well as the measured thread value (thread quality valuation, which, for example, which is measured by a thread monitor, and yarn quality, thickness, frequency of failure points, etc.) are respectively transmitted to the overall monitoring and control unit **85, 87, 91, 95**.

[**0064**] Having the advantage of the configuration data which is now at hand, the operational and quality parameters then allow, in one of the control units **85, 87, 91, 95** optimized operational parameters to be reached for the operations at the spinning station **80**, and these optimized parameters are transmitted by means of the communication channels **84, 88, 90, 94, 97, 98** back to the spinning station **1**. For example, the optimizing parameters from the service unit **95** are transmitted to the external data transmission unit **94**. Or the data were sent from the service unit **95** to the data transmission unit **93** and either input into the works control equipment or sent directly to the control unit **87** of the spinning machine.

[**0065**] A remote diagnostic system can be realized, in which, because of the available data, an external evaluation can be undertaken, in order that immediately, in the service centrum, a failure-cause-determination is made possible to carry out. Upon the occurrence of disturbances at the spinning station, it is, on this account, not necessary in every case, that a service technician must derive the system configuration directly at the site and carry out the analysis.

Claimed is:

1. A rotor bowl for a rotor spinning machine with a identification recognition symbol **(16, 31)** for automatic detection by a sensor apparatus **(11, 12; 32)**, therein characterized, in that the identification recognition symbol **(16, 31)** is placed on the inside circumferential surface and/or on the inner base of the rotor bowl **(5, 30)**.

2. A disintegrating roll for a spinning machine, especially a rotor spinning machine, therein characterized, in that the disintegrating roll **(50)** possesses an identification recognition symbol **(51)** for automatic detection by a sensor apparatus **(52)**.

3. A disintegrating roll in accord with claim 2, therein characterized, in that the identification recognition symbol **(51)** is placed in the side area of the disintegrating roll **(50)**.

4. A disintegrating roll in accord with claim 3, therein characterized, in that the identification recognition symbol is placed on a side cover of the disintegrating roll.

5. A rotor shaft for a rotor spinning machine, therein characterized, in that the rotor shaft **(4, 20)** possesses an identification recognition symbol **(17, 21)** for automatic detection by a sensor apparatus **(11, 12; 22)**.

6. A rotor shaft in accord with claim 5, therein characterized, in that the identification recognition symbol **(17, 21)** is placed on the circumference and/or on an end face of the rotor shaft **(4, 20)**.

7. A rotor shaft in accord with claim 6, therein characterized, in that the identification recognition symbol **(17)** lies on the end face of the shaft **(4)**, which protrudes through the base of the a rotor bowl **(4)** into the said rotor bowl.

8. A support disk for a rotor spinning machine, therein characterized, in that a support base body **(40)**, a support disk coating and/or a support disk shaft for said support disk possess an identification recognition symbol **(41)** for automatic detection through a sensor apparatus **(42)**.

9. A bearing for a spin rotor bearing of a rotor spinning machine, therein characterized, in that the axial bearing and/or the radial bearing possess an identification recognition symbol for automatic detection by a sensor apparatus.

10. A withdrawal nozzle for a spinning machine, especially a rotor spinning machine, therein characterized, in that the withdrawal nozzle **(7)** possesses an identification recognition symbol **(15)** for automatic detection by a sensor apparatus **(11, 12)**.

11. A thread withdrawal tube for a spinning machine, especially a rotor spinning machine, therein characterized, in that the thread withdrawal tube **(8)** possesses an identification recognition symbol **(14)** for automatic detection by a sensor apparatus **(11, 12)**.

12. A thread withdrawal tube in accord with claim 11, therein characterized, in that a twist inhibitor **(10)** of the thread withdrawal tube **(8)** possesses an identification recognition symbol for automatic detection by a sensor apparatus **(11, 12)**.

13. A feed funnel or a fiber beard fitting of a fiber band disintegrator apparatus of a spinning machine, therein characterized, in that the feed funnel or the fiber beard fitting possesses an identification recognition symbol for automatic detection by a sensor apparatus.

14. A yarn sensor for a spinning machine, therein characterized, in that that yarn sensor possesses an identification recognition symbol for automatic detection by a sensor apparatus.

15. An exchangeable component in accord with one of the claims 1 to 14, therein characterized, in that the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** is a spectrally identifiable color marking.

16. An exchangeable component in accord with claim 15, therein characterized, in that the color marking possesses a plurality of spectrally differentiable color components.

17. An exchangeable component in accord with claim 15 or **16**, therein characterized, in that the color marking possesses spectral ranges, which lie in the spectral frequencies of ultraviolet and/or infrared ranges.

18. An exchangeable component in accord with one of the claims 1 to 17, therein characterized, in that the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** is placed in an abrasive wear zone of the exchangeable component **(3, 7, 8, 10, 20, 30, 40, 50)** and the identification recognition symbol is at least partially erasable by abrasion.

19. An exchangeable component in accord with claim 18, therein characterized, in that by means of the wear conditioned alteration of the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** the degree of wear of the exchangeable component **(3, 7, 8, 10, 20, 30, 40, 50)** can be determined.

20. An exchangeable component in accord with the one of the claim 1 to **19**, therein characterized, in that by means of the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** the rotational speed of the turnably, bearing seated, exchangeable component **(3, 7, 8, 10, 20, 30, 40, 50)** may be determined.

21. An exchangeable component in accord with one of the claims 1 to 20, therein characterized, in that, the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** is a profile on the surface.

22. An exchangeable component in accord with claim 21, therein characterized, in that the surface profile exhibits depressions and/or projections.

23. An exchangeable component in accord with one of the claims 1 to 22, therein characterized, in that the shaping of the exchangeable component **(3, 7, 8, 10, 20, 30, 40, 50)** is determinable as an identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)**.

