

METHOD AND MACHINE FOR UNRAVELING KNITTED FABRICS

TECHNICAL FIELD

The present invention relates to methods for unraveling knitted fabrics, the said methods providing that the unraveled yarns is brought into a reusable form by such a way that the
5 knitting order of yarns of the knitted fabrics for knitwear production is determined automatically whatever the number of yarns in the knit is and the yarns are unraveled either by stretching and loosening according to the knit types or by twisting the yarns to each other, and relates to a machine for unraveling knitted fabrics, the said machine being operated by the said methods, characterized in that the said machine involves the desired
10 numbers of units for unraveling knitted fabrics, thus it will be able to unravel the desired numbers of yarns and the desired numbers of various knitted fabrics together, and will be able to be controlled and used easily.

BACKGROUND ART

According to a method disclosed in US Patent No. 4530137, yarn ends are wound around
15 pulleys connected to sliding clutches, which are actuated by the same shaft driven by a common motor, have a constant torque and are preset manually. The clutches, which are preset for promoting torque such that it can overcome the frictions in the knit in order to allow the yarn to be unraveled, provides that the unravelable yarns are wound around the said pulleys by rotating the pulleys. The stopped-up yarns remains stretched due to the
20 torque on the said sliding clutches and the pulleys connected to the said yarns stops rotating, naturally at that time. In the case that all of the yarns are stopped up, the system stops and the operator should manually eliminate the stoppage. During the said operations, the stretched form of the yarns is maintained and any loosening operation is not carried out.

In the conventional machines marketed currently, the yarn ends are stretched by means of
25 tension arms, the said tension arms maintaining the tension of the yarns by gravity due to their weights constant and/or by a spring where the yarns are pulled. After the unravelable yarns are attached to the said tension arm, they are connected to bobbin winders driven by their individual motor. Since the tension on the unravelable yarn is relatively less, the tension arm is in the open position and the yarn is winded to the bobbin by the operation of

the electrical motor of the bobbin whereon the said yarn is connected, by means of an electrical switch connected to the said arm. At the moment when the yarn is stopped up, the reservoir arm comes to further closed position because of the increase in the yarn tension and by turning off the same electrical switch connected to the said arm, the current on the motor of the bobbin whereon the yarn is wound is cut off and with the use of an electromechanical brake or electrical brake applied to the motor directly, the bobbin is stopped so that the yarn breakage do not occur. In addition, in this method, the stopped-up yarns remain stretched and in the case that all of the yarns are stopped up, again the operator should eliminate the problem of stoppage of the yarns manually. During the said operations, tension of the yarns is maintained and any loosening operation is not carried out.

THE OBJECT OF THE INVENTION

The object of the present invention is

to provide a method, wherein any fabric knitted with yarns is unraveled easily whatever the condition thereof is, for example how many plies exist in the yarn tuft, how many yarn tuft is used in knitting or how the said fabric is knitted, so that the yarns can be brought into the re-usable form and

to provide a machine comprising desired number of units for unraveling knitted fabrics, the said units being able to operate practically and easily in all conditions by using the methods for unraveling knitted fabrics, with the characteristics of tension-loosening and twisting of the yarns to each other if required, and being able to unravel the desired number of various knitted fabric or fabrics simultaneously without taking into account how many plies of yarn tuft and how many yarn tuft the knitted fabric has been knitted with, and having operational modes that can operate the units for unraveling knitted fabrics separately or the desired number of units together if necessary.

THE BRIEF DESCRIPTION OF THE DRAWINGS

In order to achieve the objects of the present invention, the machine for unraveling knitted fabrics wherein methods for unraveling knitted fabrics are used is illustrated in the accompanying drawings, in which:

Figure 1 is a three-dimensional general schematic view of the machine for unraveling knitted fabrics with six unraveling units;

Figure 2 is a three-dimensional schematic view wherein in the two of the three unraveling units of the machine for unraveling knitted fabrics, with multi-unraveling units, during
5 unraveling of a fabric knitted by two yarns with double plies and one yarn with a single ply, two yarns are unraveled together via twisting operation and the single yarn is unraveled normally;

Figure 3 is three-dimensional view of a single unraveling unit of the machine for unraveling knitted fabrics, the parts of the said unit and the way followed by the yarn
10 guided through the said unit;

Figure 4 is three-dimensional view of a mechanism in operative position, used for unraveling only knits with yarns having more than one ply, in one section of a machine surface table whereon a single unraveling unit of the machine for unraveling knitted fabrics is contained;

15 Figure 5a is a side sectional view on the A-A line of the machine for unraveling knitted fabrics, wherein the twisting claws (catches) are not in the opened position while the false twisting apparatus used for unraveling knitted fabrics with yarns of more than one ply operates with low speeds or is stable;

20 Figure 5b is the plan view of the machine for unraveling knitted fabrics wherein the twisting claws are not in the opened position while the false twisting apparatus used for unraveling knitted fabrics with yarns of more than one ply operates with low speeds or is stable;

Figure 6a is a side sectional view on the A-A line of the machine for unraveling knitted fabrics wherein the twisting claws are in the opened position while the false twisting
25 apparatus used for unraveling knitted fabrics with yarns of more than one ply operates with high speeds;

Figure 6b is the plan view of the machine for unraveling knitted fabrics wherein the

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twisting claws are in the opened position while the false twisting apparatus used for unraveling knitted fabrics with yarns of more than one ply operates with high speeds;

Figure 7a is a schematic view of the machine for unraveling knitted fabrics at the normal state wherein the twisting claws are not in the opened position while the false twisting apparatus used for unraveling knitted fabrics with yarns of more than one ply operates with low speeds or is stable;

- 5 Figure 7b is a schematic view of the machine for unraveling knitted fabrics wherein the twisting claws are in the opened position while the false twisting apparatus used for unraveling knitted fabrics with yarns of more than one ply operates with high speeds and the yarns are twisted by the rotation performed;

- 10 Figure 8a is a view of the machine for unraveling knitted fabrics at the moment when the yarn in a single unraveling unit has been loosen;

Figure 8b is a view of the machine for unraveling knitted fabrics at the moment when the case of unraveling of the yarn in a single unraveling unit by stretching is tested;

Figure 8c is a view of the machine for unraveling knitted fabrics wherein the yarn in a single unraveling unit is pulled by a winding unit, to be unraveled and winded;

- 15 Figure 8d is a view of the machine for unraveling knitted fabrics at the moment when the yarn in a single unraveling unit is stopped up during the unraveling operation;