24. An exchangeable component of a spinning machine with an identification recognition symbol for automatic detection by a sensor apparatus, therein characterized, in that the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** includes at least one individual component recognition characteristic, with the aid of which each individual component is identifiable from an inventory of constructively similar components **(3, 7, 8, 10, 20, 30, 40, 50)**, and/or includes at least one individual batch recognition symbol, with the aid of which, each member of a group of constructively similar components is identifiable in accord with the production batch.

25. A component in accord with claim 24, therein characterized, in that the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** includes a construction type identification of the component **(3, 7, 8, 10, 20, 30, 40, 50)**.

26. A component in accord with claim 24 or **25**, therein characterized, in that the identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** includes an identification of the manufacturer, especially a trademark designation.

27. A component in accord with one of the claims 24 to 26, therein characterized, in that the component **(3, 7, 8, 10, 20, 30, 40, 50)** is one of a plurality of constructively similar components in an inventory in accord with one of the claims 1 to 23.

28. A spinning, station **(1)** of a spinning machine with at least one exchangeable component **(3, 7, 8, 10, 20, 3040, 50)**, which possesses an identification recognition symbol **(14, 15, 16, 21, 31, 41, 51)** for automatic detection by means of a sensor apparatus, whereby from one central detection apparatus (**61, 73**), respectively, a signal line (**23, 33, 43, 53**) or a signal routing runs to a component (**3, 7, 8, 10, 20, 3040, 50**) for the detection of the identification recognition symbol, therein characterized, in that the measuring head (**22, 32, 42, 52**) of the sensor apparatus is dedicated to that spinning station.

29. A spinning station in accord with claim 28, therein characterized, in that the central detection apparatus (**61**) possesses a multiplexer (**60**) or a transducer device for switchovers between the signal lines (**23, 33, 43, 53**).

30. A spinning station in accord with claim 28 or **29**, therein characterized, in that the signal line (**23, 33, 43, 53**) is a fiber light line.

31. A spinning station in accord with claim 28, **29** or **30**, therein characterized, in that the measuring head (**22, 32, 42, 52**) has at least an optical element and/or an optical-electronic element.

32. A spinning station in accord with one of the claims 28 to 31, therein characterized, in that the central detection unit (**73**) is placed in one of the attendant service apparatuses (**9, 85**) and between the signal lines (**23, 33, 43, 53**) in the spinning station, which lead to the components (**3, 7, 8, 10, 20, 30, 40, 50**) and the signal lines, which run to the central detection unit, a signal transfer connection (**71, 72**) can been made.

33. A spinning station in accord with claim 32, therein characterized, in that a multiplexer (**70**) or a switch-over apparatus is placed in the spinning, station (**1**).

34. A spinning station in accord with one of the claims 28 to 33, therein characterized, in that the component is at least a component (**3, 7, 8, 10, 20, 30, 40, 50**) in accord with one of the claims 1 to 27.

35. A display and/or interrogation device for a spinning station of a spinning machine, in particular a rotor spinning machine, whereby the spinning station (**1**) possesses at least one detection apparatus (**22, 32, 4252**) for automatic detection of an identification recognition symbol (**14, 15, 16, 21, 31, 41, 51**) of at least one exchangeable component (**3, 7, 8, 10, 20, 30, 40, 50**) and by means of the said detection apparatus, data regarding components are available, which, with the aid of the recognition symbol, can identify a component in question.

36. An apparatus in accord with claim 35, therein characterized, in that a control/display (**80, 81**) is placed at each spinning station.

37. An apparatus in accord with claim 35, therein characterized, in that the equipment (**87, 89**) is dedicated to a central control (**87**) of the spinning machine and the data are available for each spinning station (**1**) .

38. An apparatus in accord with claim 35, therein characterized, in that the spinning machine possesses a service apparatus (**2, 85**) available to each spinning station (**1**), whereby the display device (**86**) is assigned to the said service apparatus (**85**) and the data are available for each spinning station (**1**).

39. An apparatus in accord with claim 35, therein characterized, in that the spinning machine is installed in a spinning works, whereby the control/display (**91, 92**) is a central control (**91**) assigned to the said spinning works and the data is available for each spinning station (**1**) and/or for each spinning machine.

40. An apparatus in accord with claim 38 or **39**, therein characterized, in that the central controls (**87, 91**) of the spinning machine, of the spinning works respectively, is connectable with an external service center for data exchange wherein a service unit/display arrangement, respectively (**95, 96**), is dedicated to said service center, and the data in said service center are available for each spinning station (**1**) and/or each spinning machine.

41. An apparatus in accord with one of the claims 35 to 40, therein characterized, in that the display device (**81, 89, 92, 96**) is a display screen or a monitor.

42. An apparatus in accord with one of the claims 35 to 41, therein characterized, in that the spinning station (**1**) possesses at least one element and/or a component (**3, 7, 8, 10, 20, 30, 40, 50**) in accord with one of the claims 1 to 27.

43. A remote diagnostic system for a spinning machine with a display device and/or an interrogation means (**80, 81**; **85, 86**; **87, 89**; **91, 92**; **95, 96**) in accord with one of the claims 35 to 42.

44. A control system for a spinning machine, therein characterized, in that, with an evaluation and control apparatus of the control system, data can be called up and evaluated by each spinning station (**1**) from a device and/or interrogation means (**80, 81**; **85, 86**; **87, 89**; **91, 92**; **95, 96**) in accord with one of the claims 35 to 43 and at least a portion of the control parameters for the operation of each spinning station (**1**) or a service robot (**2, 85**) available thereto may be determined with the aid of the therein contained data.

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