Figure 9a is a sectional view of the case that the yarn attached to a mechanical Yarn tension sensor passage completes the circuit when it is in stretched form;

- 20 Figure 9b is a sectional view of the case that the circuit is kept in open position in the condition that the yarn attached to a mechanical yarn tension sensor passage is not in stretched form;

Figure 10 is a schematic view of the unraveling order of a kind of fabric knitted by three different yarns, each of which has one ply;

- 25 Figure 11 is a schematic view of entanglement in the unraveling order of a kind of fabric knitted by three different yarns, each of which has one ply;

Figure 12 is a schematic view of the cases of stretching and loosening of the yarns in order

to solve tangles in the unraveling order of a kind of fabric knitted by three different yarns, each of which has one ply;

Figure 13 is the schematic view of a problem when the yarns in a fabric knitted by using two different yarn with one ply in the same loop are pulled together in order to be
5 unraveled;

Figure 14 is a schematic view wherein the problem in the Figure 13 is eliminated by twisting the yarns together at the instant that the yarns are stopped up, and

Figure 15 is a schematic view wherein the yarns are twisted together at the instant that the yarns are unraveled in order not to meet the problem arisen in the Figure 13.

10 The numbers corresponding the members in the figures are indicated in the following:

- (1) Tension/reservoir arm (optionally stretchable)
- (2) Tension/reservoir arm shaft
- (3) Crank arm
- (4) Electrical switch cam
- 15 (5) Electrical switch
- (6) Piston arm
- (7) Piston
- (8) Rigid piston spring
- (9) Piston tube spring
- 20 (10) Fluid input
- (11) Actuator body
- (12) Fixed support
- (13) Chassis plate
- (14) First yarn guide passage of the arm
- 25 (15) Second yarn guide passage of the arm
- (16) False (artificial) twisting apparatus
- (17) Yarn support
- (18) First yarn feeder
- (19) Second yarn feeder

(20) Belt

- (21) First fixed yarn guide passage
- (22) Passage with movable cover
- (23) Yarn bobbin
- (24) Yarn bobbin arm
- 5 (25) Movable joint
- (26) Yarn winding drum
- (27) Yarn winding drum shaft
- (28) Yarn winding drum motor
- (29) Fixed support of the yarn winding mechanism
- 10 (30) Spring of the yarn winding mechanism
- (31) Crank arm of the yarn winding mechanism
- (32) Yarn-tension sensor
- (33) Yarn-feeders motor
- (34) Revolute joint housing
- 15 (35) Rubber surface actuated by the first yarn feeder
- (36) Anti-friction bearing
- (37) Upper yarn feeder input guide passage of false twisting apparatus
- (38) Lower yarn feeder output guide passage of false twisting apparatus
- (39) Claw, with hollow middle part at the bottom, of false twisting apparatus
- 20 (40) Claw, with hollow middle part at the top, of false twisting apparatus
- (41) Spring, holding the claw with hollow middle part at the bottom, of false twisting apparatus
- (42) Spring, holding the claw with hollow middle part at the top, of false twisting apparatus
- (43) Shaft attaching the claw, with hollow middle part at the bottom, to the base of the
- 25 false twisting apparatus
- (44) Shaft attaching the claw, with hollow middle part at the top, to the base of the false twisting apparatus
- (45) Revolute Joint
- (46) Fixed top cover of the yarn twisting mechanism
- 30 (47) Joint connecting the piston arm to the crank arm
- (48) Movable top plate the passage

- (49) Movable bottom contact plate of the passage
- (50) Movable contact ring of the passage
- (51) Movable collecting box of the passage
- (100) Model yarn for illustration
- 5 (101) Unraveled yarn end
- (102) Unraveled yarn end
- (103) Unraveled yarn end
- (104) First unraveled loop of the yarn (101)
- (105) Yarn (102) loop contained within the first loop at the end of the knitted fabric to
- 10 be unraveled of the other yarn (101)
- (106) First yarn (102) loop to be unraveled
- (107) Yarn (103) loop contained within the first loop to be unraveled of the other yarn
- (102)
- (108) First yarn (103) loop to be unraveled
- 15 (109) Yarn (101) loop contained within the first yarn (103) loop to be unraveled other
- than the loops in the upper order, which is not unraveled
- (110) First yarn (103) loop tangled since it can not be unraveled
- (111) Second yarn (103) loop tangled since it can not be unraveled
- (112) Second yarn (102) loop in the second order which is not unraveled
- 20 (113) First yarn (102) loop in the second order which is not unraveled
- (114) Second yarn (101) loop in the second order which is not unraveled
- (115) First yarn (101) loop in the second order which is not unraveled
- (140) Fixed final yarn guide passage of the first unit for unraveling knitted fabrics
- (141) Third yarn guide passage of the first unit for unraveling knitted fabrics
- 25 (142) Second yarn guide passage of the first unit for unraveling knitted fabrics
- (143) First yarn guide passage of the first unit for unraveling knitted fabrics
- (144) Fixed final yarn guide passage of the second unit for unraveling knitted fabrics
- (150) Unraveled yarn end with two plies
- (151) Yarn end unraveled
- 30 (152) Yarn end unraveled
- (153) First yarn (151) loop to be unraveled

- (154) Second yarn (151) loop to be unraveled
- (155) Third yarn (151) loop to be unraveled
- (156) First loop contained within the third unraveled yarn (151) loop to be unraveled, on
the side of an upper knitting order which has been not unraveled, where the yarns
5 (151, 152) are knitted together
- (157) Second loop contained within the second unraveled yarn (151) loop to be unraveled,
on the side of an upper knitting order which has been not unraveled, where the yarns
(151, 152) are knitted together
- (158) Third loop contained within the first unraveled yarn (151) loop to be unraveled on
10 the side of the upper knitting order which has been not unraveled, where the yarns
(151, 152) are knitted together
- (159) Knitted loop with two plies
- (170) Unraveled model yarn, used in knitting with two plies
- (171) Unraveled model yarn, used in knitting with two plies
- 15 (172) Unraveled model yarn, used in knitting with single ply
- (200) Machine for unraveling knitted fabrics with more than one unraveling unit
- (201) Unraveled knitted fabric
- (202) Control panel
- (203) Indicator table
- 20 (204) Pins for hanging knitted fabrics
- (205) Hanger surface
- (206) Control button
- (207) Warning lamp

DETAILED DESCRIPTION OF THE INVENTION

- 25 When there is a necessity for unraveling the knitted fabrics, the said knitted fabrics being
formed such that the yarn or yarns is/are guided through the loops in a particular
arrangement. The unraveling operation is not carried out as easily as the knitting operation
since, according to the knitting types, it is not sufficient to keep the yarns stretched by
pulling them continuously and then the determination of the unraveling order of the yarns,
30 and unraveling times and elimination of the tangle of the yarns becomes necessary. While

testing to eliminate the said problems, it should be paid attention not to form the yarn breakages.

All of the problems mentioned above are solved by the stretching-loosening characteristics constituting the base of the method for unraveling knitted fabrics according to the present invention and by a machine for unraveling knitted fabrics operated by the said methods. In
5 all stages of the unraveling operation, if necessary the yarns of the knitted fabric is stretched or loosened. If necessary, they are twisted onto each other.

The machine for unraveling knitted fabrics according to the invention consists of more than one unit for unraveling knitted fabrics. The increase in the number of the said units
10 provides that more than one knitted fabric can be unraveled simultaneously and the knitted fabric with multi-yarns can be unraveled. Each of the units for unraveling knitted fabrics comprises three basic parts and passages. The said parts are tension/reservoir arm (1), winding unit, and sensors. Also yarn feeders (18,19), twisting mechanisms, and parts acting as a spring are included in the said units. The yarns are actuated individually or all together
15 by means of the winding unit, yarn feeders (18,19) or parts acting as a spring.

The unraveling operation according to the invention is started first by connecting the yarn or yarns of knitted fabric to the different unraveling units of the machine arbitrarily. Whether or not the yarns have been unraveled by stretching and then loosening them individually is determined and the unraveling order and the case whether or not they have
20 been unraveled is recorded. After unraveling the yarns individually, the yarns, which cannot be unraveled and are stopped up thereafter are tested by stretching and loosening thereof if required, until they are unraveled according to the order recorded. Except for emergency requirements, sensors are used to detect that the tension in the yarn exceeds the tension necessary not to break the stretched yarn therefrom under this condition it is
25 understood that the yarn is stopped up and then it is loosened.

During unraveling of the knitted fabric, when the tension on the yarns stopped up at the end of the knitted fabric or within the knitted fabric due to some reasons is high and/or is maintained, the loops forming the continuation of the said yarn get smaller because of the tension whereon and then make the other loops where the yarn is connected tangled. The

tangled loops resulted from the said tension prevents the other loops from being unraveled and they form a kind of entanglement. Stretching the yarns in order to eliminate the said entanglement may cause some breakage in the yarns. Although the entanglement is eliminated and then loops can be unraveled by means of high tension applicable to relatively strong yarns, mostly it may not be possible to achieve this. The high tension applied to the yarns in order to eliminate the said entanglement, then to unravel the loop, it increases the tangle of the yarn, and it may cause the yarn to break. The lower tension applied such that it will not cause the said tangle becomes mostly insufficient to overcome the friction force required to unravel the loops being not tangled so that they can be unraveled normally, therefore the unraveling operation can not be carried out.

The said problem was exemplified by a single knitted jersey fabric formed by three yarns with single ply and order (Figure 10). The problem is identical in double jersey or other knit types. In this example, the knit is unraveled by pulling the yarn ends (101, 102, and 103). The case wherein two of the said unraveled yarn ends (101, 102) are stopped up when they reach to the knit end is illustrated in another example (Figure 11). Because the loops (114, 115) being the continuation of one of the yarns (101) and the loops (112, 113) being the continuation of another yarn (102) get smaller, due to the tension on the yarns (101, 102), the said tangle occurs (Figure 11). The case where the said loops (112, 113) getting smaller make the other loops (110, 111) within the said loops tangled (Figure 11). Although there is a normal tension on the yarn (103) except for the yarns stretched because of the said reason, the loops (110, 111) being the continuation of the said yarn (103) cannot be unraveled due to this tangle (Figure 11).

As described in the said example, the tension on the unraveled yarns is eliminated by unraveling by means of the method according to the present invention. In this method, the tension on the unravelable yarn or yarns is maintained, the yarns being stopped up due to any reason while unraveling operation are loosened by eliminating their tension and the said stopped-up yarns are stretched again at a time if required and in required orders. This operation can be carried out at an instant when one of the unraveled yarns is stopped up or when it is understood that they are stopped up after they are tested or at an instant when all of the yarns are stopped up or immediately after these events. Such stoppages are

diminished or terminated also by the use of the machine according to the invention automatically or by means of mechanisms making the stopped-up yarn both stretched and non-stretched according to the command coming from a control unit.

This method can prevent the loops constituting the continuation of the stopped-up yarns
5 from getting smaller, to some extent. Even if the loops has got smaller due to the inertia of the tension mechanisms or sudden tension caused by the stoppage, and they has tangled the yarns required to be unraveled, they can be unraveled; because the loop getting smaller due to the tension on the yarns being continuation of the loops required to be unraveled and a force exerted on the loop getting smaller can get larger by using a loosened yarn being its
10 respective continuation of it. Therefore, it is provided that the loop following the order can be unraveled (Figure 12). Also in the same method, loosening of other yarns at the end of the knit, the said yarns having been completed the knitting order and being in stretched form, becomes helpful in receiving the yarn, which is required so that the loops getting smaller get larger, from the yarn being its own continuation. The elimination of the
15 stoppage described in the previous example is illustrated in another figure (Figure 12). It is seen that the loops (110, 111), preventing the other loops (112, 113) getting smaller due to the tension of one of the stopped-up yarns (102) in this example from being tangled and then being unraveled, get larger by taking the yarn from the loop (113) being own continuation of the loop (112) get smaller previously (Figure 11) by the help of a force, the
20 said force forming the tension on the yarn (103) being the continuation of the said loops (110, 111) (Figure 12). In addition, the loop (113) through which the yarn is taken takes some yarns from the own continuation of the loosened yarn (102) and so the tension thereon is diminished (Figure 12). Because of that this loosened loop (112) of the yarn (102) gets larger, the first loop (110) of the other yarn tangled within this loop following
25 the order can be unraveled easily (Figure 12). Since the force, which forms tension of this yarn (103) stopped up on the loop (112) of the other yarn (102) that tangles it, is sensed on the loop (114) of another yarn (101) that also tangles this yarn? it is necessary that firstly, the yarn (101) is loosened and so a further yarn to eliminate the tangle. Providing that the yarn is loosened to supply also further yarn to the other yarn (102) tangled by the loops
30 (114, 115) of this yarn loosened in the same manner, also tangled loops (112, 113) of this yarn is allowed to loosen and gets larger. Hence it is provided that the loops (110, 111) of

the third yarn (103) tangled by them, the loops (110, 11) tangled by providing the tension of this yarn (103) of all of these tangled loops, (112, 113, 114, 115) become free. The loosening operation can be carried out automatically at the instant when the yarns are stopped up and it is performed also after the yarns are stopped up or at an instant when all
5 of the yarns are stopped up, depending on the type of the knit and the yarn.

After the yarns forming the unraveled fabric or the yarn ends are loosened by the use of the method for unraveling knitted fabrics according to the present invention, the tension the yarn intended to be unraveled or the yarn or yarns tested in respect to their unravelability should be changeable in order to continue to unravel these yarns. This is provided by a
10 mechanism, which can give and remove tension automatically in any way and by the machine for unraveling knitted fabrics according to the present invention wherein parts comprising the said mechanism are directed by a program.

According to the commands given by a control unit, this operation wherein the mechanism is operated is carried out according to a predetermined or moment-produced order in any
15 way wherein the said order are determined by this control unit or manually, the said control unit being developed in accordance with a program which evaluates and then predicts the unraveling order of the yarns attached on the units for unraveling knitted fabrics arbitrarily according to the position of the said unit wherein the yarns are attached, after the yarns are tested by stretching and loosening.

During these operations, it is necessary to stop immediately the bobbin whereon the yarn is wound after the yarn is stopped up. Otherwise, the stretched yarn can break. Actually, it is impossible to stop this winding of the bobbin at the instant when the yarn is stopped up in real atmosphere since the bobbin and the motor driving the said bobbin have inertia. For the said reason, some yarn should be supplied to the bobbin so that the breakage of the yarn
25 does not occur until the bobbin (23) stops completely. This operation is provided by means of a reservoir system supplying yarns, in the machine (Figure 3). The said system consists of a tension/reservoir arm (1), the yarn guide passages (14, 15) on the said arm, an electrical switch cam (4) whereon the tension/reservoir arm (1) is connected, an electrical switch (5), the said switch (5) being controlled such that it is turned on and off by the form
30 of said cam, yarn feeders (18, 19), a fixed yarn guide passages (21) with movable cover

(22), a yarn tension sensor (32), the said sensor providing that the operation stops after sensing the tension whereon the passage is attached, and being contacted by the fixed passage with movable cover at the instant of tension, and providing that a warning command for required tension is given, and a programmed electrical control unit, the said control unit controlling the commands taken from the sensor and then giving other necessary commands to the system. Tension/reservoir arm (1), yarn guide passages (14, 15) on this arm, yarn feeders (18, 19) supply the required yarn at the instant of tangling of the yarn guided through the fixed yarn guide passage (21) with movable cover (22). The tension/reservoir arm (1) approaches the yarn feeders (18, 19) by turning around a shaft (2) in the case of tension of the yarn and then the tension in the yarn increases as the yarn reserve in the reservoir on this position diminishes. An electrical switch or an electronic sensor connected to a chassis fixed is stimulated by the form of the cam (4) whereon the arm (1) is attached as soon as the angle of the arm (1) reaches a particular position because there will be a change in the location due to the increase in the tension on the tension/reservoir arm (1) when the yarns are stopped up (Figure 8-d). Hence, that the yarn has a particular tension is disclosed to the controller.

When the tension/reservoir arm (1) is active under tension, the pushing and pulling movement is provided by a linear actuator (6, 7, 11) comprising preferably mechanical springs (8, 9). However, this function can be provided easily also by means of actuators driven by pneumatic, hydraulic or electrical current. Due to the angular mobility of the cam, also an angular actuator may be used instead of a linear actuator. Preferably, a spring (8) is placed between the said actuator and the tension arm, the said spring having the functions wherein it softens the effect of the sudden movement of the actuator on the yarn and it compensates the sudden tension changes on the yarn. The mechanical damping spring (8) can be also a hydraulic, pneumatic damper, according to its position and the operation conditions of the machine. The amount of the tension on the arm (1) is provided by altering the force of the actuator, altering the lengths of the moment arms in the system, altering its tension at the beginning and using springs with different features.

The actuator which is preferably pneumatic and comprises parts (7, 11) connected to a revolute joint (45) pushes the spring (8), the said actuator rotating around a fixed support

(12), then the said spring pushes the piston arm (6) guided by a piston (7) which is contained within the spring and this arm conducts its force to the crank (3) and the tension/reservoir arm (1) becomes stretched. The amount of the pressure within the pneumatic actuator determines the amount of the tension force directly on the
5 tension/reservoir arm.

When the force exerted by the actuator is eliminated, the tension on the arm will be removed. Hence sagging that may occur in the reserve yarn between the yarn feeders of the passages (14, 15) on the arm (1) and the first and fixed yarn feeders with movable cover is provided by means of a relatively softer fixed spring (9) by pushing the
10 arm backward slightly such that it will not exert high tension.

Yarn feeders (18, 19) and yarn winding drum (26) allow the yarn to be actuated. The yarn feeders (18, 19) can be actuated in two direction preferably by means of a single motor (33) since it is found economical with use of a common belt (20) and also can operate easily. In the cases when the arm (1) is closed since the amount of yarn diminishes in the reservoir,
15 the yarn feeding cylinders (18, 19) can rotate in reverse direction, opposite to the normal winding direction in order to loosen the stopped-up yarn. The yarn-winding drum (26) is actuated by a motor (28) with adjustable speed and with a mechanical or electrical brake system, by the aid of a movable shaft (27). In the cases when the tension on the arm (1) increases as the yarns are stopped up, the amount of the yarns in the reservoir decreases. In
20 this case, the extra yarn in the reservoir passes to the yarn section on the fabric side in stretched form and then loosens the yarn, by rotation of the yarn feeding cylinders (18, 19) in reverse direction (Figure 8-a). Hence all of the functions consisting of the application to tension to the yarn which is unraveled such that it can be adjusted according to the characteristics of the yarn and knit, the removal of the tension therefrom, and acting also as
25 a reservoir are carried out by means of an integrated system.

In the cases when an active actuator are not used, the stretched form of the tension/reservoir arm (1) is maintained by a constant force and by means of a spring (9), the said spring being connected onto the said arm and being fixed but more rigid than the one in the previous method. Also in this case, since the tension decreases as the reservoir
30 amount increases; the tension, to be intended to decrease, of the yarn which is not

unraveled is provided such that the bobbin (23) wherein the yarn is wound thereon and actuated by means of a yarn winding drum (26) wherein a motor (28) is connected thereto, the said motor rotating in both two directions according to a command and having ability to brake, rotates slightly and then supplies yarns to the reservoir and therefore the force on the
5 tension/reservoir arm (1) is decreased. When it is desired to give a tension to this yarn, the bobbin (23) is turned in the direction of winding slightly and then the amount of yarn in the reservoir is pulled and is decreased thereby. Therefore, the tension on the tension/reservoir arm (1) and so on the yarn increases.

The yarn (100) is guided through the fixed yarn guide passages (21, 22) with a movable
10 cover and the passages (14, 15) above tension/reservoir arm (1), for one or more than one time so that the said arm can store the yarns of more amounts and in a smaller space, onto the latter (Figure 2). Therefore, the reserved yarn amount increases and the tensions can be controlled easily. Also the tension on the yarn becomes decreased when the yarns, which are guided through the passages, enters and exits the passages. Hence, the impact force
15 exerted on the yarn becomes decreased since the tension/reservoir arm (1) are stretched and loosened suddenly. Although the increase in the number of the passages appears to be as an advantage, there exist some disadvantages such that some frictions that can be formed in the passages, it is difficult to use the machine for workers who operate it, because moment of inertia increases due to the location of great numbers of passages. For the said reasons,
20 the optimum number should be determined depending on the usage. Preferably, two passages (14, 15) are used above the tension/reservoir arm (1) of the said machine for unraveling knitted fabrics. Preferably, the said passages are supported by the use of two yarn feeders (18, 19), the one first fixed input passage (21), and the one fixed passage (22) with movable cover.

25 While the unraveling operation is carried out or the test in respect to unravelability of the yarn is performed, or in the case when the yarn is loosened, the frictions between the yarn and the yarn guide passages leads to negative tension differences such that it increases in the direction of the yarn flow in different regions on the yarn. The yarn end in the winding region is more stretched than the end in the unraveling region (Figure 2). The tension,
30 which is given to the arm in order to provide that the unraveling side is stretched to a

particular level for unraveling the yarn, cause yarn breakage's in the winding side. When it is necessary to loosen the stopped-up yarn; in spite of the tension on the arm, which is dropped in order to loosen the yarn, the frictions in the yarn guide passages prevents the tension of the yarn in the unraveled fabric side from decreasing to a value
5 below a particular level.

In order to reduce the tension differences formed due to the frictions in the yarn guide passages to a minimum value, cylinders with slippery surface (yarn feeders (18, 19)) are placed to one or more than one passage wherein the yarn is guided, the said cylinders rotating in both two direction preferably by means of a single electrical motor, according to
10 a command. The tension differences, formed due to the friction on the passages by guiding and winding the yarn around the said yarn feeders (18, 19), have been minimized and also it has been helped the yarn to be pulled for unraveling. While the unraveling operation is carried out or the test in respect to unravelability of the yarn is performed, the yarn feeders rotates in the direction of yarn flow and with a surface velocity which is faster than the
15 possible velocity of the yarn. Meanwhile, the friction between the yarn and the yarn feeders affects the system advantageously. Hence, the elimination of the breakage problem occurring since the yarn is pulled and undesired tension is formed on the yarn is provided. In addition, it provides that the high tension on the yarn at the unraveled knitted fabric side is maintained and the tension of the yarn at the winding side is reduced.

20 When it is desired to reduce the tension on the unraveled yarn, the said yarn feeding cylinders (18, 19) starts rotating backwards by removing the tension on the arm. However, since it is desired to terminate the tension only due to the friction of the yarn, which is stationary during the backward rotation, it is sufficient to perform backward rotation with too low speeds. The excess tension, which exists at the unraveled knitted fabric side and
25 should be removed therefrom, is eliminated by this method.

When the yarn amount in the reservoir decreases, the arm (1) takes the more closed position and this situation is conducted to an electrical switch (5) by means of a cam (4) connected to the actuator taking passive condition (Figure 8-d). Therefore, the yarn loosening operation is started and the yarn feeding cylinders (18, 19) rotates in reverse
30 direction (Figure 8-a).

The test in respect to unravelability of the yarn is performed as described in the following (Figure 8-b): The actuator (11) becomes active and yarn-feeding cylinders (18, 19) begin to rotate forwardly. When the unraveling operation is not performed, it is continued to keep the arm (1) in the closed position since the amount of yarn in the reservoir is not sufficient.

5 By means of an electrical switch (5), which is closed by the cam (4) connected to the arm (1), the controller is informed about that the arm (1) is closed (Figure 8-b). In the case that the yarn can be unraveled, the arm is opened, so the cam (4) moves and the electrical switch (5) is opened by means of the form of the cam (4) and the case of stretching and loosening of yarn is conducted to the user (Figure 8-c). In this case, the actuator becomes

10 active and the yarn feeding cylinders (18, 19) rotate forwardly.

In the cases of that, some stoppage may occur after the yarn is stretched and the unraveling operation is started, the same motions are repeated. In these cases, the actuator (11) is still active; the yarn feeding cylinders (18, 19) rotates forwardly (Figure 8-d). But the tension on the arm (1) increases since the amount of the yarn in the reservoir reaches to a value less

15 than that is required, so this case is conducted to the controller by the aid of the electrical sensor (5) which the cam (4) turns off, the said cam being connected to the arm (1) (Figure 8-d). Here, the motor (28), which is connected, to the winding drum (26) having function of yarn winding is braked immediately directly by a warning sent from the electrical switch or by the controller (Figure 3). Also the bobbin (26) stops immediately due to the friction

20 between the bobbin (23) and winding drum (26). Therefore, it is provided that the yarn (100) stops immediately without breaking, the said yarn is winded to the bobbin (26) after being unraveled. Because the winding drum stops and continues to rotate frequently, its inertia should be little and so it is made up of a light metal and in a form of a cylinder, inside which is hollow and on which there exist some slots such that directing the said yarn

25 carries out uniform yarn winding on the bobbin. The bobbin surface is rough so that it can rotate the bobbin and then make it stopped, easily.

In the one of the passages (21) wherein the yarn is guided, there exists a tension sensor (32), which is preferably a mechanical switch and will sense the breakage of the yarn. This electronically controlled switch can sense the presence of the yarn during yarn unraveling

30 operation and during the test in respect to the yarn tension easily since it is a fixed passage

with movable cover, the said switch being also used as a passage.

The machine for unraveling knitted fabrics according to the present invention can unravel the knit with different kinds of choices by using the method for loosening and stretching the yarn in different ways. In a mode, being one of those mentioned and being defined as
5 ordering mode in the machine, all of the yarns exist in stretched form at the beginning. If there is no any data about yarn unraveling order, all yarn ends in the fabric to be unraveled are aligned by the controller in order to test arbitrarily. The tension mechanism and the yarn feeders of the same system are activated individually by the controller and then whether the yarns are in a suitable form to be unraveled is controlled.
10 This tension is maintained for some period. The yarns which do not come within this duration is loosened and the untested yarn following the order is tested. Maintaining the tension on the unravelable yarn, the unraveling operation of the said yarn is continued. If a yarn comes after the yarn, which has been tested but has not come, for further test the said yarn is placed in the order behind those to be tested. After the yarns placed in the order
15 previously for test are tested, the said yarn is tested again. If the last tested yarn does not come and there exists no any other yarn in the order, the detection of the order is finished. The yarns, which have not come, are defined as passive and those, which have come, are defined as active. When the yarn being subjected to unraveling operation is stopped up, the winding operation stops and the tension mechanism of that yarn is loosened. When all of
20 the other yarns are stopped up, the yarns, which could have been unraveled, are tested individually, starting the yarn, which begins to be unraveled at first according to the predetermined order. If all of these yarns or several of them come, the yarns coming at that time, maintains their activity and those, which do not come, are determined as passive. In this case, these yarns defined as passive are not tested again. When no any active-defined
25 yarn exists in the system, it is turned to the beginning and operations carried out through out this paragraph are repeated. But an alignment is made by taking the previous unraveling order as basis in this test ordering, the yarn, which has the most possibility to come, is tested first. If no any yarn comes, this test sequence is repeated as much as the programmed preset value and possible entanglements are eliminated by intervention of the operator after
30 stopping the tests. In the other usable choice of the method of the present invention, which can be defined as continuous test in the machine, while continuing the unraveling operation

of the unraveled yarns in the system, at the same time, the test of the stopped-up yarn is continued individually. This alignment is made according to a program data, the said program data predicting the yarn, which comes probably arbitrarily or at first. If no any yarn comes, the test repetition is repeated as much as the programmed preset value and possible entanglements are eliminated by intervention of the operator after stopping the tests.

In the choice of the present invention other than that is defined as the continuous tension mode in the machine, if there exist at least one unravelable yarn in the system, all of the yarns are kept in stretched form. But as soon as whole yarns in the system stops all of the yarns are loosened and they are tested by stretching and loosening respectively and the yarn, which is unraveled before, is searched. This alignment is made according to a program data, the said program data predicting the yarn, which comes probably arbitrarily or at first. When at least one yarn begins to be unraveled, all of the yarns are stretched and are kept in this form. This alignment is made according to a program data, the said program data predicting the yarn, which comes probably arbitrarily or at first. If no any yarn comes, the test repetition is repeated as much as the programmed preset value and possible entanglements are eliminated by intervention of the operator after stopping the tests.

The choice of separation of plies, which can be used together with three different choices of the present invention described above, is described as the mode of separation of plies in the machine. This choice is used in the knits formed by more than one yarn ply. When each of the yarn plies is desired to be separated in this knit, the mechanisms wherein ends of the yarn plies are connected thereto are subjected to a test at the same time, in the knit order determined during the test. During the stoppage, each of them is loosened independently.

In the event of that the same knit order is formed by more than one yarn, the problem of separation of plies appears: In case of that a fabric knitted by a yarn with two plies is unraveled together with its own plies, the yarn (150) with two plies are pulled by a tension mechanism with each other and are unraveled (Figure 13). But during the knitting, due to the different extensions forming since the plies of the yarns being used have different features and there are the resistance differences in the yarn feeding systems of the knitting machines, although the yarn ply (152) is stopped up after reaching to the knit end, the loops

(153, 154, 155) of one of the yarn (151) with two plies can not be unraveled and then the said yarn (151) can not complete the unraveling work which it should perform at that moment. For this reason, unraveling of the loops (153, 154, 155), which is the continuation of the yarn (159) to be unraveled, the said yarn having two plies, being in the upper order, does not occur. Therefore, there will be a stoppage, the machine will not be able to overcome this stoppage by testing to stretch and loosen. For this reason, the following method has been developed:

The unraveled yarns in the course of unraveling, or testing, or stopping of the yarns in a knitted fabric are twisted separately or together according to the arms of the machine for unraveling knitted fabrics wherein they are attached, during unraveling operation in a false way, carried out by a mechanism (Figure 7-b). In the course of that the yarns knitted together with two plies are unraveled, by the use of this method it is winded on the separate yarn plies in the unraveled yarn pinch due to the twisting operation performed, the said yarn plies being those which are more stretched naturally. The separation of the yarn plies from each other due to tension, quality, or other reasons is prevented and for these reasons it is prevented that they make the unraveling operation difficult. Furthermore, during unraveling of the knits formed by yarns with single or multi-ply by the said method; the stoppages of tangle and entanglements of the yarn pinches can be prevented by means of torque to be formed in the yarn by twisting operation.

Hence, the stoppage formed during unraveling of the yarn desired to be unraveled with two plies (Figure 13) can be solved by giving a false twist to the said yarn at the end of the knitting order (Figure 14), or during unraveling operation (Figure 15). The yarn guide passage (140) in the center and another passages (141, 142) opened outwardly are rotated with a very high speed and in the axis of the yarn flow direction during unraveling operation in order to give the yarn a false twist. Therefore, due to the frictions at the inner surfaces of the yarn guide passages (141, 142), the yarn guided through those takes a false twist in an axial form. This twisting operation results in that the yarn ply (151) which is in more loosened form by extending upwardly is winded onto the yarn ply (152) which is in more stretched form naturally. In this way, the yarn plies could have been unraveled without separation, or with minimum separation. Since the said twisted yarns (150) are

guided through this rotating passages in the twisted form, the twisting operation is carried out in the reverse direction of twisting automatically after they are guided through the yarn guide passage (140) in the center. Therefore, the twisting amount on the yarns has been removed and they have been brought into the untwisted form. At the end of the knit, also the twisting operation performed when there is a stoppage in the yarn (150) provides that it can take a twist at the winding side of the yarn (150) in the reversed direction (Figure 14) such that the twisting operation is stopped when the said stoppage is eliminated, and in this case, the friction on the yarn guide passages (140, 141, 142, 143) coming to the same axial position and the yarn (150) has been removed, and in this case, the reverse twists at the lower and upper sides of the passages (140, 141, 142, 143) is opened by compensating due to the tension of the reverse twisting on each other, and they take the untwisted form (Figure 7-a). The said unraveled yarns (150) go together to the tension mechanism and then to the bobbin to wind them (Figure 7-b).

The false twisting operation mentioned above is carried out by means of a mechanism, the said mechanism being opened by a centrifugal force with high speeds of the yarn guide passages providing the twisting such that it turns right and left and the said mechanism then performing the twisting, and being closed in low speeds and then providing that the yarn is left as untwisted (Figure 6-b). The false twisting mechanism is actuated by means of a motor (33), to which cylinders (18, 19) rotating in both directions (Figure 3). The motor turns the false twist housing (34) simultaneously and so it provides that the yarn is twisted, the said motor rotating the cylinders in the direction of yarn flow during test and unraveling (Figure 6-b). After the tension on the tension arm (1) mentioned above are removed, the motor provides that the twisting claws (39, 40) closed by means of springs (41-42) in the false twisting apparatus (16) (Figure 5-b) can move freely in both two direction of the yarn flow (Figure 6-b) since the motor (33) rotates with less speed backward and then at the same time, it turns the false twisting apparatus (16) backward more slowly.

The claws (39, 40) of the said false twisting apparatus (16) is closed since it rotates in stagnant form or with low speeds (Figure 5-a, Figure 5-b), and since it rotates with high speed, its claws (39, 40) are opened in order to carry out the twisting operation. There exist claws (39, 40) with hollow middle part, within the housing-like portion placed in the anti-

friction bearings (36) in the body of the said false twisting apparatus (16), the said claws being fixed with shafts (43, 44) and being allowed to move around the said shafts, being identical to each other but being placed symmetrically and inversely. Some grooves are formed toward the direction of yarn flow in order to increase the radial friction of the yarn (100) guided through the hollow of the said claws (39, 40). Further, there exist some springs (41, 42) between the lateral surface of the housing (34) rotating by these claws and the claws (39, 40). While this system is in the stagnant form or is rotating with a low speed, the said springs provide that the claws are kept in the center, the said system comprising all of the portions connected onto the rotating housing (34). Hence, the yarn (100) can be guided through the hollows of the claws (39, 40), the upper passage (37), and through the lower passage (38) without being subjected to any resistance in any direction (Figure 5-a). In high speeds, the claws (39, 40) connected onto the rotating housing (34) overcome the resistance of the springs (41, 42) by the centrifugal force occurring due to high speeds and is opened outwardly. The yarn guide passages (141, 142) in the claws (39, 40) opened in said way take the required position and then carry out the false twisting operation (Figure 14 and 15).

The said mechanisms are actuated by the yarn feeders (18, 19), which also reduce the friction resistance of the yarn (Figure 4). The twisting mechanism (16) connected to a separate shaft is kept in inert form in order to be used when necessary (Figure 3). There exist a spring (30) between a fixed support (29) and a crank arm (31) connected to this twisting mechanism (16). The said spring (30) is adjusted such that it can maintain the said mechanism in an inert position when it is not used, and it can supply the pressure, which is required so that the twisting mechanism is actuated by the yarn feeding cylinder (18) of the rubber surface (35), when it is turned countercurrent (Figure 3).

The machine for unraveling knitted fabrics is controlled by an electronic control unit with a microprocessor. The said machine being manufactured by combining more than one knitting system is designed such that when it is desired to unravel more than one tricot part at the same time, the control system can carry out unraveling of the said parts separately and independently from each other.

CLAIMS

1. A method for unraveling knitted fabrics comprising the following steps of;
 - testing the unravelability of yarn or yarns (101,102,103) forming the fabrics by stretching said yarn or yarns (101,102,103) by required period, order and amount to
5 determine their unravelability;
 - reducing said tensions on non-unravelable yarn or yarns (101,102) by required period, order and amount, as winding unravelable yarn or yarns (103) by any means of winding units as tensions on the yarn or yarns are maintained;
 - stopping the winding of the yarn during unraveling of the unravelable yarn or yarns
10 (101,102) , in case it is detected that the yarn or yarns (101,102) is/are not be able to be unraveled anymore, and reducing the tension on the yarn or yarns (101,102) by required period, order and amount.
2. A method for unraveling knitted fabrics according to claim 1, comprising the following steps of;
 - 15 • testing the unravelability of each yarn (101,102,103) forming the knitted fabric to be unraveled by stretching each of them one by one as in claim 1, for determining a correct unraveling sequence, and starting with a preferred testing sequence at the beginning, and winding unravelable yarn or yarns by means of winding units as the tensions on the yarn or yarns are maintained;
 - 20 • reducing the tension on any tested non-unravelable yarns (101,102) by required period, order and amount and then testing the other untested yarns as in claim 1;
 - testing again all of the previously tested non-unravelable yarns with a preferred sequence after any unravelable yarn detection, and then in case of detection of any new unravelable yarn, continuing testing again all of the remaining non-unravelable yarns
25 until all of the non-unraveled yarns being tested after the last unravelable yarn detected.
 - determining unraveling sequence of the yarns forming the unraveling portion of the knitted fabric same as the sequence of detection of unravelable yarns.

3. A method for unraveling knitted fabrics according to claims 1 to 2, comprising the following steps of;

- starting the yarns to be tested with the same sequence determined as in claim 2, when it is detected that all the yarns comprising the said yarn sequence will not be able to be unraveled anymore due to said yarns were unraveled up to knit end of the fabric and stopped and loosened;
- if the unraveling operation occurs in the same sequence as in claim 2, the detected non-unravelable yarns as in claim 2 are not tested anymore and unraveling of the knit fabric is continued with the same sequence determined as in claim 2;
- determining a new sequence as in claim 2, if the unraveling operation does not occur in the determined sequence;

4. A method for unraveling knitted fabrics according to claims 1 to 3, comprising the following steps of;

- continuing testing said non-unravelable yarns as in claim 1, even if the yarn unraveling sequence in the unraveled knitted fabric is determined;
- modifying said yarn sequence if any of the said tested yarns are detected to be unraveled.

5. A method for unraveling knitted fabrics according to claim 1, comprising the following steps of;

- testing the unravelability of each yarn forming the knitted fabric to be unraveled by stretching each of them one by one as in claim 1, and starting with a preferred testing sequence at the beginning, and winding unravelable yarn or yarns by means of winding units as the tensions on the yarn or yarns are maintained;
- keeping all of the yarns as stretched in the cases when there exist at least one unravelable yarn is detected in the unraveled knitted fabric as in claim 1;
- winding stretched yarn if any of the stretched yarns become unravelable, by means of

said winding units as the tensions on the yarn or yarns are maintained;

- loosening all the yarns as soon as there is no unravelable yarn remaining; starting all the yarns to be tested one by one again, with required time, order and amount.

5 6. A method for unraveling knitted fabrics according to claims 1 to 5, comprising the following steps of;

- Repeating the test provided that any yarn can not be unraveled according to a preferred number and then stopping testing;
- eliminating any possible entanglement in the yarns by manual intervention.

10 7. A method for unraveling knitted fabrics according to claims 1 to 6, comprising the following step of;

- testing simultaneously all yarn plies formed same stitches of the fabric when it is desired to unravel the knitted fabrics formed by the yarns with more than one ply and to wind the yarn plies separately.

15 8. A method for unraveling knitted fabrics according to claims 1 to 7, comprising the following step of;

- False twisting group of yarn plies (151, 152) together, by means of a rotating friction force applied radially in any region between the knitted fabric and the winding units that the yarns winded thereon, in case of the said knitted fabrics formed by the yarns with more than one ply and desired to wind the said group of yarn plies (151, 152) together and there are separation of plies problem, while unraveling of the knitted fabrics,

20 9. A method for unraveling knitted fabrics according to claims 1 to 8, comprising the following step of;

- False twisting group of yarn plies (151, 152) together, by means of a rotating friction force applied radially in any region between the knitted fabric and the winding units that the yarns winded thereon, in case of the said knitted fabrics formed by the yarns

with more than one ply and desired to wind the said group of yarn plies (151, 152) together and there are separation of plies problem, while testing the unravelability of the each group of yarn plies.

- 5 10. A machine for unraveling knitted fabrics comprising one or plurality of unraveling units having one or plurality of yarn winding units comprising yarn winding elements, a tension/reservoir arm (1) being pivotable around an arm shaft (2), and a mechanically or electronically operated sensor (5) actuated from a preferred position of the said tension/reservoir arm (1), characterized in that:
- 10 • a mechanically, electrically, hydraulically, or pneumatically operated actuator (11) being capable of increasing tension force on the said pivotable tension/reservoir arm (1) for stretching of the yarn (100) and being capable of decreasing tension force on the said pivotable tension/reservoir arm (1) for loosening of the yarn (100),
 - the said tension/reservoir arm (1) having plurality of yarn guide passages (14,15).
- 15 11. A machine for unraveling knitted fabrics comprising one or plurality of unraveling units having one or plurality of yarn winding units comprising yarn winding elements, a tension/reservoir arm (1) being pivotable around an arm shaft (2), and a mechanically or electronically operated sensor (5) actuated from a preferred position of the said tension/reservoir arm (1), and a fixed spring (9) maintaining the stretched form of the said tension/reservoir arm (1) without any driven actuators (11),
- 20 characterized in that;
- the stretching of the said yarn (100) is performed by required amount of forward rotation of the said yarn winding unit by pulling yarn from the tension/reservoir arm (1) and loosening of the said yarn (100) is performed by required amount of reverse rotation of the said yarn winding unit by supplying yarn to the tension/reservoir arm (1).
- 25

12. A machine for unraveling knitted fabrics according to claims 10 and 11 characterized in that;

an electronic controller for the synchronically operation of the said unraveling units connected thereto, and said controller receiving signal from said sensors and sending the
5 signals for the operation of the said actuators as in claim 10 and for the control of the operation of winding motors (28) of each said unraveling units.

13. A machine for unraveling knitted fabrics according to claims 10 and 12 comprising one or plurality of unraveling units characterized in that;

a spring (8) embodied for transmission of a force applied for the said moment of the said
10 actuator (11) to the said tension/reservoir arm (1).

14. A machine for unraveling knitted fabrics according to claims 10 to 13 comprising one or plurality of unraveling units characterized in that;

one or plurality of yarn feeders (18, 19) having a surface velocity faster than any possible yarn (100) flow rate, and the yarn feeders (18,19) comprising cylinder(s) with slippery
15 surfaces, for flowing the said yarn on the said yarn feeders (18,19) by winding the said yarns thereon, for eliminating the additional yarn tension being caused by the frictions on the yarn guide passages (14, 15, 21, 22), and an electrical motor (33) for driving said yarn feeders (18,19) rotating forward direction for the yarns desired to be stretched and rotating backward direction for the yarns desired to be loosen.

20 **15.** A machine for unraveling knitted fabrics according to claims 10 to 14 comprising one or plurality of unraveling units characterized in that;

one or plurality of movable yarn guide passages (141, 142) providing the yarns (150) to be false twisted by means of a radial friction force being exerted on the said yarns after the said movable yarn guide passages (141, 142) are displaced by a centrifugal force while rotating.

25 **16.** A machine for unraveling knitted fabrics according to claims 10 to 15 comprising one or plurality of unraveling units characterized in that;

a motor (33) for actuating said movable yarn guide passages (141, 142) performing the twisting and said motor (33) driving the yarn feeders (18, 19).

17. A machine for unraveling knitted fabrics according to claims 10 to 16 comprising one or plurality of unraveling units characterized in that;

a mechanical or an electrical switch (32) actuated by the tension or flow of the yarn guided thereon informing the said control unit about breakage of the yarn during the unraveling
5 operation and during testing as in claim 1, after it senses the said breakage and the said electrical switch is embodied in one of the passages wherein the yarns are guided.

18. A machine for unraveling knitted fabrics according to claims 10 to 17 comprising one or plurality of unraveling units characterized in that;

said winding units comprising a yarn winding drum (26), an electrical motor (28), and a
10 bobbin (23) wherein the yarn is wound thereon, the said yarn winding drum (26) preferably hollow cylinder shaped and having plurality of slots for the guidance of the yarn and having roughened surface for providing rotation and stopping of the said bobbin (23) as desired.